



2675 Scott Ave., Suite C
St. Louis, MO 63103
main 314.535.4544 | fax 314.535.0144
www.ahernfire.com

Webster University ISB

8274 Big Bend Blvd
Webster Groves, MO 63119

**Fire Protection
Operating & Maintenance Manual**

OPERATING & MAINTENANCE MANUAL

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September 8, 2017

Doug Mayhew
Paric Corporation
77 Westport Plaza Drive Suite 250
St. Louis, MO 63146
Ph: 636.561.9500
Fax: (636) 561-9501
Email: ddmayhew@paric.com

**RE: PROJECT NAME: WEBSTER UNIVERSITY
FIRE PROTECTION SYSTEM WARRANTY
AFP PROJECT No.: 461259**

Dear Mr. Mayhew:

Please be hereby advised that our above referenced Automatic Fire Protection System was placed in service on September 1, 2017.

Beginning with the above installation date, the system's materials and workmanship will be under warranty for one (1) year. However, we do not guarantee the operation of the installation due to factors beyond our control, i.e. potentially closed valves or depleted municipal water supply.

Thank you for this opportunity to be of service.

Very truly yours,

AHERN FIRE PROTECTION
A division of J. F. Ahern Co.

Casey Jackson
Vice President

CJ\kab
cc: File

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AHERN FIRE PROTECTION - ST. LOUIS

Contractor's Material and Test Certificate for ABOVE GROUND PIPING

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative.
All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor.
It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME:	WEBSTER UNIV - ISB				AFP # 461259			
ADDRESS:	8274 BIG BEND BLVD., WEBSTER GROVES, MO							
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)							
	1 CITY OF WEBSTER GROVES							
	2							
	ADDRESS							
	1							
2								
INSTALLATION CONFORMS TO ACCEPTED PLANS				☒ YES ☐ NO				
EQUIPMENT USED IS APPROVED				☒ YES ☐ NO				
IF NO, EXPLAIN DEVIATIONS								
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO							
	LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF EQUIPMENT?				☒ YES ☐ NO			
	IF NO, EXPLAIN.							
	HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES?				☒ YES ☐ NO			
	1. SYSTEM COMPONENTS INSTRUCTIONS							
2. CARE AND MAINTENANCE INSTRUCTIONS								
3. NFPA 25								
LOCATION OF SYSTEM	SYSTEM 1 (INCLUDING BASEMENT)							
SPRINKLERS	MAKE	MODEL		YEAR OF MANUFACTURE	ORIFICE SIZE/ K FACTOR	QTY.	TEMP.	
	VIKING	VK300 - BRZ UPR		2016	5.6	1	155	
	VIKING	VK350 - BRZ UPR		2016	8.0	62	200	
	VIKING	VK462 - CONCLD		2016	5.6	35	155	
	VIKING	VK634 - EC CONCLD		2016	8.0	66	155	
	VIKING	VK464 - CONCLD		2016	8.0	18	200	
	VIKING	VK532 - EC BRZ UPR		2016	11.2	15	200	
	RELIABLE	RA5114 - DRY PND CONCLD		2016	5.6	1	155	
PIPE AND FITTINGS	1-2.5" S40 BLK PIPE AND 3-6" S10 BLK PIPE, BLK GRVD FITTINGS, BLK DI THRD FITTINGS							
ALARM VALVE OR FLOW INDICATOR	ALARM DEVICE				MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION			
	TYPE	MAKE	MODEL	MIN.	SEC. 47			
	VANE TYPE	SYSTEM SENSOR		WFD				
TAMPER SWITCHES	TYPE	MAKE	MODEL	QTY.	DID TAMPER SWITCH / SWITCHES WORK?			
	BUTTERFLY	VICAULIC	705-W	1				
DRY PIPE OPERATING TEST	DRY VALVE				Q.O.D.			
	MAKE & MODEL		SERIAL NO.		MAKE & MODEL		SERIAL NO.	
		TIME TO TRIP	WATER PRESSURE	AIR PRESSURE	TRIP POINT	TIME WATER REACHED	ALARM OPERATED	
		TEST CONNECTION*			AIR PRESSURE	TEST OUTLET *		
		MIN. SEC.	PSI	PSI	PSI	MIN. SEC.	YES / NO	
	WITHOUT Q.O.D.							
	WITH Q.O.D.							
	IF NO, EXPLAIN							

* MEASURED FROM TIME INSPECTOR'S TEST CONNECTION IS OPENED.

DELUGE & PREACTION VALVES	OPERATION: ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC								
	PIPING SUPERVISED ☐ YES ☐ NO				DETECTING MEDIA SUPERVISED ☐ YES ☐ NO				
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS? ☐ YES ☐ NO								
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING? ☐ YES ☐ NO								
	IF NO, EXPLAIN:								
	MAKE	MODEL		DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE	
				YES	NO	YES	NO	MIN.	SEC.
PRESSURE REDUCING VALVE TEST	LOC. & FLOOR	MAKE	MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE		FLOW
					INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)	RATE
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours. Test pressure tanks normal water level and air pressure and measure air pressure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.								
TESTS	ALL PIPING HYDROSTATICALLY TESTED AT: _____ 225 PSI FOR _____ 2 HRS.						IF NO, STATE REASON:		
	DRY PIPING PNEUMATICALLY TESTED: ☐ YES ☐ NO								
	EQUIPMENT OPERATES PROPERLY: ☐ YES ☐ NO								
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO								
	DRAIN TEST: READING OF GAGE LOCATED NEAR WATER SUPPLY TEST CONNECTION: _____ PSI								
	RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE: _____ PSI								
HYDROSTATIC SIGNATURES	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO SPRINKLER PIPING.								
	VERIFIED BY COPY OF THE U FORM NO. 85B: ☒ YES ☐ NO						IF NO, EXPLAIN:		
	FLUSHED BY INSTALLER OF UNDERGROUND SPRINKLER PIPING: ☒ YES ☐ NO								
	HYDROSTATIC TESTS WITNESSED BY:								
	FOR PROPERTY OWNER/REPRESENTATIVE (SIGNATURE)				TITLE		DATE		
FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE			
WELDING	WELDING PIPE: ☒ YES ☐ NO								
	IF YES:								
	1. DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3?						☒ YES ☐ NO		
	2. DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D 10.9, LEVEL AR-3?						☒ YES ☐ NO		
CUTOUTS	3. DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED:						☒ YES ☐ NO		
	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE ALL CUTOUTS (DISCS) ARE RETRIEVED? ☒ YES ☐ NO								
HYDRAULIC DATA NAME PLATE	NAMEPLATE PROVIDED? ☒ YES ☐ NO								
REMARKS	IF NO, EXPLAIN:								
ALARM TEST/ FINALS SIGNATURES	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: _____								
	NAME OF SPRINKLER CONTRACTOR:								
	AHERN FIRE PROTECTION / 2675 Scott Ave. Suite C / St. Louis, MO 63103 / 314/535-4544								
	TESTS WITNESSED BY:								
	FOR PROPERTY OWNER (SIGNATURE)				TITLE		DATE		
	FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE		
<i>Steve Summers</i> <i>Foreman</i>									
ADDITIONAL EXPLANATION AND NOTES:									

AHERN FIRE PROTECTION - ST. LOUIS

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PROCEDURE

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PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)							
	1 CITY OF WEBSTER GROVES							
	2							
	ADDRESS							
	1							
	2							
	INSTALLATION CONFORMS TO ACCEPTED PLANS				[x] YES	[] NO		
	EQUIPMENT USED IS APPROVED				[x] YES	[] NO		
	IF NO, EXPLAIN DEVIATIONS							
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO							
	LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF EQUIPMENT?				[x] YES	[] NO		
	IF NO, EXPLAIN.							
	HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES?							
					[x] YES	[] NO		
	1. SYSTEM COMPONENTS INSTRUCTIONS							
	2. CARE AND MAINTENANCE INSTRUCTIONS							
	3. NFPA 25							
LOCATION OF SYSTEM	SYSTEM 2							
SPRINKLERS	MAKE	MODEL		YEAR OF MANUFACTURE	ORIFICE SIZE/ K FACTOR	QTY.	TEMP.	
	VIKING	VK300 - BRZ UPR		2016	5.6	-	155	
	VIKING	VK350 - BRZ UPR		2016	8.0	4	200	
	VIKING	VK462 - CONCLD		2016	5.6	22	155	
	VIKING	VK634 - EC CONCLD		2016	8.0	70	155	
	VIKING	VK464 - CONCLD		2016	8.0	8	200	
	VIKING	VK532 - EC BRZ UPR		2016	11.2	-	200	
	RELIABLE	RA5114 - DRY PND CONCLD		2016	5.6	22	155	
PIPE AND FITTINGS	1-2.5" S40 BLK PIPE AND 3-6" S10 BLK PIPE, BLK GRVD FITTINGS, BLK DI THRD FITTINGS							
ALARM VALVE OR FLOW INDICATOR	ALARM DEVICE				MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION			
	TYPE	MAKE	MODEL	MIN.	SEC.	43		
	VANE TYPE	SYSTEM SENSOR		WFD				
TAMPER SWITCHES	TYPE	MAKE	MODEL	QTY.	DID TAMPER SWITCH / SWITCHES WORK?			
	BUTTERFLY	VICAULIC	705-W	1				
DRY PIPE OPERATING TEST	DRY VALVE				Q. O. D.			
	MAKE & MODEL		SERIAL NO.		MAKE & MODEL		SERIAL NO.	
		TIME TO TRIP	WATER	AIR	TRIP POINT	TIME WATER REACHED	ALARM	
		TEST CONNECTION*	PRESSURE	PRESSURE	ATR PRESSURE	TEST OUTLET *	OPERATED	
		MIN.	SEC.	PSI	PSI	PSI	MIN.	SEC.
							YES / NO	
	WITHOUT Q. O. D.							
WITH Q. O. D.								
	IF NO, EXPLAIN:							

* MEASURED FROM TIME INSPECTOR'S TEST CONNECTION IS OPENED

DELUGE & PREACTION VALVES	OPERATION: ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC								
	PIPING SUPERVISED ☐ YES ☐ NO				DETECTING MEDIA SUPERVISED ☐ YES ☐ NO				
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS? ☐ YES ☐ NO								
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING? ☐ YES ☐ NO								
	IF NO, EXPLAIN:								
	MAKE	MODEL		DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE	
				YES	NO	YES	NO	MIN.	SEC.
PRESSURE REDUCING VALVE TEST	LOC. & FLOOR	MAKE	MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE		FLOW
					INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)	RATE
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours. Test pressure tanks normal water level and air pressure and measure air pressure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.								
TESTS	ALL PIPING HYDROSTATICALLY TESTED AT: <u>225</u> PSI FOR <u>2</u> HRS.						IF NO, STATE REASON:		
	DRY PIPING PNEUMATICALLY TESTED: ☐ YES ☐ NO								
	EQUIPMENT OPERATES PROPERLY: ☐ YES ☐ NO								
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO								
	DRAIN TEST: READING OF GAGE LOCATED NEAR WATER SUPPLY TEST CONNECTION: _____ PSI								
	RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE: _____ PSI								
HYDROSTATIC SIGNATURES	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO SPRINKLER PIPING.								
	VERIFIED BY COPY OF THE U FORM NO. 85B: ☒ YES ☐ NO						IF NO, EXPLAIN:		
	FLUSHED BY INSTALLER OF UNDERGROUND SPRINKLER PIPING: ☒ YES ☐ NO								
	HYDROSTATIC TESTS WITNESSED BY:								
	FOR PROPERTY OWNER/REPRESENTATIVE (SIGNATURE)				TITLE		DATE		
	FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE		
WELDING	WELDING PIPE: ☒ YES ☐ NO								
	IF YES:								
	1. DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☒ YES ☐ NO								
	2. DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D 10.9, LEVEL AR-3? ☒ YES ☐ NO								
CUTOUPS	3. DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED? ☒ YES ☐ NO								
	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE ALL CUTOUPS (DISCS) ARE RETRIEVED? ☒ YES ☐ NO								
HYDRAULIC DATA NAME PLATE	NAMEPLATE PROVIDED? ☒ YES ☐ NO								
REMARKS	IF NO, EXPLAIN:								
ALARM TEST/ FINALS SIGNATURES	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: _____								
	NAME OF SPRINKLER CONTRACTOR:								
	AHERN FIRE PROTECTION / 2675 Scott Ave. Suite C / St. Louis, MO 63103 / 314/535-4544								
	TESTS WITNESSED BY:								
	FOR PROPERTY OWNER (SIGNATURE)				TITLE		DATE		
	FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE		
ADDITIONAL EXPLANATION AND NOTES:									

AHERN FIRE PROTECTION - ST. LOUIS

Contractor's Material and Test Certificate for ABOVE GROUND PIPING

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative.
All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

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PROPERTY NAME:	WEBSTER UNIV - ISB				AFP # 461259				
ADDRESS:	8274 BIG BEND BLVD., WEBSTER GROVES, MO								
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)								
	1 CITY OF WEBSTER GROVES								
	2								
	ADDRESS								
	1								
	2								
	INSTALLATION CONFORMS TO ACCEPTED PLANS				[x] YES	[] NO			
	EQUIPMENT USED IS APPROVED				[x] YES	[] NO			
	IF NO, EXPLAIN DEVIATIONS								
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO								
	LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF EQUIPMENT?				[x] YES	[] NO			
	IF NO, EXPLAIN.								
	HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES?				[x] YES	[] NO			
	1. SYSTEM COMPONENTS INSTRUCTIONS								
	2. CARE AND MAINTENANCE INSTRUCTIONS								
	3. NFPA 25								
LOCATION OF SYSTEM	SYSTEM 3								
SPRINKLERS	MAKE	MODEL		YEAR OF MANUFACTURE	ORIFICE SIZE/ K FACTOR	QTY.	TEMP.		
	VIKING	VK300 - BRZ UPR		2016	5.6	-	155		
	VIKING	VK534 - WHT PND		2016	11.2	3	200		
	VIKING	VK462 - CONCLD		2016	5.6	46	155		
	VIKING	VK634 - EC CONCLD		2016	8.0	71	155		
	VIKING	VK464 - CONCLD		2016	8.0	2	200		
	VIKING	VK532 - EC BRZ UPR		2016	11.2	3	200		
	RELIABLE	RA5114 - DRY PND CONCLD		2016	5.6	1	155		
PIPE AND FITTINGS	1-2.5" S40 BLK PIPE AND 3-6" S10 BLK PIPE, BLK GRVD FITTINGS, BLK DI THRD FITTINGS								
ALARM VALVE OR FLOW INDICATOR	ALARM DEVICE				MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION				
	TYPE	MAKE	MODEL	MIN.	SEC.	45			
	VANE TYPE	SYSTEM SENSOR		WFD					
TAMPER SWITCHES	TYPE	MAKE	MODEL	QTY.	DID TAMPER SWITCH / SWITCHES WORK?				
	BUTTERFLY	VICAULIC	705-W	1					
DRY PIPE OPERATING TEST	DRY VALVE				Q. O. D.				
	MAKE & MODEL		SERIAL NO.		MAKE & MODEL		SERIAL NO.		
	TIME TO TRIP		WATER	AIR	TRIP POINT	TIME WATER REACHED		ALARM	
	TEST CONNECTION*		PRESSURE	PRESSURE	AIR PRESSURE	TEST OUTLET *		OPERATED	
		MIN.	SEC.	PSI	PSI	PSI	MIN.	SEC.	YES / NO
	WITHOUT Q. O. D.								
	WITH Q. O. D.								
	IF NO, EXPLAIN								
	* MEASURED FROM TIME INSPECTOR'S TEST CONNECTION IS OPENED.								

DELUGE & PREACTION VALVES	OPERATION: ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC							
	PIPING SUPERVISED ☐ YES ☐ NO				DETECTING MEDIA SUPERVISED ☐ YES ☐ NO			
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS? ☐ YES ☐ NO							
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING? ☐ YES ☐ NO							
	IF NO, EXPLAIN:							
	MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE	
			YES	NO	YES	NO	MIN.	SEC.
PRESSURE REDUCING VALVE TEST	LOC. & FLOOR	MAKE	MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE	
					INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours. Test pressure tanks normal water level and air pressure and measure air pressure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.							
TESTS	ALL PIPING HYDROSTATICALLY TESTED AT: <u>225</u> PSI FOR <u>2</u> HRS.						IF NO, STATE REASON:	
	DRY PIPING PNEUMATICALLY TESTED: ☐ YES ☐ NO							
	EQUIPMENT OPERATES PROPERLY: ☐ YES ☐ NO							
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO							
	DRAIN TEST: READING OF GAGE LOCATED NEAR WATER SUPPLY TEST CONNECTION: _____ PSI							
	RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE: _____ PSI							
	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO SPRINKLER PIPING.							
HYDROSTATIC SIGNATURES	HYDROSTATIC TESTS WITNESSED BY:							
	FOR PROPERTY OWNER/REPRESENTATIVE (SIGNATURE)				TITLE		DATE	
	FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE	
WELDING	WELDING PIPE: ☒ YES ☐ NO							
	IF YES:							
	1. DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3?						☒ YES ☐ NO	
	2. DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D 10.9, LEVEL AR-3?						☒ YES ☐ NO	
CUTOUTS	3. DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED:						☒ YES ☐ NO	
	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE ALL CUTOUTS (DISCS) ARE RETRIEVED? ☒ YES ☐ NO							
HYDRAULIC DATA NAME PLATE	NAMEPLATE PROVIDED? ☒ YES ☐ NO							
	IF NO, EXPLAIN:							
REMARKS	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: _____							
ALARM TEST/ FINALS SIGNATURES	NAME OF SPRINKLER CONTRACTOR:							
	AHERN FIRE PROTECTION / 2675 Scott Ave. Suite C / St. Louis, MO 63103 / 314/535-4544							
	TESTS WITNESSED BY:							
	FOR PROPERTY OWNER (SIGNATURE)				TITLE		DATE	
ADDITIONAL EXPLANATION AND NOTES:	FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE	
	Steve Summers				Foreman			

AHERN FIRE PROTECTION - ST. LOUIS

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	1 CITY OF WEBSTER GROVES							
	2							
	ADDRESS							
	1							
	2							
	INSTALLATION CONFORMS TO ACCEPTED PLANS				[x] YES	[] NO		
	EQUIPMENT USED IS APPROVED				[x] YES	[] NO		
	IF NO, EXPLAIN DEVIATIONS							
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO							
	LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF EQUIPMENT?				[x] YES	[] NO		
	IF NO, EXPLAIN.							
	HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES?				[x] YES	[] NO		
	1. SYSTEM COMPONENTS INSTRUCTIONS							
	2. CARE AND MAINTENANCE INSTRUCTIONS							
	3. NFPA 25							
LOCATION OF SYSTEM	SYSTEM 4							
SPRINKLERS	MAKE	MODEL		YEAR OF MANUFACTURE	ORIFICE SIZE/ K FACTOR	QTY.	TEMP.	
	VIKING	VK300 - BRZ UPR		2016	5.6	1	155	
	VIKING	VK350 - BRZ UP		2016	8.0	2	200	
	VIKING	VK462 - CONCLD		2016	5.6	33	155	
	VIKING	VK634 - EC CONCLD		2016	8.0	57	155	
	VIKING	VK464 - CONCLD		2016	8.0	1	200	
	VIKING	VK532 - EC BRZ UPR		2016	11.2	2	200	
	VIKING	VK305 - WHT HSW		2016	5.6	2	200	
PIPE AND FITTINGS	1-2.5" S40 BLK PIPE AND 3" S10 BLK PIPE, BLK GRVD FITTINGS, BLK DI THRD FITTINGS							
ALARM VALVE OR FLOW INDICATOR	ALARM DEVICE				MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION			
	TYPE	MAKE	MODEL	MIN.	SEC. 49			
	VANE TYPE	SYSTEM SENSOR	WFD					
TAMPER SWITCHES	TYPE	MAKE	MODEL	QTY.	DID TAMPER SWITCH / SWITCHES WORK?			
	BUTTERFLY	VICAULIC	705-W	1				
DRY PIPE OPERATING TEST	DRY VALVE				Q.O.D.			
	MAKE & MODEL		SERIAL NO.		MAKE & MODEL		SERIAL NO.	
	TIME TO TRIP		WATER PRESSURE	AIR PRESSURE	TRIP POINT	TIME WATER REACHED	ALARM OPERATED	
	TEST CONNECTION*				AIR PRESSURE	TEST OUTLET*		
		MIN.	SEC.	PSI	PSI	PSI	MIN.	SEC.
								YES / NO
	WITHOUT Q.O.D.							
	WITH Q.O.D.							
	IF NO, EXPLAIN:							

* MEASURED FROM TIME INSPECTOR'S TEST CONNECTION IS OPENED.

DELUGE & PREACTION VALVES	OPERATION: ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC								
	PIPING SUPERVISED ☐ YES ☐ NO			DETECTING MEDIA SUPERVISED ☐ YES ☐ NO					
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS? ☐ YES ☐ NO								
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING? ☐ YES ☐ NO								
	IF NO, EXPLAIN:								
	MAKE	MODEL		DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE	
				YES	NO	YES	NO	MIN.	SEC.
PRESSURE REDUCING VALVE TEST	LOC. & FLOOR	MAKE	MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE		FLOW
					INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)	RATE
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours. Test pressure tanks normal water level and air pressure and measure air pressure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.								
TESTS	ALL PIPING HYDROSTATICALLY TESTED AT: _____ 225 PSI FOR _____ 2 HRS.						IF NO, STATE REASON:		
	DRY PIPING PNEUMATICALLY TESTED: ☐ YES ☐ NO								
	EQUIPMENT OPERATES PROPERLY: ☐ YES ☐ NO								
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☒ YES ☐ NO								
	DRAIN TEST: READING OF GAGE LOCATED NEAR WATER SUPPLY TEST CONNECTION: _____ PSI								
	RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE: _____ PSI								
UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO SPRINKLER PIPING.									
VERIFIED BY COPY OF THE U FORM NO. 85B: ☒ YES ☐ NO IF NO, EXPLAIN:									
FLUSHED BY INSTALLER OF UNDERGROUND SPRINKLER PIPING: ☒ YES ☐ NO									
HYDROSTATIC SIGNATURES	HYDROSTATIC TESTS WITNESSED BY:								
	FOR PROPERTY OWNER/REPRESENTATIVE (SIGNATURE)				TITLE		DATE		
	FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE		
WELDING	WELDING PIPE: ☒ YES ☐ NO								
	IF YES:								
	1. DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☒ YES ☐ NO								
	2. DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D 10.9, LEVEL AR-3? ☒ YES ☐ NO								
3. DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED: ☒ YES ☐ NO									
CUTOUTS	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE ALL CUTOUTS (DISCS) ARE RETRIEVED? ☒ YES ☐ NO								
HYDRAULIC DATA NAME PLATE	NAMEPLATE PROVIDED? ☒ YES ☐ NO								
REMARKS	IF NO, EXPLAIN:								
	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN: _____								
ALARM TEST/ FINALS SIGNATURES	NAME OF SPRINKLER CONTRACTOR:								
	AHERN FIRE PROTECTION / 2675 Scott Ave. Suite C / St. Louis, MO 63103 / 314/535-4544								
	TESTS WITNESSED BY:								
	FOR PROPERTY OWNER (SIGNATURE)				TITLE		DATE		
FOR SPRINKLER CONTRACTOR (SIGNATURE)				TITLE		DATE			
Steve Summers				Foreman					
ADDITIONAL EXPLANATION AND NOTES:									

AHERN FIRE PROTECTION - ST. LOUIS

Contractor's Material and Test Certificate for ABOVE GROUND PIPING

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative.

All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor.

It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME:	WEBSTER UNIV - ISB				AFP # 461259		
ADDRESS:	8274 BIG BEND BLVD., WEBSTER GROVES, MO						
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)						
	1 CITY OF WEBSTER GROVES						
	2						
	ADDRESS						
	1						
2							
INSTALLATION CONFORMS TO ACCEPTED PLANS				☒ YES		☐ NO	
EQUIPMENT USED IS APPROVED				☒ YES		☐ NO	
IF NO, EXPLAIN DEVIATIONS							
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO						
	LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF EQUIPMENT?				☒ YES		☐ NO
	IF NO, EXPLAIN.						
	HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES?				☒ YES		☐ NO
	1. SYSTEM COMPONENTS INSTRUCTIONS						
2. CARE AND MAINTENANCE INSTRUCTIONS							
3. NFPA 25							
LOCATION OF SYSTEM	PREACTION SYSTEM						
SPRINKLERS	MAKE	MODEL	YEAR OF MANUFACTURE	ORIFICE SIZE/ K FACTOR	QTY.	TEMP.	
	VIKING	VK462 - CONCLD	2016	5.6	7	155	
PIPE AND FITTINGS	S40 GALV ON PREACTION, BLK GRVD FITTINGS, BLK DI THRD FITTINGS						
ALARM VALVE OR FLOW INDICATOR	ALARM DEVICE			MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION			
	TYPE	MAKE	MODEL	MIN.	SEC.		
	PRESSURE SWITCH	POTTER	PS-10				
TAMPER SWITCHES	TYPE	MAKE	MODEL	QTY.	DID TAMPER SWITCH / SWITCHES WORK?		
	BUTTERFLY	VICAULIC	705-W	1			
	PRESSURE SWITCH	POTTER	PS-40	1			
DRY PIPE OPERATING TEST	DRY VALVE			Q. O. D.			
	MAKE & MODEL		SERIAL NO.	MAKE & MODEL		SERIAL NO.	
		TIME TO TRIP	WATER PRESSURE	AIR PRESSURE	TRIP POINT	TIME WATER REACHED	
		TEST CONNECTION*			AIR PRESSURE	TEST OUTLET *	
		MIN.	SEC.	PSI	PSI	PSI	
						MIN.	
						SEC.	
	WITHOUT Q. O. D.					YES / NO	
	WITH Q. O. D.						
IF NO, EXPLAIN:							

* MEASURED FROM TIME INSPECTOR'S TEST CONNECTION IS OPENED

DELUGE & PREACTION VALVES	OPERATION: ☒ PNEUMATIC ☒ ELECTRIC ☐ HYDRAULIC									
	PIPING SUPERVISED ☒ YES ☐ NO					DETECTING MEDIA SUPERVISED ☒ YES ☐ NO				
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS? ☒ YES ☐ NO									
	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING? ☒ YES ☐ NO									
	IF NO, EXPLAIN:									
	MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM?		DOES EACH CIRCUIT OPERATE VALVE RELEASE?		MAXIMUM TIME TO OPERATE RELEASE.			
			YES	NO	YES	NO	MIN.	SEC.		
	Viking	TotalPax	☒	☐	☒	☐	0	35		
PRESSURE REDUCING VALVE TEST	LOC. & FLOOR	MAKE	MODEL	SETTING	STATIC PRESSURE		RESIDUAL PRESSURE		FLOW	
					INLET (PSI)	OUTLET (PSI)	INLET (PSI)	OUTLET (PSI)	RATE	
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (10.2 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test to prevent damage. All aboveground piping leakage shall be stopped. PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours. Test pressure tanks normal water level and air pressure and measure air pressure drop, which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.									
TESTS	ALL PIPING HYDROSTATICALLY TESTED AT: <u>200</u> PSI FOR <u>2</u> HRS. IF NO, STATE REASON:									
	DRY PIPING PNEUMATICALLY TESTED: ☒ YES ☐ NO EQUIPMENT OPERATES PROPERLY: ☒ YES ☐ NO									
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? ☐ YES ☐ NO									
	DRAIN TEST: READING OF GAGE LOCATED NEAR WATER SUPPLY TEST CONNECTION: <u>85</u> PSI RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE: <u>71</u> PSI									
	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO SPRINKLER PIPING.									
	VERIFIED BY COPY OF THE U FORM NO. 85B: ☒ YES ☐ NO IF NO, EXPLAIN: FLUSHED BY INSTALLER OF UNDERGROUND SPRINKLER PIPING: ☒ YES ☐ NO									
HYDROSTATIC SIGNATURES	HYDROSTATIC TESTS WITNESSED BY:									
	FOR PROPERTY OWNER/REPRESENTATIVE (SIGNATURE) <u>[Signature]</u>					TITLE Superintendent		DATE 4/20/17		
	FOR SPRINKLER CONTRACTOR (SIGNATURE) Steve Summers					TITLE Foreman		DATE 4/20/17		
WELDING	WELDING PIPE: ☐ YES ☒ NO									
	IF YES:									
	1. DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3? ☐ YES ☐ NO 2. DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D 10.9, LEVEL AR-3? ☐ YES ☐ NO 3. DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED: ☐ YES ☐ NO									
CUTOUTS	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE ALL CUTOUTS (DISCS) ARE RETRIEVED? ☐ YES ☐ NO									
HYDRAULIC DATA NAME PLATE	NAMEPLATE PROVIDED? ☒ YES ☐ NO									
REMARKS	IF NO, EXPLAIN:									
ALARM TEST/FINALS SIGNATURES	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN:									
	NAME OF SPRINKLER CONTRACTOR: Ahern Fire Protection 2675 Scott Ave. Suite C St. Louis, MO 63103									
	FOR PROPERTY OWNER (SIGNATURE) <u>[Signature]</u>					TITLE Superintendent		DATE 6/29/17		
	FOR SPRINKLER CONTRACTOR (SIGNATURE) Steve Summers					TITLE Foreman		DATE 6/29/17		
ADDITIONAL EXPLANATION AND NOTES:										

BRODZ SALES & ENGINEERING CO.
10751 Indian Head Industrial Blvd.
St. Louis, MO 63132
PH: (314) 890-8201
Fax: (314) 890-8204

AC Pump
8200 N. Austin
Morton Grove, IL 60063
PH: (847) 966-3700

Fire Pump Test

Location:	Webster University - ISB	Contractor:	Ahern	Date:	6/26/2017
Address:	8274 Big Bend Blvd	City:	Webster	State:	MO
				Zip:	63119

Pump	Fire Pump	AC	Model:	8100	Serial #	17-078136-01-01/QKZ959
	Manufacturer:					
	Size:	8X6X12F-S	Rated GPM:	1000	Rated Head:	55 PSI

Driver	Drive	Electric	X	Manufacturer:	WEG	HP:	40	RPM:	1775
		Diesel							
	Model:	040180P3EFP324TS	Serial #	01JUN2016 1032424340	Voltage	460	FLA	49.4	

Controller	MFG	EATON	Model:	FT70-40-D-L1-USB	Serial #	16D2695E	Voltage	480	AIC	100K
	JOCKEY MFG	EATON	Model:	XTJP-G02-L1	Serial #	16D2695J	Voltage		AIC	50K

Pump Test Results

DRIVER		PUMP PRESSURE				NOZZLE SIZE - PRESSURE - GPM						TOTALS	
VOLTS	AMPS	RPM	SUCT	DISC	NET	1	2	3	4	5	6	GPM	%
475	30	1789	78	145	67	AT SHUT OFF						0	0
476	29												
476	29												
474	39	1783	70	130	60	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	502	50
474	37					32	0	0	0	0	0		
476	39					502	0	0	0	0	0		
473	49	1782	48	103	55	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1004	100
473	47					32	32	0	0	0	0		
475	48					502	502	0	0	0	0		
474	55	1776	10	52	42	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1-3/4	1504	150
474	53					18	18	18	18	0	0		
476	54					376	376	376	376	0	0		

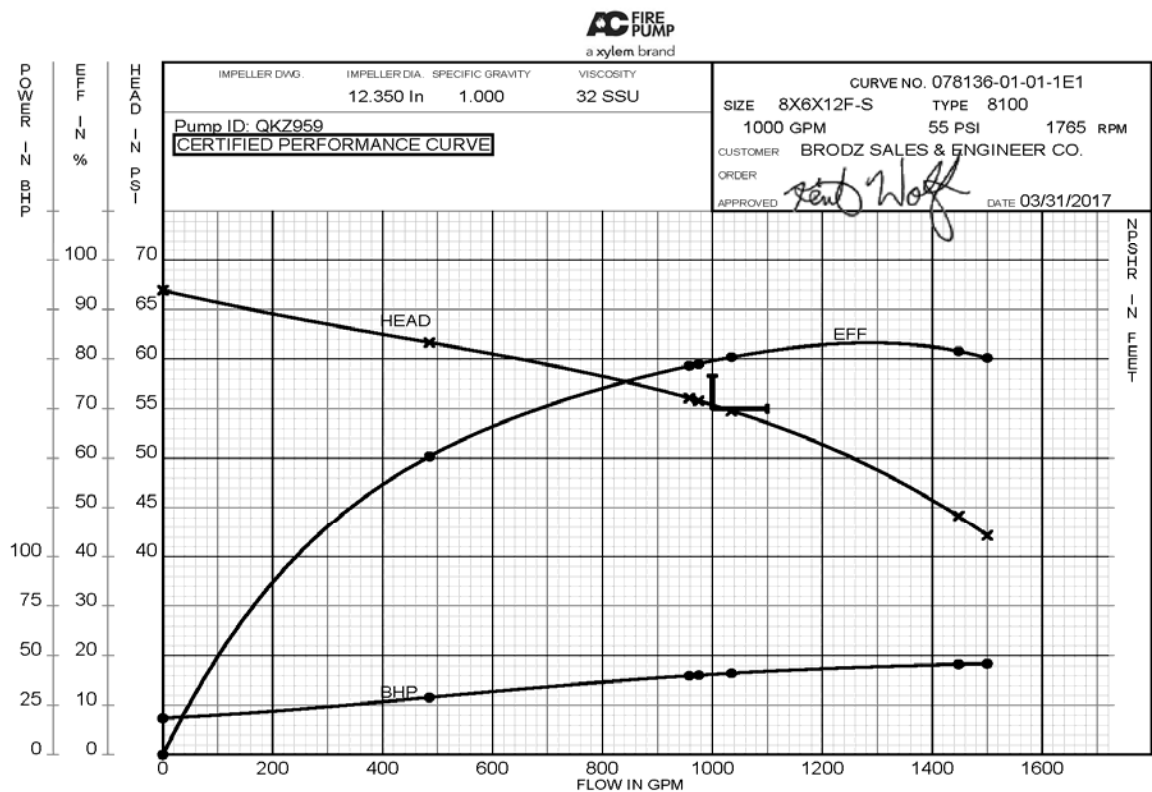
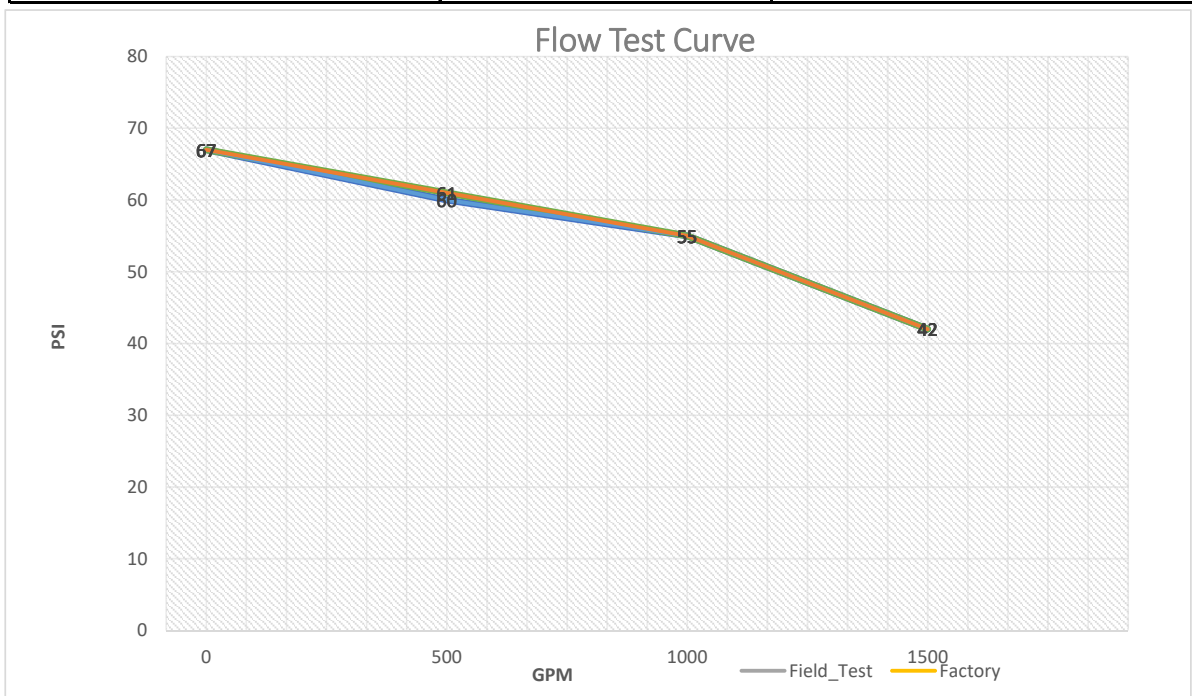
Jockey Pump Pressure (PSIG) Fire Pump Pressure (PSIG)

ON	120	OFF	135	ON	110	OFF	135		Manual Stop
								X	Automatic Stop @ 10 Minutes

Manual Starts		Automatic Starts		Other:
Normal	5	Normal	4	
Emerg	4	Emerg	3	

Personnel at Test	Comments
Steve Summers - Ahern Liz Kelly - Ahern Dan Wagoner - Guarantee Electric Steve Carey - Brodz / AC Fire Pump	
	Submitted By: Steve Carey

Location:	Webster University - ISB	Contractor:	Ahern	Date:	6/26/2017
Address:	8274 Big Bend Blvd	City:	Webster	State:	MO
Zip:	63119				
Fire Pump Manufacturer:	AC	Model:	8100	Serial #	17-078136-01-01/QKZ959
Size:	8X6X12F-S	Rated GPM:	1000	Rated Head:	55 PSI





MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
PUBLIC DRINKING WATER BRANCH

BACKFLOW PREVENTION ASSEMBLY TEST DATA AND MAINTENANCE REPORT

CUSTOMER Webster University		CUSTOMER NUMBER		FILE NUMBER	
MAILING ADDRESS 8274 Big Bend Blvd. Webster Groves, MO 63119					
SERVICE LOCATION ISB pump room				METER NUMBER	
DATE OF TEST 8/7/17	TIME 8 am	A.M. P.M.	SUPPLY PRESSURE 85 LBS.	AIR GAP (2 X SUPPLY DIAM.) SUPPLY _____ IN. GAP _____ IN.	☐ PASS ☐ FAIL
TYPE OF ASSEMBLY Double Check	MANUFACTURER Zurn Wilkins	MODEL	SIZE 6"	SERIAL NUMBER 50099	
HEIGHT OFF FLOOR 3 ft (IN./FT.)	PROTECTION FROM: FREEZING ☒ YES ☐ NO FLOODING ☒ YES ☐ NO			COMMENTS: NEW INSTALLATION YES ☒ NO ☐	
INITIAL TEST			FINAL TEST AFTER REPAIR		
REDUCED PRESSURE PRINCIPLE ASSEMBLY:			REDUCED PRESSURE PRINCIPLE ASSEMBLY:		
RELIEF VALVE OPENED AT _____ *PSID (2 PSID or more)			RELIEF VALVE OPENED AT _____ PSID (2 PSID or more)		
2ND CHECK held backpressure			2ND CHECK held backpressure		
NO. 2 SHUTOFF VALVE leak tight			NO. 2 SHUTOFF VALVE leak tight		
1ST CHECK held in direction of flow _____ *PSID (5 PSID or more)			1ST CHECK held in direction of flow _____ PSID (5 PSID or more)		
DIFFERENCE (1st check - relief) _____ PSID (3 PSID or more)			DIFFERENCE (1st check - relief) _____ PSID (3 PSID or more)		
NOTE: Failure of any of the above items, requires repair.			*Pounds per Square Inch Differential		
INITIAL TEST			FINAL TEST AFTER REPAIR		
DOUBLE CHECK VALVE ASSEMBLY:			DOUBLE CHECK VALVE ASSEMBLY:		
1ST CHECK held in direction of flow 3 PSID (1 PSID or more)			1ST CHECK held in direction of flow _____ PSID (1 PSID or more)		
2ND CHECK held in direction of flow 3 PSID (1 PSID or more)			2ND CHECK held in direction of flow _____ PSID (1 PSID or more)		
NOTE: Failure of any of the above items, requires repair.					
APPLICATION:		COMMENTS			
☐ COMMERCIAL ☒ FIRE LINE ☐ IRRIGATION ☐ OTHER (EXPLAIN)					
THE ABOVE REPORT IS CERTIFIED TO BE TRUE, ACCURATE AND COMPLETE					
TESTED BY (PRINT) Steve Summers.		(SIGNATURE) 		REPAIRED BY (PRINT) (SIGNATURE)	
COMPANY Ahern Fire Protection 2675 Scott Ave. Suite C St. Louis, MO		FINAL TEST BY (PRINT) (SIGNATURE)			
CERTIFICATION NUMBER AND EXPIRATION DATE SF-9120. 3/31/19		OWNER OR OWNER'S REPRESENTATIVE Steve Ray. Paric Superintendent		DATE 8/7/17	
Missouri state regulation 10 CSR 60-11.010(6)(E) requires testers to report results of tests and inspections to the customer and the water supplier.					

Figure 10-1(b) Contractor's material and test certificate for underground piping.

Contractor's Material and Test Certificate for Underground Piping			
PROCEDURE Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job. A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.			
Property name		Date	
WEBSTER UNIVERSITY		5/3/2017	
Property address			
8274 BIG BEND			
Plans	Accepted by approving authorities (names)		
	Address		
	Installation conforms to accepted plans		
	Equipment used is approved If no, state deviations		
		☒ Yes	☐ No
		☒ Yes	☐ No
Instructions	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? If no, explain		
	☐ Yes ☐ No		
Location	Supplies buildings		
	Have copies of appropriate instructions and care and maintenance charts been left on premises? If no, explain		
	☐ Yes ☐ No		
Underground pipes and joints	Pipe types and class		Type joint
	DUCTILE		MP
	Pipe conforms to _____ standard		☒ Yes ☐ No
	Fittings conforms to _____ standard If no, explain		☒ Yes ☐ No
	Joints needed anchorage clamped, strapped, or blocked in accordance with _____ standard If no, explain		☒ Yes ☐ No
Test description	Flushing: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blow-offs. Flush at flows not less than 390 gpm (1476 L/min) for 4-in. pipe, 880 gpm (3331 L/min) for 6-in. pipe, 1560 gpm (5905 L/min) for 8-in. pipe, 2440 gpm (9235 L/min) for 10-in. pipe, and 3520 gpm (13,323 L/min) for 12-in. pipe. When supply cannot produce stipulated flow rates, obtain maximum available. Hydrostatic: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 150 psi (10.3 bar) for 2 hours.		
	Leakage: New pipe laid with rubber gasketed joints shall, if the workmanship is satisfactory, have little or no leakage at the joints. The amount of leakage at the joints shall not exceed 2 quarts per hour (1.89 L/hr) per 100 joints irrespective of pipe diameter. The leakage shall be distributed over all joints. If such leakage occurs at a few joints, the installation shall be considered unsatisfactory and necessary repairs made. The amount of allowable leakage specified above can be increased by 1 fluid ounce per inch valve diameter per hr. (30 mL/25 mm/hr) for each metal seated valve isolating the test section. If dry barrel hydrants are tested with the main valve open so the hydrants are under pressure, an additional 5 ounces per minute (150 mL/min) leakage is permitted for each hydrant.		
Flushing tests	New underground piping flushed according to _____ standard by (company)		☒ Yes ☐ No
	ALUMA HARPER CONST. INC.		
	If no, explain		
	FLOW EXCEEDED 3 FT/SEC		
How flushing flow was obtained	☒ Public water ☐ Tank or reservoir ☐ Fire pump		Through what type opening
			☐ Hydrant butt ☒ Open pipe
Lead-ins flushed according to _____ standard by (company)	If no, explain		☐ Yes ☐ No
How flushing flow was obtained	☒ Public water ☐ Tank or reservoir ☐ Fire pump		Through what type opening
			☐ Y connection to flange ☐ Open pipe and spigot

Figure 10-1(b) (Continued)

Hydrostatic test	All new underground piping hydrostatically tested at <u>140</u> psi for <u>2</u> hours <u>PSI TESTED MAY 2, 2017</u>		Joints covered ☒ Yes ☐ No
Leakage test	Total amount of leakage measured <u>—</u> gallons <u>—</u> hours		
	Allowable leakage <u>—</u> gallons <u>—</u> hours		
Hydrants	Number installed <u>0</u>	Type and make <u>—</u>	All operate satisfactorily ☐ Yes ☐ No
Control valves	Water control valves left wide open If no, state reason <u>NEW CONSTRUCTION. INSIDE NOT COMPLETE</u>		☐ Yes ☒ No
	Hose threads of fire department connections and hydrants interchangeable with those of fire department answering alarm		☐ Yes ☐ No
Remarks	Date left in service		
Signatures	Name of installing contractor <u>CASTLE CONSTRUCTION INC.</u>		
	Tests witnessed by		
	For property owner (signed)	Title	Date
	For installing contractor (signed) <u>Mike Harney</u>	Title <u>PSI</u>	Date <u>MAY 3, 2017</u>
Additional explanation and notes <u>MIKE HARNEY, CITY OF W.G. WITNESS PRESSURE TEST OF UNDERGROUND SYSTEM</u> <u>Tom Yous</u> <u>Fire Marshal - Witness Flush of Domestic/Sprinkler Supply</u>			

10-2 Acceptance Requirements.

10-2.1* Flushing of Piping. Fire service mains (from the water supply to the system riser) and lead-in connections to system risers shall be completely flushed before connection is made to sprinkler piping. The flushing operation shall be continued for a sufficient time to ensure thorough cleaning. The minimum rate of flow shall be not less than one of the following:

- (1) The hydraulically calculated water demand rate of the system including any hose requirements
- (2) That flow necessary to provide a velocity of 10 ft/sec (3.1 m/sec) [see Table 10-2.1(2)]
- (3) The maximum flow rate available to the system under fire conditions

10-2.2 Hydrostatic Tests.

10-2.2.1* All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi (13.8 bar) and shall maintain that pressure without loss for 2 hours. Loss shall be determined by a drop in gauge pressure or visual leakage. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested.

Exception No. 1: Portions of systems normally subjected to system

scribed in 10-2.2.1 at a pressure of 50 psi (3.5 bar) in excess of system working pressure.

Exception No. 2: Where cold weather will not permit testing with water, an interim air test shall be permitted to be conducted as described in 10-2.3.

Exception No. 3: Modifications affecting 20 or fewer sprinklers shall not require testing in excess of system working pressure.

Exception No. 4: Where addition or modification is made to an existing system affecting more than 20 sprinklers, the new portion shall be isolated and tested at not less than 200 psi (13.8 bar) for 2 hours.

Exception No. 5: Modifications that cannot be isolated, such as relocated drops, shall not require testing in excess of system working pressure.

Exception No. 6: In buried pipe, leakage shall be permitted as follows:

(a)* The amount of leakage at the joints shall not exceed 2 qt/hr (1.89 L/hr) per 100 gaskets or joints, irrespective of pipe diameter.

(b)* The amount of allowable leakage specified in item (a) of this exception shall be permitted to be increased by 1 fluid ounce (30 ml) per inch valve diameter per hour for each metal seated valve isolating the test section.

(c) If dry barrel hydrants are tested with the main valve open so the hydrants are under pressure, an additional 5 oz/min (150 ml/min) of leakage shall be permitted for each hydrant.

(d) The amount of leakage in buried piping shall be measured at



2675 Scott Avenue, Suite C
St. Louis, MO 63103
(877) 237-1785

Calculation Riser Placard for **AREA/DENSITY** Designed Systems.

System Design Area: **RA2 - Dock**

At: **Webster ISB**

Contract No.: **461259** Print No.(s): **FP-101.A** Dated: **12/2/16**

This system, as shown on **Ahern Fire Protection** drawing, is designed for **22** sprinklers to discharge at a density of **0.20** GPM/SqFt over a minimum area of **2,506.00** SqFt when supplied with water at the rate of **742.16** GPM at a pressure of **111.26** PSI at the **base of system riser**.

Occupancy Classification: **HC-2**

Commodity Classification: **N/A**

Inside Hose Stream added at base of riser: **0** GPM

Outside Hose Stream added at source: **250** GPM

Standard / Issue: **NFPA 13, 2010**

Antifreeze System Solution: **N/A**

Antifreeze System Capacity: **N/A** Gallons; **N/A**% Antifreeze

Storage Height (max.): **N/A**

Other Storage: **N/A**

General Information	Yes	No
High Pile	☐	☒
Rack Storage	☐	☒
Hazardous Material	☐	☒
Idle Pallets	☐	☒
Flammable/Combustible Liquids	☐	☒
Solid Shelving	☐	☒
Encapsulation	☐	☒
Aisle Width (min.)		Feet

Sprinkler Head Quantity & Type:

Qty.	Make/Vendor	Model/Type	K-Factor	Temp.
9	Viking	VK350	8.0	200° F
2	Viking	VK462	5.6	155° F
8	Viking	VK464	8.0	200° F
9	Viking	VK634	8.0	200 F



2675 Scott Avenue, Suite C
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(877) 237-1785

Calculation Riser Placard for **AREA/DENSITY** Designed Systems.

System Design Area: **RA1 - Lobby**

At: **Webster ISB**

Contract No.: **461259** Print No.(s): **FP-102.B** Dated: **12/2/16**

This system, as shown on **Ahern Fire Protection** drawing, is designed for **11** sprinklers to discharge at a density of **0.10** GPM/SqFt over a minimum area of **1,552.00** SqFt when supplied with water at the rate of **426.86** GPM at a pressure of **118.90** PSI at the **base of system riser**.

Occupancy Classification: **HC-1**

Commodity Classification: **N/A**

Inside Hose Stream added at base of riser: **0** GPM

Outside Hose Stream added at source: **250** GPM

Standard / Issue: **NFPA 13, 2010**

Antifreeze System Solution: **N/A**

Antifreeze System Capacity: **N/A** Gallons; **N/A**% Antifreeze

Storage Height (max.): **N/A**

Other Storage: **N/A**

General Information	Yes	No
High Pile	☐	☒
Rack Storage	☐	☒
Hazardous Material	☐	☒
Idle Pallets	☐	☒
Flammable/Combustible Liquids	☐	☒
Solid Shelving	☐	☒
Encapsulation	☐	☒
Aisle Width (min.)		Feet

Sprinkler Head Quantity & Type:

Qty.	Make/Vendor	Model/Type	K-Factor	Temp.
11	Viking	VK634	8.0	155° F



2675 Scott Avenue, Suite C
St. Louis, MO 63103
(855) 289-0071

Calculation Riser Placard for **Standpipe** Systems.

System Design Area: **Entire**

At: **Webster University ISB**

Contract No.: **461259** Print No.(s): **FP-101.A** Dated: **12/2/16**

This system, as shown on **Ahern Fire Protection** drawing, is designed for **500.00** gallons per minute from the most remote standpipe at a minimum pressure of **100.00** pounds per square inch and **250.00** gallons per minute flowing from the remaining **(1)** standpipes for a total flow of **750.00** gallons per minute when supplied with water at the rate of **750.00** gallons per minute at a pressure of **131.63** pounds per square inch at the **fire pump outlet**.

Standpipe Classification: **Class I**

Standard / Issue: **NFPA 14 2010 Edition**

Antifreeze System Solution: **N/A**

Antifreeze System Capacity: Gallons; % Antifreeze



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St. Louis, MO 63103
(877) 237-1785

Calculation Riser Placard for **AREA/DENSITY** Designed Systems.

System Design Area: **Preaction**

At: **Webster ISB**

Contract No.: **461259** Print No.(s): **FP-101.B** Dated: **12/2/16**

This system, as shown on **Ahern Fire Protection** drawing, is designed for **7** sprinklers to discharge at a density of **0.10** GPM/SqFt over a minimum area of **583.00** SqFt when supplied with water at the rate of **109.80** GPM at a pressure of **57.92** PSI at the **base of system riser**.

Occupancy Classification: **HC-1**

Commodity Classification: **N/A**

Inside Hose Stream added at base of riser: **0** GPM

Outside Hose Stream added at source: **250** GPM

Standard / Issue: **NFPA 13, 2010**

Antifreeze System Solution: **N/A**

Antifreeze System Capacity: **N/A** Gallons; **N/A**% Antifreeze

Storage Height (max.): **N/A**

Other Storage: **N/A**

General Information	Yes	No
High Pile	☐	☒
Rack Storage	☐	☒
Hazardous Material	☐	☒
Idle Pallets	☐	☒
Flammable/Combustible Liquids	☐	☒
Solid Shelving	☐	☒
Encapsulation	☐	☒
Aisle Width (min.)		Feet

Sprinkler Head Quantity & Type:

Qty.	Make/Vendor	Model/Type	K-Factor	Temp.
7	Viking	VK462	5.6	155
	Viking			
	Viking			

Fire Protection Equipment Submittal

Webster University Interdisciplinary Science Bldg.

8274 Big Bend
Webster Groves, MO 63119



FIRE PROTECTION EQUIPMENT DATA

J. F. AHERN CO.

2675 SCOTT AVE. SUITE C

ST. LOUIS, MO 63103

T: 314.535.4544

F: 314.535.0144

NAME OF PROJECT: **Webster University Interdisciplinary Science Building
8274 Big Bend Blvd.
Webster Groves, MO 63119**

AHERN PROJECT NO.: **461259**

SPECIFICATION NO.:

SUBMITTAL NO.:

STAMP

Prepared By:

Dana Mitchell

Dana Mitchell,
Senior Designer

EQUIPMENT/MANUFACTURER

Pipe

SHEET 100

Pipe—NFPA 13, UL/FM as noted

Schedule 10 Steel Pipe

SHEET 101

Pipe—NFPA-13, UL/FM

Schedule 40 Steel Pipe

Valves

SHEET 208

Gate valve—(2 1/2" thru 12") 250-lb. wwp iron body gate valve—meets AWWA C-509 standard, flanged—UL/FM

Nibco Fig F-607-RW

SHEET 211

Grooved-end butterfly valve with built-in tamper switch (2" thru 12") ductile iron—UL/FM as noted—two (2) factory mounted internal supervisory switches

Victaulic 705 Firelock® Butterfly Valve

SHEET 213

Grooved swing check valve (2-1/2", 3", 4", 6", and 8") 175 psi—UL/FM as noted, rubber faced check valve approved for use in fire service systems. Valve may be installed vertically or horizontally.

Viking Model D-1/G-1

SHEET 215

Bronze OS & Y gate valve, threaded ends (1" - 2"), 175 psi—UL/FM

Nibco T-104-O

SHEET 216

Bronze angle valve, 175-lb. wwp, (1-1/4" - 2"), threaded ends, renewable disc

Nibco T-301-W

Valves (Cont.)

SHEET 217

Bronze globe valve, 175-lb. wwp, (1/2" - 1"), threaded ends, renewable disc

Nibco KT-65UL

SHEET 219

Bronze globe valve—175-lb. wwp, (1-1/4" - 2"), threaded ends—UL as noted

Nibco KT-211-W-UL

SHEET 220

Bronze side outlet globe valve (1/4"), 3-way, 400-lb. wwp, threaded ends

Nibco KT-291-W3

SHEET 222

Soft-seat Swing Check Valve, threaded top, 200-lb. wwp

Nibco Bronze Check Valve Model KT-403-W

SHEET 223

Bronze ball valve (*domestic use only*), 300-lb. wwp, (1/4" - 3"), threaded ends—UL/FM as noted

Nibco KT-580/585-70-UL

SHEET 224

Bronze ball valve—provides slow opening & closing properties in a quarter turn valve with built-in tamper switch—two (2) sets of contacts—UL/FM (threaded ends Victaulic 1"- 2"); (grooved ends Victaulic 1-1/4"- 2" and Milwaukee 2-1/2")

Victaulic Series 728 FireLock® / Milwaukee BB-SC Series Ball Valves

SHEET 225

Pressure relief valve—1/2" & 3/4" inlet, all bronze construction & stainless steel spring, calibrated—adjustable range 50-175 psi

Watts 530C

Valves (Cont.)

SHEET 226

Inspector's test/pressure relief valve for gridded systems

AGF Model 1011A

SHEET 228A

Double check valve assembly (*2-1/2" thru 10"*) flanged, flanged by grooved, or grooved by grooved, 175 psi—UL/FM as noted—backflow prevention to prevent potable water contamination caused by cross connection

Zurn® Wilkins Model 350A-OSY (FxF), 350A-OSYFG (FxG), & 350ABGVIC (GxG)

SHEET 240

Two-piece, full port, chrome plated, threaded ends forged brass ball valve (*1/2 thru 2-1/2"*) PTFE seats—UL/FM as noted

Threaded Ball Valve KITZ Code #58 (AKSZA)

Hangers

SHEET 300

Standard duty loop hanger for suspension of non-insulated stationary pipe lines—UL/FM as noted

Pentair Standard Duty Loop Hanger 115

SHEET 301

Steel Beam clamp (*1/2"*) with set screw—structural attachment to top or bottom of metal beams or bar joists—UL Listed/FM Approved as noted

Pentair/Caddy® Universal Beam Clamp 300

SHEET 301A

Beam clamp (*3/8"*) cold rolled steel with a plated hardened cup point set screw and lock nut—structural attachment to top or bottom of metal beams or bar joists—UL/FM as noted

Globe's Silver Hawk Series 100 Universal Beam Clamp

Hangers (Cont.)

SHEET 302

Carbon steel screw anchor with an internally threaded hex washer head (1/4" X 1-5/8" | 3/8")—ICC-ES Listed and FM Approved as noted

Hilti KWIK HUS-EZ Screw Anchor

SHEET 303

Riser clamp for use with steel pipe—UL Listed & FM Approved for 3/4" thru 8" sizes. Complies with Federal Specification A-A-1192A (Type 8) and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 8)

PHD Manufacturing, Inc. Riser Clamp Fig. 551

SHEET 308

Retains the beam clamp in its attached position to the structural member for use in preventing hanger failure—UL Listed as noted

Afcon #162 Universal Restraining Strap

SHEET 309

Pipe Clamp for use on smaller pipe sizes allowing the restraining clamps to be attached to the pipe—UL/FM as noted

B-Line, by Eaton, Pipe Clamp for Sway Bracing Fig. B3140 (Tolco Fig. 4)

SHEET 310

Sleeve expansion anchors—UL/FM as noted

Powers® Lok-Bolt™ Sleeve Expansion Anchors

SHEET 312

12-gauge steel channel for use with trapeze hangers

Gregory Strut Products Model G132OS, G582OS, G582A, G712OS, & G712A

SHEET 315

Surge restrainer used to restrict the upward movement of smaller branch line piping (1/2" - 2") during sprinkler operation—UL Listed

Pentair Hanger Surge Restraint SR6

Hangers (Cont.)

SHEET 322

Direct vertical attachment in Metal Deck and Purlin for 1/4" and 3/8" rod—UL/FM as noted

Sammy Xpress™ Model XP 20 & XP 35

SHEET 325

Steel Bar Joist Attachment (#CSBBARJEG) and Universal Structural Attachment (#CSBUNIV05EG/CSBUNIV075EG)

Pentair Structural Attachments

SHEET 326

Easy (1" thru 6") and Standard (8" and 10") Universal Sway Brace

Pentair Longitudinal Sway Brace

SHEET 327

Quick Grip Lateral Sway Brace (Jr. 1" thru 2") and (2-1/2" thru 8")

Pentair Lateral Sway Brace

Sprinklers

SHEET 423

Quick response dry pendent sprinkler head, 5.6 K-Factor—UL/FM as noted

Viking QR Dry Pendent Sprinkler VK176

SHEET 427

Quick response upright sprinkler head—small thermosensitive glass bulb spray sprinkler, 5.6 K-Factor, UL/FM as noted

Viking Microfast® QR Upright Sprinkler VK300

SHEET 428

Quick response pendent sprinkler head—small thermosensitive glass bulb spray sprinkler, 5.6 K-Factor—UL/FM as noted

Viking Microfast® Pendent Sprinkler VK302

Sprinkler (Cont.)

SHEET 429

Quick response, horizontal sidewall sprinkler head, 5.6 K-Factor—UL/FM as noted

Viking Microfast® Horizontal Sidewall VK305

SHEET 430

Quick response upright sprinkler head—small thermosensitive glass bulb spray sprinkler, 8.0 K-Factor—UL/FM as noted

Viking Microfast® QR Upright Sprinkler VK350

SHEET 431

Quick response pendent sprinkler head—small thermosensitive glass bulb spray sprinkler, 8.0 K-Factor—UL/FM as noted

Viking Microfast® Pendent Sprinkler VK352

SHEET 432

Standard and quick response concealed pendent sprinkler heads, standard orifice, 5.6 K-Factor—UL/FM as noted

Viking Mirage® Concealed Pendent Sprinkler VK462

SHEET 449

Spare sprinkler cabinet for ESFR and other large frame heads (6) (ESFR, Large Drop, ELO)—red enamel steel with close fitting hinge

Fire Protection Products

SHEET 451

Spare head cabinet & appropriate sprinkler wrench (12)—red enamel steel all welded joints and close fitting hinge

Tyco Spare Head Cabinet

SHEET 452

Slip-on Style Model E-1 Recessed Escutcheon and Model F-1 Adjustable Escutcheon—UL/FM as noted (Expansion Plate optional)

Viking Model E-1 and F-1 Escutcheons

Sprinkler (Cont.)

SHEET 453

One-piece sprinkler head guard—UL/FM as noted

Viking Model D-1 Sprinkler Guard

SHEET SP-1

Standard/Quick Response extended coverage upright sprinkler—UL/FM as noted

Viking Model VK532

SHEET SP-2

Standard/Quick Response extended coverage pendent sprinkler—UL/FM as noted

Viking Model VK534

SHEET SP-3

Mirage Quick Response extended coverage concealed pendent sprinkler—UL/FM as noted

Viking

SHEET SP-4

RA5114 Reliable Model G5-56 Dry Pnd Concl'd—UL/FM as noted

Reliable

Fittings

SHEET 500

Flexible couplings for Fire Protection Systems—UL/FM

Victaulic Style 75 Flexible Coupling

SHEET 501

Reducing coupling ($2 \times 1''$ through $8 \times 6''$)—UL/FM

Victaulic Style 750 Reducing Couplings

SHEET 503

FireLock fittings—elbows, tees, & caps—UL/FM

Victaulic FireLock Fittings

Fittings (Cont.)

SHEET 504

FireLock rigid couplings (*1-1/4" through 8"*) use with C-shaped gasket on wet-type system installations and use with FlushSeal gasket on dry-type system installations—UL/FM

Victaulic Style 005 FireLock Rigid Couplings

SHEET 505

Grooved flange (*2" through 8"*)—UL/FM

Victaulic Style 744 FireLock Flange Adapter

SHEET 506

Mechanical tees—grooved or threaded, bolted branch outlets—UL/FM

Victaulic Styles 920 and 920N

SHEET 508

Rigid, installation-ready coupling for fire protection pipe joining—UL Listed and FM Approved for standard pipe services up to 365-psi

Victaulic FireLock EZ® Rigid Coupling Style 009N

SHEET 510

Threaded Mechanical Branch Tee-type used in 1-1/4 thru 2-1/2"—UL/FM as noted

Anvil Star / Anvil International Fittings MT-30

SHEET 513

Schedule 10 and Schedule 40 Grooved Weld Outlet Fittings for use in fire sprinkler systems 300-PSI, UL/FM as noted

Grooved Welded Pipe Outlets Cerieco Brand™

SHEET 514

Threaded weld outlet fittings, 300 psi—UL/FM

Welded Steel Pipe Outlets Cerieco Brand™

Fittings (Cont.)

SHEET 515

Ductile Iron threaded pipe fittings joining arrangement for piping 4" and smaller 500-psi service—UL/FM as noted

AnvilStar™ SPF™ Ductile Iron Threaded Fittings

SHEET 517A

Galvanized Malleable Iron pipe fittings—UL/FM as noted

Smith-Cooper International Galvanized Malleable Iron Pipe Fittings

SHEET 518

Braided Flexible Hose Assemblies connect the branch line to the sprinkler head using a flexible stainless steel hose and steel bracket assembly, available in 31" to 72" length, in 1/2" and 3/4" outlet sizes—UL/FM as noted (*Braided AH2/AB7 FM Approved; Braided AH2/AB1 UL Listed & FM Approved*)

Victaulic® VicFlex™ Series AH2 Braided Flexible Hose Assembly

Alarms

SHEET 600

Waterflow Detector with retard, vane-type for use on wet systems, S10 & S40 steel pipe, (2" – 8")—UL/FM as noted

System Sensor WFD Series

SHEET 602

Supervisory switch, 1/2" NPT, adjustable nipple, weather resistant—UL/FM - for use with post indicator valve

Potter PCVS-2

SHEET 606

6" Model PBA1206 electric vibrating type bell

Potter Electric Signal Company PBA1206

SHEET 608

Air/Water Pressure Gauge, used to monitor water pressure at system riser (3-1/2")—UL/FM

Air/Water Gauges

Hose

SHEET 802

2-1/2" Female to Male Hose Valve

Potter Roemer Model 4065

SHEET 803

(4615) 1-1/2" or (4625) 2-1/2" Caps and Chains

Potter Roemer 4600 Series

Miscellaneous

SHEET 900

Wall/Ceiling escutcheon plates, used to trim piping through walls & ceilings

Plastic Wall Plates

SHEET 902

Sprinkler identification signs with enamel finish—for use in identifying all system control, main and auxiliary drain, and inspectors test valves

Sprinkler ID Signs

SHEET 906

Firestop sealant—intumescent caulk for use in restoring fire rating to wall penetrations for steel and plastic pipe—UL/FM as noted

STI SpecSeal Series LCI Intumescent Sealant

SHEET 913

Pipe markers for indoor and outdoor line service identification and system color coding

MS-900 Self Adhesive Pipe Markers

SHEET M-1

Free standing fire department connection inlet connections

Potter Roemer Model/Series No. 5761-5792

SHEET M-2

TotalPac 3 self contained – double interlock preaction system electric / pneumatic release

Fire Pump

SHEETS ATTACHED

Equipment Submittal Table of Contents.docx

SCHEDULE 10 STEEL PIPE

The Schedule 10 ferrous steel piping, black or galvanized, used on this project shall meet or exceed one of the following NFPA 13 (2007 Edition) standards found in Section 6.3, Aboveground Pipe and Tube:

1. ASTM A795 -- Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
2. ANSI/ASTM A53 -- Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A135 -- Specification for Electric Resistance -- Welded Steel Pipe.

The following is a list of ferrous piping Manufacturers that Ahern Fire Protection may use on this project. This list also indicates the ASTM conformance standard(s) as well as the current UL Listing (VIZY-2005) and/or FM Approval (STEEL PIPE-2006) for each brand of pipe.

Allied Tube and Conduit Corp.

- UL Listed Sizes 1-1/4" through 8"
- FM Approved Sizes 1-1/4" through 8"
- ASTM A135 & ASTM A123

Wheatland Tube Co.

- UL Listed Sizes 1-1/4" through 4" (*black only*)
- FM Approved Sizes 1-1/4" through 8" (*black only*)
- ASTM A135 & ASTM A795

Bull Moose Tube Co.

- UL Listed Sizes 1" through 4"
- FM Approved Sizes 3/4" through 4"
- ASTM A135, ASTM A795, & ASTM A53

Youngstown Tube Company

- UL Listed Sizes 1-1/4" through 8"
- FM Approved Sizes 1-1/4" through 6" (*black only*)
- ASTM A795 Type E, Grade A, NH standards

Nominal	Minimum I.D.
1	1.097
1.25	1.442
1.5	1.682
2	2.157
2.5	2.635
3	3.26
4	4.26
5	5.295
6	6.357
8	8.249

If necessary, the Manufacturer's Technical Data Sheets for each of these products can be obtained from Ahern Fire Protection. Please contact the Ahern Fire Protection District office indicated on the cover of this submittal package.

SCHEDULE 40 STEEL PIPE

The Schedule 40 ferrous steel piping, black or galvanized, used on this project shall meet or exceed one of the following NFPA 13 (2007 Edition) standards found in Section 6.3, Aboveground Pipe and Tube:

1. ASTM A795 -- Specification for Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
2. ANSI/ASTM A53 -- Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A135 -- Specification for Electric Resistance -- Welded Steel Pipe.

The following is a list of ferrous piping Manufacturers that Ahern Fire Protection may use on this project. This list also indicates the ASTM conformance standard(s) as well as the current UL Listing (VIZY-2005) and/or FM Approval (STEEL PIPE-2006) for each brand of pipe.

Allied Tube and Conduit Corp.

- UL Listed Sizes 1" through 2-1/2"
- FM Approved Sizes 1" through 2-1/2"
- ASTM A135 & ASTM A123

Bull Moose Tube Co.

- UL Listed Sizes 1" through 4"
- FM Approved Sizes 1" through 4"
- ASTM A135 & ASTM A795

Wheatland Tube Co.

- UL Listed Sizes 1" through 2"
- FM Approved Sizes 1" through 2"
- ASTM A135, ASTM A795, & ASTM A53F 1" through 6"

Youngstown Tube Company

- Black UL Listed / FM Approved Sizes 1" through 2"
- Galvanized UL Listed only – 1" through 2"
- ASTM A135/A795 Type E, Grade A, NH standards

Nominal	Minimum I.D.
1	1.049
1.25	1.38
1.5	1.61
2	2.067
2.5	2.469
3	3.068
4	4.026

If necessary, the Manufacturer's Technical Data Sheets for each of these products can be obtained from Ahern Fire Protection. Please contact the Ahern Fire Protection District office indicated on the cover of this submittal package.

210523 - Valves for Fire Protection Piping

250 PSI WWP Iron Body Gate Valves

Fire Protection Valve • Outside Screw and Yoke • **Resilient Wedge** •
Epoxy Coated Interior/Exterior • Pre-Grooved Stem for Supervisory Switch •
Drilled, Tapped and Plugged at Boss Location A**

250 PSI/17.2 Bar Non-Shock Cold Working Pressure
(160° F/71° C max. operating temperature)

UL/ULC LISTED† • FM APPROVED •
AWWA C509 & 515 • NEW YORK CITY M.E.A. APPROVED 236-93E •
CERTIFIED LEAD-FREE* BY IAPMO R&T TO NSF/ANSI 372

MATERIAL LIST

PART	SPECIFICATION
1. Valve Body	Ductile Iron ASTM A536
2. Resilient Wedge	Ductile Iron ASTM A536/EPDM ASTM D2000
3. Wedge Nut	Bronze ASTM B584 UNS C83600
4. Dowel Pin	Stainless Steel ASTM A276 UNS S42000 4" - 12" ASTM B584 UNS C92200 2½" - 3"
5. Stem Back Seat O-Ring	EPDM ASTM D2000
6. Bonnet Gasket	EPDM ASTM D2000
7. Bonnet	Ductile Iron ASTM A536
8. Stem Packing	EPDM ASTM D2000
9. Threaded Rod	Carbon Steel Zinc Plated
10. Gland Bushing	Bronze ASTM B584
11. Gland	Cast Iron ASTM A126 Class B
12. Gland Nut	Stainless Steel 18-8
13. Yoke Screw	Alloy Steel ASTM A574M Zinc Plated
14. Yoke	Cast Iron ASTM A126 Class B
15. Yoke Bushing	Bronze ASTM B584
16. Flat Point Set Screw	Alloy Steel ASTM F912M Black Oxide
17. Yoke Bushing Retainer	Cast Iron ASTM A126 Class B
18. Handwheel	Ductile Iron ASTM A536
19. Handwheel Nut	Carbon Steel Zinc Plated
20. Flat Head Screw	Carbon Steel Zinc Plated
21. Stem	Bronze ASTM B150 UNS C61400
22. Bonnet Screw	Alloy Steel ASTM A574M Zinc Plated
23. NPT Pipe Plug	Malleable Iron ANSI B16.3 (Epoxy Coated)
24. UL/FM Label (not shown)	Aluminum

NOTE: Electrostatically applied fusion-bonded epoxy coated inside and outside per AWWA C-550.

Epoxy NSF and FDA certification

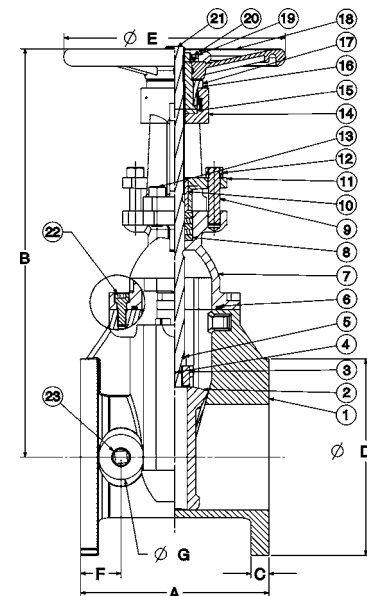
**Drilled, tapped and plugged at Position A with ½" valve sizes 2½"-4", ¾" on 6"-8", 1" on 10"-12".

† Compliance with the Standard for Gate Valves for Fire Protection Service, UL 262, and the Canadian Requirements, ULC/ORD-C262.

NOTE: Flanged valve is consistent with ANSI B16.1 Class 125.



F-607-RW
Flanged



F-607-RW
Flg x Flg

DIMENSIONS—WEIGHTS—QUANTITIES

Size		Dimensions																Bolt Circle		Flange Holes	Turns To Open	Weight	
		A		B Open		B Closed		C		D		E		F		G							
In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.		
2½	65	7.5	190	17.8	453	14.9	378	0.69	17.5	7.0	178	7.9	200	1.50	38	1.6	40	5.50	140	4	8.8	45	20
3	80	8.0	203	19.7	500	15.9	405	0.75	19.0	7.5	191	7.9	200	1.73	44	2.1	54	6.00	152	4	10.5	53	24
4	100	9.0	229	21.0	534	16.6	422	0.94	24.0	9.0	229	10.2	260	2.13	54	2.1	54	7.50	191	8	10.4	94	43
6	150	10.5	267	29.3	744	22.9	581	1.00	25.4	11.0	279	12.4	315	2.24	57	2.5	64	9.50	241	8	15.7	154	70
8	200	11.5	292	37.0	939	28.5	724	1.13	28.6	13.5	343	14.8	375	2.48	63	2.8	70	11.75	298	8	17.2	247	112
10	250	13.0	330	44.8	1139	34.5	877	1.19	30.2	16.0	406	16.4	416	2.56	65	2.8	70	14.25	362	12	21.4	349	159
12	300	14.0	356	52.2	1326	39.9	1014	1.25	31.8	19.0	483	17.5	445	2.91	74	3.4	86	17.00	432	12	25.5	484	220



*Weighted average lead content ≤ 0.25%

FREEZING WEATHER PRECAUTION: Subsequent to testing a piping system, valves should be left in an open position to allow complete drainage.

FireLock® Butterfly Valve
Style 705 with Weatherproof Actuator



Approvals/Listings:



G410001 104j/04

[See Victaulic Publication 10.01 for more details.](#)

Product Description:

The Series 705 Butterfly Valve features a weatherproof actuator housing Approved for indoor or outdoor use, a ductile iron body and disc with EPDM seats. Designed for fire protection services only. Victaulic FireLock Series 705 Butterfly Valve is cULus Listed, LPCB Listed, FM and VdS Approved for 300 psi/2068 kPa service. Contact Victaulic for details of agency approvals.

Material Specifications:

Body: Ductile iron conforming to ASTM A-536, grade 65-45-12

End Face, 2 – 6"/50 – 150 mm: Ductile iron conforming to ASTM A-536, grade 65-45-12

Seal Retainer, 8 – 12"/200 – 300 mm: Ductile iron conforming to ASTM A-536, grade 65-45-12

Coating: Black alkyd enamel

Disc: Ductile iron conforming to ASTM A-536, grade 65-45-12, with electroless nickel coating conforming to ASTM B-733

Seat:

☐ Grade “E” EPDM

Stems: 416 stainless steel conforming to ASTM A-582

Stem Seal Cartridge: C36000 brass

Bearings: Stainless Steel with TFE lining

Stem Seals: EPDM

Stem Retaining Ring: Carbon steel

Actuator:

- ☐ 2 – 8"/50 – 200mm: Brass or bronze traveling nut on a steel lead screw, in a ductile iron housing
- ☐ 10 – 12"/250 – 300mm: Steel worm and cast iron quadrant gear, in a cast iron housing

Job/Owner

System No.	
Location	

Contractor

Submitted By	
Date	

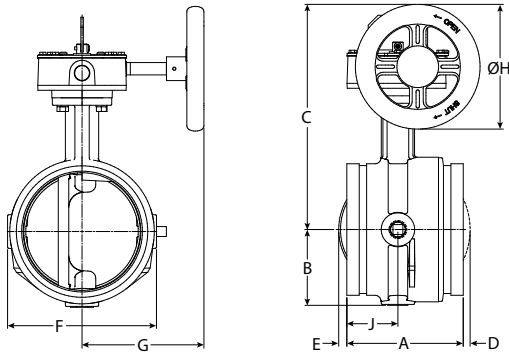
Engineer

Spec Section	
Paragraph	
Approved	
Date	



Approvals and Listings:

Size	Approval/Listing Service Pressures			
	Series 705 Butterfly Valve			
	cULus	FM	Vds	LPCB
2"/50 mm	up to 300psi/2068kPa	n/a	up to 300psi/2068kPa	up to 300psi/2068kPa
2½"/65 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	n/a	up to 300psi/2068kPa
76.1 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa
3"/80 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa
4"/100 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa
5"/125 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	n/a	up to 300psi/2068kPa
139.7 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa
6"/150 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa
165.1 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	n/a	up to 300psi/2068kPa
8"/200 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa	up to 300psi/2068kPa
10"/250 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	n/a	up to 300psi/2068kPa
12"/300 mm	up to 300psi/2068kPa	up to 300psi/2068kPa	n/a	up to 300psi/2068kPa

Dimensions:

NOTE: OPTIONAL ½"/15MM TAP AVAILABLE.
CONTACT VICTAULIC FOR DETAILS.

Nominal Size	Actual Outside Diameter	Dimensions								
		E to E A	B	C	D	E	F	G	DIA H	J
inches mm	inches mm	inches mm	inches mm	inches mm	inches mm	inches mm	inches mm	inches mm	inches mm	inches mm
2 60.3	2.375 60.3	4.25 108.0	2.28 57.9	6.41 162.8	–	–	4.00 101.6	4.22 107.2	4.50 114.3	2.12 53.8
2½ 73	2.875 73.0	3.77 95.8	2.28 57.9	7.54 191.5	–	–	4.00 101.6	4.22 107.2	4.50 114.3	1.77 45.0
76.1 mm	3.000 76.1	3.77 95.8	2.28 57.9	7.54 191.5	–	–	4.00 101.6	4.22 107.2	4.50 114.3	1.77 45.0
3 88.9	3.500 88.9	3.77 95.8	2.53 64.3	7.79 197.9	–	–	4.50 114.3	4.22 107.2	4.50 114.3	1.77 45.0
108 mm	4.250 108.0	4.63 117.6	2.88 73.2	8.81 223.8	–	–	5.50 139.7	4.22 107.2	4.50 114.3	2.20 55.9
4 114.3	4.500 114.3	4.63 117.6	2.88 73.2	8.81 223.8	–	–	5.50 139.7	4.22 107.2	4.50 114.3	2.20 55.9
133 mm	5.250 133.0	5.88 149.4	3.35 85.1	10.88 276.4	–	–	6.56 166.6	6.19 157.2	6.30 160.0	2.58 65.5
139.7 mm	5.500 139.7	5.88 149.4	3.35 85.1	10.88 276.4	–	–	6.56 166.6	6.19 157.2	6.30 160.0	2.58 65.6
5 141.3	5.563 141.3	5.88 149.4	3.35 85.1	10.88 276.4	–	–	6.56 166.6	6.19 157.2	6.30 160.0	2.58 65.5
159 mm	6.250 159.0	5.88 149.4	3.84 97.5	11.38 289.1	–	0.41 10.4	7.52 191.0	6.19 157.2	6.30 160.0	2.58 65.5
165.1 mm	6.500 165.1	5.88 149.4	3.84 97.5	11.38 289.1	–	0.41 10.4	7.52 191.0	6.19 157.2	6.30 160.0	2.58 65.5
6 168.3	6.625 168.3	5.88 149.4	3.84 97.5	11.38 289.1	–	0.41 10.4	7.52 191.0	6.19 157.2	6.30 160.0	1.90 48.3
8 219.1	8.625 219.1	5.33 135.4	5.07 128.8	13.53 343.6	0.80 20.3	1.47 37.3	10.00 254.0	6.19 157.2	8.10 205.7	2.33 59.2
10 273	10.750 273.0	6.40 162.6	6.37 161.8	15.64 397.3	1.41 35.8	1.81 46.0	12.25 311.2	8.10 205.7	9.00 228.6	–
12 323.9	12.750 323.9	6.50 165.1	7.36 186.9	16.64 422.7	2.30 58.4	2.80 71.1	14.25 362.0	8.10 205.7	9.00 228.6	–

Performance:

The chart expresses the frictional resistance of Victaulic Series 705 Butterfly Valve in equivalent feet/ meters of straight pipe.

Nominal Size mm inches	Outside Diameter mm inches	Equivalent Feet/m of pipe
2 50	2.375 60.3	6 1.8
2½ 65	2.875 73.0	6 1.8
76.1 mm	3.000 76.1	6 1.8
3 80	3.500 88.9	7 2.1
4 100	4.500 114.3	8 2.4
108 mm	108 mm	8 2.4
5 125	5.563 141.3	12 3.7
133 mm	133 mm	12 3.7
139.7 mm	5.500 139.7	12 3.7
6 150	6.625 168.3	14 4.2
159 mm	159 mm	14 4.3
165.1 mm	6.500 165.1	14 4.2
8 200	8.625 219.1	16 4.9
10 250	10.750 273.0	18 5.5
12 300	12.750 323.9	19 5.8

Performance:

C_v values for flow of water at +60°F/+16°C through a fully open valve are shown in the table below. For additional details, contact Victaulic.

Formulas for C_v values

$$\Delta P = Q^2 / C_v^2$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Flow Coefficient	C_v
Q (Flow)	GPM
ΔP (Pressure Drop)	psi

Valve Size		Full Open
Nominal Size inches mm	Actual Outside Diameter inches mm	Flow Coefficient C_v
2 50	2.375 60.3	170
2½ 65	2.875 73.0	260
76.1 mm	3.000 76.1	260
3 80	3.500 88.9	440
4 100	4.500 114.3	820
108 mm	108 mm	820
5 125	5.563 141.3	1200
133 mm	133 mm	1200
139.7 mm	5.500 139.7	1200
6 150	6.625 168.3	1800
159 mm	159 mm	1800
165.1 mm	6.500 165.1	1800
8 200	8.625 219.1	3400
10 250	10.750 273.0	5800
12 300	12.750 323.9	9000

Formulas for K_v values

$$\Delta P = Q^2 / K_v^2$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

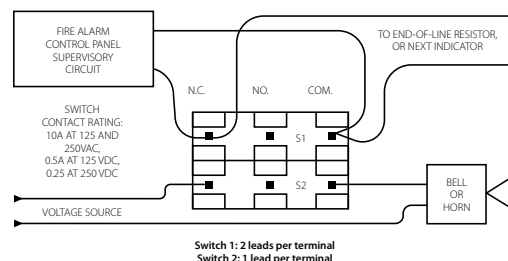
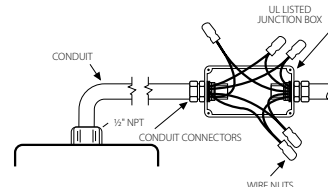
Flow Factor	K_v
Q (Flow)	m³/hr
ΔP (Pressure)	bar

Valve Size		Full Open
Nominal Size inches mm	Actual Outside Diameter inches mm	Flow Coefficient K_v
2 50	2.375 60.3	147
2½ 65	2.875 73.0	225
76.1 mm	3.000 76.1	225
3 80	3.500 88.9	380
4 100	4.500 114.3	710
108 mm	108 mm	710
5 125	5.563 141.3	1040
133 mm	133 mm	1040
139.7 mm	5.500 139.7	1040
6 150	6.625 168.3	1560
159 mm	159 mm	1560
165.1 mm	6.500 165.1	1560
8 200	8.625 219.1	2940
10 250	10.750 273.0	5020
12 300	12.750 323.9	7790

Switch and Wiring:

1. The supervisory switch contains two single pole, double throw, pre-wired switches.
2. Switches are rated:
10 amps @ 125 or 250 VAC/60 Hz
0.50 amps @ 125 VDC
0.25 amps @ 250 VDC
3. Switches supervise the valve in the “OPEN” position.
5. One switch has two #18 insulated wires per terminal, which permit complete supervision of leads (refer to diagrams and notes below). The second switch has one #18 insulated wire per terminal. This double circuit provides flexibility to operate two electrical devices at separate locations, such as an indicating light and an audible alarm, in the area that the valve is installed.
6. A #14 insulated ground lead (green) is provided.
Switch #1 = S1
For connection to the supervisory circuit of a UL Listed alarm control panel
Switch #2 = S2
Auxiliary switch that may be connected to auxiliary devices, per the authority having jurisdiction

S1	{	Normally Closed: (2) Blue
		Common: (2) Yellow
S2	{	Normally Closed: Blue with Orange Stripe
		Normally Open: Brown with Orange Stripe
		Common: Yellow with Orange Stripe



NOTE: The above diagram shows a connection between the common terminal (yellow – S1 and yellow-with-orange stripe – S2) and the normally closed terminal (blue – S1 and blue-with-orange stripe – S2). In this example, the indicator light and alarm will stay on until the valve is fully open. When the valve is fully open, the indicator light and alarm will go out. Cap off any unused wires (e.g. brown with orange stripe).

Only S1 (two leads per terminal) may be connected to the fire alarm control panel.

The connection of the alarm switch wiring shall be in accordance with NFPA 72 and the auxiliary switch per NFPA 70 (NEC).

Installation

Reference should always be made to the [I-100 Victaulic Field Installation Handbook](#) for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Trademarks

Victaulic® is a registered trademark of Victaulic Company.



TECHNICAL DATA

SWING CHECK VALVE MODEL D-1 & G-1

213

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Swing Check Valve is a general purpose rubber-faced check valve approved for use in fire protection systems. The Swing Check Valve is manufactured with a ductile iron body, brass seat, and a rubber-faced clapper assembly, hinged to a removable access cover for easy inspection and maintenance.

The valve may be installed vertically or horizontally with access cover facing up. For availability of flanged-flanged and grooved-grooved options, refer to Table 1. Tapped openings (with plugs) and gauge connections are provided on both the inlet and outlet chambers of the valve.

FEATURES

- A. Ductile iron body for less weight and extra strength.
- B. Rated to 300 psi (20.7 bar) water working pressure.
- C. Rubber-faced clapper hinged to access cover for quick removal and easy servicing. All moving parts can be serviced without removing the valve from the installed position.
- D. With the cover/clapper assembly removed, the clapper rubber replacement requires removal of only one screw.
- E. Can be installed vertically or horizontally with access cover facing up.



2. LISTINGS AND APPROVALS

cULus Listed: Guide No. HMER

FM Approved: Single Check Valves

NYC Department of Buildings: MEA 89-92-E, Vol. XI

3. TECHNICAL DATA

Specifications:

Rated to 300 psi (20.7 bar) water working pressure.

Factory tested hydrostatically to 600 psi (41.4 bar).

Standard Flanged Connections: ANSI B16.42 Class 150 (mates with ANSI Class 125 and Class 150 flanges).

Standard Grooved Connections: ANSI/AWWA C606

Tapped Bosses: 2-1/2" (DN65), 3" (DN80) and 4" (DN100): Two 1/2" (15 mm) NPT
6" (DN150) and 8" (DN200): Two 3/4" (20 mm) NPT

Material Standards: Refer to Figure 1.

Ordering Information: Refer to Table 1 for part numbers and shipping weight.

Viking Technical Data may be found on The Viking Corporation's Web site at <http://www.vikinggroupinc.com>. The Web site may include a more recent edition of this Technical Data Page.

Table 1

Size Valve Nominal	Inlet Type	Outlet Type	Friction Loss*	Shipping Weight	Part No.
2-1/2" (DN65)	Groove	Groove	6 ft.(1.8 m)	16 lbs. (7 kg)	05497C
3" (DN80)	Goove	Groove	10 ft. (3.1 m)	20 lbs. (9 kg)	08536
4" (DN100)	Flange	Flange	13 ft. (4.0 m)	47 lbs. (21 kg)	08538
4" (DN100)	Groove	Groove	13 ft. (4.0 m)	27 lbs. (12 kg)	08539
6" (DN150)	Flange	Flange	20 ft. (6.0 m)	75 lbs. (34 kg)	08542
6" (DN150)	Groove	Groove	20 ft. (6.0 m)	51 lbs. (23 kg)	08543
8" (DN200)	Flange	Flange	23 ft. (7.0 m)	135 lbs. (61 kg)	08546
8" (DN200)	Groove	Groove	23 ft. (7.0 m)	106 lbs. (48 kg)	08547

*Expressed in equivalent length of Schedule 40 pipe based on Hazen & Williams formula: C = 120.

Systems with water working pressures above 175 psi (12 bar) may require extra-heavy pattern fittings. Viking Swing Check Valve flanges are Ductile Iron ANSI B16.42, Class 150, with a maximum water working pressure of 300 psi (20.7 bar). ANSI B16.42, Class 150 flanges are NOT compatible with ANSI Class 250 or Class 300 flanges. To mate the Viking Swing Check Valve with ANSI Class 250 or Class 300 flanges, use the grooved-inlet/grooved-outlet style installed with listed grooved/ flanged adapters of the appropriate pressure rating. For piping with grooved connections, the grooved-inlet/grooved-outlet style Swing Check Valve may be installed with listed grooved couplings of the appropriate pressure rating.



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4. INSTALLATION

The Swing Check Valve must be installed in an area not subject to physical damage. When corrosive atmospheres and/or contaminated water supplies are present, it is the owner's responsibility to verify compatibility with the Swing Check Valve and associated equipment. Prior to installing the valve, thoroughly flush the water supply piping to verify that no foreign matter is present. The Swing Check Valve may be installed in the vertical position with direction of flow up, or in the horizontal position with the access cover up.

Systems with water working pressures above 175 psi (12 bar) may require extra-heavy pattern fittings. Viking Swing Check Valve flanges are Ductile Iron ANSI B16.42, Class 150, with a maximum water working pressure of 300 psi (20.7 bar). ANSI B16.42, Class 150 flanges are not compatible with ANSI Class 250 or Class 300 flanges. To mate the Viking Swing Check Valve with ANSI Class 250 or Class 300 flanges, use the grooved-inlet/grooved-outlet style installed with listed grooved/flanged adapters of the appropriate pressure rating. For piping with grooved connections, the grooved-inlet/grooved-outlet style Swing Check Valve may be installed with listed grooved couplings of the appropriate pressure rating.

5. OPERATION (Refer to Figure 1)

Flow through the Viking Swing Check Valve lifts the rubber-gasketed clapper (8, and 9) off the seat (12) to enter the sprinkler piping. When flow through the valve stops, the clapper (8) closes quickly. The rubber gasket (9) forms a tight seal against the brass water seat (12), trapping pressure above the clapper and preventing reverse flow from sprinkler piping.

Hydrostatic Test:

The Swing Check Valve is manufactured and listed for use at a maximum water working pressure of 300 psi (20.7 bar). The valve is factory tested at 600 psi (41.4 bar). Check Valves may be hydrostatically tested (in accordance with NFPA 13) at 350 psi (24.1 bar) and/or 50 psi (3.4 bar) above the normal water working pressure for limited periods of time (two hours) for the purpose of acceptance by the Authority Having Jurisdiction. If air testing is required, do not exceed 40 psi (2.8 bar) air pressure.

6. INSPECTIONS, TESTS AND MAINTENANCE

NOTICE: The owner is responsible for maintaining the fire-protection system and devices in proper operating condition.

The Viking Swing Check Valve must be kept free of foreign matter, freezing conditions (when used on wet systems), corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the device.

It is imperative that the system be inspected and tested on a regular basis. The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, and corrosive atmospheres. For minimum maintenance and inspection requirements, refer to NFPA 25. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

WARNING: Any system maintenance which involves placing a control valve or detection system out of service may eliminate the fire-protection capabilities of that system. Prior to proceeding, notify all the Authority Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected areas.

6-A. Five-Year Internal Inspection

Internal inspection of Swing Check Valves is recommended every five years unless inspections and tests indicate more frequent inspections are required.

(Refer to Figure 1)

1. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the area affected that the system will be taken out of service. Consideration should be given to employment of a fire patrol in the affected areas.
2. Close the water supply main control valve, placing the system out of service.
3. Open the main drain. If necessary, open the system test valve to vent and completely drain the system.
4. Use the appropriate wrench to loosen and remove the cover screws (14), and remove the cover/clapper assembly (2-11).
5. Inspect the water seat (12). Wipe away all contaminants, dirt, and mineral deposits. DO NOT use solvents or abrasives.
6. Inspect the cover/clapper assembly (2-11) and the cover gasket (13). Test the hinged clapper (8) for freedom of movement. Renew or replace damaged or worn parts as required.

CAUTION: Never apply any lubricant to seats, gaskets, or any internal operating parts of the valve. Petroleum-based grease or oil will damage rubber components and may prevent proper operation.

7. When Internal inspection of the Check Valve is complete, perform step 6 of paragraph 11. VALVE MAINTENANCE to re-install the cover/clapper assembly (2-11).



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6-B. Valve Maintenance

(Refer to Figure 1)

1. Perform steps 1 through 5 of paragraph 6.A - FIVE-YEAR INTERNAL INSPECTION.
2. To remove clapper rubber (9):
 - a. Use the appropriate wrenches to loosen and remove the button-head socket screw (11), hex nut (6), sealing washer (7), and rubber retainer (10).
 - b. Remove the clapper rubber (9) for inspection. If the clapper rubber shows signs of wear, such as cracking, cuts, or excessively deep grooves where the rubber contacts the water seat, replace the rubber.
3. To re-install clapper rubber (9):
 - a. Place the clapper rubber (9) over the center hub of the rubber retainer (10).
 - b. Position the retainer (10) (with rubber in place) against the clapper (8) as shown in Figure 1.
 - c. Replace and tighten the button-head socket screw (11), sealing washer (7), and hex nut (6). The sealing washer (7) and hex nut (6) must be located on the top side of the clapper as shown in Figure 1. Do not over-tighten.
4. To remove clapper (8), and/or hinge pin (4):
 - a. Remove the hinge pin retaining rings (5) to free the hinge pin (4) for removal. After the hinge pin (4) is removed, the clapper (8) can be removed.
5. To re-install clapper (8), and/or hinge pin (4):
 - a. Verify that the clapper rubber (9) is in good condition and that it is properly installed.
 - b. Position the clapper (8) with the elongated hinge holes aligned between the holes of the hinge bracket welded inside the cover (2). The system (top) side of the clapper (8) must face the direction indicated by the flow arrow stamped inside the cover (2).
 - c. Insert the hinge pin (4) through the holes at one end of the hinge assembly. Continue to push the hinge pin (4) through the holes at the remaining end of the hinge assembly.
 - d. Re-install the hinge pin retaining rings (5).
6. To re-install cover/clapper assembly (2-11):
 - a. Verify that cover gasket (13) is in position and in good condition.
 - b. Slide the cover/clapper assembly (2-11) into the Swing Check Valve so that the clapper rubber (9) contacts the water seat (12).
 - c. Replace the cover screws (14). Use the appropriate wrench to cross-tighten all screws to the torque value shown in Table 2 for the valve used. DO NOT over-tighten.

7. AVAILABILITY

The Viking Swing Check Valve is available through a network of domestic and international distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

8. GUARANTEES

For details of warranty, refer to Viking's current list price schedule or contact The Viking Corporation directly.

Table 2: Torque Values for Viking Swing Check Valve Cover Screws

Valve Size	Screw Size	Torque Values
2-1/2" (DN65)	3/8"-16 HHC	19 ft-lbs 2.63 kg-m
3" (DN80)	3/8"-16 HHC	19 ft-lbs 2.63 kg-m
4" (DN100)	3/8"-16 HHC	19 ft-lbs 2.63 kg-m
6" (DN150)	1/2"-13 HHC	45 ft-lbs 6.23 kg-m
8" (DN200)	5/8"-11 HHC	93 ft-lbs 12.9 kg-m



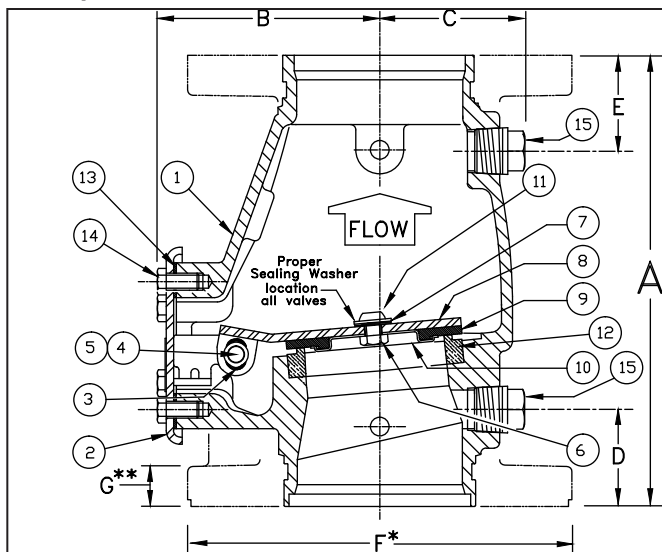
TECHNICAL DATA

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The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



SIZE	A	B	C	D	E	F	G**
2-1/2" (65mm)	9" (228,6)	4-1/2" (114,3)	2-5/8" (66,7)	2" (50,8)	2" (50,8)	Flg-Flg Not Available	
3" (80mm)	10-1/8" (257)	4-13/16" (122,2)	2-11/16" (68,3)	2-9/32" (58,1)	2-9/32" (58,1)	Flg-Flg Not Available	
4" (100mm)	10-5/8" (269,9)	5-3/16" (131,8)	3-1/8" (79,4)	2-1/4" (57,2)	2-1/4" (57,2)	9" (228,6)	15/16" (23,81)
6" (150mm)	13-3/8" (340)	6-13/16" (173,3)	4-1/16" (103,2)	2-1/4" (57,2)	2-1/4" (57,2)	11" (279,4)	1" (25,4)
8" (200mm)	17" (431,8)	8-13/16" (223,4)	5" (127)	2-1/2" (63,4)	2-7/8" (73,0)	13-1/2" (342,9)	1-1/8" (28,58)

Dimensions shown in parentheses are millimeters.

** 4", 6", and 8" valves are manufactured with sculptured flanges.
Dimension indicates thickness of flange at bolt holes.

Figure 1

ITEM NO.	PART NUMBER					DESCRIPTION	MATERIAL	NO. REQ'D				
	D-1	G-1	G-1	G-1	G-1			2-1/2"	3"	4"	6"	8"
	2-1/2" (DN65)	3" (DN80)	4" (DN100)	6" (DN150)	8" (DN200)							
1	--	--	--	--	--	Body	Ductile Iron, ASTM A536 (65-45-12)	1	1	1	1	1
2	--	--	--	--	--	Cover Assembly, 300 PSI WWP	E-Coated HSLA Steel, A715 and Stainless Steel, UNS-S30400	1	1	1	1	1
3	07576	07576	07576	07576	None	Bushing	Lubricomp 189 Ryton	2	2	2	2	0
4	05355A	05355A	04900A	04991A	05334A	Clapper Hinge Pin	Stainless Steel, UNS-S30400	1	1	1	1	1
5	05445A	05445A	05445A	05445A	05369A	Hinge Pin Retaining Ring	Stainless Steel, UNS-S15700	2	2	2	2	2
6	01755A					Clapper Hex Jam Nut #10-24 UNC	Stainless Steel, UNS-S30400	1	0	0	0	0
		08159	08159			Clapper Hex Jam Nut 3/8"-24 UNF	Stainless Steel, UNS-S30400	0	1	1	0	0
				08144	08144	Clapper Hex Jam Nut 1/2"-20 UNC	Stainless Steel, UNS-S30400	0	0	0	1	1
7	06595A	08158	08158	08143	08143	Sealing Washer	EPDM and Stainless Steel	1	1	1	1	1
8	*	*	*	*	*	Clapper	Teflon® Coated HR Steel UNS-G10180	1	1	1	1	1
9	*	*	*	*	*	Clapper Rubber	EPDM, ASTM D2000	1	1	1	1	1
10	*	*	*	*	*	Clapper Rubber Retainer	Stainless Steel, UNS-S30400	1	1	1	1	1
11	06595A					H.H.C. Screw #10-24 UNC x 1/2" (12.7 mm) lg.	Stainless Steel, UNS-S30400	1	0	0	0	0
		10194	10194			Screw, Button Head, Socket, 3/8" - 24 UNF x 1/2"	Stainless Steel, UNS-S30400	0	1	1	0	0
				10308		Screw, Button Head, Socket, 1/2" - 20 UNF x 3/4" (19.1 mm) lg.	Stainless Steel, UNS-S30400	0	0	0	1	1
					10686	Screw, Button Head, Socket, 1/2" - 20 UNF x 7/8"	Stainless Steel, UNS-S30400	0	0	0	0	1
12	--	--	--	--	--	Seat	Brass, UNS-C84400	1	1	1	1	1
13	05354B	05354B	04649B	04992B	05339C	Cover Gasket	EPDM, ASTM D2000	1	1	1	1	1
14	01517A	01517A	01517A			H.H.C. Screw 3/8"-16 UNC x 3/4" (19.1 mm) lg.	Steel, Zinc Plated	4	4	6	0	0
				04993A		H.H.C. Screw 1/2"-13 UNC x 7/8" (22.2 mm) lg.	Steel, Zinc Plated	0	0	0	6	0
					01922A	H.H.C. Screw 5/8"-11 UNC x 1-1/4" (31.8 mm) lg.	Steel, Zinc Plated	0	0	0	0	6
15	--	--	--			1/2" (15 mm) NPT Pipe Plug	Steel	2	2	2	0	0
				--	--	3/4" (20 mm) NPT Pipe Plug	Steel	0	0	0	2	2

-- Indicates replacement part is not available

* Indicates replacement part only available in a Sub-Assembly listed below.

Sub-Assemblies

3, 6-11	05499B	08518	08519	08520	08521	Clapper Assembly
9, 10	--	14864	14865	14866	--	Replacement Clapper Rubber Kit*

*Clapper rubbers are different on 3", 4", & 6" G-1 valve than original manufacture. If clapper rubber requires replacement, order replacement rubber kit.

210523 - Valves for Fire Protection Piping

175 PSI WWP Bronze Gate Valves

Fire Protection Valve • Screw-over Bonnet •
Outside Screw and Yoke • Solid Wedge

175 PSI/12.1 Bar Non-Shock Cold Water
(400 PSI Non-Shock CWP General Service)

UL/ULC LISTED* • FM APPROVED •
APPROVED BY THE NEW YORK CITY B.S.A. 143-69-SA

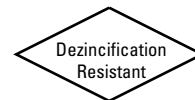
MATERIAL LIST

PART	SPECIFICATION
1. Set Screw	Steel ASTM A307
2. Handwheel	Malleable Iron
3. Yoke Bushing	Brass ASTM B16
4. Gland Bolts	Steel ASTM A307 Zinc Plated
5. Packing Gland	Bronze ASTM B62
6. Packing	Non Asbestos Aramid Fibers w/Graphite
7. Bonnet	Bronze ASTM B62
8. Stem	Silicon Bronze ASTM B371 Alloy C69430
9. Stem Collar	Silicon Bronze ASTM B371 Alloy C69430
10. Wedge Pin	Bronze ASTM B140 Alloy C31400
11. Wedge	Bronze ASTM B62
12. Body	Bronze ASTM B62

DIMENSIONS—WEIGHTS—QUANTITIES

Size		Dimensions				Diameter		Handwheel		Box Qty.	Master Ctn. Qty.
		A		B				Weight			
In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.		
1/2	15	2.19	59	5.88	149	3.25	88	2.28	1.04	1	20
3/4	20	2.44	62	6.44	164	3.25	88	2.83	1.29	1	20
1	25	2.88	73	7.44	189	3.25	88	3.67	1.67	1	10
1 1/4	32	3.13	79	8.69	221	4.00	100	5.83	2.65	1	10
1 1/2	40	3.38	84	9.38	238	4.00	100	6.84	3.11	1	10
2	50	3.44	87	10.59	269	3.50	89	9.74	4.44	1	6

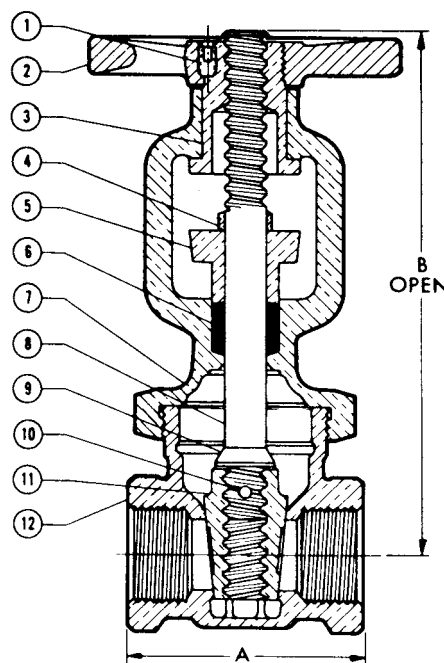
* Compliance with Standard for Gate Valves for Fire Protection Service, UL 262, and the Canadian Requirements.



215



T-104-0
Threaded



T-104-0
NPT x NPT



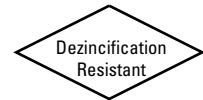
210523 - Valves for Fire Protection Piping

175 PSI WWP Bronze Angle Valves

Fire Protection Valve • Screw-in Bonnet • Integral Seat • Renewable Disc

175 PSI/12.1 Bar Non-Shock Cold Water

CONFORMS TO MSS SP-80 • UL/ULC LISTED*



216

MATERIAL LIST

PART	SPECIFICATION
1. Handwheel Nut	300 Series Stainless Steel
2. Identification Plate	Aluminum
3. Handwheel	Aluminum Commercial Alloy C38000
4. Stem	Silicon Bronze ASTM B371 Alloy C69430
5. Packing Gland	Bronze ASTM B62/ ASTM B16†/ ASTM B584 Alloy C84400
6. Packing Nut	Bronze ASTM B62/ ASTM B584 Alloy C84400/ASTM B16
7. Packing	Non Asbestos Aramid Fibers w/Graphite
8. Bonnet	Bronze ASTM B62 Alloy C83600
9. Disc Holder Nut	Bronze ASTM B62 Alloy C83600
10. Disc Holder	Bronze ASTM B62 Alloy C83600
11. Seat Disc	Nitrile (W) (1 1/4" - 2") PTFE (Y) (2 1/2" - 3")
12. Seat Disc Nut	Bronze ASTM B62†/ ASTM B96 Alloy C65100 w/SS Washer
13. Body	Bronze ASTM B62/B584 Alloy C83600

‡ 2 1/2" and 3" size only.
† Not on 2"

DIMENSIONS—WEIGHTS—QUANTITIES

Size		Dimensions						Weight		Box Qty.	Master Ctn. Qty.
		A		B		H					
In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.		
1¼	32	2.19	56	6.13	156	2.19	56	3.71	1.69	1	10
1½	40	2.38	60	7.19	183	2.38	60	5.54	2.52	1	10
2	50	2.25	57	7.25	184	2.25	57	6.72	3.05	1	10
**2½	65	3.19	81	10.56	268	3.19	81	16.13	7.33	1	2
**3	80	3.88	86	11.13	283	3.88	86	21.72	9.87	1	2

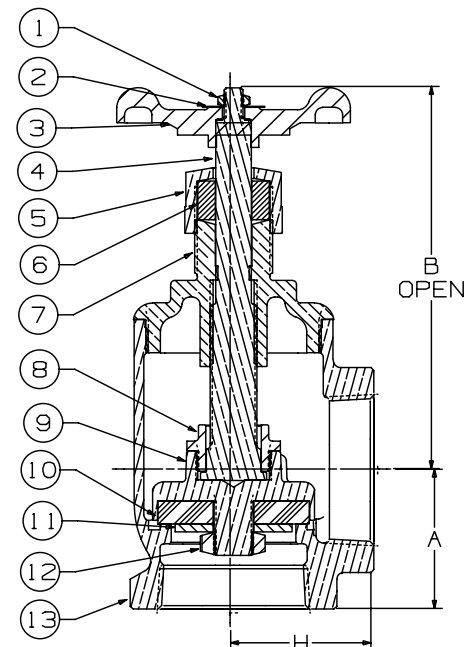
* UL/ULC Listed for sizes for trim and drain use (Subject 258) - Sizes 1 1/4", 1 1/2", 2".

** Sizes 2 1/2" and 3" supplied as T-311-Y with PTFE seat disc. Subject to AHJ Approval.

NOTE: See KT-67-UL for 1/2"-1" sizes.



T-301-W
Threaded



T-301-W
NPT x NPT

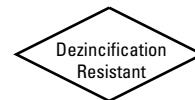


210523 - Valves for Fire Protection Piping

175 PSI WWP Bronze Globe Valves

Fire Protection Valve • Threaded Ends • Rubber Disc • Screw Over Bonnet

217


175 PSI/12.1 Bar Non-Shock Cold Water

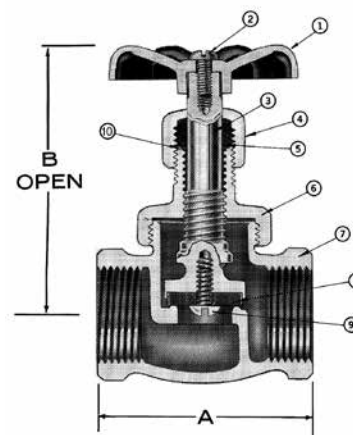
UL LISTED*

MATERIAL LIST

PART	SPECIFICATION
1. Handwheel	Aluminum
2. Handwheel Screw	Carbon Steel Stainless Steel (1")
3. Stem	Bronze ASTM B584 Alloy C84400 or ASTM B505 Alloy C84400
4. Packing Nut	Bronze ASTM B584 Alloy C83600 or ASTM B16
5. Packing	Graphite Impregnated (Non Asbestos)
6. Bonnet	Bronze ASTM B584 Alloy C84400
7. Body	Bronze ASTM B584 Alloy C84400
8. Seat Disc	EPDM Rubber (1/4" - 3/8") Nitrile (1/2" - 1")
9. Seat Screw	Stainless Steel
10. Pack Washer	Sheet Brass



KT-65-UL
Threaded



KT-65-UL
NPT x NPT

DIMENSIONS—WEIGHTS—QUANTITIES

		Dimensions				Weight		Box Qty.	Master Ctn. Qty.
Size		A		B		Lbs.	Kg.		
In.	mm.	In.	mm.	In.	mm.				
† 1/4	8	2.00	50	2.75	70	.48	.22	10	100
† 3/8	10	2.00	50	2.75	70	.45	.20	10	100
1/2	15	2.28	58	3.12	79	.68	.31	10	60
3/4	20	2.28	58	3.12	79	.74	.34	10	60
1	25	3.12	79	4.50	114	1.68	.76	5	25

* UL Listed for Trim and Drain use (Subject 258) – sizes 1/2", 3/4", 1".

Size 1/4" and 3/8" supplied as KT-65 (Not UL Listed). Subject to AHJ Approval.

† NOTE: See KT-211-W-UL for 1 1/4" - 2" sizes.



210523 - Valves for Fire Protection Piping

175 PSI WWP Bronze Globe Valves

Fire Protection Valve • Screw-in Bonnet • Integral Seat • Renewable Disc

175 PSI/12.1 Bar Non-Shock Cold Water

CONFORMS TO MSS SP-80 • UL LISTED*

MATERIAL LIST

PART	SPECIFICATION
1. Handwheel Nut	300 Series Stainless Steel
2. Identification Plate	Aluminum
3. Handwheel	Aluminum Commercial Alloy 380
4. Stem	Silicon Bronze ASTM B371 Alloy C69430
5. Packing Gland	Bronze ASTM B62 or ASTM B584 Alloy C84400 or ASTM B282 or ASTM B16
6. Packing Nut	Bronze ASTM B62 or ASTM B584 Alloy C84400 or ASTM B16
7. Packing	Non Asbestos Aramid Fibers w/Graphite
8. Bonnet	Bronze ASTM B62
9. Disc Holder Nut	Bronze ASTM B140 Alloy C31400 or B62
10. Disc Holder	Bronze ASTM B62±/ ASTM B 9 Alloy C65100 w/SS Washer
11. Seat Disc	Nitrile (W) (1 1/4" - 2") PTFE (Y) (2 1/2" - 3")
±12. Disc Nut	Bronze ASTM B62/ASTM 89 Alloy C65100 w/SS Washer
13. Body	Bronze ASTM B62

± 2 1/2" and 3" size only.

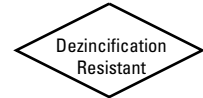
DIMENSIONS—WEIGHTS—QUANTITIES

Size	Dimensions				Weight		Box Qty.		Master Ctn. Qty.	
	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.		
1 1/4	32	4.31	110	6.13	156	3.55	1.61	2	10	
1 1/2	40	4.69	119	7.19	183	5.50	2.49	2	10	
2	50	5.38	143	7.94	202	8.25	3.75	2	6	
**2 1/2	65	6.63	168	10.19	259	15.40	7.00	1	2	
**3	80	7.75	197	11.19	284	22.44	10.20	1	2	

* UL Listed for Trim and Drain use (Subject 258) – sizes 1 1/4", 1 1/2", 2".

** Sizes 2 1/2" and 3" supplied as T-211-Y with PTFE seat disc. Subject to AHJ Approval.

NOTE: See KT-65-UL for 1/2"-1" sizes.

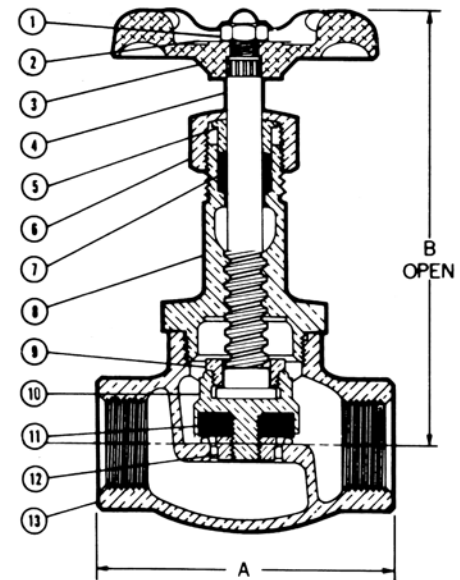


219



KT-211-W-UL

Threaded



KT-211-W-UL
NPT x NPT



210523 - Valves for Fire Protection Piping

400 PSI WWP Bronze Side Outlet Globe Valves

Fire Protection Valve • 3-Way Valve • Screw-in Bonnet • Integral Seat • Renewable Disc

400 PSI/27.6 Bar Non-Shock Cold Water

Dezincification
Resistant

220

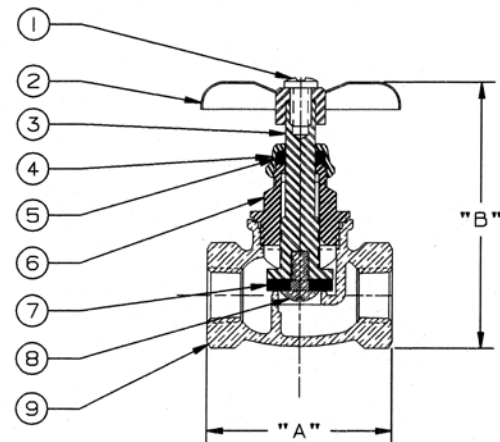
MATERIAL LIST

PART	SPECIFICATION
1. Handwheel Screw	Zinc Plated Steel
2. Handwheel	Aluminum ASTM B85 Alloy C38000
3. Stem	ASTM B133 Alloy C10200
4. Packing Nut	ASTM B16 Alloy C36000
5. Packing	Non Asbestos Aramid Fibers w/Graphite
6. Bonnet	Bronze ASTM B584 Alloy C84400
7. Disc	Nitrile
8. Disc Screw	Stainless Steel ASTM A276 Alloy S43000
9. Body	Bronze ASTM B584 Alloy C84400



KT-291-W3

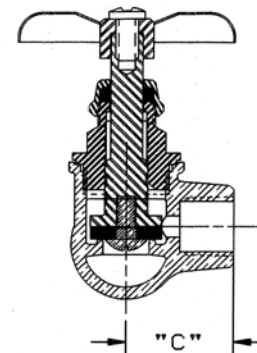
Threaded



KT-291-W3
NPT x NPT x NPT

DIMENSIONS—WEIGHTS—QUANTITIES

Size		Dimensions						Weight		Box Qty.	Master Ctn.	Qty
		A		B		C						
In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.			
1/4	8	1.75	44	2.25	57	.94	24	.41	.19	10		100



210523 - Valves for Fire Protection Piping

200 PSI WWP Bronze Check Valves

Fire Protection Valve • Horizontal Swing • Rubber Disc

200 PSI/13.8 Bar Non-Shock Cold Water

CONFORMS TO MSS SP-80

MATERIAL LIST

PART	SPECIFICATION
1. Bonnet	Bronze ASTM B62 or B584 Alloy C84400
2. Body	Bronze ASTM B62 or B584 Alloy C84400
3. Hinge Pin	Bronze ASTM B140 Alloy C31400 or B134 Alloy C23000
4. Disc Hanger	Bronze ASTM B62
5. Hanger Nut	Bronze ASTM B97 Alloy C65500 or Brass ASTM B16
6. Disc Holder	Bronze ASTM B62
7. Seat Disc	Nitrile (W) PTFE (Y)†
8. Seat Disc Nut	Brass ASTM B16 or B97 Alloy C65500
9. Hinge Pin Plug	Bronze ASTM B140 Alloy C32000 (Not Shown)
*10. Seat Disc Washer	Stainless Steel

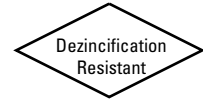
* Sizes ¾", 1", 1¼" and 1½" only.

† 2½" and 3" size only.

DIMENSIONS—WEIGHTS—QUANTITIES

Size	Dimensions				Weight		Box Qty.		Master Ctn. Qty.	
	In.	mm.	A	B	In.	mm.	Lbs.	Kg.		
½	15	2.44	62	1.69	43	.58	.26	10	50	
¾	20	2.94	75	1.88	48	.92	.42	10	50	
1	25	3.56	90	2.31	59	1.55	.70	5	30	
1¼	32	4.19	106	2.69	68	2.32	1.05	5	20	
1½	40	4.50	114	2.94	75	3.00	1.36	2	10	
2	50	5.25	133	3.81	97	4.87	2.21	2	10	
2½	65	8.00	203	5.06	129	11.48	5.22	1	5	
3	80	9.25	235	6.25	159	17.53	7.97	1	4	

Sizes 2½" and 3" supplied as T-433-Y with PTFE seat disc.

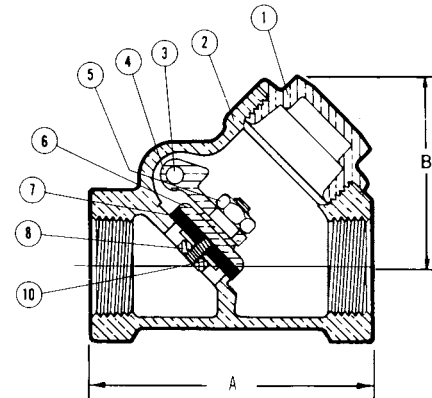


222



KT-403-W

Threaded



KT-403-W
NPT x NPT

NIBCO check valves may be installed in both horizontal and vertical lines with upward flow or in any intermediate position.

WARNING - Valve must be installed downstream of receiver tank if used in line with reciprocating air compressor.

210523 - Valves for Fire Protection Piping

300 PSI WWP Bronze Ball Valves

Fire Protection Valve • Two-Piece Body • Chrome Plated Ball •
Blowout-Proof Stem • Reinforced PTFE Seats

300 PSI/20.7 Bar Non-Shock Cold Water

CONFORMS TO MSS SP-110 • UL LISTED† •
FM APPROVED†

MATERIAL LIST

PART	SPECIFICATION
1. Handle Nut	Zinc Plated Steel
2. Handle	Zinc Plated Steel Clear Chromate with Platisol Grip
3. Threaded Pack Gland	Brass ASTM B16
4. Packing	PTFE
5. Stem	Silicon Bronze ASTM B371 Alloy C69430 or ASTM B99 Alloy C65100
6. Thrust Washer	Reinforced PTFE
7. Ball	Brass ASTM B124 Alloy C37700 or ASTM B16 Alloy C36000 with Hard Chrome Plate
8. Seat Ring (2)	Reinforced PTFE
9. Body	Cast Red Bronze ASTM B584 Alloy C84400
10. Body End Piece	Cast Red Bronze ASTM B584 Alloy C84400

1/4" and 3/8" size only has A304 stainless steel grounding washer.

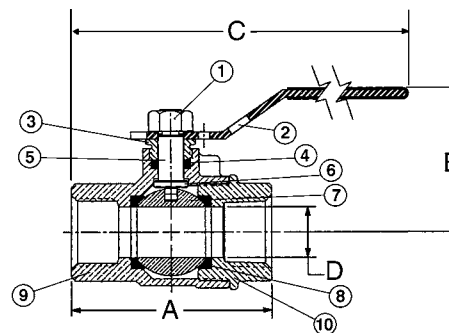


KT-585-70-UL

1/4" - 1" Full Port
Threaded

KT-580-70-UL

1 1/4" - 2" Standard Port
Threaded



KT-585-70-UL

Full Port
NPT x NPT

KT-580-70-UL

Standard Port
NPT x NPT

DIMENSIONS—WEIGHTS—QUANTITIES

KT-585-70-UL Dimensions													
Size		A		B		C		D Port		Weight		Box	Master
In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.	Qty.	Ctn. Qty.
¼	8	2.00	51	1.75	44	5.00	127	.38	10	.45	.20	10	100
⅜	10	2.00	51	1.75	44	5.00	127	.38	10	.45	.20	10	100
½	15	2.44	62	1.88	48	5.19	132	.50	13	.64	.29	10	100
¾	20	2.94	75	2.25	57	6.25	159	.75	19	1.33	.60	5	50
1	25	3.34	85	2.38	59	6.44	164	1.00	25	1.79	.81	5	20

KT-580-70-UL Dimensions													
Size		A		B		C		D Port		Weight		Box	Master
In.	mm.	In.	mm.	In.	mm.	In.	mm.	In.	mm.	Lbs.	Kg.	Qty.	Ctn. Qty.
1 ¼	32	3.94	100	2.63	67	6.75	171	1.00	25	2.17	.99	5	20
1 ½	40	4.31	110	3.00	76	8.91	228	1.25	32	3.27	1.49	5	20
2	50	4.63	117	3.25	83	9.06	230	1.50	38	5.09	2.31	5	10
*2½	65	5.84	148	3.53	90	9.66	245	2.00	51	8.25	3.79	2	6
*3	80	7.09	202	4.41	112	11.53	293	2.50	64	15.65	7.11	1	4

† UL Listed, FM Approved for trim and drain use (UL Subject 258) – 585-70-UL 1/4" thru 1" – 580-70-UL 1 1/4" thru 2".

*2 1/2"-3" supplied as T-580-70-UL subject to AHJ approval.

DO NOT USE FOR NATURAL GAS



FireLock® Ball Valve

SERIES 728

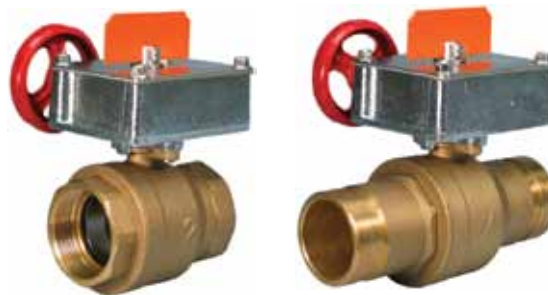
210523 - Valves for Fire Protection Piping

The Series 728 FireLock valve is a full port, ball valve that is UL/FM rated for 365psi/25 BAR service in all sizes (LPCB and VdS listed for 20 BAR services). Available with grooved or threaded ends (NPT), the valve body is brass. The ball is chrome plated brass with a stainless steel stem. Reinforced seats aid ease of operation and provide a durable, corrosion-free seat. Flow characteristics exceed UL Specification 1091 and FM Approval Standard 1112. The valve is approved for indoor and outdoor use.

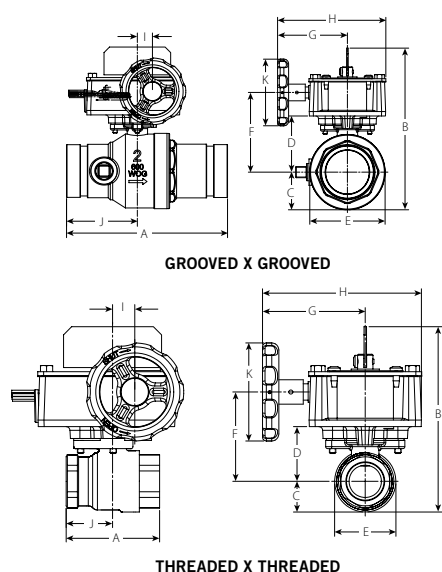


SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

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DIMENSIONS



Size	Dimensions – Inches/mm											Approx. Wgt. Each
Nominal Inches/mm	E to E A	Height B	C	D	E	F	G	H	I	J	K	Lbs. kg
1/25 Thd. X Thd.	2.84 72	4.74 120	0.91 23	1.67 42	1.82 46	2.40 61	3.15 80	4.86 123	0.68 17	1.42 36	3.00 76	5.1 2.3
1 1/4/32 Thd. X Thd.	3.31 84	4.95 126	1.10 28	1.88 48	2.20 56	2.61 66	3.15 80	4.86 123	0.68 17	1.65 42	3.00 76	5.8 2.6
1 1/2/40 Thd. X Thd.	3.66 92	5.13 130	1.29 33	2.06 52	2.58 66	2.79 71	3.15 80	4.86 123	0.68 17	1.83 47	3.00 76	6.6 3.0
2/50 Thd. X Thd.	4.33 110	5.49 140	1.69 43	2.42 62	3.38 86	3.15 80	3.15 80	4.86 123	0.68 17	2.16 55	3.00 76	8.5 3.9
1 1/4/32 Grv. X Grv.	7.25 184	4.95 126	1.10 28	1.87 48	2.20 56	2.61 66	3.15 80	4.86 123	0.68 17	3.19 81	3.00 76	7.5 3.4
1 1/2/40 Grv. X Grv.*	7.25 184	5.17 131	1.29 33	2.10 53	2.58 66	2.83 72	3.15 80	4.86 123	0.68 17	3.19 81	3.00 76	8.5 3.9
2/50 Grv. X Grv.*	7.25 184	5.47 139	1.69 43	2.40 61	3.38 86	3.13 80	3.15 80	4.86 123	0.68 17	3.19 81	3.00 76	10.5 4.8

* 1 1/2 and 2" / 40 and 50mm sizes feature a 1/2" / 12mm tap (Groove by Groove only).

PERFORMANCE

SIZE Nominal Inches/mm	Equivalent Feet/meters of Pipe	SIZE Nominal Inches/mm	Equivalent Feet/meters of Pipe
1/25 Thread X Thread	0.5 0.2	1 1/4/32 Groove X Groove	0.7 0.2
1 1/4/32 Thread X Thread	1.0 0.3	1 1/2/40 Groove X Groove	0.7 0.2
1 1/2/40 Thread X Thread	1.0 0.3	2/50 Groove X Groove	0.7 0.2
2/50 Thread X Thread	1.0 0.3		

JOB/OWNER

System No. _____

Location _____

CONTRACTOR

Submitted By _____

Date _____

ENGINEER

Spec Sect _____ Para _____

Approved _____

Date _____

www.victaulic.com

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REV_H



10.17_1

FireLock® Ball Valve

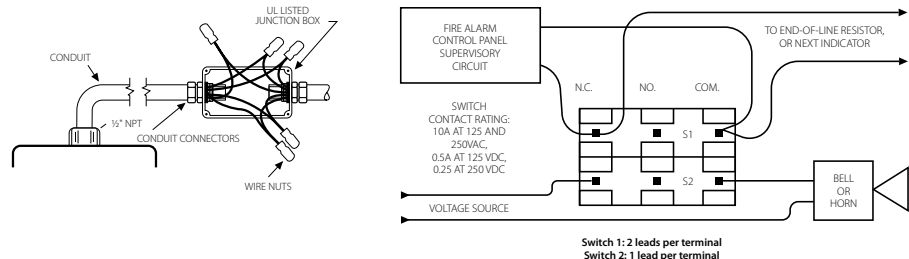
224

SERIES 728

SWITCH AND WIRING

1. The supervisory switch contains two single pole, double throw, pre-wired switches.
2. Switches are rated:
 - 10 amps @ 125 or 250 VAC/60 Hz
 - 0.50 amps @ 125 VDC
 - 0.25 amps @ 250 VDC
3. Switches supervise the valve in the “OPEN” position.
4. One switch has two #18 insulated wires per terminal, which permit complete supervision of leads (refer to diagrams and notes below). The second switch has one #18 insulated wire per terminal. This double circuit provides flexibility to operate two electrical devices at separate locations, such as an indicating light and an audible alarm, in the area that the valve is installed.
5. A #14 insulated ground lead (green) is provided.
 - Switch #1 = S1 For connection to the supervisory circuit of a UL Listed alarm control panel
 - Switch #2 = S2 Auxiliary switch that may be connected to auxiliary devices, per the authority having jurisdiction

S1	{	Normally Closed: (2) Blue
		Common: (2) Yellow
S2	{	Normally Closed: Blue with Orange Stripe
		Normally Open: Brown with Orange Stripe
		Common: Yellow with Orange Stripe



NOTE: The above diagram shows a connection between the common terminal (yellow – S1 and yellow-with-orange stripe – S2) and the normally closed terminal (blue – S1 and blue-with-orange stripe – S2). In this example, the indicator light and alarm will stay on until the valve is fully open. When the valve is fully open, the indicator light and alarm will go out. Cap off any unused wires (e.g. brown with orange stripe).

Only S1 (two leads per terminal) may be connected to the fire alarm control panel.

The connection of the alarm switch wiring shall be in accordance with NFPA 72 and the auxiliary switch per NFPA 70 (NEC).

MATERIAL SPECIFICATIONS

Valve Body: Brass ASTM B124

Ball: Chrome Plated Brass

Ball Valve Stem: 316 Stainless Steel

Seat: Carbon Filled (TFE) tetrafluoroethylene

Stem Nut: Brass ASTM B-16 C36000

Actuator: Brass traveling nut, on a steel lead screw, in a ductile iron housing

FireLock® Ball Valve

224

SERIES 728

INSTALLATION

Reference should always be made to the I-100 Victaulic Field Installation Handbook for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

WARRANTY

Refer to the Warranty section of the current Price List or contact Victaulic for details.

NOTE

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

For complete contact information, visit www.victaulic.com

10.17 2226 REV H UPDATED 05/2011

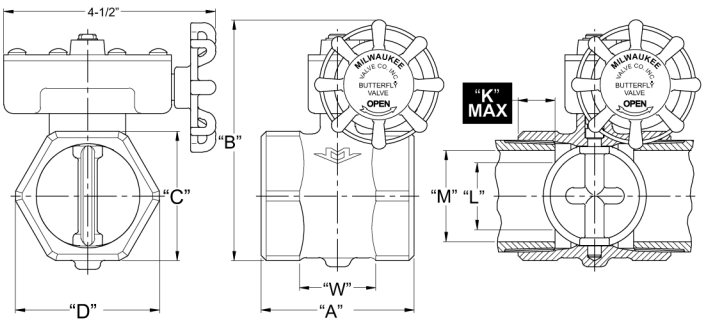
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10.17

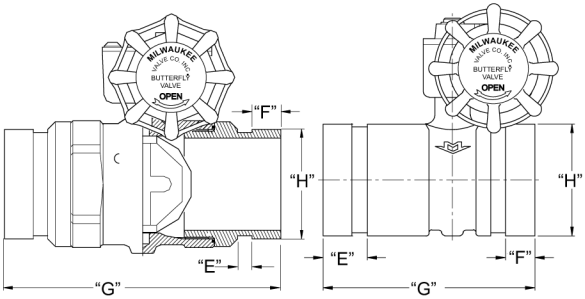


INDOOR/OUTDOOR butterball® BUTTERFLY VALVES

VALVES LESS SUPERVISORY TAMPER SWITCH ASSEMBLY



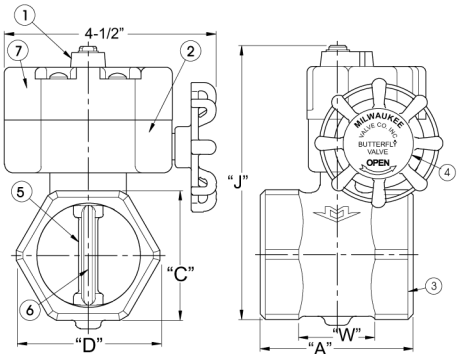
BB-SC100 (Threaded Ends)
Sizes 1", 1-1/4", 1-1/2", 2", 2-1/2"



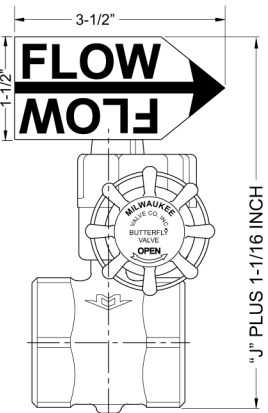
BBVSC100
3 piece with
Grooved Ends
Size 2"

BBVSC100
Uni-body with
Grooved Ends
Size 2-1/2"

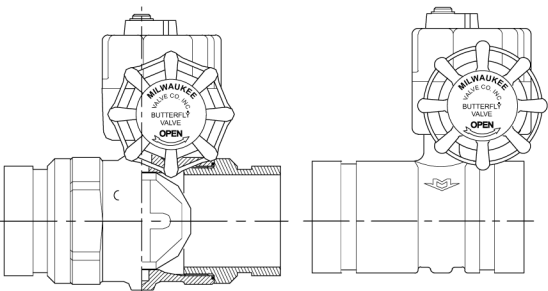
VALVES WITH SUPERVISORY TAMPER SWITCH ASSEMBLY



THREADED ENDS
BB-SCS02



NYC INDICATOR
(Available on both switched and non-switched models.)



BBVSCS02
3 piece with
Grooved Ends
Size 2"

BBVSCS02
Uni-body with
Grooved Ends
Size 2-1/2"

ALL DIMENSIONS-INCHES

Threaded					Grooved		
SIZE	1"	1-1/4"	1-1/2"	2"	SIZE	2"	2-1/2"
A	2-1/8	2-5/8	2-7/8	3-1/4	A	-	4-1/8
B	3-15/16	4-9/32	4-1/2	5	B	5	5-13/32
C	1-9/16	1-15/16	2-3/16	2-3/4	C	2-3/4	3-3/16
D	1-23/32	2-7/64	2-3/8	3-1/16	D	3-1/16	3-1/2
J	4-15/16	5-1/8	5-19/32	6-1/8	E	5/8	15/16
K	.66	.73	.73	.79	F	5/16	5/8
L	.83	.90	.99	1.41	G	6	4-1/2
M-40	1.05	1.38	1.61	2.07	H	2-3/8	2-7/8
M-80	.96	1.28	1.50	1.94	J	6-1/8	6-1/4
N-40	2.25	2	2.5	2.25	K	.79	1.18
W	1-1/8	1-1/4	1-13/32	1-11/16	L	1.41	1.29

M-40 ARE DIMENSIONS USING SCHEDULE 40 PIPE
M-80 ARE DIMENSIONS USING SCHEDULE 80 PIPE
N-40 IS FLOW RESISTANCE EXPRESSED IN EQUIVALENT LENGTH OF SCHEDULE 40 PIPE
W IS THE WRENCH MAKE-UP LENGTH

MATERIAL LIST

NO.	PART	MATERIAL	SPECIFICATION
1	Indicator	Sintered Iron	F0008P
2	Housing	Bronze	ASTM 584
3	Body	Bronze	ASTM 584
4	Handle	Brass	
5	Disc	Stainless Steel	Type 304
6	Disc Seal	EPDM Elastomer	
7	Switch Housing	Die Cast Aluminum	

For Commercial, Institutional and Industrial Applications

Job Name _____
Job Location _____
Engineer _____
Approval _____

Contractor _____
Approval _____
Contractor's P.O. No. _____
Representative _____

Series 530C
Calibrated Pressure Relief Valves

Sizes: 1/2" or 3/4" (15 or 20mm)

Series 530C Calibrated Pressure Relief Valves are spring operated brass valves designed for use only as protection from the build up of excessive pressure in systems containing water, oil or air. Series 530C valves incorporate a calibrated adjustment feature for setting the valve to the relief pressure required. These valves are ideally suited for bypass thermal expansion relief.

Features

- Calibrated adjustment feature for setting valve to relief pressure required
- Adjustable range 50 – 175psi (3.4 – 12.1 bar)
- All brass construction
- All stainless steel spring
- Buna-N disc on machined body seat
- Inlet (bottom), male NPT threaded
- Outlet (side), female NPT threaded

Pressure – Temperature

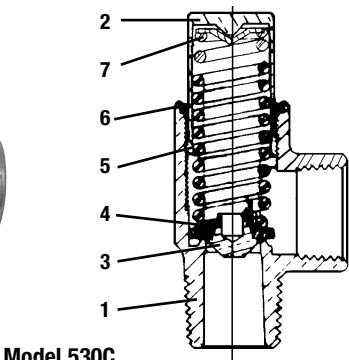
Maximum Temperature: 180°F (82°C)

Spring Ranges

1/2" or 3/4" (15 or 20mm): 50 – 175psi (3.4 – 12.1 bar)
3/4" (20mm): 100 – 300psi (6.9 – 20.7 bar)

Application Note: The Watts Series 530C are not ASME approved safety relief valves and should not be used in system application with this requirement.

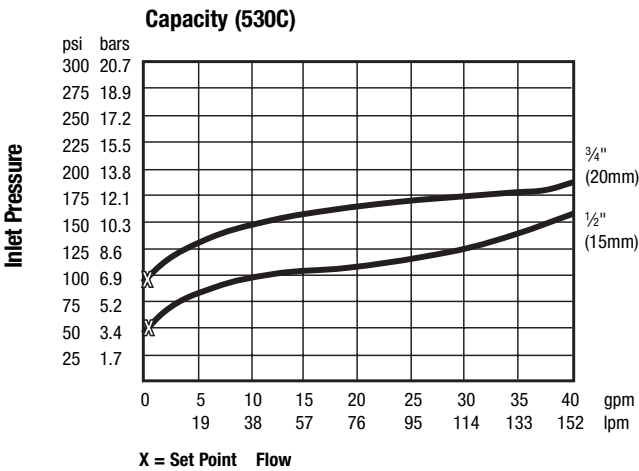
MODEL	SIZE (DN)		DIMENSIONS				WEIGHT	
	in.	mm	Height		Width		lbs.	kg.
			in.	mm	in.	mm		
530C	1/2 or 3/4	15 or 20	3	76	1 1/2	41	.37	0.17



Model 530C

Materials

- | | |
|----------------------|------------------|
| 1. Body | Brass |
| 2. Bonnet | Brass |
| 3. Disc Holder | Brass |
| 4. Disc | Buna-N (Nitrile) |
| 5. Adjustable Spring | Stainless Steel |
| 6. O-ring | Buna-N (Nitrile) |
| 7. Spring Washer | Brass |



Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



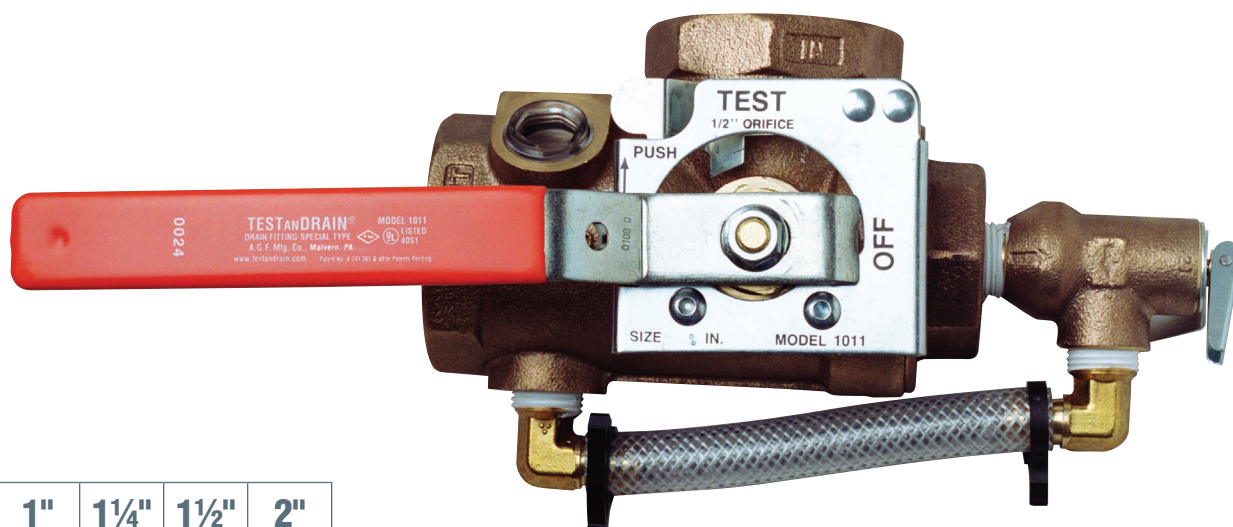
USA: 815 Chestnut St., No. Andover, MA 01845-6098; www.watts.com
Canada: 5435 North Service Rd., Burlington, ONT. L7L 5H7; www.wattscanada.ca

Water Safety & Flow Control Products



Model 1011A TEST^{AND}DRAIN[®]

Sectional Floor Control Test and Drain Valve
for Systems Requiring Pressure Relief Valve



Sizes:

3/4"	1"	1 1/4"	1 1/2"	2"
------	----	--------	--------	----

The AGF **Model 1011A TEST^{AND}DRAIN[®]** provides the test and express drain functions for wet fire sprinkler systems on multi-story installations requiring pressure relief (NFPA 13 and NFPA 13R). The **Model 1011A** features a **Model 7000 Pressure Relief Valve** with drain pipe.

The **Model 1011A** is available in a full range of sizes (3/4" to 2") with NPT connections (BSPT available). The **Model 7000 Pressure Relief Valve** (UL/FM) features a flushing handle and a 175 PSI factory rating (other pressure ratings available).

- Complies with NFPA 13 and NFPA 13R Requirements
- Compact, Single-Handle Ball Valve
- Tamper-Resistant Test Orifice and Sight Glasses
- 300 PSI rated.
- Specifiable orifice sizes: 3/8" (2.8K), 7/16" (4.2K), 1/2" (5.6K), 17/32" (8.0K), 5/8" (11.2K, ELO), 3/4" (14.0K, ESFR), and K25
- Relieves Excess System Pressure caused by Surges or Temperature Changes
- Shipped with Relief Valve and Bypass Drain Ports Plugged to Expedite Pressure Testing
- Locking Kit Available

Repair kits are available for all **TEST^{AND}DRAIN[®]** valves. Kit includes: Adapter Gasket (1), Ball (1), Valve Seats (2), Stem Packing (1), and Stem Washer (1). *Valve and orifice size must be specified when ordering.*

NOTE: It is important to note that the pressure rating of the relief valve indicates an operating range of pressure for both opening and closing of the valve. Standard relief valves are required to OPEN in a range of pressure between 90% and 105% of their rating. The valves are required to CLOSE at a pressure above 80% of that rating. The relief valve should be installed where it is easily accessible for maintenance. Care should be taken that the relief valve CANNOT be isolated from the system when the system is operational. A relief valve should NEVER have a shutoff valve or a plug downstream of its outlet.

Reliability, Versatility, Code Compatibility



Model 1011A TEST AND DRAIN®

Model 1011A 300 PSI Bronze Ball Valve, Model 7000 Pressure Relief Valve
Factory Rated at 175 PSI with other setting available

Dimensions

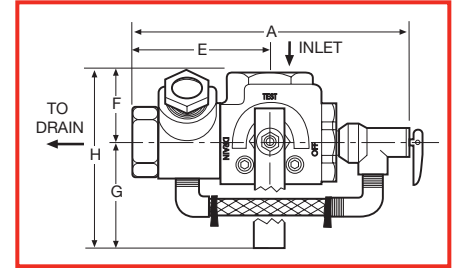
SIZE	A	B	C	D	E	F	G	H
3/4"	7 9/16" (191 mm)	1 1/2" (37.5 mm)	2 3/16" (57 mm)	3 5/8" (93 mm)	3 3/8" (86 mm)	1 13/16" (46 mm)	4 9/16" (117 mm)	6 3/8" (162.5 mm)
1"	7 9/16" (191 mm)	1 1/2" (37.5 mm)	2 3/16" (57 mm)	3 5/8" (93 mm)	3 3/8" (86 mm)	1 13/16" (46 mm)	4 9/16" (117 mm)	6 3/8" (162.5 mm)
1 1/4"	7 15/16" (201 mm)	1 11/16" (43 mm)	2 9/16" (65 mm)	4 1/4" (108 mm)	3 5/8" (91 mm)	1 15/16" (51 mm)	5 9/16" (141 mm)	7 1/2" (192 mm)
1 1/2"	8 15/16" (227 mm)	1 13/16" (45 mm)	3 1/4" (81.5 mm)	5 1/16" (127 mm)	3 7/8" (99 mm)	2 5/8" (67 mm)	8 1/4" (207 mm)	10 7/8" (274 mm)
2"	8 15/16" (227 mm)	1 13/16" (45 mm)	3 1/4" (81.5 mm)	5 1/16" (127 mm)	3 7/8" (99 mm)	2 5/8" (67 mm)	8 1/4" (207 mm)	10 7/8" (274 mm)

The Model 1011A provides the following...

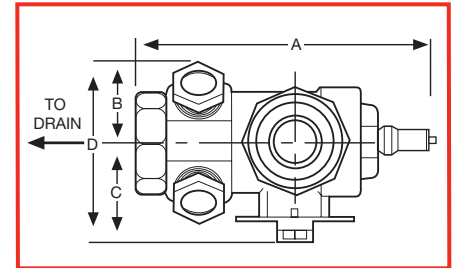
From the 2013 Edition of NFPA 13

- Chapter 8.16.2.4.1* Provisions shall be made to properly drain all parts of the system.
- Chapter 8.16.2.4.2 Drain connections, interior sectional or floor control valve(s) – shall be provided with a drain connection having a minimum size as shown in Table 8.16.2.4.2.
- Chapter 8.16.2.4.4 Drains shall discharge outside or to a drain capable of handling the flow of the drain.
- Chapter A.8.17.4.2 (Wet Pipe System) test connection is permitted to terminate into a drain capable of accepting full flow... using an approved sight test connection containing a smooth bore corrosion-resistant orifice giving a flow equivalent to one sprinkler...
- Chapter 8.17.4.2.2 The test connection valve shall be accessible.
- Chapter 8.17.4.2.4 shall be permitted to be installed in any location... downstream of the waterflow alarm.
- Chapter 8.17.4.3.1 (Dry Pipe System) a trip test connection not less than 1" in diameter, terminating in a smooth bore corrosion-resistant orifice, to provide a flow equivalent to one sprinkler...
- Chapter 8.17.4.3.2 The trip test connection... with a shutoff valve and plug not less than 1", at least one of which shall be brass.
- Chapter 7.1.2 - a wet pipe system shall be provided with a listed relief valve set to operate at 175 PSI or 10 PSI in excess of the maximum system pressure, whichever is greater.
- Chapter 8.16.1.2.3* A listed relief valve of not less than 1/2" in size shall be provided on the discharge side of the pressure-reducing valve set to operate at a pressure not exceeding rated pressure of the system.
- Chapter A.8.16.1.2.3 - consideration should be given to piping the discharge from the (pressure relief) valve

Model 1011A - Front View



Model 1011A - Plan View



Orifice Sizes

3/8", 7/16", 1/2", 17/32", 5/8" ELO*,
3/4" ESFR*, and K25**

Materials

Handle Steel
Stem Rod Brass
Ball C.P. Brass
Body Bronze
Valve Seat Impregnated Teflon®
Indicator Plate Steel
Relief Valve Bronze
Bypass Fittings... Brass
Bypass Tubing.... Nylobraid

Approvals

UL and ULC Listed:
(EX4019 & EX4533)
FM Approved
NYC-BSA No. 720-87-SM



USA Patent # 4741361 and Other Patents Pending



AGF Manufacturing Inc.
100 Quaker Lane, Malvern, PA 19355
Phone: 610-240-4900
Fax: 610-240-4906
www.testandrain.com

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

*Available on 1 1/4" to 2" size units only • **Available on 1 1/2" and 2" size units only



Model 350A

Double Check Valve Assembly

228A

Application

Designed for installation on potable water lines to protect against both backsiphonage and backpressure of polluted water into the potable water supply. The Model 350A shall provide protection where a potential health hazard does not exist. Ideal for use where Lead-Free* valves are required.

Standards Compliance (Horizontal & Vertical)

- ASSE® Listed 1015
- AWWA Compliant C510 (with gates only), and C550
- IAPMO® Listed
- Certified to NSF/ANSI 372* by IAPMO R&T
- CSA® Certified
- UL® Classified
- C-UL® Classified
- FM® Approved
- NYC MEA 220-04-M Vol 2 (2 1/2" - 8")
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- NSF® Listed-Standard 61, Annex G*

*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

Materials

Main valve body	Ductile Iron ASTM A 536 Grade 4
Access covers	Ductile Iron ASTM A 536 Grade 4
Coatings	FDA Approved electrostatic epoxy finish
Internals	Stainless steel, 300 Series NORYL™, NSF Listed
Fasteners & springs	Stainless Steel, 300 Series
Seal ring	EPDM (FDA approved)
O-ring	Buna Nitrile (FDA approved)

Features

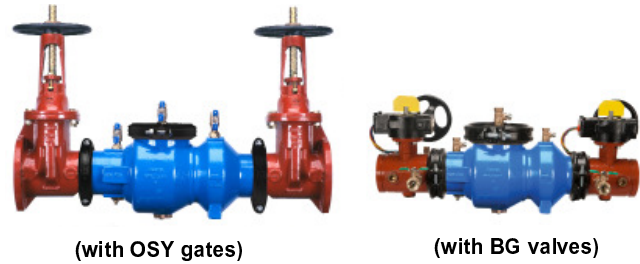
Sizes:	2 1/2", 3", 4", 6", 8", 10"
Maximum working water pressure	175 PSI
Maximum working water temperature	140°F
Hydrostatic test pressure	350 PSI
End connections	
(Grooved for steel pipe)	AWWA C606
(Flanged)	ANSI B16.1 Class 125

Dimensions & Weights (do not include pkg.)

MODEL 350A SIZE	WEIGHT														
	LESS SHUTOFF VALVES		NRS GATE VALVES FLANGED		NRS GATE VALVES GROOVED		OSY GATE VALVES FLANGED		OSY GATE VALVES GROOVED		BUTTERFLY VALVES FLANGED		BUTTERFLY VALVES GROOVED		
	in.	mm	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	
2 1/2	65	90	41	184	83	176	80	192	87	184	83	142	65	132	60
3	80	89	40	204	93	194	88	210	95	200	91	147	66	133	61
4	100	76	34	220	100	194	88	230	104	204	93	147	66	124	56
6	150	126	57	346	157	316	143	362	164	332	151	231	105	200	91
8	200	286	130	738	335	738	335	762	346	738	335	476	216	430	195
10	250	339	154	966	438	844	383	1024	464	902	409	613	278	555	252

MODEL 350A SIZE		DIMENSION (approximate)																							
		A		A WITH BUTTERFLY VALVES		B LESS GATE VALVES		C		D		E OS&Y OPEN		E OS&Y CLOSED		E NRS GATE		E WITH BUTTERFLY VALVES		F		G WITH GATE VALVES		G WITH BUTTERFLY VALVES	
		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
2 1/2	65	35 1/8	892	32 1/8	816	20 1/8	511	4 1/2	114	7 1/4	184	17 3/4	451	15 3/8	391	11 1/2	292	8 1/4	210	6	152	45 1/4	1149	42 1/4	1073
3	80	36 1/8	918	33	838	20 1/8	511	4 1/2	114	7 1/4	184	20 1/4	514	17	432	12 3/4	324	8 1/2	216	6	152	46 7/8	1191	43 3/4	1111
4	100	38 1/4	972	33 1/4	845	19 7/8	505	4 1/2	114	8	203	22 1/2	572	18 1/4	464	14 1/2	368	9	229	6	152	53 3/8	1356	48 3/8	1229
6	150	47 1/4	1200	40 1/4	1022	25 7/8	657	5 1/2	140	10	254	30 1/2	775	24 1/4	616	18	457	10 1/4	260	7	178	65 3/8	1661	58 3/8	1483
8	200	62	1575	55	1397	38 1/2	978	10	254	11	279	37	940	28 1/2	724	21 1/8	537	12	305	8 1/2	216	86 3/8	2194	79 3/8	2016
10	250	64 5/8	1641	58 1/2	1486	38 1/2	978	10	254	12	305	45 5/8	1159	34 3/4	883	24 3/4	629	13	330	8 1/2	216	94 3/8	2397	88 1/4	2242

Attention:
Model 350A
(grooved body)
& Model 350
(flange body)
have different
lay lengths.



(with OSY gates)

(with BG valves)



Options

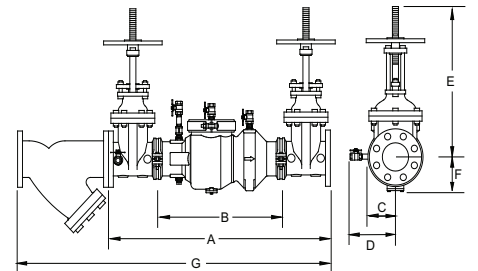
(Suffixes can be combined)

- ☐ - with flanged end NRS gate valves (standard)
- ☐ FSC - with epoxy coated wye type strainer (flanged only)
- ☐ G - with grooved end connections
- ☐ GF - with grooved inlet connection and flanged outlet connection
- ☐ FG - with flanged inlet connection and grooved outlet connection
- ☐ L - less shut-off valves (grooved body connections)
- ☐ OSY - with flanged end OS&Y gate valves
- ☐ OSYG - with grooved end OS&Y gate valves
- ☐ PI - with Post Indicator Gate Valves
- ☐ BG - with grooved end butterfly valves with integral supervisory switches
- ☐ BF - with flanged end butterfly valves with integral supervisory switches

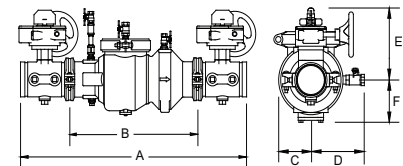
Accessories

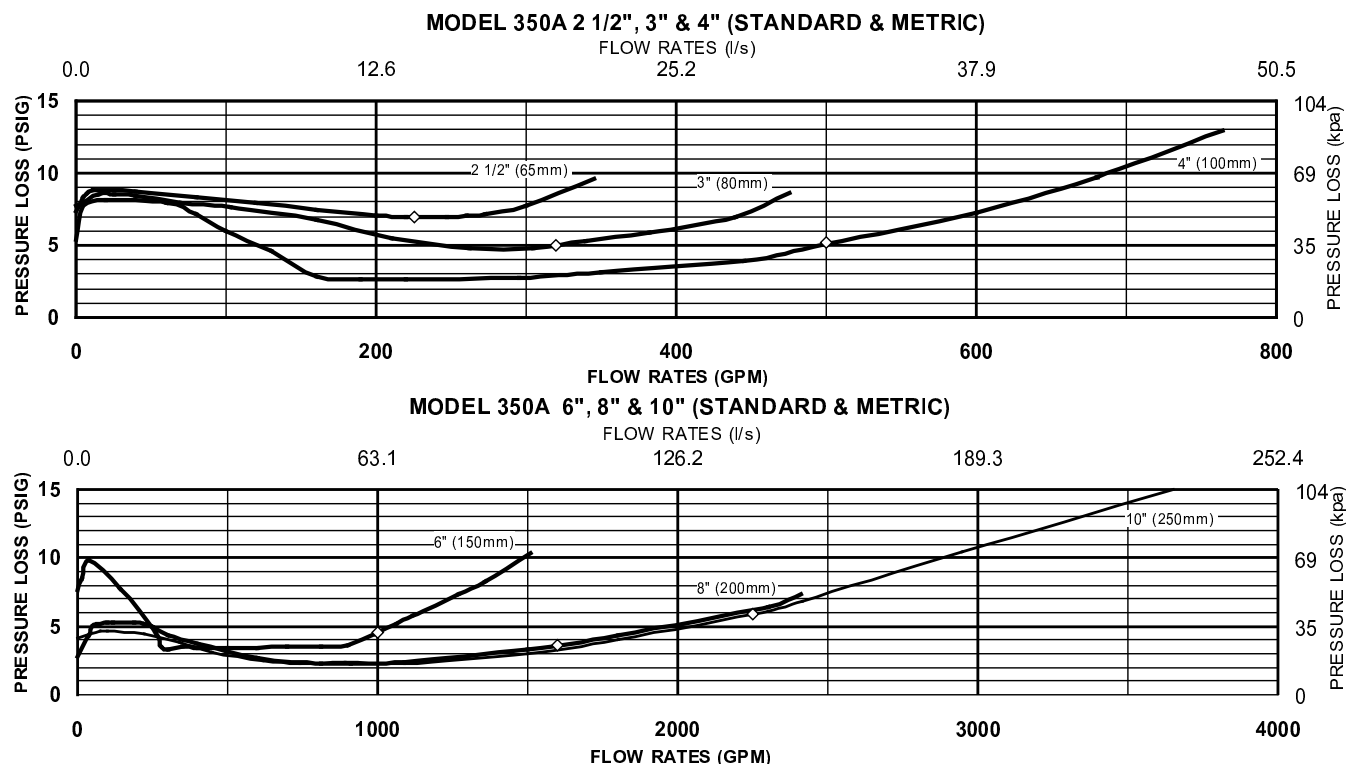
- ☐ Repair kit (rubber only)
- ☐ Thermal expansion tank (Model XT)
- ☐ OS & Y Gate valve tamper switch (OSY-40)

MODEL 350A with OSY & FSC option



MODEL 350A with BG option

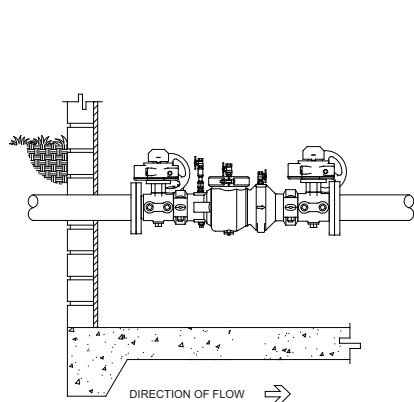




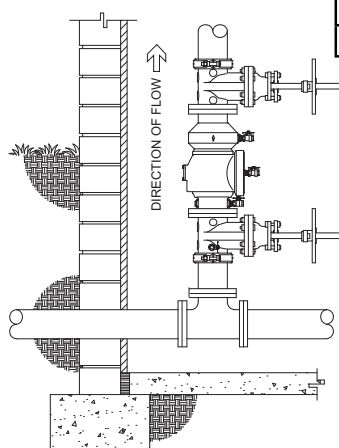
Typical Installation

Local codes shall govern installation requirements. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

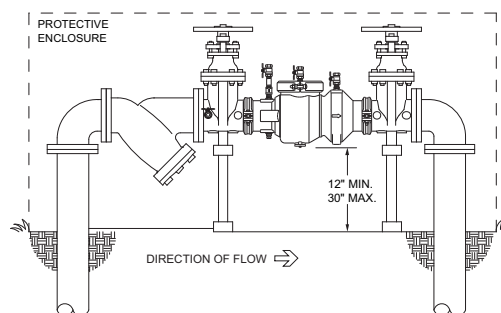
Capacity thru Schedule 40 Pipe (GPM)				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
2 1/2"	75	112	149	224
3"	115	173	230	346
4"	198	298	397	595
6"	450	675	900	1351
8"	780	1169	1559	2339
10"	1229	1843	2458	3687
12"	1763	2644	3525	5288



**INDOOR INSTALLATION
MODEL 350ABF**



**INDOOR INSTALLATION
(VERT.) MODEL 350A**



**OUTDOOR INSTALLATION
MODEL 350AFS**

Specifications

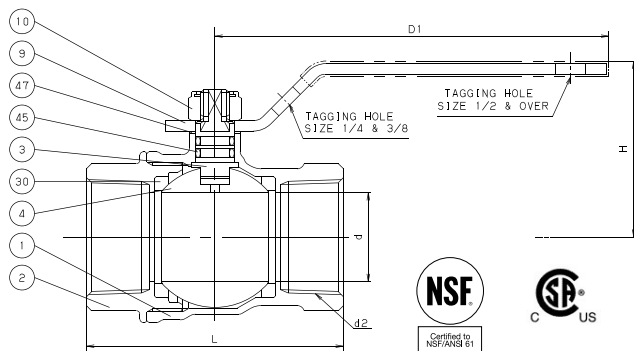
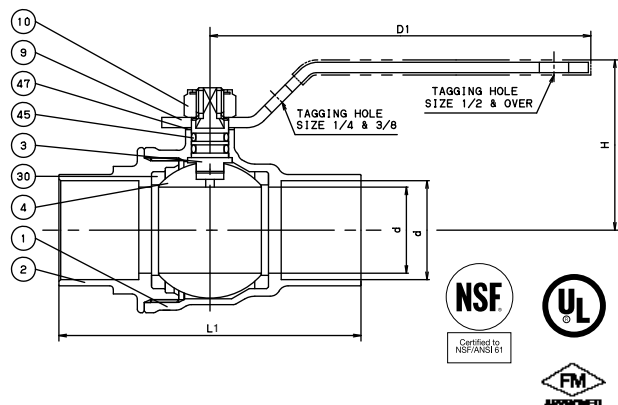
The Double Check Backflow Prevention Assembly shall be certified to NSF/ANSI 372, ASSE® Listed 1015, and supplied with full port gate valves. The main body and access cover shall be epoxy coated ductile iron (ASTM A 536 Grade 4), the seat ring and check valve shall be NORYL™, the stem shall be stainless steel (ASTM A 276) and the seat disc elastomers shall be EPDM. The checks shall be accessible for maintenance without removing the device from the line. The Double Check Backflow Prevention Assembly shall be a ZURN WILKINS Model 350A.

FORGED BRASS BALL VALVE

240

MAINTENANCE FREE DOUBLE O-RING STEM SEALS

Two Piece Body • Full Port • Chrome Plated
 Blowout Proof Stem (Ni Plated) • PTFE Seats
 NSF • CSA (US/C) • UL • FM

**CODE # 58
FIPS X FIPS****CODE # 59
Cx C*****OPTIONS**

OVAL HANDLE
 EXTENDED STEM
 MEMORY STOP

KITZ Code No. 58 (AKSZA) Threaded Ends
59 (CSZA) Solder Ends

STANDARDS

END TO END	KITZ
THREADED ENDS	ANSI B1.20.1
SOLDER JOINT ENDS	ANSI B16.18
WALL THICKNESS	KITZ
DESIGN	MSS SP-110

PRESSURE/TEMPERATURE

150 PSI SATURATED STEAM TO 366°F
 600 PSI - NON-SHOCK COLD WATER, OIL OR GAS

* SEE VALVE INSTALLATION INSTRUCTIONS/PRESSURE TEMPERATURE
 LIMITATIONS FOR COPPER TUBE AND SOLDER JOINT VALVES - PAGE
 BV-29 & 30.

MATERIAL LIST

NO.	NAME OF PART	SPECIFICATION
1	BODY	FORGED BRASS (B283, C37700)
2	BODY CAP	FORGED BRASS (B283, C37700)
3	STEM	K-METAL
4	BALL	(1) FORGED BRASS (B283, C37700) STRAIGHT OR HOLLOW BALL
9	HANDLE	(2) CARBON STEEL
10	HANDLE NUT	CARBON STEEL
30	BALL SEATS	PTFE
45	O-RINGS	FPM
47	THRUST WASHER	PBT

NOTES: (1) TEA PLATED
 (2) ELECTROPLATED ZINC WITH PLASTIC COVERING

DIMENSIONS - WEIGHTS - QUANTITIES

d2 SIZE	d	H	D1	L	L1	d1 Max. Min.	APPROX. NET WT.	CARTON QTY
1/4	.39	1.46	2.76	1.65	1.05	.381 .377	29	120
3/8	.39	1.46	2.76	1.65	1.11	.506 .502	29	120
1/2	.59	1.57	3.15	2.08	1.13	.631 .627	29	96
3/4	.79	1.69	3.15	2.36	1.37	.881 .877	45	60
1	.98	1.97	4.33	2.83	1.64	1.132 1.128	60	36
1 1/4	1.26	2.16	4.33	3.31	2.00	1.382 1.378	68	24
1 1/2	1.57	2.52	5.90	3.62	2.35	1.633 1.628	50	16
2	1.97	2.83	5.90	4.33	2.83	2.133 2.128	71	16

CERTIFICATIONS:

NSF/ANSI STANDARDS 61-8, C-HOT (180°F/82°C)

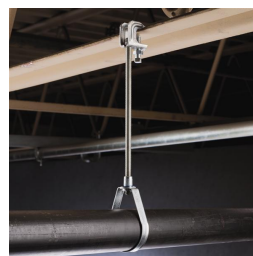
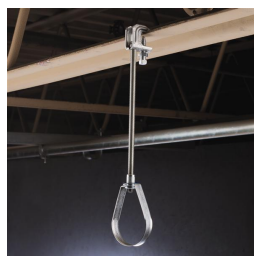
CAS (US/C):

- CGA 9.1b-2001/ANSI 21.15b-2006 - .5G
- CGA CR 91-002 - 2G
- ASME B16.44 - 5G
- CAN/CGA 3.16-M88 - 125G
- ASME B16.33-2002-125G

UL-258 - 175 WWP (Fire Trim Protection Valves)

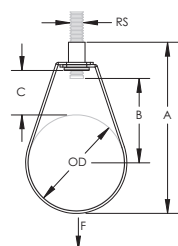
FM-1140 - 175 WWP (Fire Protection Systems)

115 Standard Duty Loop Hanger



The 115 Standard Duty Loop Hanger is ideal for suspending stationary, non-insulated pipe lines, including CPVC pipes, in fire sprinkler systems. A knurled insert nut helps simplify vertical adjustments and flared edges on the base (1/2" to 4" sizes) help protect pipes from coming into contact with any sharp edges of the hanger.

- Flared edges help prevent any sharp surfaces from coming into contact with the pipe (1/2" to 4" sizes)
- Retained insert nut helps ensure the loop hanger and insert nut stay together
- Recommended for the suspension of stationary non-insulated pipe lines
- Manufactured to use the minimum rod size permitted by NFPA® for fire sprinkler piping
- Conforms with Federal Specification WW-H-171 (Type 10), Manufacturers Standardization Society (MSS) SP-58 (Type 10)



Material: Steel
Finish: Pregalvanized



Part Number	Pipe Size	Outer Diameter OD	Rod Size RS	A	B	C	Static Load F	Certifications
1150050EG	1/2"	0.840"	3/8"	2 13/16"	1 1/8"	1"	300 lb	cULus
1150075EG	3/4"	1.050"	3/8"	3"	1 3/16"	15/16"	300 lb	cULus, FM
1150100EG	1"	1.315"	3/8"	3 1/4"	1 3/8"	15/16"	300 lb	cULus, FM
1150125EG	1 1/4"	1.660"	3/8"	3 9/16"	1 1/2"	15/16"	300 lb	cULus, FM
1150150EG	1 1/2"	1.900"	3/8"	3 13/16"	1 5/8"	15/16"	300 lb	cULus, FM
1150200EG	2"	2.375"	3/8"	4 1/4"	1 7/8"	15/16"	300 lb	cULus, FM
1150250EG	2 1/2"	2.875"	3/8"	5 9/16"	2 13/16"	1 9/16"	525 lb	cULus, FM
1150300EG	3"	3.500"	3/8"	6 9/16"	3 1/2"	1 15/16"	525 lb	cULus, FM
1150350EG	3 1/2"	4.000"	3/8"	7 1/16"	3 3/4"	1 15/16"	585 lb	cULus, FM
1150400EG	4"	4.500"	3/8"	7 9/16"	4"	1 15/16"	650 lb	cULus, FM
1150500EG	5"	5.563"	1/2"	9 13/16"	4 3/4"	2 1/4"	1,000 lb	cULus, FM
1150600EG	6"	6.625"	1/2"	11 5/16"	6 5/16"	3 5/16"	1,000 lb	cULus, FM
1150800EG	8"	8.625"	1/2"	12 7/8"	6 7/8"	2 7/8"	1,000 lb	cULus, FM



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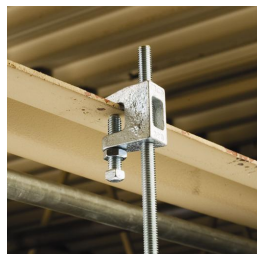
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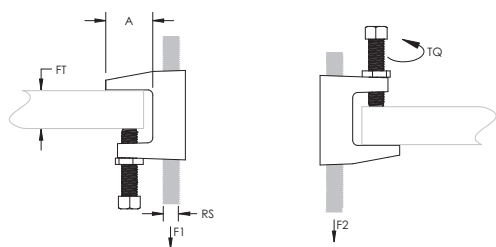
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300 Universal Beam Clamp



- Conforms with Federal Specification WW-H-171 (Type 23), Manufacturers Standardization Society ANSI®/MSS-SP-58 (Type 19 and 23)



Material: Steel



Part Number	Rod Size RS	Flange Thickness FT	A	Torque TQ	Static Load 1 F1	Static Load 2 F2	Certifications	Standard Packaging Quantity
Finish: Plain								
3000037PL	3/8"	13/16" Max	1 1/8"	5 ft lb	500 lb	250 lb	cULus, FM	100 pc
3000050PL	1/2"	13/16" Max	1 1/8"	8 ft lb	950 lb	760 lb	cULus, FM	50 pc
3000062PL	5/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000075PL	3/4"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000087PL	7/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
Finish: Electrogalvanized								
3000037EG	3/8"	13/16" Max	1 1/8"	5 ft lb	500 lb	250 lb	cULus, FM	100 pc
3000050EG	1/2"	13/16" Max	1 1/8"	8 ft lb	950 lb	760 lb	cULus, FM	50 pc
3000062EG	5/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000075EG	3/4"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc
3000087EG	7/8"	13/16" Max	1 1/8"	5 ft lb	950 lb	760 lb	cULus	50 pc

Setscrew must be tightened and torqued onto the sloped side of the I-beam.

Recognizing that torque wrenches are generally not used or available on many job sites, the setscrew should be tightened so it contacts the I-beam and then an additional 1/4 to 1/2 turn added.

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WARNING

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211313 - Wet-Pipe Sprinkler System

301A

Globe Pipe Hanger Products, Inc.

14601 Industrial Pkwy

Cleveland, OH, 44135, US

Phone: 216.362.6300

Toll-free: (800) 338-3555

Email: sales@globepipehanger.com

Website: http://www.globepipehanger.com

All Categories > SilverHawk Top Beam Clamp > SilverHawk 100 Series Universal Beam Clamp > View Items

SilverHawk 100 Series Universal Beam Clamp

Check up to five results to perform an action.

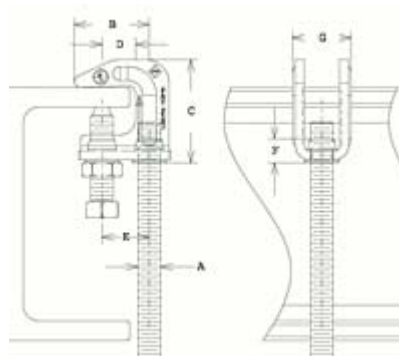
SilverHawk Top Beam Clamps are our strongest, lightweight top beam clamps. Made from cold rolled steel with a zinc plated finish, they are rust and corrosion resistant. These super strong SilverHawk clamps exceed UL and FM testing requirements. Zinc finish aesthetically works with plated rods and plated swivel ring hangers.

Tested by industry professionals, SilverHawk installation is quick and easy. Their unique counter balance design makes it easy to "spin" them onto threaded rods so installation goes faster. The open back shape provides visual verification during installation.

- Made in USA.
- Supports 3/8" rod – metric also available
- 90° angle fits I-beam or T-bar up to 3/4" thick
- Extruded tap holes meet FM Approvals requirements
- Accommodates retaining strap usage
- Competitively priced domestic par



[larger image](#)



[larger image](#)

Results 1 - 1 of 1

1

<u>Item #</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>Max. Recommended Load</u>
103-101S	3/8 inches	1 3/16 inches	1 5/8 inches	17/32 inches	3/4 inches	3/8 (min.) inches	15/16 inches	400 lbs

Results 1 - 1 of 1

1

Print

Back

3.3.5 KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchor

302

3.3.5.1 Product Description

3.3.5.2 Material Specifications

3.3.5.3 Technical Data

3.3.5.4 Installation Instructions

3.3.5.5 Ordering Information



3.3.5.1 Product Description

Hilti KWIK HUS-EZ I (KH-EZ I) anchors are comprised of a body with an internally threaded hex washer head. The anchor is manufactured from carbon steel and is heat treated. It has a minimum 0.0003 inch (8 μ m) zinc coating in accordance with DIN EN ISO 4042. The internally threaded head is larger than the diameter of the anchor and is formed with serrations on the underside. The anchor body is formed with threads running most of the length of the anchor body. The anchor is installed in a predrilled hole with a powered impact wrench or torque wrench. The anchor threads cut into the concrete on the sides of the hole and interlock with the base material during installation. Applicable base materials include normal-weight concrete, structural lightweight concrete and lightweight concrete over metal deck.

Guide Specifications

Screw anchors shall be KWIK HUS-EZ I as supplied by Hilti, Inc. Anchors shall be manufactured from heat treated carbon steel material, zinc plated to a minimum thickness of 8 μ m. Anchors shall be installed using a drill bit of same nominal diameter as anchor.

Product Features

- Suitable for cracked and uncracked normal weight and lightweight concrete, and lightweight concrete over metal deck.
- Suitable for seismic and nonseismic loads.
- Quick and easy to install.

- Thread design enables quality setting and exceptional load values in wide variety of base material strengths.
- Anchor is fully removable
- Anchor size is same as drill bit size and uses standard ANSI B212.15 – 1994 drill bits.
- Suitable for reduced edge distances and spacing.

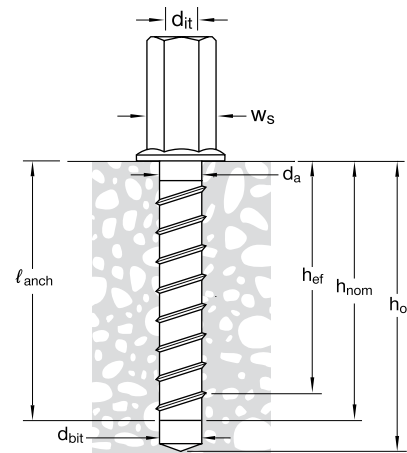
3.3.5.2 Material Specifications

Hilti KWIK HUS-EZ I anchors are manufactured from carbon steel. The anchors are bright zinc plated to a minimum thickness of 8 μ m.

3.3.5.3 Technical Data

The data contained in Tables 1-4 of this section have been evaluated in accordance with AC 193. For more detail, see ICC-ES ESR 3027.

Figure 1 — KWIK HUS-EZ I anchor installation details



Listings/Approvals

ICC-ES (International Code Council)
ESR-3027
(Cracked & Uncracked Concrete)
FM Approved



Independent Code Evaluation

IBC® / IRC® 2009 (AC 193 / ACI 355.2)
IBC® / IRC® 2006 (AC 193 / ACI 355.2)
IBC® / IRC® 2003 (AC 193 / ACI 355.2)

KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchor 3.3.5

Table 1 – KWIK HUS-EZ I (KH-EZ I)

302

Design Guidelines For KWIK HUS-EZ I ¹				
Values for Normal Weight and Lightweight Concrete				
Characteristic	Symbol	Units	Value	
Internal Thread Diameter of Head	d _{it}	in.	1/4 or 3/8	
Wrench Socket Size	w _s	in.	3/8 or 1/2	
Nominal Diameter	d _a	in.	1/4	
Drill Bit Diameter	d _{bit}	in.	1/4	
Maximum Installation Torque ⁴	T _{inst,max}	ft-lbf	18	
Maximum Impact Wrench Torque Rating ³	T _{impact,max}	ft-lbf	114	137
Minimum Nominal Embedment Depth	h _{nom}	in.	1 5/8	2 1/2
Minimum Hole Depth	h _{hole}	in.	2	2 7/8
Critical Edge Distance ²	c _{ac} ⁵	in.	2.00	2.78
Minimum Spacing at Critical Edge Distance	s _{min,cac} ⁵	in.	1.50	
Minimum Edge Distance	c _{min} ⁵	in.	1.50	
Minimum Spacing at Minimum Edge Distance	s _{min} ⁵	in.	3.0	
Minimum Concrete Thickness	h _{min}	in.	3.25	4.125
Anchor Category			3	1
Steel Strength in Tension (ACI 318 D.5.2)				
Tension Resistance of Steel	N _{sa}	lb.	6,070	
Reduction Factor for Steel Strength	Φ _{sa}	-	0.65	
Concrete Breakout Strength in Tension (ACI 318 D.5.2)				
Effective Embedment Depth	h _{ef}	in.	1.18	1.92
Effectiveness Factor - Uncracked Concrete	K _{uncr}	-	24	
Effectiveness Factor - Cracked Concrete	K _{cr}	-	17	
Modification Factor for cracked and uncracked concrete	Ψ _{c,N}	-	1	
Reduction Factor for Concrete Breakout Strength	Φ _{cb}	-	0.45	0.65
Pullout Strength in Tension (ACI 318 D.5.3)				
Characteristic pullout strength, uncracked concrete (2500 psi)	N _{p,uncr}	lb	1305 ⁶	2358 ⁷
Characteristic pullout strength, cracked concrete	N _{p,cr}	lb	667 ⁶	1166 ⁷
Reduction Factor for pullout strength	Φ _p	-	0.45	0.65
Characteristic Pullout Strength, Seismic (2500 psi)	N _{p,eq}	lb	534 ⁶	1166 ⁷
Reduction Factor for pullout strength	Φ _{eq}	-	0.45	0.65
Values for Installation in the underside of Concrete-Filled Profile Steel Deck Assemblies ²				
Pullout Resistance, (uncracked concrete) - Lower Flute	N _{p,deck,uncr}	lb	1210 ⁸	1875 ⁹
Pullout Resistance, (uncracked concrete) - Upper Flute	N _{p,deck,uncr}	lb	1490 ⁸	1960 ⁹
Pullout Resistance, (cracked concrete and seismic loads) - Lower Flute	N _{p,deck,cr}	lb	620 ⁸	930 ⁹
Pullout Resistance, (cracked concrete and seismic loads) - Upper Flute	N _{p,deck,cr}	lb	760 ⁸	975 ⁹

- The data presented in this table is to be used in conjunction with the design criteria of ACI 318 Appendix D.
- For installations through the soffit of steel deck into concrete, anchors installed in the lower flute may be installed with a maximum one inch offset in either direction from the center of the flute. See Figure 2.
- Because of variability in measurement procedures, the published torque of an impact tool may not correlate properly with the above setting torques. Over-torquing can damage the anchor and/or reduce its holding capacity.
- $T_{inst,max}$ applies to installations using a calibrated torque wrench.
- Additional combinations for minimum edge distance, c_{min} and minimum spacing distance, s_{min} or $s_{min,cac}$ may be derived by linear interpolation between the given boundary values.
- The characteristic pullout resistance for concrete compressive strengths greater than 2,500 psi may be increased by multiplying the value in the table by $(f'c/2,500)^{0.3}$.
- The characteristic pullout for concrete compressive strengths greater than 2,500 psi may be increased by multiplying the value in the table by $(f'c/2,500)^{0.5}$.
- The characteristic pullout resistance for concrete compressive strengths greater than 3,000 psi may be increased by multiplying the value in the table by $(f'c/3,000)^{0.3}$.
- The characteristic pullout for concrete compressive strengths greater than 2,500 psi may be increased by multiplying the value in the table by $(f'c/2,500)^{0.5}$.

3.3.5 KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchor

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Table 2 - Calculated ACI 318-08 Appendix D Strength Design Capacity for Single anchor in Tension^{3,4,5,6,7}

Anchor Size (in.)	Internally Threaded Head (in.)	Nominal Embedment Depth (in.)	Normal Weight Concrete						LWCOMD			
			2500 psi ¹			4000 psi			3000 psi ²			
			Uncracked Concrete	Cracked Concrete	Seismic	Uncracked Concrete	Cracked Concrete	Seismic	Uncracked Concrete		Cracked Concrete	
									Lower Flute	Upper Flute	Lower Flute	Upper Flute
1/4 x 1-5/8	1/4	1-5/8	587	300	240	675	346	277	545	670	280	342
	3/8	1-5/8	587	300	240	675	346	277	545	670	280	342
1/4 x 2-1/2	1/4	2-1/2	1533	758	758	1940	958	958	1218	1275	605	634
	3/8	2-1/2	1533	758	758	1940	958	958	1218	1275	605	634

1 Values for other strengths can be calculated per $(f'_c/2500)^{0.3}$ for 1-5/8" embedment and $(f'_c/2500)^{0.5}$ for 2-1/2" embedment

2 Values for other strength can be calculated per $(f'_c/3000)^{0.3}$ for 1-5/8" embedment and $(f'_c/3000)^{0.5}$ for 2-1/2" embedment

3 Based on single anchor with edge and spacing values greater than those given as critical values in Table 1.

4 Based on lower value of concrete breakout or pullout strength

5 These loads are factored resistance loads in accordance with Chapter 9 of ACI 318-08 (ΦN_p).

6 Interpolation of values for other embedments is not permitted

7 Minimum concrete thickness and edge distance must comply with Table 1.

Table 3 – KWIK HUS-EZ I (KH-EZ I) Allowable Stress Design Values for Illustrative Purposes^{1,2,3,4,5,6,7,8,9,10,11}

Internal Thread Diameter of Head (in.)	Nominal Anchor Diameter (in.)	Embedment Depth, h_{nom} (in.) (mm)	Effective Embedment Depth, h_{ef} (in.) (mm)	Allowable Tension Load lb (kN)
1/4 or 3/8	1/4	1-5/8 (41)	1.18 (30)	470 (2.1)
		2-1/2 (64)	1.92 (49)	1340 (6.0)

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

1 Single anchor with static tension load only.

2 Concrete determined to remain uncracked for the life of the anchorage.

3 Load combinations are taken from ACI 318 Section 9.2 (no seismic loading).

4 40% dead load and 60% live load, controlling load combination 1.2D + 1.6L.

5 Calculation of weighted average for conversion factor $\alpha = 1.2(0.4) + 1.6(0.6) = 1.44$.

6 $f'_c = 4,000$ psi (27.6 MPa) (normal weight concrete).

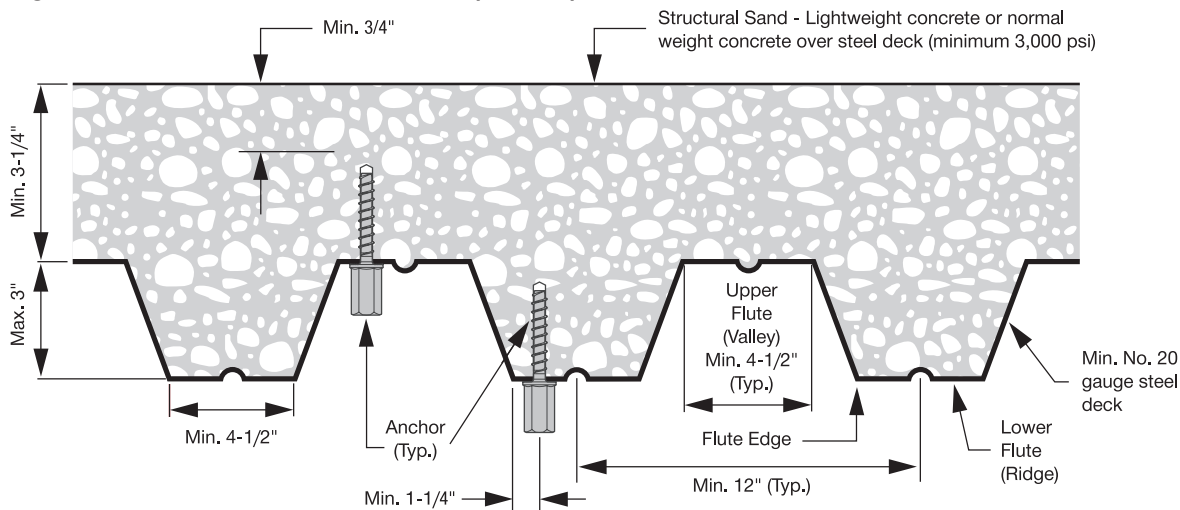
7 $c_{a1} = c_{a2} \geq c_{ac}$, see Table 1.

8 $h \geq h_{min}$, see Table 1.

9 Values are for Condition B where supplementary reinforcement in accordance with ACI 318 D.4.4 is not provided.

10 Allowable Tension Load = factored Load (Lesser of N_p or Concrete Breakout from Table 1) $\div 1.44$

11 Values are for single anchors installed without influence of base material edge distance or adjacent anchors.

Figure 2 – Installation of KWIK HUS-EZ I (KH-EZ I) in Soffit of Concrete Over Steel Deck Floor and Roof Assemblies


1 Anchors may be placed in the upper or lower flute of the steel deck profile provided the minimum concrete cover above the drilled hole is satisfied. Anchors in the lower flute may be installed with a maximum 1-inch offset in either direction from the center of the flute. The offset distance may be increased proportionally for profiles with lower flute widths greater than those shown provided the minimum lower flute edge distance is also satisfied.

KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchor 3.3.5

Table 4 - KWIK HUS EZ I (KH-EZ I) Allowable Stress Design Tension Values for Installations in Soffit of Concrete Over Steel Deck Floor and Roof Assemblies

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Internal Thread Diameter of Head (in.)	Nominal Anchor Diameter (in.)	Embedment Depth (in.) (mm)	Effective Embedment Depth (in.) (mm)	Allowable Tension Load lb (kN)	
				Upper Flute	Lower Flute
1/4 or 3/8	1/4	1-5/8 (41)	1.18 (30)	466 (2.1)	378 (1.7)
		2-1/2 (64)	1.92 (49)	885 (3.9)	846 (3.7)

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

- 1 Single anchor with static tension load only.
- 2 Concrete determined to remain uncracked for the life of the anchorage.
- 3 Load combinations are taken from ACI 318 Section 9.2 (no seismic loading).
- 4 40% dead load and 60% live load, controlling load combination 1.2D + 1.6L.
- 5 Calculation of weighted average for conversion factor $\alpha = 1.2(0.4) + 1.6(0.6) = 1.44$.
- 6 $f'_c = 3,000$ psi (27.6 MPa) (light weight concrete).
- 7 $c_{a1} = c_{a2} \geq c_{ac}$, see Table 1.
- 8 $h \geq h_{min}$, see Table 1.
- 9 Values are for Condition B where supplementary reinforcement in accordance with ACI 318 D.4.4 is not provided.
- 10 Allowable Tension Load = factored Load (Lesser of N_p or Concrete Breakout from Table 1) $\div 1.44$
- 11 Values are for single anchors installed without influence of base material edge distance or adjacent anchors.

Table 5 - Kwik HUS-EZ I (KH-EZ) Tested Load Values for FM Approval for Automatic Sprinkler Systems

Hanger Rod Size (in.)	Screw Length (in.)	FM Test Load Tension lb (kN)	FM Maximum Pipe Diameter (in.)
3/8	1 5/8	1475 (6.6)	4
	2 1/2		

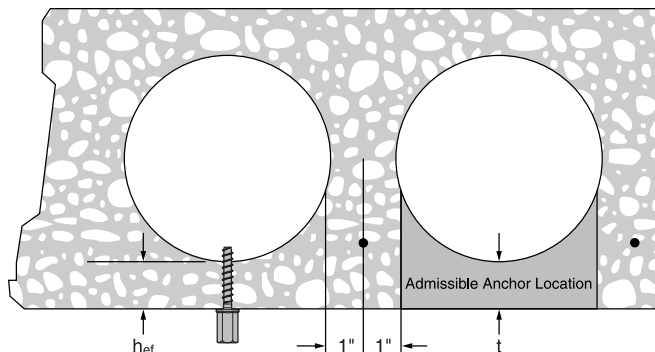
- 1 Tested in accordance with FM Approval Standard for Pipe Hanger Components for Automatic Sprinklers Systems Class Numbers 1951, 1952 and 1953.

Table 6 - Kwik HUS-EZ I (KH-EZ I) Allowable Stress Design Values for Installations into Hollow Core Concrete Panels^{1,2}

Hanger Rod Size (in.)	Min. Effective Embedment h_{ef} (in.)	Allowable Load ³		Ultimate Load	
		Tension lb (kN)	Shear lb (kN) ^{4,5}	Tension lb (kN)	Shear lb (kN) ^{4,5}
1/4	1 3/8	455 (2.0)	485 (2.2)	1810 (8.1)	1,930 (8.6)
3/8			755 (3.4)		3,025 (13.5)

- 1 The Admissible Anchor Location must be established to prevent damage to the prestressed cable during the drilling process. Verify the location and height of the cable with the hollow core plank supplier to confirm Admissible Anchor Location.
- 2 Minimum compressive strength of prestressed concrete is 7,000 psi. Published ultimate loads represent the average results conducted in local base materials. Due to variations in materials and dimensional configurations, on-site testing is required to determine the actual performance.
- 3 Allowable loads calculated with a 4:1 factor of safety.
- 4 The bottom of the shear plane adjacent to the top of the coupler.
- 5 Shear values controlled by the steel strength of ASTM A193, Grade B7 (min. tensile strength 125 ksi) screws used to fasten the shear fixturing. Shear values should consider the screw or threaded rod strength.

Figure 3 – Installation of KWIK HUS-EZ I (KH-EZ I) in Hollow Core Concrete



3.3.5.4 Installation Instructions

Use the installation instructions that are including with the Kwik HUS-EZ I packaging box. To obtain a digital copy of the Installation Instructions, visit www.us.hilti.com, www.hilti.ca or contact Hilti Technical Support.

3.3.5 KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchor

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The data below is developed from testing performed in accordance with ACI 355.2. It is intended for applications designed according to CSA A23.3-04 Update No. 3 (August 2009) Design Of Concrete Structures Annex D and is generally suitable for the conditions described in the introduction of Annex D.

Table 7 – KWIK HUS-EZ I (KH-EZ I)



Design Guidelines For KWIK HUS-EZ I'				
Values for Normal Weight and Lightweight Concrete				
Characteristic	Symbol	Units	Value	
Internal Thread Diameter of Head		in.	1/4 or 3/8	
Wrench Socket Size		in.	3/8 or 1/2	
Nominal Diameter	d _a	in.	1/4	
Drill Bit Diameter	d _{bit}	in.	1/4	
Maximum Installation Torque ⁴	T _{inst,max}	ft-lbf (Nm)	18 (24)	
Maximum Impact Wrench Torque Rating ³	T _{impact,max}	ft-lbf (Nm)	114 (154)	137 (186)
Minimum Nominal Embedment Depth	h _{nom}	mm	41	64
Concrete material resistance factor	Φ _c	-	0.65	
Steel material resistance factor	Φ _s	-	0.85	
Ultimate Strength of anchor steel	f _{ut}	MPa	924	
Effective cross-sectional area of anchor	A _{se}	mm ²	29.0	
Minimum Hole Depth	h _{hole}	mm	51	73
Minimum Spacing at Critical Edge Distance	s _{min,cac} ⁵	mm	38	
Minimum Edge Distance	c _{min} ⁵	mm	38	
Minimum Spacing at Minimum Edge Distance	s _{min} ⁵	mm	76	
Minimum Concrete Thickness	h _{min}	mm	83	105
Anchor Category			3	1
Steel Strength in Tension (CSA A23.3 D.6.1)				
Factored Steel Resistance in Tension	N _{sr}	kN	15.9	
Reduction Factor for Steel Strength	R	-	0.70	
Concrete Breakout Strength in Tension (CSA A23.3 D.6.2)				
Effective Embedment Depth	h _{ef}	mm	30	49
Critical Edge Distance ²	c _{ac} ⁵	mm	51	71
Effectiveness Factor - Uncracked Concrete	K _{uncr}	-	10	
Effectiveness Factor - Cracked Concrete	K _{cr}	-	7	
Modification Factor for cracked and uncracked concrete	Ψ _{c,N}	-	1.4	
Reduction Factor for Concrete Breakout Strength	R	-	0.70	1.00
Pullout Strength in Tension - Non Seismic Applications (CSA A23.3 D.6.3)				
Factored Pullout Resistance, uncracked concrete (17.23 MPa)	N _{pr,uncr}	kN	2.6 ⁶	6.8 ⁷
Factored Pullout Resistance, cracked concrete (17.23 MPa)	N _{pr,cr}	kN	1.3 ⁶	3.4 ⁷
Concrete Resistance Factor for pullout strength	Φ _{c,pull}	-	0.65	
Factored Pullout Strength, Seismic (17.23 MPa)	N _{pr,eq}	kN	1.1 ⁶	3.4 ⁷
Concrete Resistance Factor for pullout strength	Φ _{c,seis}	-	0.65	
Values for Installation in the underside of Concrete-Filled Profile Steel Deck Assemblies ²				
Factored Pullout Resistance, (uncracked concrete 20.68 MPa) - Lower Flute	N _{pr,deck,uncr}	kN	2.4 ⁸	5.4 ⁹
Factored Pullout Resistance, (uncracked concrete 20.68 MPa) - Upper Flute	N _{pr,deck,uncr}	kN	3.0 ⁸	5.7 ⁹
Factored Pullout Resistance, (cracked concrete and seismic loads 20.68 MPa) - Lower Flute	N _{pr,deck,cr}	kN	1.3 ⁸	2.7 ⁹
Factored Pullout Resistance, (cracked concrete and seismic loads 20.68 MPa) - Upper Flute	N _{pr,deck,cr}	kN	1.5 ⁸	2.8 ⁹

1 The data presented in this table is to be used in conjunction with the design criteria of CSA A23.3-04.

2 For installations through the soffit of steel deck into concrete, anchors installed in the lower flute may be installed with a maximum one inch offset in either direction from the center of the flute.

3 Because of variability in measurement procedures, the published torque of an impact tool may not correlate properly with the above setting torques. Over-torquing can damage the anchor and/or reduce its holding capacity.

4 $T_{inst,max}$ applies to installations using a calibrated torque wrench.

5 Additional combinations for minimum edge distance, c_{min} and minimum spacing distance, s_{min} or $s_{min,cac}$ may be derived by linear interpolation between the given boundary values.

6 The characteristic pullout resistance for concrete compressive strengths greater than 17.23 MPa may be increased by multiplying the value in the table by $(f'_c/17.23)^{0.3}$.

7 The characteristic pullout for concrete compressive strengths greater than 17.23 MPa may be increased by multiplying the value in the table by $(f'_c/17.23)^{0.5}$.

8 The characteristic pullout resistance for concrete compressive strengths greater than 20.68 MPa may be increased by multiplying the value in the table by $(f'_c/20.68)^{0.3}$.

9 The characteristic pullout for concrete compressive strengths greater than 20.68 MPa may be increased by multiplying the value in the table by $(f'_c/20.68)^{0.5}$.

KWIK HUS-EZ I (KH-EZ I) Carbon Steel Screw Anchor 3.3.5

3.3.5.6 Ordering Information

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Order Information

Description	Internal Thread Diameter	Internal Thread Length	Hole Diameter	Minimum Embedment	Qty (pcs) / Box
KH-EZ 1/4"x1-5/8" 1/4"	1/4"	3/8"	1/4"	1-5/8"	100
KH-EZ 1/4"x2-1/2" 1/4"	1/4"	3/8"	1/4"	2-1/2"	100
KH-EZ 1/4"x1-5/8" 3/8"	3/8"	7/16"	1/4"	1-5/8"	100
KH-EZ 1/4"x2-1/2" 3/8"	3/8"	7/16"	1/4"	2-1/2"	100

RISER CLAMPS



FUNCTION: Designed for supporting and stabilizing vertical pipe runs. The PVC coating on Fig. 553 protects the pipe from the metal surface of the clamp. This product is not intended for use with hanger rods. Clamp is designed for standard iron pipe O.D. and must be considered when sizing other types of piping.

APPROVALS: Underwriters' Laboratories Listed in the U.S. (UL) and Factory Mutual Approved for sizes $\frac{3}{4}$ " (20mm) to 8" (200mm) only. Complies with Federal Specifications A-A-1192A (Type 8) and Manufacturers' Standardization Society ANSI/SP-69 and SP-58 (Type 8).

MATERIAL: Low carbon steel

ORDERING: Specify pipe size and figure number.

Fig. 550, 551 & 553 RISER CLAMP

Fig. 550* PLAIN

Fig. 551 ELECTRO-GALVANIZED

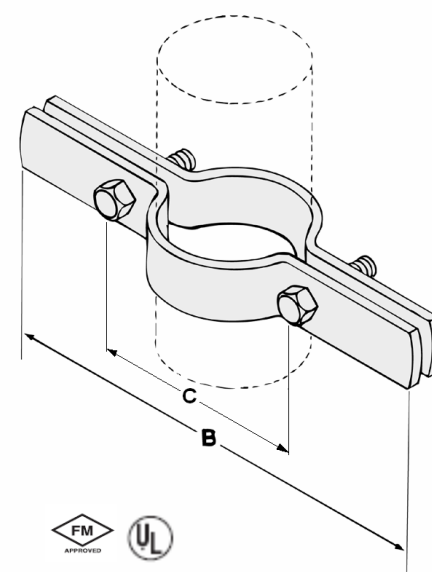
Fig. 553 PLAIN WITH PVC COATING

*Available in stainless steel.

To order, specify 304 or 316 and add suffix SS to figure number.

Price on request.

Pipe Size		B		C		Bolt Size	Max. Rec. Load		Wt. Each	
							lbs.	kN	lbs.	kg
$\frac{1}{2}$	(15)	9	(228.60)	$2\frac{1}{2}$	(63.50)	$\frac{3}{8} \times 1\frac{1}{4}$	220	(0.98)	1.05	(.48)
$\frac{3}{4}$	(20)	$8\frac{7}{8}$	(225.43)	$2\frac{3}{8}$	(60.33)	$\frac{3}{8} \times 1\frac{1}{4}$	220	(0.98)	1.05	(.48)
1	(25)	$8\frac{3}{4}$	(222.25)	$2\frac{1}{4}$	(57.15)	$\frac{3}{8} \times 1\frac{1}{4}$	220	(0.98)	1.05	(.48)
$1\frac{1}{4}$	(32)	$9\frac{1}{4}$	(234.95)	$2\frac{3}{4}$	(69.85)	$\frac{3}{8} \times 1\frac{1}{4}$	250	(1.11)	1.10	(.50)
$1\frac{1}{2}$	(40)	10	(254.00)	$2\frac{3}{4}$	(69.85)	$\frac{3}{8} \times 1\frac{1}{4}$	250	(1.11)	1.17	(.53)
2	(50)	$10\frac{1}{4}$	(260.35)	$3\frac{1}{2}$	(88.90)	$\frac{3}{8} \times 1\frac{1}{4}$	300	(1.33)	1.20	(.54)
$2\frac{1}{2}$	(65)	$11\frac{1}{8}$	(282.58)	$3\frac{3}{4}$	(95.25)	$\frac{3}{8} \times 1\frac{1}{2}$	400	(1.78)	1.89	(.86)
3	(80)	$11\frac{3}{4}$	(298.45)	$4\frac{5}{8}$	(117.48)	$\frac{3}{8} \times 1\frac{1}{2}$	500	(2.22)	1.99	(.90)
$3\frac{1}{2}$	(90)	$12\frac{1}{2}$	(317.50)	$5\frac{1}{4}$	(133.35)	$\frac{3}{8} \times 1\frac{1}{2}$	600	(2.67)	2.17	(.98)
4	(100)	13	(330.20)	6	(152.40)	$\frac{1}{2} \times 1\frac{3}{4}$	750	(3.34)	2.21	(1.00)
5	(125)	$14\frac{1}{4}$	(361.95)	$6\frac{1}{2}$	(165.10)	$\frac{1}{2} \times 1\frac{3}{4}$	1500	(6.67)	3.24	(1.47)
6	(150)	$15\frac{3}{8}$	(390.53)	$7\frac{3}{4}$	(196.85)	$\frac{1}{2} \times 1\frac{3}{4}$	1600	(7.12)	3.89	(1.76)
8	(200)	$18\frac{1}{2}$	(469.90)	$8\frac{7}{8}$	(225.43)	$\frac{5}{8} \times 2$	2500	(11.12)	7.60	(3.45)
10	(250)	$20\frac{1}{2}$	(520.70)	12	(304.80)	$\frac{5}{8} \times 2$	2500	(11.12)	11.10	(5.03)
12	(300)	$22\frac{1}{2}$	(571.50)	14	(355.60)	$\frac{5}{8} \times 2\frac{1}{2}$	2700	(12.01)	16.50	(7.48)
14	(350)	$25\frac{1}{8}$	(638.18)	16	(406.40)	$\frac{5}{8} \times 3$	2700	(12.01)	17.70	(8.03)
16	(400)	$26\frac{1}{4}$	(666.75)	$18\frac{5}{8}$	(473.08)	$\frac{3}{4} \times 3\frac{1}{2}$	2900	(12.90)	30.40	(13.79)
18	(450)	$27\frac{7}{8}$	(708.03)	$20\frac{3}{4}$	(527.05)	$\frac{3}{4} \times 3\frac{1}{2}$	2900	(12.90)	33.30	(15.10)
20	(500)	30	(762.00)	$22\frac{3}{8}$	(568.33)	$\frac{3}{4} \times 3\frac{1}{2}$	2900	(12.90)	36.30	(16.47)
24	(600)	35	(889.00)	$24\frac{1}{2}$	(622.30)	$\frac{7}{8} \times 3\frac{1}{2}$	2900	(12.90)	48.68	(22.08)
30	(750)	$42\frac{3}{8}$	(1076.33)	$29\frac{1}{2}$	(749.30)	$\frac{7}{8} \times 3\frac{1}{2}$	2900	(12.90)	60.16	(27.29)



Installation practice for Model 550 Riser Clamps

When possible the clamp should be placed under a coupling, hub or welded lugs on steel pipe. Bolt torques should be per industry standards.

Recommended Torque For Pipe Clamp Hardware						
Bolt Size	1/4"-20	5/16"-18	3/8"-16	1/2"-13	5/8"-11	3/4"-10 & Larger
ft/lbs	6	11	19	50	65	75
N/m	(8)	(15)	(26)	(68)	(88)	(102)

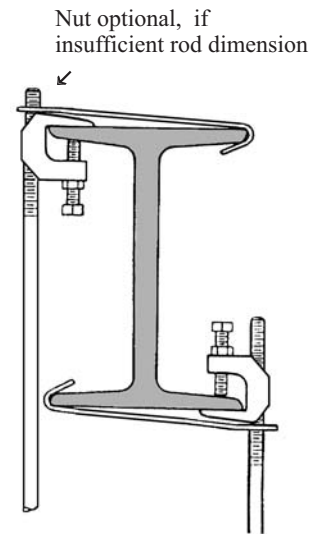
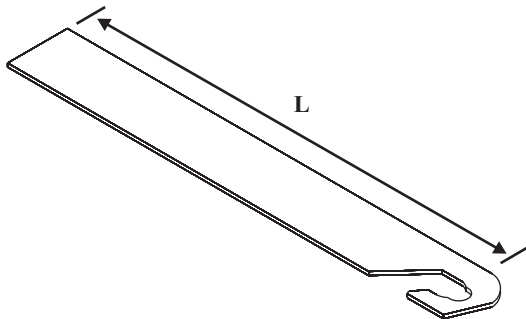
Unless otherwise specified, all dimensions on drawings and in charts are in inches and dimensions shown in parentheses are in millimeters.



P.O. Box 3365 South El Monte, CA 91733 626.444.0541 Fax 626.444.3887 www.Afcon.org

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UNIVERSAL RESTRAINING STRAP



SIZE- One size fits both 3/8" and 1/2" rod or set screw.
Available lengths 4" and longer.

MATERIAL - Carbon Steel.

FINISH - Mil. Galvanized.

LISTINGS -

c  _{US} 203-EX 2551

PATENT - No. 5,897,088

FUNCTION - To enhance hanger attachment in areas subject to Earthquakes.

INSTALLATION - Install tight to structure and component parts
Minimum return on strap: 1"
L-dimension is measured from hanger rod center to the strap end.

FEATURES

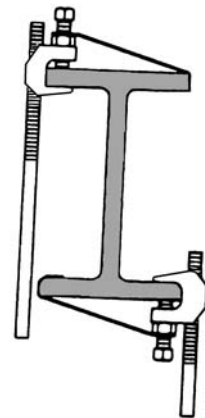
* Fast installation for new construction or retrofit.

* Requires no hanger disassembly to install.

IMPORTANT NOTE: "No Nut Is Required"

When installed tight to structure and component parts. (See drawings provided)

ORDERING - Part # and L-dimension.



Pipe Clamps

- **B3140 - Standard Pipe Clamp (TOLCO Fig. 4)**
B3140F - Standard Pipe Clamp Felt Lined for Copper Tubing (TOLCO Fig. 4F)
B3140C - Standard Pipe Clamp PVC Coated (TOLCO Fig. 4PVC)

Size Range: B3140/B3140C Size 1/2" (15mm) thru 30" (750mm) pipe.

B3140F Size 1/2" (15mm) thru 2 1/2" (65mm) copper tubing

Material: Steel

Function: Recommended for the suspension of non-insulated pipe or insulated pipe with B3151 shields. (Use B3200 weldless eye nut, B3210 eye rod or B3211 welded eye rod.) B3140F and B3140C are designed to reduce noise and vibration and/or prevent electrolysis.

Approvals: Underwriters Laboratories Listed in the USA (**UL**), Canada (**cUL**) 3/4" (20mm) - 12" (300mm), and approved by Factory Mutual Engineering (**FM**), 3/4" (20mm) - 8" (200mm). Federal Specification WW-H-171E & A-A-1192A, Type 4, and Manufacturers Standardization Society ANSI/MSS SP-69 & SP-58, Type 4. Included in our Seismic Restraints Catalog approved by the State of California Office of Statewide Health Planning and Development (**OSHPD**). For additional load, spacing and placement information relating to OSHPD projects, please refer to the Seismic Restraint Systems Guidelines.

Note: For piping that requires sway bracing refer to Fig. 4A.

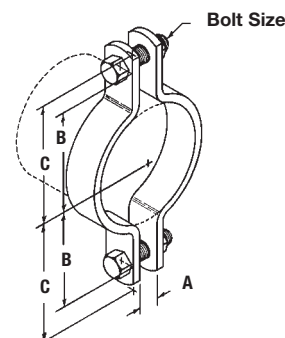
Maximum Temperature: — 750°F (399°C)

Finish: Plain. Contact B-Line for alternative finishes and materials.

Order By: Part number, pipe size and finish.

Order Note: When ordering B3140F allow for 3/16" (4.8mm) felt on each half of clamp.

Component of State of
California OSHPD Approved
Seismic Restraints System



B3140



B3140F



B3140C

B3140 - Standard Pipe Clamp (TOLCO Fig. 4)

B3140F - Standard Pipe Clamp Felt Lined (TOLCO Fig. 4F)

B3140C - Standard Pipe Clamp PVC Coated (TOLCO Fig. 4PVC) Cont.

Part No.	Pipe Size		A		B		C		Bolt Size
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	
B3140-1/2	1/2"	(15)	3/8"	(9.5)	31/32"	(24.6)	117/32"	(38.9)	5/16"-18
B3140-3/4	3/4"	(20)	9/16"	(14.3)	13/32"	(27.8)	121/32"	(42.0)	5/16"-18
B3140-1	1"	(25)	9/16"	(14.3)	15/16"	(33.3)	17/8"	(47.6)	5/16"-18
B3140-1 1/4	1 1/4"	(32)	17/32"	(13.5)	17/16"	(36.5)	2"	(50.8)	5/16"-18
B3140-1 1/2	1 1/2"	(40)	19/32"	(15.1)	121/32"	(42.0)	27/32"	(56.4)	5/16"-18
B3140-2	2"	(50)	9/16"	(14.3)	21/8"	(54.0)	23/4"	(69.8)	1/2"-13
B3140-2 1/2	2 1/2"	(65)	5/8"	(15.9)	221/32"	(67.5)	39/32"	(83.3)	1/2"-13
B3140-3	3"	(75)	5/8"	(15.9)	215/16"	(74.6)	39/16"	(90.5)	1/2"-13
B3140-3 1/2	3 1/2"	(90)	5/8"	(15.9)	35/32"	(80.1)	325/32"	(96.0)	1/2"-13
B3140-4	4"	(100)	3/4"	(19.0)	39/16"	(90.5)	45/16"	(109.5)	5/8"-11
B3140-5	5"	(125)	3/4"	(19.0)	41/8"	(104.8)	47/8"	(123.8)	5/8"-11
B3140-6	6"	(150)	7/8"	(22.2)	415/16"	(125.4)	513/16"	(147.6)	3/4"-10
B3140-8	8"	(200)	1"	(25.4)	61/16"	(154.0)	615/16"	(176.2)	3/4"-10
B3140-10	10"	(250)	1"	(25.4)	73/8"	(187.3)	811/16"	(220.7)	7/8"-9
B3140-12	12"	(300)	1"	(25.4)	87/16"	(214.3)	93/4"	(247.6)	7/8"-9
B3140-14	14"	(350)	1 1/8"	(28.6)	91/4"	(234.9)	105/8"	(269.9)	7/8"-9
B3140-16	16"	(400)	1 1/8"	(28.6)	101/4"	(260.3)	115/8"	(295.3)	7/8"-9
B3140-18	18"	(450)	1 1/4"	(31.7)	117/8"	(301.6)	131/4"	(336.5)	1"-8
B3140-20	20"	(500)	13/8"	(34.9)	123/4"	(323.8)	141/8"	(358.8)	1 1/8"-7
B3140-24	24"	(600)	15/8"	(41.3)	151/4"	(387.3)	167/8"	(428.6)	1 1/4"-7
B3140-30	30"	(750)	2 1/4"	(57.1)	185/8"	(473.1)	21"	(533.4)	1 1/2"-6

Part No.	Pipe Size		Max. Design Load				Approx. Wt./100	
	in.	(mm)	650°F (343°C)		750°F (399°C)		lbs.	(kg)
			lbs.	(kN)	lbs.	(kN)		
B3140-1/2	1/2"	(15)	500	(2.22)	390	(1.73)	30	(13.6)
B3140-3/4	3/4"	(20)	500	(2.22)	390	(1.73)	31	(14.0)
B3140-1	1"	(25)	500	(2.22)	390	(1.73)	33	(14.5)
B3140-1 1/4	1 1/4"	(32)	500	(2.22)	390	(1.73)	39	(17.7)
B3140-1 1/2	1 1/2"	(40)	800	(3.56)	620	(2.76)	41	(18.6)
B3140-2	2"	(50)	1040	(4.62)	810	(3.60)	118	(53.5)
B3140-2 1/2	2 1/2"	(65)	1040	(4.62)	810	(3.60)	130	(58.9)
B3140-3	3"	(75)	1040	(4.62)	810	(3.60)	150	(68.0)
B3140-3 1/2	3 1/2"	(90)	1040	(4.62)	810	(3.60)	158	(71.6)
B3140-4	4"	(100)	1040	(4.62)	810	(3.60)	239	(108.4)
B3140-5	5"	(125)	1040	(4.62)	810	(3.60)	272	(123.4)
B3140-6	6"	(150)	1615	(7.18)	1260	(5.60)	541	(245.4)
B3140-8	8"	(200)	1615	(7.18)	1260	(5.60)	642	(291.2)
B3140-10	10"	(250)	2490	(11.07)	1950	(8.67)	1366	(619.6)
B3140-12	12"	(300)	2490	(11.07)	1950	(8.67)	1543	(699.9)
B3140-14	14"	(350)	2490	(11.07)	1950	(8.67)	2077	(942.1)
B3140-16	16"	(400)	2490	(11.07)	1950	(8.67)	2289	(1038.3)
B3140-18	18"	(450)	3060	(13.61)	2390	(10.63)	3206	(1454.2)
B3140-20	20"	(500)	3060	(13.61)	2390	(10.63)	3616	(1640.2)
B3140-24	24"	(600)	3060	(13.61)	2390	(10.63)	5161	(2341.0)
B3140-30	30"	(750)	3500	(15.57)	2740	(12.14)	10460	(4744.6)

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

Lok-Bolt™ Sleeve Expansion Anchor

PRODUCT DESCRIPTION

The Lok-Bolt is a pre-assembled single unit sleeve anchor available in carbon steel and stainless steel which can be used in concrete, block, brick, and stone. The Lok-Bolt is designed to draw the fixture into full bearing against the base material through the action of its unique and flexible compression ring. This helps to increase the resistance of the anchor to loosening when subjected to vibratory loads. As the anchor is being tightened, the nylon compression ring will compress if necessary, so that the fixture is tightly secured against the face of the base material. Under load, the specially tapered plow bolt is drawn further into the expansion sleeve to develop increased locking action against the walls of the hole. Extension sleeves are added for longer lengths.

GENERAL APPLICATIONS AND USES

- Door and Window Frame Installations
- Mounting fixtures on walls
- Mounting of Handrails and Fencing
- Shelving and Storage
- Masonry Applications
- Electrical and Mechanical Attachments

FEATURES AND BENEFITS

- Multiple head styles for multiple applications and finished appearance
- Fits standard fixture holes – No need to undersize anchors for proper fit
- Immediate Loading – Minimizes downtime
- Sleeve has 360° contact area and reduces concrete stress
- Versatile and ideal for concrete, or masonry
- Available in carbon steel and Type 304 stainless steel

APPROVALS AND LISTINGS

Factory Mutual Research Corporation (FM Approvals) Serial No. 26692, J.I. OJ8A1.AH, J.I. OJ9A9.AH

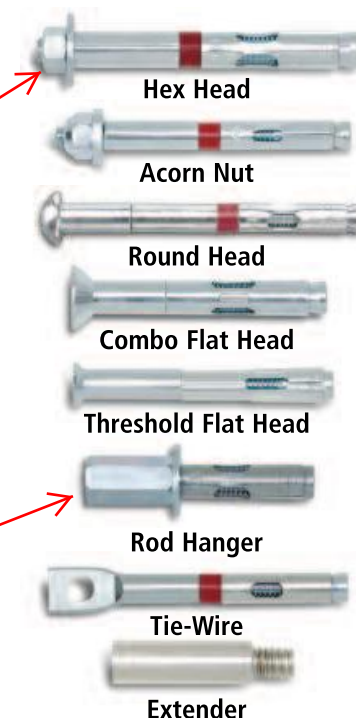
Underwriters Laboratory (UL Listed) File No. EX 1289 (N) See listing for applicable sizes and styles.

GUIDE SPECIFICATIONS

CSI Divisions: 03151-Concrete Anchoring, 04081-Masonry Anchorage and 05090-Metal Fastenings. Sleeve Anchors shall be Lok-Bolt anchors as supplied by Powers Fasteners, Inc., Brewster, NY.

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HEAD STYLES

Hex Head
 Acorn Nut
 Round Head
 Combo Flat Head
 Threshold Flat Head
 Rod Hanger
 Tie-Wire

ANCHOR MATERIALS

Zinc Plated Carbon Steel
 Type 304 Stainless Steel

ANCHOR SIZE RANGE (TYP.)

1/4" diameter x 5/8" length to
 3/4" diameter x 7-1/2" length

SUITABLE BASE MATERIALS

Normal-Weight Concrete
 Structural Lightweight Concrete
 Grouted Concrete Masonry
 Hollow Concrete Masonry

(b)

INSTALLATION SPECIFICATIONS

Acorn Nut and Hex Head Lok-Bolt

Dimension	Anchor Size, <i>d</i>					
	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	1/4	5/16	3/8	1/2	5/8	3/4
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16	3/8	7/16	9/16	11/16	15/16
Plow Bolt Size (UNC)	10-24	1/4-20	5/16-18	3/8-16	1/2-13	5/8-11
Nut Height (in.)	3/16	7/32	17/64	21/64	7/16	35/64
Washer O.D., <i>d_w</i> (in.)	1/2	5/8	13/16	1	1 3/8	1 3/4
Wrench Size (in.)	3/8	7/16	1/2	9/16	3/4	15/16

Round Head Lok-Bolt

Dimension	Anchor Size, <i>d</i>		
	1/4"	5/16"	3/8"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	1/4	5/16	3/8
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16	3/8	7/16
Plow Bolt Size (UNC)	10-24	1/4-20	5/16-18
Head Height (in.)	11/64	13/64	15/64
Head Width, <i>d_{hd}</i> (in.)	29/64	9/16	43/64

Combo Flat Head Lok-Bolt

Dimension	Anchor Size, <i>d</i>		
	1/4"	5/16"	3/8"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	1/4	5/16	3/8
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16	3/8	7/16
Plow Bolt Size (UNC)	10-24	1/4-20	5/16-18
Head Height (in.)	5/32	3/16	15/64
Head Width, <i>d_{hd}</i> (in.)	1/2	5/8	3/4

Rod Hanger Lok-Bolt

Dimension	Anchor Size, <i>d</i>		
	1/4"	3/8"	1/2"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	1/4	3/8	1/2
Plow Bolt Size (UNC)	1/4-20	5/16-18	3/8-16
Coupling Height (in.)	7/8	1	1 1/4
Washer O.D., <i>d_w</i> (in.)	5/8	13/16	1
Coupling Wrench Size (in.)	7/16	1/2	11/16

Threshold Lok-Bolt

Dimension	Anchor Size, <i>d</i>
	1/4"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	1/4
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16
Plow Bolt Size (UNC)	10-24
Head Height (in.)	5/64
Head Width, <i>d_{hd}</i> (in.)	23/64

Tire-Wire Lok-Bolt

Dimension	Anchor Size, <i>d</i>
	5/16"
ANSI Drill Bit Size, <i>d_{bit}</i> (in.)	5/16
Fixture Clearance Hole, <i>d_h</i> (in.)	1/4
Plow Bolt Size (UNC)	1/4-20
Head Height (in.)	1 9/16
Head Width, <i>d_{hd}</i> (in.)	31/64

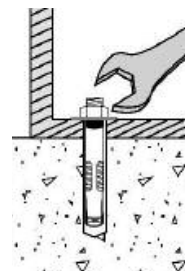
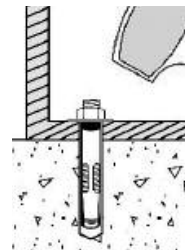
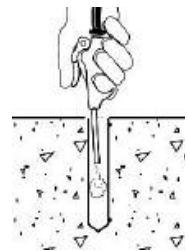
Installation Guidelines

Using the proper diameter bit, drill a hole into the base material to a depth of at least 1/2" or one anchor diameter deeper than the embedment required. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.

Blow the hole clean of dust and other material. Do not expand the anchor prior to installation.

Drive the anchor through the fixture into the anchor hole until the head is firmly seated against the fixture. Be sure the anchor is driven to the required embedment depth.

Tighten the anchor by turning the nut of head 3 to 5 turns past finger tight or by applying the guide installation torque from the finger tight position.



MATERIAL SPECIFICATIONS

General Lok-Bolt Components

Anchor Component	Component Material	
	Carbon Steel	Stainless Steel
Plow Bolt	AISI 1010 / 1018	Type 18-8 SS
Expansion Sleeve	AISI 1010 / 1020	Type 304 SS
Extension Sleeve	AISI 1010 / 1020	Type 304 SS
Compression Ring	Nylon	Nylon
Zinc Plating	ASTM B633, SC1, Type III (Fe/Zn 5)	N/A

Lok-Bolt Head Components

Anchor Component	Component Material	
	Carbon Steel	Stainless Steel
Hex Nut	ASTM A 563, Grade A	Type 304 SS
Acorn Nut	AISI 1010 / 1018	Type 304 SS
Washer	ASTM F 844	Type 18-8 SS
Round Head	AISI 1010 / 1018	Type 304 SS
Flat Head	AISI 1010 / 1018	Type 304 SS
Rod Coupling	AISI 12L14	Type 18-8 SS
Threshold	AISI 1010 / 1018	N/A
Tie-Wire	AISI 1010 / 1018	N/A
Zinc Plating	ASTM B 633, SC1, Type III (Fe/Zn 5)	N/A

PERFORMANCE DATA**Ultimate Load Capacities for Carbon and Stainless Steel Lok-Bolt in Normal-Weight Concrete¹**

Anchor Diameter <i>d</i> in. (mm)	Minimum Embed. Depth <i>h_v</i> in. (mm)	Maximum Tightening Torque <i>T_{max}</i> ft.-lbs.		Minimum Concrete Compressive Strength (<i>f'_c</i>)					
				2,000 psi (13.8 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)	
				Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	5/8 (15.9)	3-4	2-3	540 (2.4)	1,000 (4.5)	620 (2.8)	1,200 (5.4)	680 (3.1)	1,200 (5.4)
	1 1/8 (28.6)			1,000 (4.5)	1,520 (6.8)	1,150 (5.1)	1,520 (6.8)	1,150 (5.1)	1,520 (6.8)
5/16 (7.9)	1 1/2 (38.1)	6-8	—	2,000 (8.9)	1,520 (6.8)	2,040 (9.0)	1,520 (6.8)	2,040 (9.0)	1,520 (6.8)
3/8 (9.5)	1 5/8 (41.3)	12-16	8-11	2,450 (11.1)	2,440 (11.0)	2,680 (12.1)	2,440 (11.0)	2,700 (12.2)	2,440 (11.0)
1/2 (12.7)	2 1/4 (57.2)	20-28	15-20	4,770 (21.5)	4,210 (19.0)	5,015 (22.6)	4,220 (19.0)	5,275 (23.7)	4,210 (19.0)
5/8 (15.9)	2 1/4 (57.2)	45-60	30-40	3,270 (14.7)	7,200 (32.4)	5,860 (26.4)	7,200 (32.4)	6,250 (28.1)	7,200 (32.4)
	2 3/4 (69.9)			6,060 (27.3)	7,820 (35.2)	6,620 (29.8)	7,820 (35.2)	6,800 (30.6)	7,810 (35.2)
3/4 (19.1)	2 1/4 (57.2)	70-90	45-60	4,480 (20.2)	9,840 (44.3)	8,420 (37.9)	11,670 (52.5)	8,940 (40.2)	11,670 (52.5)
	3 3/8 (85.7)			6,790 (30.6)	12,600 (56.7)	8,720 (39.2)	12,600 (56.7)	8,940 (40.2)	12,600 (56.7)

1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.

Allowable Load Capacities for Carbon and Stainless Steel Lok-Bolt in Normal-Weight Concrete^{1,2}

Anchor Diameter <i>d</i> in. (mm)	Minimum Embed. Depth <i>h_v</i> in. (mm)	Maximum Tightening Torque <i>T_{max}</i> ft.-lbs.		Minimum Concrete Compressive Strength (<i>f'_c</i>)					
				2,000 psi (13.8 MPa)		4,000 psi (27.6 MPa)		6,000 psi (41.4 MPa)	
				Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	5/8 (15.9)	3-4	2-3	135 (0.6)	250 (1.1)	155 (0.7)	300 (1.4)	170 (0.8)	300 (1.4)
	1 1/8 (28.6)			250 (1.0)	380 (1.7)	285 (1.3)	380 (1.7)	285 (1.8)	380 (1.7)
5/16 (7.9)	1 1/2 (38.1)	6-8	—	500 (2.2)	380 (1.7)	510 (2.2)	380 (1.7)	510 (2.2)	380 (1.7)
3/8 (9.5)	1 5/8 (41.3)	12-16	8-11	615 (2.2)	610 (2.7)	670 (3.0)	610 (2.7)	675 (3.0)	610 (2.7)
1/2 (12.7)	2 1/4 (57.2)	20-28	15-20	1,195 (5.4)	1,055 (4.7)	1,255 (5.6)	1,055 (4.7)	1,320 (5.9)	1,055 (4.7)
5/8 (15.9)	2 1/4 (57.2)	45-60	30-40	818 (3.7)	1,800 (8.1)	1,465 (6.6)	1,800 (8.1)	1,565 (7.0)	1,800 (8.1)
	2 3/4 (69.9)			1,515 (6.8)	1,955 (8.8)	1,655 (7.4)	1,955 (8.8)	1,700 (7.7)	1,955 (8.8)
3/4 (19.1)	2 1/4 (57.2)	70-90	40-60	1,120 (5.0)	2,460 (11.1)	2,105 (9.5)	2,918 (13.1)	2,235 (10.1)	2,920 (13.1)
	3 3/8 (85.7)			1,700 (7.7)	3,150 (14.2)	2,180 (9.8)	3,150 (14.2)	2,235 (10.1)	3,150 (14.2)

1. Allowable load capacities listed are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Carbon and Stainless Steel Lok-Bolt in Structural Lightweight Concrete^{1,2}

Anchor Dia. <i>d</i> in. (mm)	Min. Embed. Depth <i>h_v</i> in. (mm)	Maximum Tightening Torque <i>T_{max}</i> ft.-lbs.	Minimum Concrete Compressive Strength							
			<i>f'_c</i> = 3,000 psi (20.7 MPa)				<i>f'_c</i> = 5,000 psi (34.5 MPa)			
			Ultimate Load		Allowable Load		Ultimate Load		Allowable Load	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1/4 (6.4)	2-3	1,040 (4.7)	1,160 (5.2)	260 (1.2)	290 (1.3)	1,240 (5.6)	1,160 (5.2)	310 (1.4)	290 (1.3)
5/16 (7.9)	5/16 (7.9)	5-6	1,140 (5.1)	1,560 (7.0)	285 (1.3)	390 (1.8)	1,720 (7.7)	1,560 (7.0)	430 (1.9)	390 (1.8)
3/8 (9.5)	3/8 (9.5)	8-11	1,180 (5.3)	2,600 (11.7)	295 (1.3)	650 (2.9)	1,720 (7.7)	2,600 (11.7)	430 (1.9)	650 (2.9)
1/2 (12.7)	1/2 (12.7)	15-20	2,400 (10.8)	4,020 (18.1)	600 (2.7)	1,005 (4.5)	3,780 (17.0)	4,020 (18.1)	945 (4.3)	1,005 (4.5)
5/8 (15.9)	5/8 (15.9)	30-40	3,740 (16.8)	6,420 (28.9)	935 (4.2)	1,605 (7.2)	4,640 (20.9)	6,420 (28.9)	1,160 (5.2)	1,605 (7.2)
3/4 (19.1)	3/4 (19.1)	40-60	3,740 (16.8)	10,440 (47.0)	935 (4.2)	2,610 (11.7)	4,640 (20.9)	10,440 (47.0)	1,160 (5.2)	2,610 (11.7)

1. The values listed above are ultimate and allowable load capacities for anchors in sand-lightweight concrete.
2. Allowable load capacities are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.

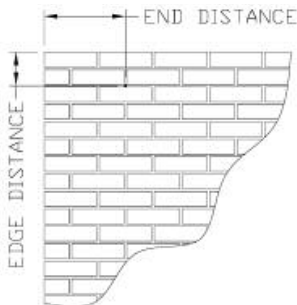
Ultimate and Allowable Load Capacities for Carbon and Stainless Steel Lok-Bolt Installed Through Metal Deck into Structural Lightweight Concrete^{1,2,3,4}

Anchor Dia. <i>d</i> in. (mm)	Min. Embed. Depth <i>h_v</i> in. (mm)	Maximum Tightening Torque <i>T_{max}</i> ft.-lbs.	Lightweight Concrete Over Minimum 20 Ga. Metal Deck <i>f'_c</i> ≥ 3,000 (20.7 MPa)							
			Minimum 1-1/2" Wide Deck				Minimum 4-1/2" Wide Deck			
			Ultimate Load		Allowable Load		Ultimate Load		Allowable Load	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 1/4 (31.8)	2-3	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)
5/16 (7.9)	1 1/2 (38.1)	5-6	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)
3/8 (9.5)	2 (50.8)	8-11	1,080 (4.9)	2,480 (11.2)	270 (1.2)	620 (2.8)	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)
1/2 (12.7)	2 1/2 (63.5)	15-20	1,940 (8.7)	2,480 (11.2)	485 (2.2)	620 (2.8)	2,840 (12.8)	4,640 (20.9)	710 (3.2)	1,160 (5.2)
5/8 (15.9)	2 3/4 (69.9)	30-40	—	—	—	—	2,840 (12.8)	4,640 (20.9)	710 (3.2)	1,160 (5.2)
3/4 (19.1)	3 (76.2)	40-60	—	—	—	—	4,440 (20.0)	9,060 (40.8)	1,110 (5.0)	2,265 (10.2)

1. The values listed above are ultimate and allowable load capacities for anchors in sand-lightweight concrete over metal deck.
2. Allowable loads capacities are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Tabulated load values are for anchors installed in the center of the flute. Spacing distances shall be in accordance with the spacing lightweight concrete table listed in the Design Criteria section.
4. Anchors are permitted to be installed in the lower or upper flute of the metal deck provided the proper installed procedures are maintained.

PERFORMANCE DATA

1. Tabulated load values are for carbon and stainless steel anchors installed in minimum 6-inch wide, Grade N, Type II, medium and normal-weight concrete masonry units. Mortar must be minimum Type N. Masonry prism compressive strength must be 1,500 psi minimum at the time of installation.
2. Allowable loads are for carbon and stainless steel anchors and are based on average ultimate values using a safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Linear interpolation may be used for allowable loads for intermediate embedment depths.
4. The tabulated values are for anchors installed at a minimum of 12 anchor diameters on center for 100 percent capacity. Spacing distances may be reduced to 6 anchor diameters on center provided the capacities are reduced by 50 percent. Linear interpolation may be used for intermediate spacings.
5. Anchors with diameters of 1/2" and larger installed in hollow concrete masonry units are limited to one anchor per unit cell.
6. Anchors shall be of suitable length for the masonry wall thickness and attachment.



1. Tabulated load values are for carbon and stainless steel anchors installed in Grade SW multiple wythe, solid brick masonry conforming to ASTM C62.
2. Allowable loads are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. The tabulated values are for anchors installed at a minimum of 12 anchor diameters on center for 100 percent capacity. Spacing distances may be reduced to 6 anchor diameters on center provided the capacities are reduced by 50 percent. Linear interpolation may be used for intermediate spacings.
4. Anchors length shall be of suitable length for the concrete masonry wall thickness and attachment.

Ultimate and Allowable Load Capacities for Lok-Bolt in Hollow or Solid Concrete Masonry^{1,2,3,4,5,6}

Anchor Dia. <i>d</i> in. (mm)	Min. Embed. Depth <i>h_v</i> in. (mm)	Maximum Tightening Torque <i>T_{max}</i> ft.-lbs.	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	<i>f'_m</i> ≥ 1,500 psi (10.4 MPa)			
					Ultimate Load		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	5/8 (15.9)	1-3	3 3/4 (95.3)	3 3/4 (95.3)	230 (1.0)	1,000 (4.5)	45 (0.2)	200 (0.9)
	1 1/8 (28.6)	1-3	3 3/4 (95.3)	8 (203.2)	1,200 (5.4)	1,270 (5.7)	240 (1.1)	255 (1.1)
5/16 (7.9)	1 1/2 (38.1)	4-6	3 3/4 (95.3)	8 (203.2)	1,430 (6.4)	1,970 (8.9)	285 (1.3)	395 (1.8)
3/8 (9.5)	1 1/2 (38.1)	8-11	12 (304.8)	12 (304.8)	1,700 (7.7)	2,180 (9.8)	340 (1.5)	435 (2.0)
1/2 (12.7)	1 1/2 (38.1)	16-20	12 (304.8)	12 (304.8)	2,460 (11.1)	2,840 (12.8)	490 (2.2)	570 (2.6)

Ultimate and Allowable Load Capacities for Lok-Bolt in Hollow or Solid Clay Brick Masonry^{1,2,3,4}

Anchor Dia. <i>d</i> in. (mm)	Min. Embed. Depth <i>h_v</i> in. (mm)	Maximum Tightening Torque <i>T_{max}</i> ft.-lbs.	Min. Edge Dist. in. (mm)	Min. End Dist. in. (mm)	<i>f'_m</i> ≥ 1,500 psi (10.4 MPa)			
					Ultimate Load		Allowable Load	
					Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	5/8 (15.9)	1-3	4 (101.6)	4 (101.6)	800 (3.6)	1,120 (5.0)	160 (0.7)	225 (1.0)
	1 1/8 (28.6)	1-3			950 (4.3)	1,120 (5.0)	190 (0.9)	225 (1.0)
5/16 (7.9)	1 1/2 (38.1)	4-6	8 (203.2)	8 (203.2)	1,230 (5.5)	1,120 (5.0)	245 (1.1)	225 (1.0)
3/8 (9.5)	1 1/2 (38.1)	8-11			1,860 (8.4)	1,260 (5.7)	370 (1.7)	250 (1.1)
1/2 (12.7)	1 1/2 (38.1)	16-20			3,520 (15.8)	4,010 (18.0)	705 (3.2)	800 (3.6)

DESIGN CRITERIA**Combined Loading**

For anchors loaded in both shear and tension, the combination of loads should be proportioned as follows:

$$\left(\frac{N_u}{N_n}\right)^{\frac{5}{3}} + \left(\frac{V_u}{V_n}\right)^{\frac{5}{3}} \leq 1 \quad \text{OR} \quad \left(\frac{N_u}{N_n}\right) + \left(\frac{V_u}{V_n}\right) \leq 1$$

Where: N_u = Applied Service Tension Load
 N_n = Allowable Tension Load
 V_u = Applied Service Shear Load
 V_n = Allowable Shear Load

Load Adjustment Factors for Spacing and Edge Distances

Anchor Installed in Normal-Weight Concrete					
Anchor Dimension	Load Type	Critical Distance (Full Anchor Capacity)	Critical Load Factor	Minimum Distance (Reduced Capacity)	Minimum Load Factor
Spacing (<i>s</i>)	Tension and Shear	$s_{cr} = 3.0h_v$	$F_N = F_V = 1.0$	$s_{min} = 1.5h_v$	$F_N = F_V = 0.50$
Edge Distance (<i>c</i>)	Tension	$c_{cr} = 12d$	$F_N = 1.0$	$c_{min} = 5d$	$F_N = 0.70$
	Shear	$c_{cr} = 12d$	$F_V = 1.0$	$c_{min} = 5d$	$F_V = 0.45$

Anchor Installed in Lightweight Concrete					
Anchor Dimension	Load Type	Critical Distance (Full Anchor Capacity)	Critical Load Factor	Minimum Distance (Reduced Capacity)	Minimum Load Factor
Spacing (<i>s</i>)	Tension and Shear	$s_{cr} = 3.0h_v$	$F_N = F_V = 1.0$	$s_{min} = 1.5h_v$	$F_N = F_V = 0.50$
Edge Distance (<i>c</i>)	Tension	$c_{cr} = 12d$	$F_N = 1.0$	$c_{min} = 5d$	$F_N = 0.85$
	Shear	$c_{cr} = 12d$	$F_V = 1.0$	$c_{min} = 5d$	$F_V = 0.40$

1. Allowable load values found in the performance data tables are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances. Linear interpolation is allowed for intermediate anchor spacing and edge distances between critical and minimum distances. When an anchor is affected by both reduced spacing and edge distance, the spacing and edge reduction factors must be combined (multiplied). Multiple reduction factors for anchor spacing and edge distance may be required depending on the anchor group configuration.

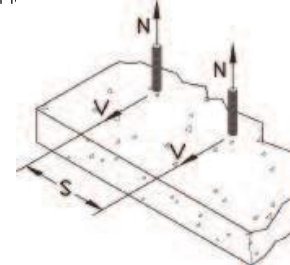
(b)

DESIGN CRITERIA

Load Adjustment Factors for Normal-Weight Concrete

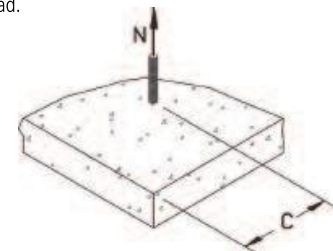
Spacing, Tension (F_N) & Shear (F_V)						
Dia. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
h_V (in.)	1 1/4	1 1/2	2	2 1/2	2 3/4	3
s_{cr} (in.)	3 3/4	4 1/2	6	7 1/2	8 1/4	9
s_{min} (in.)	1 7/8	2 1/4	3	3 3/4	4 1/8	4 1/2
Spacing, s (inches)	1 7/8	0.50				
	2 1/4	0.56	0.50			
	3	0.80	0.67	0.50		
	3 3/4	1.00	0.83	0.63	0.50	
	4		0.89	0.67	0.53	
	4 1/8		0.92	0.69	0.55	0.50
	4 1/2		1.00	0.75	0.60	0.55
	6			1.00	0.80	0.73
	7 1/2				0.91	0.83
	8 1/4				1.00	0.92
	9					1.00

Notes: For anchors loaded in tension and shear, the critical spacing (s_{cr}) is equal to 3 embedment depths ($3h_V$) at which the anchor achieves 100% of load. Minimum spacing (s_{min}) is equal to 1.5 embedment depths ($1.5h_V$) at which the anchor achieves 50% of load.



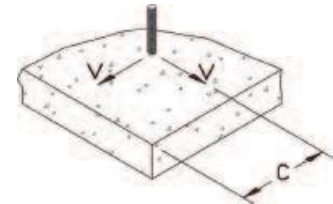
Edge Distance, Tension (F_N)						
Dia. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
c_{cr} (in.)	3	3 3/4	4 1/2	6	7 1/2	9
c_{min} (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
Edge Distance, c (inches)	1 1/4	0.70				
	1 5/8	0.76	0.70			
	1 7/8	0.81	0.74	0.70		
	2 1/2	0.91	0.83	0.77	0.70	
	3	1.00	0.90	0.83	0.74	
	3 1/8		0.91	0.84	0.75	0.70
	3 3/4		1.00	0.91	0.81	0.74
	4 1/2			1.00	0.87	0.79
	6				0.90	0.81
	7 1/2				1.00	0.84
	9					1.00

Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 12 anchor diameters ($12d$) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 5 anchor diameters ($5d$) at which the anchor achieves 70% of load.



Edge Distance, Shear (F_V)						
Dia. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
c_{cr} (in.)	3	3 3/4	4 1/2	6	7 1/2	9
c_{min} (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
Edge Distance, c (inches)	1 1/4	0.45				
	1 5/8	0.57	0.45			
	1 7/8	0.65	0.53	0.45		
	2 1/2	0.84	0.69	0.58	0.45	
	3	1.00	0.81	0.69	0.53	
	3 1/8		0.84	0.71	0.55	0.45
	3 3/4		1.00	0.84	0.65	0.53
	4 1/2			1.00	0.76	0.62
	6				0.81	0.69
	7 1/2				1.00	0.84
	9					1.00

Notes: For anchors loaded in shear, the critical edge distance (c_{cr}) is equal to 12 anchor diameters ($12d$) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 5 anchor diameters ($5d$) at which the anchor achieves 45% of load.

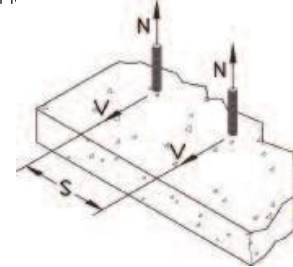


DESIGN CRITERIA
Load Adjustment Factors for Lightweight Concrete

Spacing, Tension (F_N) & Shear (F_V)						
Dia. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
h_V (in.)	1 1/4	1 1/2	2	2 1/2	2 3/4	3
s_{cr} (in.)	3 3/4	4 1/2	6	7 1/2	8 1/4	9
s_{min} (in.)	1 7/8	2 1/4	3	3 3/4	4 1/8	4 1/2
Spacing, s (inches)	1 7/8	0.50				
	2 1/4	0.56	0.50			
	3	0.80	0.67	0.50		
	3 3/4	1.00	0.83	0.63	0.50	
	4		0.89	0.67	0.53	
	4 1/8		0.92	0.69	0.55	0.50
	4 1/2		1.00	0.75	0.60	0.55
	6			1.00	0.80	0.73
	7 1/2				0.91	0.83
	8 1/4				1.00	0.92
	9					1.00

Notes: For anchors loaded in tension and shear, the critical spacing (s_{cr}) is equal to 3 embedment depths ($3h_V$) at which the anchor achieves 100% of load.

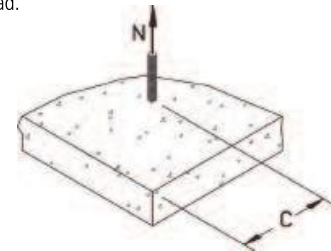
Minimum spacing (s_{min}) is equal to 1.5 embedment depths ($1.5h_V$) at which the anchor achieves 50% of load.



Edge Distance, Tension (F_N)						
Dia. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
c_{cr} (in.)	3	3 3/4	4 1/2	6	7 1/2	9
c_{min} (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
Edge Distance, c (inches)	1 1/4	0.85				
	1 5/8	0.88	0.85			
	1 7/8	0.90	0.87	0.85		
	2 1/2	0.96	0.91	0.89	0.85	
	3	1.00	0.95	0.91	0.87	
	3 1/8		0.96	0.92	0.88	0.85
	3 3/4		1.00	0.96	0.90	0.87
	4 1/2			1.00	0.94	0.90
	6				1.00	0.95
	7 1/2				1.00	0.92
	9					1.00

Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 12 anchor diameters ($12d$) at which the anchor achieves 100% of load.

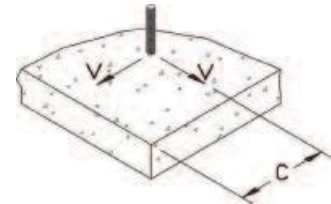
Minimum edge distance (c_{min}) is equal to 5 anchor diameters ($5d$) at which the anchor achieves 85% of load.



Edge Distance, Shear (F_V)						
Dia. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
c_{cr} (in.)	3	3 3/4	4 1/2	6	7 1/2	9
c_{min} (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
Edge Distance, c (inches)	1 1/4	0.40				
	1 5/8	0.53	0.40			
	1 7/8	0.61	0.49	0.40		
	2 1/2	0.83	0.66	0.54	0.40	
	3	1.00	0.79	0.66	0.49	
	3 1/8		0.83	0.69	0.51	0.40
	3 3/4		1.00	0.83	0.61	0.49
	4 1/2			1.00	0.74	0.59
	6				1.00	0.79
	7 1/2				1.00	0.83
	9					1.00

Notes: For anchors loaded in shear, the critical edge distance (c_{cr}) is equal to 12 anchor diameters ($12d$) at which the anchor achieves 100% of load.

Minimum edge distance (c_{min}) is equal to 5 anchor diameters ($5d$) at which the anchor achieves 40% of load.



ORDERING INFORMATION
Hex Nut Lok-Bolt

Catalog Number		Size	Bolt Length	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless							
5005	—	5/16" x 1-1/2"	1 13/16"	5/16"	1 3/8"	100	1,000	4 1/4
5010	—	5/16" x 2 3/8"	2 11/16"	5/16"	1 1/2"	100	500	5 3/4
5015	6152	3/8" x 1 7/8"	2 3/16"	3/8"	1 5/8"	50	500	7
5020	6153	3/8" x 3"	3 5/16"	3/8"	1 5/8"	50	500	10
5022	—	3/8" x 4"	4 5/16"	3/8"	1 5/8"	50	500	16
5025	6156	1/2" x 2 1/4"	2 7/8"	1/2"	2 1/8"	25	250	14
5030	6157	1/2" x 3"	3 3/8"	1/2"	2 1/4"	25	250	17 1/4
5034	6160	1/2" x 4"	4 3/8"	1/2"	2 1/4"	25	125	22
5033	—	1/2" x 5 1/4"	6 1/8"	1/2"	2 1/4"	25	125	27
5032	—	1/2" x 6"	6 3/4"	1/2"	2 1/4"	10	100	35
5035	—	5/8" x 2 1/4"	3 3/16"	5/8"	2 1/8"	25	125	25 1/2
5038	—	5/8" x 3"	3 3/4"	5/8"	2 3/4"	25	125	34
5040	6164	5/8" x 4 1/4"	5"	5/8"	2 3/4"	10	100	41
5045	—	5/8" x 6"	6 1/4"	5/8"	2 3/4"	10	100	49
5050	—	3/4" x 2 3/4"	3 5/8"	3/4"	2 1/8"	10	100	46
5055	6168	3/4" x 4 1/4"	5 1/8"	3/4"	3 3/8"	10	40	70
5060	—	3/4" x 6 1/4"	7 1/8"	3/4"	3 3/8"	10	30	90
5065	—	3/4" x 8 1/4"	9"	3/4"	3 3/8"	10	30	115

The published minimum length is measured from below the washer to the end of the anchor. Actual anchor lengths may be slightly longer.

Acorn Nut Lok-Bolt

Catalog Number		Size	Bolt Length	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless							
*5125	—	1/4" x 5/8"	1 1/32"	1/4"	1/2"	100	1,000	2
5150	6150	1/4" x 1 3/8"	1 21/32"	1/4"	1 1/8"	100	1,000	2 3/4
5175	—	1/4" x 2 1/4"	2 9/16"	1/4"	1 1/8"	100	1,000	3 1/4

The published minimum length is measured from below the washer to the end of the anchor. Actual anchor lengths may be slightly longer.

*This size does not have a compression ring.

Round Head Lok-Bolt, Slotted

Catalog Number		Size	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless						
*5205	—	1/4" x 1 1/8"	5/16"	1 3/8"	100	1,000	4 1/4
5210	6180	1/4" x 2"	5/16"	1 1/2"	100	500	5 3/4
5215	—	1/4" x 2 3/4"	3/8"	1 5/8"	50	500	7
5235	—	3/8" x 2 1/2"	1/2"	2 1/4"	25	250	17 1/4
5240	—	3/8" x 3 3/4"	1/2"	2 1/4"	25	125	22

The published length is measured from below the head to the end of the anchor.

*This size does not have a compression ring.



ORDERING INFORMATION
Combo Flat Head Lok-Bolt

Catalog Number		Size	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless						
5305	—	1/4" x 1 1/8"	1/4"	1"	100	1,000	2
5310	6170	1/4" x 2"	1/4"	1 1/8"	100	1,000	2 3/4
5315	6172	1/4" x 3"	1/4"	1 1/8"	100	1,000	3 3/4
5320	—	1/4" x 4"	1/4"	1 1/8"	100	500	4 1/2
5325	—	1/4" x 5 1/4"	1/4"	1 1/8"	100	500	6 1/2
5330	—	5/16" x 2 1/2"	5/16"	1 1/2"	100	1,000	4 1/2
5340	—	3/8" x 2 3/4"	3/8"	1 5/8"	50	500	7 1/2
5345	6174	3/8" x 4"	3/8"	1 5/8"	50	250	10 3/4
5350	6175	3/8" x 5"	3/8"	1 5/8"	50	250	14
5360	6176	3/8" x 6"	3/8"	1 5/8"	50	250	16

The published length is the minimum overall length of the anchor. Combo Flat Head Lok-Bolts do not have a compression ring.


Threshold Flat Head Lok-Bolt, Slotted

Catalog Number		Size	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless						
5500	—	1/4" x 2"	1/4"	1 1/8"	100	1,000	2 1/2

The published length is the minimum overall length of the anchor. Threshold Flat Head Lok-Bolts do not have a compression ring.


Rod Hanger Lok-Bolt

Catalog Number		Size	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless						
5810	—	1/4" x 1 1/2"	5/16"	1 1/2"	50	250	5 1/2
5815	—	3/8" x 1 7/8"	3/8"	1 5/8"	50	250	9
5825	—	1/2" x 2 1/4"	1/2"	2 1/4"	25	125	21

The published length is measured from below the washer to the end of the anchor. Rod Hanger Lok-Bolts do not have a compression ring.


Tie-Wire Lok-Bolt

Catalog Number		Size	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless						
5700	—	5/16" x 1 1/2"	5/16"	1 1/2"	100	1,000	5 1/4

The published length is measured from below the head to the end of the anchor.


Lok-Bolt Extenders

Catalog Number		Size	Drill Diameter	Minimum Embed.	Standard Box	Standard Carton	Wt./ 100
Carbon	Stainless						
5684	5689	3/8" x 1"	3/8"	1 5/8"	50	500	3

Extenders are used for added length on all head styles.



SECTION 7

312

Engineering Data

Mill certification physical/mechanical properties, specification and engineering data for G-STRUT® Channel are as follows:

PRODUCT(S) PROFILE TYPES	AVG. YIELD STRENGTH	AVG. TENSILE STRENGTH	ROCKWELL B (RB VALUE)
ALL 1-5/8 industry standard strut profiles in sizes inclusive from 13/16" through 3-1/4"	42,700	62,600	62 –74

G-STRUT® Metal Framing Channel is interchangeable with industry-standard 1-5/8" strut profiles.

G-STRUT® is cold roll-formed, structural grade (33,000MY, CS Type B), prime carbon steel.

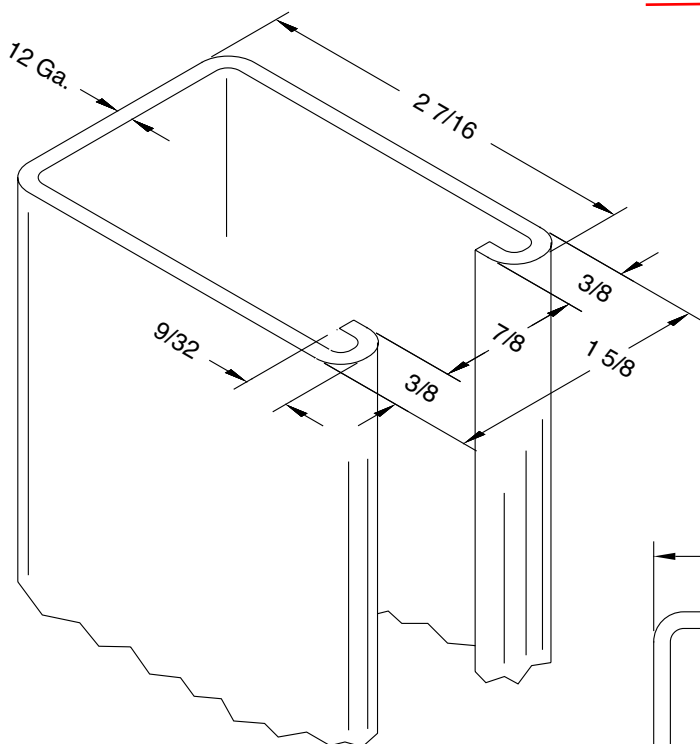
G-STRUT® conforms to ASTM 1011 for hot rolled steel and ASTM 653 for pre-galvanized steel.

Standard finishes include pre-galvanized (G-90 coating weight), painted, galvanized, pickle & oil plain, and hot dip galvanized.

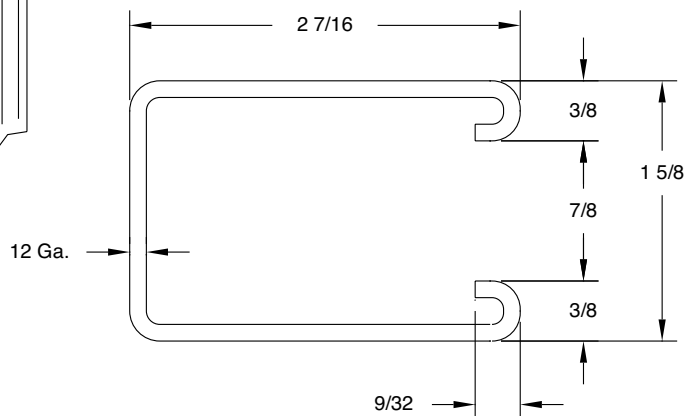
Painted available in polyester urethane powder coat finish or electro deposition cathodic epoxy e-coating.

Engineering/Load factors (see following pages by channel part number)

G-STRUT® Channel is manufactured exclusively in the USA, Canton, Ohio.

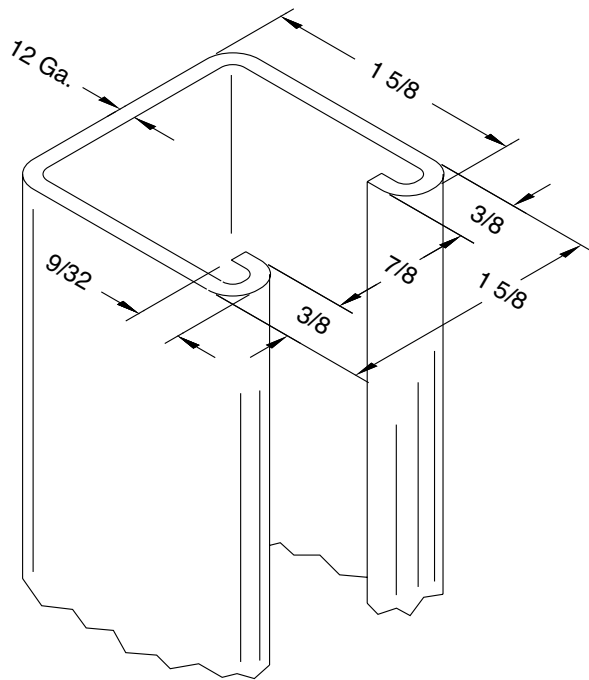


	G712OS [Oval-Slot] 9/16" x 1-1/8" - 2" ON CTR
	G712LS [Long-Slot] 13/32" x 3" - 4" ON CTR
	G712H [Holes] 9/16" DIAM. - 1-7/8" ON CTR
	G712A [Back-to-Back] WELDED
	G712KO [Knock-Out] 7/8" DIAM. - 6" ON CTR

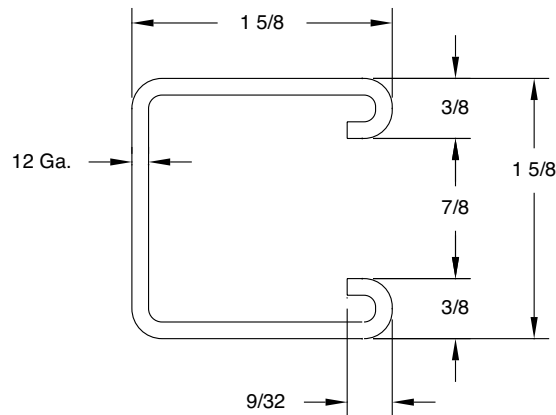


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ITEM	QNT'Y	DESCRIPTION		MATERIAL
				ROLLFORM TOLERANCES
SCALE		FULL	CHK'D BY	LENGTH ± 0.125"
DWN BY		IDI	02-02-02	APP'D BY
ALL OTHER DIMENSIONS ± 0.020"				
G-STRUT CHANNEL, PART # G712				
CAD FILENAME: G712			GREGORY STRUT PRODUCTS Division of Gregory Industries 4100 13th Street SW; Canton, OH 44710 PH: 330-477-4800 FX: 330-477-0626	REF. No.
LAST PLOT DATE: 02-02-02				DRWG No.
G712				

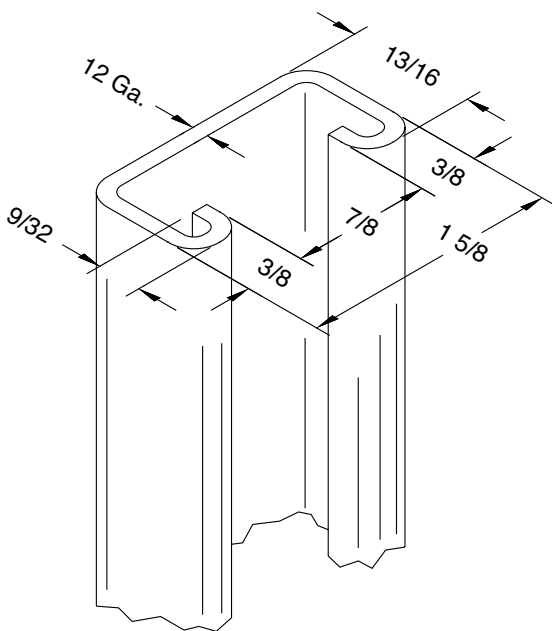


	G582OS [Oval-Slot] 9/16" x 1-18" – 2" ON CTR
	G582LS [Long-Slot] 13/32" x 3" – 4" ON CTR
	G582H [Holes] 9/16" DIAM. – 1-7/8" ON CTR
	G582A [Back-to-Back] WELDED
	G582KO [Knock-Out] 7/8" DIAM. – 6" ON CTR

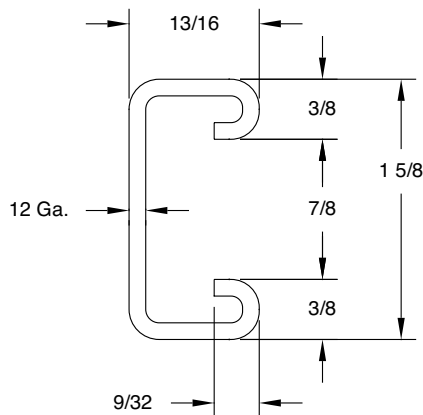


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ITEM	QNT'Y	DESCRIPTION		MATERIAL
				ROLLFORM TOLERANCES LENGTH ± 0.125" ALL OTHER DIMENSIONS ± 0.020"
SCALE FULL		CHK'D BY		
DWN BY	IDI	02-02-02		
APP'D BY				
G-STRUT CHANNEL, PART # G582				
CAD FILENAME: G582		GREGORY STRUT PRODUCTS Division of Gregory Industries 4100 13th Street SW; Canton, OH 44710 PH: 330-477-4800 FX: 330-477-0626		REF. No.
LAST PLOT DATE: 02-02-02				DRWG No.
				G582



	G132OS [Oval-Slot] Ⓢ
	9/16" x 1-1/8" – 2" ON CTR
	G132LS [Long-Slot] Ⓢ
	13/32" x 3" – 4" ON CTR
	G132H [Holes] Ⓢ
	9/16" DIAM. – 1-7/8" ON CTR
	G132A [Back-to-Back] Ⓚ
	WELDED
	G132KO [Knock-Out] Ⓢ
	7/8" DIAM. – 6" ON CTR



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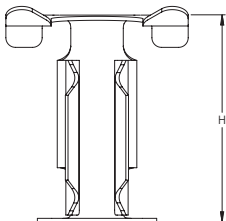
ITEM	QNT'Y		DESCRIPTION		MATERIAL
				ROLLFORM TOLERANCES	
SCALE		FULL	CHK'D BY		LENGTH ± 0.125" ALL OTHER DIMENSIONS ± 0.020"
DWN BY	IDI	02-02-02	APP'D BY		
G-STRUT CHANNEL, PART :G132					
CAD FILENAME: G132			GREGORY STRUT PRODUCTS Division of Gregory Industries 4100 13th Street SW; Canton, OH 44710 PH: 330-477-4800 FX: 330-477-0626		REF. No.
LAST PLOT DATE: 02-02-02					DRWG No.
					G132

115 Surge Restraint



315

- Accommodates multiple sizes of 115 standard duty loop hangers
- Complies with NFPA® 13 standard by restricting the upward surge movement of activated fire sprinkler systems
- Grips the loop hanger, not the nut, allowing fine tuning for height adjustment
- Easily installs by hand before or after pipe is positioned in hanger



Material: Spring Steel
Finish: CADDY ARMOUR



Part Number	Pipe Size	Height H
SR6	1/2" – 2"	1.3"

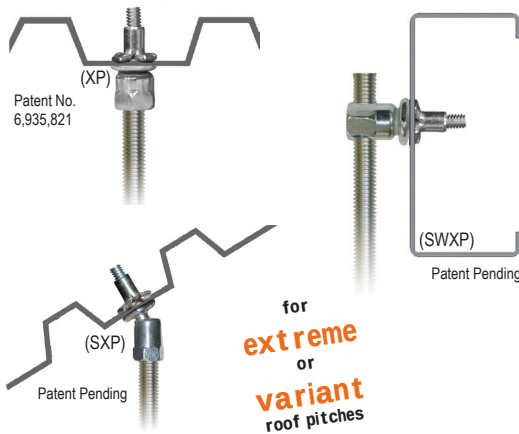
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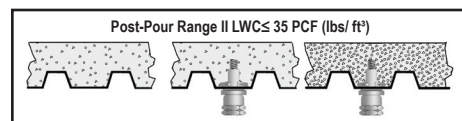
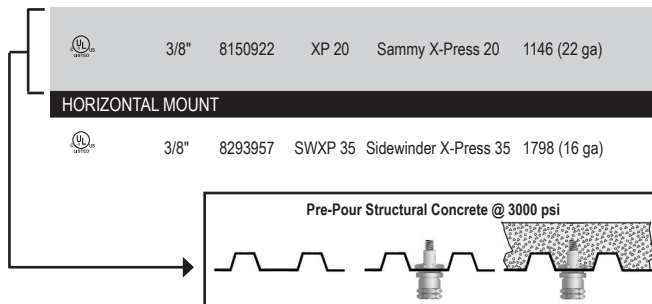
Sammy X-Press® *Installs into Metal Deck, Purlin, or Tubular Steel*



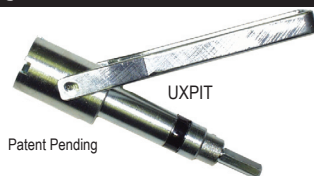
Product Features

- The **Sammy X-Press** expands to provide direct vertical attachment in:
 - Metal Deck (22-16 gauge)
 - Z-Purlin (18-16 gauge)
- The **Sammy X-Press Swivel** allows you to hang plumb in extreme roof pitches:
 - 89° in Z-Purlin
 - 45° in metal deck for 12/12 pitch
- The **Sammy X-Press Sidewinder** expands to provide horizontal attachment in:
 - 16 ga - 3/16" steel - purlin, tubular steel.
- Installs in seconds, saving time & installation costs.
- Use in applications where access to the back of the installed fastener is prohibited. ie. metal roof deck, tubular steel, or vapor barrier fabric.
- Less jobsite material needed.
- No retaining nut required.
- Provides design flexibility.

Approvals	Rod Size	Part Number	Model	Description	Ultimate Pullout (lbs)	UL Test Load (lbs)	FM Test Load (lbs)	Min Thick	Max Thick	Box Qty	Case Qty	Application
VERTICAL MOUNT												
	1/4"	8181922	XP 200	X-Press 200	1146 (22 ga)	185 (Luminaire) 250 (Luminaire)		.027" .056"	.125"	25	125	Metal Deck
 	3/8"	8150922	XP 20	X-Press 20	1146 (22 ga)	850 (2½" Pipe) 185 (Luminaire) 250 (Luminaire) 283 (Conduit & Cable)	940 (2" Pipe) 1475 (4" Pipe)	.027" .027" .056"	.125"	25	125	Metal Deck
 	3/8"	8153922	XP 35	X-Press 35	1783 (16 ga)	1250 (3½" Pipe) 85 (Luminaire) 250 (Luminaire) 416 (Conduit & Cable)	940 (2" Pipe) 1475 (4" Pipe)	.060" .105" .027" .056"	.125"	25	125	Purlin
 	3/8"	8294922	SXP 20	Swivel X-Press 20	1061 (22 ga Vertical) 829 (45° Off Vertical)	750 (2" Pipe) 170 vertical (Luminaire) 80 @ 45° (Luminaire) 283 vertical (Conduit & Cable) 233 @ 45° (Conduit & Cable)	635 (2" Pipe)	.027"	.125"	25	125	Metal Deck
 	3/8"	8295922	SXP 35	Swivel X-Press 35	1675 (16 ga Vertical) 1558 (89° Off Vertical)	1250 (3½" Pipe) 250 vertical (Luminaire) 80 @ 90° (Luminaire) 500 vertical (Conduit & Cable) 333 @ 89° (Conduit & Cable)	635 (2" Pipe)	.060"	.125"	25	125	Purlin
	3/8"	8150922	XP 20	Sammy X-Press 20	1146 (22 ga)	850 (2½ Pipe)	Pre-Pour Structural Concrete@ 3000 psi			25	125	Metal Deck (Pre-Pour)
							Post-Pour Range II LWC≤ 35 PCF (lbs/ft³)					Metal Deck (Post-Pour)
HORIZONTAL MOUNT												
	3/8"	8293957	SWXP 35	Sidewinder X-Press 35	1798 (16 ga)	1250 (3½" Pipe) 80 (Luminaire) 416 (Conduit & Cable)		.060"	.125"	25	125	Purlin

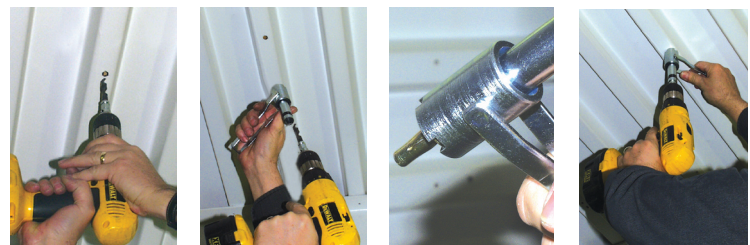


Sammy X-Press It® INSTALLATION TOOL



Part Number	Model	Description	Each Qty
8194910	UXPIT*	Universal X-Press It Tool	1
8195910	RXPIT	Retro Socket for 8151910	1
8152910	XPDB	25/64" Drill Bit	1

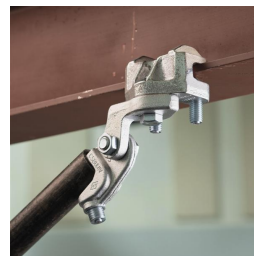
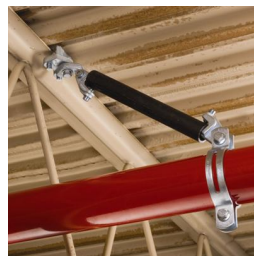
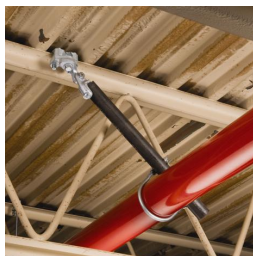
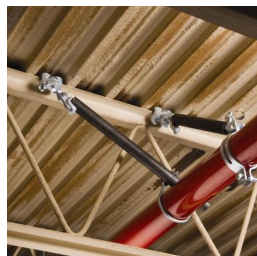
*Tool Includes: Sleeve, Bit Receiver, Hex Wrench, and 25/64" Drill Bit.



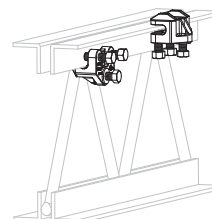
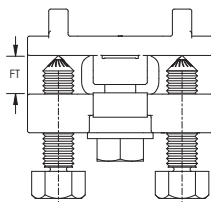
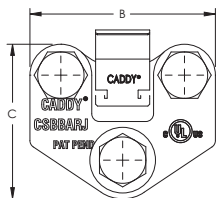
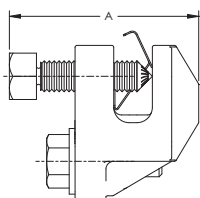
To watch a video demonstration of the Sammy X-Press, visit <http://www.sammysuperscrew.com/sammyxpress.htm>



Bar Joist Attachment



- Can be installed on bar joists or I-beams
- Thumb spring retainer allows for ease of positioning
- Snap-off bolt head helps enable easy installation and inspection of seismic sway braces
- No assembly required
- No loose parts
- Meets NFPA®-13 requirements for seismic sway bracing



Material: Steel



OSHPD

Part Number	Finish	Flange Thickness FT	A	B	C
CSBBARJEG	Electrogalvanized	1/4" - 1/2"	2"	3"	2 1/2"
CSBBARJHD	Hot-Dip Galvanized	1/4" - 1/2"	2"	3"	2 1/2"

UL Loads		
Brace Direction to Structure	Service Pipe Size	Rating
Parallel	1" - 10"	3,000 lb
Perpendicular	1" - 12"	3,740 lb

FM Loads					
Brace Direction to Structure	Service Pipe Size	Horizontal Capacity per Installation Angle from Vertical			
		30° - 44°	45° - 59°	60° - 74°	75° - 90°
Parallel	N/A	1,410 lb	2,110 lb	2,540 lb	2,830 lb
Perpendicular	N/A	1,740 lb	1,710 lb	2,060 lb	2,300 lb



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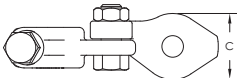
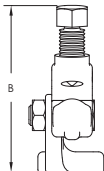
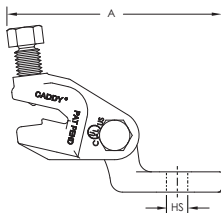
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Universal Structural Attachment



- Universal design allows one product to attach directly to concrete, wood, bar joist or I-beam adapters
- Snap-off bolt head helps enable easy installation and inspection of seismic sway braces
- Use for both lateral and longitudinal sway brace applications
- Works with 1" through 2" brace pipes and 1/4" angle iron braces to reduce inventory
- Center bolt does not require tightening
- Meets NFPA®-13 requirements for seismic sway bracing



Material: Steel



Part Number	Finish	Hole Size HS	A	B	C
CSBUNIV050EG	Electrogalvanized	9/16"	5 1/4"	4"	1 5/8"
CSBUNIV075EG	Electrogalvanized	13/16"	5 1/4"	4"	1 5/8"
CSBUNIV050HD	Hot-Dip Galvanized	9/16"	5 1/4"	4"	1 5/8"

UL Loads		
Brace Type	Service Pipe Size	Rating
Pipe	1" - 10"	3,000 lb
1/4" Thick Angle	1" - 8"	2,015 lb

FM Loads					
Brace Type	Service Pipe Size	Horizontal Capacity per Installation Angle from Vertical			
		30° - 44°	45° - 59°	60° - 74°	75° - 90°
Pipe	N/A	1,620 lb	2,300 lb	2,820 lb	3,140 lb



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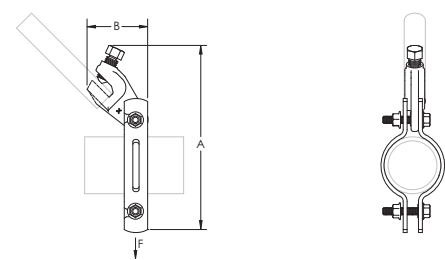
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Easy Universal Sway Brace



- Use for both lateral and longitudinal sway brace applications
- Unique slotted holes provide for easy slip-on installation eliminating loose hardware
- Snap-off bolt head helps enable easy installation and inspection of seismic sway braces
- Works with 1" through 2" brace pipes and 1/4" angle iron braces to reduce inventory
- Meets NFPA®-13 requirements for seismic sway bracing



Material: Steel
Finish: Electrogalvanized



Part Number	Pipe Size	A	B
CSBEZU0100EG	1"	6 7/8"	1"
CSBEZU0125EG	1 1/4"	7 3/8"	1"
CSBEZU0150EG	1 1/2"	7 3/4"	1"
CSBEZU0200EG	2"	8 1/8"	1 3/16"
CSBEZU0250EG	2 1/2"	8 7/8"	1 3/16"
CSBEZU0300EG	3"	9 3/8"	1 3/16"
CSBEZU0400EG	4"	10 5/8"	1 1/2"
CSBEZU0500EG	5"	12 1/8"	1 1/2"
CSBEZU0600EG	6"	13 5/8"	2"

UL Loads (Listed for Restraints)			
Part Number	Dyna-Flow® Service Pipe	Sch 10 Service Pipe	Sch 40 Service Pipe
CSBEZU0100EG	N/A	655 lb	655 lb
CSBEZU0125EG	655 lb	655 lb	655 lb
CSBEZU0150EG	655 lb	655 lb	655 lb



UL Loads (Listed for Sway Braces)								
Part Number	Lateral				Longitudinal			
	Dyna-Flow® Service Pipe	EZ FLOW™ Service Pipe	Sch 10 Service Pipe	Sch 40 Service Pipe	Dyna-Flow® Service Pipe	Mega-Flow Service Pipe	Sch 10 Service Pipe	Sch 40 Service Pipe
CSBEZU0200EG	3,000 lb	N/A	3,000 lb	3,000 lb	N/A	N/A	N/A	N/A
CSBEZU0250EG	3,000 lb	N/A	3,000 lb	3,000 lb	1,265 lb	N/A	1,265 lb	1,265 lb
CSBEZU0300EG	3,000 lb	N/A	3,000 lb	3,000 lb	1,265 lb	N/A	1,265 lb	1,265 lb
CSBEZU0400EG	3,000 lb	3,000 lb	3,000 lb	3,000 lb	1,265 lb	N/A	1,265 lb	1,265 lb
CSBEZU0500EG	N/A	3,000 lb	3,000 lb	3,000 lb	N/A	1,600 lb	1,600 lb	1,600 lb
CSBEZU0600EG	N/A	3,000 lb	3,000 lb	3,000 lb	N/A	1,600 lb	1,600 lb	1,600 lb

FM Loads (Lightwall, Sch 10 and Sch 40 Service Pipes)								
Part Number	Horizontal Capacity per Installation Angle from Vertical							
	Lateral				Longitudinal			
	30° - 44°	45° - 59°	60° - 74°	75° - 90°	30° - 44°	45° - 59°	60° - 74°	75° - 90°
CSBEZU0100EG	860 lb	1,220 lb	1,500 lb	1,670 lb	390 lb	550 lb	670 lb	750 lb
CSBEZU0125EG	860 lb	1,220 lb	1,500 lb	1,670 lb	390 lb	550 lb	670 lb	750 lb
CSBEZU0150EG	860 lb	1,220 lb	1,500 lb	1,670 lb	390 lb	550 lb	670 lb	750 lb
CSBEZU0200EG	1,530 lb	2,160 lb	2,650 lb	2,960 lb	520 lb	690 lb	830 lb	930 lb
CSBEZU0250EG	1,530 lb	2,160 lb	2,650 lb	2,960 lb	520 lb	690 lb	830 lb	930 lb
CSBEZU0300EG	1,530 lb	2,160 lb	2,650 lb	2,960 lb	520 lb	690 lb	830 lb	930 lb
CSBEZU0400EG	1,570 lb	2,220 lb	2,720 lb	3,030 lb	630 lb	900 lb	1,100 lb	1,230 lb
CSBEZU0500EG	1,570 lb	2,220 lb	2,720 lb	3,030 lb	630 lb	900 lb	1,100 lb	1,230 lb
CSBEZU0600EG	1,980 lb	2,810 lb	3,440 lb	3,840 lb	730 lb	1,000 lb	1,230 lb	1,370 lb

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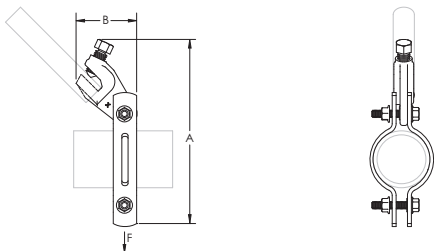
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Standard Universal Sway Brace



- Use for both lateral and longitudinal sway brace applications
- Snap-off bolt head helps enable easy installation and inspection of seismic sway braces
- Works with 1" through 2" brace pipes and 1/4" angle iron braces to reduce inventory
- Slotted design grabs service pipe for added gripping strength
- Meets NFPA®-13 requirements for seismic sway bracing



Material: Steel



Part Number	Pipe Size	A	B
Finish: Electrogalvanized			
CSBSTU0100EG	1"	6 7/8"	1"
CSBSTU0125EG	1 1/4"	7 3/8"	1"
CSBSTU0150EG	1 1/2"	7 3/4"	1"
CSBSTU0200EG	2"	8 1/8"	1 3/16"
CSBSTU0250EG	2 1/2"	8 7/8"	1 3/16"
CSBSTU0300EG	3"	9 3/8"	1 3/16"
CSBSTU0400EG	4"	10 5/8"	1 1/2"
CSBSTU0500EG	5"	12 1/8"	1 1/2"
CSBSTU0600EG	6"	13 5/8"	2"
CSBSTU0800EG	8"	15 3/4"	2"
CSBSTU1000EG	10"	18"	2"
Finish: Hot-Dip Galvanized			
CSBSTU0100HD	1"	6 7/8"	1"
CSBSTU0125HD	1 1/4"	7 3/8"	1"
CSBSTU0150HD	1 1/2"	7 3/4"	1"
CSBSTU0200HD	2"	8 1/8"	1 3/16"
CSBSTU0250HD	2 1/2"	8 7/8"	1 3/16"
CSBSTU0300HD	3"	9 3/8"	1 3/16"
CSBSTU0400HD	4"	10 5/8"	1 1/2"
CSBSTU0500HD	5"	12 1/8"	1 1/2"



Part Number	Pipe Size	A	B
CSBSTU0600HD	6"	13 5/8"	2"
CSBSTU0800HD	8"	15 3/4"	2"
CSBSTU1000HD	10"	18"	2"

UL Loads (Listed for Restraints)			
Part Number	Dyna-Flow® Service Pipe	Sch 10 Service Pipe	Sch 40 Service Pipe
CSBSTU0100xx	N/A	655 lb	655 lb
CSBSTU0125xx	655 lb	655 lb	655 lb
CSBSTU0150xx	655 lb	655 lb	655 lb

UL Loads (Listed for Sway Braces)								
Part Number	Lateral				Longitudinal			
	Dyna-Flow® Service Pipe	EZ FLOW™ Service Pipe	Sch 10 Service Pipe	Sch 40 Service Pipe	Dyna-Flow® Service Pipe	EZ FLOW™ Service Pipe	Sch 10 Service Pipe	Sch 40 Service Pipe
CSBSTU0200xx	3,000 lb	N/A	3,000 lb	3,000 lb	N/A	N/A	N/A	N/A
CSBSTU0250xx	3,000 lb	N/A	3,000 lb	3,000 lb	2,015 lb	N/A	2,015 lb	2,015 lb
CSBSTU0300xx	3,000 lb	N/A	3,000 lb	3,000 lb	2,015 lb	N/A	2,015 lb	2,015 lb
CSBSTU0400xx	3,000 lb	3,000 lb	3,000 lb	3,000 lb	2,015 lb	N/A	2,015 lb	2,015 lb
CSBSTU0500xx	N/A	3,000 lb	3,000 lb	3,000 lb	N/A	N/A	2,015 lb	2,015 lb
CSBSTU0600xx	N/A	3,000 lb	3,000 lb	3,000 lb	N/A	2,015 lb	2,015 lb	2,015 lb
CSBSTU0800xx	N/A	N/A	3,000 lb	3,000 lb	N/A	N/A	2,015 lb	2,015 lb
CSBSTU1000xx	N/A	N/A	3,000 lb	3,000 lb	N/A	N/A	3,000 lb	3,000 lb

FM Loads (Lightwall, Sch 10 and Sch 40 Service Pipes)								
Part Number	Horizontal Capacity per Installation Angle from Vertical							
	Lateral				Longitudinal			
	30° - 44°	45° - 59°	60° - 74°	75° - 90°	30° - 44°	45° - 59°	60° - 74°	75° - 90°
CSBSTU0100xx	860 lb	1,220 lb	1,500 lb	1,670 lb	970 lb	720 lb	860 lb	960 lb
CSBSTU0125xx	860 lb	1,220 lb	1,500 lb	1,670 lb	970 lb	720 lb	860 lb	960 lb
CSBSTU0150xx	860 lb	1,220 lb	1,500 lb	1,670 lb	970 lb	720 lb	860 lb	960 lb
CSBSTU0200xx	1,530 lb	2,160 lb	2,650 lb	2,960 lb	870 lb	690 lb	830 lb	930 lb
CSBSTU0250xx	1,530 lb	2,160 lb	2,650 lb	2,960 lb	870 lb	690 lb	830 lb	930 lb
CSBSTU0300xx	1,530 lb	2,160 lb	2,650 lb	2,960 lb	870 lb	690 lb	830 lb	930 lb
CSBSTU0400xx	1,570 lb	2,220 lb	2,720 lb	3,030 lb	1,550 lb	1,390 lb	1,680 lb	1,870 lb
CSBSTU0500xx	1,570 lb	2,220 lb	2,720 lb	3,030 lb	1,550 lb	1,390 lb	1,680 lb	1,870 lb
CSBSTU0600xx	1,980 lb	2,810 lb	3,440 lb	3,840 lb	1,470 lb	1,170 lb	1,410 lb	1,570 lb

FM Loads (0.188" wall and Sch 40 Service Pipes)								
Part Number	Horizontal Capacity per Installation Angle from Vertical							
	Lateral				Longitudinal			
	30° - 44°	45° - 59°	60° - 74°	75° - 90°	30° - 44°	45° - 59°	60° - 74°	75° - 90°
CSBSTU0800xx	2,040 lb	2,890 lb	3,540 lb	3,950 lb	1,200 lb	1,700 lb	2,090 lb	2,330 lb
CSBSTU1000xx	2,040 lb	2,890 lb	3,540 lb	3,950 lb	1,200 lb	1,700 lb	2,090 lb	2,330 lb



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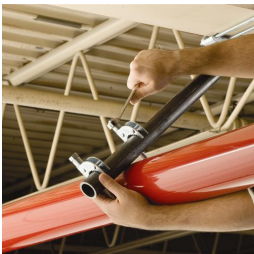
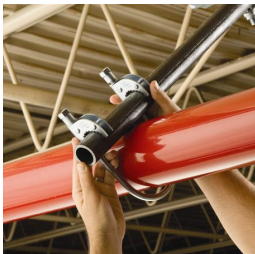
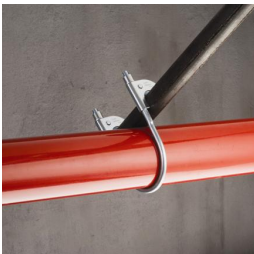
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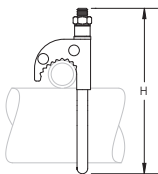
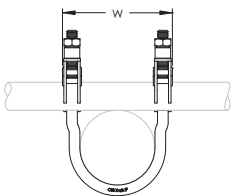
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Quick Grip Jr. Lateral Sway Brace



- Easy two-step installation eliminates extra trips between structure and service pipe
- Works with 1" and 1 1/4" [25 mm and 32 mm] brace pipes to reduce inventory
- Snap-off bolt head helps enable easy installation and inspection of seismic sway braces
- Meets NFPA®-13 requirements for seismic sway bracing



Material: Steel
Finish: Electrogalvanized



Part Number	Pipe Size	Height H	Width W
CSBQIKCL0100EG	1"	5 1/8"	2 5/8"
CSBQIKCL0125EG	1 1/4"	5 3/8"	3"
CSBQIKCL0150EG	1 1/2"	5 5/8"	3 1/4"
CSBQIKCL0200EG	2"	6 3/8"	3 5/8"

UL Loads (Listed for Restraints)			
Part Number	Service Pipe Schedule	Lateral	
		1" Brace Pipe	1 1/4" Brace Pipe
CSBQIKCL0100EG	Dyna-Flow®	N/A	N/A
	10	655 lb	655 lb
	40	655 lb	655 lb
CSBQIKCL0125EG	Dyna-Flow®	655 lb	540 lb
	10	655 lb	540 lb
	40	655 lb	540 lb
CSBQIKCL0150EG	Dyna-Flow®	750 lb	655 lb
	10	750 lb	655 lb
	40	750 lb	655 lb
CSBQIKCL0200EG	Dyna-Flow®	750 lb	540 lb
	10	750 lb	540 lb
	40	750 lb	540 lb



FM Loads					
Part Number	Service Pipe Schedule	Lateral			
		Horizontal Capacity per Installation Angle from Vertical			
		30° - 44°	45° - 59°	60° - 74°	75° - 90°
CSBQIKCL0100EG	Lightwall	290 lb	410 lb	495 lb	550 lb
	10	150 lb	210 lb	280 lb	315 lb
	40	475 lb	665 lb	825 lb	925 lb
CSBQIKCL0125EG	Lightwall	290 lb	410 lb	495 lb	550 lb
	10	150 lb	210 lb	280 lb	315 lb
	40	475 lb	665 lb	825 lb	925 lb
CSBQIKCL0150EG	Lightwall	290 lb	410 lb	495 lb	550 lb
	10	150 lb	210 lb	280 lb	315 lb
	40	475 lb	665 lb	825 lb	925 lb
CSBQIKCL0200EG	Lightwall	390 lb	550 lb	670 lb	750 lb
	10	350 lb	500 lb	620 lb	690 lb
	40	490 lb	690 lb	850 lb	950 lb

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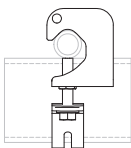
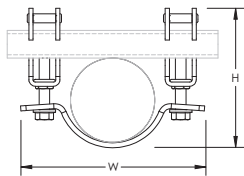


Quick Grip Lateral Sway Brace



The Quick Grip Lateral Brace, part of the CADDY line of fire sprinkler bracing systems from Pentair, is designed to help simplify installations when bracing service pipe for seismic or other catastrophic events. It features an innovative design for quick attachment of brace pipe to service pipe saving time and money.

- Easy two-step installation eliminates extra trips between structure and service pipe
- Works with 1" and 1 1/4" (25 mm and 32 mm) brace pipes to reduce inventory
- Yellow tips provide a visual indicator that the bolts have been properly torqued
- Easy installation with an impact wrench from the bottom side of the clamp
- Meets NFPA®-13 requirements for seismic sway bracing



Material: Steel
Finish: Electrogalvanized



Part Number	Pipe Size	Height H	Width W
CSBQG0250EG	2 1/2"	5 7/16" – 5 7/8"	6 3/4"
CSBQG0300EG	3"	6 1/8" – 6 1/2"	7 1/2"
CSBQG0400EG	4"	7 1/8" – 7 1/2"	8 3/4"
CSBQG0600EG	6"	9 1/4" – 9 5/8"	11 3/4"
CSBQG0800EG	8"	11 3/8" – 11 13/16"	13 7/8"

UL Loads			
Part Number	Service Pipe Schedule	Lateral	
		1" Brace Pipe	1 1/4" Brace Pipe
CSBQG0250EG	Dyna-Flow®	2,015 lb	2,015 lb
	10	2,015 lb	2,015 lb
	40	2,015 lb	2,015 lb
CSBQG0300EG	Dyna-Flow®	2,015 lb	2,015 lb
	10	2,015 lb	2,015 lb
	40	2,015 lb	2,015 lb
CSBQG0400EG	Dyna-Flow®	2,015 lb	2,015 lb
	10	2,015 lb	2,015 lb
	40	2,015 lb	2,015 lb



UL Loads			
Part Number	Service Pipe Schedule	Lateral	
		1" Brace Pipe	1 1/4" Brace Pipe
CSBQG0600EG	Mega-Flow	2,015 lb	2,015 lb
	10	2,015 lb	2,015 lb
	40	2,015 lb	2,015 lb
CSBQG0800EG	10	2,015 lb	2,015 lb
	40	2,015 lb	2,015 lb

FM Loads					
Part Number	Service Pipe Schedule	Lateral			
		Horizontal Capacity per Installation Angle from Vertical			
		30° - 44°	45° - 59°	60° - 74°	75° - 90°
CSBQG0250EG	Lightwall	1,410 lb	2,000 lb	2,450 lb	2,740 lb
	10	1,410 lb	2,000 lb	2,450 lb	2,740 lb
	40	1,410 lb	2,000 lb	2,450 lb	2,740 lb
CSBQG0300EG	Lightwall	1,190 lb	1,680 lb	2,060 lb	2,300 lb
	10	1,190 lb	1,680 lb	2,060 lb	2,300 lb
	40	1,190 lb	1,680 lb	2,060 lb	2,300 lb
CSBQG0400EG	Lightwall	1,190 lb	1,680 lb	2,060 lb	2,300 lb
	10	1,190 lb	1,680 lb	2,060 lb	2,300 lb
	40	1,190 lb	1,680 lb	2,060 lb	2,300 lb
CSBQG0600EG	Lightwall	870 lb	1,230 lb	1,510 lb	1,690 lb
	10	870 lb	1,230 lb	1,510 lb	1,690 lb
	40	970 lb	1,370 lb	1,680 lb	1,870 lb
CSBQG0800EG	0.188" (Wall Thickness)	790 lb	1,110 lb	1,360 lb	1,520 lb
	40	790 lb	1,110 lb	1,360 lb	1,520 lb

Dyna-Flow is a registered trademark of Allied Tube & Conduit Corporation. FM is a registered certification mark of FM Approvals LLC, LTD. NFPA is a registered trademark of National Fire Protection Association, Inc. UL, UR, cUL, cULR, cULus and cULrus are registered certification marks of UL LLC.

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TECHNICAL DATA

QUICK RESPONSE DRY PENDENT SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Quick Response Dry Pendent Sprinklers are thermosensitive spray sprinklers suitable for use in areas subject to freezing. The sprinklers are designed for dry systems and preaction systems where it is necessary to prevent water or condensation from entering the drop nipple before sprinkler operation. They may also be installed in spaces subject to freezing and supplied from a wet system in an adjacent heated area.

Viking Quick Response Dry Pendent Sprinklers are available in various finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: FM Global has no approval classification for Polyester coatings as corrosion resistant.)

NOTE: When installed in some corrosive environments, the Polyester finish may change color. This natural discoloration over time is not in itself an indication of corrosion and should not be treated as such. All sprinklers installed in corrosive environments should be replaced or tested as described in NFPA 25 on a more frequent basis.



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Classes 2013 and 2015

NYC Approved: MEA 89-92-E Volume 15

Refer to Approval Chart 1 and Design Criteria on page 105d for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page 105e for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)

Maximum Working Pressure: 175 psi (12 bar).

Factory tested pneumatically to 100 psi (6.89 bar)

Thread size: 1" NPT or 25 mm BSP

Nominal K-Factor: 5.6 U.S. (80.6 metric*) for all listed and approved lengths.

* Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Covered by the following U.S. Patents: 8,636,075

Material Standards:

Frame Casting: Brass UNS-C84400

Deflector: Brass UNS-C26000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Compression Screw: Brass UNS-C36000

Pip Cap: Brass UNS-C31400 or UNS-C31600

Pip Cap Adapter: Brass UNS-C36000

Orifice: Copper UNS-C22000 or UNS-C11000

Tube: ERW Hydraulic Steel Tube

Support (Internal): Stainless Steel UNS-S30400

Barrel: Steel Pipe UNS-G10260, Electrodeposited Epoxy Base finish

Barrel End and Threads: QM Brass

Sleeve (for Adjustable Standard style only): Brass UNS-C26000 or UNS-C26800

Escutcheon Materials:

Adjustable Standard Dry Escutcheons: Brass UNS-C26000 or UNS-C26800

Recessed Dry Escutcheons: Cold Rolled Steel UNS-G10080

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

QUICK RESPONSE DRY PENDENT SPRINKLERS

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ENT Coated Adjustable and Recessed Escutcheons: Stainless Steel UNS-S30400

Ordering Information: (Also refer to the current Viking price list.)

Order Quick Response Dry Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish, the appropriate suffix for the temperature rating, and then the suffix for the length ("A" dimension) to sprinkler base part number. Order in a specific length noted as the "A" dimension. The "A" dimension is the distance from the face of the fitting (tee) to the desired finished surface of the ceiling.

These sprinklers are listed and approved in lengths from 1-1/2" to 45-1/2" (38.1 mm to 1,156 mm) for the adjustable standard style, 3" to 47" (76.2 mm to 1,194 mm) for the plain barrel style, and 3-1/4" to 47-1/2" (82.5 mm to 1,207 mm) for the adjustable recessed style. Lengths exceeding the standard lengths are available, with no approvals, on a "made-to-order" basis: Recessed Dry Pendent up to 65-1/2" (1,664 mm). Adjustable Standard Dry Pendent up to 63-1/2" (1,613 mm). Plain Barrel Dry Pendent up to 65" (1,651 mm). Contact the manufacturer for more information.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, and ENT = JN

Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G

For example, sprinkler VK176 with a Chrome finish and a 155 °F (68 °C) temperature rating, and "A" length of 10" = Part No. 08383UFB10.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 07297W/B (available since 1991)

B. Wrench for recessed sprinklers: Part No. 07565W/B** (available since 1991)

**A 1/2" ratchet is required (not available from Viking).

Sprinkler Guard: Chrome, with no listings or approvals, for installation on dry pendent sprinklers made after May 1994 only (Part No. 08954).

Replacement Escutcheons:

A. Adjustable Standard Dry Escutcheon: Base Part No. 07741

B. Recessed Dry Escutcheon Cup: Base Part No. 05459A

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the internal parts to open the waterway. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS & MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Quick Response Dry Pendent Sprinkler is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

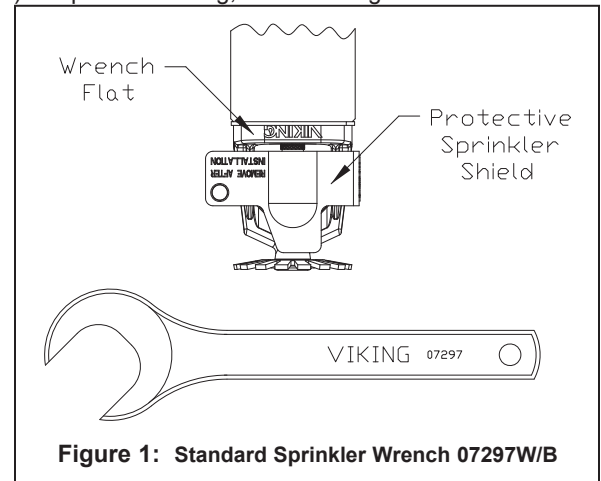


Figure 1: Standard Sprinkler Wrench 07297W/B

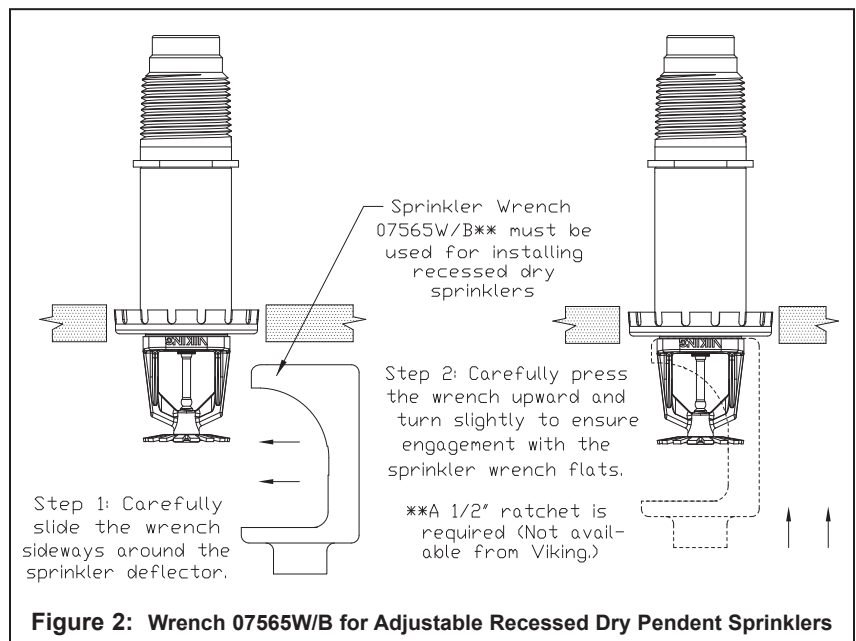


Figure 2: Wrench 07565W/B for Adjustable Recessed Dry Pendent Sprinklers



TECHNICAL DATA

QUICK RESPONSE DRY PENDENT SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, and ENT

Corrosion-Resistant Coating^{3,4}: White Polyester and ENT in all temperature ratings

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant Polyester and ENT coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Note: These coatings are NOT corrosion proof. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. Polyester and ENT coatings are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings.

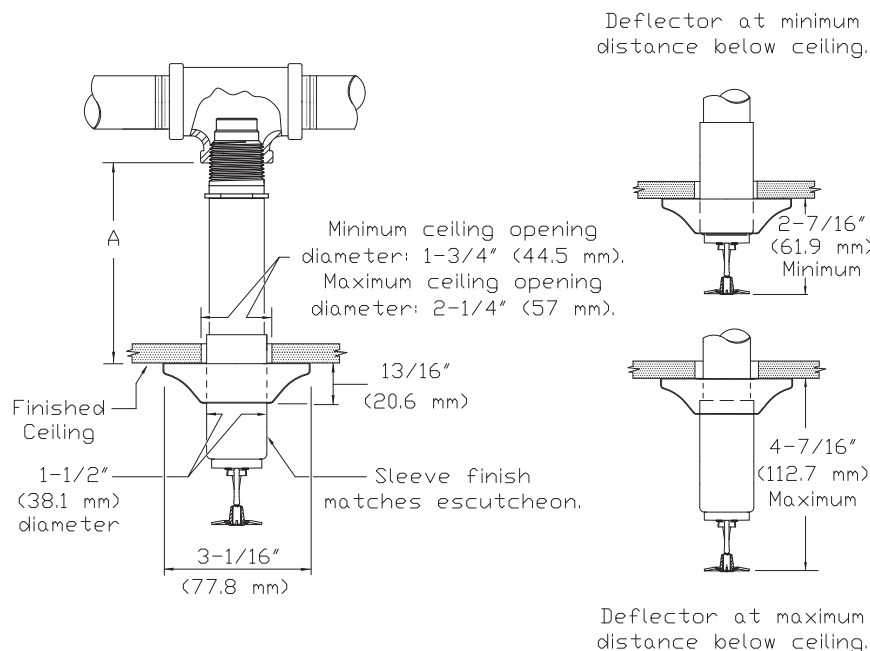
⁴ When installed in some corrosive environments, the Polyester finish may change color. This natural discoloration over time is not in itself an indication of corrosion and should not be treated as such. All sprinklers installed in corrosive environments should be replaced or tested as described in NFPA 25 on a more frequent basis.

For "A" Dimension: 1. Determine the distance from the face of the tee to the finished ceiling.

2. Round to the nearest 1/2" (12.7 mm) between 1-1/2" and 45-1/2" (38.1 mm and 1,156 mm).

NOTE: The deflector will be located approximately 3-7/16" (87.3 mm) below the ceiling,

with 1" (25.4 mm) upward and 1" (25.4 mm) downward adjustment.



NOTE:

To locate the deflector at the minimum distance below the ceiling, with no downward adjustment available, order the dry pendent sprinkler 1" (25.4 mm) shorter than the "A" dimension.

NOTE:

To locate the deflector at the maximum distance below the ceiling, with no downward adjustment available, order the dry pendent sprinkler 1" (25.4 mm) longer than the "A" dimension.

Figure 3: Adjustable Standard Dry Pendent Sprinkler



TECHNICAL DATA

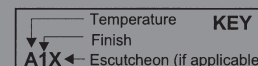
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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

Quick Response Dry Pendent Sprinklers
Maximum 175 PSI (12 bar) WWP



Sprinkler Base Part No. ¹	SIN	Style	Thread Size		Nominal K-Factor ²		Order Length Increment		Listings and Approvals ⁴ (Refer also to Design Criteria below.)					
			NPT	BSP	U.S.	metric ³	Inches	mm	cULus ⁵	NYC ⁶	VdS	LPCB	CE	⚙
08383U	VK176	Adjustable	1"	--	5.6	80.6	1/2"	12.7	A1, A5	A1	--	--	--	--
16457U		Standard	--	25 mm	--	80.6	1/2"	12.7	A1, A5	--	--	--	--	--
08385U	VK180	Adjustable	1"	--	5.6	80.6	1/4"	6.35	B2, B6	B2	--	--	--	--
16453U		Recessed	--	25 mm	--	80.6	1/4"	6.35	B2, B6	--	--	--	--	--
08387U	VK172	Plain	1"	--	5.6	80.6	1/2"	12.7	A3	A4	--	--	--	--
16455U		Barrel	--	25 mm	--	80.6	1/2"	12.7	A3	--	--	--	--	--

Approved Temperature Ratings

A - 155 °F (68 °C), 175 °F (79°C), 200 °F (93 °C), and 286 °F (141 °C)

B - 155 °F (68 °C), 175 °F (79°C), and 200 °F (93 °C)

Approved Finishes and "A" Dimensions

- 1 - Chrome or White Polyester⁷ sprinkler with a Chrome or White Polyester Sleeve and Escutcheon with "A" dimensions 1-1/2" to 45-1/2" (38.1 mm to 1,156 mm)
- 2 - Chrome or White Polyester⁷ with "A" dimensions 3-1/4" to 47-1/2" (82.5 mm to 1,207 mm)
- 3 - Chrome, Brass, White Polyester⁷, or ENT⁷ with "A" dimensions 3" to 47" (76.2 mm to 1,194 mm)
- 4 - Chrome or Brass with "A" dimensions 3" to 47" (76.2 mm to 1,194 mm)
- 5 - ENT⁷ sprinkler with an ENT⁷ Sleeve and Escutcheon with "A" dimensions 1-1/2" to 45-1/2" (38.1 mm to 1,156 mm)
- 6 - ENT⁷ with "A" dimensions 3-1/4" to 47-1/2" (82.5 mm to 1,207 mm)

Footnotes

¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

² K-Factor applies for standard lengths ("A" Dimensions indicated above).

³ Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

⁴ This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

⁵ Listed by Underwriter's Laboratories for use in the U.S. and Canada.

⁶ Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 15.

⁷ cULus Listed as corrosion resistant.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

NOTE: When using CPVC fittings with Viking dry sprinklers, use only new Nibco Model 5012-S-BI tees. When selecting other CPVC fittings, contact Viking Technical Services.

cULus Listing Requirements:

Standard Dry Pendent Sprinklers are cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation and obstruction rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page DRY1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

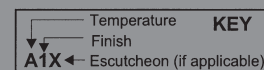
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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Quick Response Dry Pendent Sprinklers
Maximum 175 PSI (12 bar) WWP



Sprinkler Base Part No. ¹	SIN	Style	Thread Size		Nominal K-Factor ²		Order Length Increment		FM Approvals ⁴ (Refer also to Design Criteria below.)
			NPT	BSP	U.S.	metric ³	Inches	mm	
08383U	VK176	Adjustable Standard	1"	--	5.6	80.6	1/2"	12.7	A1
16457U			--	25 mm	--	80.6	1/2"	12.7	A1
08385U	VK180	Adjustable Recessed	1"	--	5.6	80.6	1/4"	6.35	B2
16453U			--	25 mm	--	80.6	1/4"	6.35	B2
08387U	VK172	Plain Barrel	1"	--	5.6	80.6	1/2"	12.7	A3
16455U			--	25 mm	--	80.6	1/2"	12.7	A3

Approved Temperature Ratings

A - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

B - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finishes and "A" Dimensions

1 - Brass, Chrome, White Polyester, or ENT⁵ sprinkler with a Brass, Chrome, White Polyester, or ENT⁵ Sleeve and Escutcheon with "A" dimensions 1-1/2" to 45-1/2" (38.1 mm to 1,156 mm)

2 - Brass, Chrome, White Polyester, or ENT⁵ with "A" dimensions 3-1/4" to 47-1/2" (82.5 mm to 1,207 mm)

3 - Brass, Chrome, White Polyester, or ENT⁵ with "A" dimensions 3" to 47" (76.2 mm to 1,194 mm)

Footnotes

¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

² K-Factor applies for standard lengths ("A" Dimensions indicated above).

³ Metric K-Factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

⁴ This chart shows the FM Approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

⁵ FM approved as corrosion resistant.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

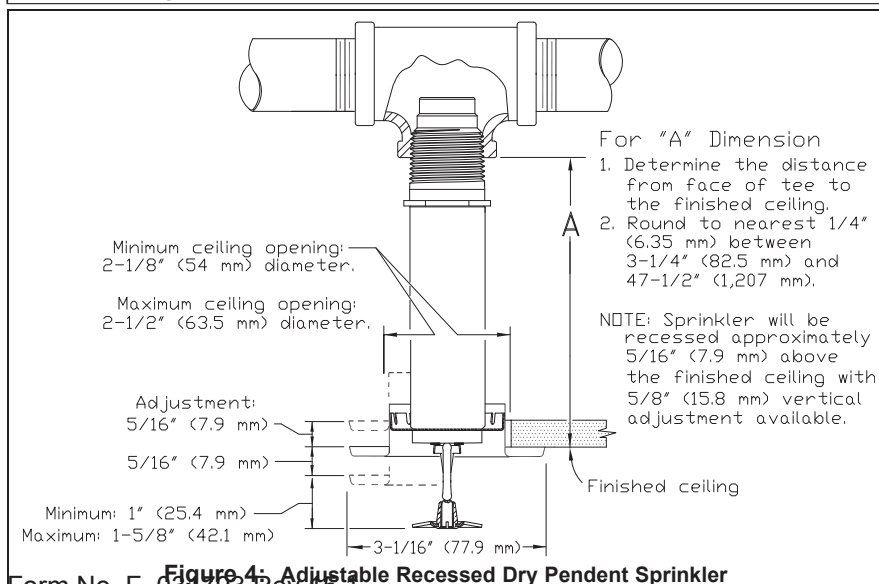
NOTE: When using CPVC fittings with Viking dry sprinklers, use only new Nibco Model 5012-S-BI tees. When selecting other CPVC fittings, contact Viking Technical Services.

FM Approval Requirements:

The Dry Pendent Sprinklers in the Approval Chart above are FM Approved as quick response **Non-storage** standard spray sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including 2-0) and Technical Advisory Bulletins. FM Global Loss Prevention Data Sheets and Technical Advisory Bulletins contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page DRY1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



Form No. F_034793 Rev 15.1

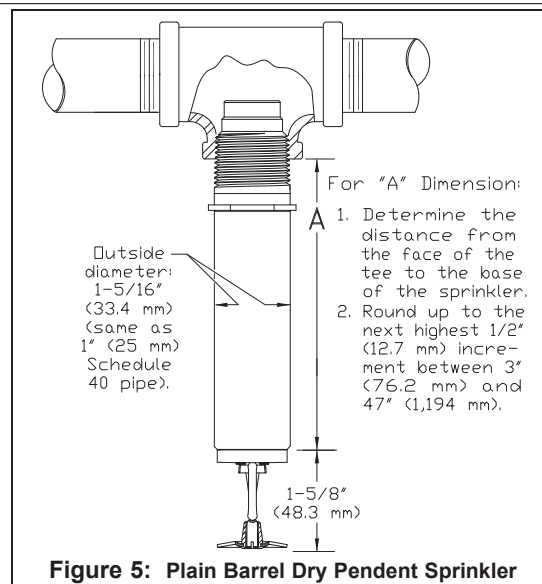


Figure 5: Plain Barrel Dry Pendent Sprinkler



TECHNICAL DATA

QUICK RESPONSE DRY PENDENT SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

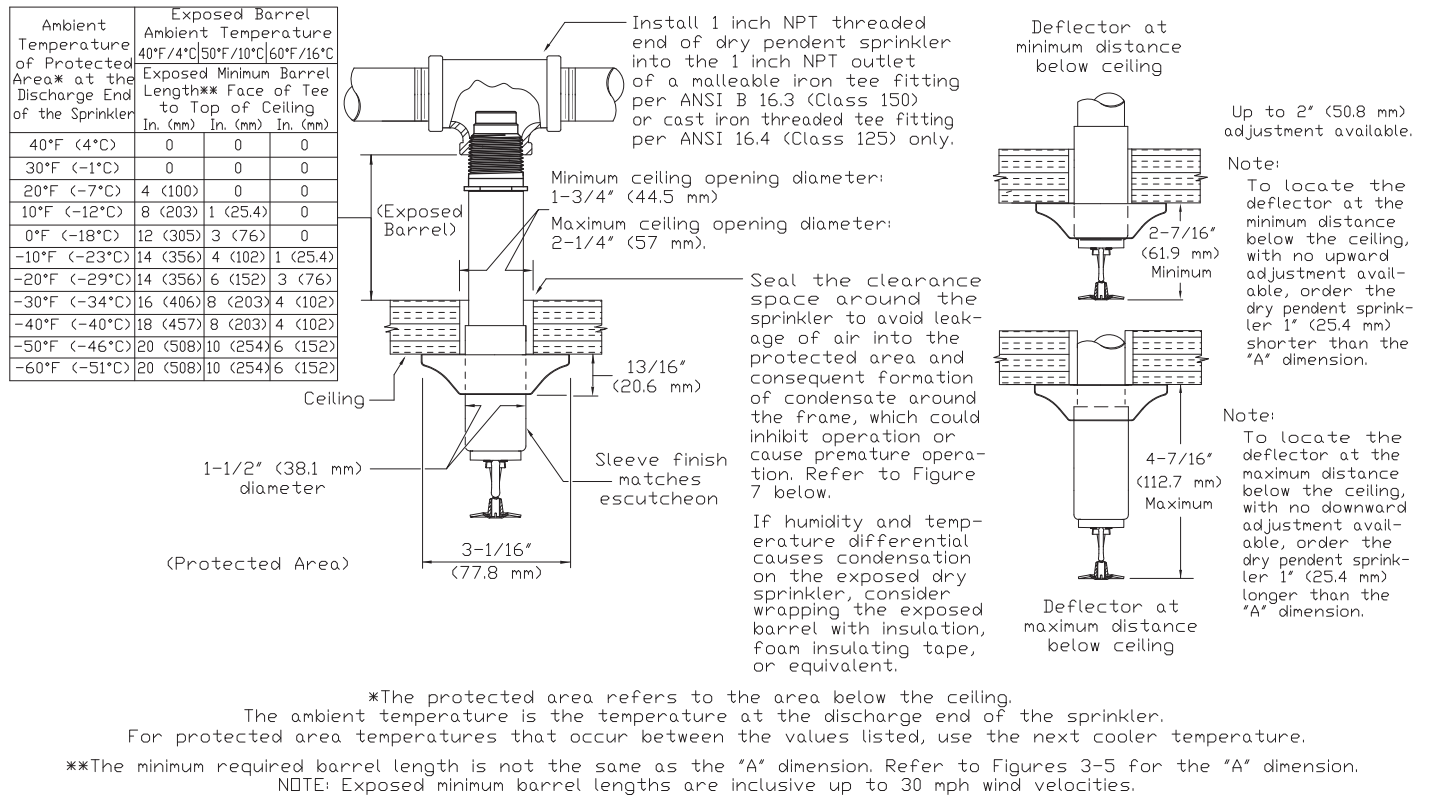


Figure 6: Dry Pendent Sprinkler Required Minimum Barrel Length Based on Ambient Temperature in the Protected Area (Adjustable Standard Dry Pendent Sprinkler is Shown)

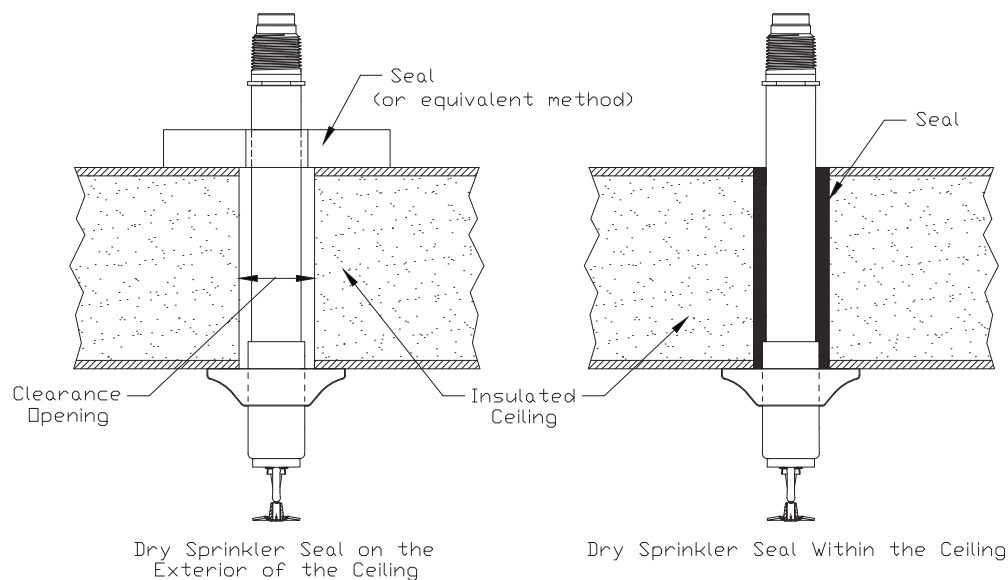


Figure 7: Dry Sprinkler Seal (Adjustable Standard Dry Pendent Sprinkler is Shown)



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Upright Sprinkler VK300 is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM global approves the ENT coating as corrosion resistant.** FM Global has no approval classification Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV

FM Approved: Classes 2002 and 2020

Refer to Approval Chart 1 and Design Criteria on for cULus Listing requirements and refer to Approval Chart 2 and Design Criteria FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)*
Maximum Working Pressure: 175 psi (12 bar) wwp.
Factory tested hydrostatically to 500 psi (34.5 bar)
Testing: U.S.A. Patent No. 4,831,870
Thread size: 1/2" NPT, 15 mm BSP
Nominal K-Factor: 5.6 U.S. (80.6 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-3/16" (56 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass
Deflector: Brass UNS-C23000 or Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated

Ordering Information: (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Upright Sprinkler VK300 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

For example, sprinkler VK300 with a 1/2" NPT thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 12978AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrench: Standard Wrench: Part No. 10896W/B (available since 2000)

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Upright Sprinkler VK300 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.

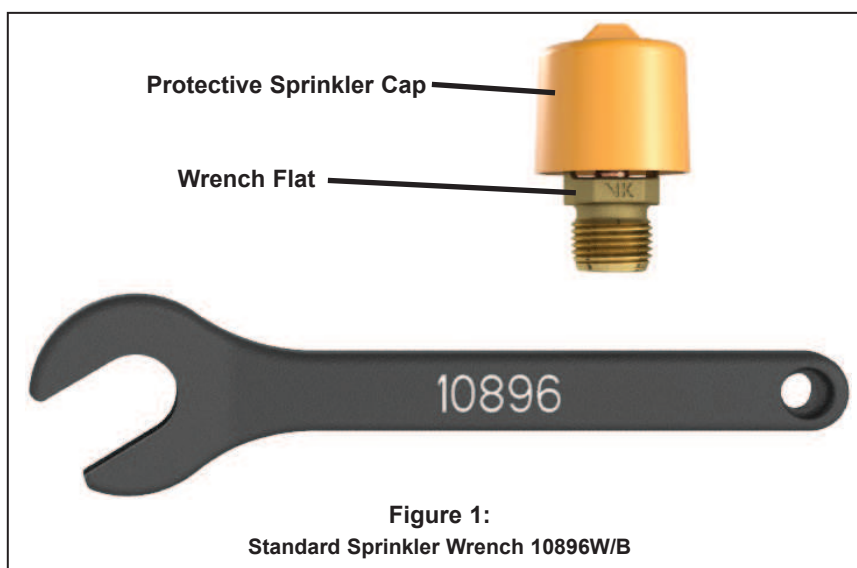


Figure 1:

Standard Sprinkler Wrench 10896W/B



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

Microfast® Quick Response
Upright Sprinkler VK300
Maximum 175 PSI (12 bar) WWP

KEY	
Temperature	Finish
A1X	Escutcheon (if applicable)

Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³				
		NPT	BSP	U.S.	metric ²	Inches	mm	cULus	VdS	LPCB	NYC ⁸	CE
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, and Black Polyester^{5,6}
2 - ENT⁶

Footnotes

¹ Base part number is shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.

⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada

⁵ Other colors are available on request with the same Listings and Approvals as the standard colors.

⁶ cULus Listed as corrosion resistant.

⁷ Meets New York City requirements, effective July 1, 2008

⁸ Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA and City of New York Department of Buildings, MEA 89-92-E, Vol. 16.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Upright Sprinkler VK300 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



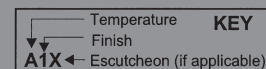
TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Microfast® Quick Response
Upright Sprinkler VK300
Maximum 175 PSI (12 bar) WWP



Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric ²	Inches	mm	
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester⁵, and Black Polyester⁵
2 - ENT⁶

Footnotes

¹ Base part number is shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals.

⁵ Other colors are available on request with the same Approvals as the standard colors.

⁶ FM approved as corrosion resistant.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Microfast® Quick Response Upright Sprinkler VK300 is FM Approved as a quick response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

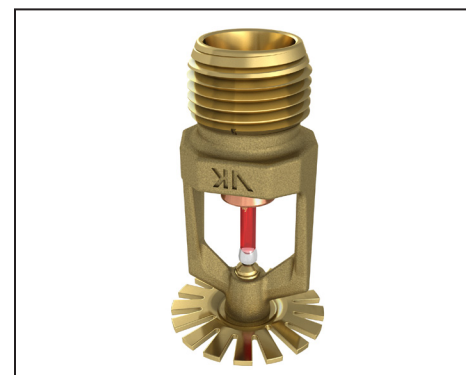
MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester, Polytetrafluoroethylene (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves ENT finish as corrosion resistant.** FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class Series 2000



VdS Approved: Certificates G414009 and G414010



LPCB Approved



CE Certified: Standard EN 12259-1:1999, A3:2006 Certificate of Constancy of Performance 0832-CPR-S0021



CCCF Approved: Approved by the China Certification Center for Fire Products (CCCF)

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)
 Rated to 175 psi (12 bar) water working pressure
 Factory tested hydrostatically to 500 psi (34.5 bar)
 Thread size: 1/2" NPT, 15 mm BSP
 Nominal K-Factor: 5.6 U.S. (80.6 metric**)
 Glass-bulb fluid temperature rated to -65 °F (-55 °C)
 Overall Length: 2-1/4" (58 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass
 Deflector: Phosphor Bronze UNS-C51000 or Copper UNS-C19500
 Bulb: Glass, nominal 3 mm diameter
 Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
 Screw: Brass UNS-C36000
 Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Quick Response Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, Black PTFE = N, and ENT = JN
 Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G
 For example, sprinkler VK302 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 12979AB

Viking Technical Data may be found on
 The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
 The Web site may include a more recent
 edition of this Technical Data Page.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 10896W/B (available since 2000).

B. Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B** (available since 2006)

C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool*** Part No. 15915 (available since 2010)

**A ½" ratchet is required (not available from Viking).

***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

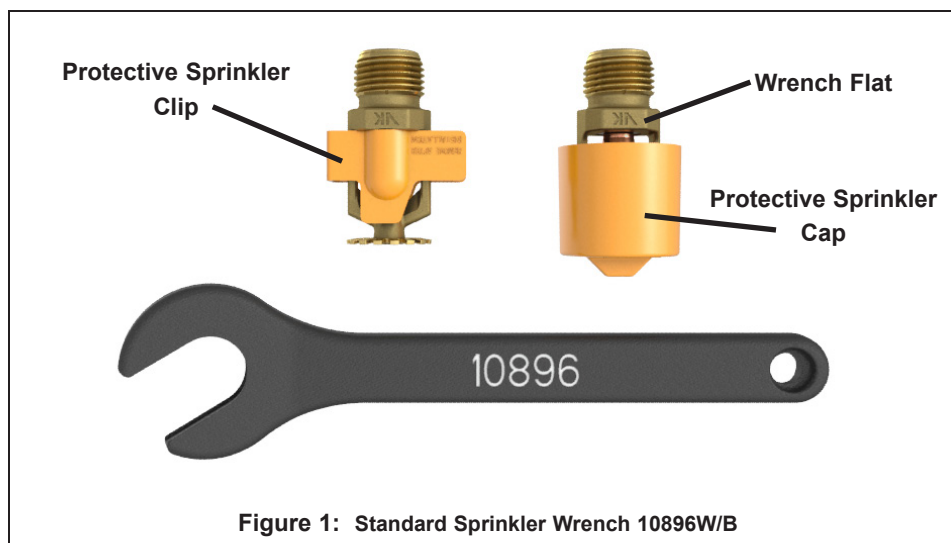


Figure 1: Standard Sprinkler Wrench 10896W/B



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, Black PTFE, and ENT

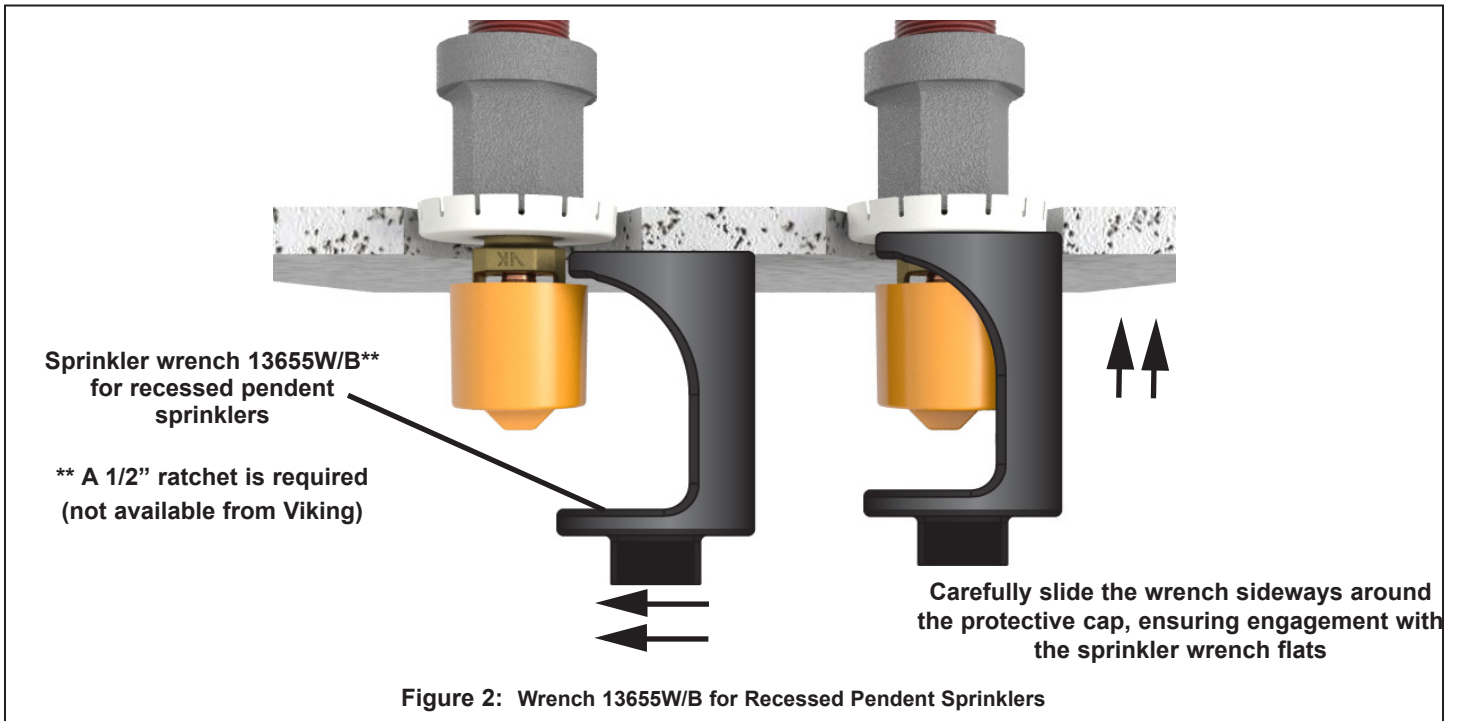
Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, PTFE, and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated





TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL) The Viking Microfast® Quick Response Pendent Sprinkler VK302 Maximum 175 PSI (12 Bar) WWP

	Temperature	KEY
↓	Finish	
A1X ←	Escutcheon (if applicable)	

Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to Design Criteria.)					
			NPT	BSP	U.S.	metric ²	Inches	mm	cULus ⁴	VdS	LPCB	CE ⁷	⚙	CCC
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	A1	A1Z, B1Y	D1Z, C1Y	--	D3Z

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06662B	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	--	--	--	--	--
18021	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1X, B1Y	A1	A1X, B1Y	D1X, C1Y ⁸	D1X, C1Y ⁹	--

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
 C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
 D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, Black Polyester^{5,6}
 2 - ENT⁵
 3 - Chrome

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
 Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1, E-2, or E-3 Recessed Escutcheon
 Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.

⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.

⁵ cULus Listed as corrosion-resistant.

⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.

⁷ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001.

⁸ CE Certified, Standard EN 12259-1, EC-certificates of conformity 0832-CPD-2001 and 0832-CPD-2003.

⁹ MED Certified, Standard EN 12259-1, EC-certificates of conformity 0832-MED-1003 and 0832-MED-1008.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray pendent sprinklers.

- Designed for use in Light and Ordinary occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



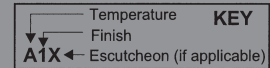
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM) The Viking Microfast® Quick Response Pendent Sprinkler VK302 Maximum 175 PSI (12 Bar) WWP



Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria.)
			NPT	BSP	U.S.	metric ²	Inches	mm	
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)									
06662B	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2
18021	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
 C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
 D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester⁴, and Black Polyester⁴
 2 - ENT⁵

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
 Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon
 Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process.

⁴ Other colors are available on request with the same Approvals as the standard colors.

⁵ FM approved as corrosion resistant.

DESIGN CRITERIA - FM (Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is FM Approved as quick response **Non-storage** upright and pendent sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

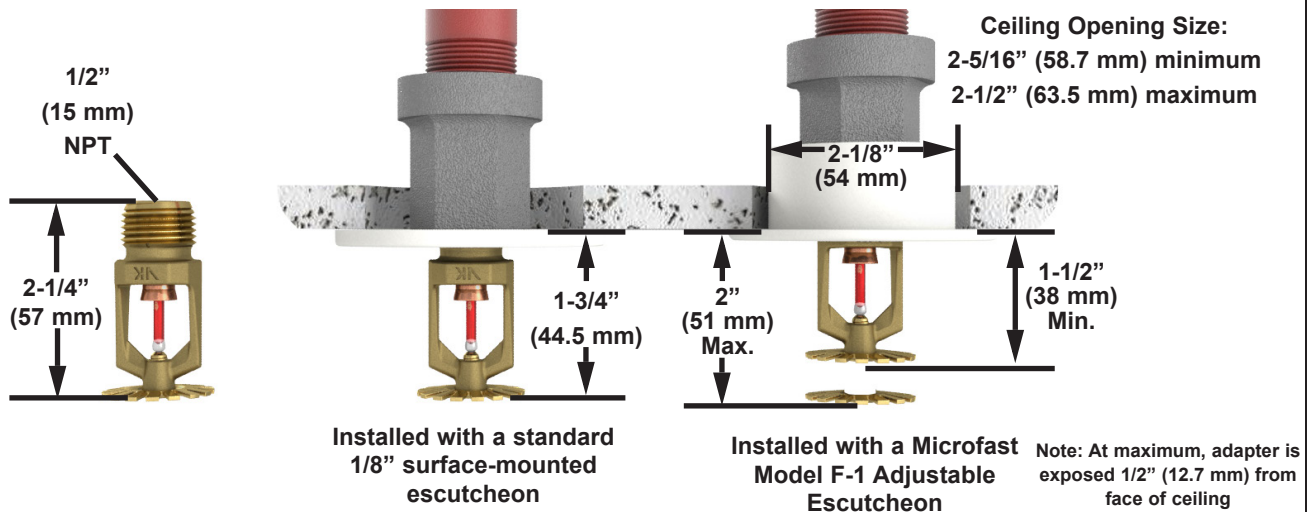


Figure 3: Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

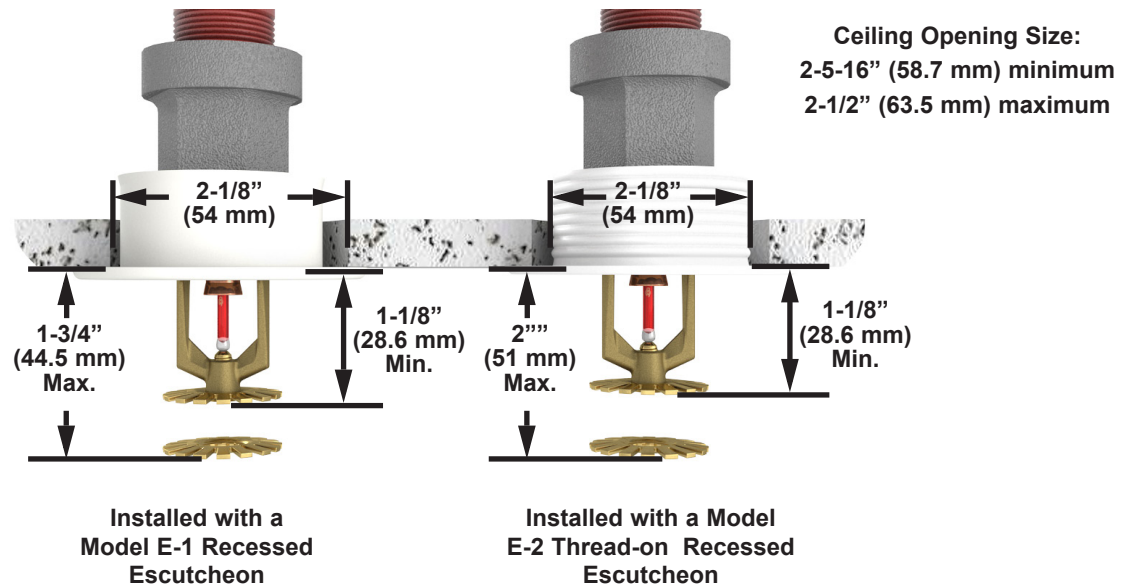


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons



TECHNICAL DATA

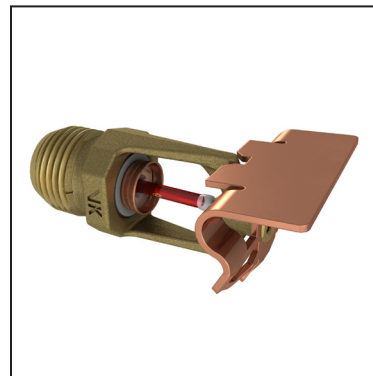
MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in Approval Charts.



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class 2020

Refer to Approval Chart 1 and Design Criteria for cULus

Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)

Rated to 175 psi (12 bar) water working pressure

Factory tested hydrostatically to 500 psi (34.5 bar)

Nominal K-Factor: 5.6 U.S. (80.6 metric*)

* Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Overall Length: 2-3/4" (68 mm)

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass

Deflector: Copper UNS-C19500

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinklers: Belleville Spring - Exposed, Screw and Pip cap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix: 135 °F / 57 °C = A, 155 °F / 68 °C = B, 175 °F / 79 °C = D, 200 °F / 93 °C = E, and 286 °F / 141 °C = G

For example, sprinkler 12997 with a Brass finish and a 155 °F / 68 °C temperature rating = Part No. 12997AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 10896W/B (available since 2000).

B. Wrench for recessed and/or wax coated sprinklers: Part No. 13655W/B** (available since 2006)

**A 1/2" ratchet is required (not available from Viking).

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive fusible link disengages, the pip cap and spring are released, and the waterway is opened. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

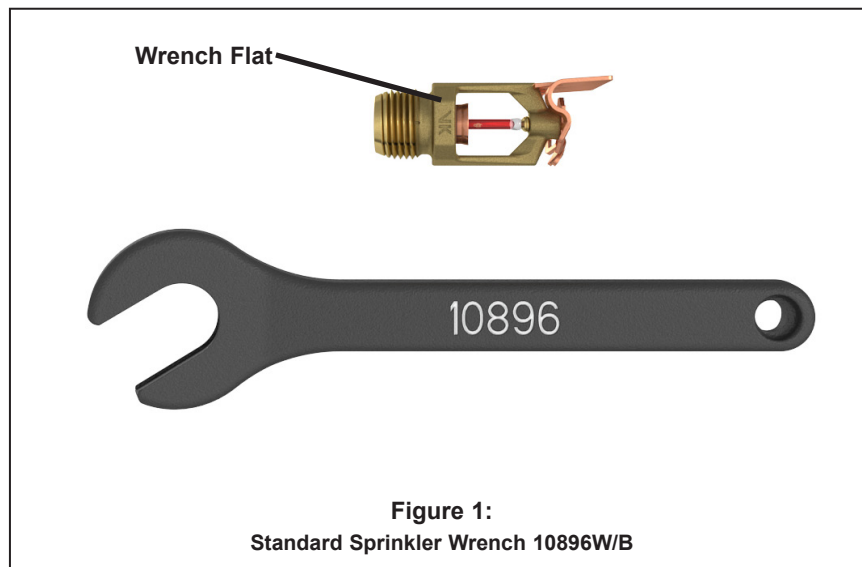
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Microfast® Quick Response Horizontal Sidewall Sprinkler VK305 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.





TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

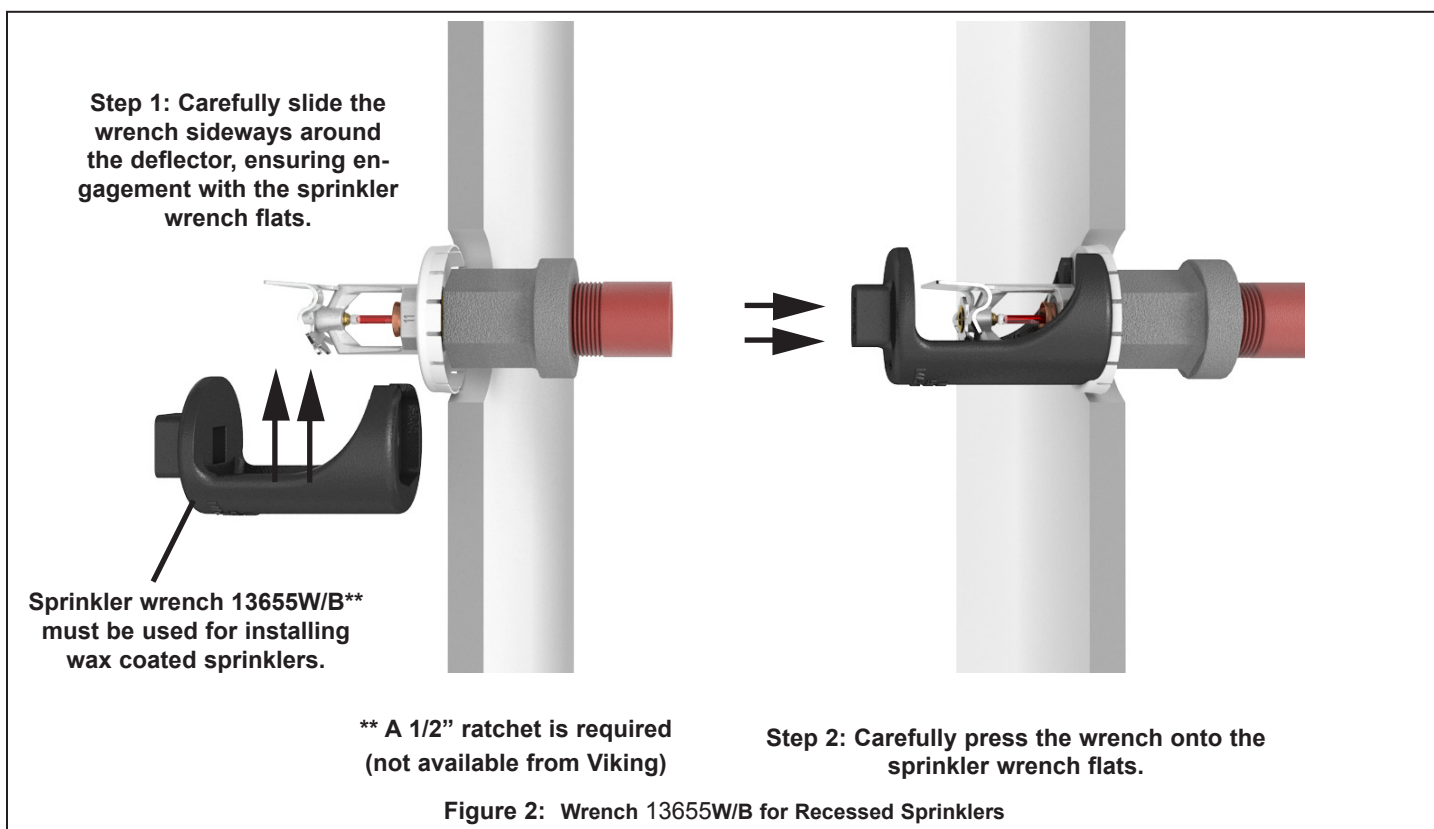
Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and ENT

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. For ENT coated sprinklers, the waterway is coated. Note that the spring is exposed on sprinklers with Polyester, and ENT coatings.





TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

Microfast® Quick Response Horizontal Sidewall Sprinkler VK305
For Light or Ordinary Hazard Occupancies

Maximum 175 PSI (12 Bar) WWP

Deflector must be located 4" to 12" (102 mm to 305 mm) below the ceiling.

Temperature	KEY
↓	Finish
A1X ←	Escutcheon (if applicable)

Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to Design Criteria on page 43x.)			
			NPT	BSP	U.S.	metric ²	Inches	mm	cULus ⁴	LPCB	CE	⚙
12997	VK305	HSW	1/2"	15 mm	5.6	80.6	2-11/16	68	A1Y, B1X, C2W, D2Z	--	--	--

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

12121	VK305	HSW	1/2"	15 mm	5.6	80.6	1-11/16	68	A1Y, B1X, C2W, D2Z	--	--	--
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Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
 C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)
 D - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finishes

1 - Brass, Chrome, White Poly-ester^{5,6}, and Black Polyester^{5,6}
 2 - ENT⁵

Approved Escutcheons

W - Installed with standard surface-mounted escutcheons
 X - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1, E-2, or G-1 Recessed Escutcheon
 Y - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon
 Z - Installed with standard surface-mounted escutcheons or recessed with the Viking Micromatic Model E-1

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.

⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.

⁵ cULus Listed as corrosion-resistant.

⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

Quick Response Horizontal Sprinkler VK305 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for sidewall standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- Locate with the deflector 4" to 12" (102 mm to 305 mm) below the ceiling.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13.
- Minimum spacing allowed is 6 ft. (1.8 m).
- Align the top of the deflector parallel with the ceiling.
- Locate no less than 4" (102 mm) from end walls.
- Maximum distance from end walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler installation and obstruction rules contained in NFPA 13 for sidewall standard spray sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



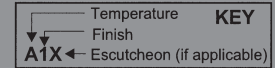
TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Quick Response Sidewall Sprinklers
Maximum 175 PSI WWP



Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ^{3,4} (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric ²	Inches	mm	
12997	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1Y, B1X
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
12121	VK305	1/2"	15 mm	5.6	80.6	2-11/16	68	A1Y, B1X

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)

Approved Finishes

1 - Brass

Approved Escutcheons

X - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon, **or** recessed with the Viking Micromatic® Model E-1, E-2, E-3, or G-1 Recessed Escutcheon
Y - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process.

⁴ Viking vertical sidewall sprinklers may be installed pendent or upright.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Horizontal Sidewall Sprinkler VK305 is FM Approved as a quick response **Non-Storage** sidewall sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

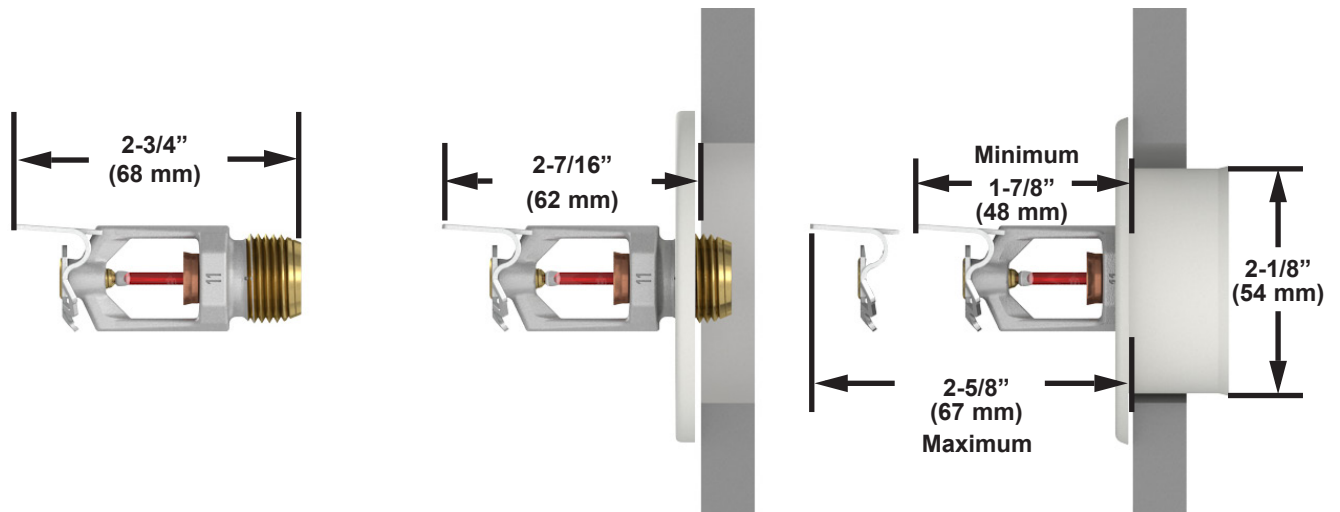


TECHNICAL DATA

MICROFAST® QUICK RESPONSE HORIZONTAL SIDEWALL SPRINKLER VK305 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

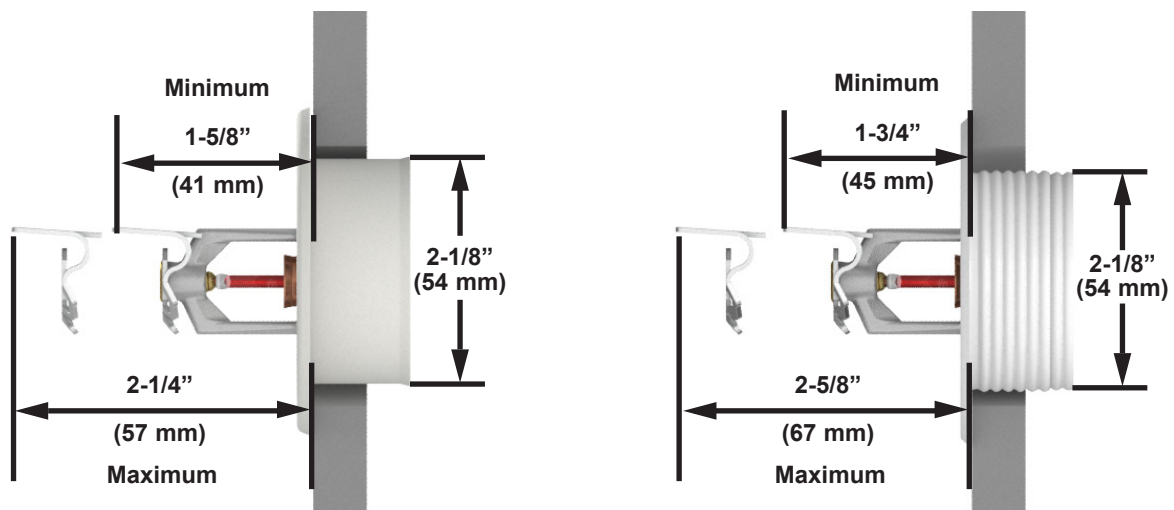


Wall Opening Size:
2-5/16\" (58.7 mm) minimum
2-1/2\" (63.5 mm) maximum

Installed with a Standard
1/8\" Surface-Mounted
Escutcheon

Installed with a Microfast
Model F-1 Adjustable
Escutcheon

Figure 3: Sidewall Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon



Wall Opening Size:
2-5/16\" (58.7 mm) minimum
2-1/2\" (63.5 mm) maximum

Installed with the
Micromatic Model E-1
Recessed Escutcheon

Installed with the
Threaded Model E-2
Recessed Escutcheon

Figure 4: Sidewall Sprinkler VK305 Dimensions with the Model E-1 and E-2 Recessed Escutcheons



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Upright Sprinkler VK350 is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes, temperature ratings, and K-Factors to meet design requirements. The special Polyester, Polytetrafluoroethylene (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves the ENT coating as corrosion resistant.** FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class Series 2000



VdS Approved: Certificates G414017 and G414018



LPCB Approved



CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0786-CPD-40278

NOTE: Other International approval certificates are available upon request.

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)*
Maximum Working Pressure: 175 psi (12 bar) wwp.
Factory tested hydrostatically to 500 psi (34.5 bar)
Testing: U.S.A. Patent No. 4,831,870
Thread size: 1/2" NPT, 15 mm BSP, 3/4" NPT, 20 mm BSP
Nominal K-Factor: 8.0 U.S. (115.2 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-5/16" (59 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar).
The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400
Deflector: Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information:

(Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Upright Sprinkler VK350 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and Black PTFE = N, ENT = JN

Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

For example, sprinkler VK350 with a 1/2" thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 18259AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrench: Standard Wrench: Part No. 10896W/B (available since 2000)

Sprinkler Cabinets:

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

- A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Upright Sprinkler VK350 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, Black PTFE, and ENT

Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated on pages 51c-e. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.

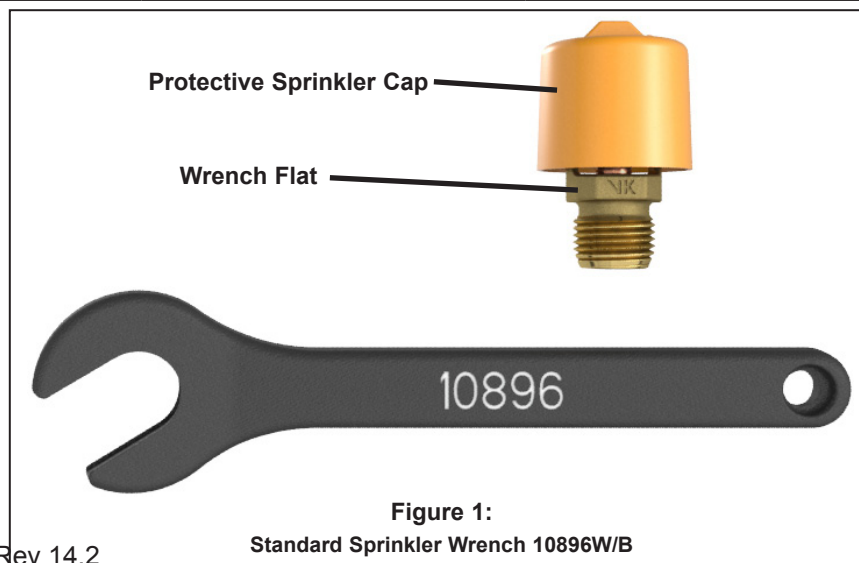


Figure 1:

Standard Sprinkler Wrench 10896W/B



TECHNICAL DATA

MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

Microfast® Quick Response
Upright Sprinkler VK350
Maximum 175 PSI (12 bar) WWP

	Temperature	KEY
↓	Finish	
A1X ←	Escutcheon (if applicable)	

Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to Design Criteria.)			
		NPT	BSP	U.S.	metric ²	Inches	mm	cULus ⁴	VdS	LPCB	CE
18257	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B1 ⁷
18278	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B1 ⁷
18259 ⁹	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A1, B2	A1	--	B1 ⁸

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06665B	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B1 ⁷
14817	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2	A1	A1	B1 ⁷
06764B ⁹	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A1, B2	A1	--	A1 ⁸

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, and Black Polyester^{5,6}
2 - ENT⁵

Footnotes

¹ Base part number is shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.

⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.

⁵ cULus Listed as corrosion resistant.

⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.

⁷ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0832-CPD-2003.

⁸ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40278.

⁹ The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1)

cULus Listing Requirements:

The Microfast® Quick Response Upright Sprinkler VK350 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

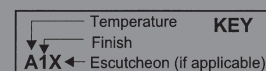
MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK350 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Microfast® Quick Response
Upright Sprinkler VK350
Maximum 175 PSI (12 bar) WWP



Base Part Number ¹	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric ²	Inches	mm	
18257	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B2
18278	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2
18259 ⁵	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A1, B2
NOTICE - Product Below - Limited Availability (Contact Local Viking Office)								
06665B	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B2
14817	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B2
06764B ⁵	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A1, B2
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C) B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)						Approved Finishes 1 - Brass, Chrome, White Polyester ⁴ , and Black Polyester ⁴ 2 - ENT ⁶		

Footnotes

¹ Base part number is shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals.

⁴ Other colors are available on request with the same Approvals as the standard colors.

⁵ The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

⁶ FM approved as corrosion resistant.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Microfast® Quick Response Upright Sprinkler VK350 is FM Approved as a quick response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester, Polytetrafluoroethylene (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves ENT finish as corrosion resistant.** FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class Series 2000



VdS Approved: Certificates G414019 and G414020



LPCB Approved



CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0786-CPD-40279

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)
Rated to 175 psi (12 bar) water working pressure
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread size: 3/4" NPT, 20 mm BSP
Nominal K-Factor: 8.0 U.S. (115.2 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4" (58 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400
Deflector: Phosphor Bronze UNS-C51000 or Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Quick Response Upright and Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, Black PTFE = N, and ENT = JN
Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G
For example, sprinkler VK352 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 18258AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

- A. Standard Wrench: Part No. 10896W/B (available since 2000).
- B. Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B** (available since 2006)
- C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool*** Part No. 15915 (available since 2010)

**A ½" ratchet is required (not available from Viking).

***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:

- A. Six-head capacity: Part No. 01724A (available since 1971)
- B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

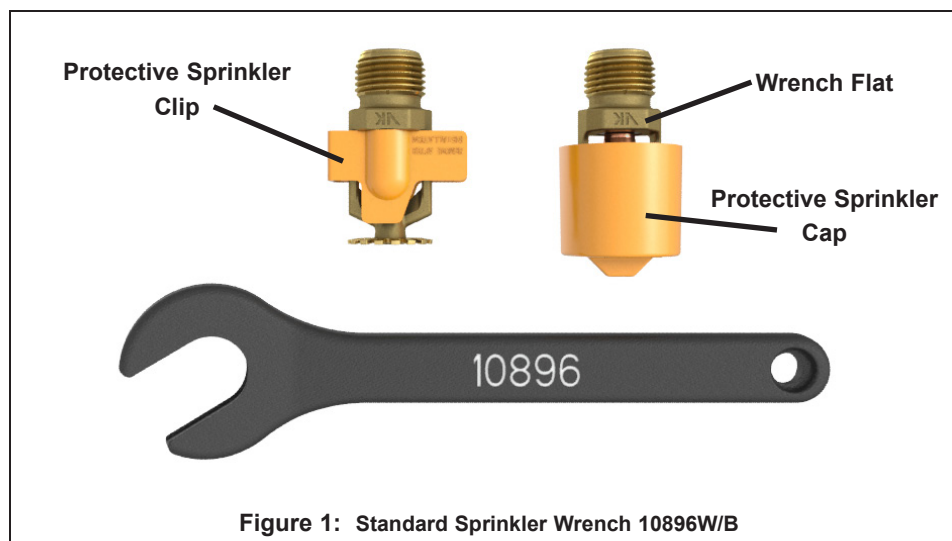


Figure 1: Standard Sprinkler Wrench 10896W/B



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, Black PTFE, and ENT

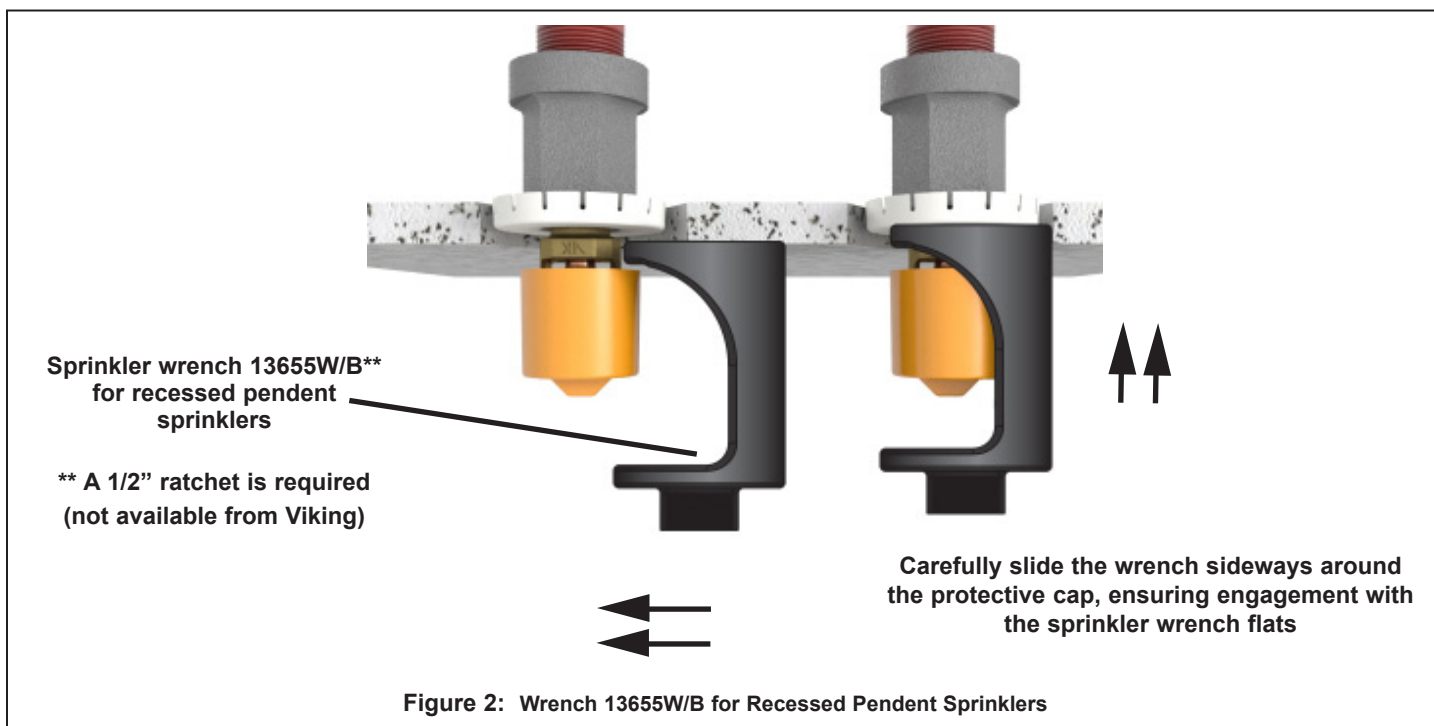
Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, PTFE, and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated



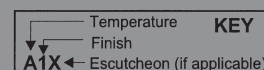


TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL) The Viking Microfast® Quick Response Pendent Sprinkler VK352 Maximum 175 PSI (12 Bar) WWP



Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to Design Criteria.)			
			NPT	BSP	U.S.	metric ²	Inches	mm	cULus ⁴	VdS	LPCB	CE
18258	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, C2X, D2	A3	A3Z	D3 ⁸
18260 ⁷	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, C2X, D2	A3	--	D3 ⁹

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06666B	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-3/8	60	A1Z, B1Y, C2X, D2	A3	A3Z	D3 ⁸
06765B ⁷	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-3/8	60	A1Z, B1Y, C2X, D2	A3	--	A3 ⁹

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, Black Polyester^{5,6}, and Black PTFE
2 - ENT⁵
3 - Brass, Chrome, White Polyester^{5,6}, and Black Polyester^{5,6}

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon
Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

- ¹ Base part number shown. For complete part number, refer to Viking's current price schedule.
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.
⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
⁵ cULus Listed as corrosion-resistant.
⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.
⁷ The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.
⁸ CE Certified, Standard EN 12259-1, EC-certificates of conformity 0832-CPD-2001 and 0832-CPD-2003.
⁹ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40279.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



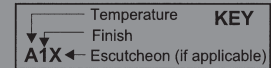
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM) The Viking Microfast® Quick Response Pendent Sprinkler VK352 Maximum 175 PSI (12 Bar) WWP



Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria.)
			NPT	BSP	U.S.	metric ²	Inches	mm	
18258	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, D2X, C2
18260 ⁶	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, D2X, C2

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06666B	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-38	60	A1Z, B1Y, D2X, C2
06765B ⁶	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-38	60	A1Z, B1Y, D2X, C2

Approved Temperature Ratings			Approved Finishes			Approved Escutcheons			
A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)			1 - Brass, Chrome, White Polyester ⁴ , and Black Polyester ⁴			X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon			
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)			2 - ENT ⁵			Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon			
C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)						Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon			
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)									

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process.

⁴ Other colors are available on request with the same Approvals as the standard colors.

⁵ FM approved as corrosion resistant.

⁶ The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

DESIGN CRITERIA - FM (Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is FM Approved as quick response **Non-storage** upright and pendent sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

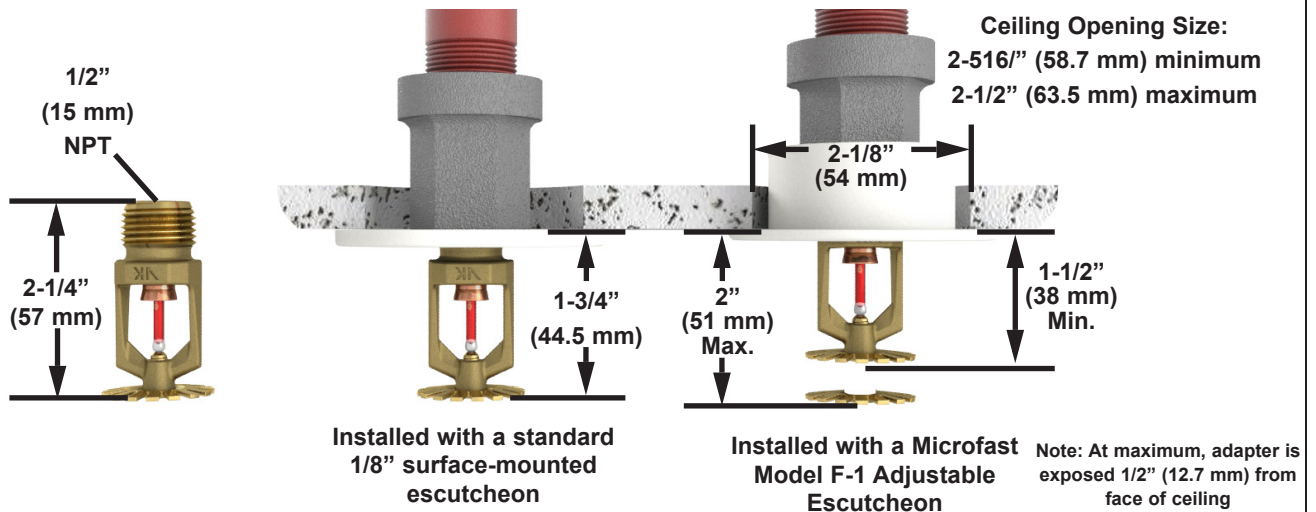


Figure 3: Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

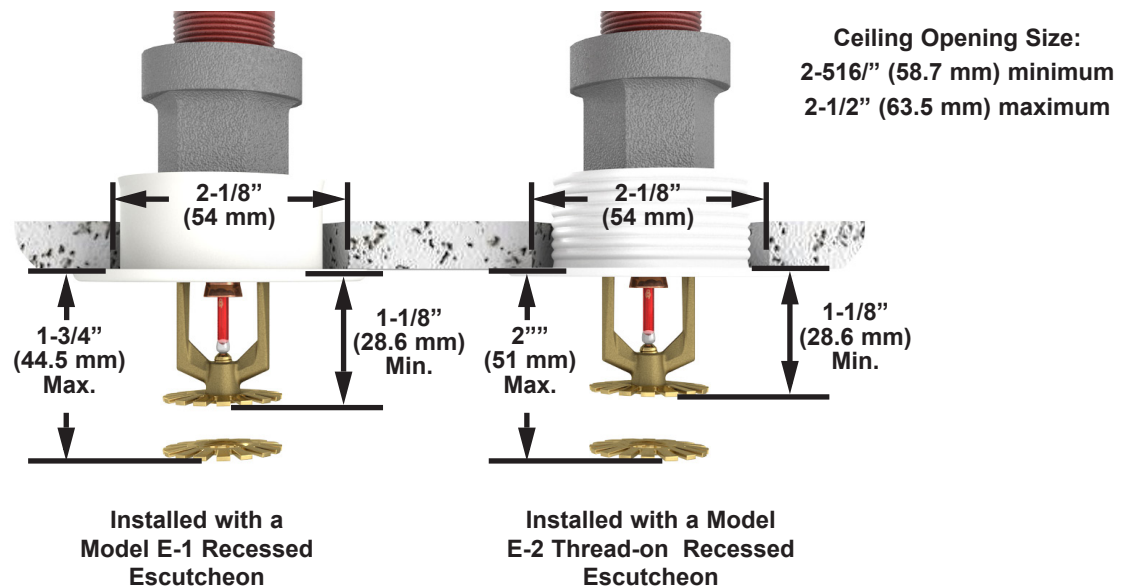


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is a small thermosensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester, Polytetrafluoroethylene (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves ENT finish as corrosion resistant.** FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class Series 2000



VdS Approved: Certificates G414019 and G414020



LPCB Approved



CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0786-CPD-40279

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)
Rated to 175 psi (12 bar) water working pressure
Factory tested hydrostatically to 500 psi (34.5 bar)
Thread size: 3/4" NPT, 20 mm BSP
Nominal K-Factor: 8.0 U.S. (115.2 metric**)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4" (58 mm)

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400
Deflector: Phosphor Bronze UNS-C51000 or Copper UNS-C19500
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Quick Response Upright and Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-W, Black Polyester = M-B, Black PTFE = N, and ENT = JN
Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G
For example, sprinkler VK352 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 18258AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

- A. Standard Wrench: Part No. 10896W/B (available since 2000).
- B. Wrench for Recessed Pendent Sprinklers: Part No. 13655W/B** (available since 2006)
- C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool*** Part No. 15915 (available since 2010)

**A ½" ratchet is required (not available from Viking).

***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:

- A. Six-head capacity: Part No. 01724A (available since 1971)
- B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

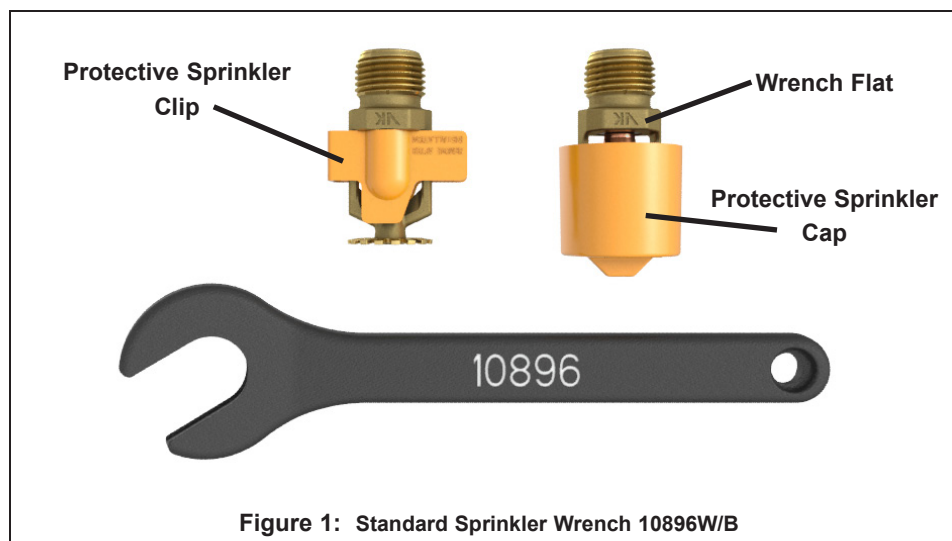


Figure 1: Standard Sprinkler Wrench 10896W/B



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, Black PTFE, and ENT

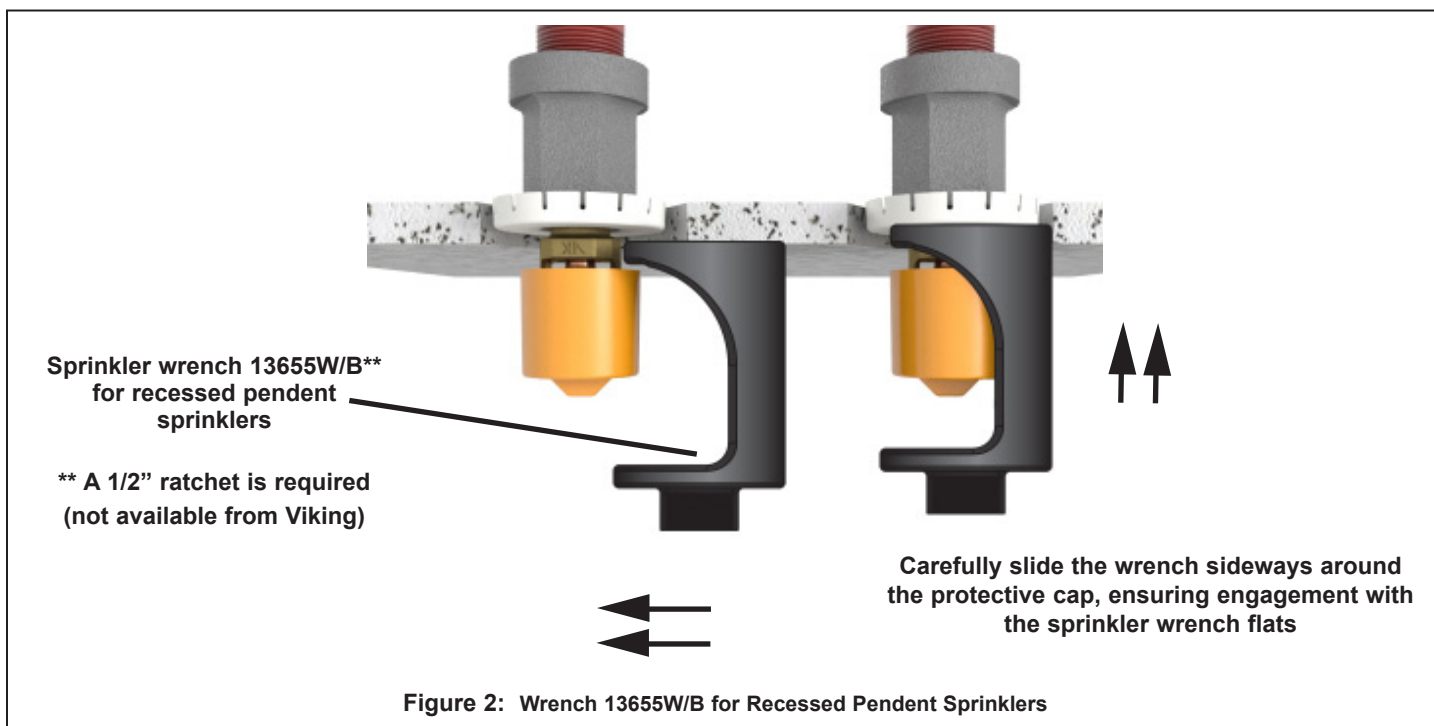
Corrosion-Resistant Coatings³: White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, PTFE, and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated





TECHNICAL DATA

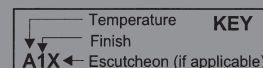
MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

The Viking Microfast® Quick Response
Pendent Sprinkler VK352
Maximum 175 PSI (12 Bar) WWP



Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to Design Criteria.)			
			NPT	BSP	U.S.	metric ²	Inches	mm	cULus ⁴	VdS	LPCB	CE
18258	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, C2X, D2	A3	A3Z	D3 ⁸
18260 ⁷	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, C2X, D2	A3	--	D3 ⁹

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06666B	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-3/8	60	A1Z, B1Y, C2X, D2	A3	A3Z	D3 ⁸
06765B ⁷	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-3/8	60	A1Z, B1Y, C2X, D2	A3	--	A3 ⁹

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
 C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)
 D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester^{5,6}, Black Polyester^{5,6}, and Black PTFE
 2 - ENT⁵
 3 - Brass, Chrome, White Polyester^{5,6}, and Black Polyester^{5,6}

Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon
 Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon
 Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

Footnotes

- ¹ Base part number shown. For complete part number, refer to Viking's current price schedule.
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.
⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
⁵ cULus Listed as corrosion-resistant.
⁶ Other colors are available on request with the same Listings and Approvals as the standard colors.
⁷ The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.
⁸ CE Certified, Standard EN 12259-1, EC-certificates of conformity 0832-CPD-2001 and 0832-CPD-2003.
⁹ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40279.

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

cULus Listing Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light, Ordinary, and Extra Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



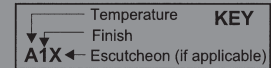
TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM) The Viking Microfast® Quick Response Pendent Sprinkler VK352 Maximum 175 PSI (12 Bar) WWP



Base Part Number ¹	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria.)
			NPT	BSP	U.S.	metric ²	Inches	mm	
18258	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, D2X, C2
18260 ⁶	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-1/4	58	A1Z, B1Y, D2X, C2

NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06666B	VK352	Pendent	3/4"	20 mm	8.0	115.2	2-38	60	A1Z, B1Y, D2X, C2
06765B ⁶	VK352	Pendent	1/2"	15 mm	8.0	115.2	2-38	60	A1Z, B1Y, D2X, C2

Approved Temperature Ratings			Approved Finishes			Approved Escutcheons			
A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)			1 - Brass, Chrome, White Polyester ⁴ , and Black Polyester ⁴			X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon			
B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)			2 - ENT ⁵			Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon			
C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)						Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon			
D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)									

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the FM Approvals available at the time of printing. Other approvals may be in process.

⁴ Other colors are available on request with the same Approvals as the standard colors.

⁵ FM approved as corrosion resistant.

⁶ The 1/2" NPT Large Orifice Sprinkler is listed and approved for retrofit only when installed in accordance with NFPA 13.

DESIGN CRITERIA - FM (Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK352 is FM Approved as quick response **Non-storage** upright and pendent sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK352 (K8.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

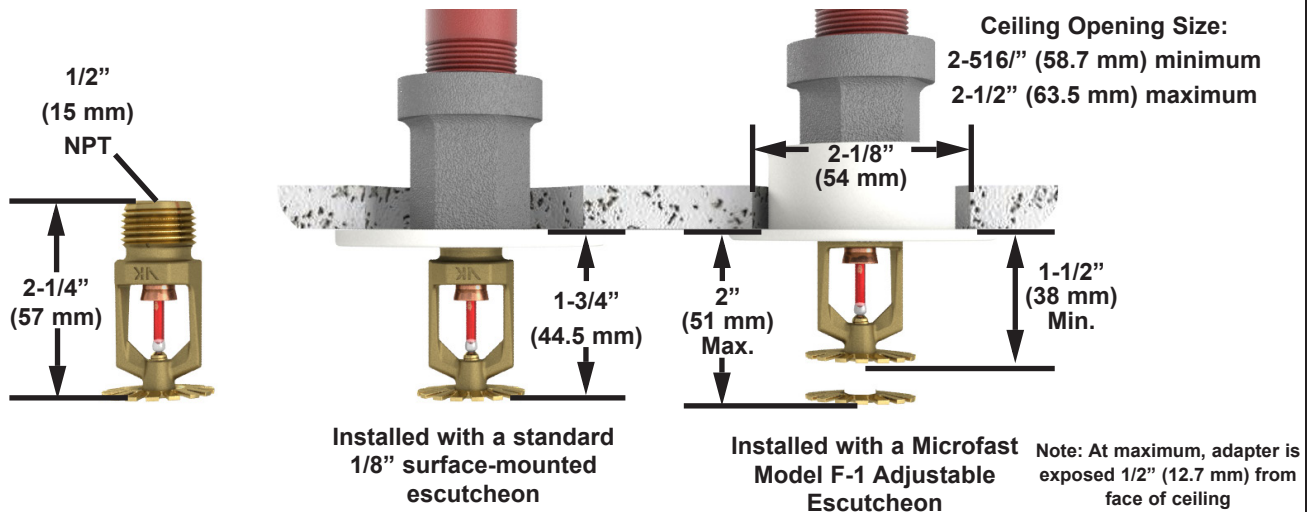


Figure 3: Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

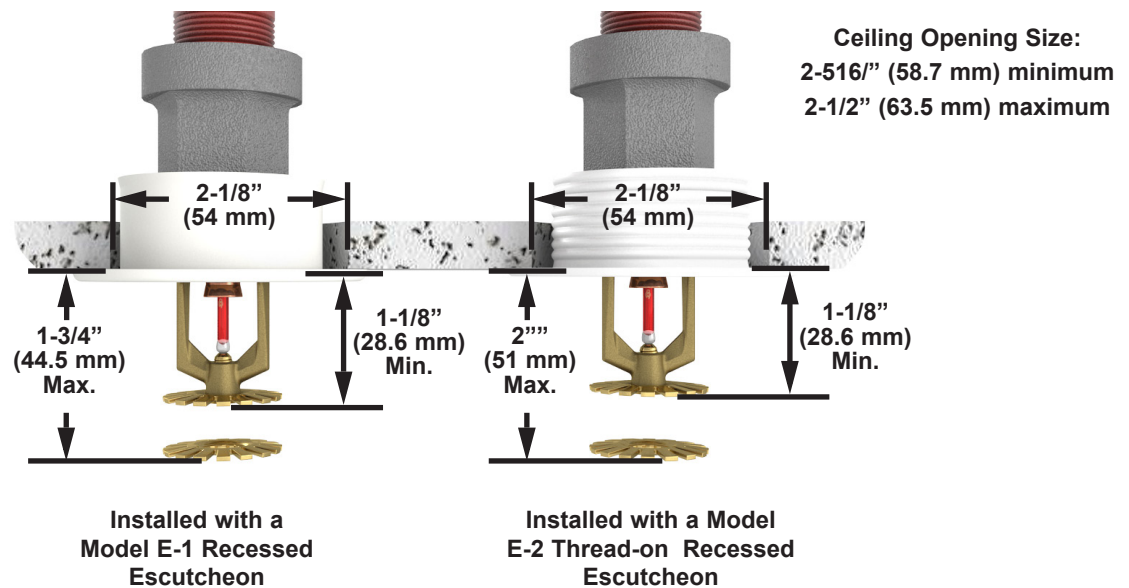


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons



TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Mirage® Standard and Quick Response Concealed Pendent Sprinkler VK462 and HP Sprinkler VK463 are thermosensitive glass-bulb spray sprinklers designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to 1/2" (12.7 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is cULus Listed as corrosion resistant as indicated in the Approval Charts. The ENT finish is only available for the sprinkler assembly, the cover plate is not plated.



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approval: Class 2015



NYC Approved: MEA 89-92-E, Volume 32



VdS Approved: Certificate G4080021



LPCB Approved: Ref. No. 096e/12



CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2032



CCCF Approved: Approved by the China Certification Center for Fire Products (CCCF)

Refer to Approval Chart 1 Design Criteria for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page for FM Approval requirements that must be followed.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

3. TECHNICAL DATA

Specifications:

Available since 2006.

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: Sprinkler VK463 is rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17.2 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. Sprinkler VK462 is rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 5.6 U.S. (80.6 metric)†

Glass-bulb fluid temperature rated to -65°F (-55°C)

Patents Pending

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

†Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:

Sprinkler Body: Brass UNS-C84400

Deflector: Copper UNS-C19500 for Sprinkler VK462

Phosphor Bronze UNS-C51000 for Sprinkler VK463

Deflector Pins: Stainless Steel Alloy

Bulb: Glass, nominal 3 mm diameter

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Button: Brass UNS-C36000

Screws: 18-8 Stainless Steel

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Yoke: Phosphor Bronze UNS-C51000

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating



TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Cover Assembly Materials:

Cover: Copper UNS-C11000

Base: Brass UNS-C26000 or UNS-C26800

Springs: Nickel Alloy

Solder: Eutectic

Ordering Information: (Also refer to the current Viking price list.)

Viking Mirage® Standard and Quick Response Concealed Pendent Sprinklers and Cover Plate Assemblies must be ordered separately:

Sprinkler: Base Part No. VK462 - 13503A for Brass finish and 13503JN for ENT finish. VK463 - HP Base Part No. 13667A

Specify sprinkler temperature rating by adding the appropriate suffix for the temperature rating to the base part number:

Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E

For example, sprinkler VK463 with a 155 °F (68 °C) temperature rating = 13667AB.

Cover Plate Assembly: Base Part No. 13504 (2-3/4" diameter), Base Part No. 13642 (3-5/16" diameter), or Base Part No. 15394 (square cover plate, 3-5/16" diameter)

Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:

Finish Suffix: Polished Chrome = F, Brushed Chrome = F-/B, Bright Brass = B, Antique Brass = B-/A, Brushed Brass = B-/B, Brushed Copper = E-/B, Painted White = M-/W, Painted Ivory = M-/I, Painted Black = M-/B

Temperature Suffix: 135 °F (57 °C) UL (139 °F (59 °C) FM and LPCB) = A, 165 °F (74 °C) = C

For example, cover 13504 with a Polished Chrome finish and a 165 °F (74 °C) temperature rating = 13504FC.

Note: Square cover plate 15394 cULus Listing is for the 135 °F (57 °C) temperature rated cover plate only. Refer to the Approval Chart.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches**:

A. Heavy Duty Wrench Part No. 14047W/B (available since 2006), or

B. Head Cabinet Wrench Part No. 14031*** (available since 2006)

C. Optional Concealed Cover Plate Installer Tool Part No. 14412 for cover 13504, or Part No. 14867 for the large diameter cover (available since 2007)

Requires a 1/2" ratchet (not available from Viking). *Optional for removal of the protective cap. Ideal for sprinkler cabinets.

Sprinkler Cabinet: Part No. 01731A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand and the bulb to shatter, releasing the yoke, pip-cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinklers VK462 and VK463 are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Temperature Rating of Cover Assembly (Required)	Bulb Color
Ordinary	155 °F (68° C)	100 °F (38 °C)	135 °F (57 °C) cULus 139 °F (59 °C) FM and LPCB	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	165 °F (74 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	165 °F (74 °C)	Green

Cover Plate Finishes: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

Sprinkler Finishes: Brass and ENT

Corrosion Resistant Coatings³: ENT

Footnotes

¹ The sprinkler temperature rating is stamped on the sprinkler deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway, but the Belleville spring is exposed.

Approval Chart 1 (UL)

Mirage® Concealed Pendent Sprinklers VK462 and VK463

— Sprinkler Temperature Rating
— Cover Plate Temperature Rating
AW1 Cover Plate Finish KEY

Sprinkler Base Part No. ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Listings and Approvals ⁴ (Refer also to Design Criteria)					
		Inch	mm	U.S.	metric ²		cULus ⁵	NYC	VdS ⁷	LPCB	CE	CCC
Standard Response Applications												
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	--	--	AY1, CZ1	AY1, BZ1	AY1, CZ1 ⁸	AV1, CW1
Quick Response Applications												
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AV1, BX1	AV1, BW1 ⁶	--	--	--	--
13503JN ¹¹	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AV1, BX1	AV1, BW1 ⁶	--	--	--	--
13667A	VK463	1/2"	15	5.6	80.6	250 psi (17.2 bar) ³	AV1, BX1	AV1, BW1 ⁶	--	--	--	--
Sprinkler Temperature Ratings A - 155 °F (68 °C) B - 175 °F (79 °C) and 200 °F (93 °C) C - 200 °F (93 °C)			Cover Plate Assembly Temperature Ratings ⁹ V - 135 °F (57 °C) cULus Listed cover 13504 ¹ , 13642 ¹ (large diam- eter), or 15394 ¹ (square cover plate) W - 165 °F (74 °C) cover 13504 ¹ or 13642 ¹ (large diameter) X - 165 °F (74 °C) cover 13504 ¹ , or 13642 ¹ (large diameter) Y - 135 °F (57 °C) cover 13504 ¹ LPCB Approved as 139 °F (59 °C) Z - 165 °F (74 °C) cover 13504 ¹						Cover Plate Assembly Finishes ¹⁰ 1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black			

Footnotes

¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ The Water Working Pressure rating is stamped on the deflector.

⁴ This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

⁵ Listed by Underwriter's Laboratories for use in the U.S. and Canada.

⁶ Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 32.

⁷ VdS Approved, standards VdS 2344:2005-12, VdS 2100-25:2008-01, and EN 12259-1:1999 + A1:2001 + A2:2004 + A3:2006, Certificate G4080021.

⁸ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2032.

⁹ The 135/139 °F cover has an orange label. The 165 °F (74 °C) cover has a white label.

¹⁰ Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

¹¹ cULus Listed as corrosion resistant.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.



TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1)

cULus Listing Requirements:

Mirage® Concealed Pendent Sprinklers VK462 and VK463 are cULus Listed as quick response for installation in accordance with the latest edition of NFPA 13 for standard coverage pendent spray sprinklers as indicated below.

- For hazard occupancies up to and including Ordinary Hazard, Group II.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13. Maximum spacing allowed is 15 ft. (4.6 m).
- Minimum spacing allowed is 6 ft. (1.8 m) unless baffles are installed in accordance with NFPA 13.
- Minimum distance from walls is 4 in. (102 mm).
- Maximum distance from walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler obstruction rules contained in NFPA 13 for standard coverage pendent spray sprinklers must be followed.

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

VdS Approval Requirements:

- The sprinkler can be installed in a concrete ceiling (massive ceiling) or in a false ceiling made of light materials.
- This sprinkler is deflector fixed type and can be only activated by heat. The housing is not tight.
- Follow installation guidelines of current standards, CEA4001VdS and EN12845. These sprinklers can only be installed in LH and OH occupancies, except in OH4.

NOTES: Due to the design the sprinkler type 'Domed-CCP' shall not be installed in false ceilings in which the false ceiling space is protected by a water extinguishing system.

Due to the design the sprinkler type 'Domed-CCP' shall not be installed in false ceilings in which during a fire the pressure above the false ceiling may be assumed to be higher than the pressure below the false ceiling.

The criterion for the dropping of the cover relevant for this approval is heat.

Steps of installation:

1. Prepare the sprinkler key.
2. Remove the plastic cover.
3. Hold the sprinkler with the wrench and fasten it.
4. Replace the plastic cover and do not remove until the cover is installed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page SR1-3 or QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



Identification of Custom Paint Color:
All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint Color for Concealed Covers

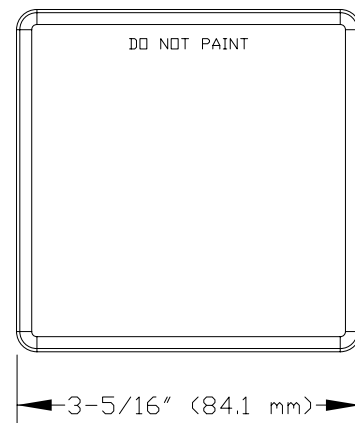


Figure 2: Square Cover Assembly 15394



TECHNICAL DATA

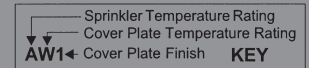
MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Mirage® Standard Response Concealed Pendent Sprinkler VK462



Sprinkler Base Part No. ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	FM Approvals ³ (Refer also to Design Criteria below.)
		Inch	mm	U.S.	metric ²		
13503A	VK462	1/2"	15	5.6	80.6	175 psi (12 bar)	AW1, BX1
Sprinkler Temperature Ratings A - 155 °F (68 °C) B - 175 °F (79 °C) and 200 °F (93 °C)		Cover Plate Assembly Temperature Ratings⁴ W - 139 °F (59 °C) cover 13504 ¹ , 13642 ¹ (large diameter), or 15394 ¹ (square cover plate) X - 165 °F (74 °C) cover 13504 ¹ , 13642 ¹ (large diameter), or 15394 ¹ (square cover plate)				Cover Plate Assembly Finishes⁵ 1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black	

Footnotes

¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This chart shows the FM Approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

⁴ The 139 °F (59 °C) cover has an orange label. The 165 °F (74 °C) cover has a white label.

⁵ Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Viking Concealed Pendent Sprinkler VK462 is FM Approved as a standard response **Non-Storage** concealed pendent sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page SR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

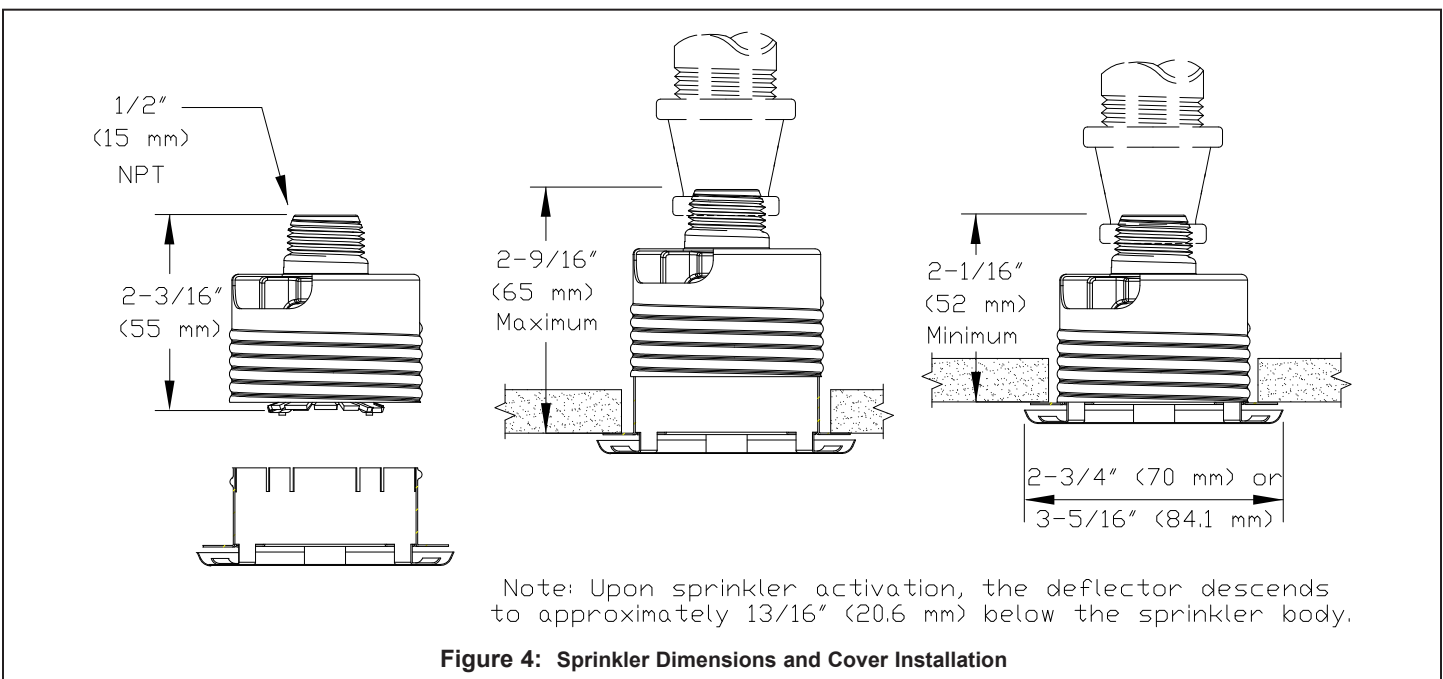
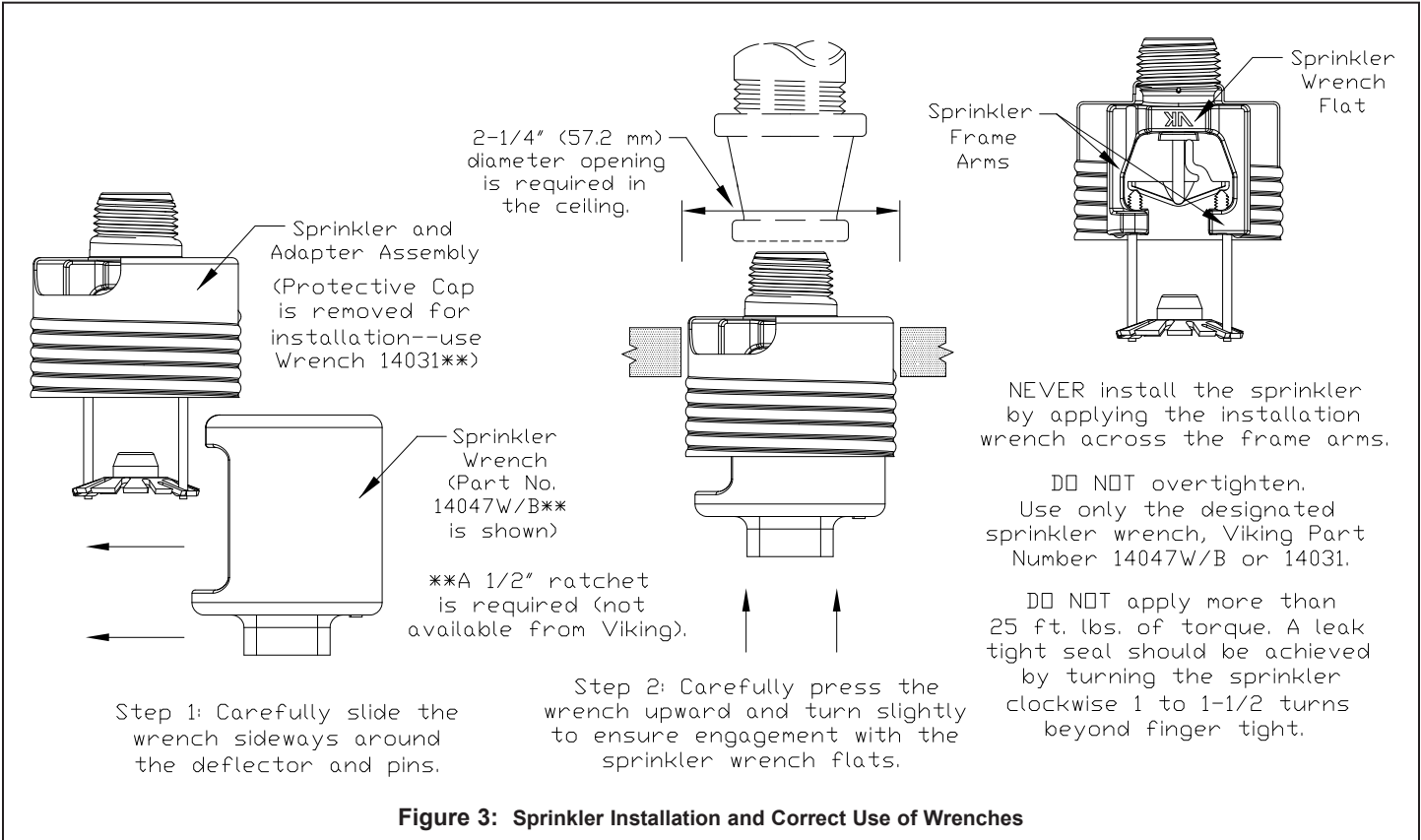


TECHNICAL DATA

MIRAGE® STANDARD AND QR CONCEALED PENDENT SPRINKLER VK462 AND HP SPRINKLER VK463 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



Spare Sprinkler Head Storage Cabinet

INSIST ON
F P P I®

211313 - Wet-Pipe Sprinkler System

449

Description

Fire Protection Products, Inc. Spare Sprinkler Head Cabinets are designed to allow for spare sprinkler head storage as required by NFPA guidelines. The Spare Sprinkler Head Cabinets are available in six configurations. Three head, six head, six head ESFR, twelve head, twenty-four head and thirty-six head. All six styles are manufactured with "knockouts" to accommodate the most common size sprinklers. The shelf is located to allow for the storage of a typical sprinkler head wrench. Each cabinet is finished with a red enamel finish. Each spare head cabinet comes with a hinged door which remains closed to protect the spare sprinklers from the elements and features two holes on the back panel to allow for attachment to most surfaces utilizing the appropriate fasteners. Not intended for exposed or harsh environments.



Installation

Select the correct Spare Sprinkler Head Cabinet in accordance with the Automatic Sprinkler Systems Handbook. As per the 1989 Edition the correct number of spare sprinkler is as follows:

0-300 sprinklers, not less than 6; 300-1000, not less than 12; 1000 or more, not less than 24. Stock of spare sprinklers shall include all types and ratings installed.*

Once the correct Spare Sprinkler Head Cabinet has been selected, installation is accomplished by inserting the correct fastener in each of the two holes inside the cabinet, securing the cabinet securely to the wall. The insert the correct number and type of sprinklers in accordance with the "handbook".

**Final determination is subject to approval by the AHJ.*

Specifications

Material:

Painted Plain Steel

Finish:

Red enamel

Styles:

3 Spare sprinklers, ½ or ¾
6 Spare sprinklers, ½ or ¾
6 Spare, ESFR, ½, ¾ or 1"
12 Spare sprinklers ½ or ¾
24 Spare sprinklers
36 Spare sprinklers



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Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500

Sprinkler Cabinets
3, 6, & 12 Sprinklers, 1/2 or 3/4 Inch NPT
6 ESFR Sprinklers, 3/4 or 1 Inch NPT

**General
Description**

Tyco® Sprinkler Cabinets are constructed of metal enclosures with hinged covers designed to provide on-site storage of an emergency supply of sprinklers and a sprinkler wrench.

NFPA 13 requires a representative number of each type of sprinkler used in a sprinkler system to be stored in a cabinet on-site to allow for immediate removal and replacement of sprinklers that may have operated or become damaged.

Sprinkler Cabinets are manufactured of heavy gauge steel with knock-outs to accommodate NPT threaded sprinklers and are painted an attractive red enamel.



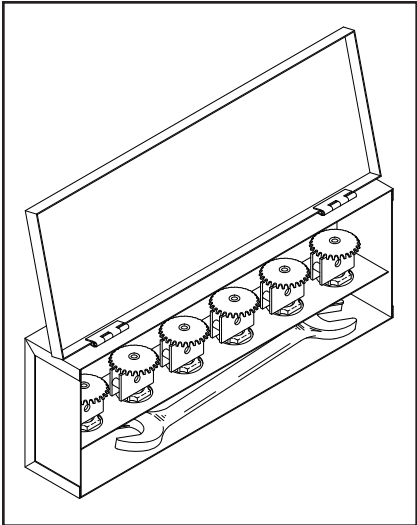
WARNINGS

*The Sprinkler Cabinets described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. **Failure to do so may impair the performance of these devices.***

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

**Technical
Data**

Material	
Carbon Steel	
Weights	
3 Sprinkler Cabinet	1.5 Lbs. (0,68 kg)
6 Sprinkler Cabinet	2.3 Lbs. (1,04 kg)
12 Sprinkler Cabinet	4.0 Lbs. (1,81 kg)
6 ESFR Sprinkler Cabinet	3.3 Lbs. (1,36 kg)





TECHNICAL DATA

SPRINKLER ESCUTCHEONS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking sprinkler escutcheons are ornamental plates used with 3/8" NPT (10 mm BSP)*, 1/2" NPT (15 mm BSP)*, and 3/4" NPT (20 mm BSP)* frame-style pendent and sidewall* sprinklers. The escutcheons are installed between the sprinklers and the ceiling or wall for a pleasing appearance. They are available with several finish options to meet design requirements.

Viking recessed and adjustable escutcheons provide a low-profile decorative recessed sprinkler installation. The E-1 Recessed Escutcheon may be recessed up to 5/8" (16 mm). The Model G-1 Recessed Escutcheon allows horizontal sidewall sprinklers to be recessed up to 1/2" (12.7 mm). The Model F-1 Adjustable Escutcheon has 1/2" (12.7 mm) total adjustment available.

The two-piece design of Viking's recessed and adjustable escutcheons allows installation and testing of the sprinklers prior to installing the ceiling or wall. Viking's Model E-1, F-1, and G-1 Escutcheons feature a slip-on design, while the Model E-2 and E-3 escutcheons are threaded (outer cup threads onto the adapter).

The Viking adjustable and recessed escutcheons are made to allow for minor adjustments due to pipe or ceiling pitch. These escutcheons can be removed and reinstalled, allowing access above removable ceiling panels for servicing building equipment without shutting down the sprinkler system and removing the sprinkler.

Viking standard 1/8" (3 mm) style flat and 1" (25 mm) style raised surface-mounted escutcheons have a one-piece design.

***Refer to the specific sprinkler technical data page for the escutcheon(s) listed and approved for use with the sprinkler.**



2. LISTINGS AND APPROVALS

Refer to the specific sprinkler technical data pages for sprinkler listings and approvals. Sprinklers must be specifically listed and/or approved for recessed installation. When using Viking Model E-1, E-2, E-3, F-1, and G-1 escutcheons for recessed applications, refer to technical data describing the sprinkler model to be used to verify whether the sprinkler is listed and/or approved for recessed installations. **NOTE:** Viking's thread-on style Model E-2 and E-3 Recessed Escutcheons carry the same listings and approvals as the slip-on style Model E-1 Recessed Escutcheons. **Model E-3 Recessed Escutcheon also meets IBC-ASCE/SEI 7 Codes for Seismic Areas C, D, and E.**

3. TECHNICAL DATA

Specifications:

A. Slip-on Style Model E-1 Recessed Escutcheons

Depth of Outer Cup: 1-1/16" (26.9 mm)
 Outside Diameter of Outer Cup: 3-1/16" (77.7 mm)
 Depth of Center Adapter Ring: 11/32" (8.7 mm) +/- 1/32" (0.8 mm)
 Adjustment Range: Flush to 5/8" (16 mm) recessed
NOTE: Escutcheon adapter is stamped "Viking Model E-1".
 Available since 1987.

B. Threaded Style Model E-2 Recessed Escutcheons

Depth of Outer Cup: 13/16" (20.6 mm)
 Outside Diameter of Outer Cup: 3-1/8" (79.4 mm)
 Depth of Center Adapter Ring: 21/32" (16.6 mm)
 Adjustment Range: 27/32" (21.4 mm) total adjustment with 1/2" (12.7 mm) maximum recess available. **Note:** Face of escutcheon adapter may extend up to 11/32" (8.7 mm) beyond edge of escutcheon cup.
 Available since 2000.

Viking Technical Data may be found on
 The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
 The Web site may include a more recent
 edition of this Technical Data Page.



TECHNICAL DATA

SPRINKLER ESCUTCHEONS

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C. Threaded Style Model E-3 Recessed Escutcheons

Depth of Outer Cup: 13/16" (20.6 mm)

Outside Diameter of Outer Cup: 5-1/8" (130.2 mm). (See Figure 4)

Depth of Center Adapter Ring: 21/32" (16.6 mm)

Adjustment Range: 27/32" (21.4 mm) total adjustment with 1/2" (12.7 mm) maximum recess available. **Note:** Face of escutcheon adapter may extend up to 11/32" (8.7 mm) beyond edge of escutcheon cup.

Available since 2012.

D. Model F-1 Adjustable Escutcheons

Depth of Outer Cup: 1-1/16" (26.9 mm)

Outside Diameter of Outer Cup: 3-1/16" (77.7 mm)

Depth of Center Adapter Ring: 23/32" (18.3 mm)

Adjustment Range: 1/2" (12.7 mm) total adjustment with 1/4" (6.4 mm) maximum recess available. **Note:** The face of escutcheon adapter may extend up to 1/4" (6.4 mm) beyond the edge of the escutcheon cup.

NOTE: Escutcheon adapter is stamped "Viking Model F-1".

Available since 1988.

E. Slip-on Style Model G-1 Recessed Escutcheons (US Patent No. 8,376,060)

Depth of Outer Cup: 1-1/16" (26.9 mm)

Outside Diameter of Outer Cup: 4" (101.6 mm)

Depth of Center Adapter Ring: 1-7/16" (36.5 mm)

Adjustment Range: Up to 5/8" (16 mm) total adjustment available for use with ceilings sloped up to 8/12 (33.7°). May be recessed up to 1/2" (12.7 mm), depending on degree of slope. **Note:** The face of escutcheon adapter may extend up to 1/2" (12.7 mm) beyond the edge of the escutcheon cup.

NOTE: Escutcheon adapter is stamped "Viking Model G-1".

Available since 2007.

F. Expansion Plate (optional)

1. Base Part No. 12620 for use with Model E-1, E-2, and F-1 Escutcheons. May also be used with dry recessed sprinklers, dry standard adjustable sprinklers, and flat plate concealed sprinklers.

Outside Diameter: 5" (127 mm)

Inside Diameter: 2-3/16" (55.5 mm)

Available since 2005.

2. Base Part No. 13128 for use with Domed Concealed Sprinklers.

Outside Diameter: 5" (127 mm)

Inside Diameter: 2-15/32" (62.7 mm) for Part No. 13128.

Available since 2005.

3. Base Part No. 16340 for use with Concealed Sprinkler VK636.

Outside Diameter: 5-5/16" (135 mm)

Inside Diameter: 2-3/8" (60.6 mm)

Available since 2010.

G. Standard Flat and Raised Surface-Mounted Escutcheons

Depth of Escutcheons: Flat: 1/8" (3.2 mm), Raised: 1" (25 mm)

Available since 1972.

Material Standards:

A. Slip-on Style Model E-1 Recessed Escutcheons:

Cold Rolled Steel UNS-G10080 or Stainless Steel UNS-S30400

B. Threaded Style Model E-2 and E-3 Recessed Escutcheons:

Escutcheons:

24 ga. (0.61 mm) thick 1010-1018 mild steel

C. Model G-1 Recessed Escutcheons and Model F-1 Adjustable Escutcheons:

Cold Rolled Steel UNS-G10080

D. Expansion Plate (optional):

Cold Rolled Steel UNS-G10080

E. Standard Flat and Raised Surface-Mounted Escutcheons:

Flat Style Part Numbers 01960A, 01015A, 02960A, and 05464A:

Cold Rolled Steel UNS-G10080.

Flat Style Part Numbers 09488, 07526, and 09596*: Stainless Steel

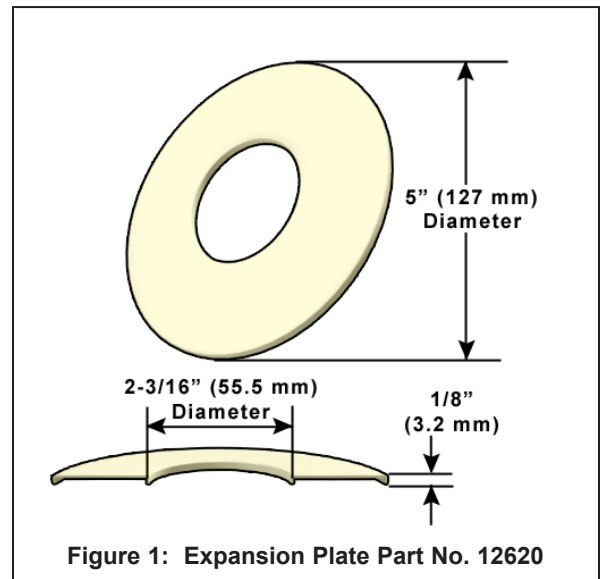


Figure 1: Expansion Plate Part No. 12620



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UNS-S43000

* These may also be special ordered and manufactured from Brass (non-magnetic material). Contact the manufacturer for more information.

Raised Style Part Numbers 01961B and 01016A: Brass UNS-C26000 or UNS-C26800.

Ordering Information: (Also refer to the current Viking price list.)

Viking recessed and adjustable escutcheons are available as escutcheon packages (includes outer cup and adapter). Escutcheon cups are also available to order separately as individual pieces for Model E-1, E-2, E3, or F-1 Escutcheons (refer to Table 1 on page 5. Order Viking escutcheons by adding the appropriate suffix for the finish to the base part number.

A. Model F-1 Adjustable and Model E-1, E-2, E-3, and G-1 Recessed Escutcheons:

1. To order as an escutcheon package (includes outer cup and adapter), specify the appropriate package part number from Table 1.
2. To order individual outer cup separately for Model E-1, E-2, E-3, or F-1 Escutcheons, specify the appropriate part number for the individual piece from Table 1.

B. Standard Flat and Raised Surface-Mounted Escutcheons: Specify the flat or raised escutcheon part number from Table 1.

Finish Suffix: Bright Brass = B, Polished Chrome = F, White Polyester = M-/W, and Black Polyester = M-/B.

For example, the Model E-1 Recessed Escutcheon for 1/2" NPT sprinkler, Brass finish = Part No. 06419AB. The 1/2" Model E-1 Recessed Escutcheon is also available in Antique Brass, Brushed Copper, Brushed Chrome, and Brushed Brass as standard finishes.

NOTE: Sprinklers are not included and must be ordered separately.

4. INSTALLATION

A. If the proposed installation of Model E-1, E-2, E-3, F-1, or G-1 Escutcheons requires recessing any of the heat-sensitive operating element, some Authorities Having Jurisdiction may limit the use, depending on the occupancy classification. Refer to the Authority Having Jurisdiction prior to installation. The use of quick response sprinklers may also be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

B. All escutcheon styles are made to thread onto the sprinkler head prior to installing the sprinkler into the fitting. The escutcheon must be attached to the sprinkler prior to applying pipe-joint compound or PTFE tape to the sprinkler threads. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape.

C. Refer to the appropriate sprinkler technical data page for additional warnings and installation instructions and then install the escutcheons according to the following sequence.

D. Model F-1 Adjustable and Model E-1, E-2, E-3, and G-1 Recessed Escutcheons:

(Refer to Figures 2-5.)

Step 1: Install all piping and cut the sprinkler nipple so that the reducing coupling is at the desired location and centered in a minimum 2-5/16" (59 mm) to a maximum 2-1/2" (64 mm) diameter opening in the ceiling or wall for Model E-1, E-2, or F-1 Escutcheons, 2-5/16" (59 mm) to 4-1/2" (115mm) for Model E-3, or 2-5/8" (66 mm) to 3-3/4" (95 mm) for Model G-1 Escutcheons.

Step 2: Secure the escutcheon adapter onto the sprinkler by hand turning the adapter clockwise onto the sprinkler threads. The face of the adapter should rest on the shoulder of the sprinkler wrench boss.

Step 3: Apply a small amount of pipe-joint compound or PTFE tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape.

Step 4: Install the sprinkler into the coupling using the special recessed sprinkler wrench only, taking care not to over-tighten or damage the sprinkler operating parts. DO NOT use the escutcheon, sprinkler deflector, or fusible element to start or thread the sprinkler into a fitting.

Step 5: Test the system as required and repair all leaks. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or PTFE tape applied, and then reinstalled. This is due to the fact that when the joint seal leaks, the sealing compound or tape is washed out of the joint.

Step 6: **Remove plastic protective sprinkler caps and bulb shields AFTER the wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.** To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS AND BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap in the spare sprinkler cabinet.

Step 7: After installing the ceiling or wall with the required opening size, press on or thread on (depends on the style of escutcheon used) the outer escutcheon cup until the flanges touch the surface of the ceiling or wall.



TECHNICAL DATA

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(NOTE: If the optional escutcheon expansion plate is used, first slide it onto the escutcheon cup. The flange on the expansion plate should touch the surface of the ceiling or wall.)

With the slip-on style Model E-1 Recessed Escutcheon, the maximum adapter recess is 5/8" (16 mm).

With the threaded style Model E-2 and E-3 Recessed Escutcheons, the maximum recess is 1/2" (12.7 mm). **Note:** The face of the escutcheon adapter may extend up to 11/32" (8.7 mm) beyond edge of escutcheon cup, resulting in 27/32" (21.4 mm) total adjustment range.

With the Model F-1 Adjustable Escutcheon, the maximum recess is 1/4" (6.4 mm). **Note:** The face of the escutcheon adapter may extend up to 1/4" (6.4 mm) beyond the edge of the escutcheon cup, resulting in 1/2" (12.7 mm) total adjustment range.

With the slip-on style Model G-1 Recessed Escutcheon, the maximum adapter recess is 1/2" (12.7 mm).

DO NOT modify the unit. If necessary, re-cut the sprinkler drop nipple as required.

E. Standard Flat and Raised Surface-Mounted Escutcheons:

Step 1: Install all piping and cut the sprinkler nipple so that the reducing coupling is at the desired location and centered in a maximum 2-1/2" (64 mm) diameter opening in the ceiling or wall.

Step 2: Secure the escutcheon onto the sprinkler by hand turning the escutcheon clockwise onto the sprinkler threads. (The convex surface of the escutcheon must face toward the deflector of the sprinkler.)

Step 3: Apply a small amount of pipe-joint compound or PTFE tape to the external threads of the sprinkler only, taking care not to allow a build-up of compound in the sprinkler inlet. **NOTE:** Sprinklers with protective caps or bulb shields must be contained within the caps or shields before applying pipe-joint compound or tape.

Step 4: Install the sprinkler into the coupling using the special sprinkler wrench only, taking care not to over-tighten or damage the sprinkler operating parts. DO NOT use the escutcheon, sprinkler deflector, or fusible element to start or thread the sprinkler into a fitting.

Step 5: After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the installation standards. Make sure the sprinkler is properly tightened. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal leaks, the sealing compound or tape is washed out of the joint.

Step 6: **Remove plastic protective sprinkler caps and bulb shields AFTER the wall or ceiling finish work is completed where the sprinkler is installed and there no longer is a potential for mechanical damage to the sprinkler operating elements.** To remove the bulb shields, simply pull the ends of the shields apart where they are snapped together. To remove caps from frame style sprinklers, turn the caps slightly and pull them off the sprinklers. **SPRINKLER CAPS AND BULB SHIELDS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE!** Retain a protective cap in the spare sprinkler cabinet.

DO NOT modify the unit. If necessary, re-cut the sprinkler drop nipple as required.

F. Disassembly:

The outer cups of Viking adjustable and recessed escutcheons can be removed and reinstalled without removing the sprinklers to allow access above the ceiling or to replace it, if necessary.

1. For slip-on style Model E-1 or G-1 Recessed Escutcheons and Model F-1 Adjustable Escutcheons, remove the outer cup simply by pulling it outward and away from the wall or ceiling.
2. To remove the outer cup of the threaded style Model E-2 and E-3 Recessed Escutcheons, turn it counterclockwise to unthread it from the adapter.

If it is necessary to remove the entire unit, the system must be removed from service. Refer to maintenance instructions on the appropriate sprinkler technical data page and follow all warnings and instructions.

5. OPERATION

Refer to the sprinkler technical data page for the sprinkler model used.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinklers and escutcheons are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

SPRINKLER ESCUTCHEONS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Base Part Number	Material	Style	Sprinkler Thread Size	Available Finishes	Outside Diameter
Standard Flat and Raised Surface-Mounted Escutcheons					
01960A	Steel	Flat	1/2" (15 mm)	B, F	3-5/16" (84.1 mm)
09488	Stainless Steel††	Flat	1/2" (15 mm)	F, JN	3-5/16" (84.1 mm)
01015A	Steel	Flat	3/4" (20 mm)	F	3-5/16" (84.1 mm)
02960A	Steel	Flat	1/2" (15 mm)	B, F, M/W, M/B	2-3/4" (69.9 mm)
07526	Stainless Steel††	Flat	1/2" (15 mm)	F, M/W, JN	2-3/4" (69.9 mm)
05464A	Steel	Flat	3/4" (20 mm)	B, F, M/W	2-3/4" (69.9 mm)
09596	Stainless Steel††	Flat	3/4" (20 mm)	F, JN	2-3/4" (69.9 mm)
01961B	Brass	Raised	1/2" (15 mm)	F	3-1/16" (77.7 mm)
01016A	Brass	Raised	3/4" (20 mm)	F	3-1/16" (77.7 mm)
E-1 Slip-on Style Recessed Escutcheon Packages (includes adapter and outer cup)					
11123	Steel	Recessed Slip-on	3/8" (10 mm)	F, M/W	3-1/16" (77.7 mm)
06419A	Steel	Recessed Slip-on	1/2" (15 mm)	B, F, M/W, M/B	3-1/16" (77.7 mm)
07902	Stainless Steel	Recessed Slip-on	1/2" (15 mm)	F, M/W, JN	3-1/16" (77.7 mm)
13220	Stainless Steel	Recessed Slip-on	3/4" (20 mm)	F, M/W, JN	3-1/16" (77.7 mm)
06420A	Steel	Recessed Slip-on	3/4" (20 mm)	B, F, M/W, M/B	3-1/16" (77.7 mm)
E-2 Threaded Style Recessed Escutcheon Packages (includes adapter and outer cup)					
11038	Steel	Recessed Threaded	1/2" (15 mm)	F, M/W	3-1/8" (79.4 mm)
11625	Steel	Recessed Threaded	3/4" (20 mm)	F, M/W	3-1/8" (79.4 mm)
E-3 Threaded Style Recessed Escutcheon Packages (includes adapter and outer cup)					
18347	Steel	Recessed Threaded	1/2" (15 mm)	F, M/W	5 -1/8" (130.2mm)
18348	Steel	Recessed Threaded	3/4" (20 mm)	F, M/W	5 -1/8" (130.2mm)
F-1 Adjustable Escutcheon Packages (includes adapter and outer cup)					
06911A	Steel	Adjustable	1/2" (15 mm)	B, F, M/W, M/B	3-1/16" (77.7 mm)
06912A	Steel	Adjustable	3/4" (20 mm)	B, F, M/W, M/B	3-1/16" (77.7 mm)
G-1 Recessed Escutcheon Package (includes adapter and outer cup)					
14315	Steel	Recessed Slip-on	1/2" (15 mm)	B, F, M/W, M/B	4" (101.6 mm)
14955	Steel	Recessed Slip-on	3/4" (20 mm)	B, F, M/W, M/B	4" (101.6 mm)
Optional Expansion Plates Available Separately					
12620	Steel	E-1, E-2 Recessed & F-1 Adjustable	3/8", 1/2", & 3/4" (10, 15, & 20 mm)	B, F, M/W, M/B, M/SW1641, B/B, F/B, E/B	5" (127 mm)
13128	Steel	Domed Concealed	1/2" & 3/4" (15 & 20 mm)	F, M/W	5" (127 mm)
16340	Steel	Concealed (for Sprinkler VK636)	3/4" (20 mm)	F, M/W	5-5/16" (135 mm)

Escutcheon Finishes: B = Bright Brass, F = Polished Chrome, M/W = White Polyester, M/B = Black Polyester, JN = Electroless Nickel PTFE, M/ SW1641 = Navajo White Paint, B/A = Antique Brass, B/B = Brushed Brass, F/B = Brushed Chrome, E/B = Brushed Copper. **Note:** Other colors are available on request with the same listings and approvals as the standard colors. See Sherwin-Williams® Color Answers™ Interior Color Selection color chart.

††Escutcheons 09488, 07526, and 09596 may also be special ordered and manufactured from Brass (non-magnetic material). Contact the manufacturer for more details.

Table 1



TECHNICAL DATA

SPRINKLER ESCUTCHEONS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

IMPORTANT NOTES

Per the current edition of NFPA 13: "Escutcheons used with recessed, flush-type, or concealed sprinklers shall be part of a listed sprinkler assembly." The Viking Corporation will not authorize the sale of unlisted recessed sprinkler assemblies nor assume any liability involving recessed sprinkler assemblies that are not considered cULus Listed, FM Approved, or in full compliance with NFPA requirements".

Listings and approvals vary, depending on the sprinkler model, temperature rating, finish, and occupancy classification.

⚠ WARNING Viking products are manufactured and tested to meet the rigid requirements of the approving agency. The sprinklers are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to the sprinkler after it leaves the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinkler inoperative and will nullify the approval and any guarantee made by The Viking Corporation.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to the appropriate sprinkler data page. Viking sprinklers are designed to be installed in accordance with the latest edition of Viking technical data, the latest standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards whenever applicable. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

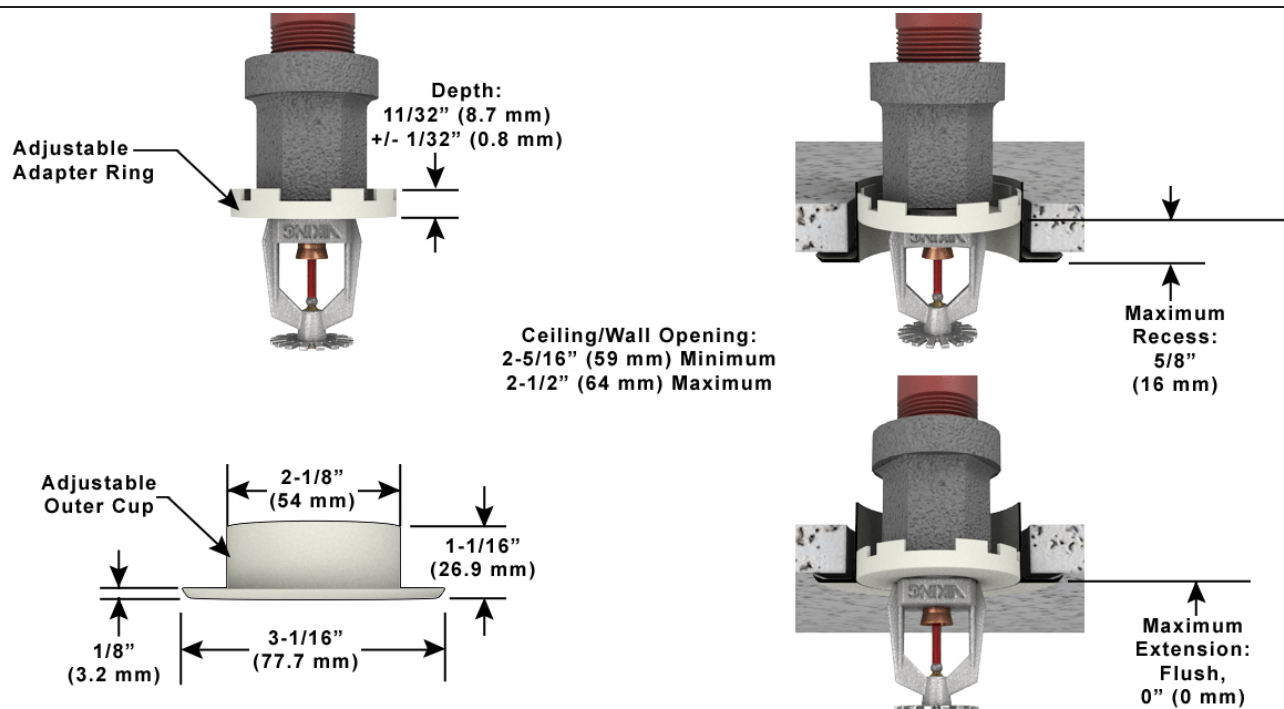


Figure 2: Installation of a Slip-on Style Model E-1 Recessed Escutcheon with $5/8''$ (16 mm) Maximum Recess.



TECHNICAL DATA

SPRINKLER ESCUTCHEONS

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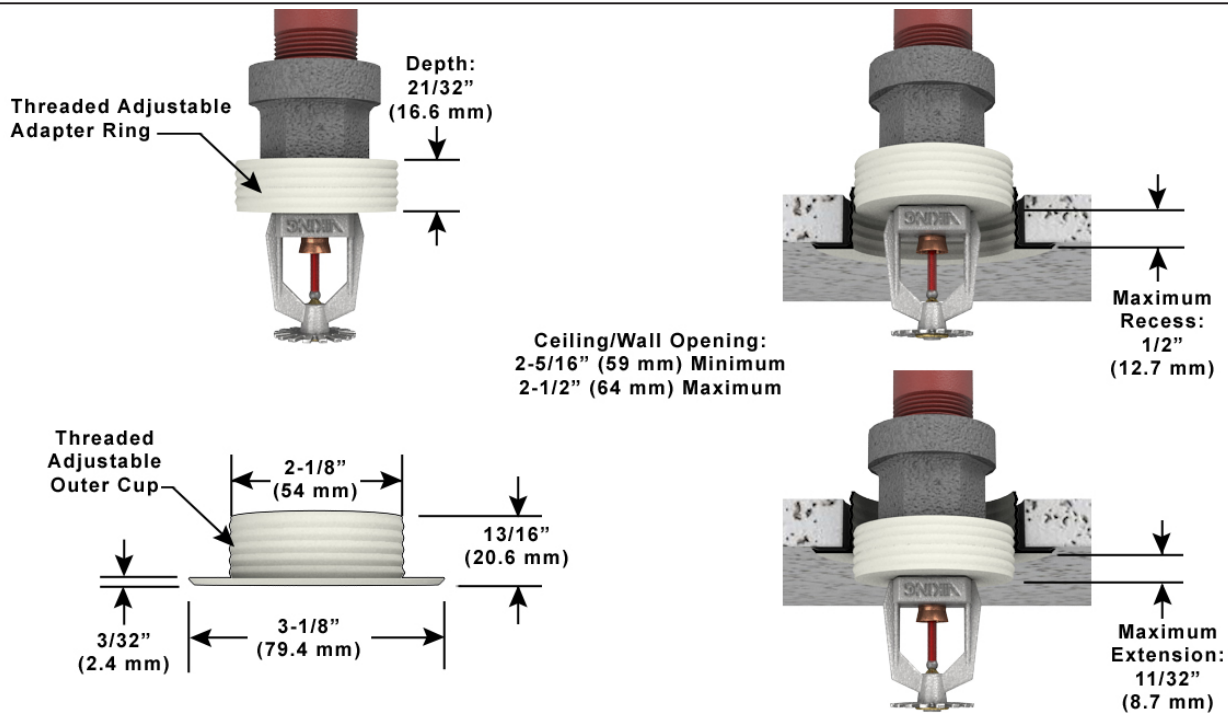


Figure 3: Installation of a Thread-on Style Model E-2 Recessed Escutcheon with 27/32" (21 mm) Total Adjustment.

Model E-3 Recessed Escutcheon meets IBC-ASCE/SEI 7 Codes for Seismic Areas C, D, and E

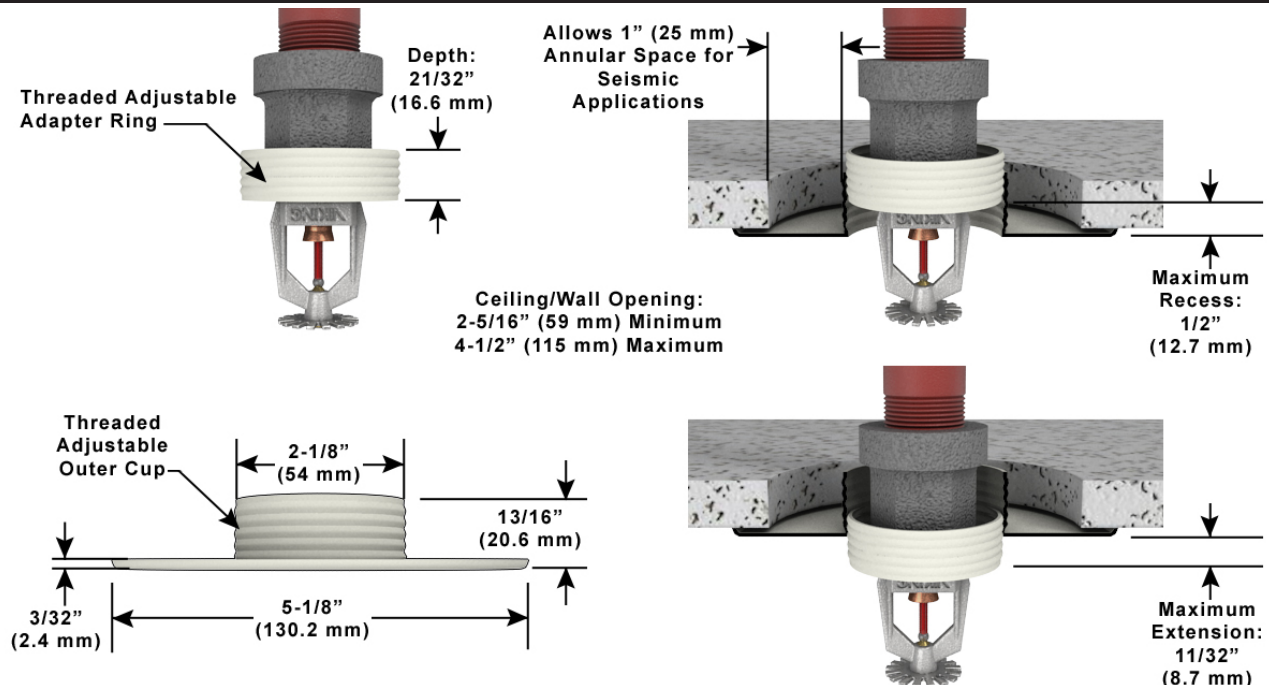


Figure 4: Installation of a Thread-on Style Model E-3 Recessed Escutcheon with 27/32" (21 mm) Total Adjustment.



TECHNICAL DATA

SPRINKLER ESCUTCHEONS

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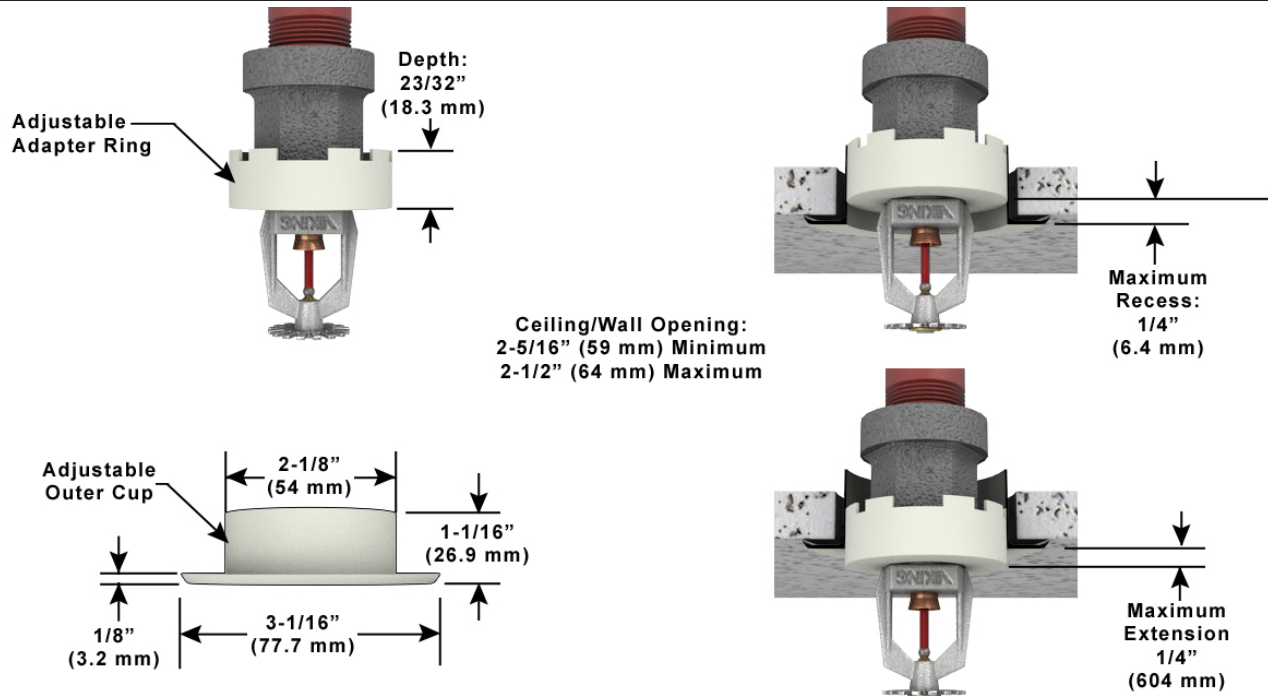


Figure 5: Installation of a Model F-1 Adjustable Escutcheon with $1/2$ " (12 mm) Total Adjustment.

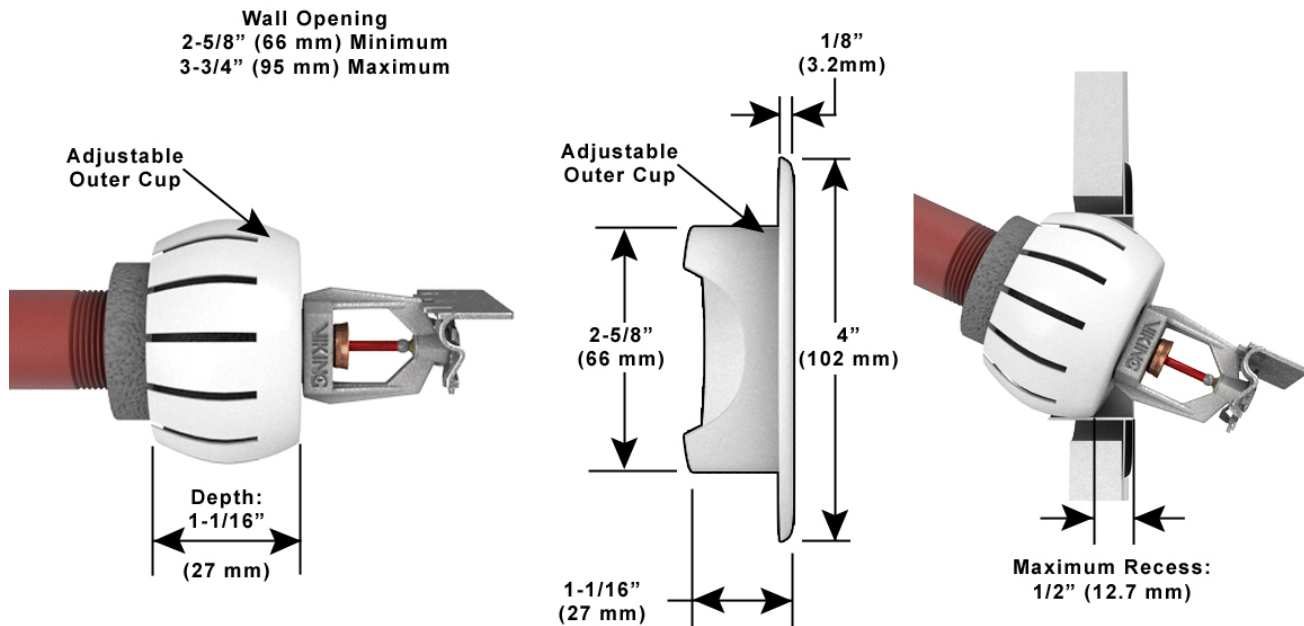


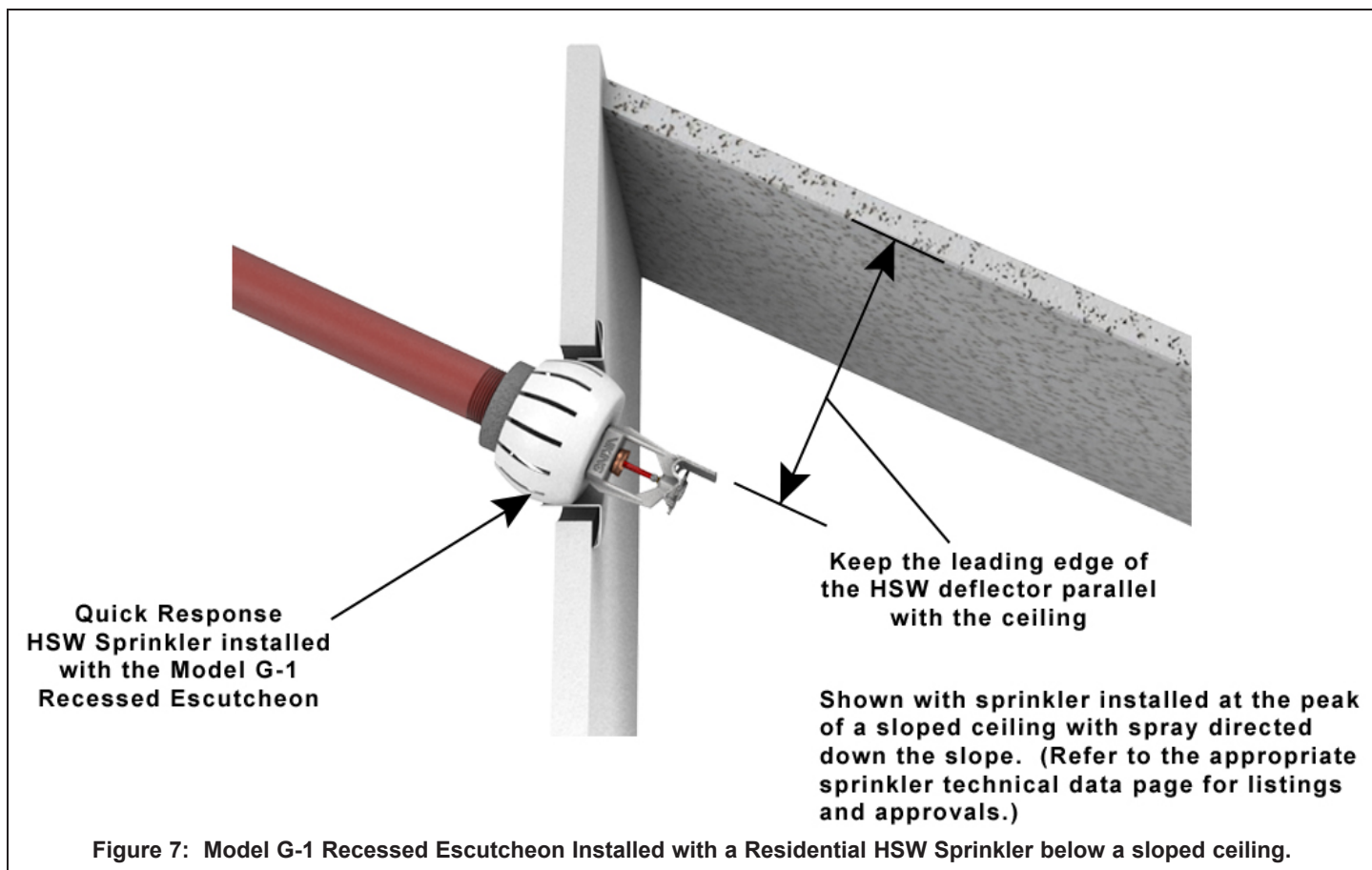
Figure 6: Installation of the Model G-1 Recessed Escutcheon with up to $1/2$ " (12.7 mm) Adjustment.



TECHNICAL DATA

SPRINKLER ESCUTCHEONS

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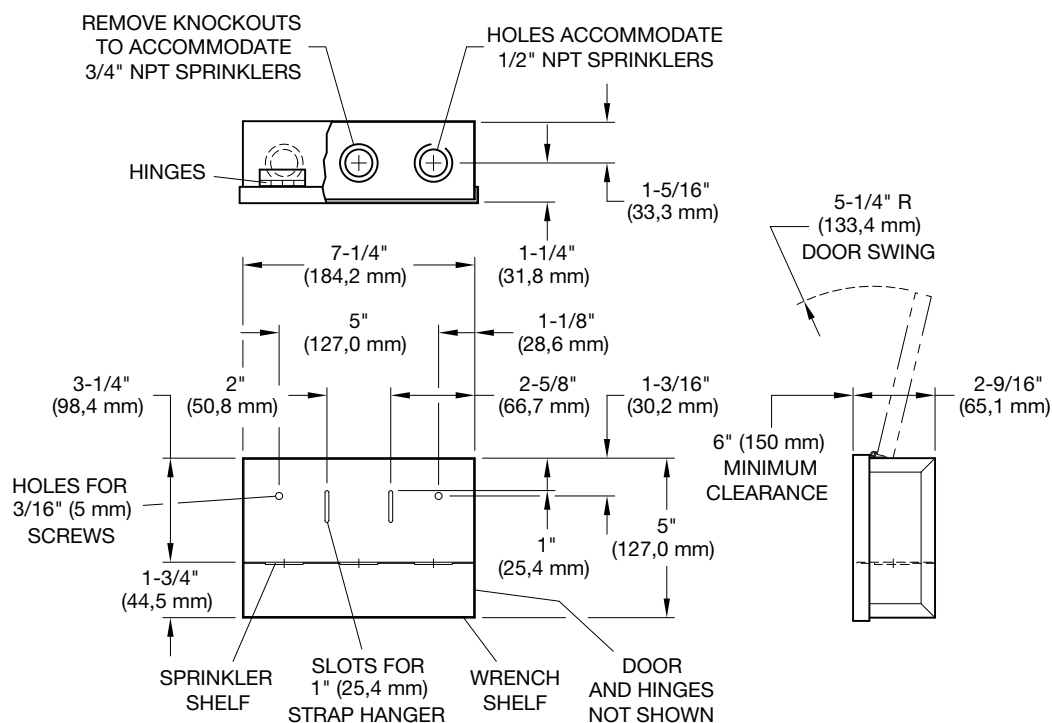


FIGURE 1
3 SPRINKLER CABINET

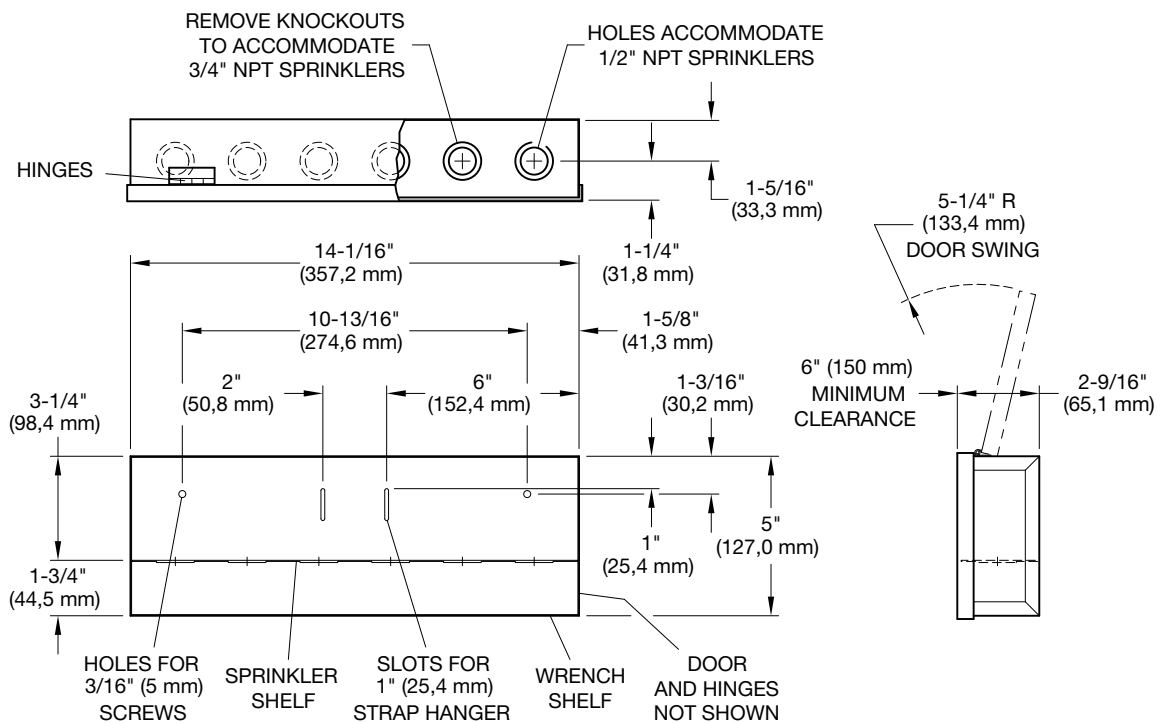


FIGURE 2
6 SPRINKLER CABINET

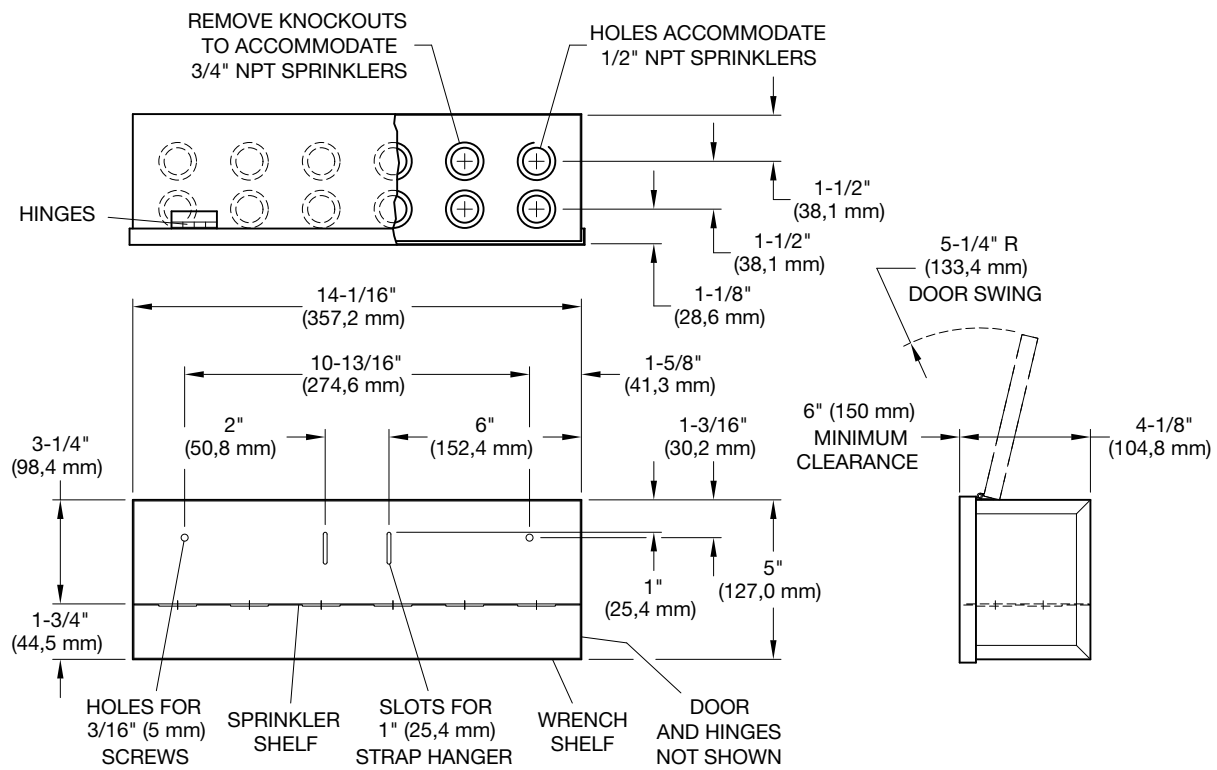


FIGURE 3
12 SPRINKLER CABINET

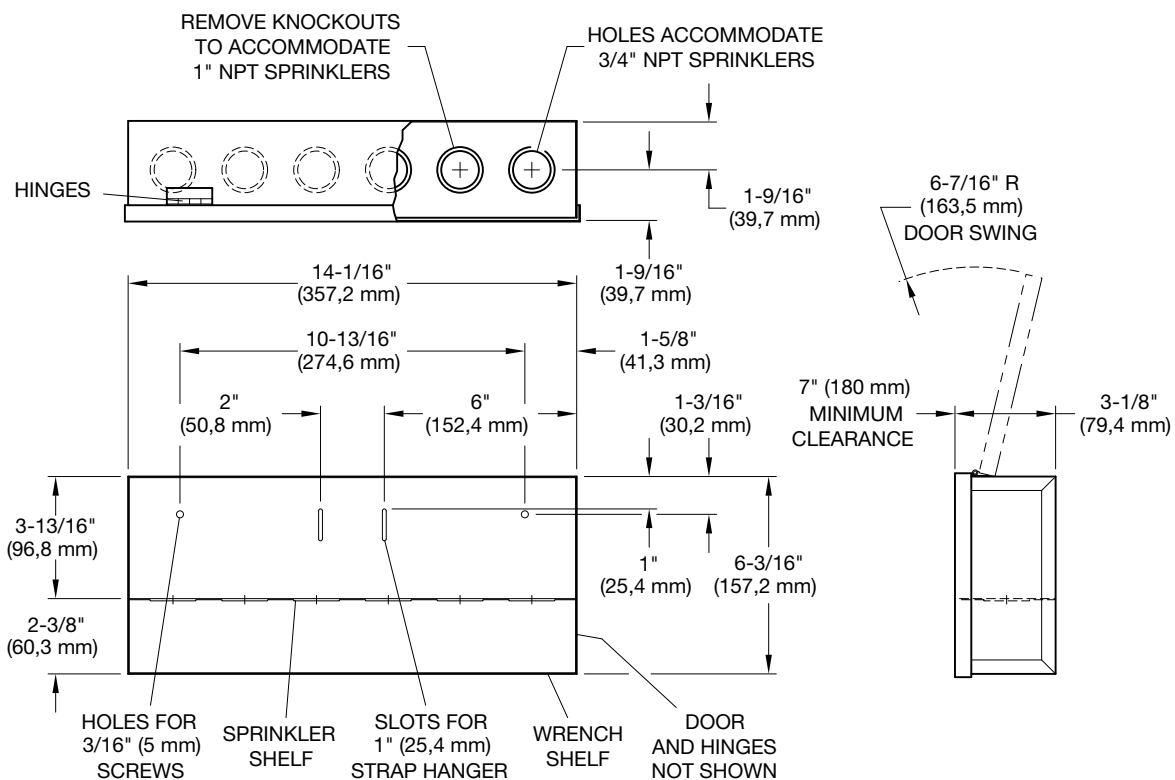


FIGURE 4
6 ESFR SPRINKLER CABINET

Installation

Sprinkler Cabinets are designed with two 3/16 Inch (4,7 mm) diameter holes for wall mounting or direct attachment to the system riser with a strap-type hanger. The Sprinkler Cabinet should be installed at or near the system control valve and must be stocked with an adequate supply of spare sprinklers and a sprinkler wrench.

The stock of spare sprinklers should include sprinklers of each type and temperature rating as are installed in the sprinkler system, in the following quantities:

Sprinklers In System	Spare Sprinklers Required
Under 300	6
300-1000	12
Over 1000	24

The 3, 6, and 12 Sprinkler Cabinets are designed to accept both 1/2 & 3/4 Inch NPT threaded sprinklers, whereas the 6 ESFR Sprinkler Cabinets are designed to accept both 3/4 & 1 Inch NPT threaded sprinklers. As necessary, insert a screwdriver blade from the front top of the shelf and under the near bottom part of the knockout annular ring. Press the screwdriver handle down to remove the knockout ring.

Care and Maintenance

The Sprinkler Cabinet, wrench, and stock of spare sprinklers should be inspected at least quarterly. The following items should be checked:

- The Sprinkler Cabinet should be readily accessible, and not exposed to a corrosive atmosphere or temperatures in excess of 100°F (38°C).
- The stock of spare sprinklers should include an adequate number of each type and temperature rating.
- The stock of sprinklers must be in good condition.
- A sprinkler wrench of the appropriate type must be included in the Sprinkler Cabinet.

Limited Warranty

Products manufactured by Tyco Fire & Building Products (TFBP) are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFBP or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

In no event shall TFBP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, indirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFBP was informed about the possibility of such damages, and in no event shall TFBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

When placing an order, indicate the full product name. Contact your local distributor for availability.

Sprinkler Cabinet:
Specify: (Description), P/N (specify).

3 Sprinkler Cabinet	P/N 1177
6 Sprinkler Cabinet	P/N 1119
12 Sprinkler Cabinet	P/N 1124
6 ESFR Sprinkler Cabinet	P/N 1111



TECHNICAL DATA

SPRINKLER GUARDS

453

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

The Viking Sprinkler Guard is a hard-wire cage designed to encase the sprinkler and protect it from mechanical damage. It is recommended for areas where the sprinkler is installed at a low elevation and/or near areas of high human or mechanical activity.

The Model D-1 Sprinkler Guard is for use with Viking standard and large orifice, standard and quick response upright and pendent frame style sprinklers.

The Dry Pendent Sprinkler Guard is for use with Viking standard and large orifice, standard and quick response dry upright, dry vertical sidewall, and dry pendent sprinklers.

2. LISTINGS AND APPROVALS

A. Model D-1 Sprinkler Guard:



cULus Listed: Category VFJV

FM Approved: Class 2091

cULus Listed and/or FM Approved for use with standard and large orifice, standard and quick response upright and pendent frame style sprinklers, including the following: VK001, VK003, VK100, VK102, VK108, VK110, VK122, VK124, VK130, VK132, VK200, VK202, VK204, VK206, VK300, VK301, VK302, VK303, VK350, VK352, VK377, and VK536.

B. Dry Sprinkler Guard: No Listings or Approvals

3. TECHNICAL DATA

Specifications:

A. Model D-1 Sprinkler Guard

Dimensions: 3-1/8" (79 mm) diameter,
3-1/8" (79 mm) high.

B. Dry Sprinkler Guard:

Dimensions: 2" (51 mm) diameter,
2-1/8" (54 mm) high.

Material Standards:

A. Model D-1 Sprinkler Guard:

Guard: Bright Basic Steel UNS-G10100

Guard Finish: Clear Chromate over Zinc Plating

Screws: Two Self-Tapping 6-32 x 1/2" (Combination Head): Steel

Screw Finish: Zinc Plated

Stainless Steel Model D-1 Sprinkler Guard:

Guard: T302/T304 Electro-Polished Stainless Steel

Screws: Two 6-32 x 1/2" (Combination Head): Stainless Steel UNS-S41000

B. Dry Sprinkler Guard:

Guard and Ring: Bright Basic Steel UNS-G10100

Finish: Clear Chromate over Zinc Plating

Ordering Information: (Also refer to the current Viking price list.)

A. Model D-1 Sprinkler Guard:

The Model D-1 Sprinkler Guard may be ordered separately or factory installed on Viking upright and pendent standard or large orifice, standard or quick response frame style sprinklers.

NOTICE

The Model D-1 Sprinkler Guard is NOT designed to be used on sidewall sprinklers, or sprinklers installed in recessed escutcheons.

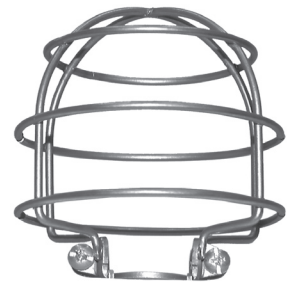
To order the Model D-1 Sprinkler Guard separately (Figure 1 - Top):

1. Order Viking Part No. 10325 or

2. Order Viking Part No. 12198 (Stainless Steel)

To order the Model D-1 Sprinkler Guard factory installed:

1. Refer to the Viking Price Book to select the appropriate base part number (plus appropriate suffixes for temperature and finish) for the sprinkler used.



Model D-1 Sprinkler Guard
Order Sprinkler Guard Separately
or Factory Installed
(See Ordering Instructions)



**Model D-1 Sprinkler Guard
on Upright and Pendent
Frame-Style Sprinklers***



*The standard response sprinklers with 5 mm glass bulb shown above are representative only. The Model D-1 Guard may be used with standard and large orifice, upright or pendent standard response sprinklers with 5 mm glass bulbs; standard response fusible link sprinklers; and quick response sprinklers with 3 mm glass bulbs and QR fusible element sprinklers VK301 and VK303.

Figure 1



TECHNICAL DATA

SPRINKLER GUARDS

453

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

2. To order the Model D-1 Sprinkler Guard factory installed on the sprinkler, add the suffix "G".

B. To order the Viking Dry Sprinkler Guard (Figure 2 - Top): Order Viking Part No. 08954.

NOTICE The Dry Sprinkler Guard is NOT Listed or Approved.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

For frame style sprinklers equipped with Model D-1 Sprinkler Guard, use Wrench Part No. 10896W/B (available since 2000) or 05000CW/B (no longer available). For ELO sprinklers use Wrench Part No. 05118CW/B.

Model E-1 Water Shield for frame style upright sprinklers equipped with Model D-1 Sprinkler Guards: Part No. 10326 (see form F_012498).

Model F-1 Water Shield for frame style pendent sprinklers equipped with Model D-1 Sprinkler Guards (see form F_012498):

- For use on 1/2" NPT Sprinklers, order Part No. 10323
- For use on 3/4" NPT Sprinklers (standard and large orifice only, NOT ELO), order Part No. 10324

4. INSTALLATION

A. Installing the Model D-1 Sprinkler Guard: Model D-1 Sprinkler Guards can be retrofitted onto sprinklers that have already been installed on the system. However, it is recommended to install the guard onto the sprinkler prior to installing the sprinkler on the system and prior to applying any pipe-joint compound or tape to the external threads of the sprinkler. Consider ordering the guard factory installed on the sprinkler used.

- Loosen the screws in the brackets at the base of the sprinkler guard.
- Spread and hold the two bracket halves (at the base of the sprinkler guard) apart just enough to place the guard over the deflector and wrench boss of the sprinkler.
- With the sprinkler inside the sprinkler guard, position the guard so the two halves of the bracket grip the sprinkler just below the wrench boss, but above the threads.

NOTICE

Orient the sprinkler guard so the screw openings in the base of the guard are located at the ends of the sprinkler wrench boss (where the sprinkler frame arms contact the wrench boss). See Figure 1.

- Thread both screws into the openings provided in the opposite bracket half and tighten to secure the base of the guard to the sprinkler.
- Apply a small amount of pipe-joint compound or tape to the external threads only, taking care not to allow a build-up of compound in the sprinkler orifice.
- Install the sprinkler on the piping using the special sprinkler wrench. DO NOT use the guard to start or thread the sprinkler into the fitting.

B. Installing the Dry Sprinkler Guard: Dry sprinklers must be installed on the system prior to installing the guard onto the dry sprinklers. Note: When installing the Dry Sprinkler Guard on recessed Dry Pendent or recessed Vertical Dry Sidewall Sprinklers, the Viking Recessed Escutcheon Cup must be removed and the sprinkler centered in a minimum 2-1/8" (54 mm) diameter hole prior to installation of the Dry Sprinkler Guard.

- Remove the retaining ring from the Dry Sprinkler Guard.
- Spread and hold the two "C" shaped halves of the bracket (at the base of the guard) apart just enough to place the guard over the deflector and wrench boss of the sprinkler.
- With the sprinkler inside the guard, position the guard so the "C" shaped bracket halves of the guard grip the sprinkler in the slot provided just below the wrench boss.

NOTICE

Orient the sprinkler guard so two of the four guard wires align with the frame arms of the sprinkler.

See Figure 2.

- Push the retaining ring over the guard toward the base of the sprinkler until the ring snaps firmly into the depression provided on each of the four wire members of the guard.
- For recessed dry pendent or recessed vertical dry sidewall sprinklers, re-install the Viking recessed escutcheon cup.



Dry Sprinkler Guard
(Order sprinkler guard separately from sprinklers.)



The standard response dry pendent sprinkler with 5 mm glass bulb shown above is representative only. The Dry Sprinkler Guard may be used with Viking standard or quick response dry upright, dry vertical sidewall, and dry pendent (including adjustable recessed) sprinklers.

Figure 2



TECHNICAL DATA

SPRINKLER GUARDS

453

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

NOTICE

The Model D-1 Sprinkler Guard is NOT designed to be used on sidewall sprinklers, or sprinklers installed in recessed escutcheons.

The Model D-1 Sprinkler Guard is cULus Listed and/or FM Approved for use with standard and large orifice, standard and quick response upright and pendent frame style sprinklers, including the following: VK001, VK003, VK100, VK102, VK108, VK110, VK122, VK124, VK130, VK132, VK200, VK202, VK204, VK206, VK300, VK301, VK302, VK303, VK350, VK352, VK377, and VK536.

Model D-1 Sprinkler Guards can be retrofitted onto sprinklers that have already been installed on the system. However, it is recommended to install the guard onto the sprinkler prior to installing the sprinkler on the system and prior to applying any pipe-joint compound or tape to the external threads of the sprinkler. Consider ordering the guard factory installed on the sprinkler used.

⚠ WARNING Viking products are manufactured and tested to meet the rigid requirements of the approving agency. The sprinklers are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to the sprinkler after it leaves the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinkler inoperative and will nullify the approval and any guarantee made by The Viking Corporation.

The Dry Sprinkler Guard is NOT Listed or Approved.

NOTICE Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to the appropriate sprinkler data page. Viking sprinklers are designed to be installed in accordance with the latest edition of Viking technical data, the latest standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards whenever applicable. The use of certain types of sprinklers may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.

5. OPERATION

Refer to the sprinkler technical data page for the sprinkler model used. The Sprinkler Guard is a hard-wire cage designed to encase the sprinkler and protect it from mechanical damage.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking sprinklers and sprinkler guards are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE UPRIGHT SPRINKLER VK532 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking EC/QREC Upright Sprinkler VK532 is a thermosensitive spray sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The extra-large orifice produces the flows required to meet Light and Ordinary Hazard density requirements at lower pressures than standard orifice or large orifice sprinklers. The glass bulb operating element and special deflector characteristics meet the challenges of quick response extended coverage standards. Upright Sprinkler VK532 is cULus Listed as standard and quick response and FM Approved as quick response. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, ENT coating has been investigated for installation in corrosive atmospheres. See Approval Charts.



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class 2022

Refer to Approval Chart 1 and Design Criteria for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: Refer to the Approval Charts.

Maximum Working Pressure: 175 psi (12 Bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 3/4" (20 mm) NPT

Nominal K-Factor: 11.2 U.S. (161.3 metric†)

† Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: 2-5/16 (59 mm)

Material Standards:

Sprinkler Frame: Brass UNS-C84400

Deflector: Copper UNS-C19500

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinkler: Belleville Spring-Exposed, Screw and Pipcap-ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Viking EC/QREC Upright Sprinkler VK532 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, and 286 °F (141 °C) = G

For example, sprinkler VK532 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 08687AB

Available Finishes And Temperature Ratings:

Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 05118CW/B (available since 1981)

B. Wrench for recessed pendent sprinkler: Part No. 11663W/B** (available since 2001)

**A 1/2" ratchet is required (not available from Viking).

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

**STANDARD/QUICK RESPONSE
EXTENDED COVERAGE
UPRIGHT SPRINKLER
VK532 (K11.2)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Sprinkler Cabinets:

- A. Six-head capacity: Part No. 01724A (available since 1971)
- B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

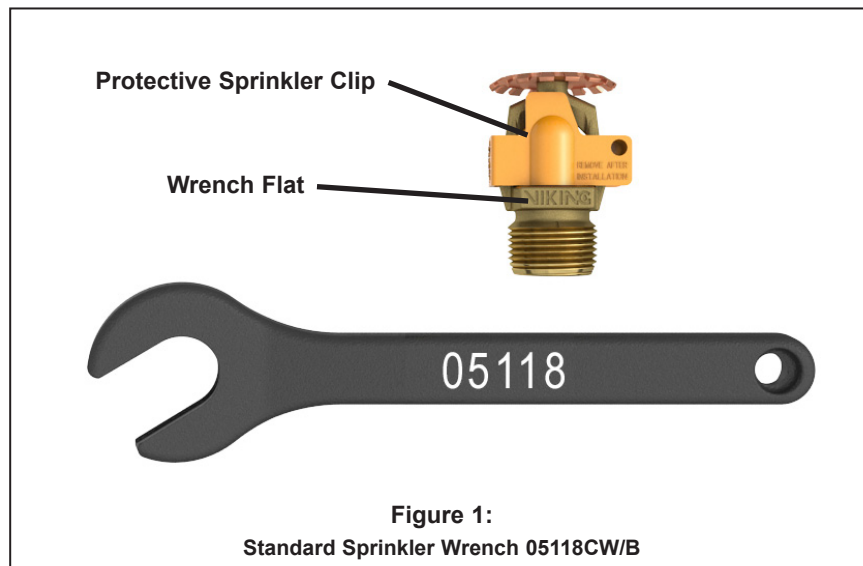
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinkler VK532 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.





TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE UPRIGHT SPRINKLER VK532 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester³, Black Polyester³, and ENT

Corrosion-Resistant Coatings⁴: ENT

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester.

⁴ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For ENT sprinklers, all exposed surfaces and the waterway are coated, but note that the spring is exposed.



TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE UPRIGHT SPRINKLER VK532 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)							Temperature Finish KEY A1X ← Escutcheon (if applicable)	
Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length	
		Inches	mm	U.S.	metric ²		Inches	mm
08687 Upright	VK532	3/4	20	11.2	161.3	175 psi (12 Bar)	2-5/16	59
Max. Sprinkler Spacing (L x W ⁷)	Maximum Area per Sprinkler	Minimum Water Supply Requirements ⁵				Listings and Approvals ³ (Refer also to UL Design Criteria)		
		Light Hazard		Ordinary Hazard Group I	Ordinary Hazard Group II			
		Flow / Pressure		Flow / Pressure	Flow / Pressure			
Standard Response								
16 ft. x 16 ft. (4.9 m x 4.9 m)	256 ft ² (23.8 m ²)	--		38 gpm @ 11.5 psi (143.9 L/min @ .79 Bar)		51 gpm @ 20.7 psi (193.1 L/min @ 1.43 Bar)	C1, C2	
18 ft. x 18 ft. (5.5 m x 5.5 m)	324 ft ² (30.1 m ²)	--		49 gpm @ 19.1 psi (185.5 L/min @ 1.32 Bar)		65 gpm @ 33.7 psi (246.1 L/min @ 2.32 Bar)	C1, C2	
20 ft. x 20 ft. (6.1 m x 6.1 m)	400 ft ² (37.2 m ²)	--		60 gpm @ 28.7 psi (227.1 L/min @ 1.98 Bar)		80 gpm @ 51.0 psi (302.8 L/min @ 3.52 Bar)	C1, C2	
Quick Response								
12 ft. x 12 ft. (3.7 m x 3.7 m)	144 ft ² (13.4 m ²)	--		30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar)		39 gpm @ 12.1 psi (147.7 L/min @ .84 Bar)	D1, D2	
14 ft. x 14 ft. (4.3 m x 4.3 m)	196 ft ² (18.2 m ²)	--		30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar)		39 gpm @ 12.1 psi (147.7 L/min @ .84 Bar)	D1, D2	
16 ft. x 16 ft. (4.9 m x 4.9 m)	256 ft ² (23.8 m ²)	30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar)		--		--	B1, E2	
18 ft. x 18 ft. (5.5 m x 5.5 m)	324 ft ² (30.1 m ²)	33 gpm @ 8.7 psi (124.9 L/min @ .60 Bar)		--		--	B1, E2	
20 ft. x 20 ft. (6.1 m x 6.1 m)	400 ft ² (37.2 m ²)	40 gpm @ 12.8 psi (151.4 L/min @ .88 Bar)		--		--	A1, F2	
Approved Temperature Ratings						Approved Finishes		
A - 135 °F (57 °C) and 175 °F (79 °C) B - 135 °F (57 °C), 155 °F (68 °C), and 175 °F (79 °C) C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C) D - 155 °F (68 °C) E - 155 °F (68 °C), and 175 °F (79 °C) F - 175 °F (79 °C)						1 - Brass, Chrome, White Polyester, and Black Polyester 2 - ENT ⁶		
Footnotes								
¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.								
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.								
³ This chart shows listings and approvals available at time of printing. Check with the manufacturer for any additional approvals.								
⁴ cULus Listed for use in the U.S. and Canada.								
⁵ To determine "Minimum Water Supply Requirement" for areas of coverage where length and width of actual sprinkler spacing are not equal, select the "Maximum Sprinkler Spacing" from the chart that is equal to or greater than the larger of the actual spacing (length or width) dimensions used. Example: When using 10'-6" x 13'-0" sprinkler spacing, provide the "Minimum Water Supply Requirement" listed in the chart for 14'-0" x 14'-0" spacing. For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" in the appropriate hazard group for the next larger area listed. The distance from sprinklers to walls shall not exceed one-half the "Maximum Sprinkler Spacing" listed for the "Minimum Water Supply Requirement" used.								
⁶ cULus Listed as corrosion-resistant.								



TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE UPRIGHT SPRINKLER VK532 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

EC-ELO Upright Sprinkler VK532 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for extended coverage upright sprinklers as indicated below:

- The minimum water supplies and maximum areas of coverage shown in Approval Chart 1 are designed to provide the following design densities: 0.10 gpm/ft² (4.1 mm/min) for Light Hazard densities; 0.15 gpm/ft² (6.1 mm/min) for Ordinary-Hazard Group I densities; 0.2 gpm/ft.² (8.1 mm/min) for Ordinary-Hazard Group II densities.
- The sprinkler installation rules contained in NFPA 13 for extended coverage upright and pendent spray sprinklers must be followed.
- Viking EC-ELO Upright Sprinklers are cULus Listed for use in unobstructed construction, and noncombustible obstructed construction consisting of solid steel and/or concrete beams as defined in the latest edition of NFPA 13.
- Ceiling slope not to exceed 2/12 (9.5°).

Also, Viking ECOH-ELO Upright Sprinkler VK532 is specifically cULus Listed for Ordinary Hazard Occupancies:

- For non-combustible obstructed construction within trusses or bar joists having non-combustible web members greater than 1" (25.4 mm) when applying the 4 times obstruction criteria rule as defined in NFPA 13 under "Obstructions to Sprinkler Discharge Pattern Development".
- For installation under concrete tees when installed as follows:
 1. The stems of the concrete tee construction must be spaced between 3 ft (0.9 m) and 7 ft-6 in (2.3 m) on center. The depth of the concrete tees must not exceed 30 in (762 mm). The maximum permitted concrete tee length is 32 ft (9.8 m). However, where the concrete tee length exceeds 32 ft (9.8 m), non-combustible baffles, equal in height to the depth of the tees, can be installed so that the space between the tees does not exceed 32 ft (9.8 m).
 2. The sprinkler deflector is to be located in a horizontal plane at or above 1" (25.4 mm) below the bottom of the concrete tee stems.
 3. When the sprinkler deflector is located higher than a horizontal plane 1" (25.4 mm) beneath the bottom of the concrete tee stems, the obstruction to sprinkler discharge criteria requirements of NFPA 13 for extended coverage upright sprinklers applies.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to pages EC1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

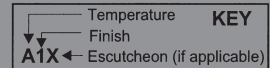
STANDARD/QUICK RESPONSE EXTENDED COVERAGE UPRIGHT SPRINKLER VK532 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Quick Response Extended Coverage ELO Upright Sprinkler VK532
For HC-1, HC-2, and HC-3 Occupancies
Maximum 175 PSI (12 Bar) WWP



Maximum Sprinkler Spacing (L x W ²)	Maximum Area per Sprinkler	Refer to <u>Design Criteria below.</u> NOTE: FM installation guidelines may differ from cULus and/or NFPA criteria. Refer to the latest applicable FM Loss Prevention Data Sheets (including 2-0 and 3-26).	FM Approval ¹ Upright Sprinkler VK532
16 ft. x 16 ft. (4.9 m x 4.9 m)	256 ft ² (23.8 m ²)		A1
18 ft. x 18 ft. (5.5 m x 5.5 m)	324 ft ² (30.1 m ²)		A1
20 ft. x 20 ft. (6.1 m x 6.1 m)	400 ft ² (37.2 m ²)		A1

Approved Temperature Ratings

A - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

Approved Finishes

1 - Brass, Chrome, White Polyester, Black Polyester, ENT³

Footnotes

¹ This chart shows the FM Approvals available at time of printing. Check with the manufacturer for any additional approvals.

² To determine "Minimum Water Supply Requirement" for areas of coverage where length and width of actual sprinkler spacing are not equal, select the "Maximum Sprinkler Spacing" from the chart that is equal to or greater than the larger of the actual spacing (length or width) dimensions used. Example: When using 10'-6" x 13'-0" sprinkler spacing, provide the "Minimum Water Supply Requirement" listed in the chart for 14'-0" x 14'-0" spacing. For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" in the appropriate hazard group for the next larger area listed. The distance from sprinklers to walls shall not exceed one-half the "Maximum Sprinkler Spacing" listed for the "Minimum Water Supply Requirement" used.

³ FM Approved as corrosion-resistant.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Sprinkler VK532 is FM Approved as a quick response **Non-Storage** extended coverage upright sprinkler as indicated in the FM Approval Guide for use in occupancy hazard classifications HC-1, HC-2, and HC-3. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheets 2-0 and 3-26). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page EC1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

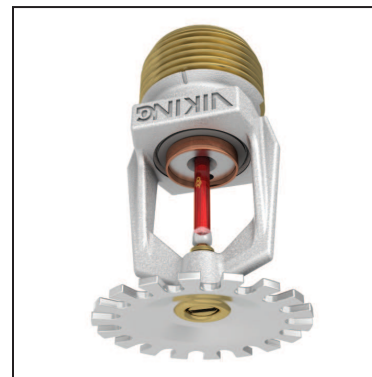
STANDARD/QUICK RESPONSE EXTENDED COVERAGE PENDENT SPRINKLER VK534 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking EC/QREC Pendent Sprinkler VK534 is a thermosensitive spray sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The extra-large orifice produces the flows required to meet Light and Ordinary Hazard density requirements at lower pressures than standard orifice or large orifice sprinklers. The glass bulb operating element and special deflector characteristics meet the challenges of quick response extended coverage standards. Pendent Sprinkler VK534 is cULus Listed as standard and quick response. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, ENT coating has been investigated for installation in corrosive atmospheres. See Approval Charts.



2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: Refer to the Approval Charts.

Maximum Working Pressure: 175 psi (12 Bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 3/4" (20 mm) NPT

Nominal K-Factor: 11.2 U.S. (161.3 metric)[†]

[†] Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: 2-3/8" (61 mm)

Material Standards:

Sprinkler Frame: Brass UNS-C84400

Deflector: Brass UNS-C26000

Bulb: Glass, nominal 3 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Screw: Brass UNS-C36000

Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel
UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinkler: Belleville Spring-Exposed, Screw and Pipcap-
ENT plated.

Ordering Information: (Also refer to the current Viking price list.)

Order Viking EC/QREC Pendent Sprinkler VK534 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN

Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, and 286 °F (141 °C) = G

For example, sprinkler VK534 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 08340AB

Available Finishes And Temperature Ratings:

Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:

A. Standard Wrench: Part No. 05118CW/B (available since 1981)

B. Wrench for recessed pendent sprinkler: Part No. 11663W/B** (available since 2001)

**A 1/2" ratchet is required (not available from Viking).

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

**TECHNICAL DATA****STANDARD/QUICK RESPONSE
EXTENDED COVERAGE
PENDENT SPRINKLER
VK534 (K11.2)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

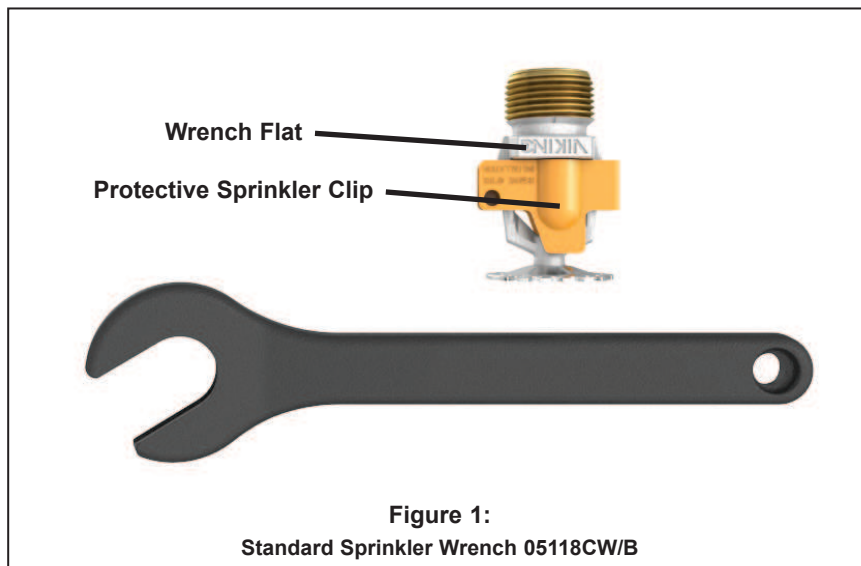
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking EC/QREC Pendent Sprinkler VK534 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.





TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE PENDENT SPRINKLER VK534 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome, White Polyester³, Black Polyester³, and ENT

Corrosion-Resistant Coatings⁴: ENT

Footnotes

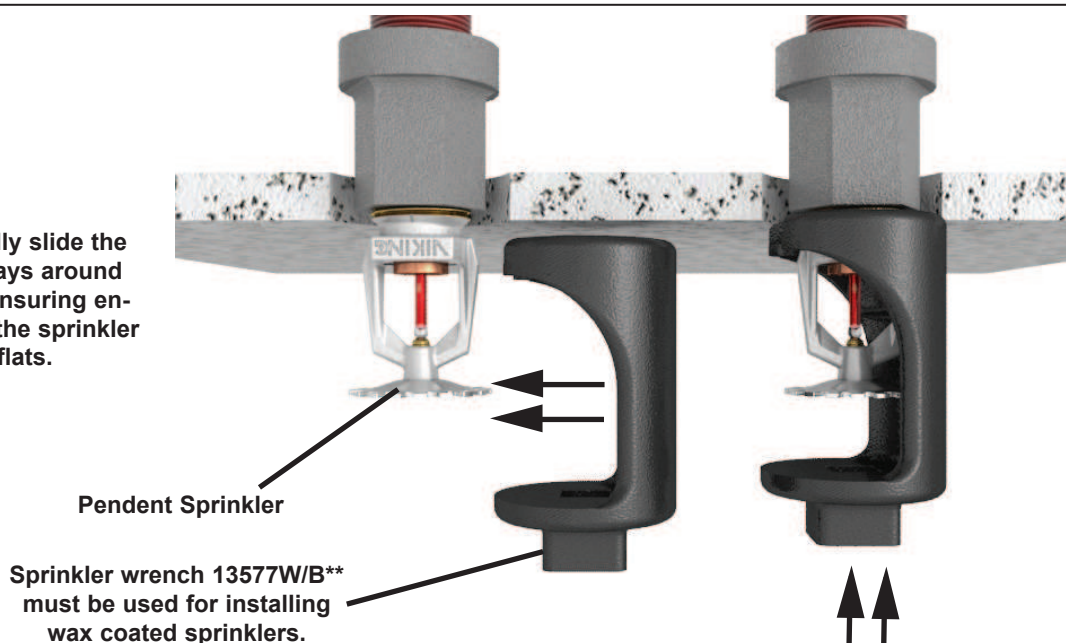
¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester coatings.

⁴ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For ENT sprinklers, all exposed surfaces and the waterway are coated, but note that the spring is exposed.

Step 1: Carefully slide the wrench sideways around the deflector, ensuring engagement with the sprinkler wrench flats.



**** A 1/2" ratchet is required (not available from Viking)**

Step 2: Carefully press the wrench upward and ensure engagement with the sprinkler wrench flats.

Figure 2: Wrench 11663W/B for Recessed Pendant Sprinkler VK534



TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE PENDENT SPRINKLER VK534 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)							Temperature Finish A1X ← Escutcheon (if applicable) KEY	
Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length	
		Inches	mm	U.S.	metric ²		Inches	mm
08340 Pendent	VK534	3/4	20	11.2	161.3	175 psi (12 Bar)	2-5/16	59
Max. Sprinkler Spacing (L x W ⁷)	Maximum Area per Sprinkler	Minimum Water Supply Requirements ⁵					Listings and Approvals ³ (Refer also to UL Design Criteria)	
		Light Hazard		Ordinary Hazard Group I	Ordinary Hazard Group II			
		Flow / Pressure		Flow / Pressure	Flow / Pressure	cULus ⁴		
Standard Response								
16 ft. x 16 ft. (4.9 m x 4.9 m)	256 ft ² (23.8 m ²)	--		38 gpm @ 11.5 psi (143.9 L/min @ .79 Bar)		51 gpm @ 20.7 psi (193.1 L/min @ 1.43 Bar)	C1X, D1Y, D2Z, C2W	
18 ft. x 18 ft. (5.5 m x 5.5 m)	324 ft ² (30.1 m ²)	--		49 gpm @ 19.1 psi (185.5 L/min @ 1.32 Bar)		65 gpm @ 33.7 psi (246.1 L/min @ 2.32 Bar)	C1X, D1Y, D2Z, C2W	
20 ft. x 20 ft. (6.1 m x 6.1 m)	400 ft ² (37.2 m ²)	--		60 gpm @ 28.7 psi (227.1 L/min @ 1.98 Bar)		80 gpm @ 51.0 psi (302.8 L/min @ 3.52 Bar)	C1X, D1Y, D2Z, C2W	
Quick Response								
12 ft. x 12 ft. (3.7 m x 3.7 m)	144 ft ² (13.4 m ²)	--		30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar)		39 gpm @ 12.1 psi (147.7 L/min @ .84 Bar)	E1Y, E2Z	
14 ft. x 14 ft. (4.3 m x 4.3 m)	196 ft ² (18.2 m ²)	--		30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar)		39 gpm @ 12.1 psi (147.7 L/min @ .84 Bar)	E1Y, E2Z	
16 ft. x 16 ft. (4.9 m x 4.9 m)	256 ft ² (23.8 m ²)	30 gpm @ 7.2 psi (113.6 L/min @ .50 Bar)		--		--	B1Y, F2Z	
18 ft. x 18 ft. (5.5 m x 5.5 m)	324 ft ² (30.1 m ²)	33 gpm @ 8.7 psi (124.9 L/min @ .60 Bar)		--		--	B1Y, F2Z	
20 ft. x 20 ft. (6.1 m x 6.1 m)	400 ft ² (37.2 m ²)	40 gpm @ 12.8 psi (151.4 L/min @ .88 Bar)		--		--	A1Y, G2Z	
Approved Temperature Ratings			Approved Finishes 1 - Brass, Chrome, White Polyester, and Black Polyester 2 - ENT ⁶			Approved Escutcheons		
A - 135 °F (57 °C) and 175 °F (79 °C)						W - Standard surface-mounted escutcheons only		
B - 135 °F (57 °C), 155 °F (68 °C), and 175 °F (79 °C)						X - Standard surface-mounted escutcheons or the Micro-fast® Model F-1 Adjustable Escutcheon		
C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)						Y - Standard surface-mounted escutcheons or the Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Micromatic® Model E-1, E-2, or E-3 Recessed Escutcheon		
D - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)						Z - Standard surface-mounted escutcheons or the Micromatic Model E-1 Recessed Escutcheon.		
E - 155 °F (68 °C)								
F - 155 °F (68 °C), and 175 °F (79 °C)								
G - 175 °F (79 °C)								
Footnotes								
¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.								
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.								
³ This chart shows listings and approvals available at time of printing. Check with the manufacturer for any additional approvals.								
⁴ cULus Listed for use in the U.S. and Canada.								
⁵ To determine "Minimum Water Supply Requirement" for areas of coverage where length and width of actual sprinkler spacing are not equal, select the "Maximum Sprinkler Spacing" from the chart that is equal to or greater than the larger of the actual spacing (length or width) dimensions used. Example: When using 10'-6" x 13'-0" sprinkler spacing, provide the "Minimum Water Supply Requirement" listed in the chart for 14'-0" x 14'-0" spacing. For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" in the appropriate hazard group for the next larger area listed. The distance from sprinklers to walls shall not exceed one-half the "Maximum Sprinkler Spacing" listed for the "Minimum Water Supply Requirement" used.								
⁶ cULus Listed as corrosion-resistant.								



TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE PENDENT SPRINKLER VK534 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1.)

cULus Listing Requirements:

EC-ELO Pendent Sprinkler VK534 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for extended coverage pendent spray sprinklers as indicated below:

- The minimum water supplies and maximum areas of coverage shown in Approval Chart 1 are designed to provide the following design densities: 0.10 gpm/ft² (4.1 mm/min) for Light Hazard densities; 0.15 gpm/ft² (6.1 mm/min) for Ordinary-Hazard Group I densities; 0.2 gpm/ft² (8.1 mm/min) for Ordinary-Hazard Group II densities.
- The sprinkler installation rules contained in NFPA 13 for extended coverage pendent spray sprinklers must be followed.
- Viking EC-ELO Pendent Sprinklers are cULus Listed for use in unobstructed construction, and noncombustible obstructed construction consisting of solid steel and/or concrete beams as defined in the latest edition of NFPA 13.
- Ceiling slope not to exceed 2/12 (9.5°).

Also, Viking ECOH-ELO Pendent Sprinkler VK534 is specifically cULus Listed for Ordinary Hazard Occupancies:

- For non-combustible obstructed construction within trusses or bar joists having non-combustible web members greater than 1" (25.4 mm) when applying the 4 times obstruction criteria rule as defined in NFPA 13 under "Obstructions to Sprinkler Discharge Pattern Development".
- For installation under concrete tees when installed as follows:
 1. The stems of the concrete tee construction must be spaced between 3 ft (0.9 m) and 7 ft-6 in (2.3 m) on center. The depth of the concrete tees must not exceed 30 in (762 mm). The maximum permitted concrete tee length is 32 ft (9.8 m). However, where the concrete tee length exceeds 32 ft (9.8 m), non-combustible baffles, equal in height to the depth of the tees, can be installed so that the space between the tees does not exceed 32 ft (9.8 m).
 2. The sprinkler deflector is to be located in a horizontal plane at or above 1" (25.4 mm) below the bottom of the concrete tee stems.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to pages EC1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



TECHNICAL DATA

STANDARD/QUICK RESPONSE EXTENDED COVERAGE PENDENT SPRINKLER VK534 (K11.2)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

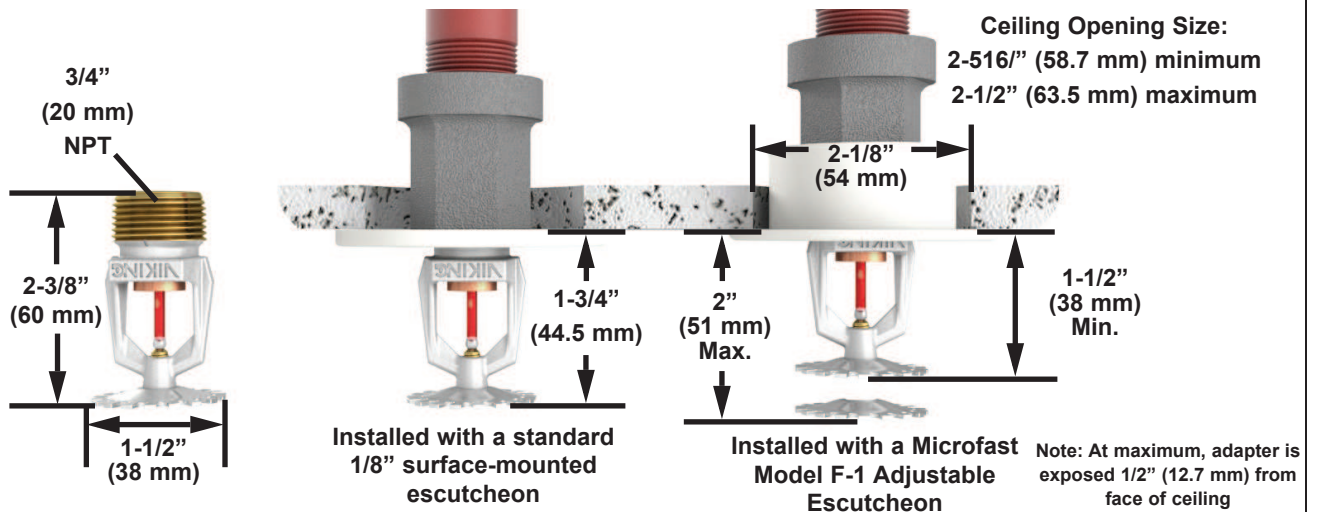


Figure 3: Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

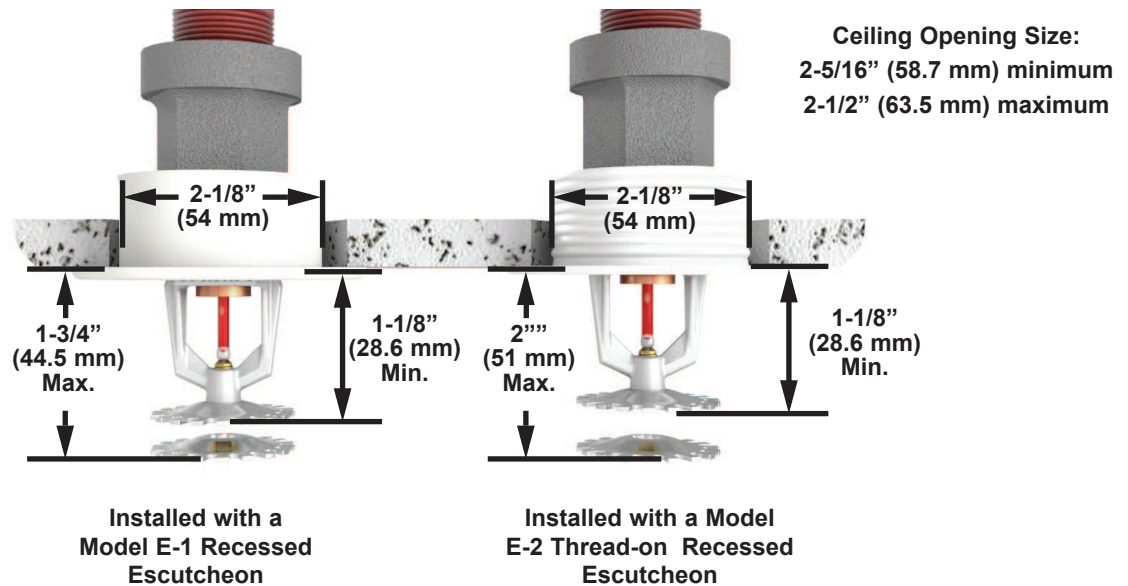


Figure 4: Sprinkler Dimensions with the Model E-1 and E-2 Recessed Escutcheons

211313 - Wet-Pipe Sprinkler System

May 20, 2013

Sprinkler 92a



TECHNICAL DATA

**MIRAGE® QUICK RESPONSE
EXTENDED COVERAGE
CONCEALED PENDENT
SPRINKLERS (VK632 AND VK634)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Mirage® Quick Response Extended Coverage Concealed Pendent Sprinkler VK632 and VK634 are thermosensitive glass-bulb spray sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The glass bulb operating element and special deflector characteristics meet the challenges of quick response extended coverage standards.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile cover assembly that provides up to ½" (12.7 mm) of vertical adjustment. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler.



For Light Hazard Occupancies Only

2. LISTINGS AND APPROVALS

cULus **cULus Listed:** Category VNIV

Refer to the Approval Chart on page 92c and Design Criteria on page 92d for cULus Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 2007.

Minimum Operating Pressure: 7 psi (0.5 bar)

Maximum Working Pressure: 175 psi (12 Bar).

Factory tested hydrostatically to 500 psi (34.5 bar)

Thread sizes: Sprinkler VK632: 1/2" (15 mm) NPT,

Sprinkler VK634: 3/4" (20 mm) NPT

Nominal K-Factors: Sprinkler VK632: 5.6 U.S. (80.6 metric*)

Sprinkler VK634: 8.0 U.S. (115.2 metric*)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Patents Pending

Material Standards:

Sprinkler Body: Brass UNS-C84400

Deflector: Copper UNS-C19500

Deflector Pins: Stainless Steel Alloy

Bulb: Glass, nominal 3 mm diameter

Pip Cap: Lead Bronze UNS-C31400 or UNS-C31600, or Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

Button: Brass UNS-C36000

Screws: 18-8 Stainless Steel

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Yoke: Phosphor Bronze UNS-C51000

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating

Cover Assembly Materials:

Cover: Copper UNS-C11000

Base: Brass UNS-C26000 or UNS-C26800

Springs: Nickel Alloy

Solder: Eutectic

Ordering Information: (Also refer to the current Viking price list.)

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

MIRAGE® QUICK RESPONSE EXTENDED COVERAGE CONCEALED PENDENT SPRINKLERS (VK632 AND VK634)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Viking Mirage® Quick Response Extended Coverage Concealed Pendent Sprinklers and Cover Plate Assemblies must be ordered separately:

Sprinkler: Base Part No. 14613A or 14535A

Specify sprinkler temperature rating by adding the appropriate suffix for the temperature rating to the base part number:

Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E

For example, sprinkler VK634 with a 155 °F (68 °C) temperature rating = 14535AB.

Cover Plate Assembly: Base Part No. 13504 (2-3/4" diameter), Base Part No. 13642 (3-5/16" diameter), or Base Part No. 15394 (square cover plate, 3-5/16" diameter)

Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:

Finish Suffix: Polished Chrome = F, Brushed Chrome = F-/B, Bright Brass = B, Antique Brass = B-/A, Brushed Brass = B-/B, Brushed Copper = E-/B, Painted White = M-/W, Painted Ivory = M-/I, Painted Black = M-/B

Temperature Suffix: 135 °F (57 °C) = A, 165 °F (74 °C) = C

For example, cover 13504 with a Polished Chrome finish and a 165 °F (74 °C) temperature rating = 13504FC.

Note: Square cover plate 15394 cULus Listing is for the 135°F (57°C) temperature rated cover plate only. Refer to the Approval Chart.

Available Finishes And Temperature Ratings:

Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches**:

A. Heavy Duty Wrench Part No. 14047W/B or

B. Head Cabinet Wrench Part No. 14031***

C. Optional Concealed Cover Plate Installer Tool Part No. 14412 for cover 13504, or Part No. 14867 for the large diameter cover (available since 2007)

Requires a 1/2" ratchet (not available from Viking). *Also optional for removal of the protective cap. Ideal for sprinkler cabinets.

Sprinkler Cabinet: Part No. 01731A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand and the bulb to shatter, releasing the yoke, pip-cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinklers VK632 and VK634 are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

May 20, 2013

Sprinkler 92c

	TECHNICAL DATA	MIRAGE® QUICK RESPONSE EXTENDED COVERAGE CONCEALED PENDENT SPRINKLERS (VK632 AND VK634)
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The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Temperature Rating of Cover Assembly (Required)	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	135 °F (57 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	135 °F (57 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	165 °F (74 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	165 °F (74 °C)	Green

Cover Plate Finishes: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, and Painted Black

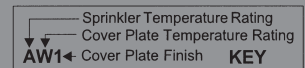
Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

Approval Chart

Mirage® QR Extended Coverage Concealed Pendent Sprinklers
For Light Hazard Occupancies Only.
Maximum 175 PSI (12 Bar) WWP



Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Areas of Coverage ⁴	Minimum Water Supply Requirements ⁴ Flow/Pressure	Listings and Approvals ³ (Refer also to Design Criteria on page 92d.)		
		Inches	mm	U.S.	metric ²			cULus ⁵	FM	NYC
Standard Orifice										
14613A	VK632	1/2	15	5.6	80.6	16' x 16' (4.9 m x 4.9 m)	26 gpm @ 21.6 psi (98.4 L/min @ 1.49 Bar)	AW1, BX1	--	See Footnote 6.
14613A	VK632	1/2	15	5.6	80.6	18' x 18' (5.5 m x 5.5 m)	33 gpm @ 34.7 psi (124.9 L/min @ 2.39 Bar)	AW1, BX1	--	See Footnote 6.
14613A	VK632	1/2	15	5.6	80.6	20' x 20' (6.1 m x 6.1 m)	40 gpm @ 51.0 psi (151.4 L/min @ 3.52 Bar)	CW1, DX1	--	See Footnote 6.
Large Orifice										
14535A	VK634	3/4	20	8.0	115.2	16' x 16' (4.9 m x 4.9 m)	26 gpm @ 10.6 psi (98.4 L/min @ 0.73 Bar)	AW1, BX1	--	See Footnote 6.
14535A	VK634	3/4	20	8.0	115.2	18' x 18' (5.5 m x 5.5 m)	33 gpm @ 17.0 psi (124.9 L/min @ 1.17 Bar)	AW1, BX1	--	See Footnote 6.
14535A	VK634	3/4	20	8.0	115.2	20' x 20' (6.1 m x 6.1 m)	40 gpm @ 25.0 psi (151.4 L/min @ 1.72 Bar)	CW1, DX1	--	See Footnote 6.
Sprinkler Temperature Ratings A - 135 °F (57 °C) and 155 °F (68 °C) B - 175 °F (79 °C) and 200 °F (93 °C) C - 135 °F (57 °C) D - 175 °F (79 °C)				Cover Plate Temperature Ratings ⁷ W - 135 °F (57 °C) cover 13504 ¹ , 13642 ¹ (large diameter), or 15394 ¹ (square cover plate) X - 165 °F (74 °C) cover 13504 ¹ , 13642 ¹ (large diameter)				Cover Plate Finishes ⁸ 1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, and Painted Black		

Footnotes

¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.

⁴ For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler.

⁵ Listed by Underwriter's Laboratories, Inc. for use in the U.S. and Canada for Light Hazard occupancies with smooth, flat, horizontal ceilings only.

⁶ Meets New York City requirements, effective July 1, 2008.

⁷ The 135 °F (57 °C) cover has an orange label. The 165 °F (74 °C) cover has a white label.

⁸ Painted finish consists of Polyester Baked Enamel. Other paint colors are available on request with the same listings as the standard paint colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information.

NOTE: Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

	TECHNICAL DATA	MIRAGE® QUICK RESPONSE EXTENDED COVERAGE CONCEALED PENDENT SPRINKLERS (VK632 AND VK634)
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The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA
 (Also refer to the Approval Chart on page 92c.)

cULus Listing Requirements: Mirage® Quick Response Extended Coverage Concealed Pendent Sprinklers VK632 and VK634 are cULus Listed for installation in accordance with the latest edition of NFPA 13 for extended coverage pendent spray sprinklers:

- Limited to Light Hazard occupancies, with smooth, flat, horizontal ceilings only.
- Minimum spacing allowed is 8 ft. (2.4 m) unless baffles are installed in accordance with NFPA 13.
- Minimum distance from walls is 4 in. (102 mm).
- Maximum distance from walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler installation and obstruction rules contained in NFPA 13 for extended coverage pendent spray sprinklers must be followed.

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to pages EC1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.



Identification of Custom Paint Color:
 All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint Color for Concealed Covers

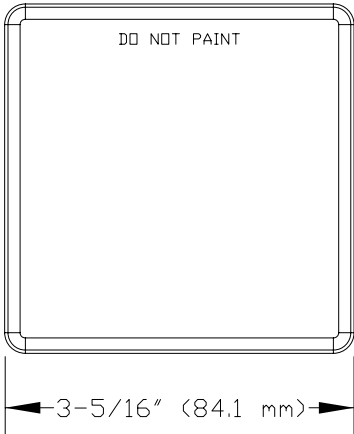


Figure 2: Square Cover Assembly 15394

May 20, 2013

Sprinkler 92e

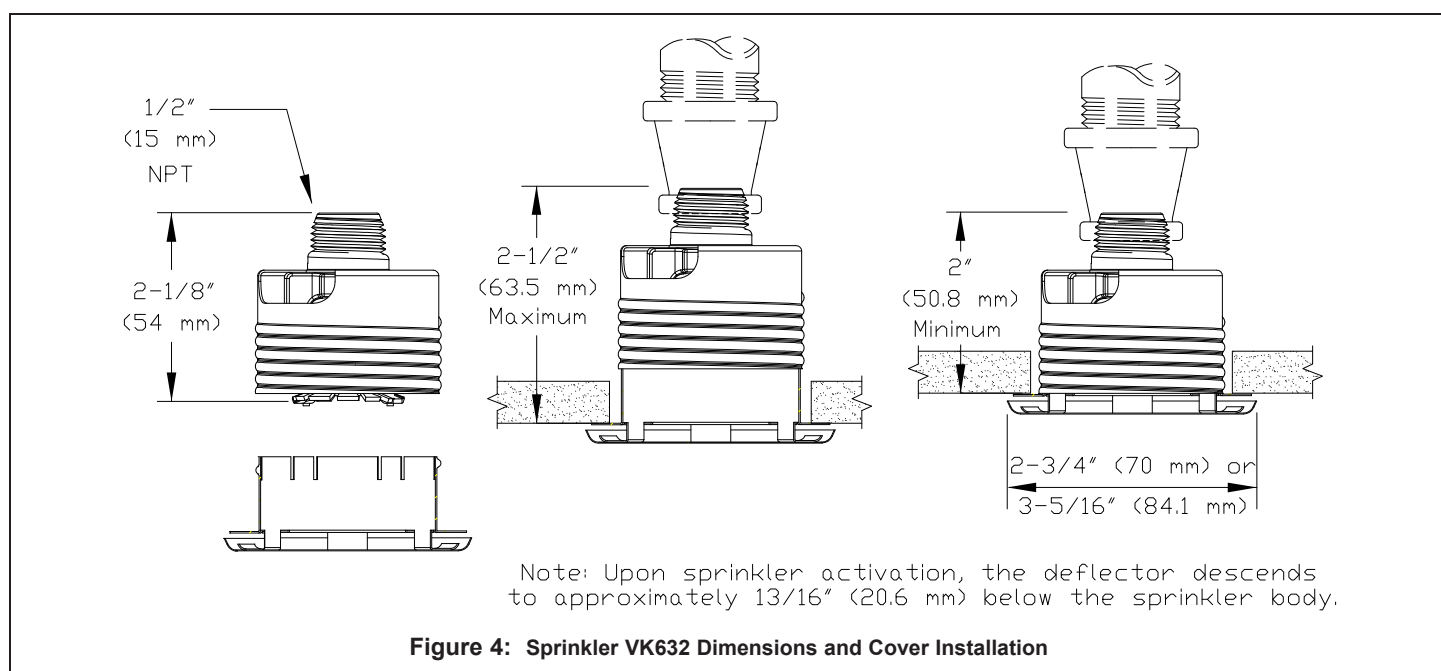
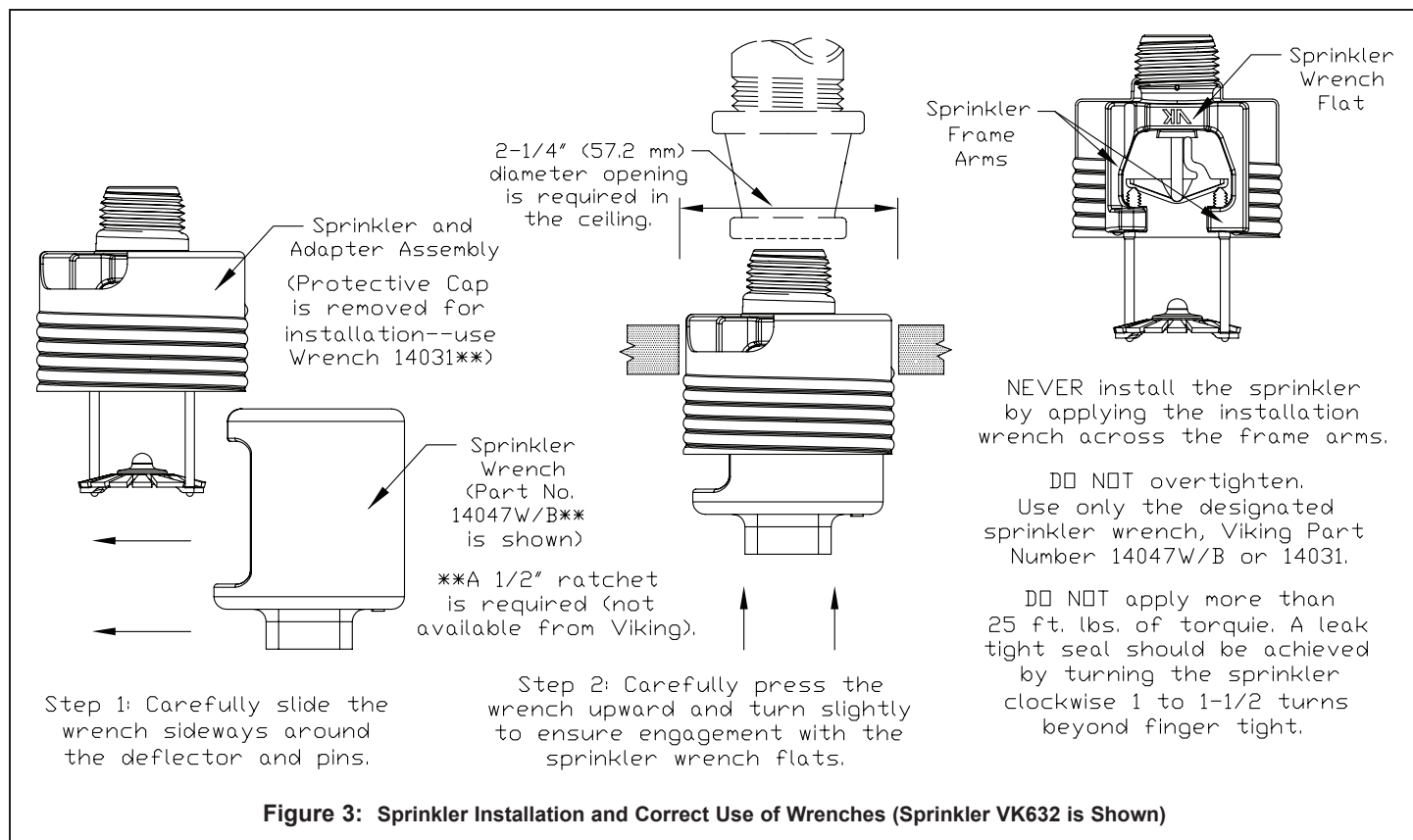


TECHNICAL DATA

**MIRAGE® QUICK RESPONSE
EXTENDED COVERAGE
CONCEALED PENDENT
SPRINKLERS (VK632 AND VK634)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

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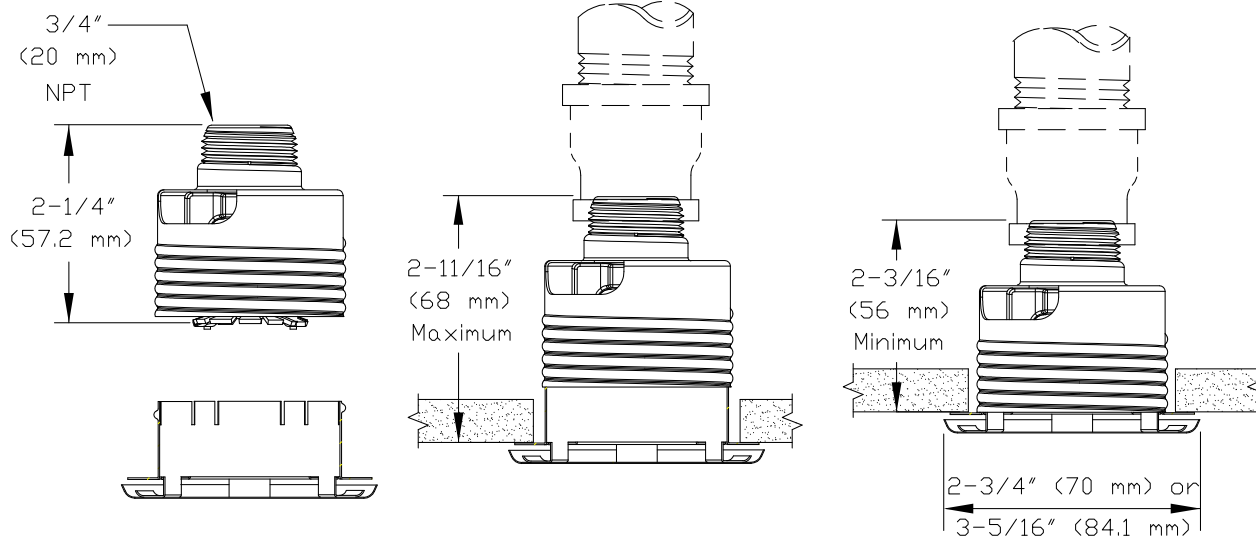


TECHNICAL DATA

**MIRAGE® QUICK RESPONSE
EXTENDED COVERAGE
CONCEALED PENDENT
SPRINKLERS (VK632 AND VK634)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



Note: Upon sprinkler activation, the deflector descends to approximately 13/16" (20.6 mm) below the sprinkler body.

Figure 5: Sprinkler VK634 Dimensions and Cover Installation



Model G5-56 Dry (SIN RA5114) K5.6 (80 metric) Concealed Dry Pendent Sprinkler

UL Quick Response FM Standard Response ½" (13mm) Cover plate Adjustment

Features

1. Flat cover plate with threaded attachment.
2. Solid or perforated cover plate available in chrome and white as Standard Finishes.
Also available in a wide variety of Special Application Finishes.
3. Cover plates with gaskets are available to limit dust and air movement through the ceiling.
4. Available in Ordinary or Intermediate temperature rating.
5. Sprinkler available in lengths from 4¼ inches (108mm) to 48 inches (1219mm) in ¼-inch (6.35mm) increments (see Fig. 1).

Approvals & Listings

1. Listed by Underwriters Laboratories and Certified for Canada (cULus) as a Quick-response sprinkler for Light and Ordinary Hazard occupancies. UL Guide Number VNIV, Sprinklers, Automatic and Open.
2. FM Approved as a Standard-response sprinkler.

Patents

The Model G5-56 Dry is covered by the following patents:
U.S. 5,775,431
U.S. 5,967,240

Application

The Model G5-56 Dry is a cULus Listed Quick Response Concealed Dry Pendent sprinkler intended for use in accordance with NFPA 13. The Model G5-56 Dry sprinkler is cULus Listed for use in Light and Ordinary Hazard occupancies.

The Model G5-56 Dry is FM Approved as a Standard Response Concealed Dry Pendent sprinkler intended for use in accordance with FM Loss Prevention Data Sheet 2.0.

Product Description

The Reliable Model G5-56 Dry sprinkler is a Dry Pendent sprinkler, where the sealing washer is located at the inlet end of the sprinkler assembly. The position of the sealing washer is controlled by a fusible element at the opposite end of the sprinkler assembly. The sprinkler is installed with the fusible element at the ceiling of a protected space that may be subject to freezing temperatures and the inlet orifice located in a heated area above the ceiling. Operation of the fusible element allows the



Model G5-56 Dry Sprinkler

sealing washer to move out of the inlet orifice admitting water from the supply piping. The sprinkler uses a fast-response fusible element with an Ordinary, 165°F (74°C), or Intermediate, 212°F (100°C), temperature classification.

The Model G5-56 Dry sprinkler has a dropdown deflector design that allows the sprinkler to be recessed into the ceiling and concealed by a flat cover plate. The cover plate assembly threads into the sprinkler's cup and provides ½-inch (13mm) of cover adjustment. The cover plate assembly consists of a flat cover plate that is attached to the skirt using either 135°F (57°C) or 165°F (74°C) temperature rated solder. The 135°F (57°C) cover plates are for use with Ordinary temperature classification sprinklers and the 165°F (74°C) cover plates are for use with Intermediate temperature classification sprinklers.

The Model G5-56 Dry sprinkler is available in lengths ranging from 4¼ inches (108mm) to 48 inches (1219mm) in ¼-inch (6.35mm) increments (see Fig. 1). The length of the sprinkler must be selected to provide the Exposed Minimum Barrel Length in a Heated Area required by Fig. 2.

The Model G5-56 Dry sprinkler is available with 1-inch NPT or ISO 7-1 R1 threaded inlet fittings. The standard inlet fitting includes a long inlet designed to minimize the potential for water, scale, and sediment to accumulate on the sprinkler inlet in wet- and dry-pipe sprinkler systems. For wet-pipe sprinkler system applications where the standard inlet interferes with installation into existing plastic pipe fittings, an inlet fitting is available with a short ("PL") inlet. See Fig. 3 for further information.

Technical Data:

Nominal Orifice Size: 1/2-inch (15mm)

Thread Size: 1-inch NPT per ANSI B2.1 or ISO 7-1 R1

Nominal K Factor: 5.6 (80 metric)

Maximum Working Pressure: 175 psi (12 bar) – 100%
factory hydrostatically tested to 500 psi (34.5 bar)

Sprinkler Installation Wrench: Model FC wrench

Sprinkler Identification Number (SIN): RA5114

Materials: See Fig. 4

Temperature Rating

Classification	Sprinkler	Cover Plate	Max. Ambient Temp.
Ordinary	165°F (74°C)	135°F (57°C)	100°F (38°C)
Intermediate	212°F (100°C)	165°F (74°C)	150°F (66°C)

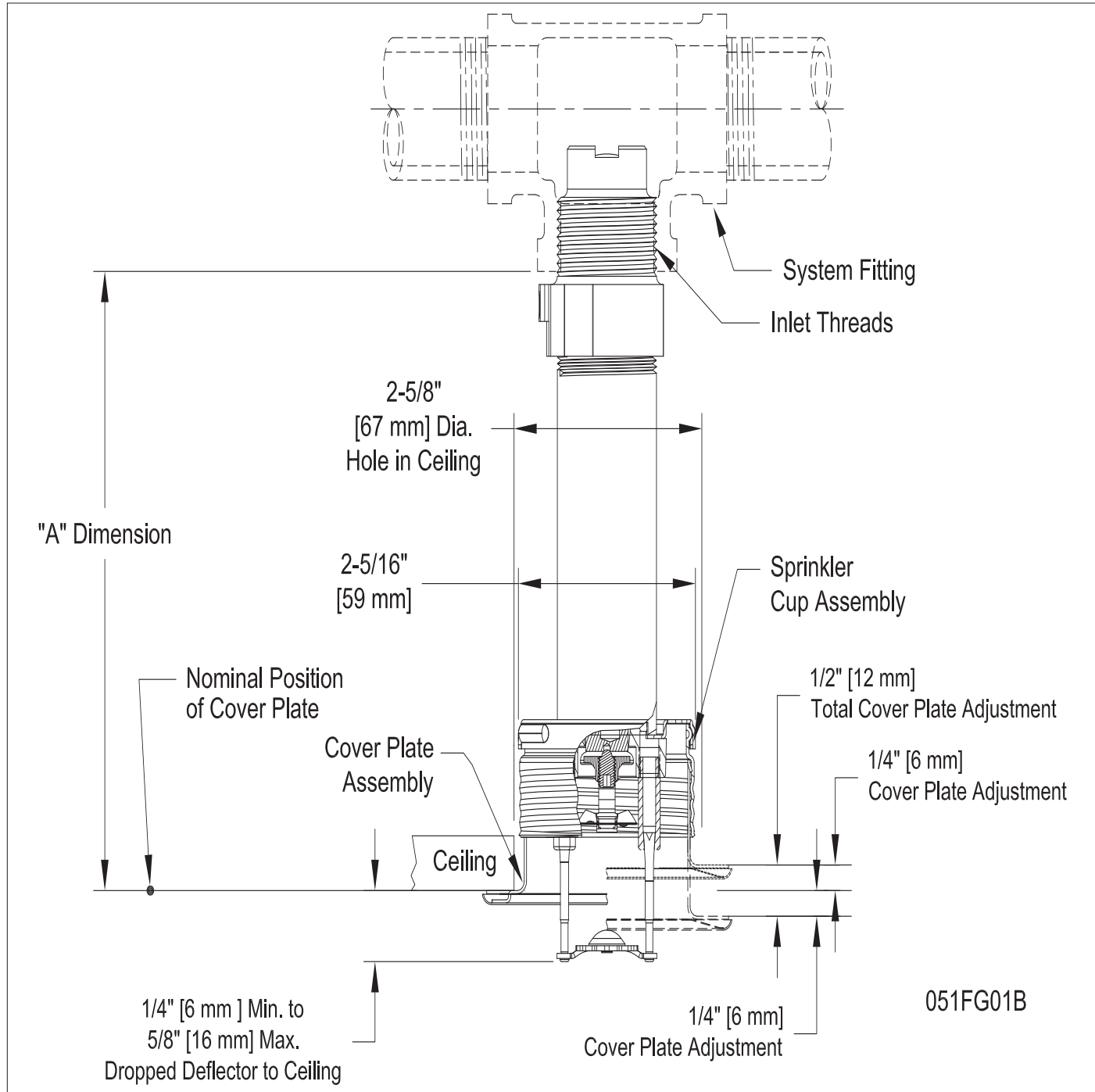


Figure. 1

Note: The “A” dimension is based on a nominally gauged pipe thread “make-up” of 0.600” (15mm) per ANSI B2.1 [7½ threads approximately].

“A” Dim.	4¼” to 48” (108mm to 1219mm) in ¼” (6.35mm) increments
-----------------	--

Cover Plate Finishes

Standard Finishes
White Paint
Chrome
Special Application Finishes
Off White Paint
Black Paint
Custom Color Paint – Specify ⁽¹⁾
Raw Brass (Lacquered)
Bright Brass
Finished Bronze
Black Plated
Satin Chrome
Stainless Steel Clad ⁽²⁾

⁽¹⁾ Custom color paint is semi-gloss, unless specified otherwise.

⁽²⁾ Stainless steel clad cover plates are Type 316 Stainless Steel on the finished side and C102 Copper Alloy on the back side. Cover plates are not listed or approved as corrosion resistant. Stainless steel clad cover plates are not available perforated.



Model FC
Sprinkler Wrench

Optional Cover Plate with Gasket*



Model G4 QR Gasket
Cover Plate
(cULus Listed)



Model G4 SR Gasket
Cover Plate
(FM Approved)

* Model G4 QR Gasket and Model G4 SR Gasket cover plates are sold as assembled units including both the cover plate and gasket. Model G4 QR Gasket and Model G4 SR Gasket cover plates and gaskets are not interchangeable.

Installation Instructions

Model G5-56 Dry sprinklers must only be installed in standard (ANSI B 16.3 class 150 and ANSI B 16.4 class 125) pipe tees in the horizontal position, even at branch line ends. Model G5-56 Dry sprinklers shall not be installed into elbows or pipe couplings located on drop nipples to the sprinklers. In all installations, including into CPVC piping, the dry sprinkler shall be installed with protrusion into the fitting in accordance with the installation diagrams in this Bulletin.

Installation of the Model G5-56 Dry sprinkler is not recommended in copper pipe systems, as this may reduce the life expectancy of the sprinkler. Do not install Model G5-56 Dry sprinklers with the standard (long) inlet fitting into CPVC adapter fittings or tees that have an internal obstruction (see Fig. 3); this will damage the sprinkler, the fitting, or both. A short inlet ("PL") version of the Model G5-56 Dry sprinkler is available for use in existing installations with CPVC adapter fittings or tees having an internal obstruction; Model G5-56 sprinklers with the short inlet fitting shall not be used on dry-

pipe sprinkler systems. The Model G5-56 Dry sprinkler and the cover plate assembly are not intended for installation in corrosive environments, including, but not limited to, those with salt aerosols or chlorine.

Model G5-56 Dry sprinklers must be installed with the Exposed Minimum Barrel Length required by Fig. 2 located in a Heated Area. Do NOT install the sprinkler in ceilings which have positive pressure in the space above.

The following steps must be followed for installation:

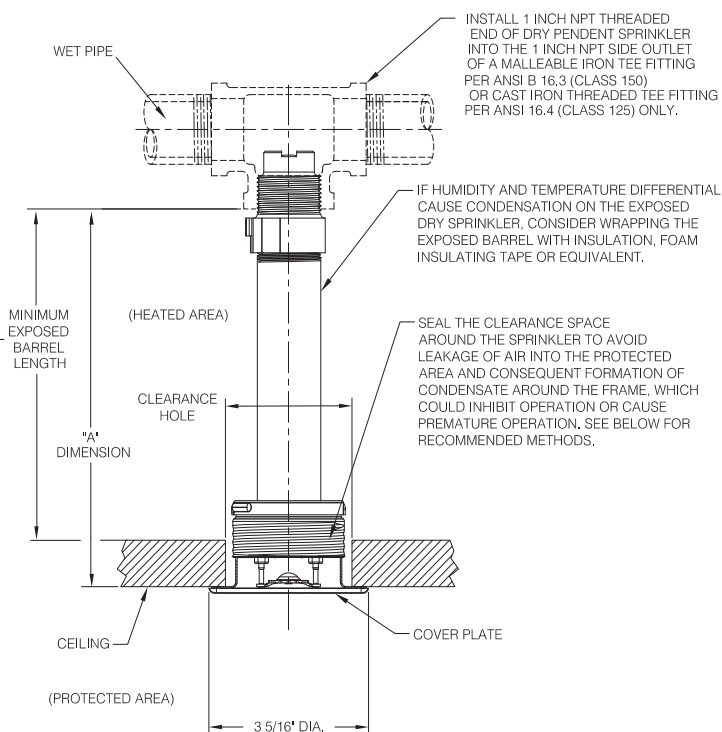
1. Cut a 2⁵/₈-inch (67mm) diameter hole in the ceiling directly in-line with the outlet of the tee.
2. Apply pipe joint compound or Polytetrafluoroethylene (PTFE) tape to the threads of the sprinkler's inlet fitting.
3. A protective cap is provided to protect the drop-down sprinkler deflector from damage which could occur during construction before the cover plate is installed. The cap is factory installed inside the sprinkler cup. Remove the cap to install sprinkler, Step 4, then reinstall cap until the cover plate is installed.
4. Install the sprinkler in the tee using the Model FC wrench. The Model FC wrench has a socket drive which is inserted into the sprinkler's cup and around the body of the sprinkler prior to installation of the sprinkler. Do NOT wrench any of the part of the sprinkler/cup assembly. The sprinkler is then tightened into the pipe fitting to achieve a leak free connection. The recommended minimum to maximum installation torque is 22-30 lb-ft (30 – 40 N-m). When inserting or removing the wrench from the sprinkler/cup assembly, care should be taken to prevent damage to the sprinkler. Reinstall the protective cap following installation of the sprinkler, until the cover plate is installed.
 - a. Alternatively, where access to the outer tube of the sprinkler is available, the Model G5-56 Dry sprinkler may be installed using a pipe wrench. The protective cap should not be removed to install the sprinkler with a pipe wrench. The pipe wrench shall only be permitted to interface with the steel outer tube portion of the sprinkler (Item #8 in Fig. 4). Do NOT wrench any other portion of the sprinkler/cup assembly. A pipe wrench can install the sprinkler into the fitting with a large amount of torque; consideration should be given to the need for future removal of the sprinklers because the installation torque will have to be matched or exceeded to remove the sprinkler. The recommended minimum to maximum installation torque is 22-30 lb-ft (30 – 40 N-m).
5. To install the cover plate, remove the protective cap and install the cover plate by hand turning the cover in the clockwise direction until it is tight against the ceiling. For Model G4 QR Gasket and Model G4 SR Gasket cover plates, the gasket should be attached to the flange of the cover plate skirt only. Do not glue the gasket in place or allow the gasket to overlap both the cover plate and the flange of the skirt.

RECOMMENDED EXPOSED MINIMUM BARREL LENGTH BASED ON AMBIENT TEMPERATURE IN THE PROTECTED AREA

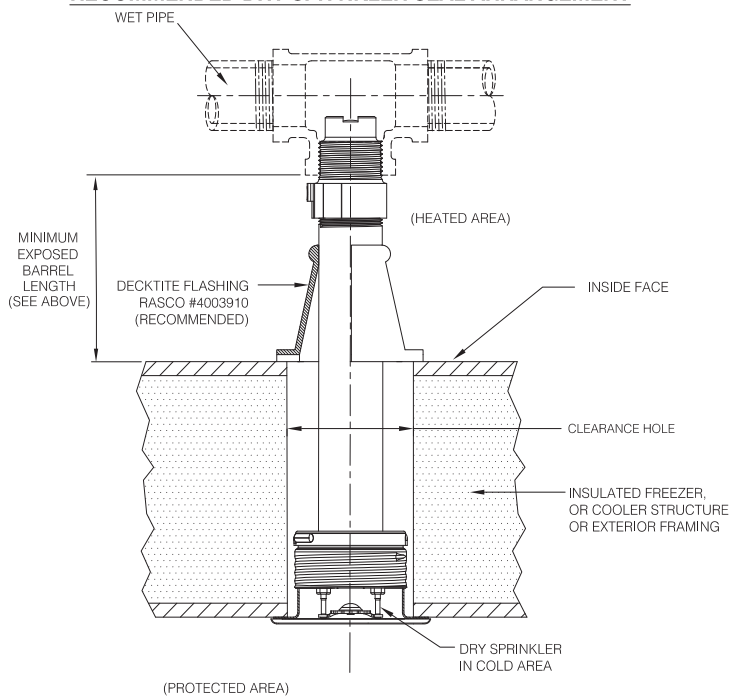
AMBIENT TEMPERATURE OF PROTECTED AREA* AT THE DISCHARGE END OF THE SPRINKLER	EXPOSED BARREL AMBIENT TEMPERATURE		
	40°F/4°C	50°F/10°C	60°F/16°C
	EXPOSED MINIMUM BARREL LENGTH** (FACE OF TEE TO TOP OF CEILING)		
	IN. (MM)	IN. (MM)	IN. (MM)
40°F (4°C)	0	0	0
30°F (-1°C)	0	0	0
20°F (-7°C)	4 (100)	0	0
10°F (-12°C)	8 (200)	1 (25)	0
0°F (-18°C)	12 (300)	3 (75)	0
-10°F (-23°C)	14 (350)	4 (100)	1 (25)
-20°F (-29°C)	14 (350)	6 (150)	3 (75)
-30°F (-34°C)	16 (400)	8 (200)	4 (100)
-40°F (-40°C)	18 (450)	8 (200)	4 (100)
-50°F (-46°C)	20 (500)	10 (250)	6 (150)
-60°F (-51°C)	20 (500)	10 (250)	6 (150)

* FOR AMBIENT TEMPERATURES EXPOSED TO THE DISCHARGE END OF THE SPRINKLER THAT OCCUR BETWEEN THE VALUES LISTED, USE THE NEXT COOLER TEMPERATURE.

** THE MINIMUM EXPOSED BARREL LENGTH IS NOT THE SAME AS THE 'A' DIMENSION. THE MINIMUM EXPOSED BARREL LENGTH IS BASED ON A PROPERLY SEALED PENETRATION WITH A MAXIMUM WIND VELOCITY PN THE EXPOSED SPRINKLER OF 30 MPH (48 KM/H). LONGER EXPOSED BARREL LENGTHS WILL HELP AVOID FREEZING OF THE WET PIPING WHERE HIGHER WIND VELOCITY IS EXPECTED.



RECOMMENDED DRY SPRINKLER SEAL ARRANGEMENT



051FG02

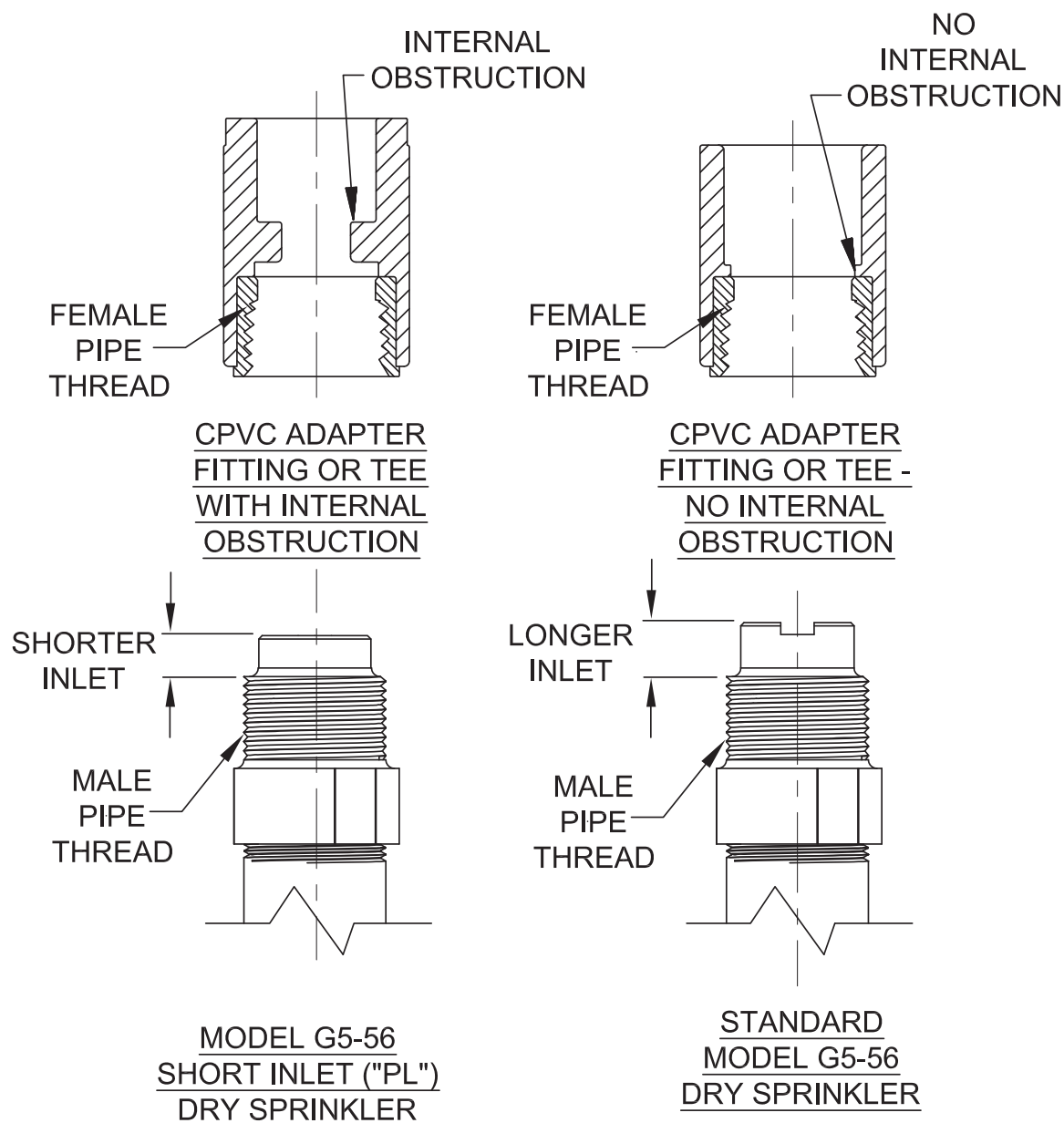
Figure 2

CAUTION

DO NOT INSTALL MODEL G5-56 DRY SPRINKLERS WITH STANDARD INLETS INTO CPVC ADAPTER FITTINGS OR TEES THAT HAVE AN INTERNAL OBSTRUCTION; THIS WILL DAMAGE THE SPRINKLER, THE FITTING, OR BOTH.

CPVC ADAPTER FITTINGS AND TEES WITH INTERNAL OBSTRUCTIONS ARE COMMONLY FOUND DURING THE RETROFITTING PROCESS OF RELIABLE'S OLDER MODEL G3 DRY SPRINKLERS.

A SHORT INLET ("PL") VERSION OF THE MODEL G5-56 DRY SPRINKLER IS AVAILABLE FOR USE IN EXISTING INSTALLATIONS WITH CPVC ADAPTER FITTINGS OR TEES HAVING AN INTERNAL OBSTRUCTION; THE SHORT INLET VERSION SHALL NOT BE USED ON DRY-PIPE SPRINKLER SYSTEMS. VERIFY SPRINKLER AND FITTING DIMENSIONS PRIOR TO INSTALLATION TO AVOID INTERFERENCE.



BE SURE TO ORDER THE CORRECT SPRINKLERS FOR YOUR APPLICATION

051FG03

Figure 3

Maintenance

The Model G5-56 Dry should be inspected and the sprinkler system maintained in accordance with NFPA 25. Do not clean sprinklers with soap and water, ammonia or any other cleaning fluids. Replace any sprinkler that has been painted (other than factory applied) or damaged in any way. Concealed sprinklers cover plates can not be painted in the field, after installation or have any other coating applied other than the factory finish. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinkler should be maintained in the original cartons and packaging to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

Engineering Specification

Model G5-56 Dry Pendent Concealed Sprinkler

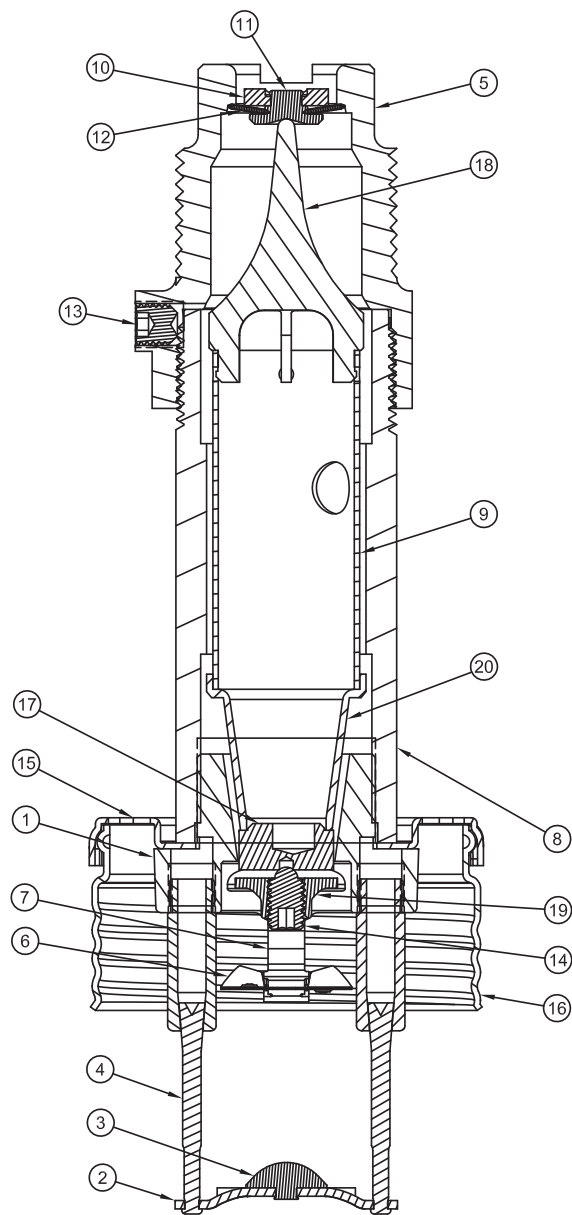
Dry pendent sprinklers shall be dry pendent concealed sprinklers with a flat cover plate. Sprinklers shall be cULus Listed as Quick Response for Light and Ordinary Hazard applications as well as FM Approved as Standard Response. Sprinklers shall be available in lengths from 4¼ inches (108mm) to 48 inches (1219mm) in ¼-inch (6.35mm) increments based on face of fitting to finished ceiling distance. Sprinkler length shall be selected to provide the Exposed Minimum Barrel Length based on the minimum design temperature in the protected area and the minimum temperature in the conditioned space where the barrel is located in accordance with the Manufacturer's written installation instructions. Sprinklers shall have [1-inch NPT][ISO 7-1 R1] threaded inlet fittings with [standard length inlets designed for use with wet- or dry-pipe sprinkler systems][short length inlets designed for use with wet-pipe sprinkler systems having pipe fittings with internal obstructions that prevent the insertion of standard length inlets]. Sprinklers shall have a PTFE coated beryllium nickel Belleville spring washer inlet seal and brass alloy cap that prevent water entry from the sprinkler system piping into the sprinkler prior to actuation. Sprinklers shall have a fast-response fusible link that controls the movement of the inlet seal and cap through a mechanism consisting of link arms, a seat adapter, an orifice adapter, an inner tube, and a yoke. Sprinklers shall use a drop down deflector supported by tapered pins. Sprinklers shall have a galvanized steel cup for threaded attachment of the flat cover plate assembly. Cover plate attachment shall provide up to ½-inch (13mm) of adjustment. Sprinklers shall be [Ordinary temperature classification, 165°F (74°C), with 135°F temperature rated cover plates][Intermediate temperature classification, 212°F, with 165°F temperature rated cover plates]. Cover plates shall be [solid][perforated] with factory applied [White][Chrome][Special Application – Specify] finish. Dry pendent concealed sprinklers shall be Reliable Model G5-56 Dry (SIN RA5114).

Ordering Information

Specify:

1. Sprinkler: Model G5-56 Dry
2. Threads: [1-inch NPT - standard][ISO 7/1 R1 - optional]
3. Inlet Length: [Standard][Short ("PL")– for existing wet-pipe installations only]
4. Cover Plate Finish: [White][Chrome][Special Application – Specify]
5. Sprinkler/Cover Plate Temperature Rating: [Ordinary – 165°F sprinkler with 135°F cover plate][Intermediate – 212°F sprinkler with 165°F cover plate]
6. Nominal Sprinkler Length (face of fitting to face of ceiling - "A" Dimension from Fig. 1): [Specify length – Lengths available from 4¼ inches to 48 inches (108mm to 1219mm) in ¼-inch (6.35mm) increments]

MATERIAL SPECIFICATIONS



ITEM #	DESCRIPTION	MATERIAL
1	BODY, MACH.	DZR BRASS
2	DEFLECTOR	COPPER ALLOY
3	DEFL. SPLITTER	BRASS ALLOY
4	DEFL. PIN	STAINLESS STEEL
5	MEGA-INLET	DZR BRASS
6	LINK ASSY.	NICKEL/BERYLLIUM NICKEL
7	LEVER	COPPER ALLOY
8	OUTER TUBE	GALVANIZED STEEL
9	INNER TUBE	BRASS ALLOY
10	FLIP DISK	BRASS ALLOY
11	CAP	BRASS ALLOY
12	WASHER	PTFE COATED BERYLLIUM NICKEL
13	SET SCREW	STAINLESS OR ALLOY STEEL
14	LOAD SCREW	STAINLESS STEEL
15	BOTTOM CUP	GALVANIZED STEEL
16	TOP CUP	GALVANIZED STEEL
17	ADJ. SEAT ADAPTER	BRASS ALLOY
18	YOKE	BRASS ALLOY
19	CLOSURE YOKE	BRASS ALLOY
20	ORIFICE ADAPTER	BRASS ALLOY

8 (PIPE WRENCH MAY ONLY BE USED ON OUTER STEEL PIPE OF SPRINKLER)

051FG04

Figure 4

Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors
- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gauges
- Identification signs
- Fire department connection

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable.

Products manufactured and distributed by Reliable have been protecting life and property for almost 100.

Manufactured by



Reliable Automatic Sprinkler Co., Inc.

(800) 431-1588

(800) 848-6051

(914) 829-2042

www.reliablesprinkler.com

Sales Offices

Sales Fax

Corporate Offices

Internet Address

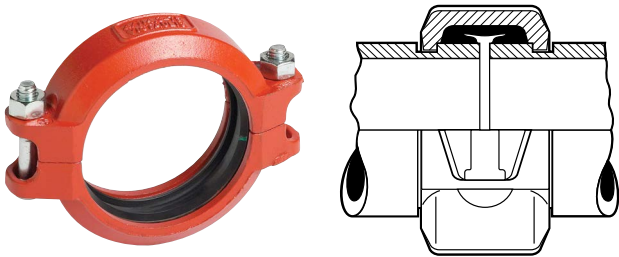


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EG. Printed in U.S.A. 09/16 P/N 9999970480

Victaulic® Flexible Coupling Style 75



Exaggerated for clarity

Approvals/Listings



See Victaulic [publication 10.01](#) for details
See Victaulic [publication 02.06](#) for portable water approvals if applicable.

Product Description

Style 75 is available where moderate pressures are expected or weight considerations are a factor. Up to 50% lighter in weight than the Style 77, the Style 75 coupling is recommended for service up to 500 psi/3450 kPa depending on size. Housings are cast in two identical pieces in all sizes. Hot-dip galvanized and special coatings are available for all sizes.

The Victaulic standard flexible coupling offering for grade “EHP” or “T” gaskets is the Style 177 installation-ready flexible coupling. For all available sizes, the Style 177 is the standard flexible coupling Victaulic supplies in North America for piping systems using Grade “EHP” or “T” gaskets. Contact Victaulic for further details.

Performance data presented in this document is based on use with standard wall, carbon steel pipe. For use with stainless steel pipe, please reference [publication 17.09](#) for pressure ratings and end loads. When used on light wall stainless steel pipe, the Victaulic RX roll set must be used to roll groove the pipe. For further information regarding roll grooving stainless steel, refer to [publication 17.01](#).

 **WARNING**

- Victaulic RX roll sets must be used when grooving light-wall/thin-wall stainless steel pipe for use with Victaulic Couplings.

Failure to use Victaulic RX roll sets when grooving light-wall/thin-wall stainless steel pipe may cause joint failure, resulting in serious personal injury and/or property damage.

NOTICE

- Victaulic RX grooving rolls must be ordered separately. They are identified by a silver color and the designation RX on the front of the roll sets.

Job/Owner

System No.	
Location	

Contractor

Submitted By	
Date	

Engineer

Spec Section	
Paragraph	
Approved	
Date	



Material Specifications

Housing:

Ductile iron conforming to ASTM A-536, grade 65-45-12.
Ductile iron conforming to ASTM A-395, grade 65-45-15,
is available upon special request.

Bolts/Nuts:

Heat-treated plated carbon steel, trackhead meeting the
physical and chemical requirements of ASTM A-449 and
physical requirements of ASTM A-183

Housing Coating: (specify choice)

- ☐ Standard: Orange enamel.
- ☐ Optional: Hot dipped galvanized and others.

Gasket: (specify choice¹)

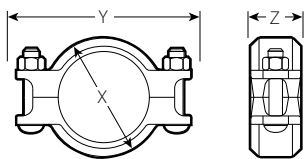
NOTE: Additional gasket styles are available. Contact Victaulic for details.

- ☐ **Grade “E” EPDM**
EPDM (Green stripe color code). Temperature
range –30°F to +230°F/–34°C to +110°C. May be
specified for cold and hot water service within the
specified temperature range plus a variety of dilute
acids, oil-free air and many chemical services. UL
Classified in accordance with ANSI/NSF 61 for cold
+73°F/+23°C and hot +180°F/+82°C potable water
service and ANSI/NSF 372. NOT COMPATIBLE FOR
PETROLEUM SERVICES.
- ☐ **Grade “T” Nitrile**
Nitrile (Orange stripe color code). Temperature range
20°F to +180°F/29°C to +82°C. May be specified for
petroleum products, air with oil vapors, vegetable
and mineral oils within the specified temperature
range. Not compatible for hot water services over
+150°F/+66°C or for hot dry air over +140°F/+60°C.

¹ Services listed are General Service Guidelines only. It should be noted that there are services for which these gaskets are not compatible. Reference should always be made to the latest [Victaulic Gasket Selection Guide](#) for specific gasket service guidelines and for a listing of services which are not compatible.

Dimensions

Style 75



Nominal Size	Actual Outside Diameter	Maximum Working Pressure ²	Maximum End Load ²	Allow. Pipe End Separation ³	Deflection from Centerline ³		Bolt/Nut ⁴	Dimensions			Approx. Weight Each
								X	Y	Z	
inches mm	inches mm	psi kPa	lbs. N	inches mm	Per Cplg. Degrees	Pipe inches/ft. mm/m	(No.) size inches	inches mm	inches mm	inches mm	lbs. kg
1 25	1.315 33.4	500 3450	680 3025	0-0.06 0-1.6	2°-43'	0.57 48	2- 3/8 x 2	2.38 61	4.27 108	1.77 45	1.3 0.6
1 1/4 32	1.660 42.2	500 3450	1080 4805	0-0.06 0-1.6	2°-10'	0.45 38	2- 3/8 x 2	2.68 68	4.61 117	1.77 45	1.4 0.6
1 1/2 40	1.900 48.3	500 3450	1420 6320	0-0.06 0-1.6	1°-56'	0.40 33	2- 3/8 x 2	2.91 74	4.82 122	1.77 45	1.5 0.6
2 50	2.375 60.3	500 3450	2215 9860	0-0.06 0-1.6	1°-31'	0.32 26	2- 3/8 x 2	3.43 87	5.22 133	1.88 48	1.7 0.8
2 1/2 65	2.875 73.0	500 3450	3245 14440	0-0.06 0-1.6	1°-15'	0.26 22	2- 3/8 x 2	3.88 98	5.68 144	1.88 48	1.9 0.9
76.1 mm	3.000 76.1	500 3450	3535 15730	0-0.06 0-1.6	1°-12'	0.26 22	2- 3/8 x 2	4.00 102	5.90 150	1.88 48	1.9 0.9
3 80	3.500 88.9	500 3450	4800 21360	0-0.06 0-1.6	1°-2'	0.22 18	2- 1/2 x 2 3/4	4.50 114	7.00 178	1.88 48	2.9 1.3
3 1/2 90	4.000 101.6	500 3450	6300 28035	0-0.06 0-1.6	0°-54'	0.19 16	2- 1/2 x 2 3/4	5.00 127	7.50 191	1.88 48	2.9 1.3
4 100	4.500 114.3	500 3450	7950 35380	0-0.13 0-3.2	1°-36'	0.34 28	2- 1/2 x 2 3/4	5.80 147	8.03 204	2.13 54	4.1 1.9
108.0 mm	4.250 108.0	450 3100	6380 28395	0-0.13 0-3.2	1°-41'	0.35 29	2- 12 x 70	5.55 141	7.79 198	2.13 54	3.7 1.7
4 1/2 120	5.000 127.0	450 3100	8820 39250	0-0.13 0-3.2	1°-26'	0.25 21	2- 5/8 x 3 1/4	6.13 156	9.43 240	2.13 54	5.5 2.5
5 125	5.563 141.3	450 3100	10935 48660	0-0.13 0-3.2	1°-18'	0.27 23	2- 5/8 x 3 1/4	6.88 175	10.07 256	2.13 54	5.8 2.6
133.0 mm	5.250 133.0	450 3100	9735 43325	0-0.13 0-3.2	1°-21'	0.28 24	2- 16 x 82.5	6.55 166	9.37 238	2.13 54	6.0 2.7
139.7 mm	5.500 139.7	450 3100	10665 47460	0-0.13 0-3.2	1°-18'	0.28 24	2- 5/8 x 3 1/4	6.80 173	9.59 244	2.13 54	6.3 2.9
152.4 mm	6.000 152.4	450 3100	12735 56670	0-0.13 0-3.2	1°-12'	0.21 18	2- 5/8 x 3 1/4	7.38 187	10.48 266	1.88 48	6.2 2.8
6 150	6.625 168.3	450 3100	15525 69085	0-0.13 0-3.2	1°-5'	0.23 18	2- 5/8 x 3 1/4	8.00 203	11.07 281	2.13 54	7.0 3.2
159.0 mm	6.250 159.0	450 3100	13800 61405	0-0.13 0-3.2	1°-9'	0.24 20	2- 16 x 82.5	7.63 194	10.49 266	2.13 54	6.8 3.1
8 200	8.625 219.1	450 3100	26280 116945	0-0.13 0-3.2	0°-50'	0.18 14	2- 3/4 x 4 1/4	10.34 263	13.97 355	2.13 59	12.4 5.6

2 Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard **roll** or **cut** grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe.

3 Allowable Pipe End Separation and Deflection figures show the maximum nominal range of movement available at each joint for standard **roll** grooved pipe. Figures for standard **cut** grooved pipe may be doubled. These figures are maximums; for design and installation purposes these figures should be reduced by: 50% for 3/4 - 3 1/2"/20 - 90 mm; 25% for 4"/100 mm and larger.

4 Number of bolts required equals number of housing segments.

General Notes

Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.

WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1½ times the figures shown.

Installation

Reference should always be made to the [I-100 Victaulic Field Installation Handbook](#) for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Trademarks

Victaulic® is a registered trademark of Victaulic Company.

Reducing Coupling

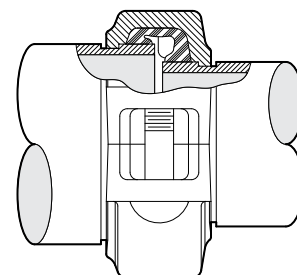
STYLE 750

211313 - Wet-Pipe Sprinkler System

The Style 750 Reducing Coupling permits direct reduction on the piping run. Designed to replace two couplings and a reducing fitting, the Style 750 features a special reducing gasket for pressure responsive sealing. A steel washer which prevents telescoping of the smaller pipe inside the larger pipe during vertical systems assembly is available upon request.



501



Exaggerated for clarity

MATERIAL SPECIFICATIONS

Housing: Ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

Housing Coating: Orange enamel

- **Optional:** Hot dipped galvanized and others

Gasket: (Specify choice*):

- **Grade "E" EPDM (All other sizes)**

EPDM (Green color code). Temperature range -30°F to $+230^{\circ}\text{F}$ / -34°C to $+110^{\circ}\text{C}$.

Recommended for cold and hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL classified in accordance with ANSI/NSF 61 for cold $+86^{\circ}\text{F}/+30^{\circ}\text{C}$ and hot $+180^{\circ}\text{F}/+82^{\circ}\text{C}$ potable water service. NOT RECOMMENDED FOR PETROLEUM SERVICES.

- **Grade "T" nitrile**

Nitrile (Orange color code). Temperature range -20°F to $+180^{\circ}\text{F}$ / -29°C to $+82^{\circ}\text{C}$.

Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range. Not recommended for hot water services over $+150^{\circ}\text{F}/+66^{\circ}\text{C}$ or for hot dry air over $+140^{\circ}\text{F}/+60^{\circ}\text{C}$.

* Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide for specific gasket service recommendations and for a listing of services which are not recommended.

- **Optional:** Assembly Washer: Galvanized, carbon steel

Bolts/Nuts: Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

JOB/OWNER

System No. _____

Location _____

CONTRACTOR

Submitted By _____

Date _____

ENGINEER

Spec Sect _____ Para _____

Approved _____

Date _____

www.victaulic.com

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REV_J



06.08_1

Reducing Coupling

501

STYLE 750

DIMENSIONS

Size			Max. Work Pressure *	Max. End Load *	Allow. Pipe End Sep. †	Deflect. Fr. C _L †		Bolt/Nut@ No - Size	Dimensions – Inches/mm			Approx. Wgt. Each
Nominal Size Inches/mm			psi kPa	Lbs. N	Inches/ mm	Per Cplg. Deg.	Pipe In./Ft. mm/m	Inches	X	Y	Z	Lbs. kg
2 50	×	1 25	350 2410	500 2225	0 – 0.07 0 – 1.8	0° – 57°	0.20 17	2 – 3/8 x 2	3.38 85	5.28 134	1.88 48	2.7 1.2
		1 1/2 40	350 2410	1000 4450	0 – 0.07 0 – 1.8	0° – 57°	0.20 17	2 – 3/8 x 2	3.38 85	5.28 134	1.88 48	2.0 1.0
2 1/2 65	×	2 50	500 3450	2215 9850	0 – 0.07 0 – 1.8	0° – 47°	0.16 14	2 – 3/8 x 2	4.00 102	5.93 151	1.88 48	3.1 1.4
76.1 mm	×	2 50	350 2410	1550 6900	0 – 0.07 0 – 1.8	0° – 47°	0.16 14	2 – 1/2 x 2 3/4	4.38 111	6.63 168	1.88 48	4.6 2.1
3 80	×	2 50	350 2410	1550 6900	0 – 0.07 0 – 1.8	0° – 39°	0.13 11	2 – 1/2 x 2 3/4	4.75 121	7.13 181	1.88 48	4.9 2.2
		2 1/2 65	500 3450	3250 14460	0 – 0.07 0 – 1.8	0° – 39°	0.13 11	2 – 1/2 x 2 3/4	4.75 121	7.13 181	1.88 48	4.3 2.0
88.9 mm	×	76.1 mm	350 2410	2475 11010	0 – 0.07 0 – 1.8	0° – 39°	0.13 11	2 – 1/2 x 2 3/4	4.75 121	7.13 181	1.88 48	4.2 1.9
4 100	×	2 50	350 2410	1550 6900	0 – 0.13 0 – 3.2	1° – 19°	0.28 25	2 – 5/8 x 3 1/4	6.25 159	8.90 226	2.25 57	8.1 3.7
		2 1/2 65	350 2410	2275 10125	0 – 0.13 0 – 3.2	1° – 19°	0.28 25	2 – 5/8 x 3 1/4	6.25 159	8.90 226	2.25 57	8.6 3.9
		3 80	500 3450	4810 21400	0 – 0.13 0 – 3.2	1° – 19°	0.28 25	2 – 5/8 x 3 1/4	6.00 152	8.90 226	2.25 57	6.7 3.0
114.3 mm	×	76.1 mm	350 2410	2475 11014	0 – 0.13 0 – 3.2	1° – 19°	0.28 25	2 – 5/8 x 3 1/4	6.25 159	8.90 226	2.25 57	6.9 3.1
5 125	×	4 100	350 2410	5565 24765	0 – 0.13 0 – 3.2	1° – 3°	0.22 19	2 – 3/4 x 4 1/4	7.18 182	10.70 272	2.13 54	11.2 5.1
6 150	×	4 100	350 2410	5565 24765	0 – 0.13 0 – 3.2	0° – 52°	0.18 15	2 – 3/4 x 4 1/4	8.63 181	11.90 302	2.25 57	16.7 7.6
		5 125	350 2410	8500 37825	0 – 0.13 0 – 3.2	0° – 52°	0.18 15	2 – 3/4 x 4 1/4	8.31 211	11.90 302	2.25 57	12.9 5.9
165.1 mm	×	4 100	350 2410	5565 24765	0 – 0.13 0 – 3.2	0° – 55°	0.19 16	2 – 3/4 x 4 1/4	8.63 219	11.90 302	2.25 57	15.2 6.9
8 200	×	6 150	350 2410	12060 53645	0 – 0.13 0 – 3.2	0° – 38°	0.13 11	2 – 7/8 x 5	10.81 275	14.88 378	2.50 64	22.4 10.2
219.1 mm	×	165.1 mm	350 2410	11610 51645	0 – 0.13 0 – 3.2	0° – 38°	0.13 11	2 – 7/8 x 5	10.75 273	14.88 378	2.50 64	23.2 10.5
10 273	×	8 219.1	350 2410	20450 90970	0 – 0.13 0 – 3.2	0° – 25°	0.9 8	2 – 1 x 5 1/2	13.12 333	17.26 438	2.62 67	31.4 14.2

Style 750 Reducing couplings should not be used with end caps (#60) in systems where a vacuum may be developed. Contact Victaulic for details.

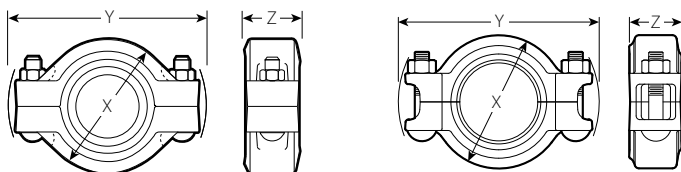
* Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard **roll** or **cut** grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe. Maximum working pressure rating based on larger pipe size. Maximum End Load rating based on smaller pipe size. WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1 1/2 times the figures shown.

† Allowable Pipe End Separation and Deflection figures show the maximum nominal range of movement available at each joint for standard **roll** grooved pipe. Figures for standard **cut** grooved pipe may be doubled. These figures are maximums; for design and installation purposes these figures should be reduced by: 50% for 3/4 – 3 1/2"/20 – 90 mm; 25% for 4"/100 mm and larger.

@ Number of bolts required equals number of housing segments.

Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.

WARNING: Depressurize and drain the piping system before attempting to install, remove, or adjust any Victaulic piping products.



Reducing Coupling

501

STYLE 750

FLOW DATA

HEAD LOSS

The head loss across Style 750 Reducing coupling is very small and is essentially the same as for standard short body reducing pipe fittings.

Equivalent lengths of standard weight steel pipe are shown in the tables. All data is based on water flowing at ambient temperature.

FLOW REDUCING

Size			Equiv. Pipe Length
Nominal Size Inches/mm			Sm. Dia. Feet/m
2 50	×	1 25	5.9 1.8
		1½ 40	2.0 0.6
2½ 65	×	2 50	1.9 0.6
76.1 mm	×	2 50	1.9 0.6
3 80	×	2 50	5.5 1.7
		2½ 65	3.8 1.2
88.9 mm	×	76.1 mm	3.8 1.2
4 100	×	2 50	6.0 1.8
		2½ 65	6.0 1.8
		3 80	6.0 1.8
114.3 mm	×	76.1 mm	6.0 1.8
5 125	×	4 100	3.0 0.9
		6 150	6.0 1.8
6 150	×	4 100	6.0 1.8
		5 125	4.5 1.4
165.1 mm	×	4 100	6.0 1.8
8 200	×	6 150	7.3 2.2
		219.1 mm	7.3 2.23
10 273	×	8 219.1	8.7 2.65

FLOW EXPANDING

Size			Equiv. Pipe Length
Nominal Size Inches/mm			Sm. Dia. Feet/m
1 25	×	2 50	2.7 0.8
1½ 40	×	2 50	1.9 0.6
2 50	×	2½ 65	1.0 0.3
		76.1 mm	1.0 0.3
		3 80	3.5 1.1
2½ 65	×	4 100	3.0 0.9
		3 80	2.5 0.8
		4 100	3.0 0.9
76.1 mm	×	88.9 mm	2.5 0.8
		114.3 mm	3.0 0.9
3 80	×	4 100	2.5 0.8
4 100	×	5 125	3.3 1.0
		6 150	4.6 1.4
		165.1 mm	4.6 1.4
5 125	×	6 150	2.3 0.7
6 150	×	8 200	6.0 1.8
		165.1 mm	5.4 1.65
8 219.1	×	10 273	6.3 1.92

Reducing Coupling

501

STYLE 750

INSTALLATION

Reference should always be made to the I-100 Victaulic Field Installation Handbook for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

WARRANTY

Refer to the Warranty section of the current Price List or contact Victaulic for details.

NOTE

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

For complete contact information, visit www.victaulic.com

06.08 1536 REV J UPDATED 08/2012

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06.08



FireLock® Fittings



Material Specifications:

Fitting:

Ductile iron conforming to ASTM A-536, grade 65-45-12.

Fitting Coating:

- ☐ Orange enamel
- ☐ Red enamel in Europe, Middle East, Africa, and India
- ☐ Optional: Hot dipped galvanized

Approvals/Listings:



Product Description:

FireLock® products comprise a unique system specifically designed for fire protection services. FireLock full-flow elbows and tees feature CAD-developed, hydrodynamic design, affording a shorter center-to-end dimension than standard fittings. A noticeable bulge allows the water to make a smoother turn to maintain similar flow characteristics as standard full flow fittings.

FireLock fittings are designed for use exclusively with Victaulic couplings that have been Listed or Approved for Fire Protection Services. Use of other couplings or flange adapters may result in bolt pad interference.

Refer to the appropriate listing agency or approval body for pressure ratings. Pressure ratings vary by agency.

Job/Owner

System No.	
Location	

Contractor

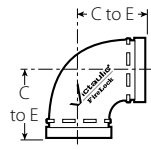
Submitted By	
Date	

Engineer

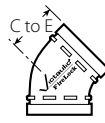
Spec Section	
Paragraph	
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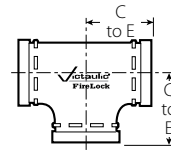
Dimensions:



NO. 001



NO. 003



NO. 002



No. 006

Nominal Size inches mm	Actual Outside Diameter inches mm	No. 001 90° Elbow		No. 003 45° Elbow		No. 002 Straight Tee		No. 006 Cap	
		C to E inches mm	Approx. Weight Each Lbs. kg	C to E inches mm	Approx. Weight Each Lbs. kg	C to E inches mm	Approx. Weight Each Lbs. kg	C to E inches mm	Approx. Weight Each Lbs. kg
1 ¼ 32	1.660 42.4	—	—	—	—	—	—	0.82 21	0.3 0.1
1 ½ 40	1.900 48.3	—	—	—	—	—	—	0.82 21	0.4 0.2
2 50	2.375 60.3	2.75 70	1.7 0.8	2.00 51	1.8 0.8	2.75 70	2.4 1.1	0.88 22	0.6 0.3
2 ½ 65	2.875 73.0	3.00 76	3.1 1.4	2.25 57	2.2 1.0	3.00 76	3.6 1.6	0.88 22	1.0 0.5
76.1 mm	3.000 76.1	3.00 76	3.30 1.5	2.25 57	2.4 1.1	3.00 76.2	3.8 1.7	—	—
3 80	3.500 88.9	3.38 86	4.0 1.8	2.50 64	3.1 1.4	3.38 86	5.3 2.4	0.88 22	1.2 0.5
108 mm	4.250 108.0	4.00 102	5.7 2.6	3.00 76	5.1 2.3	4.00 102	7.5 3.4	—	—
4 100	4.500 114.3	4.00 102	6.7 3.0	3.00 76	5.6 2.5	4.00 102	8.7 3.9	1.00 25	2.4 1.1
5 125	5.563 141.3	4.88 124	12.6 5.7	3.25 83	8.3 3.8	4.88 124	15.7 7.1	1.00 25	4.1 1.9
139.7 mm	5.500 139.7	4.88 124.0	12.4 5.6	3.25 82.6	8.2 3.7	4.88 124.0	15.4 6.9	—	—
159 mm	6.250 158.8	5.50 140	12.6 5.7	3.50 89	9.2 4.2	5.50 140	17.9 8.0	—	—
6 150	6.625 168.3	5.50 140	18.3 8.3	3.50 89	11.7 5.3	5.50 140	22.7 10.3	1.00 25	5.9 2.7
165.1 mm	6.500 165.1	5.43 139.7	17.6 7.9	3.50 88.9	11.4 5.2	5.50 139.7	22.0 9.9	—	—
8 200	8.625 219.1	6.81 173	25.5 11.6	4.25 108	20.4 9.3	6.94 176	38.7 17.6	1.13 29	12.7 5.8

Flow Data:

Nominal Size inches mm	Actual Outside Diameter inches mm	Frictional Resistance Equivalent Feet/meters of Straight Pipe ¹			
		Elbows		No. 002 Straight Tee	
		No. 001 90° Elbow	No. 003 45° Elbow	Branch	Run
1 ¼ 32	1.660 42.4	— —	— —	— —	— —
1 ½ 40	1.900 48.3	— —	— —	— —	— —
2 50	2.375 60.3	3.5 1.1	1.8 0.5	8.5 2.6	3.5 1.1
2 ½ 65	2.875 73.0	4.3 1.3	2.2 0.7	10.8 3.3	4.3 1.3
76.1 mm	3.000 76.1	4.5 1.4	2.3 0.7	11.0 3.4	4.5 1.4
3 80	3.500 88.9	5.0 1.5	2.6 0.8	13.0 4.0	5.0 1.5
108 mm	4.250 108.0	6.4 2.0	3.2 0.9	15.3 4.7	6.4 2.0
4 100	4.500 114.3	6.8 2.1	3.4 1.0	16.0 4.9	6.8 2.1
5 125	5.563 141.3	8.5 2.6	4.2 1.3	21.0 6.4	8.5 2.6
139.7 mm	5.500 139.7	8.3 2.5	4.1 1.3	20.6 6.3	8.3 2.5
159 mm	6.250 158.8	9.4 2.9	4.9 1.5	25.0 7.6	9.6 2.9
6 150	6.625 168.3	10.0 3.0	5.0 1.5	25.0 7.6	10.0 3.0
165.1 mm	6.500 165.1	9.8 3.0	4.9 1.5	24.5 7.5	9.8 3.0
8 200	8.625 219.1	13.0 4.0	5.0 1.5	33.0 10.1	13.0 4.0

¹ The flow data listed is based upon the pressure drop of Schedule 40 pipe.

General Notes:

NOTE: When assembling FireLock EZ couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For FireLock EZ Style 009N/009H couplings, use FireLock No. 006 end caps containing the “EZ” marking on the inside face or No. 60 end caps containing the “QV EZ” marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009/009V/009H couplings.

Installation

Reference should always be made to the [I-100 Victaulic Field Installation Handbook](#) for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Trademarks

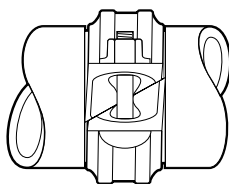
Victaulic® is a registered trademark of Victaulic Company.

FireLock® Rigid Coupling**Style 005H****with Vic-Plus™ Gasket System**

10.02



Patented



Exaggerated for clarity

**Approvals/Listings:**

104-1a/02

See Victaulic Publication 10.01 for more details.

LPC and VdS Approved, see notes on page 3

Product Description:

FireLock Style 005H rigid coupling has a unique, patented angle-pad design which allows the housings to offset while clamping the grooves. By permitting the housings to slide on the angled bolt pads, rigidity is obtained.

Support and hanging requirements correspond to NFPA 13 Sprinkler Systems. Angle-pad design permits assembly by removing one nut/bolt and swinging the housing over the gasket. This reduces components to handle during assembly.

Style 005H FireLock coupling are designed and recommended for use ONLY on fire protection systems.

Vic-Plus™ Gasket System:

Victaulic offers a gasket system which requires no field lubrication on wet pipe systems that are hydrostatically tested. The Vic-Plus System (patented) is dry, clean, and non-toxic. It reduces assembly time substantially and eliminates the mess and chance of over-lubrication. Please refer to the latest copy of the Victaulic Field Installation Handbook (I-100) for supplemental lubrication requirements and dry pipe fire protection system notes.

Job/Owner

System No.	
Location	

Contractor

Submitted By	
Date	

Material Specifications:

Housing: Ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

Housing Coating: (specify choice)

Standard: Orange enamel (North America); red enamel (Europe)

☐ Optional: Hot dipped galvanized

Coupling Gasket: (specify choice)

NOTE: Additional gasket styles are available. Contact Victaulic for details.

☐ Grade "E" EPDM Type A Vic-Plus™ Gasket System¹

EPDM (Violet color code). FireLock products have been Listed by Underwriters Laboratories Inc. and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services up to the rated working pressure using the Grade "E" Type A Vic-Plus™ Gasket System, requiring no field lubrication for most installation conditions.

☐ Grade "L" silicone

Recommended for dry heat, air without hydrocarbons to +350°F and certain chemical services.

For dry services, Victaulic continues to recommend the use of Grade "E" Type A FlushSeal® Gasket. Contact Victaulic for details.

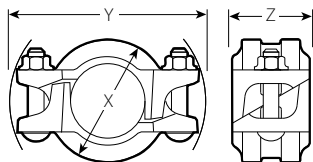
Bolts/Nuts: Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

¹ Standard gasket and FlushSeal gasket approved for dry pipe systems to -40°F/-40°C. Based on "typical" pipe surface conditions, supplemental lubricant is recommended for services installed below 0°F/-18°C and for all dry pipe systems or systems to be subjected to air tests prior to being filled with water. Supplemental lubrication may also be required on pipe with raised or undercut weld seams or pipe that has voids and/or cracks at the weld seams. Victaulic continues to recommend the use of FlushSeal gaskets for dry services.

Engineer

Spec Section	
Paragraph	
Approved	
Date	



Dimensions:

Rated for wet and dry sprinkler systems at 350 psi/2413 kPa for 1 ¼ – 4"/32 – 100 mm sizes and 300 psi /2068 kPa for 4 ¼ – 8"/108 – 200 mm sizes; Schedule 10 roll grooved or Schedule 40 cut or roll grooved steel pipe. Style 005H is rigid and does not accommodate expansion, contraction or angular deflection.

Nominal Size inches mm	Actual Outside Diameter inches mm	Maximum Working Pressure ^{1 4} psi kPa	Maximum End Load ¹ lbs. N	Allow. Pipe End Separation ² inches mm	Bolt/Nut ³ No. – size inches	Dimensions			Approx. Weight Each lbs. kg
						X inches mm	Y inches mm	Z inches mm	
1 ¼ 32	1.660 42.4	350 2413	755 3370	0.05 1.2	2 – ⅜ × 2 ¼	2.75 70	4.50 114	1.88 48	1.2 0.5
1 ½ 40	1.900 48.3	350 2413	990 4415	0.05 1.2	2 – ⅜ × 2 ¼	3.00 76	4.75 121	1.88 48	1.2 0.5
2 50	2.375 60.3	350 2413	1550 6900	0.07 1.7	2 – ⅜ × 2 ½	3.50 89	5.25 133	1.88 48	1.6 0.7
2 ½ 65	2.875 73.0	350 2413	2270 10110	0.07 1.7	2 – ⅜ × 2 ½	4.00 102	5.75 146	1.88 48	1.9 .09
76.1 mm	3.000 76.1	350 2413	2475 11010	0.07 1.7	2 – ⅜ × 2 ½	4.13 105	5.75 146	1.88 48	1.9 0.9
3 80	3.500 88.9	350 2413	3365 14985	0.07 1.7	2 – ⅜ × 2 ½	4.63 118	6.13 156	1.88 48	2.1 1.0
4 100	4.500 114.3	350 2413	5565 24770	0.16 4.1	2 – ⅜ × 2 ½	5.75 146	7.25 184	2.13 54	3.1 1.4
108.0 mm	4.250 108.0	300 2068	4255 18940	0.16 4.1	2 – ⅜ × 2 ½	5.63 143	7.25 184	2.13 54	3.1 1.4
5 125	5.563 141.3	300 2068	7290 32445	0.16 4.1	2 – ½ × 3	6.88 175	9.00 229	2.13 54	4.5 2.0
133.0 mm	5.250 133.0	300 2068	6495 28900	0.16 4.1	2 – ½ × 2 ¾	6.63 168	9.00 229	2.13 54	4.5 2.0
139.7 mm	5.500 139.7	300 2068	7125 31715	0.16 4.1	2 – ½ × 2 ¾	6.88 175	9.00 229	2.13 54	4.8 2.2
6 150	6.625 168.3	300 2068	10340 46020	0.16 4.1	2 – ½ × 3	8.00 203	10.00 254	2.13 53	5.0 2.3
159.0 mm	6.250 159.0	300 2068	9200 40955	0.16 4.1	2 – ½ × 2 ¾	7.63 194	10.00 254	2.13 54	5.5 2.5
165.1 mm	6.500 165.1	300 2068	9955 44295	0.16 4.1	2 – ½ × 3	8.15 207	10.00 254	2.13 54	5.5 2.5
8 200	8.625 219.1	300 2068	17525 78000	0.19 4.8	2 – ⅝ × 4 ¼	10.50 267	13.14 334	2.63 67	11.3 5.1

- 1 Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe. WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1½ times the figures shown.
- 2 The allowable pipe separation dimension shown is for system layout purposes only. Style 005H couplings are considered rigid connections and will not accommodate expansion or contraction of the piping system.
- 3 Number of bolts required equals number of housing segments. Metric thread size bolts are available (color coded gold) for all coupling sizes upon request. Contact Victaulic for details.
- 4 Style 005H couplings are VdS and LPC Approved to 16 Bar/235 psi.

Listings/Approvals:

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approvals agencies.

Contact Victaulic for performance on other pipe and the latest listings and approvals.

Related Working Pressure psi					Related Working Pressure psi					Related Working Pressure psi				
Pipe Sch.	Size inches	UL	ULC	FM	Pipe Sch.	Size inches	UL	ULC	FM	Pipe Sch.	Size inches	UL	ULC	FM
5	1¼ – 3	175	175	175	EL	1¼ – 2	300	N/A	N/A	MT	1¼ – 2	300	N/A	N/A
10, 40	1¼ – 3	350	350	350	ET	1¼ – 2	300	N/A	N/A	STF	1¼ – 4	N/A	N/A	300
	5 – 8	300	300	300	EZ	4 – 6	300 ⁵	N/A	300	Steady Thd.	1¼ – 2	N/A	N/A	300
BLT	1¼ – 2	300	300	N/A	FF	1¼ – 4	N/A	N/A	300	TF	3 – 8	N/A	N/A	300
DF	1¼ – 4	300	300	300	GAL -7	1¼ – 2	300	N/A	N/A	WLS	1¼ – 2	300	300	N/A
DT	1¼ – 2	300	300	N/A	MLT	1¼ – 2	300	N/A	N/A	XL	1¼ – 3	300	300	300
EF	1¼ – 4	175 ⁷	N/A	175	MF	1¼ – 4	300	N/A	300 ⁵					

5 FM approved for service in 1 1/2 – 4" pipe.

6 UL Listed for service up to 4" pipe only.

7 UL Listed for service up to 3" only.

Installation

Reference should always be made to the [I-100 Victaulic Field Installation Handbook](#) for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Trademarks

Victaulic® is a registered trademark of Victaulic Company.

Style 744 FireLock® Flange Adapter

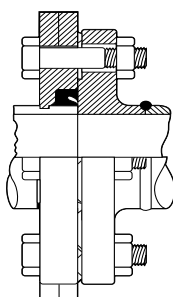
with Vic-Plus™ Gasket System



PRODUCT DESCRIPTION



2 - 8" Sizes



(Exaggerated for clarity)

Style 744 FireLock Flange adapter is designed for directly incorporating flanged components with ANSI CL. 125 or CL. 150 bolt hole patterns into a grooved pipe system. Sizes 2 - 8" (50 - 200 mm) are hinged for easy handling with integral end tabs which facilitate assembly.

The design incorporates small teeth inside the key shoulder I.D. to prevent rotation.

Because of the outside flange dimension, FireLock Flange adapters should not be used on FireLock fittings. When wafer or lug-type valves are used adjoining a Victaulic fitting, check disc dimensions to assure proper clearance.

FireLock Flange adapters should not be used as anchor points for tie-rods across nonrestrained joints. Mating rubber faced flanges, valves, etc., require the use of a FireLock Flange washer.

FireLock Flange adapters with Vic-Plus gaskets do not require lubrication. The gasket must always be assembled with the color coded lip on the pipe and the other lip facing the mating flange.

Style 744 FireLock Flange Adapters with the Vic-Plus™ Gasket System are designed and recommended for use ONLY on fire protection systems.

Vic-Plus Gasket System:

Victaulic® now offers a gasket system which requires no field lubrication on wet pipe systems. The Vic-Plus™ System (patented) is dry, clean, and non-toxic. It reduces assembly time substantially and eliminates the mess and chance of over-lubrication. Please refer to the latest copy of the Victaulic Field Installation Handbook (I-100) for supplemental lubrication requirements.

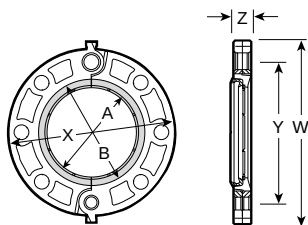


See Victaulic publication 10.01 for details.

DIMENSIONS

Style 744

Sizes 2 - 8" (50 - 200 mm)
ANSI Class 125 and 150 Flange



Note: Gray area of mating face must be free from gouges, undulations or deformities of any type for effective sealing.

Pipe Size		Max. Work Press.* PSI kPa	Max. End Load* Lbs. N	No. Bolts † Req'd.	Bolt Size † Inches	Sealing Surface Inches/mm		Dimensions Inches/millimeters				Aprx. Wgt. Each Lbs. kg
Nominal Diameter In./mm	Actual Outside Diameter In./mm					"A" Max.	"B" Min.	W	X	Y	Z	
2 50	2.375 60,3	175 1200	775 3450	4	5/8 X 2 3/4	2.38 60	3.41 87	6.75 172	6.00 152	4.75 121	0.75 19	2.7 1,2
2 1/2 65	2.875 73,0	175 1200	1135 5050	4	5/8 X 3	2.88 73	3.91 99	7.88 200	7.00 178	5.50 140	0.88 22	4.2 1,9
3 80	3.500 88,9	175 1200	1685 7500	4	5/8 X 3	3.50 89	4.53 115	8.44 214	7.50 191	6.00 152	0.94 24	4.8 2,2
4 100	4.500 114,3	175 1200	2780 11045	8	5/8 X 3	4.50 114	5.53 141	9.94 252	9.00 229	7.50 191	0.94 24	7.1 3,2
5 125	5.563 141,3	175 1200	4250 18920	8	3/4 X 3 1/2	5.56 141	6.71 171	11.00 279	10.00 254	8.50 216	1.00 25	8.3 3,8
6# 150	6.625 168,3	175 1200	6030 26840	8	3/4 X 3 1/2	6.63 168	7.78 198	12.00 305	11.00 279	9.50 241	1.00 25	9.3 4,2
8# 200	8.625 219,1	175 1200	10219 45475	8	3/4 X 3 1/2	8.63 219	9.94 252	14.63 372	13.50 343	11.75 298	1.13 29	13.9 6,3

*Refer to notes below.

†Total bolts required to be supplied by installer. Bolt sizes for conventional flange-to-flange connection. Larger bolts are required when Vic-Flange adapter is utilized with wafer-type valves.

Not available with Vic-Plus gasket system. Lubrication is required.

NOTES

* Working Pressure and End Load are total, from all internal and external loads, based on standard weight steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. Contact Victaulic for performance on other pipe.

WARNING: FOR ONE TIME FIELD TEST ONLY, the Maximum Joint Working Pressure may be increased to 1 1/2 times the figures shown.

Style 744 FireLock Flange adapters provide rigid joints when used on pipe with standard roll or cut groove dimensions and consequently allow no linear or angular movement at the joint.

WARNING: Depressurize and drain the piping system before attempting to install, remove, or adjust any Victaulic piping products.

VIC-FLANGE ADAPTER NOTES

- 1 The Style 744 (2 - 8"/50 - 200 mm) design incorporates small teeth inside the key shoulder I.D. to prevent rotation.
- 2 FireLock Flange adapter should not be used on FireLock fittings. When wafer or lug-type valves are used adjoining a Victaulic fitting, check disc dimensions to assure proper clearance.
- 3 FireLock Flange adapters should not be used as anchor points for tie-rods across nonrestrained joints. Mating rubber faced flanges, valves, etc. require the use of a FireLock Flange washer.
- 4 Area A-B noted in the above drawing must be free from gouges, undulations or deformities of any type for effective sealing.
- 5 FireLock Flange adapter gaskets must always be assembled with the color coded lip on the pipe and the other lip facing the mating flange.
- 6 Flange Washers: FireLock Flange adapters require a smooth hard surface at the mating flange face for effective sealing. Some applications for which the Vic-Flange adapter is otherwise well suited do not provide an adequate mating surface. In such cases, it is recommended that a metal Flange Washer be inserted between the FireLock Flange adapter and the mating flange to provide the necessary sealing surface.

Typical applications where a Flange Washer should be used are:

- A When mating to a serrated flange: a standard flat flange gasket should be used adjacent to the serrated flange and then the Flange Washer is inserted between the FireLock Flange adapter and the flange gasket.
- B When mating to a wafer valve: where typical valves are rubber lined and partially rubber faced (smooth or not), the Flange Washer is placed between the valve and the FireLock Flange adapter.
- C When mating a rubber faced flange: the Flange Washer is placed between the FireLock Flange adapters and the rubber faced flange.
- D When mating AWWA cast flanges to IPS flanges: the Flange Washer is placed between two FireLock Flanges. The hinge points must be oriented approximately 90° to each other. If one flange is not a FireLock Flange adapter (e.g. flanged valve), then a standard flat flange gasket must be placed adjacent to that flange and the Flange Washer inserted between the flange gasket and the FireLock Flange adapter.
- E When mating to components (valves, strainers, etc.) where the component flange face has an insert: follow the same arrangement as in Application 1.
- F When mating to a Series 705-W Butterfly valve, Style 744 may only be used on one side of the connection.

When ordering Flange Washers, always specify product style (Style 744) and size to assure proper Flange Washer is supplied.

MATERIAL SPECIFICATIONS

Flange Housing: Ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

Coating: Black enamel

- **Optional:** Hot dipped galvanized

Bolts/Nuts: Supplied by installer

Gasket:

- **Grade "E" EPDM - Type A Vic-Plus Gasket System Δ**
(Violet color code). FireLock products have been Listed by Underwriters Laboratories Inc. and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services up to the rated working pressure using the Grade "E" Type A Vic-Plus Gasket System, requiring no field lubrication for most installation conditions.

Δ Standard gasket approved for dry pipe systems to -40°F (-40°C). Based on "typical" pipe surface conditions, supplemental lubricant is recommended for services installed below 0°F (-18°C) and for all dry pipe systems or systems to be subjected to air tests prior to being filled with water. Supplemental lubrication may also be required on pipe with raised or undercut weld seams or pipe that has voids and/or cracks at the weld seams.

Mechanical-T® Bolted Branch Outlets

STYLES 920 AND 920N

211313 - Wet-Pipe Sprinkler System

Victaulic Mechanical-T® Outlet provides a direct branch connection at any location a hole can be cut in pipe. The hole is cut oversize to receive a "holefinder" locating collar which secures the outlet in position permanently. A pressure responsive gasket seals on the pipe O.D.

Cross-type connections can be achieved by utilizing two upper housings of the same style and size, with the same or differing branch size connections. NOTE: Style 920 and Style 920N housings cannot be mated to each other to achieve a cross connection.

Style 920 and Style 920N Mechanical-T outlets are available with grooved or female threaded outlet. Specify choice on order. Units are supplied painted with plated bolts. Galvanized housings are available, supplied with plated bolts.

All sizes of Style 920 and 920N are rated at 500 psi/3450 kPa working pressure on Schedule 10 and 40 carbon steel pipe. They may also be used on high density polyethylene or polybutylene (HDPE) pipe. Pressure ratings on HDPE are dependent on the pipe rating. Contact Victaulic for ratings on other pipe. **Style 920 and 920N are not recommended for use on PVC plastic pipe.**

Standard piping practices dictate that the Mechanical-T Styles 920 and 920N must be installed so that the main and branch connections are a true 90° angle when permanently attached to the pipeline surface.

Additionally, the Vic-Tap II® hole cutting tool, which allows for hole cutting capabilities on pressurized systems, utilizes the Style 920 Mechanical-T in conjunction with the Series 726 Vic-Ball Valve to create the Style 931 Vic-Tap II Mechanical-T unit. See page 8 for further information.



SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

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STYLES 920 AND 920N



STYLE 920 CROSS

PATENTED

MATERIAL SPECIFICATIONS

Housing/Coating: Ductile iron conforming to ASTM A-536, grade 65-45-12, with orange enamel coating. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

- **Optional:** Hot dipped galvanized

Gasket: (Specify choice*)

- **Grade "E" EPDM**

EPDM (Green color code). Temperature range -30°F to +230°F/-34°C to +110°C.

Recommended for cold and hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL Classified in accordance with ANSI/NSF 61 for cold +86°F/+30°C and hot +180°F/+82°C. NOT RECOMMENDED FOR PETROLEUM SERVICES.

- **Grade "T" nitrile**

Nitrile (Orange color code). Temperature range -20°F to +180°F/-29°C to +82°C.

Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range. Not recommended for hot water services over +150°F/+66°C or for hot dry air over +140°F/+60°C.

*Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide for specific gasket service recommendations and for a listing of services which are not recommended.

Bolts/Nuts: Heat-treated plated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A-449 and physical requirements of ASTM A-183.

JOB/OWNER

System No. _____

Location _____

CONTRACTOR

Submitted By _____

Date _____

ENGINEER

Spec Sect _____ Para _____

Approved _____

Date _____

www.victaulic.com

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REV_M



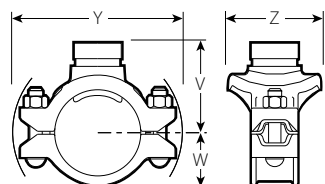
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Mechanical-T® Bolted Branch Outlets

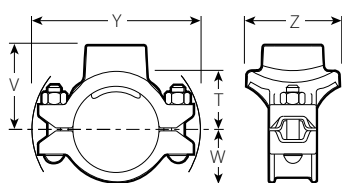
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STYLES 920 AND 920N

DIMENSIONS



GROOVED OUTLET



FEMALE THREADED OUTLET

- Provides a direct branch connection at any location where a hole can be cut in the pipe
- A pressure responsive gasket provides the seal
- Request Publication 11.03 for Mechanical-T cross assemblies
- Pressure rated up to 500 psi/3450 kPa on steel pipe; also available for use with HDPE pipe
- Sizes from 2 × ½"/50 × 15 mm through 8 × 4"/200 × 100 mm

IMPORTANT NOTES:

Style 920 and Style 920N housings cannot be mated to one another to achieve cross connections.

Size	Style No.	Max. Work Pressure@	Dimensions							Approx. Weight Each	
Run × Branch Nominal Size Inches mm	920 or 920N	psi kPa	Hole Diameter +0.13 -0.00 Inches mm	T** Inches mm	V † # Thd. Inches mm	V ‡ Grv. Inches mm	W Inches mm	Y Inches mm	Z Inches mm	Female Thd. Lbs. kg	Grv. Lbs. kg
2 50 × ½ (a) □ 15	920N	500 3450	1.50 38.1	2.00 51	2.53 64	—	1.61 41	5.35 136	2.75 70	3.1 1.5	—
	920N	500 3450	1.50 38.1	1.97 50	2.53 64	—	1.61 41	5.35 136	2.75 70	3.1 1.5	—
	920N	500 3450	1.50 38.1	1.85 47	2.53 64	—	1.61 41	5.35 136	2.75 70	3.0 1.4	—
	920N	500 3450	1.75 44.5	2.05 52	2.75 70	3.00 76	1.61 41	5.35 136	3.00 76	3.5 1.7	3.2 1.5
	920N	500 3450	1.75 44.5	2.03 52	2.75 70	3.12 79	1.61 41	5.35 136	3.25 83	3.6 1.7	3.2 1.5
2½ 65 × ½ (a) § □ 15	920N	500 3450	1.50 38.1	2.21 56	2.74 70	—	1.82 46	5.64 143	2.75 70	3.0 1.4	—
	920N	500 3450	1.50 38.1	2.18 55	2.74 70	—	1.82 46	5.64 143	2.75 70	3.0 1.4	—
	920N	500 3450	1.50 38.1	2.06 52	2.74 70	—	1.82 46	5.64 143	2.75 70	2.9 1.4	—
	920N	500 3450	1.75 44.5	2.30 58	3.00 76	3.25 83	1.82 46	6.29 160	3.00 76	3.5 1.7	3.2 1.5
	920N	500 3450	2.00 50.8	2.28 58	3.00 76	3.25 83	1.82 46	6.26 159	3.25 83	3.6 1.7	3.3 1.6
76.1 × ½ (a) □ 15	920N	300 2065	1.50 38.1	2.22 56	2.75 70	—	2.25 57	6.46 164	3.18 81	3.9 1.8	—
	920N	300 2065	1.50 38.1	2.19 56	2.75 70	—	2.25 57	6.46 164	3.18 81	3.9 1.8	—
	920N	300 2065	1.50 38.1	2.07 53	2.75 70	—	2.25 57	6.46 164	3.18 81	3.8 1.7	—
	920N	500 3450	1.75 44.5	2.30 58	3.00 76	3.31 84	1.92 49	6.29 160	3.00 76	3.5 1.6	3.2 1.5
	920N	500 3450	2.00 50.8	2.28 58	3.00 76	3.31 84	1.92 49	6.29 160	3.25 83	3.5 1.6	3.3 1.5
3 80 × ½ (a) □ 15	920N	500 3450	1.50 38.1	2.52 64	3.05 78	—	2.28 58	6.15 156	2.75 70	3.4 1.6	—
	920N	500 3450	1.50 38.1	2.49 63	3.05 78	—	2.28 58	6.15 156	2.75 70	3.4 1.6	—
	920N	500 3450	1.50 38.1	2.38 61	3.06 78	—	2.28 58	6.15 156	2.75 70	3.3 1.6	—
	920N	500 3450	1.75 44.5	2.55 65	3.25 83	3.56 90	2.28 58	6.15 156	3.00 76	3.8 1.8	3.7 1.8
	920N	500 3450	2.00 50.8	2.78 71	3.50 89	3.56 90	2.28 58	6.15 156	3.25 83	4.1 1.9	3.8 1.8
	920N	500 3450	2.50 63.5	2.75 70	3.50 89	3.56 90	2.28 58	6.75 172	3.88 99	4.9 2.3	4.6 2.1
3½ 90 × 2 50	920N	500 3450	2.50 63.5	3.00 76	—	3.75 95	2.44 62	6.72 171	3.88 99	—	3.8 1.8

TABLE CONTINUED ON PG. 3

** Center of run to engaged pipe end, female threaded outlet only (dimensions approximate).

† Available with grooved or female threaded outlet. Specify choice on order.

‡ Center of run to end of fitting.

Female threaded outlets are available to NPT and BSPT specifications.

@ See page 7 for Fire Protection approvals and pressure ratings.

(a) British Standard female pipe threaded outlet is available as listed. Specify "BSPT" clearly on order.

(b) For 76.1 mm threaded outlet, specify 2½" BSPT clearly on order.

§ Vds approved for fire protection services

□ LPCB approved for fire protection services

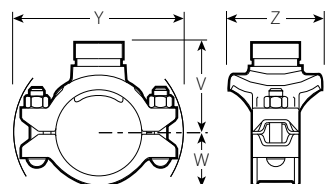
Ø Approved for use in China by Tianjin Approvals Company.

Mechanical-T® Bolted Branch Outlets

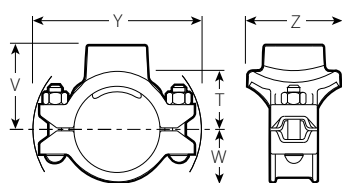
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STYLES 920 AND 920N

DIMENSIONS



GROOVED OUTLET



FEMALE THREADED OUTLET

- Provides a direct branch connection at any location where a hole can be cut in the pipe
- A pressure responsive gasket provides the seal
- Request Publication 11.03 for Mechanical-T cross assemblies
- Pressure rated up to 500psi/3450kPa on steel pipe; also available for use with HDPE pipe
- Sizes from 2 × ½"/50 × 15mm through 8 × 4"/200 × 100mm

IMPORTANT NOTES:

Style 920 and Style 920N housings cannot be mated to one another to achieve cross connections.

Size	Style No.	Max. Work Pressure@	Dimensions							Approx. Weight Each		
Run x Branch Nominal Size Inches mm	920 or 920N	psi kPa	Hole Diameter +0.13 -0.00	T** Inches mm	V ‡ # Thd. Inches mm	V ‡ Grv. Inches mm	W Inches mm	Y Inches mm	Z Inches mm	Female Thd. Lbs. kg	Grv. Lbs. kg	
TABLE CONTINUED FROM PAGE 2												
4 100 ×	½ (a) α 15	920N	500 3450	1.50 38.1	3.03 77	3.56 90	—	2.69 68	7.01 178	2.75 70	3.7 1.8	—
	¾ (a) α 20	920N	500 3450	1.50 38.1	3.00 76	3.56 90	—	2.69 68	7.01 178	2.75 70	3.7 1.8	—
	1 (a) α 25	920N	500 3450	1.50 38.1	2.88 73	3.56 90	—	2.69 68	7.01 178	2.75 70	3.6 1.8	—
	1¼ (a) †α 32 (b)	920N	500 3450	1.75 44.5	3.08 78	3.78 96	4.00 102	2.69 68	7.01 178	3.00 76	4.0 1.9	3.6 1.8
	1½ (a) †α 40 (b)	920N	500 3450	2.00 50.8	3.28 83	4.00 102	4.00 102	2.69 68	7.01 178	3.25 83	4.2 2.0	3.9 1.9
	2 (a) †α 50	920N	500 3450	2.50 63.5	3.25 83	4.00 102	4.00 102	2.69 68	7.01 178	3.88 99	5.0 2.3	4.6 2.1
	2½ (a) † 65	920	500 3450	2.75 69.9	2.88 73	4.00 102	4.00 102	2.69 68	7.34 186	4.63 118	5.8 2.6	5.0 2.3
	76.1 mm	920	500 3450	2.75 69.9	2.88 73	—	4.00 102	2.69 68	7.34 186	4.63 118	—	6.4 2.9
	3 (a) 80	920	500 3450	3.50 88.9	3.31 84	4.50 114	4.12 105	2.69 68	7.73 196	5.12 130	8.4 3.8	6.4 2.9
108.0 ×	1¼ (a) α 32	920N	500 3450	1.75 44.5	3.08 78	3.78 96	—	2.63 67	7.64 194	3.05 78	5.0 2.3	—
	1½ (a) α 40	920N	500 3450	2.00 50.8	3.28 83	4.00 102	—	2.63 67	7.64 194	3.25 83	5.0 2.3	—
	2 (a) 50	920N	500 3450	2.50 63.5	3.25 83	4.00 102	—	2.63 67	7.64 194	4.00 102	4.0 1.9	—
	76.1 mm	920	500 3450	2.75 69.9	2.88 73	4.00 102	4.00 102	2.63 67	7.64 194	4.29 109	8.0 3.6	7.8 3.5
	3 (a) 80	920	500 3450	3.50 88.9	3.31 84	4.50 114	4.50 114	2.63 67	7.63 194	4.88 124	6.8 3.1	6.5 3.0
5 125 ×	1½ (a) † 40	920	500 3450	2.00 50.8	4.03 102	4.75 121	4.75 121	3.16 80	9.70 246	3.69 94	7.4 3.4	7.6 3.4
	2 (a) † 50	920	500 3450	2.50 63.5	4.00 102	4.75 121	4.75 121	3.16 80	9.70 246	4.38 111	8.2 3.7	8.0 3.6
	2½ (a) † 65	920	500 3450	2.75 69.9	3.63 92	4.75 121	4.75 121	3.16 80	9.70 246	4.63 118	8.3 3.8	7.9 3.6
	76.1 mm α	920	500 3450	2.75 69.9	3.75 95	—	4.75 121	3.16 80	9.70 246	4.63 118	—	8.0 3.6
	3 (a) † 80	920	500 3450	3.50 88.9	3.81 97	5.00 127	4.63 118	3.16 80	9.70 246	5.31 135	8.4 3.8	8.8 4.0
133.0 ×	2 50	920N	500 3450	2.50 63.5	3.75 95	4.50 114	—	3.17 81	8.00 203	3.88 99	8.0 3.6	—
	3 80	920	500 3450	3.50 88.9	3.81 97	5.00 127	—	3.00 76	9.46 240	5.31 135	8.0 3.6	—
TABLE CONTINUED ON PG. 4												

** Center of run to engaged pipe end, female threaded outlet only (dimensions approximate).

† Available with grooved or female threaded outlet. Specify choice on order.

‡ Center of run to end of fitting.

Female threaded outlets are available to NPT and BSPT specifications.

@ See page 7 for Fire Protection approvals and pressure ratings.

(a) British Standard female pipe threaded outlet is available as listed. Specify "BSPT" clearly on order.

(b) For 76.1 mm threaded outlet, specify 2½" BSPT clearly on order.

§ Vds approved for fire protection services

α LPCB approved for fire protection services

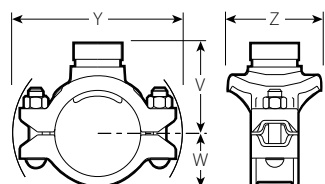
∅ Approved for use in China by Tianjin Approvals Company.

Mechanical-T® Bolted Branch Outlets

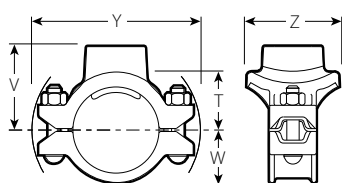
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STYLES 920 AND 920N

DIMENSIONS



GROOVED OUTLET



FEMALE THREADED OUTLET

- Provides a direct branch connection at any location where a hole can be cut in the pipe
- A pressure responsive gasket provides the seal
- Request Publication 11.03 for Mechanical-T cross assemblies
- Pressure rated up to 500 psi/3450 kPa on steel pipe; also available for use with HDPE pipe
- Sizes from 2 × ½"/50 × 15 mm through 8 × 4"/200 × 100 mm

IMPORTANT NOTES:

Style 920 and Style 920N housings cannot be mated to one another to achieve cross connections.

Size	Style No.	Max. Work Pressure@	Dimensions							Approx. Weight Each			
Run × Branch Nominal Size Inches mm	920 or 920N	psi kPa	Hole Diameter +0.13 -0.00	T** Inches mm	V † # Thd. Inches mm	V † Grv. Inches mm	W Inches mm	Y Inches mm	Z Inches mm	Female Thd. Lbs. kg	Grv. Lbs. kg		
TABLE CONTINUED FROM PAGE 3													
139.7 ×	1 ½ † 40	920N	500 3450	2.00 50.8	3.78 96	4.50 114	—	3.30 84	8.23 209	3.25 83	7.0 3.2	—	
	2 † 50	920N	500 3450	2.50 63.5	3.75 95	4.50 114	—	3.30 84	8.23 209	3.88 99	9.0 4.1	—	
6 150 ×	1 ¼ (a) 32 (b)	920N	500 3450	1.75 44.5	4.43 112	5.13 130	5.13 130	3.79 96	9.15 232	3.25 83	5.1 2.3	4.8 2.2	
	1 ½ (a) † 40 (b)	920N	500 3450	2.00 50.8	4.40 112	5.13 130	5.13 130	3.79 96	9.15 232	3.25 83	5.4 2.4	5.1 2.3	
	2 (a) † 50	920N	500 3450	2.50 63.5	4.38 111	5.13 130	5.13 130	3.79 96	9.15 232	3.88 99	6.0 2.7	5.6 2.5	
	2 ½ 65	920	500 3450	2.75 69.9	4.01 110	5.13 130	5.12 130	3.69 94	10.51 267	4.63 118	8.3 3.8	7.6 3.4	
	76.1 mm	920	500 3450	2.75 69.9	4.15 105	—	5.21 132	3.69 94	10.51 267	4.63 118	—	8.4 3.8	
	3 (a) † 80	920	500 3450	3.50 88.9	4.31 110	5.50 140	5.13 130	3.69 94	10.51 267	5.31 135	9.9 4.5	8.4 3.8	
	4 (a) † 100	920	500 3450	4.50 114.3	3.81 97	5.75 146	5.38 137	3.69 94	10.51 267	6.25 159	10.1 4.6	10.1 4.6	
	159.0 ×	1 ½ (a) 40	920N	500 3450	2.00 50.8	4.41 112	5.13 130	—	3.63 92	9.40 239	3.25 83	7.8 3.5	—
		2 (a) 50	920N	500 3450	2.50 63.5	4.38 111	5.13 130	—	3.63 92	9.40 239	3.88 99	8.0 3.6	—
76.1 mm		920	500 3450	2.75 69.9	4.38 111	5.50 140	5.13 130	3.63 92	9.40 239	4.63 118	9.5 4.3	9.5 4.3	
3 80		920	500 3450	3.50 88.9	4.31 110	5.50 140	5.13 130	3.63 92	9.40 239	5.31 135	8.1 3.7	14.0 6.4	
108.0 mm		920	500 3450	4.50 114.3	4.45 113	—	5.38 137	3.63 92	9.40 239	6.12 155	—	10.0 4.5	
4 100	920	500 3450	4.50 114.3	3.81 96.80	5.75 146	—	3.63 92	9.40 239	6.25 159	18.0 8.2	—		
TABLE CONTINUED ON PG. 5													

** Center of run to engaged pipe end, female threaded outlet only (dimensions approximate).

† Available with grooved or female threaded outlet. Specify choice on order.

‡ Center of run to end of fitting.

Female threaded outlets are available to NPT and BSPT specifications.

@ See page 7 for Fire Protection approvals and pressure ratings.

(a) British Standard female pipe threaded outlet is available as listed. Specify "BSPT" clearly on order.

(b) For 76.1 mm threaded outlet, specify 2 ½" BSPT clearly on order.

§ Vds approved for fire protection services

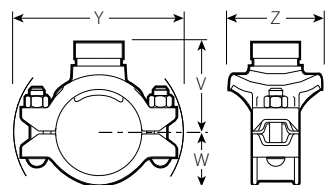
⌘ LPCB approved for fire protection services

⌘ Approved for use in China by Tianjin Approvals Company.

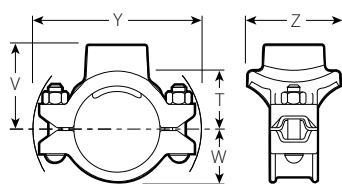
Mechanical-T® Bolted Branch Outlets

STYLES 920 AND 920N

DIMENSIONS



GROOVED OUTLET



FEMALE THREADED OUTLET

- Provides a direct branch connection at any location where a hole can be cut in the pipe
- A pressure responsive gasket provides the seal
- Request Publication 11.03 for Mechanical-T cross assemblies
- Pressure rated up to 500 psi/3450 kPa on steel pipe; also available for use with HDPE pipe
- Sizes from 2 × ½"/50 × 15 mm through 8 × 4"/200 × 100 mm

Size	Style No.	Max. Work Pressure@	Dimensions							Approx. Weight Each		
Run × Branch Nominal Size Inches mm	920 or 920N	psi kPa	Hole Diameter +0.13 -0.00	T** Inches mm	V ‡ # Thd. Inches mm	V ‡ Grv. Inches mm	W Inches mm	Y Inches mm	Z Inches mm	Female Thd. Lbs. kg	Grv. Lbs. kg	
TABLE CONTINUED FROM PAGE 4												
165.1 ×	1 25	920N	500 3450	1.50 38.1	3.88 99	4.56 116	—	3.79 96	9.34 237	2.75 70	8.0 3.6	—
	1½ × 32	920N	500 3450	1.75 44.5	4.43 113	5.13 130	—	3.79 96	9.34 237	3.25 83	8.4 3.8	—
	1½ (a) † 40	920N	500 3450	2.00 50.8	4.41 112	5.13 130	5.13 130	3.79 96	9.34 237	3.25 83	8.4 3.8	5.4 2.4
	2 (a) † 50	920N	500 3450	2.50 63.5	4.38 111	5.13 130	5.13 130	3.79 96	9.34 237	3.88 99	8.5 3.9	6.0 2.7
	76.1 mm	920	500 3450	2.75 69.9	4.01 110	5.13 130	5.21 132	3.63 92	10.51 267	4.63 118	8.6 3.9	7.6 3.4
	3 (a) † ø 80	920	500 3450	3.50 88.9	4.31 110	5.50 140	5.13 130	3.63 92	10.51 267	5.31 135	10.2 4.6	8.4 3.8
	4 (a) † 100	920	500 3450	4.50 114.3	3.81 97	5.75 146	5.38 137	3.63 92	10.51 267	6.25 159	10.5 4.8	8.4 3.8
	8 200 ×	2 (a) † 50	920	500 3450	2.75 69.9	5.44 138	6.19 157	6.25 159	4.81 122	12.42 316	4.50 114	11.6 5.3
2½ (a) † 65		920	500 3450	2.75 69.9	5.07 129	6.19 157	6.19 157	4.81 122	12.42 316	4.50 114	11.6 5.3	11.6 5.3
76.1 mm □		920	500 3450	2.75 69.9	5.25 133	—	6.25 159	4.81 122	12.42 316	4.56 116	—	11.6 5.3
3 (a) † 80		920	500 3450	3.50 88.9	5.31 135	6.50 165	6.50 165	4.81 122	12.42 316	5.31 135	12.6 5.7	11.6 5.3
4 (a) † 100		920	500 3450	4.50 114.3	4.81 122	6.75 171	6.38 162	4.81 122	12.42 316	6.25 159	15.3 6.9	12.5 5.7

** Center of run to engaged pipe end, female threaded outlet only (dimensions approximate).

† Available with grooved or female threaded outlet. Specify choice on order.

‡ Center of run to end of fitting.

Female threaded outlets are available to NPT and BSPT specifications.

@ See page 7 for Fire Protection approvals and pressure ratings.

(a) British Standard female pipe threaded outlet is available as listed. Specify "BSPT" clearly on order.

(b) For 76.1 mm threaded outlet, specify 2½" BSPT clearly on order.

§ Vds approved for fire protection services

▣ LPCB approved for fire protection services

Ø Approved for use in China by Tianjin Approvals Company.

IMPORTANT NOTES:

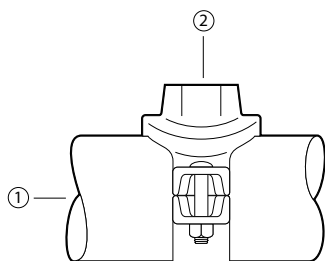
Style 920 and Style 920N housings cannot be mated to **each other** to achieve cross connections.

Mechanical-T® Bolted Branch Outlets

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STYLES 920 AND 920N

FLOW DATA



Exaggerated for clarity

Flow test data has shown that the total head loss between point (1) and (2) for the Style 920, 920N and 929 Mechanical-T® fittings can best be expressed in terms of the pressure difference across the inlet and branch. The pressure difference can be obtained from the relationship below.

C_v and K_v Values

Values for flow of water at +60°F/+16°C are shown in the table below.

Formulas for C_v/K_v Values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

$$\Delta P = \frac{Q^2}{K_v}$$

$$Q = K_v \times \sqrt{\Delta P}$$

Where:

Q = Flow (m³/h)

ΔP = Pressure Drop (bar)

K_v = Flow Coefficient

OUTLET SIZE		Equivalent Length of Outlet Size Schedule 40 Carbon Steel Pipe (per UL 213, Sec. 16) (C = 120)† FT		C _v /K _v Values	
NOMINAL DIAMETER In/mm	ACTUAL O.D. In/mm	GROOVED	THREADED	GROOVED	THREADED
½	0.840	-	2	-	11
15	21.3	-	-	-	9.4
¾	1.050	-	4	-	16
20	26.7	-	-	-	13.7
1	1.315	-	8	-	21
25	33.7	-	-	-	1.8
1 ¼	1.660	5 ½	6	50	48
32	42.7	-	-	42.9	41.1
1 ½	1.900	11	11	53	53
40	98.3	-	-	45.4	45.4
2	2.375	9	10 ½	112	104
50	60.3	-	-	96	89.1
2 ½	2.875	20	12 ½	119	150
65	73.0	-	-	102	128.5
76.1 mm	3.000	16*	-	161	-
	76.1	-	-	138.1	-
3	3.500	14	15 ½	249	237
80	88.9	-	-	213.4	203.1
4	4.500	20	22	421	401
100	114.3	-	-	360.8	343.6

† Hazen-Williams coefficient of friction is 120.

* Pipe with a wall thickness of 0.165in./4.2mm.

Mechanical-T[®] Bolted Branch Outlets

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STYLES 920 AND 920N

FIRE PROTECTION APPROVALS AND PRESSURE RATINGS

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approvals agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Run Size		Outlet Size	Pipe	Approval Agency Rated Working Pressures – psi/kPa					
Nominal Size Inches/mm	Actual Outside Diameter Inches/mm	Inches/mm	Schedule	UL	ULC	FM	LPCB	Vds	
								(Style 920)	(Style 920N)
2 1/2 - 6 65 - 150	2.875 - 6.625 73.0 - 168.3	All	10, 40	400 2755	400 2755	400 2755	290 1999	232 1599	362 2496
2 1/2 - 4 65 - 100	2.875 - 4.500 73.0 - 114.3	All	DF	300 2065	300 2065	300 2065	290 1999	232 1599	362 2496
2 1/2 - 4 65 - 100	2.875 - 4.500 73.0 - 114.3	All	SF	300 2065	300 2065	300 2065	290 1999	232 1599	362 2496
6 150	6.625 168.3	3, 4	10	300 2065	300 2065	250 1724	290 1999	232 1599	362 2496
6 150	6.625 168.3	3, 4	30, 40	300 2065	300 2065	300 2065	290 1999	232 1599	362 2496
8 200	8.625 219.1	2 1/2	10, 40	400 2755	—	—	—	145 1000	—
8 200	8.625 219.1	3, 4	10	300 2065	—	250 1724	—	145 1000	—
8 200	8.625 219.1	3, 4	30, 40	300 2065	—	300 2065	—	145 1000	—

NOTES:

10 refers to Listed/Approved Schedule 10 steel sprinkler pipe.

40 refers to Listed/Approved Schedule 40 steel sprinkler pipe.

DF refers to Listed/Approved Dyna-Flow steel sprinkler pipe manufactured by American Tube Company.

SF refers to Listed/Approved Super-Flo steel sprinkler pipe manufactured by Allied Tube and Conduit Corporation.

VIC-TAP II HOLE CUTTING TOOL FOR 4 - 8"/100 - 200MM CARBON STEEL PIPE



The Vic-Tap II hole cutting tool is designed for use with the Style 931 Vic-Tap II Mechanical-T unit, which is a combination of the Style 920 Mechanical-T and Series 726 Vic-Ball Valve. The Vic-Tap II is capable of tapping into carbon steel pipe systems under pressures up to 500 psi/3450 kPa.

The Style 931 Vic-Tap II Mechanical-T unit is a full port ball valve which can be mounted on 4"/100mm, 5"/125mm, 6"/150mm and 8"/200mm diameter pipe. The Style 931 comes with a 2 1/2"/65mm grooved outlet.

The drill motor is an electric motor with ground fault circuit interrupter (GFCI) in accordance with safety codes.

For more information, refer to publication 24.01.

Mechanical-T[®] Bolted Branch Outlets

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STYLES 920 AND 920N

INSTALLATION

Reference should always be made to the I-100 Victaulic Field Installation Handbook for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

WARRANTY

Refer to the Warranty section of the current Price List or contact Victaulic for details.

NOTE

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

For complete contact information, visit www.victaulic.com

11.02 1480 REV M UPDATED 03/2012

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Victaulic® Firelock™ Rigid Coupling

Style 009N



Patented

1.0 CERTIFICATION/LISTINGS



C104-1a/36

2.0 PRODUCT DESCRIPTION

- The FireLock EZ™ Style 009N Installation-Ready™ Rigid Coupling is for use in the fire protection market.
- The coupling's unique design eliminates loose parts, promotes consistent installation and provides substantial gains in productivity.
- **IMPORTANT:** FireLock EZ™ Style 009N couplings are recommended for use ONLY on fire protection systems.

3.0 MATERIAL SPECIFICATIONS

Housing: Ductile iron conforming to ASTM A 536, Grade 65-45-12. Ductile iron conforming to ASTM A 395, Grade 65-45-15, is available upon special request.

Housing Coating: (specify choice)

- ☐ Orange enamel (North America, Asia Pacific)
- ☐ Red enamel (Europe)
- ☐ Hot dipped galvanized

Gasket: (specify choice¹)

☐ **Grade "E" EPDM (Type A)**

FireLock EZ products have been Listed by Underwriters Laboratories Inc., Underwriters Laboratories of Canada Limited, and Approved by Factory Mutual Research for wet and dry (oil free air) sprinkler services within the rated working pressure.

¹ Services listed are General Service Guidelines only. It should be noted that there are services for which these gaskets are not compatible. Reference should always be made to the latest [Victaulic Gasket Selection Guide](#) for specific gasket service guidelines and for a listing of services which are not compatible.

Bolts/Nuts: Zinc electroplated carbon steel, trackhead meeting the physical and chemical requirements of ASTM A 449 and physical requirements of ASTM A 183.

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	



4.0 LISTINGS/APPROVAL ²

The information provided below is based on the latest listing and approval data at the time of publication. Listings/Approvals are subject to change and/or additions by the approvals agencies. Contact Victaulic for performance on other pipe and the latest listings and approvals.

Nominal Size	cULus			FM			Vds	LPCB
	Sch. 5 psi kPa	Sch. 10 psi kPa	Sch. 40 psi kPa	Sch. 5 psi kPa	Sch. 10 psi kPa	Sch. 40 psi kPa	psi kPa	psi kPa
1 ¼ 32	232 1600	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
1 ½ 40	232 1600	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
2 50	363 2502	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
2 ½ 65	N/A	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
76.1 mm	N/A	365 ³ 2517 ³	N/A	N/A	363 ⁴ 2502 ⁴	N/A	363 2500	363 2500
3 80	N/A	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
4 100	N/A	365 2517	365 2517	175 1205	363 2502	363 2502	363 2500	363 2500
108.0 mm	N/A	N/A	N/A	175 1205	363 2502	363 2502	N/A	N/A
5 125	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A
133.0 mm	N/A	N/A	N/A	N/A	363 ⁴ 2502 ⁴	N/A	N/A	N/A
139.7 mm	N/A	290 ⁵ 2000 ⁵	N/A	N/A	363 ⁴ 2502 ⁴	N/A	232 1600	N/A
159.0 mm	N/A	N/A	N/A	N/A	363 ⁴ 2502 ⁴	N/A	N/A	N/A
165.1 mm	N/A	290 ⁶ 2000 ⁶	N/A	N/A	363 ⁴ 2502 ⁴	N/A	N/A	N/A
6 150	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A
216.0 mm	N/A	N/A	N/A	N/A	363 ⁴ 2502 ⁴	N/A	N/A	N/A
8 200	N/A	290 2000	365 2517	N/A	363 2502	363 2502	232 1600	N/A

² Listed/Approved for wet and dry pipe systems (> -40°F/-40°C) for continuous use in freezing conditions, use of Style 005H Coupling with Silicone Gasket is recommended.

Please see the Victaulic [Installation Manual I-009N/009H](#) for details concerning when supplemental lubrication is required.

³ cULus listed for DIN 2458 2.6 mm pipe wall.

⁴ FM approved for BS 1387 Medium 3.6 mm pipe wall.

⁵ cULus listed for EN 10220 4.0 mm pipe wall.

⁶ cULus listed for EN 10255 4.5 mm pipe wall.

4.1 LISTINGS/APPROVAL

Speciality Pipe

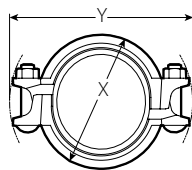
Pipe	Size inches	Pressure Rating		Pipe	Size inches	Pressure Rating		Pipe	Size inches	Pressure Rating	
		cULus psi kPa	FM psi kPa			cULus psi kPa	FM psi kPa			cULus psi kPa	FM psi kPa
BLT	1 ¼ – 2	300 2068	365 2517	EZT	1 ¼ – 2	300 2068	365 2517	MT	1 ¼ – 2	300 2068	365 2517
DF	1 ¼ – 4	300 2068	365 2517	FF	1 ¼ – 4	300 2068	365 2517	MLT	1 ¼ – 2	N/A	365 2517
DT	1 ¼ – 2	300 2068	365 2517	FLF	1 ¼ – 4	N/A	365 2517	ST	1 ¼ – 2	N/A	365 2517
EF	1 ¼ – 4	175 1206	175 1206	FLT	1 ¼ – 2	N/A	365 2517	STF	1 ¼ – 4	N/A	365 2517
EL	1 ¼ – 2	300 2068	365 2517	FLTL	1 ¼ – 2	N/A	365 2517	TF	2 ¼ – 4	N/A	365 2517
ET40	1 ¼ – 2	300 2068	365 2517	GL	1 ¼ – 2	300 2068	365 2517	WLS	1 ¼ – 2	300 2068	365 2517
EZF	3 – 4	300 2068	365 2517	MF	1 ¼ – 4	300 2068	365 2517	WST	1 ¼ – 2	N/A	365 2517
								XL	1 ¼ – 2	300 2068	365 2517

NOTES

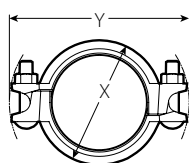
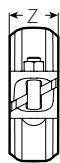
- BLT = BLT steel pipe manufactured by Allied Tube & Conduit Corp.
- DF = DYNA-FLOW steel pipe manufactured by Allied Tube & Conduit Corp.
- DT = DYNA-FLOW steel pipe manufactured by Allied Tube & Conduit Corp.
- EF = EDDY FLOW steel pipe manufactured by Bull Moose Tube Co.
- EL = EDDYLITE steel pipe manufactured by Bull Moose Tube Co.
- ET40 = Eddythread 40 steel pipe manufactured by Bull Moose Tube Co.
- EZF = EZ-Flow steel pipe manufactured by Northwest Pipe Co.
- EZT = EZ-Thread steel pipe manufactured by Youngstown Tube Co.
- FF = Fire-Flo steel pipe manufactured by Youngstown Tube Co.
- FLF = Fire-Line Flow steel pipe manufactured by Western International Forest Products Inc.
- FLT = Fire-Line Threadable steel pipe manufactured by Western International Forest Products Inc.
- FLTL = Fire-Line Threadable Light steel pipe manufactured by Western International Forest Products Inc.
- GL = GL steel pipe manufactured by Wheatland Tube Co.
- MF = Mega-Flow steel pipe manufactured by Wheatland Tube Co.
- MT = Mega-Thread steel pipe manufactured by Wheatland Tube Co.
- MLT = MLT steel pipe manufactured by Wheatland Tube Co.
- ST = STD wall pipe in accordance with ASTM A53.
- STF = Steady Flow steel pipe manufactured by AMS Tube Corp.
- TF = Tex-Flow steel pipe manufactured by Tex-Tube Co.
- WLS = WLS steel pipe manufactured by Wheatland Tube Co.
- WST = WST steel pipe manufactured by Wheatland Tube Company.
- XL = XL steel pipe manufactured by Allied Tube & Conduit Corp.

5.0 DIMENSIONS

Style 009N



Style 009N Pre-Assembled
(Push On Condition)



Style 009N Joint Assembled

Nominal Size	Actual Outside Diameter	Maximum Working Pressure ⁷	Maximum End Load ⁷	Allow. Pipe End Separation ⁸	Bolt/Nut ⁹ Size		Dimensions					Approx. Weight Each
							Pre-assembled (Push On Condition)		Joint Assembled			
							X	Y	X	Y	Z	
inches mm	inches mm	psi kPa	lbs. N	inches mm	No.	inches mm	inches mm	inches mm	inches mm	inches mm	lbs. kg	
1 ¼ 32	1.660 42.4	365 2517	790 3514	0.10 2.54	2	¾ × 2 M10 x 2	3.13 79	5.00 127	2.75 70	5.00 127	2.00 51	1.4 0.6
1 ½ 40	1.900 48.3	365 2517	1035 4604	0.10 2.54	2	¾ × 2 M10 x 2	3.38 86	5.13 130	3.00 76	5.13 130	2.00 51	1.5 0.7
2 50	2.375 60.3	365 2517	1616 7193	0.12 3.05	2	¾ × 2 ½ M10 x 2 ½	4.00 102	5.63 143	3.50 89	5.63 143	2.00 51	1.9 0.9
2 ½ 65	2.875 73.0	365 2517	2370 10542	0.12 3.05	2	¾ × 2 ½ M10 x 2 ½	4.50 114	6.13 156	4.00 102	6.13 156	2.00 51	2.1 1.0
76.1 mm	3.000 76.1	365 2517	2580 11476	0.12 3.05	2	¾ × 2 ½ M10 x 2 ½	4.63 118	6.00 152	4.13 105	6.13 156	2.00 51	2.1 1.0
3 80	3.500 88.9	365 2517	3512 15622	0.12 3.05	2	¾ × 2 ½ M10 x 2 ½	5.13 130	6.75 171	4.63 117	6.75 171	2.00 51	2.3 1.0
4 100	4.500 114.3	365 2517	5805 25822	0.17 4.32	2	¾ × 2 ½ M10 x 2 ½	6.00 152	7.88 200	5.63 143	7.50 191	2.13 54	2.9 1.3
108.0 mm	4.250 108.0	365 2517	5175 23020	0.17 4.32	2	¾ × 2 ½ M10 x 2 ½	5.63 152	7.38 187	5.38 137	7.38 187	2.13 54	3.1 1.4
5 125	5.563 141.3	365 2000	8870 39456	0.17 4.32	2	½ × 3 M12 x 3	7.25 184	9.25 235	6.75 171	9.13 232	2.25 57	5.0 2.3
133.0 mm	5.250 133.0	365 2517	7897 35106	0.17 4.32	2	½ × 3 M12 x 3	6.63 168	9.00 229	6.38 162	9.00 229	2.25 57	4.8 2.2
139.7 mm	5.500 139.7	365 2517	8667 38529	0.17 4.32	2	½ × 3 M12 x 3	6.88 175	9.25 235	6.75 171	9.13 232	2.25 57	4.9 2.2
159.0 mm	6.250 159.0	365 2517	11192 49753	0.17 4.32	2	½ × 3 ¼ M12 x 3 ¼	7.88 200	10.00 254	7.38 187	9.88 251	2.25 57	5.6 2.5
165.1 mm	6.500 165.1	365 2517	12105 53813	0.17 4.32	2	½ × 3 ¼ M12 x 3 ¼	8.00 203	10.25 260	7.75 197	10.13 257	2.25 57	6.0 2.7
6 150	6.625 168.3	365 2000	12582 44469	0.17 4.32	2	½ × 3 ¼ M12 x 3 ¼	8.38 213	10.38 264	7.88 200	10.13 257	2.25 57	6.0 2.7
216.0 mm	8.500 216.0	365 2517	20712 55968	0.17 4.32	2	¾ × 4 M16 x 4	10.63 270	13.25 337	10.25 260	10.13 257	2.63 67	11.4 5.2
8 200	8.625 219.1	365 1620	21326 94863	0.17 4.32	2	¾ × 4 M16 x 4	10.88 276	13.38 340	10.25 260	13.13 333	2.50 64	11.4 5.2

⁷ Working Pressure and End Load are total, from all internal and external loads, based on standard weight (ANSI) steel pipe, standard roll or cut grooved in accordance with Victaulic specifications. See the Listings/Approvals section of this publication for ratings on other pipe.

⁸ The allowable pipe separation dimension shown is for system layout purposes only. FireLock EZ™ couplings are considered rigid connections and will not accommodate expansion or contraction of the piping system.

⁹ Number of bolts required equals number of housing segments.

NOTES

- When assembling FireLock EZ™ couplings onto end caps, take additional care to make certain the end cap is fully seated against the gasket end stop. For FireLock EZ™ Style 009N couplings, use FireLock No. 006 end caps containing the "EZ" marking on the inside face or No. 60 end caps containing the "QV EZ" marking on the inside face. Non-Victaulic end cap products shall not be used with Style 009N couplings. **IMPORTANT:** Gaskets intended for the Style 009 or Style 009V couplings cannot be used with the Style 009N coupling. There is no interchanging of gaskets or housings between coupling styles.
- Use Of Flushseal Gaskets For Dry Pipe Systems** FireLock EZ™ couplings are supplied with FireLock EZ™ Grade "E" Type A gaskets. These gaskets include an integral pipe stop, that once installed provides the similar benefits as a FlushSeal gasket for dry pipe systems. It should be noted that standard Victaulic Flush-Seal™ gaskets are not compatible and cannot be used with the FireLock EZ™ couplings.

6.0 REFERENCE MATERIALS

[Publication 05.01](#): Seal Selection Guide

[I-009N/009H](#): Installation Instructions FireLock EZ™ Rigid Coupling

User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, as well as Victaulic performance, maintenance, safety, and warning instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, installation guide, or this disclaimer.

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No statement contained herein concerning a possible or suggested use of any material, product, service, or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Victaulic or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service, or design in the infringement of any patent or other intellectual property right. The terms "Patented" or "Patent Pending" refer to design or utility patents or patent applications for articles and/or methods of use in the United States and/or other countries.

Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Installation

Reference should always be made to the [I-009N/I-009H Firelock EZ Rigid Coupling Installation Instructions](#) for the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Trademarks

Victaulic, FireLock EZ™, Flush-Seal™, and Installation-Ready™ are trademarks or registered trademarks of Victaulic Company, and/or its affiliated entities, in the U.S. and/or other countries.

FIG. MT-30 Threaded Mechanical Branch Tee

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The MT-30 mechanical tee serves the same function as the MT-1 and MT-8, but uses a steel electro-plated u-bolt to save space and for easier installation in tight places. The MT-30 is ideal for direct connections with sprinkler heads and drop nipples. The MT-90 is the BSPT equivalent.

For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see www.anvilintl.com or contact your local Anvil Representative.



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

MATERIAL SPECIFICATIONS**HOUSING:**

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

U-BOLT & NUTS:

U-bolt is carbon steel SAE J429 Gr. 2, zinc plated complete with hex flanged lock nuts conforming to ASTM A-563 Gr. A or B of SAE J995 Gr. 2.

THREADS:

NPT per ANSI/ASME B1.20.1.

COATINGS:

- ☐ Zinc Electroplated
- ☐ Other available options: Example: RAL3000 or RAL9000 Series

GASKETS: Materials

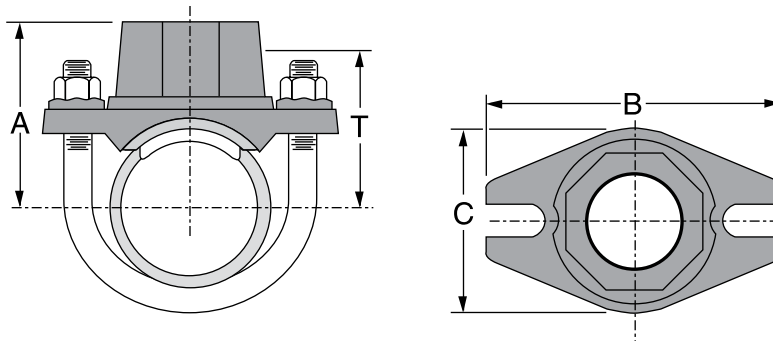
Properties as designated in accordance with ASTM D-2000.

- ☐ Grade "E" EPDM (Green color code)
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services not involving hydrocarbons, oils or gases.
NOT FOR USE WITH HYDROCARBONS.

PROJECT INFORMATION**APPROVAL STAMP**

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

FIG. MT-30 Threaded Mechanical Branch Tee



MT-30 THREADED MECHANICAL BRANCH TEE

Nominal Size	O.D.	Hole Dimensions		Max. Working Pressure ▲	Dimensions				Approx. Wt. Ea.
		Min. Diameter	Max. Diameter		A	B	C	T Take-out	
In./DN(mm)	In./mm	In./mm	In./mm	PSI/bar	In./mm	In./mm	In./mm	In./mm	Lbs./Kg
1¼ x ½ 32 x 12	1.660 x 0.840 42.4 x 21.3	1⅝ 30	1⅝ 33	300 20.7	2⅞ 54	3½ 89	2¼ 57.2	1⅝ 42	0.8 0.4
1¼ x ¾ 32 x 19	1.660 x 1.050 42.4 x 26.7	1⅝ 30	1⅝ 33	300 20.7	2⅞ 54	3½ 89	2¼ 57.2	1⅝ 42	0.8 0.4
1¼ x 1 32 x 25	1.660 x 1.315 42.4 x 33.7	1⅝ 30	1⅝ 33	300 20.7	2⅞ 58	3½ 89	2¼ 57.2	1⅝ 41	1.1 0.5
1½ x ½ 40 x 12	1.900 x 0.840 48.3 x 21.3	1⅝ 30	1⅝ 33	300 20.7	2¼ 57	3½ 89	2¼ 57.2	1¾ 48	0.8 0.4
1½ x ¾ 40 x 19	1.900 x 1.050 48.3 x 26.7	1⅝ 30	1⅝ 33	300 20.7	2¼ 57	3½ 89	2¼ 57.2	1¾ 48	0.9 0.4
1½ x 1 40 x 25	1.900 x 1.315 48.3 x 33.7	1⅝ 30	1⅝ 33	300 20.7	2¾ 61	3½ 89	2¼ 57.2	1¾ 48	1.1 0.5
2 x ½ 50 x 12	2.375 x 0.840 60.3 x 21.3	1⅝ 30	1⅝ 33	300 20.7	2½ 64	3¾ 95	2¼ 57.2	2 51	0.9 0.4
2 x ¾ 50 x 19	2.375 x 1.050 60.3 x 26.7	1⅝ 30	1⅝ 33	300 20.7	2½ 64	3¾ 95	2¼ 57.2	2 51	0.9 0.4
2 x 1 50 x 25	2.375 x 1.315 60.3 x 33.7	1⅝ 30	1⅝ 33	300 20.7	2⅝ 67	3¾ 95	2¼ 57.2	2 50	1.1 0.5
2½ x ½ 65 x 12	2.875 x 0.840 73.0 x 21.3	1⅝ 30	1⅝ 33	300 20.7	2¾ 70	4¼ 108	2¼ 57.2	2¼ 57	0.9 0.4
2½ x ¾ 65 x 19	2.875 x 1.050 73.0 x 26.7	1⅝ 30	1⅝ 33	300 20.7	2¾ 70	4¼ 108	2¼ 57.2	2¼ 57	0.9 0.4
2½ x 1 65 x 25	2.875 x 1.315 73.0 x 33.7	1⅝ 30	1⅝ 33	300 20.7	2⅞ 73	4¼ 108	2¼ 57.2	2¼ 56	1.1 0.5

BSP equivalent is available as a MT-90.

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

Note: Tighten nuts alternately to a recommended torque of 18-22 ft.-lbs. (25-30 Nm) on pipe wall less than schedule 10 (Din 2440) or 23-27 ft.-lbs. (31-37 Nm) on pipe walls schedule 10 (DIN 2440) and above.



For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is required.

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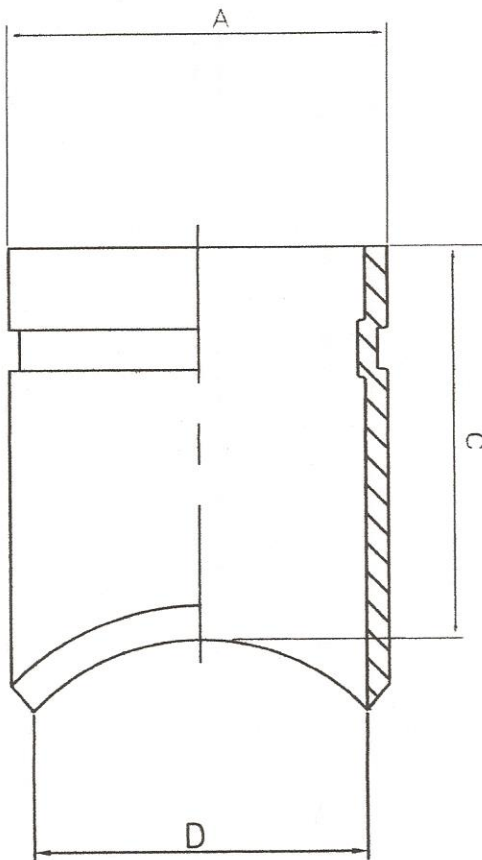
Phone: 954.370.8565 ■ Fax: 954.370.8850

Email: VandeH20in@aol.com ■ Website: vandewaterinc.com



CERIECO BRAND™ GROOVED WELDED STEEL PIPE OUTLETS

- Approved for use in fire sprinkler systems installed in accordance with the requirements of NFPA 13.
- **Pressure Data:** Schedule 40: 300 psi; Schedule 10: 300 psi



DIMENSIONS & WEIGHTS
Schedule 40 CG (Standard Cut & Groove)

OUTLET SIZE	HEADER SIZES	C STD. LENGTH	D INSIDE DIA.	A OUTSIDE DIA.	WALL THICKNESS (MIN.)	BOX QTY.	WEIGHT PER BOX
1-1/4"	1-1/4" - 8"	3"	1.368	1.660	0.140	50	28
1-1/2"	1-1/2" - 8"	3"	1.610	1.900	0.145	50	35
2"	2" - 8"	3"	2.067	2.375	0.154	50	45
2-1/2"	2-1/2" - 8"	3"	2.469	2.875	0.188	32	45
3"	3" - 8"	3"	3.068	3.500	0.188	20	42
4"	4" - 8"	4"	4.026	4.500	0.203	10	34
6"	6" - 8"	4"	6.065	6.625	0.213	4	28
8"	8"	4"	7.981	8.625	0.213	2	24

DIMENSIONS & WEIGHTS
Schedule 10 RG (Lightweight Roll Groove)

2"	2" - 8"	3"	2.157	2.375	0.065	50	35
2-1/2"	2-1/2" - 8"	3"	2.635	2.875	0.083	32	32
3"	3" - 8"	3"	3.260	3.500	0.083	20	24
4"	4" - 8"	4"	4.260	4.500	0.083	10	21
6"	6" - 8"	4"	6.357	6.625	0.109	4	15
8"	8"	4"	8.329	8.625	0.109	2	12

MATERIAL SPECIFICATION: ASTM A-53 (ERW) PIPE

Physical Properties

Tensile Strength	70,000 psi. min.
Yield Strength	30,000 psi. min.
Brinell Hardness	187 max.

SCHEDULE 40				
SIZE	PART NUMBER	QTY. PER CARTON	WEIGHT PER BOX	
1-1/4" x 1-1/4"	40CG 40CG125125	50	28	
1-1/4" x 1-1/2"	40CG 40CG125150	50	28	
1-1/4" x 2"	40CG 40CG125200	50	28	
1-1/4" x 2-1/2"	40CG 40CG125250	50	28	
1-1/4" x 3"	40CG 40CG125300	50	28	
1-1/4" x 4"	40CG 40CG125400	50	28	
1-1/4" x 6"	40CG 40CG125600	50	28	
1-1/4" x 8"	40CG 40CG125800	50	28	
1-1/2" x 1-1/2"	40CG 40CG150150	50	35	
1-1/2" x 2"	40CG 40CG150200	50	35	
1-1/2" x 2-1/2"	40CG 40CG150250	50	35	
1-1/2" x 3"	40CG 40CG150300	50	35	
1-1/2" x 4"	40CG 40CG150400	50	35	
1-1/2" x 6"	40CG 40CG150600	50	35	
1-1/2" x 8"	40CG 40CG150800	50	35	
2" x 2"	40CG 40CG200200	50	45	
2" x 2-1/2"	40CG 40CG200250	50	45	
2" x 3"	40CG 40CG200300	50	45	
2" x 4"	40CG 40CG200400	50	45	
2" x 6"	40CG 40CG200600	50	45	
2" x 8"	40CG 40CG200800	50	45	
2-1/2" x 2-1/2"	40CG 40CG250250	32	45	
2-1/2" x 3"	40CG 40CG250300	32	45	
2-1/2" x 4"	40CG 40CG250400	32	45	
2-1/2" x 6"	40CG 40CG250600	32	45	
2-1/2" x 8"	40CG 40CG250800	32	45	
3" x 3"	40CG 40CG300300	20	42	
3" x 4"	40CG 40CG300400	20	42	
3" x 6"	40CG 40CG300600	20	42	
3" x 8"	40CG 40CG300800	20	42	
4" x 4"	40CG 40CG400400	10	34	
4" x 6"	40CG 40CG400600	10	34	
4" x 8"	40CG 40CG400800	10	34	
6" x 6"	40CG 40CG600600	4	28	
6" x 8"	40CG 40CG600800	4	28	
8" x 8"	40CG 40CG800800	2	24	

SCHEDULE 10				
SIZE	PART NUMBER	QTY. PER CARTON	WEIGHT PER BOX	
2" x 2"	10RG 10RG200200	50	35	
2" x 2-1/2"	10RG 10RG200250	50	35	
2" x 3"	10RG 10RG200300	50	35	
2" x 4"	10RG 10RG200400	50	35	
2" x 6"	10RG 10RG200600	50	35	
2" x 8"	10RG 10RG200800	50	35	
2-1/2" x 2-1/2"	10RG 10RG250250	32	32	
2-1/2" x 3"	10RG 10RG250300	32	32	
2-1/2" x 4"	10RG 10RG250400	32	32	
2-1/2" x 6"	10RG 10RG250600	32	32	
2-1/2" x 8"	10RG 10RG250800	32	32	
3" x 3"	10RG 10RG300300	20	24	
3" x 4"	10RG 10RG300400	20	24	
3" x 6"	10RG 10RG300600	20	24	
3" x 8"	10RG 10RG300800	20	24	
4" x 4"	10RG 10RG400400	10	21	
4" x 6"	10RG 10RG400600	10	21	
4" x 8"	10RG 10RG400800	10	21	
6" x 6"	10RG 10RG600600	4	15	
6" x 8"	10RG 10RG600800	4	15	
8" x 8"	10RG 10RG800800	2	12	

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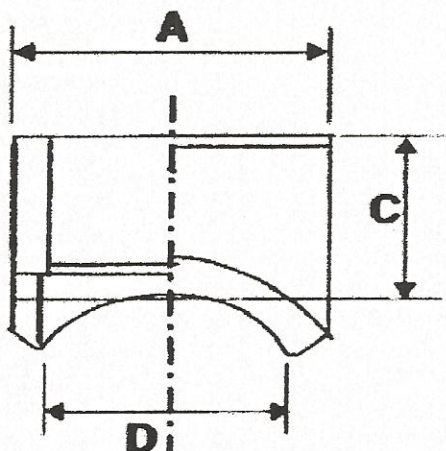
Phone: 954.370.8565 ■ Fax: 954.370.8850

Email: VandeH20in@aol.com ■ Website: vandewaterinc.com



CERIECO BRAND™ WELDED STEEL PIPE OUTLETS

All threads are carefully machines in accordance to the requirements of ANSI ASME B1.20.1, for NPT 300 lb. Class, and national standard for tapered pipe threads.



Dimensions - Weights					
OUTLET	A OUTSIDE DIA.	C LENGTH	D INSIDE DIA.	WEIGHT	BOX QTY.
1/2"	1.125	1.000	.07	0.150	400
3/4"	1.375	1.000	.09	0.220	240
1"	1.597	1.000	1.145	0.260	160
1-1/4"	1.949	1.250	1.49	0.370	90
1-1/2"	2.200	1.250	1.61	0.460	70
2"	2.700	1.500	2.067	0.750	40
2-1/2"	3.164	1.755	2.469	1.030	25

MATERIAL SPECIFICATION: ASTM A-105 Forged Steel

Chemical Properties	
Ca	0.035% max.
Ma	0.6 ~1.05%
P	0.04% max.
Su	0.05% max.
Si	0.035% max.

Physical Properties	
Tensile Strength	70,000 psi. min.
Yield Strength	30,000 psi. min.
Brinell Hardness	187 max.

Dimensions & Corresponding Part Numbers

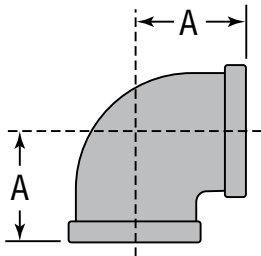
PART NUMBER	OUTLET SIZE	INSIDE DIA.*	HEADER SIZE	WEIGHT EACH	QTY. PER BOX	WEIGHT PER BOX	BOXES PER PALLET	QTY. PER PALLET	WEIGHT PER PALLET
05012	1/2"	.07	1-1/4" – 1-1/2"	0.150	400	59.9	27	10,800	1,618
05020	1/2"	.07	2" – 2-1/2"	0.154	400	61.7	27	10,800	1,665
05025	1/2"	.07	3" – 8"	0.145	400	58.1	27	10,000	1,570
07012	3/4"	.09	1-1/4" – 1-1/2"	0.220	240	52.9	27	6,480	1,427
07020	3/4"	.09	2" – 2-1/2"	0.218	240	51.8	27	6,480	1,399
07025	3/4"	.09	3" – 8"	0.203	240	48.6	27	6,480	1,313
10012	1"	1.145	1-1/4" – 1-1/2"	0.264	160	42.3	27	4,320	1,142
10020	1"	1.145	2" – 2-1/2"	0.251	160	40.2	27	4,320	1,085
10030	1"	1.145	3" – 4"	0.264	160	42.3	27	4,320	1,142
10050	1"	1.145	5" – 8"	0.251	160	40.2	27	4,320	1,085
12012	1-1/4"	1.49	1-1/4" – 1-1/2"	0.427	90	38.5	27	2,430	1,038
12020	1-1/4"	1.49	2" – 2-1/2"	0.379	90	34.1	27	2,430	921
12030	1-1/4"	1.49	3" – 4"	0.374	90	33.7	27	2,430	910
12050	1-1/4"	1.49	5" – 8"	0.352	90	31.7	27	2,430	856
15020	1-1/2"	1.61	2"	0.463	70	32.4	27	1,890	874
15025	1-1/2"	1.61	2-1/2"	0.458	70	32.1	27	1,890	866
15030	1-1/2"	1.61	3" – 4"	0.445	70	31.1	27	1,890	841
15050	1-1/2"	1.61	5" – 8"	0.427	70	29.9	27	1,890	808
20025	2"	2.067	2-1/2"	0.749	40	30.0	27	1,890	809
20030	2"	2.067	3"	0.705	40	28.2	27	1,080	761
20040	2"	2.067	4"	0.758	40	30.3	27	1,080	818
20050	2"	2.067	5"	0.661	40	26.4	27	1,080	714
20060	2"	2.067	6"	0.639	40	25.6	27	1,080	690
20080	2"	2.067	8"	0.687	40	27.5	27	1,080	742
25030	2-1/2"	2.469	3"	1.088	25	27.2	27	1,080	734
25040	2-1/2"	2.469	4"	1.022	25	25.6	27	675	690
25050	2-1/2"	2.469	5"	1.035	25	25.9	27	675	699
25060	2-1/2"	2.469	6"	1.057	25	26.4	27	675	714
25080	2-1/2"	2.469	8"	1.031	25	25.8	27	675	696

* The hole size should be the full inside diameter of the outlet prior to welding.



FIG. 3201

90° Elbow



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3201 - 90° ELBOW			
Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
In. (mm)	PSI (kPa)	In. (mm)	Lbs. (kg)
1	500	1.50	0.62
20	3450	38.10	0.28
1¼	500	1.75	0.90
32	3450	44.45	0.41
1½	500	1.94	1.20
40	3450	49.276	0.54
2	500	2.25	1.85
50	3450	57.15	0.84

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

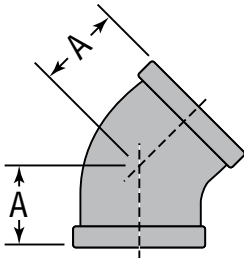
Dimensions: ASME B16.3
Material: ASTM A536 Grade 65-45-12
Finish: Black
Threads: NPT per ASME B1.20.1
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION		APPROVAL STAMP	
Project:		☐ Approved	
Address:		☐ Approved as noted	
Contractor:		☐ Not approved	
Engineer:		Remarks:	
Submittal Date:			
Notes 1:			
Notes 2:			



FIG. 3202
45° Elbow



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3202 - 45° ELBOW			
Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
In. (mm)	PSI (kPa)	In. (mm)	Lbs. (kg)
1	500	1.12	0.46
25	3450	28.44	0.21
1¼	500	1.29	0.73
32	3450	32.76	0.33
1½	500	1.43	0.92
40	3450	36.32	0.42
2	500	1.68	1.50
50	3450	42.67	0.68

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

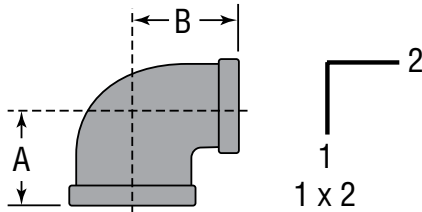
Dimensions: ASME B16.3
Material: ASTM A536 Grade 65-45-12
Finish: Black
Threads: NPT per ASME B1.20.1
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION		APPROVAL STAMP	
Project:		☐ Approved	
Address:		☐ Approved as noted	
Contractor:		☐ Not approved	
Engineer:		Remarks:	
Submittal Date:			
Notes 1:			
Notes 2:			

FIG. 3201R

Reducing 90° Elbow



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3201R - REDUCING 90° ELBOW

Nominal Size	Max. Working Pressure▲	Dimensions		Approx. Wt. Each
1 x 2		A	B	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	Lbs. (kg)
1 x ½ 25 x 15	500 3450	1.26 32.00	1.36 34.54	0.44 0.20
1 x ¾ 25 x 20	500 3450	1.37 34.79	1.45 36.83	0.52 0.24
1¼ x ½ 32 x 15	500 34550	1.34 34.03	1.53 38.86	0.64 0.29
1¼ x ¾ 32 x 20	500 3450	1.45 36.83	1.62 41.14	0.72 0.33
1¼ x 1 32 x 25	500 3450	1.58 40.13	1.67 42.41	0.75 0.34
1½ x 1 40 x 25	500 3450	1.65 41.91	1.80 45.72	0.92 0.42
1½ x 1¼ 40 x 32	500 3450	1.82 46.22	1.88 47.75	1.08 0.49
2 x ½ 50 x 15	500 3450	1.49 37.84	1.88 47.75	1.08 0.49
2 x ¾ 50 x 20	500 3450	1.60 40.64	1.97 50.03	1.24 0.56
2 x 1 50 x 25	500 3450	1.73 43.94	2.02 51.30	1.40 0.64
2 x 1¼ 50 x 32	500 3450	1.90 48.26	2.10 53.34	1.52 0.70
2 x 1½ 50 x 40	500 3450	2.02 51.30	2.16 54.86	1.65 0.75

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

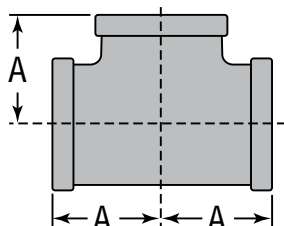
PROJECT INFORMATION

APPROVAL STAMP

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

FIG. 3205

Straight Tee



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3205 - STRAIGHT TEE

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1	500	1.50	0.85
25	3450	38.10	0.39
1¼	500	1.75	1.22
32	3450	44.45	0.55
1½	500	1.94	1.55
40	3450	49.27	0.70
2	500	2.25	2.45
50	3450	57.15	1.11

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

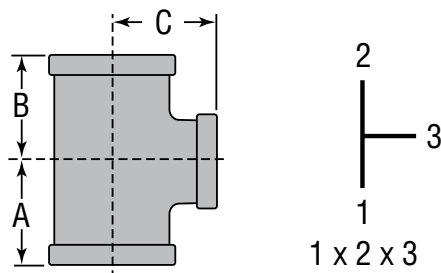
PROJECT INFORMATION

APPROVAL STAMP

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

FIG. 3205R

Reducing Tee



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3205R - REDUCING TEE

Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
1 x 2 x 3		A	B	C	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1 x 1/2 x 1 25 x 15 x 25	500 3450	1.50 38.10	1.36 34.54	1.50 38.10	0.64 0.29
1 x 3/4 x 1 25 x 20 x 25	500 3450	1.50 38.10	1.45 36.83	1.50 38.10	0.73 0.33
1 x 1 x 1/2 25 x 25 x 15	500 3450	1.26 32.00	1.26 32.00	1.36 34.54	0.71 0.32
1 x 1 x 3/4 25 x 25 x 20	500 3450	1.37 34.80	1.37 34.80	1.45 36.83	0.76 0.34
1 x 1 x 1 1/4* 25 x 25 x 32	500 3450	1.67 42.41	1.67 42.41	1.58 40.13	0.98 0.44
1 x 1 x 1 1/2* 25 x 25 x 40	500 3450	1.80 45.72	1.80 45.72	1.65 41.91	1.16 0.53
1 1/4 x 1 x 1/2* 32 x 25 x 15	500 3450	1.34 34.04	1.26 32.00	1.53 38.86	0.82 0.37
1 1/4 x 1 x 3/4 32 x 25 x 20	500 3450	1.45 36.83	1.37 34.80	1.62 41.15	0.90 0.41
1 1/4 x 1 x 1 32 x 25 x 25	500 3450	1.58 40.13	1.50 38.10	1.67 42.42	1.00 0.45
1 1/4 x 1 x 1 1/4 32 x 25 x 32	500 3450	1.75 44.45	1.67 42.42	1.75 44.45	1.08 0.49
1 1/4 x 1 x 1 1/2 32 x 25 x 40	500 3450	1.88 47.75	1.80 45.72	1.82 46.22	1.42 0.64
1 1/4 x 1 1/4 x 1/2 32 x 32 x 15	500 3450	1.34 34.04	1.34 34.04	1.53 38.86	0.86 0.39

▲ Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

* Part supplied as "Bull Head Tee".

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

FIGURE 3205R - REDUCING TEE

Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
1 x 2 x 3		A	B	C	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1 1/4 x 1 1/4 x 3/4 32 x 32 x 20	500 3450	1.45 36.83	1.45 36.83	1.62 41.15	0.92 0.42
1 1/4 x 1 1/4 x 1 32 x 32 x 25	500 3450	1.58 40.13	1.58 40.13	1.67 42.42	0.95 0.43
1 1/4 x 1 1/4 x 1 1/2* 32 x 32 x 40	500 3450	1.88 47.75	1.88 47.75	1.82 46.22	1.45 0.66

PROJECT INFORMATION

APPROVAL STAMP

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

FIG. 3205R

Reducing Tee

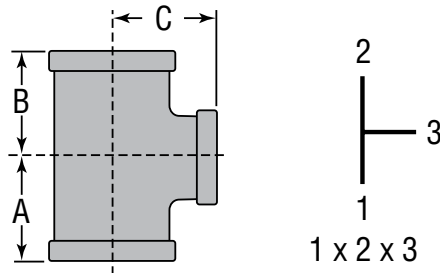


FIGURE 3205R - REDUCING TEE					
Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
1 x 2 x 3		A	B	C	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1¼ x 1¼ x 2*	500 3450	2.10 53.34	2.10 53.34	1.90 48.26	1.75 0.79
1½ x 1 x ½	500 3450	1.41 35.81	1.34 34.04	1.66 42.16	0.95 0.43
1½ x 1 x ¾	500 3450	1.52 38.61	1.37 34.80	1.75 44.45	1.14 0.52
1½ x 1 x 1	500 3450	1.65 41.91	1.50 38.10	1.80 45.72	1.17 0.53
1½ x 1 x 1¼	500 3450	1.82 46.23	1.67 42.42	1.88 47.75	1.34 0.61
1½ x 1 x 1½	500 3450	1.94 49.28	1.80 45.72	1.94 49.28	1.45 0.66
1½ x 1¼ x ½	500 3450	1.41 35.81	1.34 34.04	1.66 42.16	1.05 0.48
1½ x 1¼ x ¾	500 3450	1.52 38.61	1.45 36.83	1.75 44.45	1.15 0.5
1½ x 1¼ x 1	500 3450	1.65 41.91	1.58 40.13	1.80 45.72	1.25 0.57
1½ x 1¼ x 2*	500 3450	2.16 54.86	2.10 53.34	2.02 51.30	1.90 0.86
1½ x 1½ x ½	500 3450	1.41 35.81	1.41 35.81	1.16 29.46	1.15 0.52
1½ x 1½ x ¾	500 3450	1.52 38.61	1.52 38.61	1.75 44.45	1.24 0.56
1½ x 1½ x 1	500 3450	1.65 41.91	1.65 41.91	1.80 45.72	1.30 0.59
1½ x 1½ x 1¼	500 3450	1.82 46.23	1.82 46.23	1.88 47.75	1.48 0.67

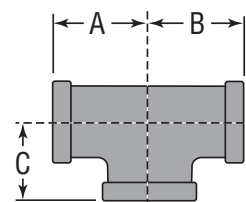
FIGURE 3205R - REDUCING TEE					
Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
1 x 2 x 3		A	B	C	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1½ x 1½ x 2*	500 3450	2.16 54.86	2.16 54.86	2.02 51.30	1.98 0.90
2 x 1 x 2	500 3450	2.25 57.15	2.02 51.31	2.25 57.15	2.15 0.98
2 x 1¼ x 2	500 3450	2.25 57.15	2.10 53.34	2.25 57.15	2.30 1.04
2 x 1½ x ½	500 3450	1.49 37.85	1.41 35.81	1.88 47.75	1.50 0.68
2 x 1½ x ¾	500 3450	1.60 40.64	1.52 38.61	1.97 50.04	1.62 0.73
2 x 1½ x 1	500 3450	1.73 43.94	1.65 41.91	2.02 51.31	1.64 0.74
2 x 1½ x 1¼	500 3450	1.90 48.26	1.82 46.23	2.10 53.34	1.80 0.82
2 x 1½ x 1½	500 3450	2.02 51.31	1.94 49.28	2.16 54.86	2.00 0.91
2 x 1½ x 2	500 3450	2.25 57.15	2.16 54.86	2.25 57.15	2.35 1.07
2 x 2 x ½	500 3450	1.49 37.85	1.49 37.85	1.88 47.75	1.60 0.73
2 x 2 x ¾	500 3450	1.60 40.64	1.60 40.64	1.97 50.04	1.68 0.76
2 x 2 x 1	500 3450	1.73 43.94	1.73 43.94	2.02 51.31	1.85 0.84
2 x 2 x 1¼	500 3450	1.90 48.26	1.90 48.26	2.10 53.34	2.04 0.93
2 x 2 x 1½	500 3450	2.02 51.31	2.02 51.31	2.16 54.86	2.18 0.99

▲ Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

* Part supplied as "Bull Head Tee".

BULL HEAD TEE**Ductile Iron****Submittal Sheet****BULL HEAD TEE**

Nominal Size	Anvil Item Number	Universal Number	Max. Working Pressure	Dimensions			Approx. Wt. Each
				A	B	C	
In. (mm)			PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1 x 1 x 1 1/4 25 x 25 x 32	840004238	DT334	500 3450	1.67 42.41	1.67 42.41	1.58 40.13	0.98 0.44
1 x 1 x 1 1/2 25 x 25 x 40	840004246	DT335	500 3450	1.80 45.72	1.80 45.72	1.65 41.91	1.16 0.53
1 1/4 x 1 x 1 1/2 32 x 25 x 40	840004295	DT435	500 3450	1.88 47.75	1.80 45.72	1.82 46.22	1.42 0.64
1 1/4 x 1 1/4 x 1 1/2 32 x 32 x 40	840004337	DT445	500 3450	1.88 47.75	1.88 47.75	1.82 46.22	1.45 0.66
1 1/4 x 1 1/4 x 2 32 x 32 x 50	840004345	DT446	500 3450	2.10 53.34	2.10 53.34	1.90 48.26	1.75 0.79
1 1/2 x 1 1/4 x 2 40 x 32 x 50	840004436	DT546	500 3450	2.16 54.86	2.10 53.34	2.02 51.30	1.90 0.86
1 1/2 x 1 1/2 x 2 40 x 40 x 50	840004485	DT556	500 3450	2.16 54.86	2.16 54.86	2.02 51.30	1.98 0.90

**MATERIAL SPECIFICATIONS**

Ductile iron threaded fittings are UL & ULC Listed & Factory Mutual Approved for 500 psi service. Dimensions conform to ASME B16.3 Class 150.
Ductile iron per ASTM A536 Class 65-45-12. Threads are NPT per ANSI/ASME B1.20.1.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened three turns beyond hand tight, but no more than four turns.

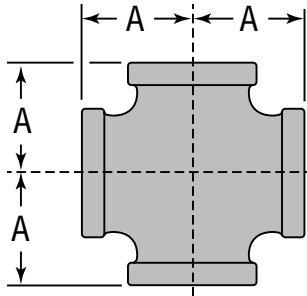
**APPROVED**

For Listing/Approval Details and Limitations visit our Web Site www.anvilintl.com or contact an Anvil®/AnvilStar™ Sales Representative.

PROJECT INFORMATION:**APPROVAL STAMP:**

Project:	
Date:	Phone:
Architect / Engineer:	
Contractor:	
Address:	
Notes 1:	
Notes 2:	

APPROVAL STAMP:

FIG. 3207**Cross**

For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3207 - CROSS

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1	500	1.50	0.98
25	3450	38.10	0.44
1¼	500	1.75	1.50
32	3450	44.45	0.68
1½	500	1.94	1.90
40	3450	49.27	0.86
2	500	2.25	2.95
50	3450	57.15	1.34

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

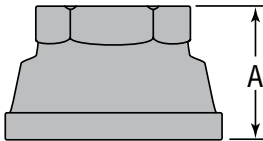
NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION**APPROVAL STAMP**

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	



FIG. 3221R
Reducing Coupling



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3221R - REDUCING COUPLING			
Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 x 1/2	500	1.69	0.39
25 x 15	3450	42.92	0.18
1 x 3/4	500	1.69	0.53
25 x 20	3450	42.92	0.24

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

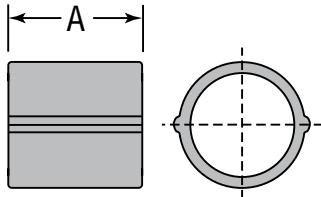
Dimensions: ASME B16.3
Material: ASTM A536 Grade 65-45-12
Finish: Black
Threads: NPT per ASME B1.20.1
Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION		APPROVAL STAMP	
Project:		☐ Approved	
Address:		☐ Approved as noted	
Contractor:		☐ Not approved	
Engineer:		Remarks:	
Submittal Date:			
Notes 1:			
Notes 2:			

FIG. 3221

Coupling



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3221 - COUPLING

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1	500	1.67	0.40
25	3450	42.42	0.18
1¼	500	1.93	0.57
32	3450	49.02	0.26
1½	500	2.15	0.75
40	3450	54.61	0.34
2	500	2.53	1.15
50	3450	64.26	0.52

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION

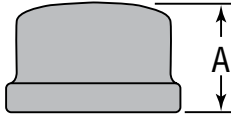
APPROVAL STAMP

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	



FIG. 3224

Cap



For Listings/Approval Details and Limitations, visit our website at www.anvilintl.com or contact an Anvil® Sales Representative.

FIGURE 3224 - CAP			
Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1	500	1.16	0.32
25	3450	29.46	0.15
1¼	500	1.28	0.43
32	3450	32.51	0.20
1½	500	1.33	0.60
40	3450	33.78	0.27
2	500	1.45	0.91
50	3450	36.83	0.41

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

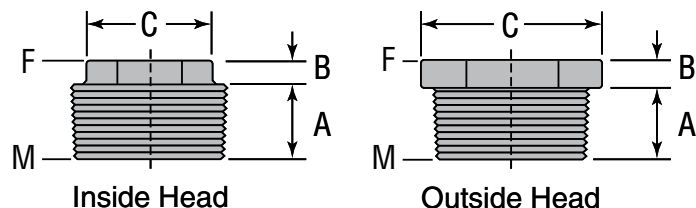
Dimensions: ASME B16.3
 Material: ASTM A536 Grade 65-45-12
 Finish: Black
 Threads: NPT per ASME B1.20.1
 Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION		APPROVAL STAMP	
Project:		☐ Approved	
Address:		☐ Approved as noted	
Contractor:		☐ Not approved	
Engineer:		Remarks:	
Submittal Date:			
Notes 1:			
Notes 2:			

FIG. 3283

Bushings


FIGURE 3283 - BUSHINGS

Nominal Size Male (M) x Female (F)	Max. Working Pressure▲	Dimensions			Style	Approx. Wt. Each
In. (mm)	PSI (kPa)	A In. (mm)	B In. (mm)	C In. (mm)		Lbs. (kg)
1 x 1/2 25 x 15	500 3450	0.75 19.05	0.25 6.35	1.42 36.06	Outside	0.22 0.10
1 x 3/4 25 x 20	500 3450	0.75 19.05	0.25 6.35	1.42 36.06	Outside	0.17 0.08
1 1/4 x 1 32 x 25	500 3450	0.80 20.32	0.28 7.11	1.76 44.70	Outside	0.28 0.13
1 1/2 x 1 40 x 25	500 3450	0.83 21.08	0.31 7.874	2.00 50.80	Outside	0.45 0.20
1 1/2 x 1 1/4 40 x 32	500 3450	0.83 21.08	0.31 7.874	2.00 50.80	Outside	0.30 0.14
2 x 1 50 x 25	500 3450	0.88 22.35	0.41 10.414	1.95 49.53	Inside	0.67 0.30
2 x 1 1/4 50 x 32	500 3450	0.88 22.35	0.34 8.636	2.48 62.99	Outside	0.73 0.33
2 x 1 1/2 50 x 40	500 3450	0.88 22.35	0.34 8.636	2.48 62.99	Outside	0.61 0.28

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit anvilintl.com or contact your local Anvil Representative.

MATERIAL SPECIFICATIONS

Dimensions: ASME B16.14

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

NOTICE: Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

PROJECT INFORMATION

APPROVAL STAMP

Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	



Malleable Iron Threaded Fittings

Class 150 and Class 300 Specifications

-  branded Class 150 fittings are UL Listed and FM Approved at 300 psi
-  branded Class 300 fittings are UL Listed
- Hot-dipped galvanized fittings are certified to; NSF/ANSI 61-4 and California AB1953 Lead Free
- Canadian Registration Numbers available at www.smithcooper.com
- Malleable castings conform to ASTM A197
- Hot-dipped galvanized fittings conform to ASTM A153
- Malleable fitting dimensions conform to ASME B16.3
- Malleable bushings, plugs and locknuts conform to ASME B16.14
- Malleable unions conform to ASME B16.39
- NPT threads on all fittings conform to ASME B1.20.1
- Independent lab verification that fittings meet applicable chemical & mechanical properties
- Manufacturing facilities are ISO 9001:2008 and ISO 14001
-  branded fittings are 100% air tested
- ProPak™ Packaging



Victaulic® Vic-Flex™ Sprinkler Fittings

Series AH2 Braided Flexible Hose



1.0 PRODUCT DESCRIPTION

Available Sizes by Component

- **Series AH2 Braided Hose:** 31, 36, 48, 60, 72"/790, 914, 1220, 1525, 1830 mm. Note: length includes adapter nipple and 5.75"/140 mm straight reducer.
- **Sprinkler Reducers:** ½" and ¾"/15 and 20 mm sprinkler connections and 5.75"/140 mm, 9"/230 mm, 13"/330 mm straight lengths and short, long 90° elbows. Note: The short 90° elbow is typically used with concealed sprinklers while the long 90° elbow is typically used in the installation of recessed pendent sprinklers.
- **Adapter Nipples:** 1"/25 mm NPT or BSPT adapter nipples for attaching to pipe and fittings outlined in NFPA standards. ¾"/20 mm NPT or BSPT available for VdS. 1 ¼"/ 32mm BSPT available for LPCB.
- **Brackets:**
 - Style AB1 for suspended and hard-lid ceilings, allows installation before most ceiling tiles in place
 - Style AB2 for suspended and hard-lid ceilings, allows for vertical sprinkler adjustment, and installation before most ceiling tiles in place
 - Style AB3 for surface mount applications, wood, metal and block walls
 - Style AB4 for hard-lid ceilings with hat furring channel grid systems, allows for vertical sprinkler adjustment
 - Style AB7 for suspended and hard-lid ceilings
 - Style AB7 Adjustable for suspended and hard-lid ceilings
 - Style AB8 for hard-lid ceilings with CD 60/27 profile metal studs (regionally available)
 - Style AB9 for hard-lid ceilings with hat furring channel grid systems
 - Style AB10 for Armstrong® TechZone™ ceilings

Maximum Working Temperature

- 225°F/107°C

Maximum Working Pressure

- 200 psi/1375 kPa (FM Approval)
- 175 psi/1206 kPa (cULus Listed)
- 1600 kPa/232 psi (VdS/LPCB Approved)

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

1.0 PRODUCT DESCRIPTION (Continued)

Connections

- To adapter nipple (inlet) via 1"/25.4 mm NPT or BSPT male thread

OR

- To adapter nipple (inlet) via ¾"/20 mm BSPT male thread (VdS only)
- To sprinkler head (outlet) via ½" or ¾"/15 mm or 20 mm

Minimum Bend Radius

- 7"/178 mm (FM Approval)
- 2"/51 mm (cULus Listed)
- 3"/76.2 mm (VdS/LPCB Approved)

Maximum Allowable Sprinkler K-Factors

- FM (½"/15mm reducer) K5.6/8,1 (S.I.), (¾"/20mm reducer) K14.0/20,2 (S.I.)
- cULus (½"/15mm reducer) K8.0/11,5 (S.I.), (¾"/20mm reducer) K14.0/20,2 (S.I.)
- VdS/LPCB (½"/15mm reducer) K5.6/8,1 (S.I.), (¾"/20mm reducer) K8.0/11,5 (S.I.)

2.0 CERTIFICATION/LISTINGS



3.0 SPECIFICATIONS – MATERIAL

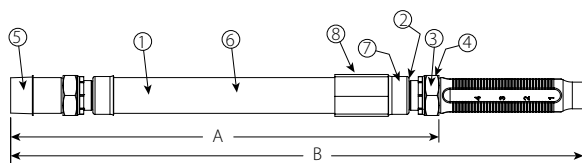
Series AH2

- **Flexible Hose:** 300-series Stainless Steel
- **Collar/Weld Fitting:** 300-series Stainless Steel
- **Gasket Seal:** Victaulic EPDM
- **Isolation Ring:** Nylon
- **Nut and Nipple:** Carbon Steel, Zinc Plated
- **Reducer (½ or ¾"):** Carbon Steel, Zinc-Plated

Brackets: Carbon Steel, Zinc-Plated

4.0 DIMENSIONS

Product Details - Series AH2 Braided Hose

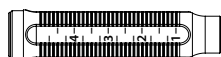


Item	Description
1	Flexible Hose
2	Isolation Ring
3	Gasket
4	Nut
5	Adapter Nipple
6	Braid
7	Collar/Weld Fitting
8	Sleeve

Hose Length Dimensions

Hose Length inches mm	A inches mm	B inches mm
31/790	25.25/641	31/790
36/915	31.25/794	36/915
48/1220	42.25/1073	48/1220
60/1525	54.25/1378	60/1525
72/1830	66.25/1683	72/1830

Standard Reducer

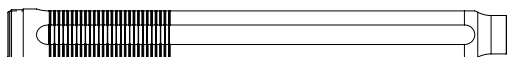


5.75"/140 mm straight reducer

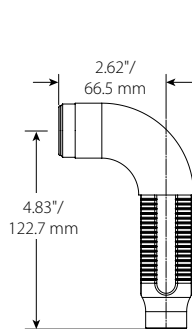
Optional Reducers



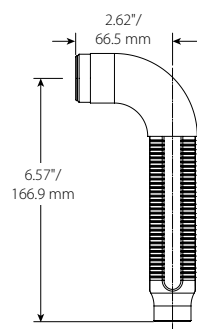
9.0"/229 mm straight reducer



13.0"/330 mm straight reducer



Short 90° elbow reducer



Long 90° elbow reducer

NOTE

- The Short 90° elbow reducer is typically used with concealed sprinklers while the longer 90 elbow is typically used in the installation of recessed pendent sprinklers.

4.1 DIMENSIONS

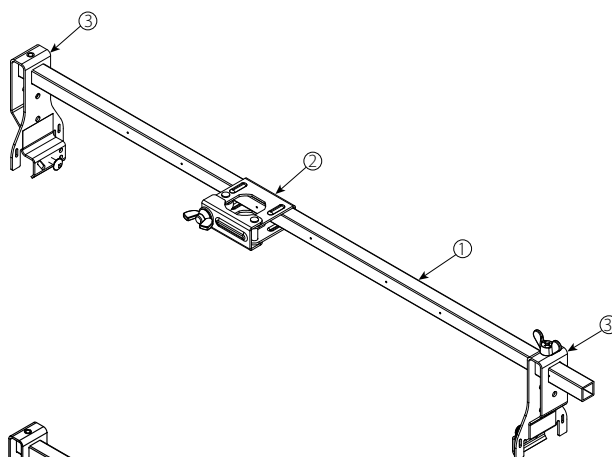
VicFlex Brackets

Style AB1

- Suspended Ceilings
- Hard-Lid Ceilings (FM Only)

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar*
2	Patented Center Bracket
3	End Bracket

*Both sizes FM/VdS/LPCB approved, cULus listed

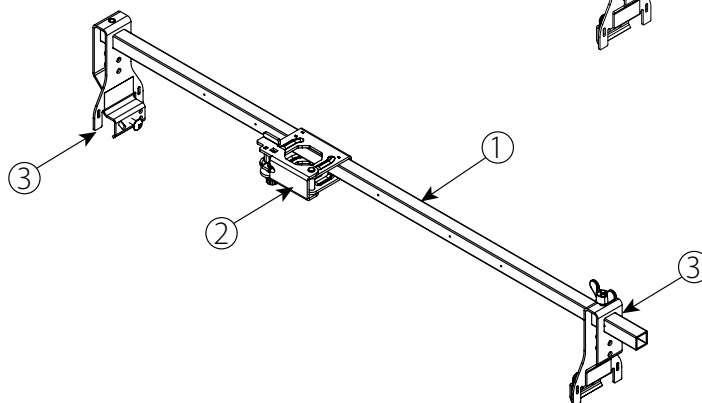


Style AB2

- Suspended Ceilings
- Hard-Lid Ceilings

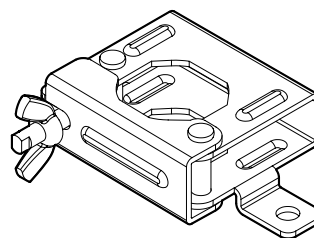
Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar*
2	Patent-Pending adjustable Center bracket
3	End Bracket

*Both sizes FM/VdS/LPCB approved, cULus listed



Style AB3

- Surface Mount Applications
- FM Approved



4.2 DIMENSIONS

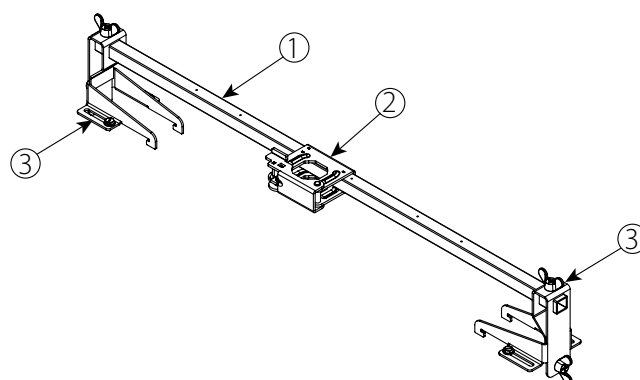
VicFlex Brackets

Style AB4

- Hard-Lid Ceilings with Hat furring channel grid system

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar*
2	Patent-Pending adjustable Center bracket
3	End Bracket for Hat Furring Channel

*Both sizes FM/VdS approved, cULus listed

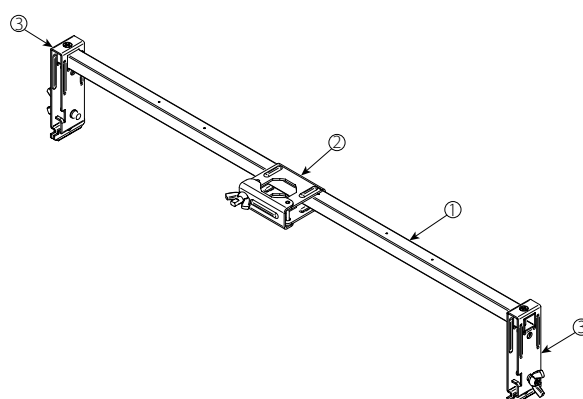


Style AB7

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar*
2	Patented 1-Bee2® Center Bracket
3	End Bracket

*Both sizes FM/VdS approved.

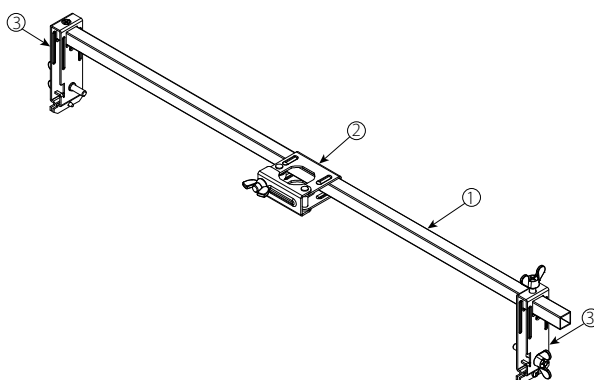


Style AB7 Adjustable

- Suspended Ceilings
- Hard-Lid Ceilings

Item	Description
1	700 mm or 1400 mm Square Bar*
2	Patented 1-Bee2® Center Bracket
3	End Bracket (adjustable)

*Both sizes FM/VdS approved.



4.3 DIMENSIONS

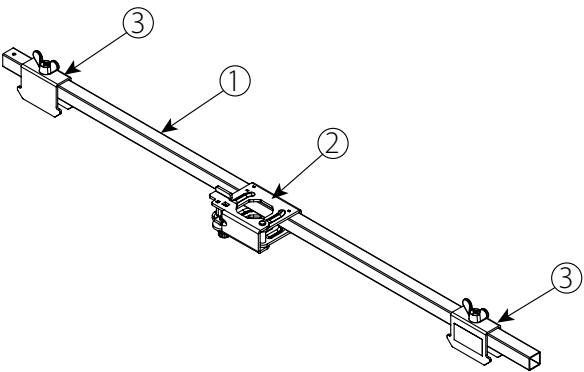
VicFlex Brackets

Style AB8

- Hard-Lid Ceilings

Item	Description
1	700 mm or 1400 mm Square Bar*
2	Patent-pending adjustable center bracket
3	*Both sizes FM/VdS

*Both sizes FM/VdS approved.

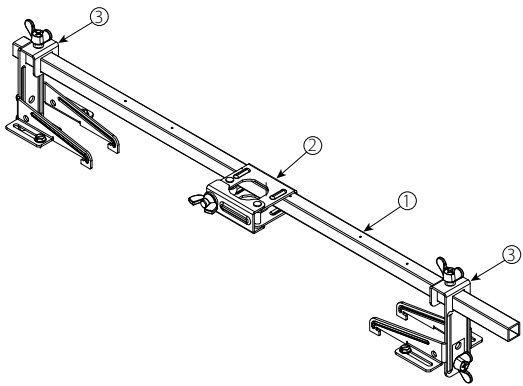


Style AB9

- Hard-Lid ceilings with Hat furring channel grid system

Item	Description
1	24"/610 mm or 48"/1220 mm Square Bar*
2	Patented 1-Bee2® Center Bracket
3	End Bracket for Hat Furring Channel

*Both sizes FM/VdS approved.

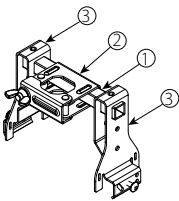


Style AB10

- Suspended ceilings
- Armstrong® TechZone™

Item	Description
1	6"/152 mm Square Bar*
2	Patented 1-Bee2® Center Bracket
3	End Bracket

*FM/VdS approved, cULus listed.

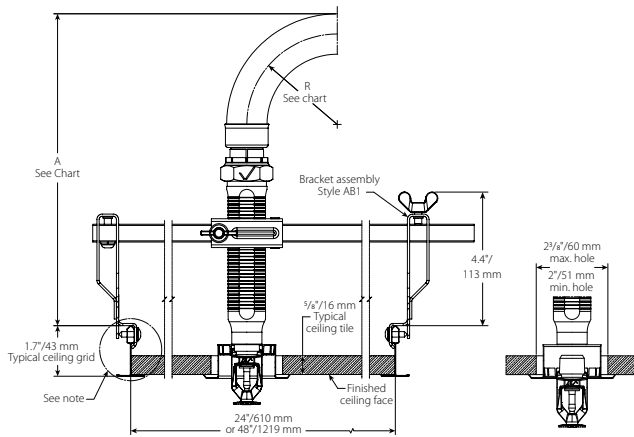


4.4 DIMENSIONS

CLEARANCES ABOVE CEILING

Series AH2 Braided Hose and Style AB1 Bracket

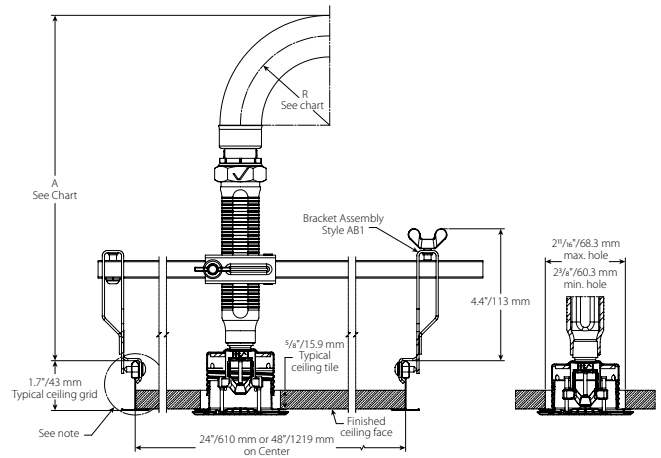
Suspended Ceiling Grid with Recessed Sprinkler



V2707 3/4"/19mm Max. Recess

Hose Clearance Chart						
Dimension		inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm
R	Minimum Bend Radius	2	3	4	5	6
		50	80	100	125	150
A	Min.	10.75	11.75	12.75	13.75	14.75
		273	298.5	324	349	375

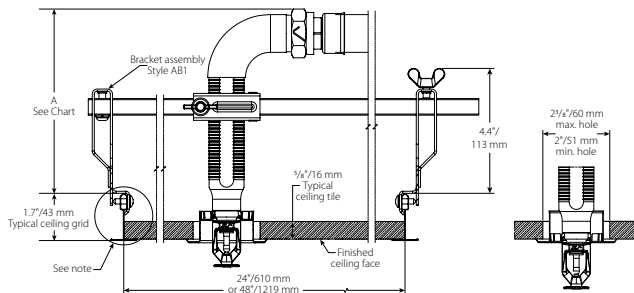
Suspended Ceiling Grid with Concealed Sprinkler



V3802 1/2"/12.7mm Max. Recess

Hose Clearance Chart						
Dimension		inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm
R	Minimum Bend Radius	2	3	4	5	6
		50	80	100	125	150
A	Min.	10.1	11.1	12.1	13.1	14.1
		269	281	307	333	358

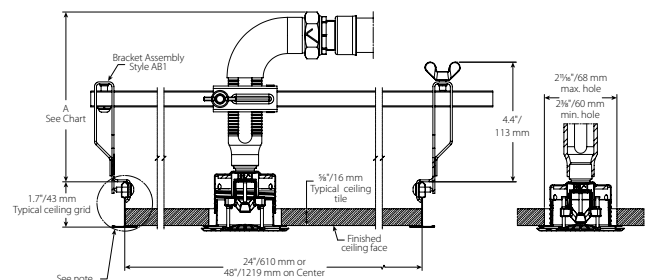
Suspended Ceiling Grid with Recessed Sprinkler with 90° Elbow (Long)



V2707 3/4"/19mm Max. Recess

Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	8
		200

Suspended Ceiling Grid with Concealed Sprinkler with 90° Elbow (Short)



V3802 1/2"/12.7mm Max. Recess

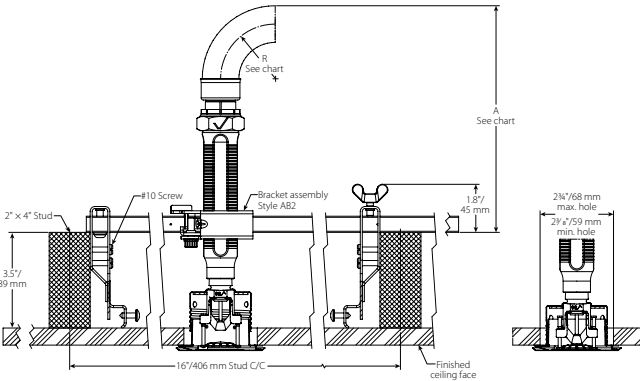
Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	5.8
		147

4.4 DIMENSIONS (Continued)

CLEARANCES ABOVE CEILING

Series AH2 Braided Hose and Style AB2 Bracket

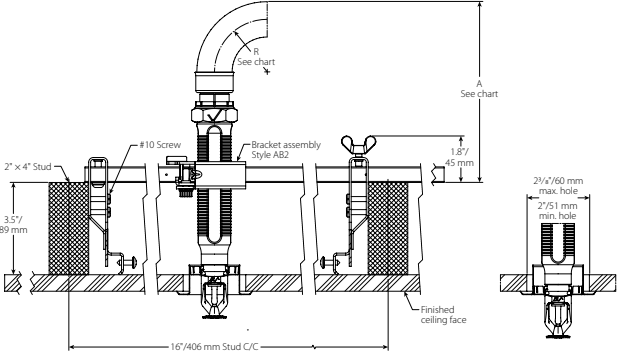
Hard-lid Ceiling with Concealed Sprinkler



V3802 1/2"/12.7mm Max. Recess

Hose Clearance Chart							
Dimension		inches	inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm	mm
R	Minimum Bend Radius	2	3	4	5	6	7
		50	80	100	125	150	175
A	Min.	7.63	8.63	9.63	10.63	11.63	12.63
		193	218	244	269	295	320

Hard-lid Ceiling with Recessed Sprinkler



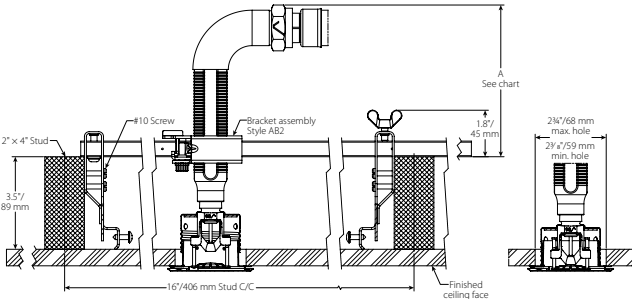
V2707 3/4"/19mm Max. Recess

Hose Clearance Chart							
Dimension		inches	inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm	mm
R	Minimum Bend Radius	2	3	4	5	6	7
		50	80	100	125	150	175
A	Min.	6.13	7.13	8.13	9.13	10.13	11.13
		155	180	206	231	256	282

NOTE

- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

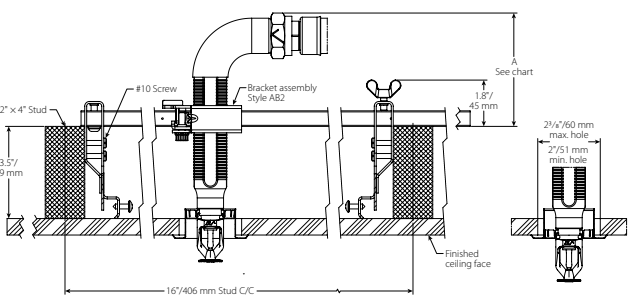
Hard-lid Ceiling Grid with Concealed Sprinkler with 90° Elbow (Short)



V3802 1/2"/12.7mm Max. Recess

Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	5
		127

Hard-lid Ceiling with Recessed Sprinkler with 90° Elbow (Long)



V2707 3/4"/19mm Max. Recess

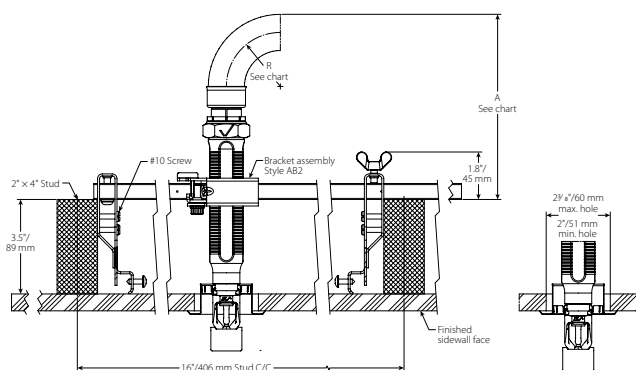
Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	3.63
		91

4.5 DIMENSIONS

CLEARANCES WITHIN SIDEWALL

Series AH2 Braided Hose and Style AB2 Bracket

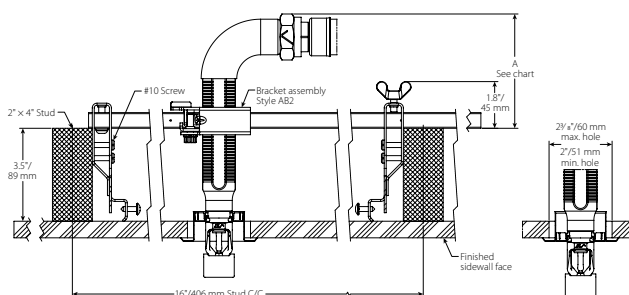
Horizontal Sidewall Sprinkler



V2707 3/4\"/>

Hose Clearance Chart							
Dimension		inches	inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm	mm
R	Minimum Bend Radius	2	3	4	5	6	7
		50	80	100	125	150	175
A	Min.	6.13	7.13	8.13	9.13	10.13	11.13
		155	180	206	231	256	282

Horizontal Sidewall Sprinkler with 90° Elbow (Long)



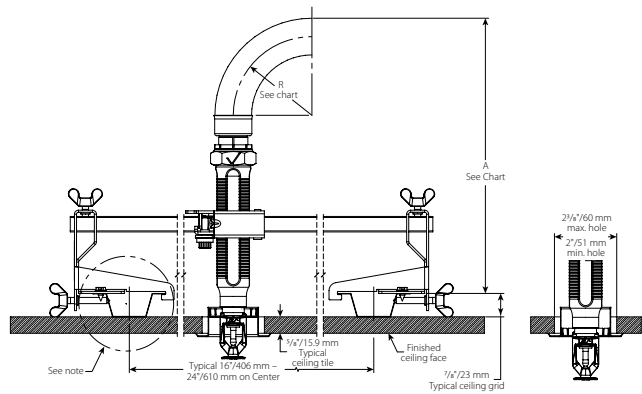
V2707 3/4\"/>

Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	3.63
		91

4.6 DIMENSIONS

CLEARANCES ABOVE CEILING

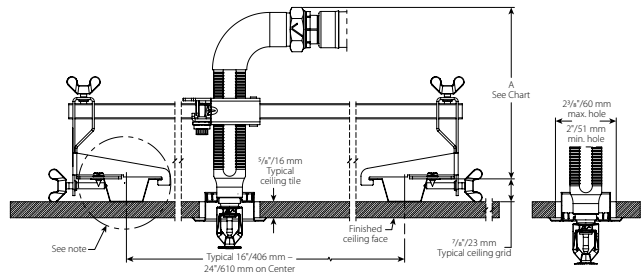
Series AH2 Braided Hose and Style AB4 Bracket
Hat Furring Channel Grid with Recessed Sprinkler



V2707 3/4"19mm Max. Recess

Hose Clearance Chart							
Dimension		inches	inches	inches	inches	inches	inches
		mm	mm	mm	mm	mm	mm
R	Minimum Bend Radius	2	3	4	5	6	7
		50	80	100	125	150	175
A	Min.	10.3	11.3	12.3	13.3	14.3	15.3
		262	287	313	338	363.5	389

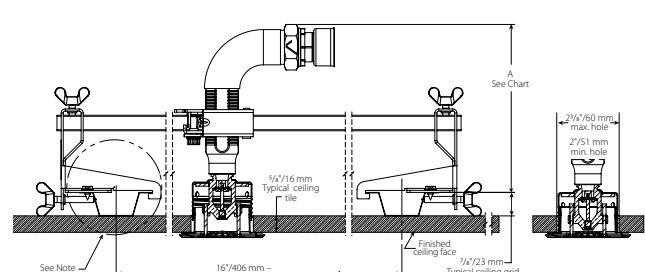
Hat Furring Channel Grid with Recessed Sprinkler with 90° Elbow (Long)



V2707 3/4"19mm Max. Recess

Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	8
		200

Hat Furring Channel Grid with Concealed Sprinkler with 90° Elbow (Short)



V2707 3/4"19mm Max. Recess

Hose Clearance Chart		
Dimension		inches
		mm
A	Min.	5.9
		149

NOTE

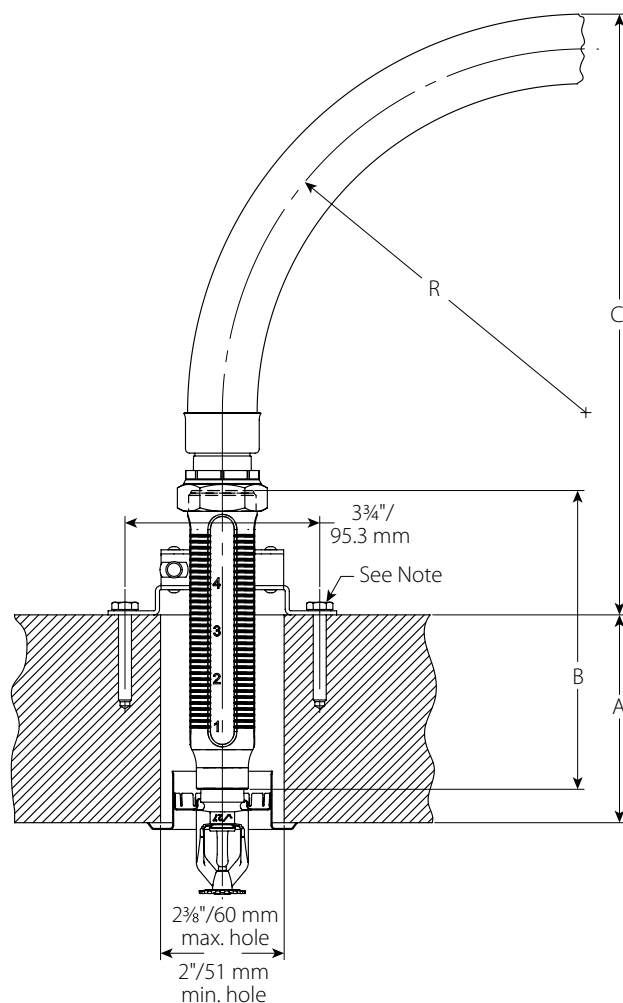
- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.

4.6 DIMENSIONS (Continued)

CLEARANCES ABOVE CEILING

Series AH2 Braided Hose and Style AB3 Bracket

Surface Mount Application with Recessed Sprinkler



Hose Clearances																				
Wall Thickness "A"	2 50			4 100			6 150		8 200	10 250	2 50			4 100			6 150		8 200	10 250
Outlet Length "B"	5.75 146.1	9 228.6	13 330.2	5.75 146.1	9 228.6	13 330.2	9 228.6	13 330.2	13 330.2	13 330.2	5.75 146.1	9 228.6	13 330.2	5.75 146.1	9 228.6	13 330.2	9 228.6	13 330.2	13 330.2	13 330.2
Hose Clearance "C"	11.6 294	14.8 376	18.8 478	9.6 243	12.8 325	16.8 427	10.8 275	14.8 376	12.8 325	10.8 275	12.6 319	15.8 402	19.8 503	10.6 268	13.8 351	17.8 452	11.8 300	15.8 402	13.8 351	11.8 300
Bend Radius "R"	7 175										8 200									

NOTE

- Variations of ceiling grids, sprinkler heads, brackets, and hoses are permitted but may result in clearance differences from the figures above.
- See installation instructions for mounting screw type and size.

5.0 PERFORMANCE – FRICTION LOSS DATA



Series AH2 Braided Hose with Straight 5.75" Reducers Style AB1, AB2, AB4, and AB10 Brackets

Length of Stainless Steel Flexible Hose inches/mm	Outlet Size inches/mm/type	Series AH2 Hose	
		Equivalent Length of 1" / 33.7 mm Sch. 40 Pipe (C=120) feet/meters	Maximum Number of 90° Bends at 2" / 51 mm Bend Radius
31/775	1/2" / 15 / Straight	16/4.9	4
	3/4" / 20 / Straight	17/5.2	4
36/900	1/2" / 15 / Straight	21/6.4	5
	3/4" / 20 / Straight	23/7.0	5
48/1200	1/2" / 15 / Straight	32/9.8	8
	3/4" / 20 / Straight	37/11.3	8
60/1500	1/2" / 15 / Straight	46/14.0	10
	3/4" / 20 / Straight	46/14.0	10
72/1800	1/2" / 15 / Straight	55/16.8	12
	3/4" / 20 / Straight	53/16.2	12

Series AH2 Braided Hose Equivalent Length Design Guide

Equivalent length values at various numbers of 90 degree bends at 2" / 51 mm center line bend radius

Length of Stainless Steel Flexible Hose inches/ mm	Outlet Size inches/ mm	1 Bend feet/ meters	2 Bends feet/ meters	3 Bends feet/ meters	4 Bends feet/ meters	5 Bends feet/ meters	6 Bends feet/ meters	7 Bends feet/ meters	8 Bends feet/ meters	9 Bends feet/ meters	10 Bends feet/ meters	11 Bends feet/ meters	12 Bends feet/ meters
31/775	1/2" / 15	8.5/2.6	11.0/3.4	13.0/4.0	16.0/4.9	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
	3/4" / 20	10.0/3.0	12.5/3.8	14.0/4.3	17.0/5.2	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
36/900	1/2" / 15	13.5/4.1	16.0/4.9	18.0/5.5	19.0/5.8	21.0/6.4	N.A	N.A	N.A	N.A	N.A	N.A	N.A
	3/4" / 20	14.0/4.3	17.0/5.2	19.5/5.9	20.0/6.1	23.0/7.0	N.A	N.A	N.A	N.A	N.A	N.A	N.A
48/1200	1/2" / 15	15.5/4.7	17.0/5.2	19.5/5.9	20.0/6.1	21.0/6.4	22.0/6.7	28.0/8.5	32.0/9.8	N.A	N.A	N.A	N.A
	3/4" / 20	17.0/5.2	19.0/5.8	21.5/6.6	24.5/7.5	26.0/7.9	27.0/8.2	30.0/9.1	37.0/11.3	N.A	N.A	N.A	N.A
60/1500	1/2" / 15	21.5/6.6	24.0/7.3	27.0/8.2	28.5/8.7	30.0/9.1	31.0/9.4	37.0/11.3	42.0/12.8	44.0/13.4	46.0/14.0	N.A	N.A
	3/4" / 20	23.0/7.0	24.0/7.3	28.0/8.5	29.5/9.0	30.5/9.3	31.0/9.4	38.0/11.6	42.0/12.8	44.0/13.4	46.0/14.0	N.A	N.A
72/1800	1/2" / 15	30.0/9.1	32.0/9.8	36.5/11.1	37.5/11.4	40.5/12.5	41.0/12.8	42.0/12.8	46.0/14.0	49.0/14.9	52.0/15.8	54.0/16.5	55.0/16.8
	3/4" / 20	32.0/9.8	32.5/9.9	35.0/10.7	35.5/10.8	40.0/12.3	40.5/12.3	41.0/12.5	46.0/14.0	50.0/15.2	51.0/15.5	52.0/15.8	53.0/16.2

NOTES:

- Values for use with 5.75" straight reducers.

How to use this Design Guide:

- For some systems, it may be advantageous for the designer to calculate the system hydraulics using shorter equivalent lengths associated with fewer than the maximum allowable number of bends. In this case, the designer may select a design number of bends for the job and use the associated equivalent length from the design guide to determine the system hydraulics.
- It is possible that the actual installed condition of some of the flexible drops may have more bends than the designer selected. When this happens, the design guide may be used to find equivalent lengths based on the actual installed number of bends for particular sprinkler installations. The system hydraulics can be recalculated using actual equivalent lengths to verify the performance of the system.

5.1 PERFORMANCE – FRICTION LOSS DATA



Series AH2 Braided Hose

Style AB1, AB2, AB3, AB4, AB7, AB7 Adj., AB8, AB9 and AB10 VicFlex Brackets

Length of Stainless Steel Flexible Hose	K-Factor	Outlet Size	Series AH2 Hose	
			Equivalent Length of 1"/33.7mm Sch. 40 Pipe	Maximum Number of 90° Bends at 7"/178mm Bend Radius
inches/mm	Imperial/S.I.	inches/mm/type	feet/meters	
31/775	5.6/8.1	½"/15/Straight	23.5/7.1	2
		½"/15/90° Elbow	23/7.0	
36/900	5.6/8.1	½"/15/Straight	27.8/8.5	2
		½"/15/90° Elbow	27.7/8.4	
48/1200	5.6/8.1	½"/15/Straight	38.2/11.6	3
		½"/15/90° Elbow	37.4/11.4	
60/1500	5.6/8.1	½"/15/Straight	42.4/12.9	4
		½"/15/90° Elbow	43/13.1	
72/1800	5.6/8.1	½"/15/Straight	46.6/14.2	4
		½"/15/90° Elbow	48.5/14.7	
31/775	8.0/11.5	¾"/20/Straight	20.7/6.3	2
		¾"/20/90° Elbow	20.5/6.2	
36/900	8.0/11.5	¾"/20/Straight	25.0/7.6	2
		¾"/20/90° Elbow	24.6/7.5	
48/1200	8.0/11.5	¾"/20/Straight	35.5/10.8	3
		¾"/20/90° Elbow	34.7/10.6	
60/1500	8.0/11.5	¾"/20/Straight	39.6/12.1	4
		¾"/20/90° Elbow	40.1/12.2	
72/1800	8.0/11.5	¾"/20/Straight	43.5/13.2	4
		¾"/20/90° Elbow	45.2/13.7	
31/775	11.2/16.1	¾"/20/Straight	17.8/5.4	2
		¾"/20/90° Elbow	18/5.5	
36/900	11.2/16.1	¾"/20/Straight	22.2/6.7	2
		¾"/20/90° Elbow	22.1/6.7	
48/1200	11.2/16.1	¾"/20/Straight	32.9/10.0	3
		¾"/20/90° Elbow	32.1/9.8	
60/1500	11.2/16.1	¾"/20/Straight	36.8/11.2	4
		¾"/20/90° Elbow	37.1/11.3	
72/1800	11.2/16.1	¾"/20/Straight	40.5/12.3	4
		¾"/20/90° Elbow	41.9/12.7	
31/775	14.0/20.2	¾"/20/Straight	14.9/4.5	2
		¾"/20/90° Elbow	15.5/4.72	
36/900	14.0/20.2	¾"/20/Straight	19.4/5.9	2
		¾"/20/90° Elbow	19.6/5.9	
48/1200	14.0/20.2	¾"/20/Straight	30.3/9.2	3
		¾"/20/90° Elbow	29.5/8.9	
60/1500	14.0/20.2	¾"/20/Straight	33.9/10.3	4
		¾"/20/90° Elbow	34.1/10.4	
72/1800	14.0/20.2	¾"/20/Straight	37.5/11.4	4
		¾"/20/90° Elbow	38.6/11.7	

FM NOTES:

- Series AH2 has been tested and Approved by FM Global for use in wet, dry and preaction systems per NFPA 13, 13R, and 13D and FM data sheets 2-0, 2-5, and 2-8. FM 1637 and Vds standards for safety include, but are not limited to, pressure cycling, corrosion resistance, flow characteristics, vibration resistance, leakage, mechanical and hydrostatic strength.
- Differences in equivalent lengths are due to varying test methods, per FM 1637 and VdS standards. Refer to these standards for additional information regarding friction loss test methods.
- EXAMPLE: A 48-inch hose installed with two 30° bends and two 90° bends at a 7-inch bend radius is permitted and considered equivalent to the data in the table shown above. In this example, the total number of degrees is 240°, which is less than the allowable 270°.

5.2 PERFORMANCE – FRICTION LOSS DATA

VdS

Series AH2 Braided Hose Style AB1, AB2, AB4, AB7, AB7 Adj., AB8, AB9, and AB10 Brackets

Length of Stainless Steel Flexible Hose mm/inches	Outlet Size mm/inches type	Series AH2 Hose	
		Equivalent Length of steel pipe according to EN 10255 DN 25 (33,7 x 3,25) meters/feet	Maximum Number of 90° Bends at 3"/76.2mm Bend Radius meters/feet
775/31	15mm/1/2"/Straight	5.5/18.0	3
	20 mm/3/4"/Straight		
900/36	15mm/1/2"/Straight	6.4/21.0	3
	20 mm/3/4"/Straight		
1200/48	15mm/1/2"/Straight	8.5/27.9	3
	20 mm/3/4"/Straight		
1500/60	15mm/1/2"/Straight	10.7/35.1	4
	20 mm/3/4"/Straight		
1800/72	15mm/1/2"/Straight	12.8/42.0	4
	20 mm/3/4"/Straight		

VDS CEILING MANUFACTURERS LIST

AB1, AB2, AB7, AB10

1. AMF
2. Armstrong
3. Chicago Metallic
4. Dipling
5. Durlum
6. Geipel
7. Gema-Armstrong
8. Hilti
9. Knauf
10. Lafarge
11. Linder
12. Odenwald
13. Richter
14. Rigips
15. Rockfon Pagos
16. Suckow & Fischer
17. USG Donn

AB4/9

No specific approval

AB8

1. Hilti
2. Knauf
3. Lafarge
4. Lindner
5. Rigips

LPCB

Series AH2 Braided Hose Style AB1 Bracket

Length of Stainless Steel Flexible Hose mm/inches	Outlet Size mm/inches/type	Series AH2 Hose	
		Equivalent Length of steel pipe according to EN 10255 DN 25 (33,7 x 3,25) meters/feet	Maximum Number of 90° Bends at 3"/76.2mm Bend Radius
775/31	15mm/1/2"/Straight	1.8/6.0	2
	20 mm/3/4"/Straight		
900/36	15mm/1/2"/Straight	3.6/11.9	3
	20 mm/3/4"/Straight		
1200/48	15mm/1/2"/Straight	4.3/14.0	3
	20 mm/3/4"/Straight		
1500/60	15mm/1/2"/Straight	4.1/13.6	3
	20 mm/3/4"/Straight		
1800/72	15mm/1/2"/Straight	5.5/18.1	3
	20 mm/3/4"/Straight		

Length of Stainless Steel Flexible Hose mm/inches	Outlet Size mm/inches/type	Series AH2 Hose	
		Equivalent Length of steel pipe according to EN 10255 DN 25 (33,7 x 3,25) meters/feet	Maximum Number of 90° Bends at 3"/76.2mm Bend Radius
775/31	15mm/1/2"/90° Elbow	1.3/4.3	2
	20 mm/3/4"/90° Elbow		
900/36	15mm/1/2"/90° Elbow	2.8/9.1	3
	20 mm/3/4"/90° Elbow		
1200/48	15mm/1/2"/90° Elbow	4.1/13.4	3
	20 mm/3/4"/90° Elbow		
1500/60	15mm/1/2"/90° Elbow	4.6/15.2	3
	20 mm/3/4"/90° Elbow		
1800/72	15mm/1/2"/90° Elbow	5.3/17.4	3
	20 mm/3/4"/90° Elbow		

6.0 NOTIFICATIONS

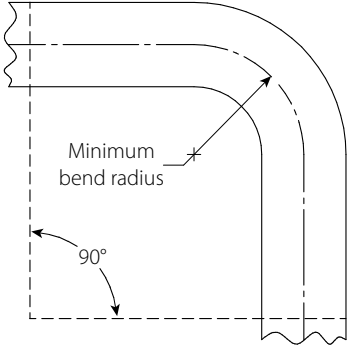
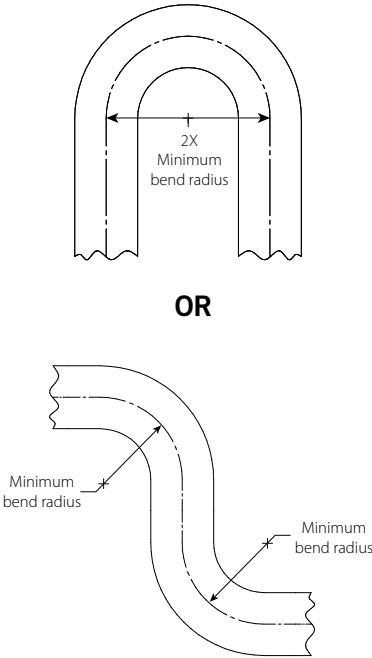
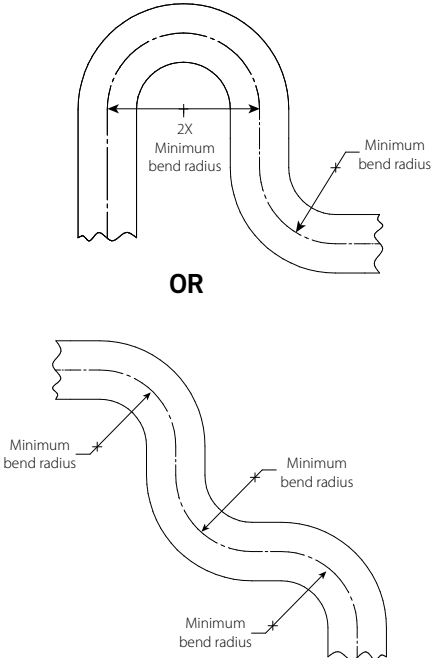
WARNING

- It is the responsibility of the system designer to verify suitability of 300-series stainless steel flexible hose for use with the intended fluid media within the piping system and external environments.
- The effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on 300-series stainless steel flexible hose must be evaluated by the material specifier to confirm system life will be acceptable for the intended service.

Failure to follow these instructions could cause product failure, resulting in serious personal injury and/or property damage.

7.0 REFERENCE MATERIALS – CHARACTERISTICS

Flexible Hose In-Plane Bend Characteristics

One Bend	Two Bends	Three Bends
 Minimum bend radius 90°	 2X Minimum bend radius OR Minimum bend radius Minimum bend radius	 2X Minimum bend radius OR Minimum bend radius Minimum bend radius Minimum bend radius

NOTE

- For out-of-plane (three-dimensional) bends, care must be taken to avoid imparting torque on the hose.

User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, as well as Victaulic performance, maintenance, safety, and warning instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, installation guide, or this disclaimer.

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Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Installation

Reference should always be made to I-VICFLEX-AB1-AB2-AB10, I-VICFLEX-AB4-AB9, I-VICFLEX-AB7, or I-VICFLEX-AB8 for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

Trademarks

Victaulic and all other Victaulic marks are the trademarks or registered trademarks of Victaulic Company, and/or its affiliated entities, in the U.S. and/or other countries.



WFD Series Waterflow Detector

The System Sensor WFD series is compatible with schedule 10 through 40 steel pipe, sizes 2" through 8", and can be mounted in a vertical or horizontal position.



Features

- Two-inch mounting hole provided in new WFD30-2 models
- UL-listed models are NEMA 4 rated
- Sealed retard mechanism immune to dust and other contaminants
- Visual switch activation
- Field-replaceable retard mechanism and SPDT switches
- Rugged, dual SPDT switches enclosed in a durable terminal block
- Accommodates up to 12 AWG wire
- Designed for both indoor and outdoor use
- 100 percent synchronization activates both alarm panel and local bell
- Tamper-resistant cover screws

Robust Construction. The WFD series consists of a rugged, NEMA 4-rated enclosure. Designed for both indoor and outdoor use, the WFD series operates across a wide temperature range, from 32°F to 120°F.

Reliable Performance. UL-listed models are equipped with tamper-resistant cover screws to prevent unauthorized entry. Inside, two sets of SPDT (Form C) synchronized switches are enclosed in a durable terminal block to assure reliable performance.

False Alarm Immunity. The WFD series incorporates a mechanical retard feature, which minimizes the risk of false alarm due to pressure surges or air trapped in the sprinkler system. In addition, the mechanical retard's unique sealed design is immune to dust and other contaminants.

Simplified Operation. The WFD series is designed to simplify installation. Two conduit openings permit easy attachment to the local alarm system. The retard mechanism and dual SPDT switches are field-replaceable.

Agency Listings



Waterflow Detector Specifications

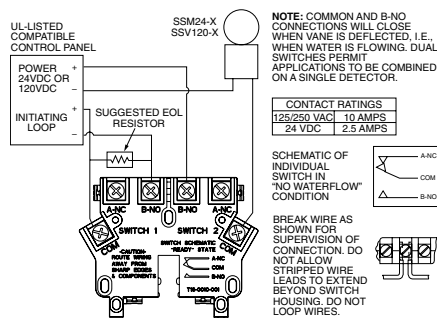
Engineering Specifications

Vane-type waterflow detectors shall be installed on system piping as designated on the drawing and/or as specified herein. Detectors shall mount on any clear pipe span of the appropriate nominal size, either a vertical upflow or horizontal run, at least 6" from any fittings that may change water direction, flow rate, or pipe diameter or no closer than 24" from a valve or drain. Detectors shall have a sensitivity in the range of 4 to 10 gallons per minute and a static pressure rating of 450 psi* for 2" – 8" pipes. The detector shall respond to waterflow in the specified direction after a preset time delay that is field adjustable. The delay mechanism shall be a sealed mechanical pneumatic unit with visual indication of actuation. The actuation mechanism shall include a polyethylene vane inserted through a hole in the pipe and connected by a mechanical linkage to the delay mechanism. Outputs shall consist of dual SPDT switches (Form C contacts). Two conduit entrances for standard fittings of commonly used electrical conduit shall be provided on the detectors. A grounding provision is provided. Unless noted, enclosures shall be NEMA 4 listed by Underwriters Laboratories Inc. All detectors shall be listed by Underwriters Laboratories Inc. for indoor or outdoor use.

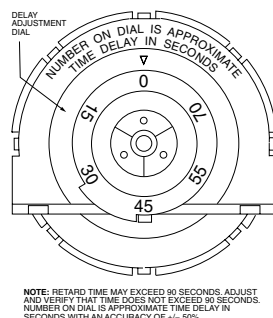
Standard Specifications

Static Pressure Rating	450 PSI*	Operating Temperature Range	32°F to 120°F (0°C to 49°C)
Maximum Surge	18 Feet Per Second (FPS)	Enclosure Rating*	NEMA 4 – suitable for indoor/outdoor use
Triggering Threshold Bandwidth (Flow Rate)	4–10 GPM	Cover Tamper Switch	Standard with ULC models, optional for UL models, part no. 546-7000
Conduit Entrances	Two openings for ½" conduit. One open, one knock-out type	Service Use	Automatic Sprinkler: NFPA-13 One or Two Family Dwelling: NFPA 13D Residential Occupancies up to 4 Stories: NFPA 13R National Fire Alarm Code: NFPA-72
Contact Ratings	Two sets of SPDT (Form C) 10.0 A, ½ HP @ 125/250 VAC 2.5 A @ 6/12/24 VDC	U.S. Patent Numbers	5,213,205
Compatible Pipe	Steel water pipe, schedule 10 through 40	Warranty	3 Years

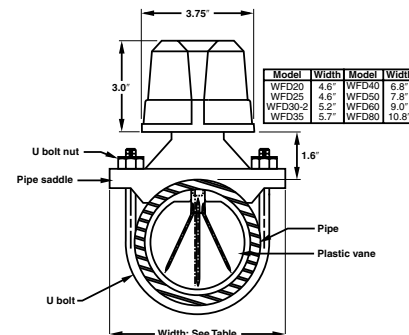
WFD Field Wiring Diagram



Delay Adjustment Dial



Overall Dimensions, Installed



Ordering Information

UL Model	ULC Model	Pipe Size	Hole Size	Shipping Weight
WFD20	WFD20A	2"	1 ¼"	4.2 lbs.
WFD25	WFD25A	2 ½"	1 ¼"	4.3 lbs.
WFD30-2	WFD30-2A	3"	2"	4.5 lbs.
WFD35	WFD35A	3 ½"	1 ¼"	4.7 lbs.
WFD40	WFD40A	4"	2"	5.2 lbs.
WFD50	WFD50A	5"	2"	6.3 lbs.
WFD60*	WFD60A	6"	2"	6.8 lbs.
WFD80*	WFD80A	8"	2"	7.5 lbs.

Accessories

A3008-00	Retard mechanism
A77-01-02	Terminal block
546-7000	Tamper-proof switch kit
WFDW	Tamper-proof wrench for cover
WFDN4	Gasket kit

*Maximum pressure rating 400 psi as approved by Factory Mutual.



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Phone: 800-SENSOR2 • Fax: 630-377-6495

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A05-0180-013 • 1/09 • #1922



PCVS Series

Control Valve Supervisory Switch

602

Features

- NEMA 4X* (IP 65) and 6P (IP 67)

*Enclosure is 4X. For additional corrosion protection of mounting hardware, use model PCVS-2 CRH
- 40° to 140° (-40°C to 60°C) operating temperature range
- Visual Switch Indicators
- Two conduit entrances
- Adjustable length trip rod
- Accommodates up to 12AWG wire
- Switch detects tampering and valve closure
- RoHS compliant
- Two SPDT contacts

NOTICE

Before any work is done on the fire sprinkler or fire alarm system, the building owner or their authorized representative shall be notified. Before opening any closed valve, ensure that opening the valve will not cause any damage from water flow due to open or missing sprinklers, piping, etc.



Important: This document contains important information on the installation and operation of PCVS valve supervisory switches. Please read all instructions carefully before beginning installation. A copy of this document is required by NFPA 72 to be maintained on site.

Description

The Model PCVS is a weather proof and tamper resistant switch for monitoring the open position of fire sprinkler control valves of the wall and yard post indicator and butterfly types. Two SPDT (Form C) contacts are provided which will operate when the valve position is altered from an open state.

The unit mounts in a 1/2" NPT tapped hole in the post indicator or butterfly valve housing. The device is engaged by the indicating assembly of the post indicator or the operating mechanism of the butterfly valve, actuating switches when the valve is fully open. The unit should be installed where it is accessible for service.

The cover is held in place by two tamper resistant screws that require a special tool to remove. The tool is furnished with each device.

Testing

The operation of the PCVS and its associated protective monitoring system shall be tested upon completion of the installation and inspected, tested and maintained in accordance with all applicable local and national codes and standards and/or the Authority Having Jurisdiction, (manufacturer recommends quarterly or more frequently). A minimum test shall consist of turning the valve operating mechanism towards the closed position. The PCVS shall operate within the first two revolutions of the operating mechanism. Fully close the valve and ensure the PCVS does not restore. Fully open the valve and ensure that the PCVS restores to normal.

Technical Specifications

Dimensions	See Fig 10
Weight	1.0 lbs (0,45 kg)
Enclosure	Cover: Die Cast Finish: Red Powder Coat Base: Die Cast Finish: Black Powder Coat All parts have corrosion resistant finishes
Cover Tamper	Tamper Resistant Screws Optional Cover Tamper Switch Available
Contact Ratings	PCVS-2: Two Sets of SPDT (Form C) 10.0 Amps at 125/250 VAC 2.0 Amps at 30VDC Resistive 10 mAmps minimum at 24 VDC
Environmental Limitations	-40° F to 140°F (-40°C to 60°C) NEMA 4X (IP 65) and NEMA 6P Enclosure (IP67) (Use suitably rated conduit and connector) Indoor or Outdoor Use (See PIVSU-EX Bulletin 5400694 for Hazardous locations)
Conduit Entrances	Two Knockouts for 1/2" conduit provided (See Notice on Page 7 and Fig. 11 on Page 6)
Service Use	NFPA 13, 13D, 13R, 72

Specifications subject to change without notice

Theory Of Operation

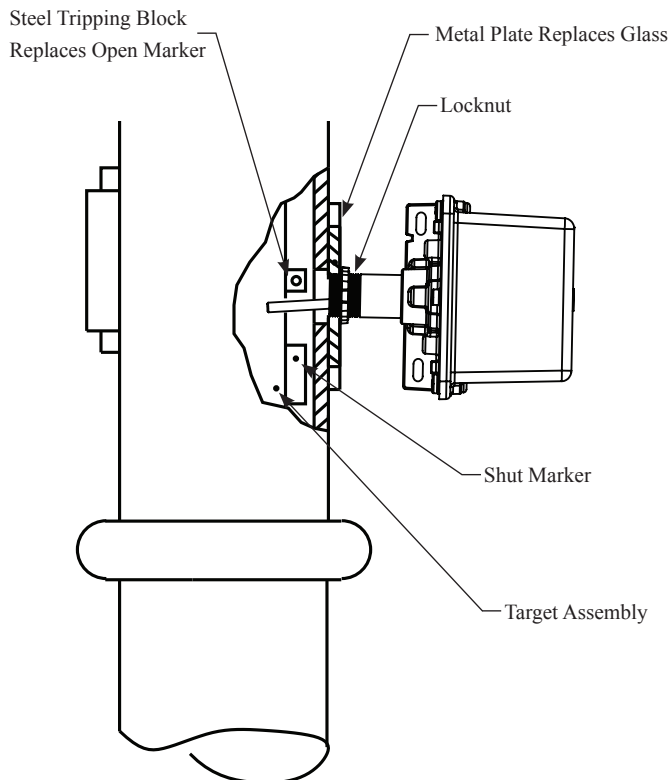
The PCVS is a spring loaded switch. It is in normal position when the trip rod is pulling against the spring force. Normal is when the switch is installed on the valve and the valve is fully open. As the valve closes, the valve actuator moves away from the trip rod of the PCVS and the spring on the PCVS pulls the trip rod over and trips the switch.

Alternate Window Installation and Moving Hood Installation

Target Moves Up as Valve is Shut

Fig 1

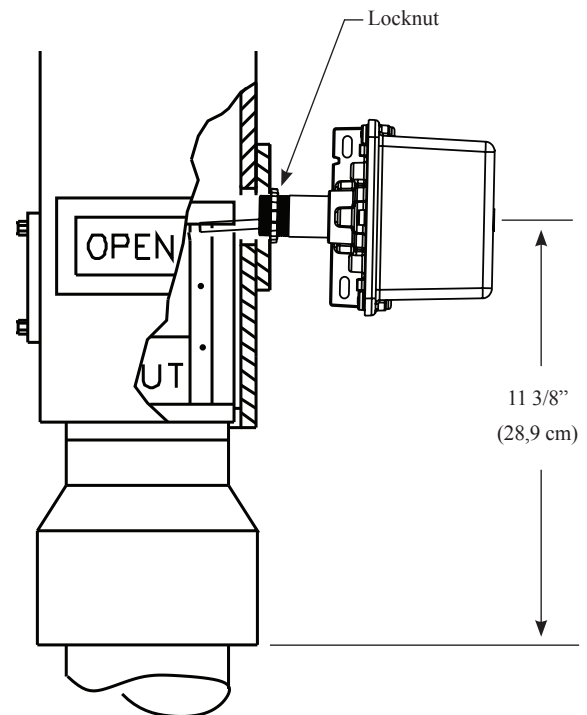
Subject to the approval of the “authority having jurisdiction” the alternate method of installation shown in Fig. 1 may be used. In this method, one of the glass windows of the housing is replaced with a 1/4” thick metal plate that is cut to fit in place of the glass and drilled and tapped to receive 1/2” NPT pipe nipple. In some cases it may be necessary to attach an angle bracket to the target assembly to engage the PCVS trip rod.



Hood Moves Down as Valve is Shut

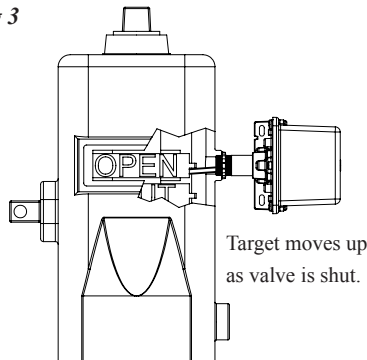
Fig 2

If the target is stationary and a hood arrangement is used, such as is shown in Fig. 2, the hood must be drilled with a 23/32” drill and tapped with a 1/2” NPT. The center line of this hole should be 1/8” below the portion of target assembly that strikes the PCVS trip rod. The 11 3/8” dimension shown is for a Clow Valve. Flexible conduit must be used for this type of installation. (More on pg. 3).



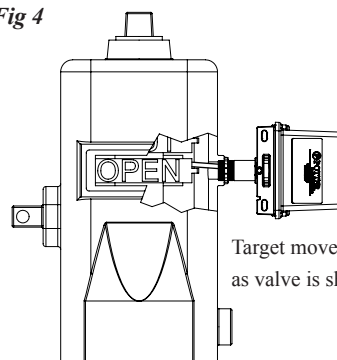
Typical Installations On Post Indicator Valve Housings

Fig 3



Target moves up
as valve is shut.

Fig 4



Target moves down
as valve is shut.

NOTE: Before any work is done on the fire sprinkler or fire alarm system, the building owner or their authorized representative shall be notified. Before opening any closed valve, ensure that opening the valve will not cause any damage from water flow due to open or missing sprinklers, piping, etc.

1. Position the valve to fully open ("OPEN" should appear in the window of the housing). Partially close the valve while observing the direction that the target assembly moves. Reopen the valve. If the valve housing is predrilled with a 1/2" NPT for installation of a monitoring switch, remove the 1/2" plug and fully open the valve. Make sure that "OPEN" appears in the window of the housing. GO TO STEP NO. 6.
2. If the valve is not pre-drilled for 1/2" NPT, remove the head and target assembly (consultation with valve manufacturer is recommended).
3. If the target assembly moved up as the valve was closed, measure the distance from the bottom of the head to the lower part of the target assembly that will contact the trip rod of the PCVS (see Fig. 3). This is usually a plate or bar on the target assembly, on a side adjacent to the "OPEN/SHUT" plates. Subtract 1/8" from the measurement. If the target moved down as the valve was closed, measure the distance from the bottom of the head to the upper portion of the target assembly that will contact the trip rod of the PCVS (see Fig. 4). Add 1/8" (3,2mm) to this measurement.
4. Mark the housing at the proper location. Using a 23/32" (18,2mm) drill bit, drill and then tap a 1/2" NPT in the housing on the side that coincides with the portion of the target assembly that will engage the trip rod of the PCVS.
5. Replace the head and target assembly.
6. Loosen the socket head screw that holds the nipple in the PCVS and remove the nipple.
7. Screw the locknut that is provided onto the nipple.
8. Screw the nipple into the 1/2" NPT hole in the valve housing hand tighten. Tighten the locknut against the valve housing to secure the nipple firmly in place.
9. Insert a scale or probe thru the nipple to measure the distance from the open end of the nipple to the target assembly. Subtract 1/2" (12,5mm) from this measurement.

NOTE: In some cases, it may be necessary to attach an angle bracket to the target assembly to engage the PCVS trip rod.

10. Using the special tool provided, loosen the two cover screws and remove the cover from the PCVS.
 11. Loosen the locking screw that holds the trip rod in place and adjust the rod length, from the end of the collar to the end of the rod, using the dimension determined in Step 9. Tighten the locking screw to 5 in-lbs minimum to hold the rod in place and properly seal the enclosure.
 12. Partially close the valve to move the target assembly away (3 to 4 revolutions of the handle/hand wheel).
 13. With the PCVS positioned so the spring will pull the trip rod to follow the target as the valve is closing, slide the PCVS over the nipple. Tighten the socket head screw in the collar.
 14. Carefully open the valve to the fully open position. As the target moves to the open position it should engage the trip rod and actuate the switch(es). There should be a minimum overtravel of 1/2 revolution of the handle/hand wheel after the switch(es) actuate (a continuity meter connected to each set of contacts is one method that could be used to determine this).
 15. Slowly close the valve. The switch must operate during the first two revolutions of the handle/hand wheel or during 1/5 of the travel distance of the valve control apparatus from its normal condition.
- NOTE:** Small adjustments of the target position may be necessary (consultation with valve manufacturer is recommended).
16. Complete the required electrical wiring, connections and tests. The valve should be operated through the entire cycle of fully closed and fully open to determine the integrity of the PCVS installation and the signaling system. Check that all electrical and mechanical connections are secure.
 17. Reinstall the cover and tighten the cover screws to 15 in-lbs minimum to properly seal the enclosure.
 18. When the installation and testing are complete, return valve to its proper position.
 19. Alternative installation for other post indicator valve housing shown in Fig. 1 and 2.

Typical Installation on a Butterfly Valve

Fig 5 Typical Indicating Butterfly Valve

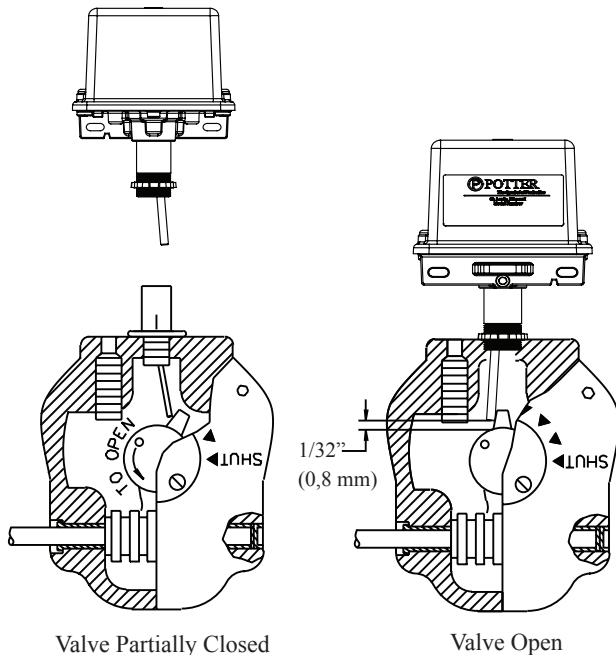
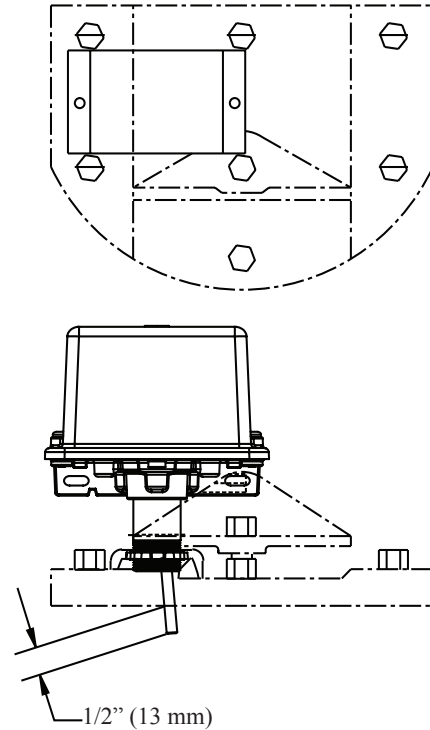


Fig 6 Dresser Indicating Butterfly Valve



1. Remove the 1/2" NPT plug from the gear operator case.
2. Loosen the set screw that holds the nipple in the PCVS and remove the nipple.
3. Screw the locknut that is provided onto the nipple.
4. Screw the nipple into the 1/2" NPT hole in the gear operator-hand tighten. Tighten the locknut against the case, to secure the nipple firmly in place
5. Partially close the valve to move the boss on the gear hub out of the way (3 or 4 revolutions of the hand wheel or crank).
6. Using the special tool provided, loosen the two cover screws and remove the cover from the PCVS.
7. Orient the PCVS so the spring will pull up the trip rod to follow the actuating cam inside the valve.
- NOTE:** If trip rod length is excessive, loosen the locking screw and remove the trip rod from the trip lever. Using pliers, break off the one (1) inch long notched section (see Fig. 12). Reinstall the trip rod, tightening the screw to 5 in-lbs minimum, and repeat Step 7 procedure.
8. Remove device from nipple and shorten the trip rod 1/32" (0,80mm) (this is to prevent the trip rod from dragging on the gear hub inside the valve). Tighten the locking screw to hold the rod in place. Re-install the device on the nipple. Tighten the screw in the collar against the nipple.

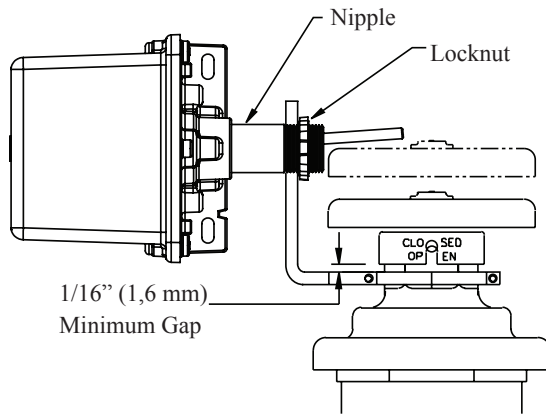
NOTE: In some cases it may be necessary to remove the

gear box cover to ensure correct operation (consultation with the valve manufacturer is recommended).

9. Carefully open the valve to its full open position, as the boss on the gear hub moves to the open position it must engage the PCVS trip rod and actuate the switch(es). There should be a minimum overtravel or revolution of the crank or hand wheel after the switch(es) actuate (a continuity meter connected to each set of contacts is one method that could be used to determine this).
- NOTE:** Slight adjustment of gear stops may be necessary to prevent overtravel of the trip rod (consultation with valve manufacture is recommended).
10. Carefully close the valve. The switch(es) must operate during the first two revolutions of the crank or hand wheel or during 1/5 of the travel distance of the valve control apparatus from its normal condition.
11. Complete the required electrical wiring, connections and tests. The valve should be operated through the entire cycle of fully closed and fully open to determine the integrity of the PCVS installation and signaling system.
12. Reinstall the cover and tighten the screws to 15 in-lbs minimum to properly seal the enclosure.
13. When the installation and testing are complete, return valve to its proper position.

Typical Pressure Reducer Type Valve Installation

Fig 7

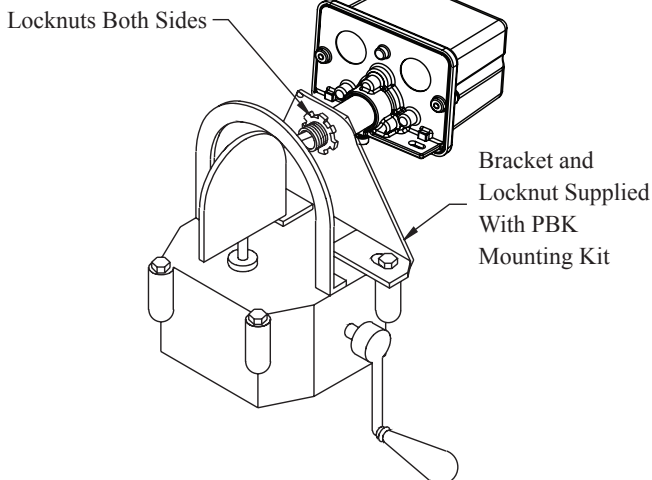


This figure shows the Model PCVS mounted on the valve yoke, with a bracket supplied by the valve manufacturer, to supervise a pressure reducer type valve.

NOTE: This application is subject to the approval of the authority having jurisdiction.

PBK - Butterfly Valve Kit for Valves with Internal Supervisory Switches

Fig 8



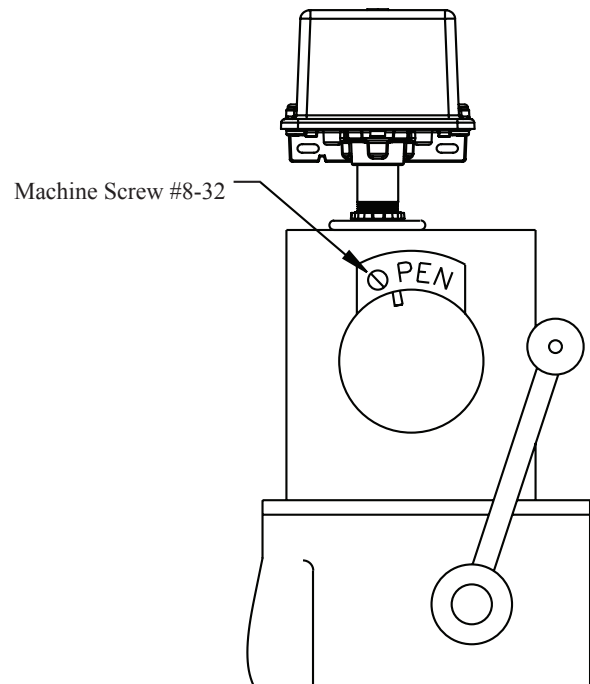
Pratt Butterfly Valve Kit as used to mount a PCVS on a Pratt Model IBV Valve.

Kits contain: Bracket, nuts and instructions

NOTE: Due to changes in valves, brackets may need to be modified by installer. This application is subject to the approval of the authority having jurisdiction.

PVK - Pratt PIVA Post Indicator Valve Kit

Fig 9

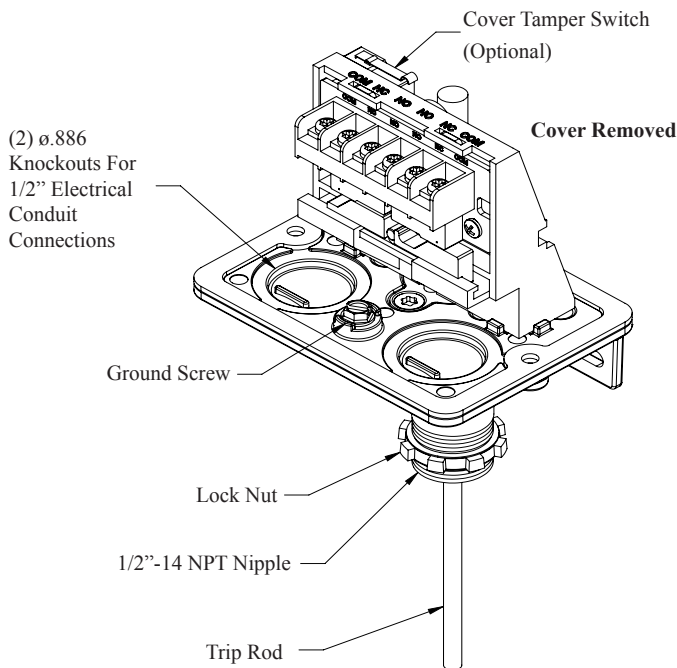
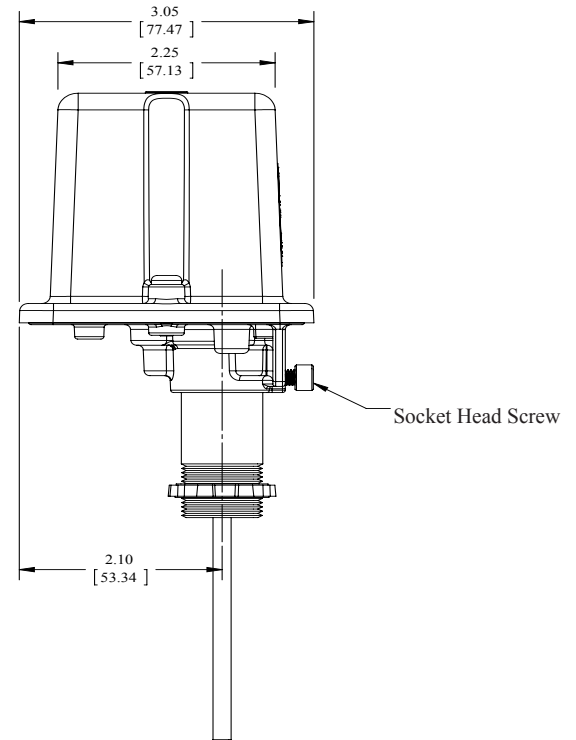
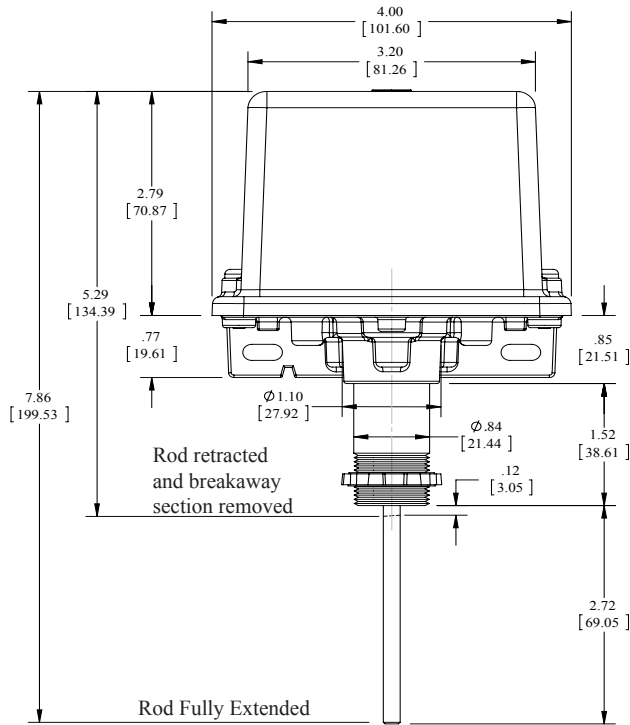


Pratt Valve Kit as used to mount a PCVS on a Pratt Model PIVA Valve. Kit contains: Instructions, template, screw and nut.

NOTE: This application is subject to the approval of the authority having jurisdiction.

Dimensions

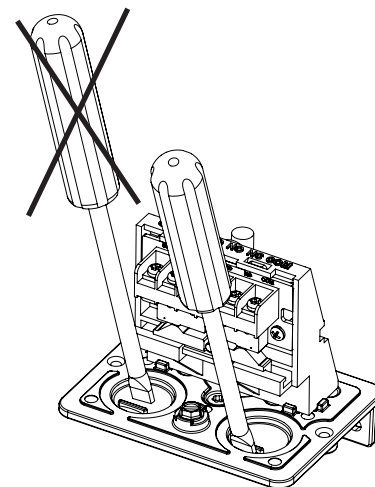
Fig 10



Knockout Removal

Fig 11

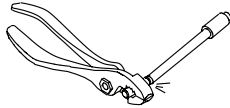
To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



NOTE: Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

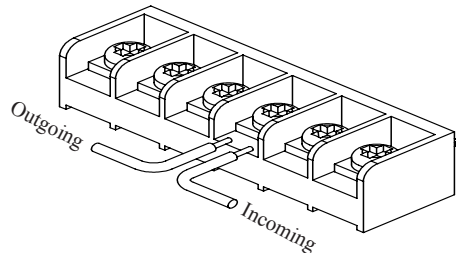
Breaking Excessive Rod Length

Fig 12



Switch Terminal Connections Clamping Plate Terminal

Fig 13



WARNING

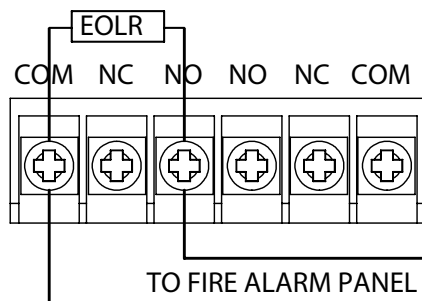
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life. Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

NOTICE

All conduit and connectors selected for the installation of this product shall be suitable for the environment for which it is to be used and shall be installed to the manufacturer's installation instructions. For NEMA 4, 4X, 6, 6P installations, the cover screws are recommended to be tightened to 15 in-lbs minimum and the trip rod locking screw tightened to 5 in-lbs minimum to properly seal the enclosure.

Typical Electrical Connections

Fig 14



Ordering Information

Model	Description	Stock No.
PCVS-2	Potter Control Valve Switch (double switch)	1010203
PCVS-2 CRH	Potter Control Valve Switch (double switch). Corrosion resistant 316 stainless steel hardware.	1010211
--	Cover Screw	5490424
--	Hex Key for Cover Screws and Installation Adjustments	5250062
PBK-S	Pratt Butterfly Valve Kit - 3" (75mm) to 12" (30mm)	0090133
PBK-M	Pratt Butterfly Valve Kit - 14" (355 mm) and 16" (406 mm)	0090146
PBK-L	Pratt Butterfly Valve Kit - 18" (457mm) to 24" (610 mm)	0090132
PVK	Pratt Valve Kit	1000060
--	Optional Cover Tamper Switch Kit	0090200
KBK	Kennedy Butterfly Valve Kit	0090143
TBK	Tycho Butterfly Valve Kit	0090150

For pressure reducer type valve installation kits (if required) contact valve manufacturer.

Engineering Specifications: Post Indicator & Butterfly Valves

UL, CUL Listed / FM Approved and CE Marked valve supervisory switches shall be furnished and installed on all post Indicator and Butterfly valves that can be used to shut off the flow of water to any portion of the fire sprinkler system, where indicated on the drawings and plans and as required by applicable local and national codes and standards. The supervisory switch shall be NEMA 4X and 6P rated and capable of being mounted in any position indoors or out and be completely submerged without allowing water to enter the enclosure. The enclosure shall be held captive by tamper resistant screws. The device shall contain two conduit entrances and two Single Pole Double Throw (SPDT) switches. The device shall contain a removable 1/2" NPT nipple and adjustable trip rod, the trip rod shall be held captive by a set screw accessible upon removal of the cover. The switch contacts shall be rated at 10A, 125/250VAC and 2A, 30VDC. Post Indicator and Butterfly Valve supervisory switch shall be model PCVS-2 manufactured by Potter Electric Signal Company LLC

NOTICE

Supervisory switches have a normal service life of 10-15 years. However, the service life may be significantly reduced by local environmental conditions.



BELLS
PBA-AC & MBA-DC



- UL, ULC, and FM Approved**
Sizes Available: 6" (150mm), 8" (200mm) and 10" (250mm)
Voltages Available: 24VAC
120VAC
12VDC (10.2 to 15.6) Polarized
24VDC (20.4 to 31.2) Polarized
- Service Use:** Fire Alarm
General Signaling
Burglar Alarm
- Environment:** Indoor or outdoor use (See Note 1)
-40° to 150°F (-40° to 66°C)
(Outdoor use requires weatherproof backbox.)
- Termination:** AC Bells - 4 No. 18 AWG stranded wires
DC Bells - Terminal strip
- Finish:** Red powder coating
- Optional:** Model BBK-1 weatherproof backbox
Model BBX-1 deep weatherproof backbox

These vibrating type bells are designed for use as fire, burglar or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4" (101mm) square electrical box for indoor use or on a model BBK-1 weatherproof backbox or BBX-1 deep weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1, Stock No. 1500001.

- Notes:**
1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C).
 2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.
 3. ULC only applies to MBA DC bells.

Size inches (mm)	Voltage	Model Number	Stock Number	Current (Max.)	Typical dB at 10 ft. (3m) (2)	Minimum dB at 10 ft. (3m) (1)
6 (150)	12VDC	MBA-6-12	1750070	.12A	85	76
8 (200)	12VDC	MBA-8-12	1750080	.12A	90	77
10 (250)	12VDC	MBA-10-12	1750060	.12A	92	78
6 (150)	24VDC	MBA-6-24	1750100	.06A	87	77
8 (200)	24VDC	MBA-8-24	1750110	.06A	91	79
10 (250)	24VDC	MBA-10-24	1750090	.06A	94	80
6 (150)	24VAC	PBA246	1806024*	.17A	91	78
8 (200)	24VAC	PBA248	1808024*	.17A	94	77
10 (250)	24VAC	PBA2410	1810024*	.17A	94	78
6 (150)	120VAC	PBA1206	1806120*	.05A	92	83
8 (200)	120VAC	PBA1208	1808120*	.05A	99	84
10 (250)	120VAC	PBA12010	1810120*	.05A	99	86

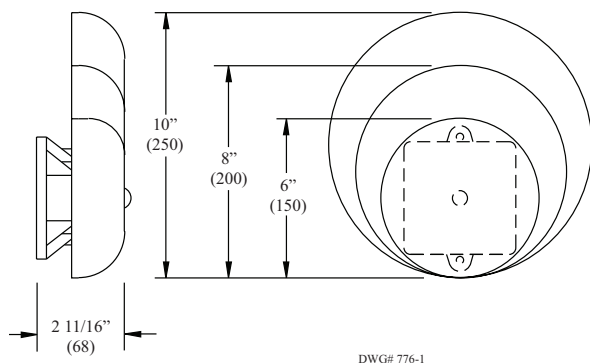
All DC bells are polarized and have built-in transient protection.
* Does not have ULC listing.

⚠ WARNING

In outdoor or wet installations, bell must be mounted with weatherproof backbox, BBK-1 or BBX-1. Standard electrical boxes will not provide a weatherproof enclosure. If the bell and/or assembly is exposed to moisture, it may fail or create an electrical hazard.

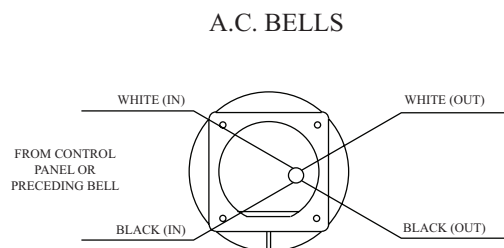
Bells Dimensions Inches (mm)

Fig. 1



Wiring (rear view)

Fig. 3



CAUTION:
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

NOTES:

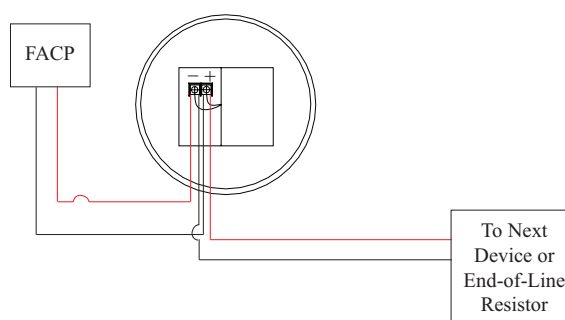
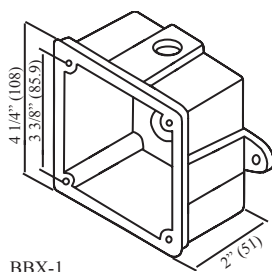
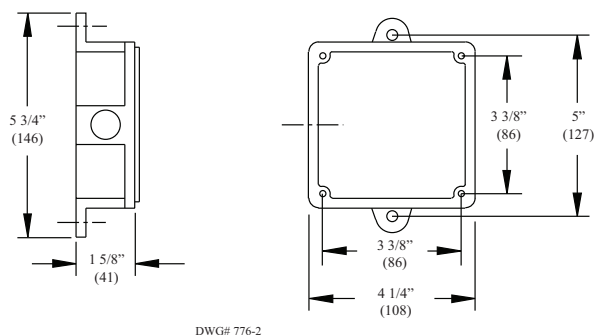
1. WHEN USING AC BELLS, TERMINATE EACH EXTRA WIRE SEPARATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON AC BELLS.

DWG# 776-3

Weatherproof Backbox Dimensions Inches (mm)

Fig. 2

Box has one threaded 1/2" conduit entrance



Installation

1. The bell shall be installed in accordance with NFPA 13, 72, or local AHJ. The top of the device shall be no less than 90" AFF and not less than 6" below the ceiling.
2. Remove the gong.
3. Connect wiring (see Fig. 3).
4. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
5. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
6. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).

WARNING

Failure to install striker down will prevent bell from operating.



Fire Protection, Sprinkler
Service Gauge Type 1005P, XUL
ASME B 40.1 Grade B
(±3-2-3% of span)

- Underwriters Laboratory listed and Factory Mutual approved
- Corrosion-resistant ABS case
- Heat-resistant polycarbonate push-in window
- Patented PowerFlex™ movement with polyester segment
- True Zero™ indication, a unique safety feature

Ashcroft® fire protection sprinkler gauges are Underwriters Laboratory listed and Factory Mutual approved for fire protection sprinkler service. The case material on Type 1005P, XUL gauges is ABS. The 0-300 psi pressure range is used on “wet” systems where water is available to the sprinkler heads. The 0-80 retard to 250 psi pressure range is used on dry systems where the lines are filled with air pressure until system activation.

The patented PowerFlex movement with polyester segment is designed to provide unequalled shock and vibration resistance resulting in superior performance and extended gauge life.



True Zero indication, a standard feature on these gauges, reduces the potential risk of installing a damaged gauge on your equipment.

GAUGE SPECIFICATIONS

Type no.:	1005P, XUL	Operating temperature:	−40°F to 150°F
Accuracy:	ASME B 40.1 Grade B (±3-2-3% of span)	Connection:	¼ NPT lower
Size:	3½"	Ranges:	0-300 psi (water) 0-80 retard to 250 psi (air) UL 393 Listed, UL of Canada Listed and FM approved. Equivalent (single or dual scale) metric scales are available
Case:	ABS (Polycarbonate blend)		
Ring:	None		
Window:	Polycarbonate, push-in		
Dial:	Black figures on white background		
Pointer:	Black, aluminum		
Bourdon tube:	“C” shaped bronze		
Movement:	Patented PowerFlex with polyester segment		
Socket:	Brass		
Restrictor:	None		

GAUGE OPTIONS

- Customized dials
- Other UL listed ranges on application

NOTES



LOOK FOR THESE AGENCY MARKS ON OUR PRODUCTS

TO ORDER THIS TYPE 1005P, XUL GAUGE:

Select:	35	W	1005	P	H	02L	XUL	300#
1. Dial Size: 3½"								
2. Patented PowerFlex™ Movement								
3. Case Type Number: 1005								
4. Case Type Material: ABS								
5. Socket Material: Brass								
6. Connection Size/Location: ¼ NPT lower								
7. UL listed, FM approved								
8. Range: 300 psi								

Consult factory for guidance in product selection
Phone (203) 385-0217, Fax (203) 385-0602 or
visit our web site at www.ashcroft.com





VALVES ANGLE HOSE VALVES

Model/Series No.
**4060-4075
SERIES**

SPECIFICATIONS

ANGLE VALVES

FEMALE X MALE

Cast brass valve with red hand wheel, Female N.P.T. inlet x male hose thread outlet. 300 psi

DOUBLE FEMALE

Cast brass valve with red hand wheel. Female N.P.T. inlet and outlet. 300 psi



MODEL 4065 (Shown)

MODEL SELECTION

VALVES

- ☐ 4060 1-1/2" Female x Male Angle Valve ◀FM▶
- ☒ 4065 2-1/2" Female x Male Angle Valve ◀FM▶
- ☐ 4065-500 2-1/2" Female x Male Angle Valve 500 psi
- ☐ 4070 1-1/2" Double Female Angle Valve ◀FM▶
- ☐ 4075 2-1/2" Double Female Angle Valve ◀FM▶
- ☐ 4075-500 2-1/2" Double Female Angle Valve 500 psi

OPTIONAL CAPS & FLANGES

- ☐ 4615 1-1/2" Cap w/ Chain
- ☐ 4625 2-1/2" Cap w/ Chain
- ☐ 4711 1-1/2" Flange 3" O.D.
- ☐ 4712 2-1/2" Flange 6-1/4" O.D.

PRODUCT OPTIONS

FINISHES:

- ☐ -B Polished Brass
- ☐ -C Rough Chrome Plated
- ☒ -D Polished Chrome Plated

THREADS:

- ☒ N.S.T.
- ☐ Other _____

VARIATIONS:

- ☐ Extended Stem Up to 24"
Specify _____
- ☐ Rocker Lugs (Cap Models Only)
- ☐ -GRV Grooved Inlet (4065 Only)

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4060-4075 SERIES Date: 10/20/15

MEMBERSHIP



FIRE EQUIPMENT
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ASSOCIATION



ONFSA
NATIONAL FIRE SPRINKLER ASSOCIATION, INC.



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Also in:
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Atlanta (800) 762-0542
Miami (866) 961-3473
Dallas (866) 644-3473

www.potterroemer.com



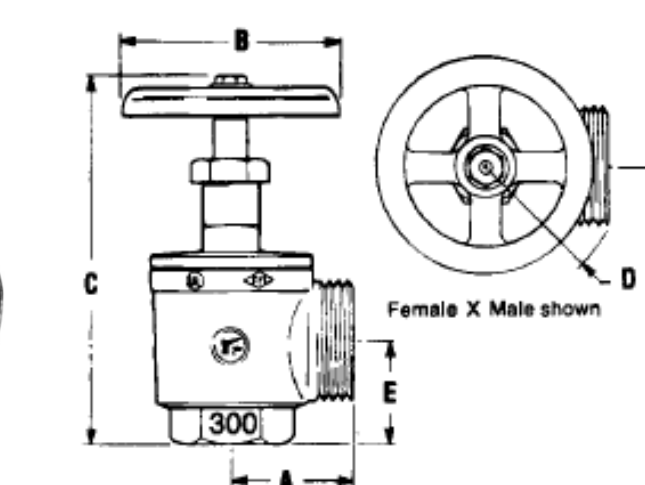
VALVES ANGLE HOSE VALVES

Model/Series No.
**4060-4075
SERIES**

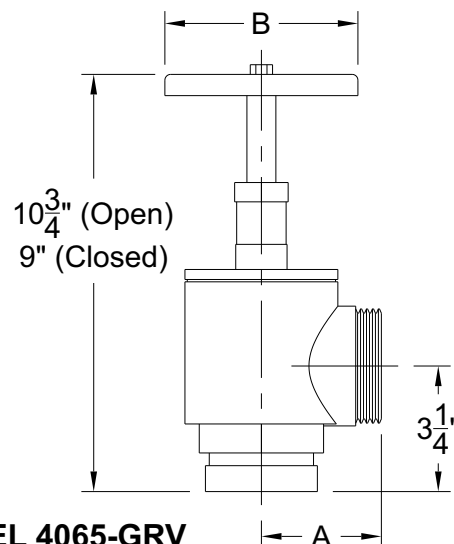
MODEL DIMENSIONS

Size	Closed			Open		
	A	B	C	C	D	E
1-1/2	2-1/4	3-1/2	6-1/2	7-1/2	2-1/2	2
2-1/2	3-1/2	5	9-1/2	11-1/2	3-1/2	2-3/4

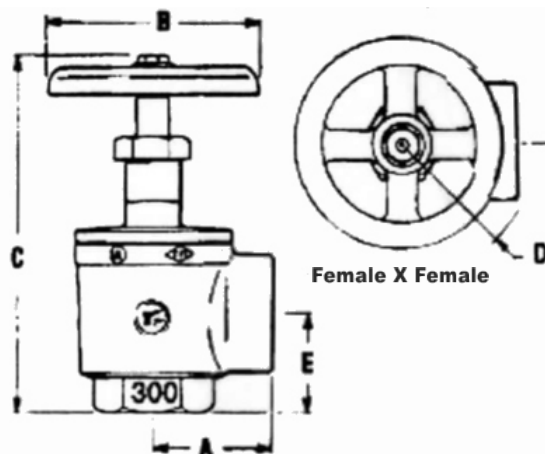
ALL DIMENSIONS IN INCHES



MODEL 4060-4065



MODEL 4065-GRV



MODEL 4070-4075

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POTTER ROEMER/FIRE PRO

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VALVES ACCESSORIES

Model/Series No.
4605-4733
SERIES

SPECIFICATIONS

CAPS

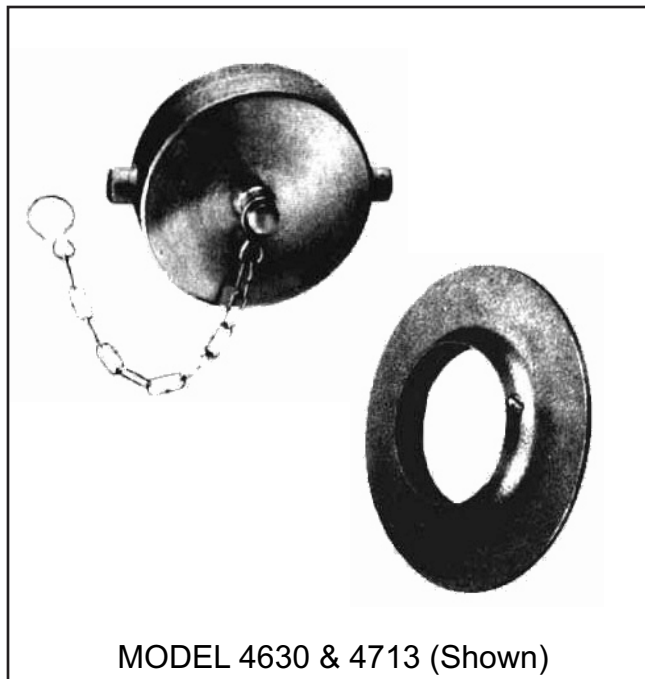
Used to cover and protect male threads on valves and hydrants. Discourages entry of foreign materials.

Cast brass cap with female hose thread. Pin lug and chain.

FLANGES

Used to trim pipe entry.

Cast brass flange with set screw.



MODEL 4630 & 4713 (Shown)

MODEL SELECTION

CAPS

☐ 4605 3/4"

☐ 4610 1"

☐ 4615 1-1/2"

☐ 4625 2-1/2"

☐ 4630 3"

☐ 4640 4"

FLANGES

☐ 4711 1-1/2"

☐ 4712 2-1/2"

☐ 4713 3"

☐ 4733 3" Chrome plated stamped steel split ring flange

PRODUCT OPTIONS

FINISHES: (Caps)

- ☐ -B Polished Brass
- ☐ -C Rough Chrome Plated
- ☒ -D Polished Chrome Plated

VARIATIONS: (Caps)

- ☐ -RL Rocker Lugs (Model 4625 & 4630 Only)
- ☐ -P Plastic

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4605-4733 SERIES Date: 03/27/14

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Escutcheons

BRECCO

Floor & Ceiling Plates (Plastic)

These 1-piece flexible plastic plates come with a split for ease of installation.

Available in White or Chrome.



Part No.	Description	Box Qty.
ESPLFCPC0050	1/2" C.P.	12
ESPLFCPC0075	3/4" C.P.	12
ESPLFCPC0100	1" C.P.	12
ESPLFCPC0125	1-1/4" C.P.	12
ESPLFCPC0150	1-1/2" C.P.	12
ESPLFCPC0200	2" C.P.	12
ESPLFCPC0250	2-1/2" C.P.	12
ESPLFCPC0300	3" C.P.	12
ESPLFCPC0400	4" C.P.	12
ESPLFCPC0500	5" C.P.	6
ESPLFCPC0600	6" C.P.	6
ESPLFCPC0800	8" C.P.	6
ESPLFCPW0050	1/2" WHITE	12
ESPLFCPW0075	3/4" WHITE	12
ESPLFCPW0100	1" WHITE	12
ESPLFCPW0125	1-1/4" WHITE	12
ESPLFCPW0150	1-1/2" WHITE	12
ESPLFCPW0200	2" WHITE	12
ESPLFCPW0250	2-1/2" WHITE	12
ESPLFCPW0300	3" WHITE	12
ESPLFCPW0400	4" WHITE	12
ESPLFCPW0500	5" WHITE	6
ESPLFCPW0600	6" WHITE	6
ESPLFCPW0800	8" WHITE	6

Auxiliary Drain



Control Valve



Main Control



Main Drain



Inspectors Test





SERIES LCI INTUMESCENT SEALANT

906

APPLICATIONS

SpecSeal® LCI Sealant has a broad application base designed to seal a wide variety of common penetrations and construction joints. Penetrant types include insulated and non-insulated metallic pipes and tubes, non-metallic pipes and tubes, and common electrical service and power distribution, telephone, data, and TV cabling. This product is also used in conjunction with other SpecSeal® Products such as SpecSeal® Firestop Collars and Wrap Strips to protect larger plastic pipes. See Table A for a summary application list.



PRODUCT DESCRIPTION

211313 - Wet-Pipe Sprinkler System

SpecSeal® LCI Sealant is a versatile and economical intumescent sealant that has excellent caulking properties as well as high build properties on vertical or overhead surfaces. This single grade may be caulked (standard cartridge or bulk loaded), knifed or troweled. In addition, SpecSeal® LCI Sealant does not contain PCB's or asbestos.

SpecSeal® LCI Sealant is storage stable (when stored according to the manufacturer's recommendations), and will not separate or shrink when dried. SpecSeal® Series LCI Sealant will adhere to all common construction and penetrant materials and contains no solvents that might adversely effect plastic pipes or cable jackets.

FEATURES

- **Economical:** High performance without the high price!
- **Highly Intumescent:** Expands up to 8 times.
- **Excellent Smoke Seal**
- **Water Resistant :** Will not re-emulsify when dry.
- **Water-Based** for easy installation, cleanup, and disposal.
- **Acoustically Tested:** Reduces noise transmission
- **Safe...**Low VOC's, No Solvents, Non-Halogenated
- **Paintable**

PERFORMANCE

SpecSeal® LCI Sealant is the basis for systems that meet the exacting criteria of ASTM E814 (UL1479) and ASTM E1966 (UL2079) as well as to the time-temperature requirements of ASTM E119 (UL263). LCI provides up to a 4-hour fire rating for typical service penetrations through concrete or wood floors, concrete or masonry walls, as well as gypsum board walls. SpecSeal® LCI Sealant meets Class A finish requirements for Flame Spread and Smoke Development when tested in accordance with ASTM E84 (UL723). Meets or exceeds the requirements of ASTM C834, Type C, Grade 0. SpecSeal® LCI Sealant is also acoustically tested, demonstrating excellent sound attenuation properties.

PHYSICAL PROPERTIES

Properties	Series LCI
Color	Red
Odor	Mild Latex
Density	9.0 lb/gal (1.08 kg/L)
pH	9.0
Solids Content By Weight	80%
Solids Content By Volume	66.9%
In Service Temperature	≤ 185°F (85°C)
Flame Spread	0*
Smoke Developed	0*
STC Rating (ASTM E90/ASTM C919)	62
VOC Content (EPA Method 24/ASTM D3960)	32.7g/L
Shelf Life	2 yrs
Volume Expansion	10X Free Expansion
Storage Temp.	40°F (4°C) - 95°F (35°C)

* Tested to ASTM E84 (UL723) at 14% surface coverage (modified test for sealants and caulks)



FBC™ System Compatible indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® pipe and fittings. FBC, FlowGuard Gold, BlazeMaster and Corzan are licensed trademarks of The Lubrizol Corporation.



FILL, VOID OR CAVITY MATERIALS FOR USE IN JOINT SYSTEMS AND THROUGH-PENETRATION FIRESTOP SYSTEMS. SEE UL FIRE RESISTANCE DIRECTORY. 3L73



SPECIFICATIONS

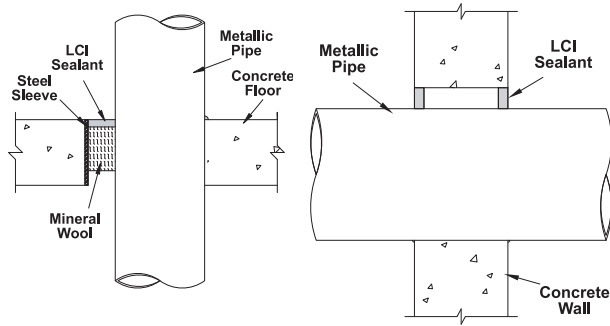
The firestopping sealant shall be a water-resistant, intumescent latex sealant. The sealant when exposed to high heat or flame shall exhibit a free expansion of up to 10 times its original volume. The firestopping sealant shall contain no water soluble nor hygroscopic ingredients and shall be acoustically tested. The sealant shall be UL Classified and/or FM approved and tested to the requirements of ASTM E814 (UL1479), CAN/ULC S115 and shall meet Class A finish requirements when tested in accordance with ASTM E84 (UL723).

SPECIFIED DIVISIONS

- DIV. 7 07840 Through-Penetration Firestopping
- DIV. 13 13900 Special Construction Fire Suppression & Supervisory Systems
- DIV. 15 15250 Mechanical Insulation – Fire Protection
- DIV. 16 16050 Basic Electrical Materials & Methods



Fig 1: METALLIC PIPES - Concrete/Masonry Floors & Walls

**UL System No. C-AJ-1353**

F Rating: 3 Hr • T Rating: 0 Hr

Steel or Iron Pipe: <12", Copper Pipe: <4"

Annulus: 0" to 2"

Sealant Depth: 1/4"

Forming Material: Nom 4 pcf mineral wool (2 1/4" Depth)

UL System No. W-J-1098

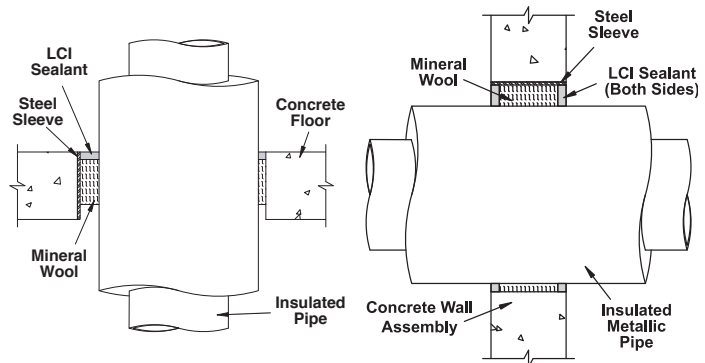
F Rating: 2 Hr • T Rating: 1/4, 3/4 & 1 Hr

Steel or Iron Pipe: <8", Copper Pipe: <4"

Annulus: 0" to 2"

Sealant Depth: 5/8"

Fig 2: INSULATED METALLIC PIPES - Concrete/Masonry Floors & Walls

**UL System No. C-AJ-5138**

F Rating: 2 Hr • T Rating: 3/4 or 1 Hr

Steel or Iron Pipe: 6", Copper Pipe: 4"

Pipe Covering: Max. 2" fiber glass or mineral wool pipe insulation.

Annulus: 1/4" to 1-5/8" • Sealant: 1/2"

Forming: Nom. 4 pcf mineral wool (3" depth)

SEALANT REQUIREMENTS IN CUBIC INCHES PER 1/4 INCH OF INSTALLED DEPTH*

PIPE SIZE	Pipe O.D. in. (mm)	Diameter of Opening - in. (mm)											
		1.5 (38)	2.0 (51)	3.0 (76)	4.0 (102)	5.0 (127)	6.0 (152)	7.0 (178)	8.0 (203)	10 (254)	12 (305)	14 (356)	26 (660)
0.5 (13)	0.840 (21)	0.3 (4.9)	0.6 (9.8)	1.6 (26.2)	3.0 (49.2)	4.8 (78.7)	6.9 (113.0)	9.5 (155.7)	12.4 (203.2)	19.5 (319.5)	28.1 (460.5)	38.3 (627.6)	132.6 (2173)
1.0 (25)	1.315 (33)	0.1 (1.6)	0.4 (6.6)	1.4 (22.9)	2.8 (45.9)	4.6 (75.4)	6.7 (109.8)	9.3 (152.4)	12.2 (200.0)	19.3 (316.3)	27.9 (457.2)	38.1 (624.3)	132.4 (2170)
1.5 (38)	1.900 (48)			1.1 (18.0)	2.4 (39.3)	4.2 (68.8)	6.4 (104.9)	8.9 (145.8)	11.9 (195.0)	18.9 (309.0)	27.6 (452.3)	37.8 (619.4)	132.0 (2163)
2.0 (51)	2.375 (60)			0.7 (11.5)	2.0 (32.8)	3.8 (62.3)	6.0 (98.3)	8.5 (139.2)	11.5 (188.4)	18.5 (309.7)	27.2 (445.7)	37.4 (568.6)	131.6 (2157)
2.5 (64)	2.875 (73)			0.1 (1.6)	1.5 (24.6)	3.3 (54.1)	5.4 (88.4)	8.0 (131.1)	10.9 (178.6)	18.0 (295.0)	26.7 (437.5)	36.9 (604.7)	131.1 (2148)
3.0 (76)	3.500 (79)				0.7 (11.5)	2.5 (41.0)	4.7 (77.0)	7.2 (118.0)	10.2 (167.1)	17.2 (281.9)	25.9 (424.4)	36.1 (591.6)	130.3 (2135)
3.5 (89)	4.000 (102)					1.8 (29.5)	3.9 (63.9)	6.5 (106.5)	9.4 (154.0)	16.5 (270.4)	25.1 (411.3)	35.3 (578.5)	129.6 (2124)
4.0 (102)	4.500 (114)					0.8 (13.1)	3.0 (49.2)	5.6 (91.8)	8.5 (139.3)	15.6 (255.6)	24.2 (396.6)	34.4 (563.7)	128.7 (2109)
6.0 (152)	6.625 (168)							1.1 (18.0)	4.0 (65.5)	11.1 (181.9)	19.7 (322.8)	29.9 (490.0)	124.2 (2035)
8.0 (203)	8.625 (219)									4.9 (80.3)	13.6 (222.9)	23.8 (390.0)	118.0 (1934)
10.0 (254)	10.750 (273)										5.6 (91.8)	15.8 (259.0)	110.0 (1803)
12.0 (305)	12.750 (324)											6.6 (108.1)	100.8 (1652)
24.0 (610)	24.000 (610)												19.6 (321.2)

*Different Sealant Depth?

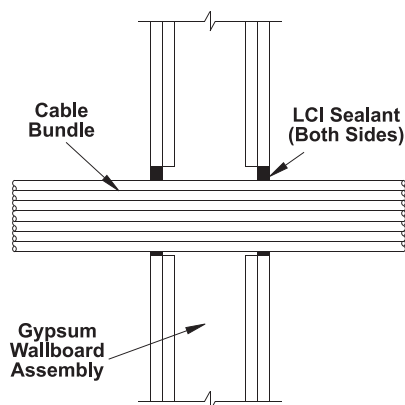
1/2" (12.7) Multiply by 2

5/8" (15.9) Multiply by 2.5

1" (25.4) Multiply by 4

1-1/4" (31.8) Multiply by 5

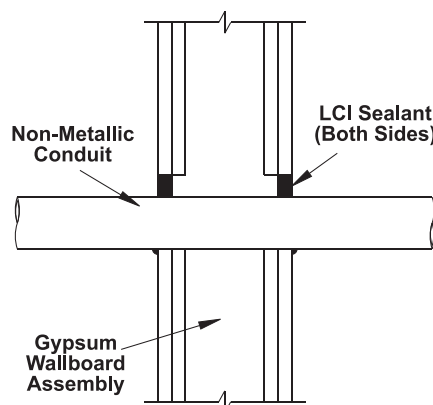
Fig. 3: ELECTRICAL, DATA OR COMMUNICATIONS - Gypsum Walls

**UL System No. W-L-3169**

F Rating: 1, 2 Hr • T Rating: 1/4 and 3/4

Up to 4-1/2" cable bundle

Annulus: 0" to 1/2" • Sealant: 5/8"

**UL System No. W-L-2241**

F Rating: 1, 2 Hr • T Rating: 0, 1/4, 1, 1-3/4

<2" Rigid PVC or ENMT, CPVC, ABS

Annulus: 0-1" • Sealant 5/8"

TABLE A: APPLICATIONS**TESTED AND CLASSIFIED FOR FIRE RESISTANCE**

- **Metallic Pipes** including steel, iron, or copper pipe and tubing.
- **Nonmetallic Pipes, Conduits & Tubing** including PVC, CPVC, ABS, and PEX.
- **Electrical & Electronic Cabling** including service entrance, power distribution, computer, telephone, and television.
- **Metal Ductwork** including HVAC, bath and dryer vents.
- **Insulated Pipes** including heating, cooling, and condensation applications.
- **Complete Wood Floor firestopping package** for electrical, plumbing, HVAC, telephone, and television.

INSTALLATION INSTRUCTIONS

906

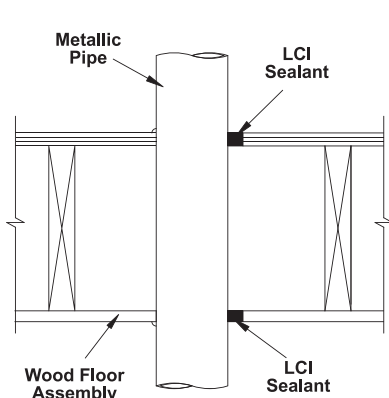
GENERAL: Areas to be protected must be clean and free of oil, loose dirt, rust or scale. Installation temperatures must be between 35°F (2°C) and 100°F (38°C). Allow product to dry a minimum of 24 hours before exposure to moisture.

SYSTEM SELECTION: Selection of an appropriate firestop system design is critical to the fire protection process. Space limitations preclude highly detailed information pertaining to individual application systems. Please consult the Product & Application Guide as well as the UL® Fire Resistance Directory for additional information.

FORMING: Some installations may require forming as either an integral part of the system or as an option to facilitate installation. In systems where forming is required, mineral wool batts with a minimum nominal density of 4 PCF (64 kg/m³) are generally required. Cut forming material oversize to allow for tight packing. Position forming material to allow for the proper depth of fill material.

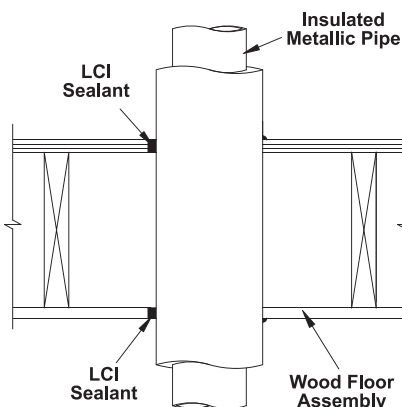
FILL MATERIAL: SpecSeal® LCI Sealant may be installed by caulking using a standard caulking gun or from bulk containers using a bulk loading caulking gun, or by manually troweling using a mason's trowel or putty knife. If the sealant tends to pull back from a surface, clean the surface with a damp rag or sponge and reapply. Work sealant into all areas exercising care to eliminate voids or seams. The surface of the sealant can be smoothed using a putty knife dipped in water. Adding water to the sealant itself is not recommended. Sealant (when dry) may be painted using most non-solvent based paints.

Fig. 4: BARE & INSULATED METALLIC PIPES - Wood Floor Assemblies



UL System No. F-C-1074

F Rating: 1 & 2 Hr • T Rating: 1/4, 1/2 and 1 Hr
Steel, Iron or Copper: 4" • Chase wall optional.
Annulus: 0" to 1" • Sealant: 5/8" bottom, 3/4" top



UL System No. F-C-5043

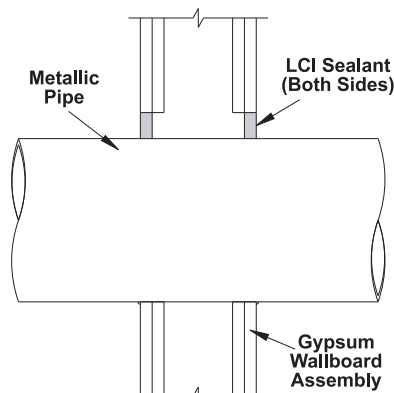
F Rating: 1 & 2 Hr • T Rating: 3/4 and 1 Hr
Steel, Iron or Copper: 4"
Pipe covering: 1" Fiber Glass, Mineral fiber or AB/PVC • Chase wall optional.
Annulus: 0" to 1" • Sealant: 5/8" bottom, 3/4" top.

In gypsum wallboard penetrations, apply a minimum cove bead of 1/4" (6 mm) at the interface of the penetrant with both exterior wall surfaces.

SMOKE SEALING: In some applications including firestop collars, SpecSeal® LCI Sealant is recommended as a smoke seal. It is suggested in these applications that the sealant be applied to both sides of walls. In floor applications, a sealing bead is suggested top and bottom.

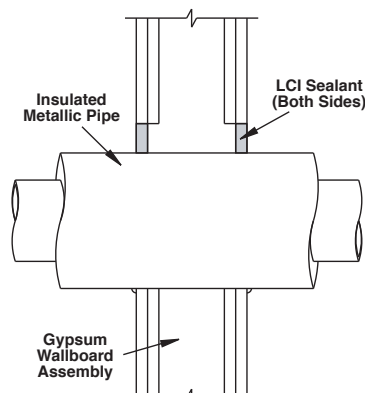
LIMITATIONS: SpecSeal® LCI Sealant is water-based and cures through the evaporation of water. Low temperatures as well as high humidity may retard drying. Non-porous or impermeable backing materials, plates, or coatings may retard the drying process. Do not paint or seal in any way that prevents contact with air until sealant has dried through completely. This product has been designed to be safe with plastics and has been used extensively and successfully with a variety of different types of plastic pipes, tubes, and plastic cable insulations. Variations in these materials however, make it impossible to guarantee compatibility. STI strongly recommends that the user consult with the manufacturer of the pipe, tubing, or cable in question regarding any known sensitivities or potential restrictions before applying this product.

Fig. 5: BARE & INSULATED METALLIC PIPES - Gypsum Walls



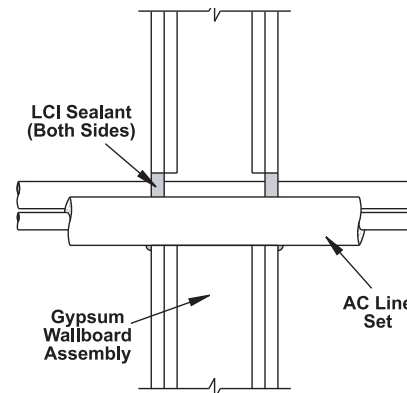
UL System No. W-L-1222

F Rating: 1, 2 Hr • T Rating: 1/4, 3/4, 1 Hr
Steel or Iron pipe: 8", Copper pipe: 4"
Annulus: 0" to 2" • Sealant: 5/8"



UL System Nos. W-L-5121, W-L-5122

F Rating: 1, 2 Hr • T Rating: 1 Hr & 1/4 Hr
Steel or Iron pipe: 6", Copper pipe: 4"
Pipe covering: Max. 2" fiber glass, 3/4" AB/PVC or 2" mineral fiber
Annulus: 0" to 1-1/2" • Sealant: 5/8"



UL System No. W-L-8025

F Rating: 1, 2 Hr • T Rating: 1/4 Hr
AC Line Set: Two copper tubes, one with 3/4" AB/PVC and thermostat wire
Annulus: 0" to 1" • Sealant 5/8"



No maintenance is normally required, however a periodic inspection of rated barriers is recommended to make sure that any new openings, modifications of previously installed firestops, or areas exhibiting physical damage, have been properly sealed or repaired. Subsequent sealing or repairs should be accomplished using SpecSeal® products per the original approved design.

RETROFIT: When adding or removing penetrants, care should be taken to minimize damage to the seal. Reseal using SpecSeal® products per the approved design. **NOTE:** New penetrants of a different nature than the original design may require a totally new firestop design or extensive modifications to the existing design. Reseal all openings as per the requirements of the modified design.

TECHNICAL SERVICE

Specified Technologies Inc. provides toll free technical support to assist in product selection and appropriate installation design. UL Systems, Material Safety Data Sheets and other technical information is available through the Technical Library at www.stifirestop.com.

PRECAUTIONARY INFORMATION

Consult Material Safety Data Sheet for additional information on the safe handling and disposal of this material.

AVAILABILITY

SpecSeal® Series LCI Sealant is available from authorized STI distributors. Consult factory or website for the names and locations of the nearest sales representatives or distributors.

ORDERING INFORMATION

CAT. NO.	DESCRIPTION	
LCI300	Sealant 10.1 oz Tube	18.2 Cu In (300 ml)
LCI305	Sealant 5 Gal Pail	1,155 Cu In (19.0 L)
LCI320	Sealant 20 oz Sausage	36 Cu in. (592 ml)
LCI329	Sealant 29 oz Quart Tube	52 Cu in. (858 ml)

Additional SpecSeal Products...

Series SSS Sealant

The industry's most versatile sealant provides the firestopping solutions for a wide range of combustible and noncombustible applications. Water-based intumescent sealant expands up to 8X!

Intumescent Wrap Strips

Three grades of intumescent wrap strips provide an unmatched combination of flexibility, economy, and expansion (up to 30X). Systems for plastic pipes including FR Polypropylene up to 8" trade size!

SSC & LCC Firestop Collars

Easy to install, economical protection for ABS and PVC pipes (both solid and foam core) as well as CPVC, PVDF, and FRPP. LCC Collars are available up to 4" and SSC Collars are available up to 6" trade size.

Firestop Mortar

Lightweight, versatile and economical! The best choice for large or complex installations.

SSP Firestop Putty

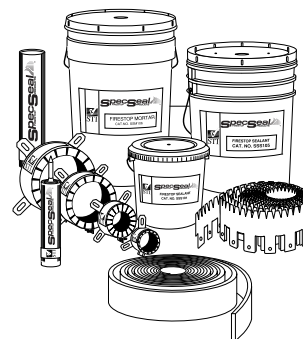
Available both in bar form and in pads, putty provides easy retrofit for through-penetrations and economical protection for electrical boxes.

SIL Silicones

Sealants and foam for through-penetrations and construction joints. Unexcelled aging characteristics and flexibility.

Elastomeric Joint Seals

Economical products for sealing construction joints. Choose caulk or spray applied products tested to UL2079.



IMPORTANT NOTICE: All statements, technical information, and recommendations contained herein are based upon testing believed to be reliable, but the accuracy and completeness thereof is not guaranteed.

LIMITED WARRANTY: STI warrants that its products will be free of defects for one year from the date of purchase. In the event a product does not conform to this warranty, the sole and exclusive remedy is, at STI's option, replacement of the product or refund of the purchase price. The warranty provided herein shall be void and of no effect in the event that the product is not installed in accordance with STI's published instructions, listed systems and applicable building and safety codes. **THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS AND EXPRESSED OR IMPLIED WARRANTIES** (including the implied warranties of merchantability or fitness for a particular use) **AND UNDER NO CIRCUMSTANCES SHALL STI BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING, WITHOUT LIMITATION, ANY LOSS OF REVENUE, PROFIT OR USE.** Prior to use, the user shall determine the suitability of the product for its intended use, and the user assumes all risks and liability for subsequent use. No person other than an officer of STI is authorized to bind STI to any other warranty for any product for which this warranty is issued.

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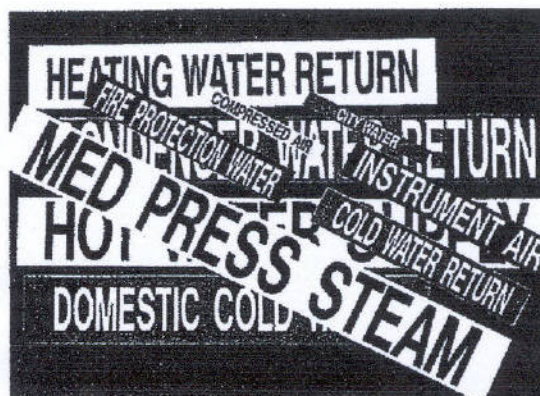


MS-900 Self-Adhesive Pipe Markers

For indoor or outdoor line service identification and system color coding.

- Complies with the ASME A13.1 "Scheme for the Identification of Piping Systems" regarding color, label size and letter size
- Printed on premium-quality, fade-resistant, outdoor-grade vinyl with durable, indoor/outdoor adhesive
- Adheres well to pipe and insulation with only limited surface preparation
- Legend markers can be used with arrow tape or separate arrow markers to indicate flow direction
- Fast turnaround with off-the-shelf delivery on stock legends

See page 11 for MS-900
Arrow Tape and Color Banding Tape.



STYLE	PIPE DIAMETER with Insulation	MARKER SIZE	LETTER SIZE
A	3/4" thru 2-1/4"	1" x 8"	3/4"
B	2-1/2" thru 7-7/8"	2-1/4" x 13"	1-3/4"
C	8" thru 10"	4" x 24"	2-1/2"
D	over 10"	4" x 32"	3-1/2"

LEGEND	BACKGROUND COLOR	A	B	C	D
2 PSI GAS	YELLOW	91100	92100		
2 PSI NATURAL GAS	YELLOW	91545	92545		
ACETYLENE GAS	YELLOW	91101	92101		
ACID	YELLOW	91102	92102		
ACID VENT	YELLOW	91400	92400		
ACID WASTE	YELLOW	91322	92322		
AIR	YELLOW	91103	92103		
AIR	BLUE	91211	92211		
AMMONIA	YELLOW	91105	92105		
ARGON	GREEN	91106	92106		
ARROWS →	YELLOW	91208	92208	93208	94208
ARROWS →	GREEN	91209	92209	93209	94209
ARROWS →	RED	91210	92210	93210	94210
ARROWS →	BLUE	91212	92212	93212	94212
ASBESTOS FREE INSULATION	BLUE	91107	92107		
BOILER BLOWDOWN	YELLOW	91108	92108		
BOILER FEED	YELLOW	91109	92109		
BOILER FEEDWATER	YELLOW	91110	92110	93110	94110
BREATHING AIR	BLUE	91401	92401		
CARBON DIOXIDE	YELLOW	91111	92111		
CARBON DIOXIDE	GREY	91112	92112		
CAUSTIC	YELLOW	91113	92113		
CHEMICAL FEED	YELLOW	91213	92213		
CHILLED WATER	GREEN	91114	92114	93114	94114
CHILLED WATER RETURN	GREEN	91115	92115	93115	94115
CHILLED WATER SUPPLY	GREEN	91116	92116	93116	94116
CHLORINE	YELLOW	91117	92117		
CHLORINE SOLUTION	YELLOW	91402	92402		
CIRCULATING WATER	GREEN	91118	92118		
CITY WATER	GREEN	91119	92119	93119	
CLEAN DRY AIR	BLUE	91403	92403		
COLD WATER	GREEN	91120	92120		
COLD WATER RETURN	GREEN	91121	92121		
COLD WATER SUPPLY	GREEN	91122	92122		
COMPRESSED AIR	YELLOW	91123	92123		
COMPRESSED AIR	BLUE	91284	92284		
CONDENSATE	YELLOW	91124	92124	93124	94124
CONDENSATE DRAIN	YELLOW	91285	92285		
CONDENSATE RETURN	YELLOW	91125	92125	93125	94125
CONDENSER WATER	GREEN	91128	92128	93128	94128
CONDENSER WATER RETURN	GREEN	91129	92129	93129	94129
CONDENSER WATER SUPPLY	GREEN	91130	92130	93130	94130

LEGEND	BACKGROUND COLOR	A	B	C	D
COOLING WATER	GREEN	91131	92131	93131	
COOLING WATER RETURN	GREEN	91286	92286		
COOLING WATER SUPPLY	GREEN	91287	92287		
DEIONIZED WATER	GREEN	91132	92132		
DEMINERALIZED WATER	GREEN	91214	92214		
DIESEL	YELLOW	91304	92304		
DISCHARGE	YELLOW	91134	92134		
DOMESTIC COLD WATER	GREEN	91136	92136	93136	
DOMESTIC HOT WATER	YELLOW	91135	92135	93135	
DOMESTIC HOT WATER RECIRC	YELLOW	91314	92314		
DOMESTIC HOT WATER RET	YELLOW	91288	92288		
DOMESTIC HOT WATER SUPPLY	YELLOW	91423	92423		
DOMESTIC WATER	GREEN	91325	92325		
DRAIN	GREEN	91137	92137	93137	
DRAIN	YELLOW	91215	92215	93215	
DUAL TEMP RETURN	YELLOW	91289	92289		
DUAL TEMP SUPPLY	YELLOW	91290	92290		
EVACUATION VACUUM	YELLOW	91404	92404		
EXHAUST	YELLOW	91139	92139		
EXHAUST AIR	YELLOW	91326	92326	93326	
FEEDWATER	YELLOW	91140	92140		
FILTERED WATER	GREEN	91253	92253	93253	94253
FIRE PROTECTION WATER	RED	91142	92142	93142	
FIRE SPRINKLER WATER	RED	91143	92143		
FREON	GREEN	91144	92144		
FUEL GAS	YELLOW	91145	92145		
FUEL OIL	YELLOW	91146	92146		
FUEL OIL RETURN	YELLOW	91332	92332		
FUEL OIL SUPPLY	YELLOW	91333	92333		
GAS	YELLOW	91147	92147		
GASOLINE	YELLOW	91148	92148		
GLYCOL	YELLOW	91149	92149	93149	
GLYCOL RETURN	YELLOW	91315	92315		
GLYCOL SUPPLY	YELLOW	91316	92316		
HALON	RED	91150	92150		
HEATING	YELLOW	91151	92151		
HEATING HOT WATER RET	YELLOW	91291	92291	93291	
HEATING HOT WATER SUP	YELLOW	91292	92292	93292	
HEATING RETURN	YELLOW	91152	92152	93152	
HEATING SUPPLY	YELLOW	91153	92153	93153	
HEATING WATER RETURN	YELLOW	91293	92293	93293	
HEATING WATER SUPPLY	YELLOW	91294	92294	93294	
HI PRESS AIR	YELLOW	91154	92154		
HI PRESS AIR	BLUE	91218	92218		

TO ORDER STOCK MARKERS:

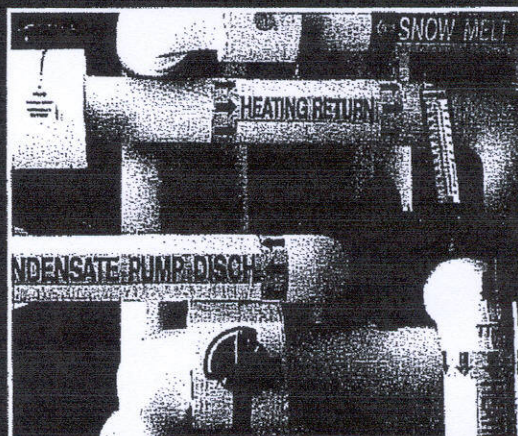
Specify part number and quantity of markers required. Combine total quantity of stock markers of all styles for best price. All markers are individual pieces.

STOCK PRICING PER MARKER				
Style	1-249	250-499	500-999	1,000+
A	\$ 57	.45	.40	CALL FOR A QUOTE
B	1 30	1 22	1 06	
C	2 65	2 50	2 17	
D	3 96	3 89	3 69	

TO ORDER FLOW DIRECTION ARROWS:

Specify part number (on page 8) and quantity required. Combine total quantity of stock arrows of all styles for best price. All arrows are individual pieces and are half the length of the corresponding pipe markers.

ARROW PRICING PER MARKER				
Style	1-249	250-499	500-999	1,000+
A	\$ 35	30	.28	CALL FOR A QUOTE
B	71	69	.64	
C	1 59	1 50	1 31	
D	1 98	1 97	1 85	



Arrow tape shown on page 11.

LEGEND	BACKGROUND COLOR	STYLE			
		A	B	C	D
HI PRESS CONDENSATE	YELLOW	91126	92126	93126	94126
HI PRESS GAS	YELLOW	91155	92155		
HI PRESS STEAM	YELLOW	91156	92156	93156	94156
HOT GAS	YELLOW	91327	92327		
HOT WATER	YELLOW	91157	92157	93157	
HOT WATER RETURN	YELLOW	91158	92158	93158	
HOT WATER SUPPLY	YELLOW	91159	92159	93159	
120° HOT WATER	YELLOW	91425	92425		
140° HOT WATER	YELLOW	91426	92426		
160° HOT WATER	YELLOW	91427	92427		
HOUSE VACUUM	YELLOW	91405	92405	93405	
HYDRAULIC FLUID	YELLOW	91257	92257		
HYDROCHLORIC ACID	YELLOW	91160	92160		
HYDROGEN	YELLOW	91161	92161		
HYDROGEN PEROXIDE	YELLOW	91305	92305		
HYDROGEN SULFIDE	YELLOW	91306	92306		
INDUSTRIAL COLD WATER	GREEN	91295	92295		
INDUSTRIAL HOT WATER	YELLOW	91296	92296		
INDUSTRIAL WASTE	YELLOW	91328	92328		
INSTRUMENT AIR	GREEN	91162	92162	93162	
INSTRUMENT AIR	BLUE	91219	92219		
INSTRUMENT NITROGEN	BLUE	91406	92406		
LO PRESS AIR	GREEN	91163	92163		
LO PRESS CONDENSATE	YELLOW	91127	92127	93127	94127
LO PRESS GAS	YELLOW	91164	92164		
LO PRESS STEAM	YELLOW	91165	92165	93165	94165
LUBE OIL	YELLOW	91166	92166		
LUBE OIL RETURN	YELLOW	91407	92407		
LUBE OIL SUPPLY	YELLOW	91408	92408		
MAKE UP WATER	GREEN	91167	92167		
MED PRESS CONDENSATE	YELLOW	91409	92409	93409	94409
MED PRESS STEAM	YELLOW	91189	92189	93189	94189
MEDICAL AIR	YELLOW	91410	92410		
MEDICAL VACUUM	WHITE	91411	92411		
MILL AIR	BLUE	91260	92260	93260	
MILL WATER	GREEN	91261	92261	93261	94261
NATURAL GAS	YELLOW	91168	92168	93168	
NITROGEN	BLACK	91169	92169		
NITROGEN	BLUE	91317	92317		
NITROUS OXIDE	BLUE	91412	92412		
NON POTABLE WATER	YELLOW	91170	92170		
OIL	YELLOW	91171	92171		
OIL FREE AIR	BLUE	91413	92413		
OUTSIDE AIR	BLUE	91329	92329	93329	
OXYGEN	YELLOW	91172	92172		
OXYGEN	GREEN	91330	92330		
PLANT AIR	GREEN	91173	92173		
PLANT WATER	GREEN	91174	92174		
POTABLE WATER	GREEN	91175	92175		
POTABLE COLD WATER	GREEN	91414	92414		
POTABLE HOT WATER	YELLOW	91415	92415		
PROCESS WATER	YELLOW	91176	92176		
PROCESS WATER	GREEN	91220	92220		
PROCESS COOLING WATER RET	GREEN	91416	92416	93416	94416

LEGEND	BACKGROUND COLOR	STYLE			
		A	B	C	D
PROCESS COOLING WATER SUP	GREEN	91417	92417	93417	94417
PROCESS VACUUM	YELLOW	91418	92418		
PROPANE GAS	YELLOW	91177	92177		
PUMPED CONDENSATE	YELLOW	91297	92297		
RAINWATER	GREEN	91419	92419		
RAW WATER	GREEN	91178	92178	93178	94178
RECIRCULATING HOT WATER	YELLOW	91424	92424		
REFRIGERANT	YELLOW	91179	92179		
REFRIGERANT LIQUID	YELLOW	91180	92180		
REFRIGERANT SUCTION	YELLOW	91181	92181		
RELIEF AIR	BLUE	91281	92281	93281	
RETURN AIR	BLUE	91282	92282	93282	
RETURN	YELLOW	91182	92182	93182	
RETURN	GREEN	91183	92183	93183	
ROOF DRAIN	GREEN	91184	92184	93184	
SANITARY DRAIN	GREEN	91236	92236	93236	
SANITARY SEWER	GREEN	91185	92185	93185	
SANITARY VENT	GREEN	91318	92318		
SANITARY WASTE	GREEN	91298	92298		
SEAL WATER	GREEN	91267	92267		
SERVICE AIR	YELLOW	91221	92221		
SLUDGE	YELLOW	91186	92186		
SODIUM HYDROXIDE	YELLOW	91310	92310		
SOFT WATER	GREEN	91187	92187		
STEAM	YELLOW	91188	92188	93188	94188
STORM DRAIN	GREEN	91299	92299	93299	
STORM SEWER	GREEN	91300	92300	93300	
STORM WATER	GREEN	91301	92301	93301	
SUCTION	YELLOW	91190	92190		
SULFURIC ACID	YELLOW	91191	92191		
SUMP PUMP DISCHARGE	YELLOW	91331	92331		
SUPPLY	YELLOW	91192	92192	93192	
SUPPLY	GREEN	91193	92193	93193	
SUPPLY AIR	BLUE	91283	92283	93283	
TEMPERED WATER	YELLOW	91302	92302		
TOLUENE	YELLOW	91194	92194		
TOWER WATER	GREEN	91195	92195	93195	
TOWER WATER RETURN	GREEN	91319	92319	93319	
TOWER WATER SUPPLY	GREEN	91320	92320	93320	
TREATED WATER	GREEN	91196	92196		
ULTRA PURE WATER	GREEN	91420	92420		
UTILITY NITROGEN	GREEN	91421	92421		
UTILITY WATER	GREEN	91422	92422		
VACUUM	GREEN	91197	92197	93197	
VACUUM	YELLOW	91198	92198		
VENT	GREEN	91199	92199	93199	
VENT	YELLOW	91200	92200	93200	
WAGD	PURPLE	91432	92432		
WASTE	YELLOW	91202	92202		
WASTE WATER	YELLOW	91201	92201		
WATER	GREEN	91203	92203	93203	
WATER	YELLOW	91204	92204	93204	
WELL WATER	GREEN	91321	92321		



CONNECTIONS (FDC) FREE STANDING FIRE DEPT. INLET CONNECTIONS

Model/Series No.
**5761-5792
SERIES**

SPECIFICATIONS

Cast brass angle body, or red glossy polyester coated ductile iron angle body, size of outlet and number and type of inlets as selected by model number. 18" long polished brass cover sleeve; cast brass identification base plate; cast brass plugs and chains on each pin lug swivel.

MODEL SELECTION

TWO-WAY WITH CLAPPER BODY

- ☐ *5761
- ☐ *5762
- ☐ *5763
- ☐ *5764

THREE-WAY WITH CLAPPER BODY

- ☐ 5771
- ☐ 5773

FOUR-WAY SQUARE

- ☒ 5775
- ☐ *5776
- ☐ 5780
- ☐ *5781

FOUR-WAY WITH CLAPPER BODY

- ☐ 5785
- ☐ *5786

SIX-WAY WITH CLAPPER BODY

- ☐ 5791
- ☐ 5792

NOTE: * = U/L Listed

NOTE: Model 5792 8" furnished less base plate, with identification on seamed sleeve



MODEL 5785 (Shown)

PRODUCT OPTIONS

FINISHES: (Brass Body)

- ☐ -B Polished Brass
- ☐ -C Rough Chrome Plated Body; Polished Chrome Plated Trim.
- ☒ -D Polished Chrome Plated

FINISHES: (Ductile Body)

- ☐ -B Red Glossy Polyester Coated Body; Polished Brass Trim
- ☐ -C Red Glossy Polyester Body; Polished Chrome Plated Trim

VARIATIONS:

- ☒ Additional length sleeve up to 36"
Specify Length 30"

THREADS:

- ☒ N.S.T.
- ☐ Other _____

LETTERING AVAILABLE:

- ☐ AUTO. SPKR.
- ☒ AUTO. SPKR. Standpipe
- ☐ Standpipe
- ☐ Dry Standpipe

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5761-5792 SERIES Date: 09/29/14

MEMBERSHIP



FIRE EQUIPMENT
MANUFACTURERS'
ASSOCIATION



ONFSA
NATIONAL FIRE SPRINKLER ASSOCIATION, INC.



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www.potterroemer.com



CONNECTIONS (FDC) FREE STANDING FIRE DEPT. INLET CONNECTIONS

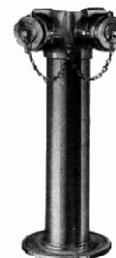
Model/Series No.
5761-5792
SERIES

MODEL DIMENSIONS

TWO-WAY WITH CLAPPER BODY

Model No.	Size	Body	Radius of Body Swing	Overall Height
*5761	4" x 2-1/2"	Brass	7-1/4"	24"
*5762	4" x 3"	Brass		
*5763	6" x 2-1/2"	Brass		
*5764	6" x 3"	Brass		

NOTE: * = U/L Listed



THREE-WAY WITH CLAPPER BODY

Model No.	Size	Body	Radius of Body Swing	Overall Height
5771	4" x 2-1/2"	Brass	8"	24"
5773	6" x 2-1/2"	Brass		



FOUR-WAY SQUARE

Model No.	Size	Body	Radius of Body Swing	Overall Height
→ 5775	6" x 2-1/2"	Brass	8"	34"
*5776		Ductile		
5780		Brass		
*5781		Ductile		

NOTE: * = U/L Listed



FOUR-WAY & SIX-WAY WITH CLAPPER BODY

Model No.	Size	Body	Radius of Body Swing	Overall Height
5785	6" x 2-1/2"	Brass	17"	26-1/2"
*5786	6" x 2-1/2"	Ductile		

NOTE: * = U/L Listed



SIX-WAY WITH CLAPPER BODY

Model No.	Size	Body	Radius of Body Swing	Overall Height
5791	6" x 2-1/2"	Brass	25"	26-1/2"
5792	8" x 2-1/2"	Brass		



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5761-5792 SERIES Date: 09/29/14

MEMBERSHIP



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TOTALPAC® 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

211316 - Dry-Pipe Pre-Action Sprinkler Systems



DESCRIPTION

This **TOTALPAC®3** integrated fire protection system by FireFlex Systems Inc. consists of a preaction system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single unit

TOTALPAC®3 preaction systems are built around the Viking trim using deluge valves model F-1.

Electric/pneumatic controlled, double interlock preaction systems requires a pneumatic actuator, normally held closed by supervisory pressure maintained in the sprinkler system AND a normally closed electric solenoid valve controlled by an approved system releasing control panel with compatible detection system. Both the electric detection system AND supervisory pressure must be relieved from the sprinkler system before the deluge valve will open and fill the sprinkler system with water.

Activation of a releasing device alone or operation of a sprinkler alone will sound an alarm but will NOT cause the system to fill with water.

All the valves are rated up to a maximum of 250 psi WWP (1724 kPa) max. and are available in the following diameters:

- | | |
|--------------------------------------|--------------------------------------|
| ☐ 1½" (40 mm) | ☐ 4" (100 mm) |
| ☐ 2" (50 mm) | ☐ 6" (150 mm) |
| ☐ 3" (80 mm) | ☐ 8" (200 mm) |

Standard features

- cULus Listed & FM Approved as an assembled unit
- Factory assembled and tested under ISO-9001 standards
- Prewired to the Viking VFR-400 releasing control panel.
- Easy and compact installation
- OSHPD certification pre-approval: OSP-0341-10
- Viking conventional trim rated at 250 psi (1724 kPa)
- Galvanized trim piping
- Serial number for easy reference
- Corrosion resistant cabinet with flush type handle and lock
- No open drain cup inside the unit
- Remote controlled unit pre-wired to a terminals strip.
- numerous modular options to meet the most demanding jobsite requirements
- Four styles of modular air supply options
- Inlet & outlet hydrostatic test ports
- User-friendly standardized operation & installation manual
- Free interactive simulator

TOTALPAC® 3

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Cabinet

The TOTALPAC® 3 cabinets are made of sturdy 14 gauge steel, they are available in four (4) sizes;

23" x 25" x 77" (58.4 x 63.5 x 195.6 cm) for 1½", and 2" systems,

36" x 25" x 77" (91.4 x 63.5 x 195.6 cm) for 3" and 4" system,

46" x 25" x 77" (116.8 x 63.5 x 195.6 cm) for 6" system

54" x 31" x 81" (137.2 x 78.7 x 205.7 cm) for 8" system

All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base. Cabinet is provided with one or two doors, all provided with a neoprene gasket to absorb vibrations.

A field wiring electrical junction boxes is integrated with the cabinet for connection of detection system, auxiliary contacts and signaling devices. All inputs & outputs are factory wired to a terminal strip (TBA) for contractor's field wiring.

Gauges to indicate air, water supply pressure and priming water pressure are all visible through clear Lexan windows.

IMPORTANT: TOTALPAC® 3 units are NOT designed to be installed where they will be subjected to outdoors and/or freezing conditions. Refer to environmental data for additional details. Subjecting the unit to conditions outside these limitations might tamper the normal operation of the system.

Cabinet doors are provided with hinges that can easily be disassembled on site to remove the door assemblies for servicing. The cabinet assembly is pre-assembled, pre-wired, and factory tested under ISO-9001 conditions.

Multiple unit installations are easily achieved by manifolding units together at their water inlets but drains shall remain separate and open.

Sequence of operation (see trim diagram)

In a fire condition, when the detection system operates, system releasing control panel energizes solenoid valve (F1) open. Alarms activate, but the deluge valve will NOT open until a sprinkler opens relieving supervisory pressure from the sprinkler system. When a sprinkler opens, supervisory pressure in the sprinkler piping is reduced causing the pneumatic actuator (F3) to open.

Pressure is released from the priming chamber of the deluge valve (A1) to the open drain manifold faster than it is supplied through the restricted orifice (B3). The deluge valve clapper opens to allow water to flow into the system piping and alarm devices, causing the alarm pressure switch (C1) and optional water motor alarm (C2) to activate. Water will flow from any open sprinklers and/or other opening in the sprinkler piping.

When the deluge valve operates, the sensing end of the PORV (B9) is pressurized, causing the PORV to open. When the PORV opens, it drains the priming water pressure to the priming chamber, preventing the deluge valve (A1) from resetting, even if the open releasing devices close. The deluge valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping is depressurized and drained.

Systems hydraulic limitations

WARNING The information contained herewith is for estimation and evaluation purposes only. Its use remains the responsibility of the designer.

Designers should refer to the appropriate NFPA Standards and any other applicable codes for their final design. Also refer to FireFlex Systems Inc. appropriate user manuals and to manufacturer's data sheets for additional details.

Systems limitations indicated below are nominal flow limitations.

System size (in.)	Usage Range (gpm)	Piping Equivalent Lengths w/o shut off valve		Piping Equivalent Lengths c/w shut off valve		Drain flow @ 250 PSIG w.p. GPM
		(m.)	(ft.)	(m.)	(ft.)	
1½	0 – 210	8.3	27.2	8.5	27.9	272
2	0 – 360	11.65	38.2	11.85	38.9	272
3	100 - 700	16.8	55.1	20.33	66.7	762
4	200 – 1400	21.89	71.8	25.33	83.1	1597
6	400 - 3500	33.28	109.15	37.28	122.3	1597
8	750 - 5250	41.15	135	44.71	146.7	1597

TOTALPAC[®] 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Standard equipments

Releasing control panel

- ☐ 120 VAC / 60 Hz, 165VA.
- ☐ 220 VAC / 50 Hz, 185VA.
- ☐ 12VDC / 7Ah batteries. (factory installed)
- ☐ 12VDC / 12Ah batteries. (optional)
- ☐ Single Zone detection
(Activated by Zone 1 **or** Zone 2)
- ☐ Crossed-Zone detection
(Activated by Zone 1 **and** Zone 2)

The releasing control panel integrated into the **TOTALPAC[®] 3** cabinet is Viking's Model **VFR-400**. This panel includes four Class B, programmable detection zones (optional Class A); two Class B supervisory zones and four Class B, programmable output circuits (optional Class A). It is also provided with menu driven programming, including a specific program assigned at the factory.

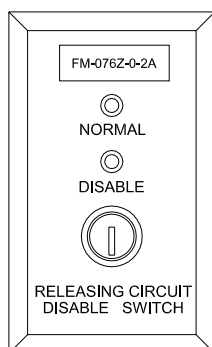
The panel is compatible with many types of fire alarm & supervisory devices such as linear heat detectors, spot-type heat and smoke detectors, water flow and release indicators, low and high air pressure switches, manual pull stations.

The releasing control panel also includes an alphanumeric display with 2 lines of 16 characters describing all the system conditions, as well as a set of red and yellow LED lamps individually indicating each of the alarm and trouble conditions of the system

Easy to operate control buttons are also provided to activate and operate the system's various functions.

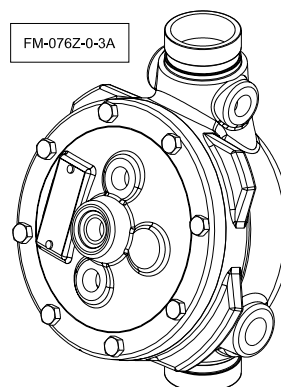
Releasing circuit disable switch

The releasing circuit disable switch is used to disable the releasing solenoid. When the key is set to "Disable", the releasing solenoid will be disconnected from the control panel's releasing circuit, causing a trouble signal and preventing accidental discharge during maintenance or inspection.



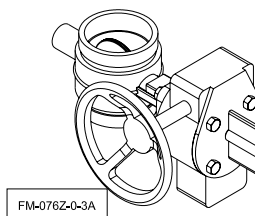
Deluge valve

The Viking Model deluge valve is a quick-opening, differential diaphragm, flood valve with one moving mechanism. The deluge valve is used to control water flow in deluge and preaction sprinkler systems. The valve is held closed by system water pressure trapped in the priming chamber, keeping the outlet chamber and system piping dry. In fire conditions, when the releasing system operates, pressure is released from the priming chamber. The deluge valve clapper opens to allow water to flow into the system piping.



Water supply control valve

The water inlet control valve is a supervised, indicating butterfly valve. Purpose of this valve is to manually shutoff the preaction system.

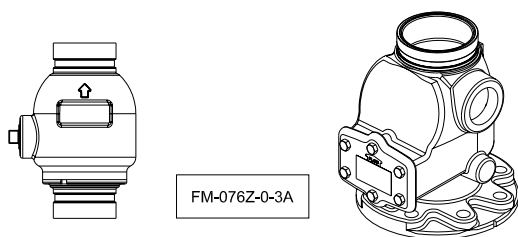


Standard equipments (continued)

Preaction riser check valve

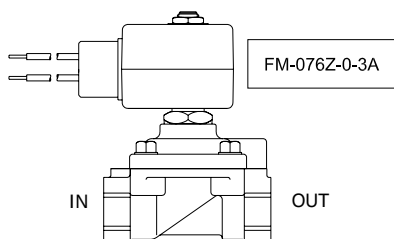
The Viking spring loaded In-Line check valve is a general purpose rubber-faced check valve approved for use in fire-service systems. The Spring Loaded In-Line check valve is manufactured with a brass body, brass seat, and a rubber-faced clapper assembly.

The Viking Easy Riser[®] Swing check valve is a general purpose rubber-faced check valve approved for use in fire service systems. The valve is for use in preaction system risers.



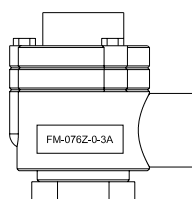
Solenoid valve

The high pressure solenoid valve is a two-way type with one inlet and one outlet. It is a packless, internal pilot operated valve, suitable for use in releasing water pressure from the priming chamber of Viking deluge valves. The solenoid valve has floating diaphragm construction, which requires a minimum pressure drop across the valve to operate properly.



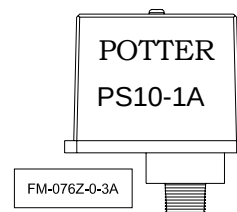
Pneumatic actuator

Used in conjunction with the solenoid valve, the Viking Pneumatic Actuator is a spring loaded, rolling diaphragm and piston operated valve. It is used wherever a combination is required between the detection and system's loss of air.



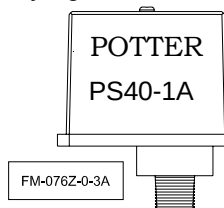
Alarm pressure switch

The alarm pressure switch monitors the water flow within the sprinkler piping. Should the Deluge Valve clapper opens to allow water to flow into the sprinkler piping. The alarm pressure switch will activate, indicating a water flow signal.



Low air supervisory switch

The low pressure switches monitors the pressure within the sprinkler piping should a loss pressure of the air below 25PSI occurs. The pressure switch contacts transfer indicating supervisory signal.



TOTALPAC[®] 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Optional mechanical equipments

❑ Shut-off valve & sight glass option

The Shut-off valve & sight glass option is intended to be used for applications where testing of the system operation without filling the sprinkler piping network is desirable and where it is critical that all functions of the preaction system be tested under actual discharge conditions. Examples of such applications are freezers, ovens, museums, data processing and other hazards where the possibility of water leaking from the piping system is to be avoided at all costs.

Warning: Shut-off valve & sight glass option is **not available** on 8" systems.

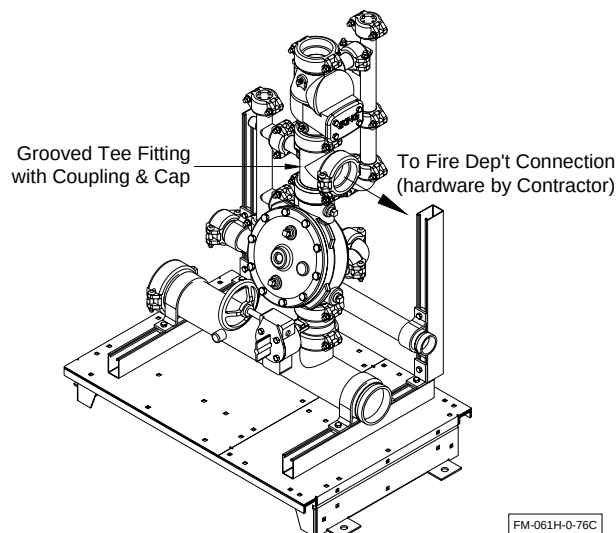
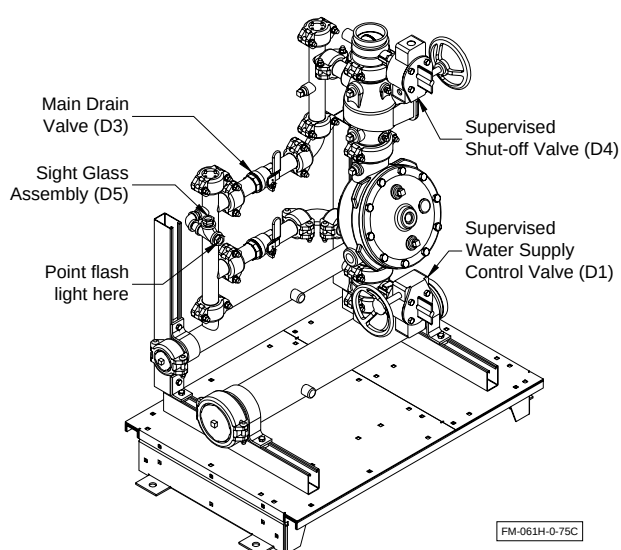
Warning: Shut-off valve is **not available** combined with Fire department connection on 6" systems.

❑ Fire department connection

The fire department connection option consists of a grooved tee fitting installed at the outlet of the deluge valve (A1). An access hole of the proper diameter is factory pre-drilled on the side of the TOTALPAC[®]3 enclosures for connection of the piping going to the fire department connection.

Note: The fire department connection hardware itself (drain, Siamese, etc.) is NOT provided with this option and shall be provided by the installing contractor. Refer to NFPA-13 Standard for additional information about the equipment layout and installation.

Warning: Fire department connection is **not available** on 8" systems.



TOTALPAC[®] 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Optional mechanical equipments (continued)

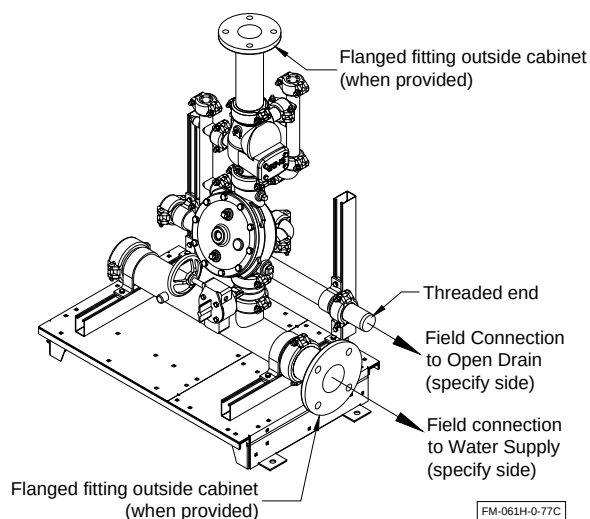
□ Semi and full flanged option

When required by the user, TOTALPAC[®]3 units can be provided in either a semi-flanged or full flanged configuration.

The semi flanged option provides flanged fittings only on the water inlet pipe (side needs to be specified at the time of order) and on the system riser outlet. The drain manifold is then provided with a threaded end that also needs to have its side specified (left or right). The rest of the fittings are the same as usual with the main components being provided in the standard grooved-grooved configuration.

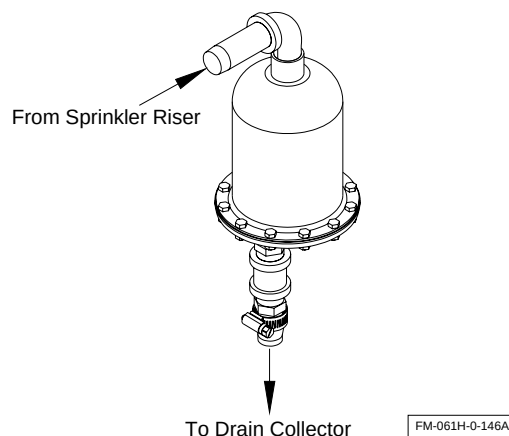
The full flanged option is the same as above but goes a step further with the main components being also provided with a flanged-flanged configuration.

When provided, the face of the flanges will always be situated 6 inches from the outside face of the mounting base or cabinet surface.



□ Anti-column device option

The model LD-1 anti-column device is an optional trim component designed for use with preaction sprinkler systems. The anti-column device automatically prevents an unwanted water column from establishing within the system riser. On preaction sprinkler systems the anti-column device prevents water from columning downstream of the easy riser check valve.



TOTALPAC® 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

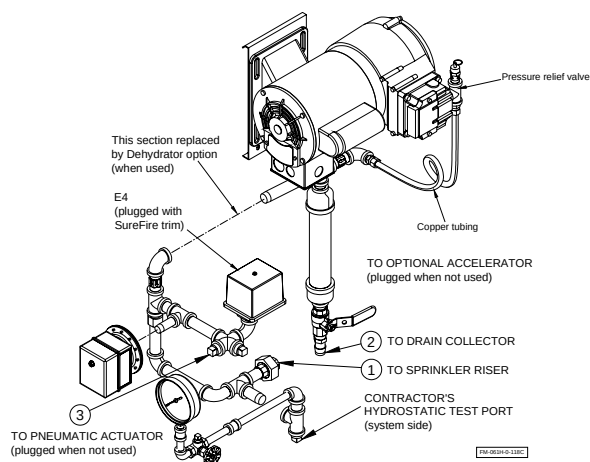
Air supply

☐ Direct air compressor (Style "A")

Used only for the sprinkler piping network of the preaction system. Air supply style "A" includes the air compressor mounted inside the **TOTALPAC®3** cabinets with its supervisory trim and options. Compressors are of the tankless, oilless piston type and are factory piped to the sprinkler system riser, all within the **TOTALPAC®3** cabinets.

Compressors are available in six (6) sizes:

- ☐ 1/6HP ☐ 1/2HP ☐ 1-1/2HP
☐ 1/3HP ☐ 1HP ☐ 2HP



Compressor Service Factor Amp (S.F.A) rating

Compressor Size (HP)	115Vac / 60Hz	230Vac / 60Hz	220Vac / 50Hz
1/6	5.0 Amp.	2.5 Amp.	1.3 Amp.
1/3	7.4 Amp.	3.7 Amp.	2.5 Amp.
1/2	10.0 Amp.	5.0 Amp.	4.0 Amp.
1	18.0 Amp.	9.0 Amp.	6.0 Amp.
1-1/2	16.6 Amp.	8.3 Amp.	6.3 Amp.
2	N/A	11.0 Amp.	N/A.

115 / 230 Vac – 60Hz air compressor selection Table:

H.P	CFM @ 40 PSI	System capacity to fill system to 35 PSI in 30 minutes *	System capacity to fill system to 55 PSI in 30 minutes **
1/6	1.33	142 gal.	90 gal.
1/3	2.61	285 gal.	181 gal.
1/2	4.06	417 gal.	265 gal.
1	7.40	702 gal.	447 gal.
1-1/2	7.40	1045 gal.	665 gal.
2	7.40	1400 gal.	890 gal.

220 / 240 Vac – 50Hz air compressor selection Table:

H.P	LPM @ 40 PSI	System capacity to fill system to 35 PSI in 30 minutes *	System capacity to fill system to 55 PSI in 30 minutes **
1/6	35.4	442 L	268 L
1/3	68	855 L	545 L
1/2	4.06	1302 L	825 L
1	7.40	2244 L	1427 L
1-1/2	7.40	3278 L	2085 L

* For systems with maximum water supply pressure of 175 PSI (1206 kPa)

** For systems with water supply pressure between 175 PSI (1207 kPa) and 250 PSI (1724 kPa)

WARNING The information contained herewith is for estimation and evaluation purposes only. Its use remains the responsibility of the designer.

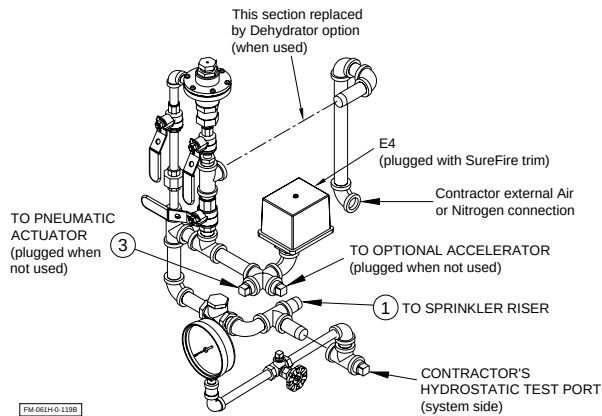
TOTALPAC® 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Air supply (continued)

□ Air Pressure Maintenance Device (Style "B")

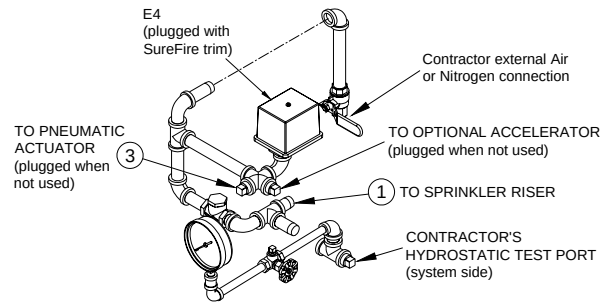
Used only for the sprinkler piping network of the preaction system, when an external air supply is provided by others (tank mounted compressor, plant air or dry nitrogen cylinders) and piped to the air inlet port of the unit. Air supply style "B" provides an Air Pressure Maintenance Device (APMD) trim, factory mounted in the **TOTALPAC®3** cabinets.



□ Direct air, external compressor (Style "D")

Mainly used with Preaction systems protecting refrigerated spaces and freezers, where a special dry external air supply unit is piped directly to the system riser inside the freezer itself, as shown in NFPA-13. Air supply Style "D" provides only an air supervisory and shut-off trim.

Warning: When air supplies style "B" or "D" is selected, the air supply should be provided and installed by the sprinkler contractor OUTSIDE of the **TOTALPAC®3** cabinet. It is NOT provided with the unit.



TOTALPAC[®] 3

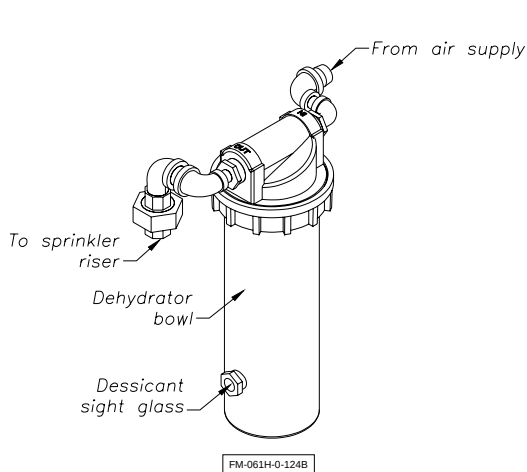
Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Optional air supply equipments

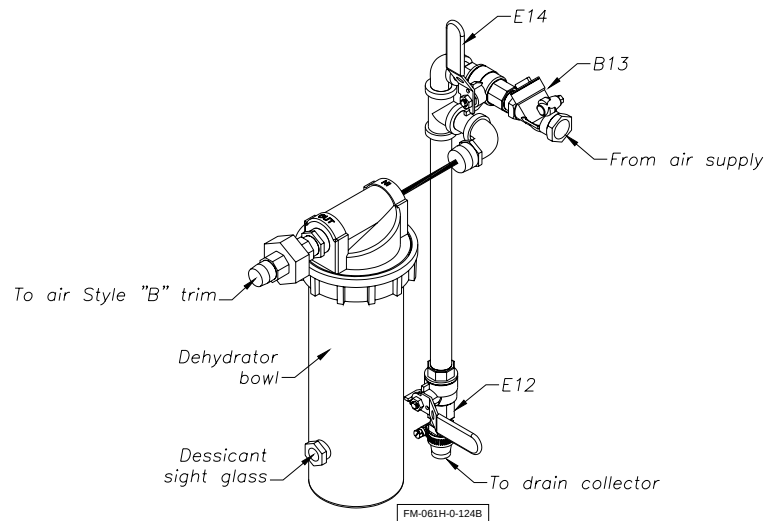
❑ Dehydrator option

The Viking Dehydrator is a manually regenerated desiccant-type air dryer. The desiccant acts as a moisture indicator by changing color, and is visible through the sight gauge.

The Dehydrator directs the incoming air down through the silica gel desiccant. The silica gel absorbs the moisture without physically changing. As the relative humidity increases, the silica gel begins to change color from dark blue to light pink, indicating the desiccant must be replaced.



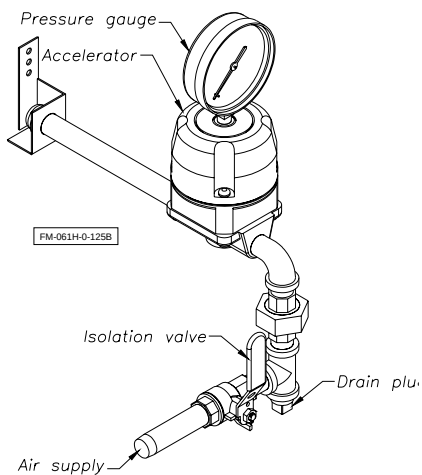
Style "A" layout



Style "B" layout

❑ Accelerator option

The Viking Model E-1 Accelerator is a quick-opening device. The Viking Model E-1 Accelerator may be used without the Anti-flood device to speed the action of a pneumatic release system on a preaction system.

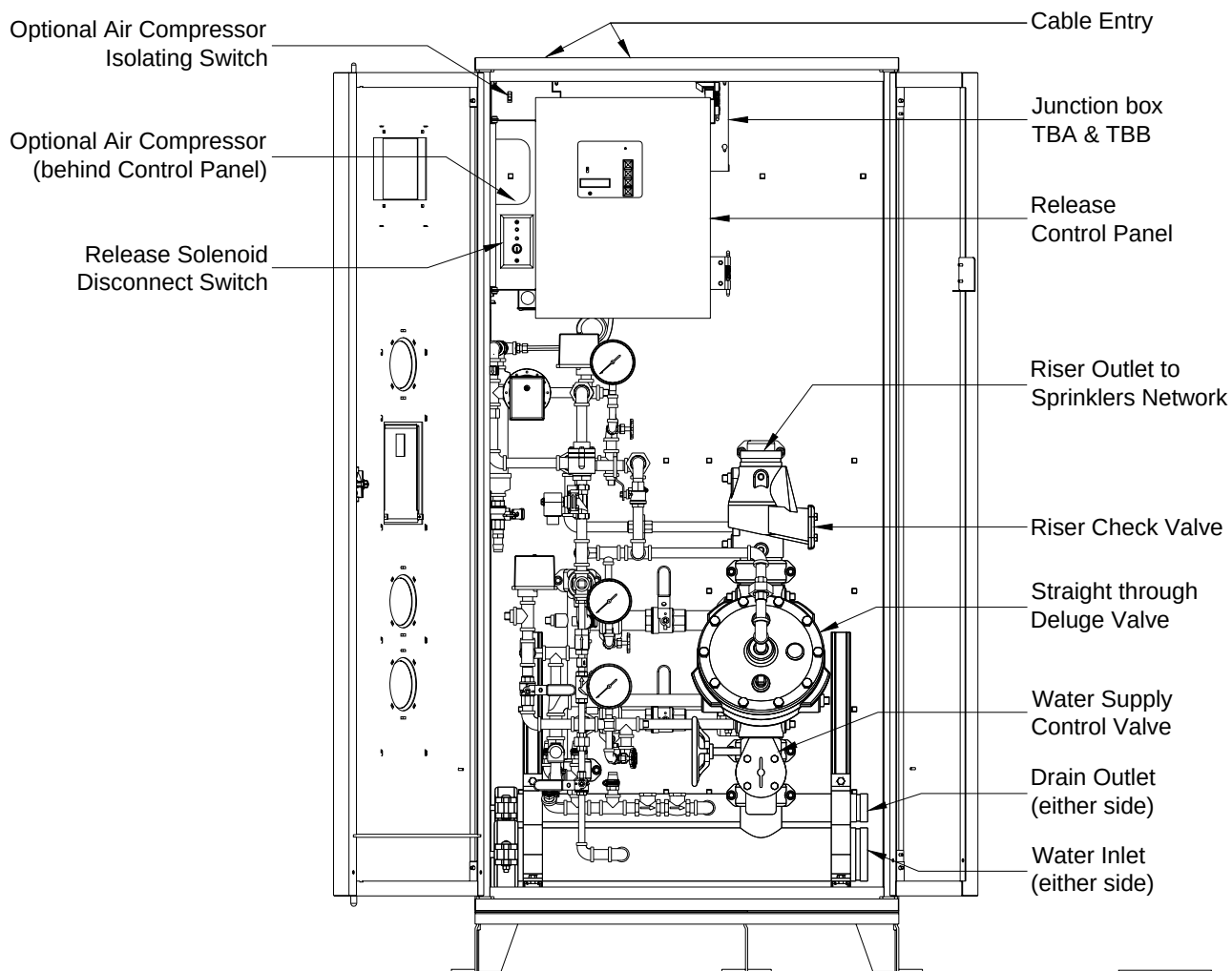


TOTALPAC[®] 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Details & field wiring diagrams

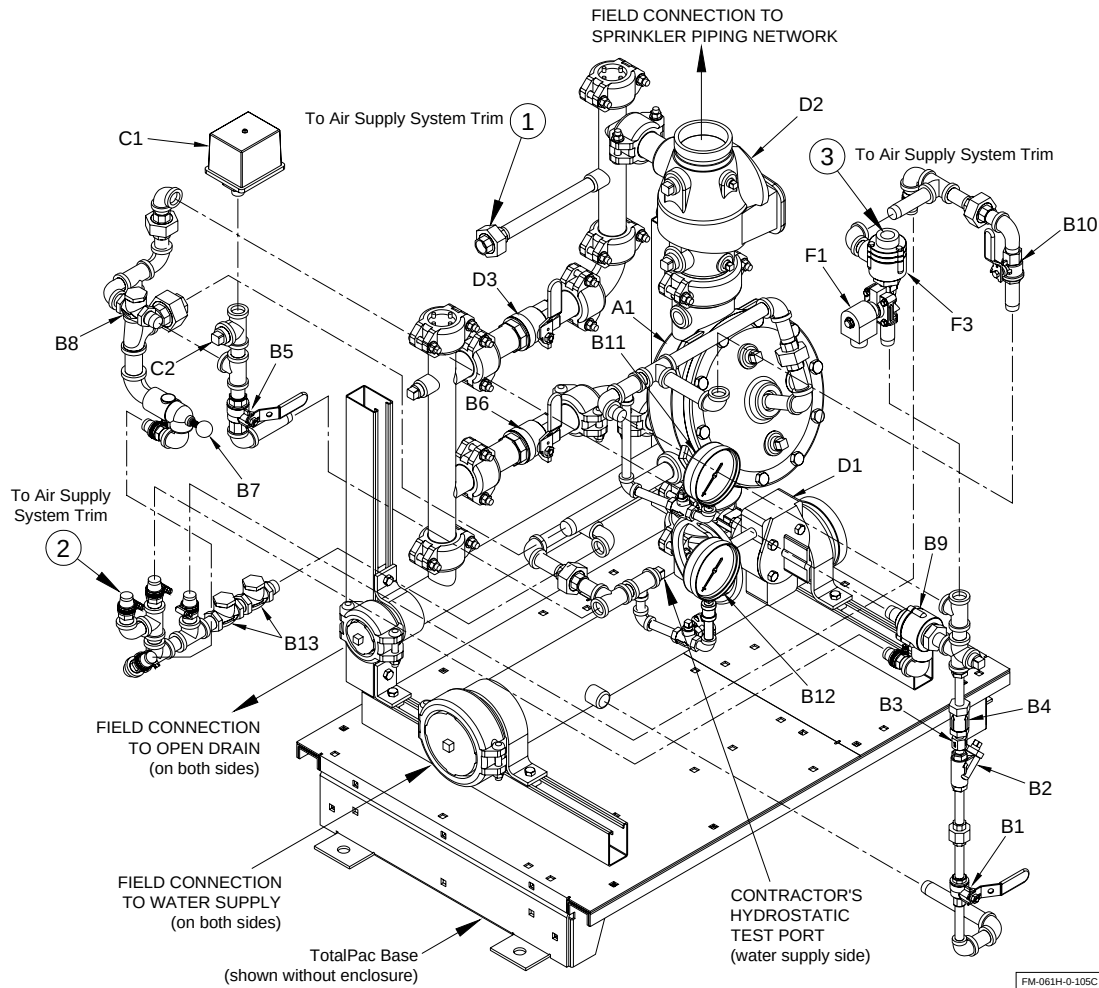
Cabinet with main components - Configuration with releasing control panel, shown with air style "A"



TOTALPAC[®] 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Trim diagram



FM-061H-0-105C

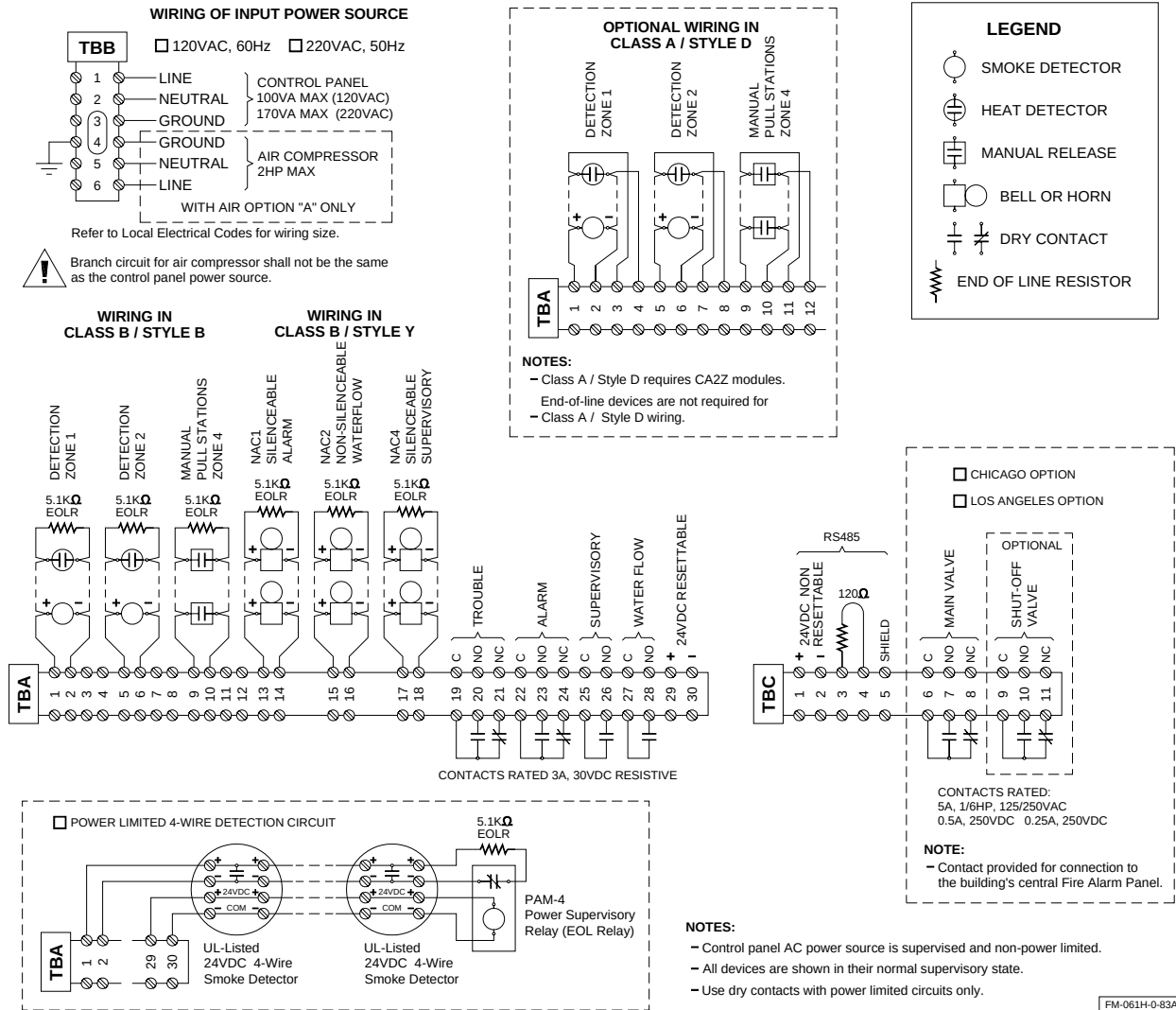
Trim Components:

A1	Deluge valve	C1	Alarm pressure switch
B1	Priming valve	C2	Connection to water motor gong (strainer supplied by contractor)
B2	Strainer	D1	Water supply control valve
B3	1/16" Restricted orifice	D2	Riser check valve
B4	Spring loaded check valve	D3	Main drain valve
B5	Alarm test valve	F1	N.C. Solenoid Valve – 24Vdc
B6	Flow test valve	F3	Pneumatic actuator
B7	Drip check valve		
B8	Drain check valve		
B9	Pressure operated relief valve (PORV)		
B10	Emergency release valve		
B11	Prime pressure water gauge & valve		
B12	Water supply pressure gauge & valve		
B13	Clapper check valve		

TOTALPAC[®] 3

Datasheet Self contained - Double interlock Preaction system Electric / Pneumatic release

Field wiring diagrams, Double interlock Electric / Pneumatic, Self-Contained:



Power Limited (supervised) Initiating Device Circuits Detection Zone 1, 2, 3, and 4.

Max. loop resistance: 100 ohms

End of line: 5.1K ohms, 1/4W

Leave ELR (provided) on all unused circuits.

Refer to Device Compatibility in the VFR-400 Releasing control panel Manual.

Power Limited (supervised) Initiating Device Circuits Supervision Zone 1, and 2.

Max. loop resistance: 100 ohms

End of line: 5.1K ohms, 1/4W

Leave ELR (provided) on all unused circuits.

For dry contact supervisory devices such as tamper, low air, or high air switches. (Class-B only)

Power Limited (supervised) Notification Appliance Circuits Output Circuit 1, 2, 3, and 4

Maximum operating voltage: 27Vdc (ripple: 0.3Vdc)

Maximum usable current per circuit: 1.0A

Total current available (all circuits): 2.5A

Polarity is reversed in supervisory condition.

Leave ELR (provided) on all unused circuits.

Refer to Device Compatibility in the VFR-400 Releasing control panel Manual.

Auxiliary Power 24Vdc Regulated Source

Total current available: 0.2A

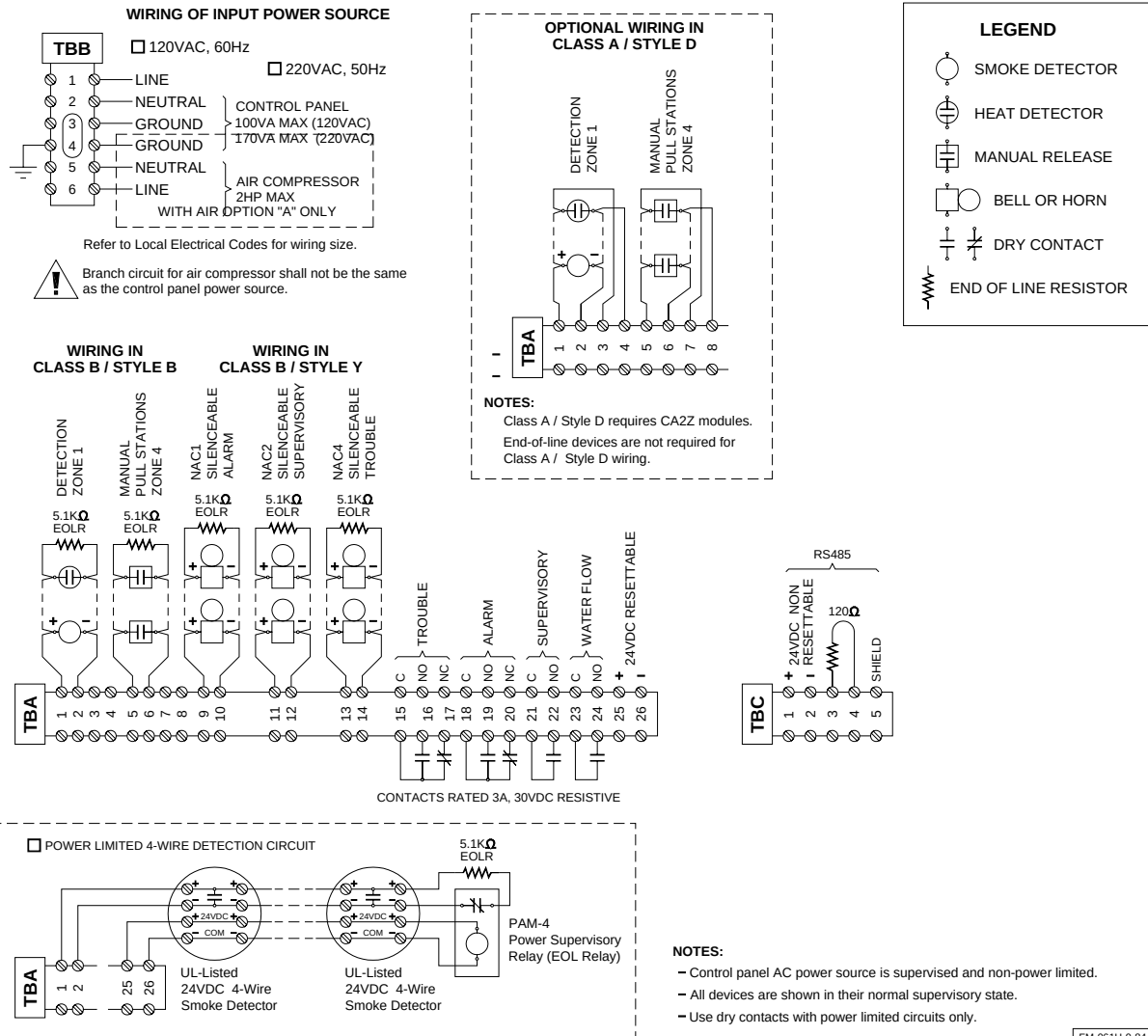
Resettable for 4 wires smoke detectors

WARNING Releasing control panel shall be supplied by a dedicated circuit breaker, as per NFPA 70, Section 760 and Canadian Electrical Code, Section 32.

TOTALPAC[®] 3

Datasheet Self contained - Double interlock Preaction system Electric / Pneumatic release

Field wiring diagrams, Double interlock Electric / Pneumatic, Self-Contained, New York City:



Power Limited (supervised) Initiating Device Circuits Detection Zone 1, 2, 3, and 4.

Max. loop resistance: 100 ohms
End of line: 5.1K ohms, 1/4W
Leave ELR (provided) on all unused circuits.
Refer to Device Compatibility in the VFR-400 Releasing control panel Manual.

Power Limited (supervised) Initiating Device Circuits Supervision Zone 1, and 2.

Max. loop resistance: 100 ohms
End of line: 5.1K ohms, 1/4W
Leave ELR (provided) on all unused circuits.
For dry contact supervisory devices such as tamper, low air, or high air switches. (Class-B only)

Power Limited (supervised) Notification Appliance Circuits Output Circuit 1, 2, 3, and 4

Maximum operating voltage: 27Vdc (ripple: 0.3Vdc)
Maximum usable current per circuit: 1.0A
Total current available (all circuits): 2.5A
Polarity is reversed in supervisory condition.
Leave ELR (provided) on all unused circuits.
Refer to Device Compatibility in the VFR-400 Releasing control panel Manual.

Auxiliary Power 24Vdc Regulated Source

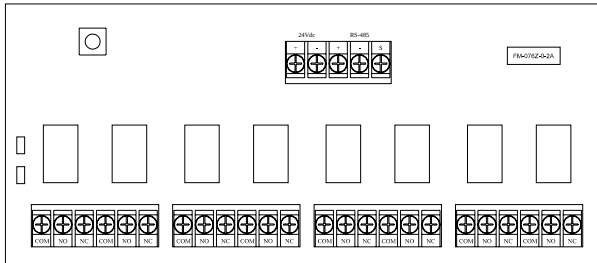
Total current available: 0.2A
Resettable for 4 wires smoke detectors

WARNING Releasing control panel shall be supplied by a dedicated circuit breaker, as per NFPA 70, Section 760 and Canadian Electrical Code, Section 32.

Optional electrical equipments

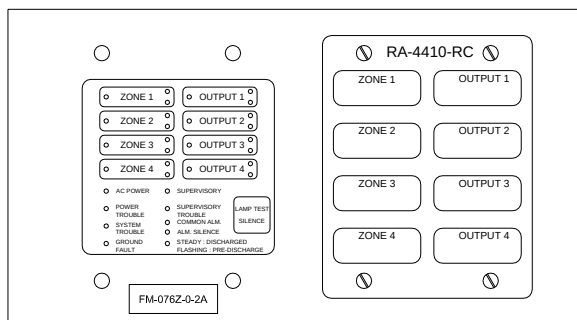
❑ Relay module ARM-44

The ARM-44 is an auxiliary relay module designed to operate with the Viking **VFR-400** releasing control panel to provide 4 independent form C relay outputs. The 4 output circuits each have a dedicated relay. Each relay is rated for 3 amps at 24 volts DC resistive load. The relay module mounts directly to the back of the cabinet and is connected to the main board. All of the relay terminals are wired back to the field wiring junction box. A disable switch is available for disabling the relays when the system is being tested or serviced.



❑ Remote Annunciator RA-4410-RC

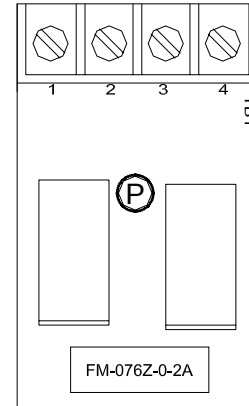
The RA-4410-RC remote annunciator is designed to operate with the Viking **VFR-400** releasing control panel. There are 34 LED's to indicate a change in panel status. There is a buzzer on the annunciator that sounds for any trouble or supervisory condition. The release releasing control panel supervises and communicates with the annunciator via separate connections for the RS-485 communication and the 24VDC power requirement of the RA-4410-RC. Separate cables should be used for power and communication. Shielded cable **MUST** be used for the RS-485 communication line.



❑ Class A initiating device module CA2Z

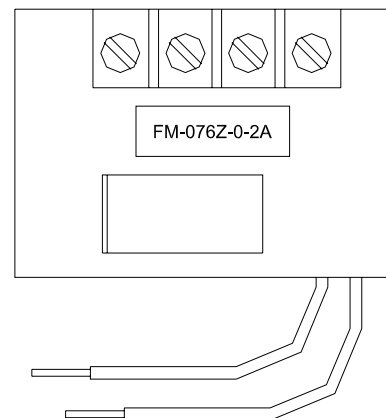
The Model CA2Z Class A Module is designed to be used with the Viking **VFR-400** releasing control panel to convert from two (Class B) initiating device circuits to two (Class A) circuits.

The module is to be mounted in the upper right hand corner of the panel. All the connections are wired back to the field wiring junction box.



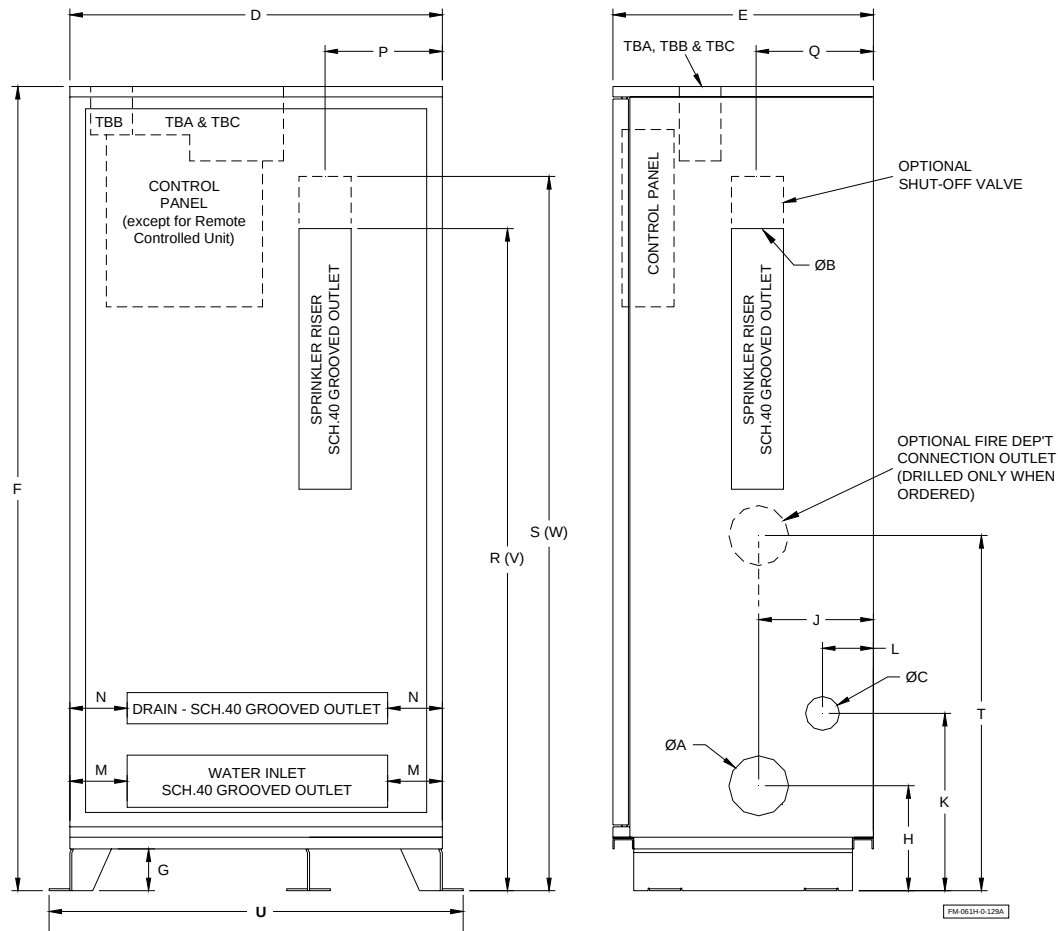
❑ CLASS A INDICATING APPLIANCE CIRCUIT MODULE

The Model CAM Class A Module is designed to be used with the Viking **VFR-400** releasing control panel to convert a single (Class B) indicating appliance circuit to a (Class A) circuit (one module is required for each indicating appliance circuit). After installing the CAM, the indicating circuit should be activated to ensure proper operation and connections. The module is provided with double-sided foam tape and should be mounted in the field wiring junction box so that the terminals are accessible.



Dimensions

Figure 1 – Cabinet dimensions:



Dimensions are nominal and may vary $\pm 1/4$ ".
Dimensions V and W are with the optional Fire Department Connection

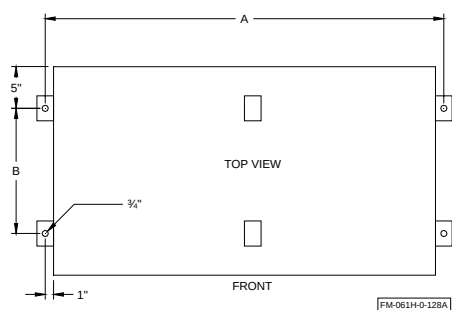
System Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W
1½"	2"	1½"	2"	23"	25"	77¼"	4"	8¾"	11½"	13¾"	3¾"	2¾"	2¾"	8"	11½"	37½"	44¾"	47½"	27"	43"	50¼"
2"	2"	2"	2"	23"	25"	77¼"	4"	8¾"	11½"	13¾"	3¾"	2¾"	2¾"	8"	11½"	37¾"	45"	47¾"	27"	43¾"	50½"
3"	4"	3"	2"	35¾"	25"	77¼"	4"	10"	11½"	13¾"	3¾"	2¾"	2¾"	11¾"	11½"	44"	47¾"	51¼"	39¾"	51"	54¾"
4"	4"	4"	2"	35¾"	25"	77¼"	4"	10"	11½"	13¾"	3¾"	2½"	2½"	12"	11½"	48½"	53"	59"	39¾"	56½"	61"
6"	6"	6"	2"	46"	25"	77¼"	4"	11"	11½"	13¾"	3¾"	5¼"	5¼"	17¾"	11½"	59¼"	65"	70½"	50"	70¼"	n/a
8"	8"	8"	2"	54"	31"	81¼"	4"	12"	13¾"	17"	3¾"	9"	6¾"	27"	13¾"	70"	75½"	n/a	58"	n/a	n/a

SYSTEMS WEIGHTS		
Cabinets with control panel		
System Description	Weight (lbs)	Weight (Kg)
1½" Preaction cabinet unit	475	215
2" Preaction cabinet unit	480	218
3" Preaction cabinet unit	755	342
4" Preaction cabinet unit	770	349
6" Preaction cabinet unit	1050	476
8" Preaction cabinet unit	1500	680

TOTALPAC[®] 3

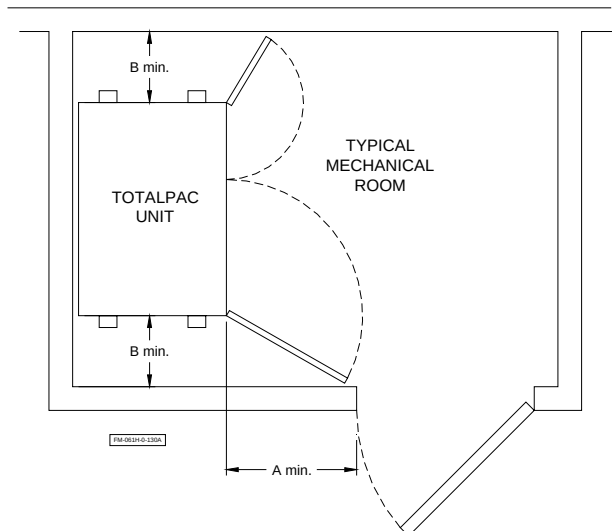
Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Figure 2 – Anchoring dimensions:



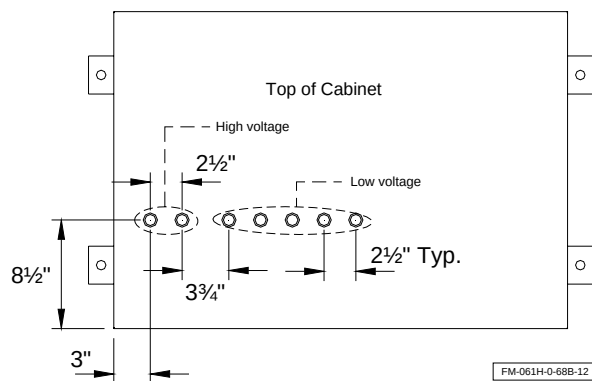
System Size	A	B
1½"	25"	15"
2"	25"	15"
3"	37¾"	15"
4"	37¾"	15"
6"	48"	15"
8"	56"	21"

Figure 3 – Cabinet clearance dimensions



System Size	A	B
1½"	24"	12"
2"	24"	12"
3"	24"	12"
4"	24"	12"
6"	24"	12"
8"	32"	12"

Figure 4 – Knockouts detail



TOTALPAC[®] 3

Datasheet
Self contained - Double interlock Preaction system
Electric / Pneumatic release

Figure 5: Open drain details for single unit:
(See dimensions in table below)

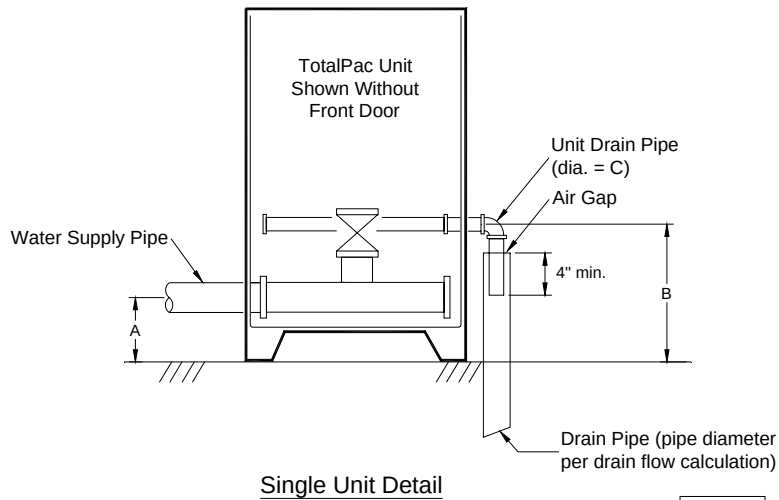
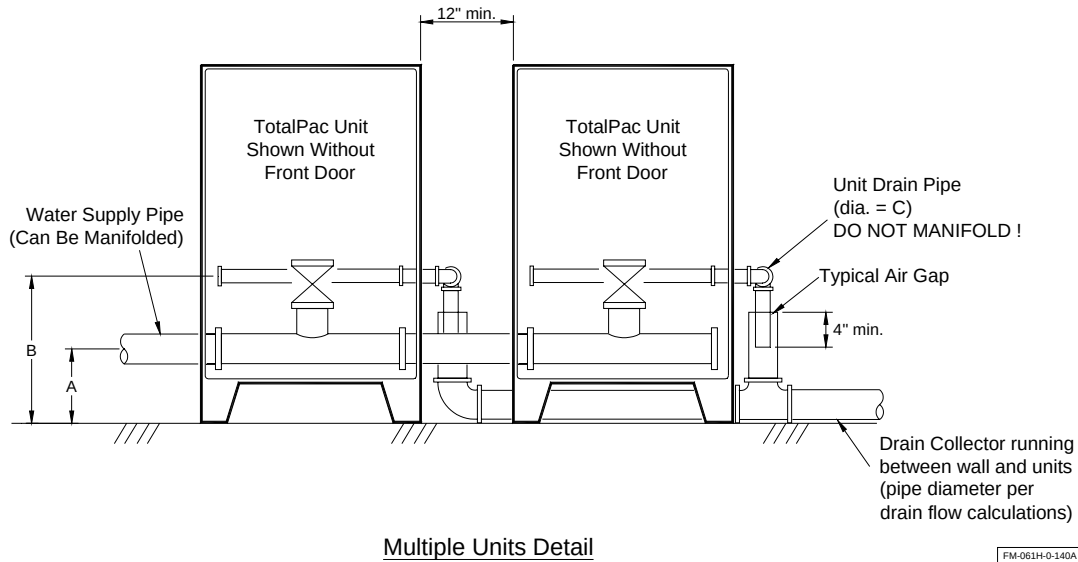


Figure 6: Open drain details for multiple units:
(See dimensions in table below)



Dimension table

Unit Size:	1½"	2"	3"	4"	6"	8"
A	8¾"	8¾"	10"	10"	11"	12"
B	13¾"	13¾"	13¾"	13¾"	13¾"	17"
C	2"	2"	2"	2"	2"	2"

Notes:

1. Supply and drain pipes can be connected on either sides of cabinet.
2. All pipes and fittings should meet applicable codes.
3. Actual drain collector diameter shall be determined with detailed hydraulic calculations and is the responsibility of the system designer.



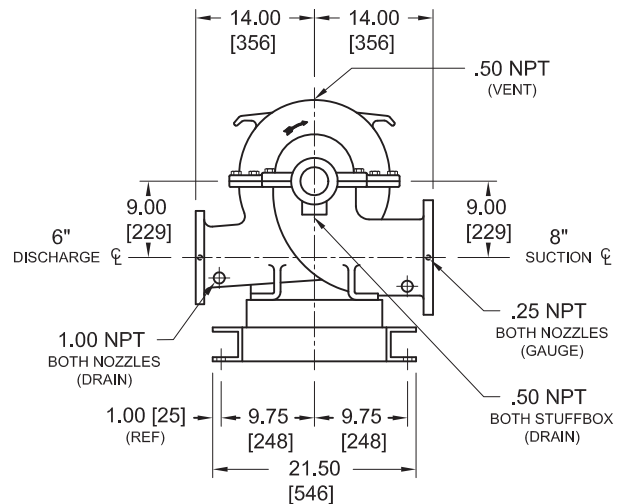
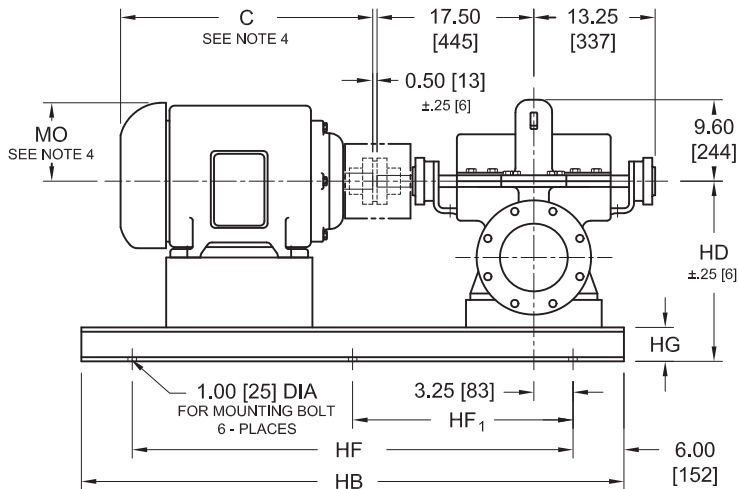
1935, Lionel-Bertrand Blvd.
Boisbriand QC Canada J7H 1N8
Tel.: 450-437-3473 • Fax: 450-437-1930
Toll Free: 866-347-3353
Email: info@fireflex.com • Web: www.fireflex.com

210513 - Motor Requirements for Fire Suppression

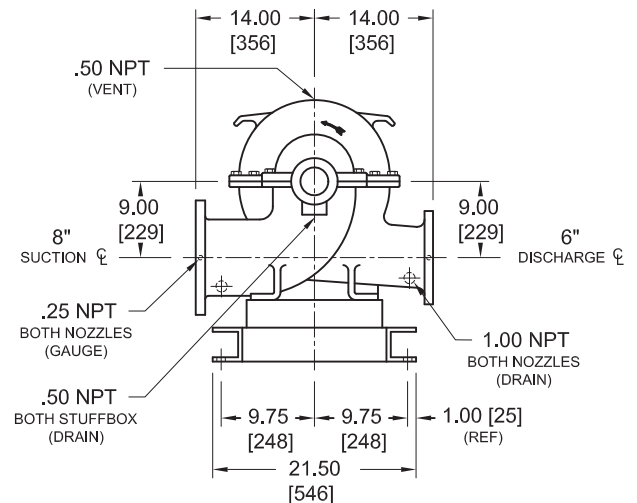
213113 - Electric-Drive, Centrifugal Fire Pumps

(H)8x6x12F – 8100 SERIES

Supersedes all previous issues



CW ROTATION VIEWED FROM COUPLING END



CCW ROTATION VIEWED FROM COUPLING END

NOTES:

- ALL DIMENSIONS ARE INCHES [mm].
- SUCTION AND DISCHARGE CONNECTIONS ARE DRILLED PER 125# ANSI B16.1. PUMPS WITH "H" PREFIX HAVE DISCHARGE CONNECTION DRILLED PER 250# ANSI B16.1. FLANGE HOLES STRADDLE CENTERLINE.
- BASE PLATE SETTING (BEFORE PIPING), GROUTING PROCEDURES, AND FINAL ALIGNMENT MUST BE IN ACCORDANCE WITH A-C FIRE PUMPS SYSTEMS RECOMMENDED PROCEDURES OUTLINED IN THE INSTRUCTION MANUAL ASSOCIATED WITH THIS PUMP TYPE.
- MOTOR DIMENSIONS ARE APPROXIMATE FOR A GIVEN NEMA FRAME. CONSULT FACTORY IF SPACE IS LIMITED.
- BOTH SUCTION AND DISCHARGE PIPES MUST BE SUPPORTED INDEPENDENTLY NEAR THE PUMP TO REDUCE STRAIN ON THE PUMP CASING. ALSO EXPANSION JOINTS, IF USED, MUST NOT EXERT FORCE ON CASING.
- COUPLING GUARD MEETS ANSI/OSHA REQUIREMENTS.
- CONSULT FACTORY FOR BASE MOUNTED CONTROLLER.

NOT FOR CONSTRUCTION, INSTALLATION OR APPLICATION PURPOSES UNLESS CERTIFIED

CERTIFIED FOR: Webster University - ISB

APPROVAL UL FM ULC
☒ ☒ ☐

CUSTOMER ORDER NO.:

TAG NO.

FLANGES

PUMP DATA	SIZE	MODEL	CURVE NO.	GPM	HEAD	ROTATION	SUCTION	DISCH.
	8X6X12F	8100	A-7524-6	1000	45 PSI	Specify	8" 125#	6" 125#
MOTOR DATA	HP	RPM	VOLTS	PHASE	HERTZ	FRAME SIZE	ENCLOSURE	
	40	1770	460	3	60	324	ODP	

SHOP ORDER:

CERTIFIED BY:

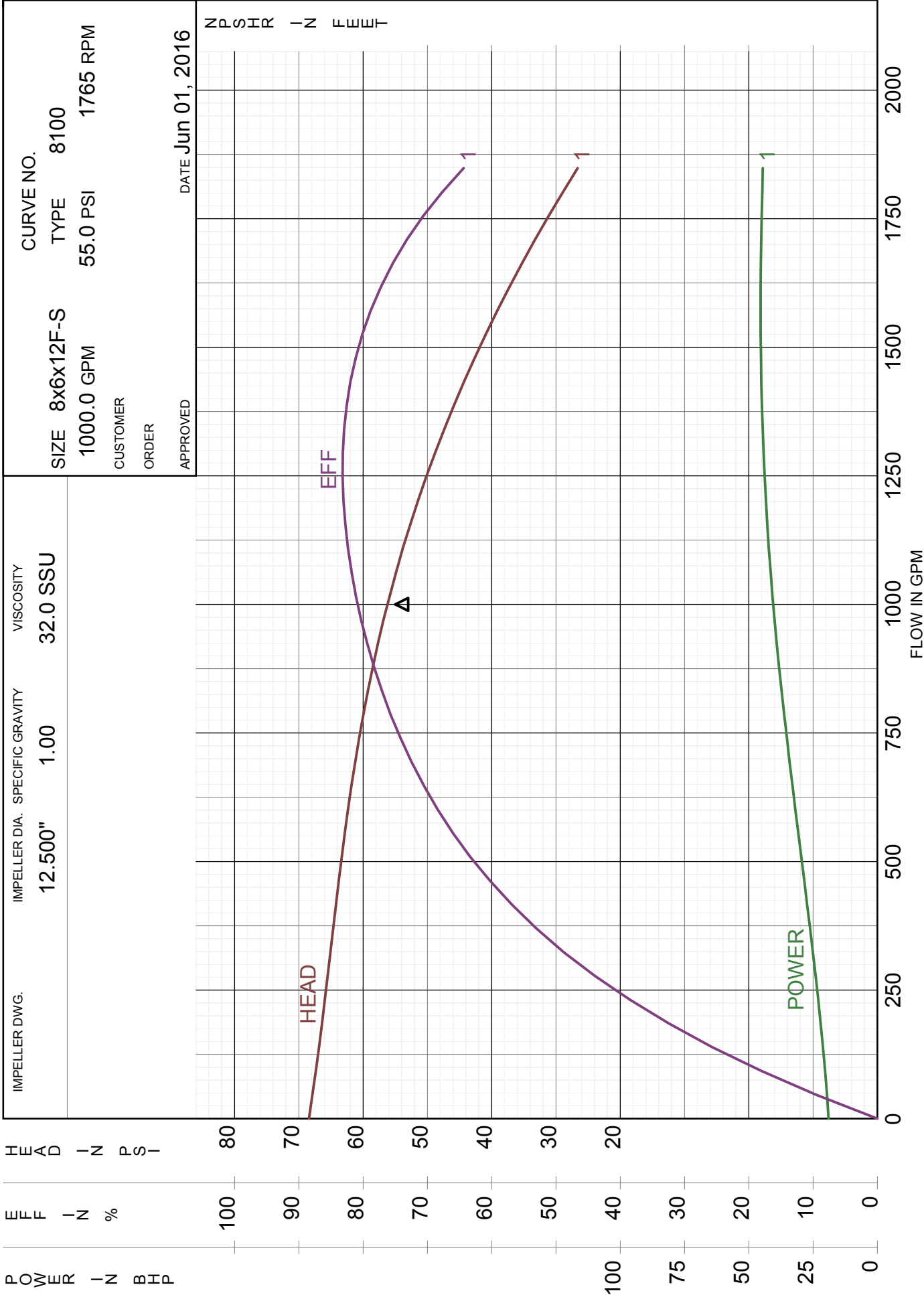
DATE:

1000 GPM



RATED PSI	PUMP SIZE	SERIES	RPM	MOTOR HP	MAX HP	UL	FM
40	8x6x12F-S	8100	1765	30	30	x	x
45	8x6x12F-S	8100	1765	30	32	x	x
	8x6x13F	8100	1780	40	39	x	x
50	8x6x13F	8100	1780	40	44	x	x
	8x6x12F-S	8100	1765	40	40	x	x
→ 55	8x6x12F-S	8100	1765	40	45	x	x
	8x6x13F	8100	1780	50	50	x	x
60	8x6x12F-S	8100	1765	50	51	x	x
	8x6x13F	8100	1780	60	67	x	x
65	8x6x12F-S	8100	1765	50	54	x	x
70	8x6x9F	8100	3550	50	57	x	x
75	8x6x9F	8100	3550	60	60	x	x
	8x6x18F	8100	1780	75	70	x	x
80	8x6x9F	8100	3550	60	66	x	x
	8x6x18F	8100	1780	75	75	x	x
85	8x6x9F	8100	3550	75	73	x	x
	8x6x18F	8100	1780	75	81	x	x
90	8x6x9F	8100	3550	75	82	x	x
	8x6x18F	8100	1780	75	86	x	x
95	8x6x9F	8100	3550	75	84	x	x
	8x6x18F	8100	1780	100	91	x	x
100	8x6x9F	8100	3550	75	86	x	x
	8x6x18F	8100	1780	100	96	x	x
105	8x6x9F	8100	3550	100	93	x	x
	8x6x18F	8100	1780	100	102	x	x
110	8x6x9F	8100	3550	100	100	x	x
	8x6x18F	8100	1780	100	108	x	x
115	8x6x9F	8100	3550	100	106	x	x
	8x6x18F	8100	1780	125	116	x	x

★ WHEN SHUT OFF HEAD PLUS SUCTION PRESSURE EXCEEDS MAXIMUM ALLOWABLE DISCHARGE PRESSURE PLEASE SPECIFY (H) INDICATING DUCTILE IRON CONSTRUCTION AND OR 250# FLANGES WHERE APPLICABLE.





a xylem brand

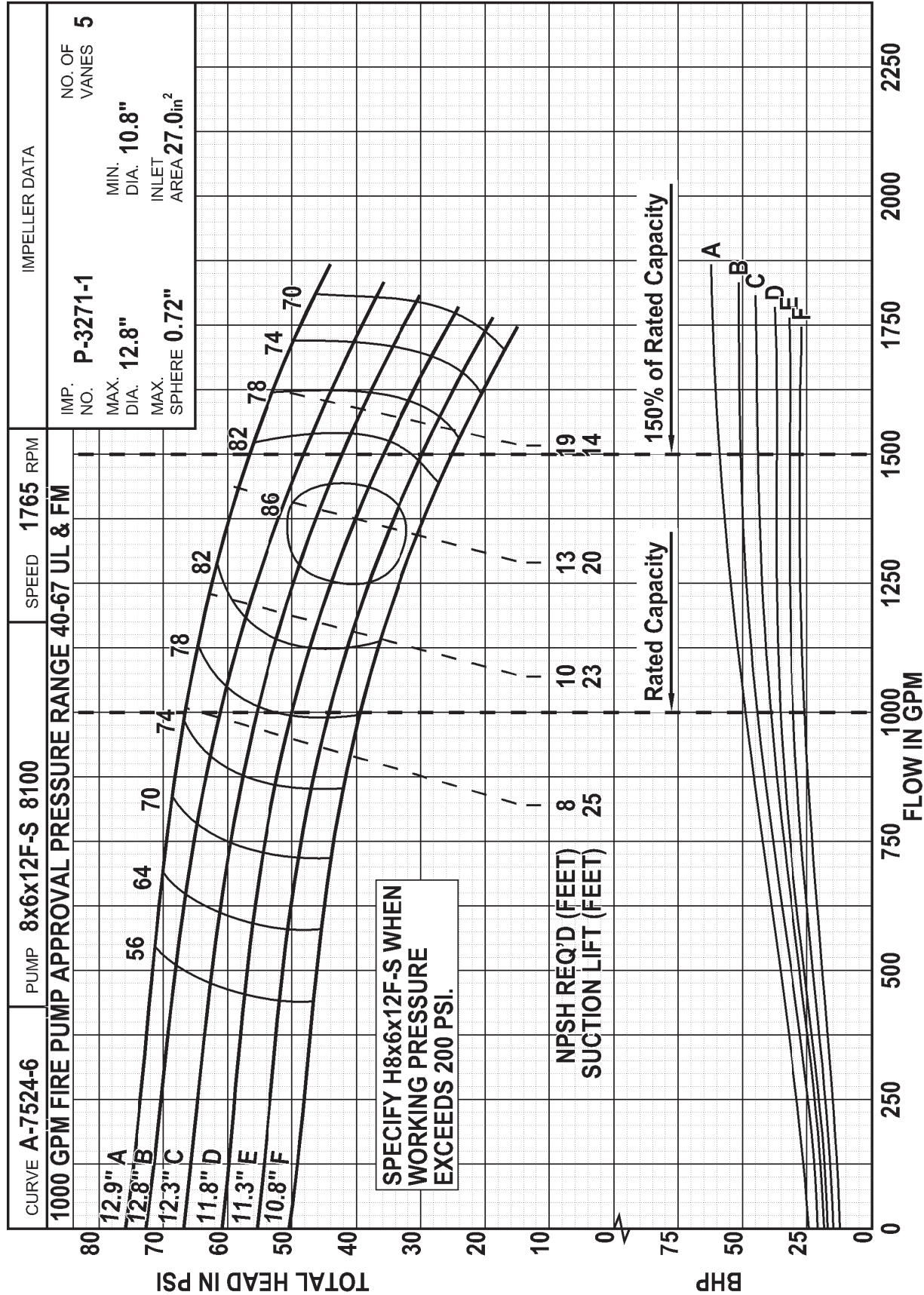
PERFORMANCE CURVES

FP 2.0

1000 GPM

OCTOBER 2012

SUPERSEDES ALL PREVIOUS ISSUES



Curves show performance with clear water at 85°F. If specific gravity is other than 1.0, BHP must be corrected.

A-C FIRE PUMP SYSTEMS

General Information and
Engineering Data

FP 1.0

Page 9

April 09

Supersedes all previous issues

① PUMP	SIZE	8x6x12F-S	H8x6x12F-S	8x6x12F-M	H8x6x12F-M	8x6x13F	H8x6x13F
	TYPE	8100	8100	8100	8100	8100	8100
STAGES		1	1	1	1	1	1

CASING DESIGN

FLANGE RATING	SUCTION	125	250	125	250	125	250
	DISCHARGE	125	250	125	250	125	250
CASING MATERIAL		CAST IRON ASTM A48 CLASS 35	DUCTILE IRON ASTM A536 GR 65-45-12	CAST IRON ASTM A48 CLASS 35	DUCTILE IRON ASTM A536 GR 65-45-12	CAST IRON ASTM A48 CLASS 35	DUCTILE IRON ASTM A536 GR 65-45-12
MAX DISCHARGE PRESSURE (PSIG)		200	375	200	375	200	375
MAX SUCTION PRESSURE (PSIG)		100	200	100	200	75	200
MAX HYDROSTATIC PRESSURE (PSIG)		338	563	375	563	315	563
CASING WALL THICKNESS		0.44	0.44	0.5	0.44	0.44	0.44

STUFFING BOX DESIGN

BORE	2.62	2.62	3.25	3.25	3.25	3.25
DEPTH	2.56	2.56	3.50	3.50	3.50	3.50
PACKING: # RINGS / SIZE SQUARE	5 / .38	5 / .38	5 / .50	5 / .50	5 / .50	5 / .50
SEAL CAGE WIDTH	0.50	0.50	0.75	0.75	0.75	0.75
SHAFT SLEEVE O.D.	1.88	1.88	2.25	2.25	2.25	2.25

IMPELLER DESIGN

# OF VANES	5	5	5	5	7	7
INLET AREA (IN ²)	27.00	27.00	19.60	19.60	44.40	44.40
MAX DIAMETER	12.80	12.80	11.60	11.60	13.10	13.10
MIN DIAMETER	7.00	7.00	6.50	6.50	7.00	7.00
MAX SPHERE	0.72	0.72	0.70	0.70	1.00	1.00
WR ² FOR MAX DIA (LBS-FT ²)	3.60	3.60	3.00	3.00	5.30	5.30
WEAR RING CLEARANCE - DIAMETRICAL	.015-.017	.015-.017	.015-.017	.015-.017	.015-.017	.015-.017

SHAFT AND BEARING DATA

DIA THRU IMPELLER		1.687	1.687	1.937	1.937	1.937	1.937
DIA THRU SLEEVE		1.499	1.499	1.874	1.874	1.874	1.874
DIA AT COUPLING		1.125	1.125	1.375	1.375	1.375	1.375
SHAFT SPAN - BRG TO BRG		22.90	22.90	25.25	25.25	27.25	27.25
BALL BEARING	INBOARD BRG #	6206	6206	6208	6208	6208	6208
	DIA THRU BRG	1.1816	1.1816	1.5753	1.5753	1.5753	1.5753
	OUTBOARD BRG #	5206	5206	5307	5307	5307	5307
	DIA THRU BRG	1.1816	1.1816	1.3785	1.3785	1.3785	1.3785
FRAME NUMBER		F20-C4	F20-C4	F20-B4	F20-B4	F20-D4	F20-D4
INSTRUCTION BOOK		AC2515	AC2515	AC2515	AC2515	AC2515	AC2515

① "H" PREFIX INDICATES HIGH PRESSURE CASING

213900 - Controllers for Fire-Pump Drivers

Part Number / Options Selection Guide

Electric Fire Pump Controllers & Transfer Switches



FD / FDF

FT / FTF

70

40

D

L1

Model
FD / FDF = Stand Alone Controller
FT / FTF = Controller c/w Transfer Switch

Starting Type
20 = Limited Service
30 = Across the Line
40 = Part Winding
50 = Primary Resistor
60 = Autotransformer
70 = Wye Delta (Star-Delta) Open
80 = Wye Delta (Star-Delta) Closed
90 = Soft Start

Horsepower
5 20 50 125 300 500 700
7.5 25 60 150 350 550
10 30 75 200 400 600
15 40 100 250 450 650

* Higher Horsepowers not available on all models. Consult Factory for pricing.

Voltage
A = 208V - 60HZ
B = 240V - 60HZ
C = 380V - 50HZ
D = 480V - 60HZ
E = 600V - 60HZ
F = 415V - 50HZ
H = 380V - 60HZ
J = 400V - 50HZ
K = 400V - 60HZ
G2 = 240V 60 HZ Single Phase*

Language
L1 = English
L2 = French
L4 = Italian
L5 = Spanish
L6 = Portuguese
L7 = Chinese
L8 = Polish
L9 = Dutch
L11 = Turkish

* Only available on Limited Service Controllers

Options
A - Built-in Alarm System
B - Alarm Bell
C1 - Extra Contacts "Pump Run" (Two Form-C)
C2 - Extra Contacts "AC Power Failure" (Two Form-C)
C3 - Extra Contacts "Phase Rev." (Two Form-C)
C4 - Remote Contacts (2 Form C) Low Reservoir
C5 - Remote Contacts (2 Form C) High Reservoir
COM - Communications Option
CX - Extra Contacts (Two Form-C; Specify Function)
E1 - NEMA 3R - Raintight Enclosure
E2 - NEMA 4 - Watertight Enclosure
E3 - NEMA 12 - Industrial Dust Tight Enclosure
E5 - NEMA 4X - 304 Stainless Steel Enclosure
E8 - Tropicalization
E9 - NEMA 4X - Painted Steel
E10 - NEMA 4X - 316 Stainless Steel Enclosure
EX - Export Crating
F2 - Floor Stand - 2 Inch Height**
H - High Withstand Rating (refer to tables)
I - Intermediate Withstand Rating (refer to tables)
LX - Extra Light (Specify Description)
P5 - Proof Pressure Switch - ALCO 15-290 PSI
P7 - Low Suction Pressure Switch
P8 - Low Suction Shutdown (Requires P7)
P10 - Pressure Transducer - Sea Water Rated
P13 - Externally Mounted Pressure Transducer**
R1 - Space Heater (120 / 220V)
R2 - Space Heater c/w Thermostat
R3 - Space Heater c/w Humidistat
R4 - Low Pump Room Temperature Switch
R5 - Space Heater (Externally powered - 120V)
USB- Externally Mounted USB Port
X1 - Printer
X2 - 4 Inch Chart Recorder (10 - 300 psi fresh water)

** Not available for NEMA 4 or NEMA 4X units.



N. Y. C.
APPROVED



LMR Plus Electric Fire Pump Controllers

Typical Specifications

1. Approvals

- A. The Fire Pump Controller shall meet the requirements of the latest edition of NFPA 20 and shall be listed by [Underwriters Laboratories (UL)] and approved by [Factory Mutual Research (FM)] [Canadian Standards Association (CSA)] [New York Department of Buildings (NYSB)] and carry the CE marking for fire pump service.

2. Starting Type

- A. The controller shall be of the combined manual and automatic type designed for [~~Full Voltage Starting~~] [~~Part Winding Starting~~] [~~Primary Resistor Starting~~] [~~Autotransformer Starting~~] **Wye-Delta (Star-Delta) Open Transition Starting** [~~Wye-Delta (Star-Delta) Closed Transition Starting~~] [~~Solid State Soft Start Starting~~]

3. Ratings

- A. The Controller shall have a withstand rating of 100,000 RMS symmetrical amperes @ [~~208V~~] [~~240V~~] [~~380V~~] [~~400V~~] [~~415V~~] **[480V]** [~~25,000 @ 600VAC~~]

4. Construction

- A. The controller shall include a motor rated combination isolating switch and circuit breaker, mechanically interlocked and operated with a single externally mounted handle.
- B. The isolating switch shall be rated to disconnect the motor load.
- C. The isolating switch/circuit breaker combination shall be mechanically interlocked such that the enclosure door cannot be opened when the handle is in the on position except by a tool operated defeater mechanism.
- D. The controller manufacturer shall manufacture the contactor, isolating switch, circuit breaker, pushbuttons, and enclosures. Brand-labeled components will not be accepted.

5. Enclosure

- A. The controller shall be housed in a NEMA Type 2 (IEC IP11) drip-proof, powder baked finish, freestanding enclosure.
- B. Optional Enclosures:
 1. NEMA 3R (IEC IP14) rain-tight enclosure.
 2. NEMA 4 (IEC IP66) watertight enclosure.
 3. NEMA 4X (IEC IP66) watertight 304 stainless steel enclosure.
 4. NEMA 4X (IEC IP66) watertight 316 stainless steel enclosure.
 5. NEMA 4X (IEC IP66) watertight corrosion resistant enclosure.
 6. NEMA 12 (IEC IP52) dust-tight enclosure.

6. Microprocessor Control

- A. The controller shall come complete with a 4 line by 40 character LCD display mounted on a panel opening in the front door. The LCD display shall indicate the following:
 1. Main screen displaying system pressure, three-phase voltage and amperage readings, system frequency, date, and time.
 2. Set point review screen displaying the programmed pressure start and stop points, and weekly test time.
 3. Controller statistics screen, including:
 - a. Powered Time
 - b. Motor Run Time
 - c. Number of Calls to Start
 - d. Number of Starts
 - e. Last Motor Start Time
 - f. Last Motor Run Time
 - g. Last Low Pressure Start
 - h. Minimum System Voltage
 - i. Maximum System Voltage
 - j. Minimum System Frequency
 - k. Maximum System Frequency
 - l. Minimum System Pressure
 - m. Maximum System Pressure
 - n. Last System Startup
 - o. Last Phase Failure
 - p. Last Phase Reversal
 - q. Last Locked Rotor Trip
 - r. Maximum Run Current
 - s. Last Locked Rotor Current
 4. Controller diagnostics screen, including:
 - a. Date & Time
 - b. Firmware Version
 - c. Shop Order Number
 - d. Customer Order Number
 - e. Transformer Output Voltage
 - f. Current Transformer Outputs
 - g. Pressure Transducer Calibrated Settings
 - h. Input Status
 - i. Output Status
 5. Display last messages screen that will display up to 10,000 alarms/messages stored in the controllers' memory.
 6. Display up to ten (10) custom messages of up to 100 characters each, which will continually scroll across the fourth line of the display.
 7. Remaining time left on active timers.
- B. The controller shall be supplied with ten (10) green status LED's for the following:
 1. Power On
 2. Pump Running
 3. Local Start
 4. Remote Start
 5. Deluge Valve
 6. Emergency Start

LMR Plus Electric Fire Pump Controllers

7. Interlock On
 8. Low Pressure
 9. Auto Shutdown Enabled
 10. Programmable LED #1
- C. The controller shall be supplied with ten (10) red alarm LED's to indicate the following:
1. Phase Reversal
 2. Phase Failure
 3. Fail to Start
 4. Undervoltage
 5. Overvoltage
 6. Low Room Temperature
 7. Locked Rotor Trip
 8. Low Suction Pressure
 9. Source 2 Disconnected
 10. Programmable LED #2
- D. The microprocessor logic board shall be available with:
1. A USB port for transference of message history, controller status, diagnostics, and statistics and the ability to update firmware.
 2. An optional Ethernet port for direct connection to a computer for data transfer.
 3. An optional RS485 Serial port for communication to various external software programs.
- E. The controller shall be available with an embedded web page to allow viewing of the controllers' current status, data values, programmed set points, and history.
- F. A Fail-to-Start alarm shall occur if the motor controller sees less than 20% of the motor full load amps after an adjustable time delay of 1-90 seconds.
- G. Locked rotor protection shall be provided. After a trip condition and restoration of power, the LCD display shall indicate "LOCKED ROTOR TRIP".
- H. A sequential start timer and weekly test timer shall be provided as standard.
- I. A restart time delay of two (2) seconds shall be provided to allow the residual voltage of the motor to decay prior to re-starting the motor. In the event that the pump motor continues to run after a request to stop, then the controller must display a fail to stop message to indicate this condition.
- J. Overvoltage (5-20%) and undervoltage (5-30%) sensing and alarming shall be provided as standard.
- K. The controller shall be supplied with interlock and shutdown circuits as standard. A flashing green LED shall indicate an interlock on condition.
- L. Where shutdown of the pump(s) due to low suction pressure is required, it shall be accomplished without the addition of a separate panel or enclosure. The LCD display shall indicate low suction shutdown. Resetting of the condition shall be automatic or manual as selected by the user.
- M. Means shall be provided to test the operation of all LED's to ensure their functionality.

7. Programming Menu

- A. The programming menu shall have the ability to enable an entry password.
- B. The programming menu shall be limited to two (2) levels of password protection.
- C. The controller shall have three (3) languages as a standard, English, French, and Spanish, with the ability to add a fourth language.
- D. The programming menu shall be grouped into 6 main menu headings as follows:
1. Regional Settings
 2. Pressure Settings
 3. Timer Values
 4. Alarm Set points
 5. Input/Output Menu
 6. System Configuration (password protected)

8. Pressure Sensor

- A. A solid-state 4-20mA pressure sensor shall be provided. The pressure Start and Stop points shall be adjustable in increments of one (1) PSI. A low pressure pre-alarm, indicated with a flashing green LED, shall denote a potential pump starting condition and will remain lit once the pump has started to indicate the starting cause.

9. Custom Inputs/Outputs

- A. The controller shall come standard with nine (9) future inputs, two (2) future LED indicators, and one (1) future output, with the ability to add up to another 8 outputs via optional relay boards.
- B. The user shall be able to program the future inputs/outputs through the main programming menu.
- C. The inputs shall be selectable based on the following criteria:
1. User selected message or thirteen (13) predetermined messages.
 2. Energize the common alarm relay when the input is received.
 3. Link to a future relay and/or LED indicator.
 4. Alarm latched until reset.
 5. Normally open or closed input.
 6. On-delay timer.
- D. The LED indicators shall be selectable based on the following criteria:
1. Indication based on a minimum of twelve (12) predetermined alarms or a custom input.
- E. The future relays shall be selectable based on the following criteria:
1. Output based on a minimum of twenty-seven (27) predetermined alarms, controller status or a custom input.
 2. Latched until reset.
 3. Energized under normal conditions.
 4. On or off delay timer on the output.

LMR Plus Electric Fire Pump Controllers

10. Alarm Relays

- A. All relays shall be of the plug-in type. An LED on the relay panel shall indicate the energized state of the relay. All relay contacts shall be rated @ 8A, 277VAC/30VDC. Two (2) sets of Form-C contacts shall be provided for each of the following:
 - 1. Phase Reversal
 - 2. Phase Failure
 - 3. Common Alarm
 - 4. Future #1
 - 5. Pump Run.
- B. The Common Alarm and Phase Failure relays shall be energized under normal conditions.

11. Audible Alarm Buzzer

An audible alarm buzzer, capable of being heard while the motor is operating, shall operate if Fail to Start, Hardware Malfunction or any Common Alarm condition exists.

12. Manufacturer

- A. The controller shall be of the LMR Plus type as manufactured by Eaton Corporation.



Typical Specifications

1. Approvals

- A. The Fire Pump Controller and Transfer Switch combination shall meet the requirements of the latest edition of NFPA 20 and shall be listed by [Underwriters Laboratories (UL)] and approved by [Factory Mutual] (FM) **, [Canadian Standards Association (CSA)] and [New York Department of Buildings (NYSB)] for fire pump service.
- B. The transfer switch shall meet UL 1008 and shall be regularly subjected to Endurance, Interrupting Capacity, and Dielectric Voltage-Withstand test as outlined by UL 489 standards.

2. Ratings

- A. The transfer switch shall be suitable for the available short circuit current at the line terminals of the controller.
- B. The transfer switch shall have an ampere rating not less than 115% of the motor full-load current.

3. Construction

- A. The transfer switch shall be installed in a barriered compartment of the fire pump controller. The complete assembly, controller and transfer switch, shall be shipped as a single unit.
- B. A single uni-gear motor shall electrically operate the transfer mechanism. It shall also be capable of being operated manually and shall have suitable provisions for readily disengaging the gear motor when necessary.
- C. The transfer switch shall be mechanically and electrically interlocked so that it shall not be possible for the load circuits to be connected to normal and emergency sources simultaneously, regardless of whether the switch is electrically or mechanically operated. The switch shall have a manual neutral.
- D. The alternate side shall be provided with an isolation switch sized to a minimum of 115% of the motor full-load current and a circuit breaker having a continuous current rating not less than 115% of the motor full load amps, have overcurrent sensing elements of the non-thermal type, and instantaneous short-circuit overcurrent protection. The isolating switch and circuit breaker shall be mechanically interlocked and operated by a single handle. The isolating switch shall be supervised to indicate when it is open by audible and visual alarms.
- E. An auxiliary contact shall be provided to prevent sending of the signal for starting of the alternate source generator when the transfer switch commands it, if the isolation switch on the alternate source side of the transfer switch is open.
- F. The transfer switch shall be provided with locked rotor overcurrent protection. The locked rotor protector shall be calibrated and set to a minimum of 300% of the motor full-load current and have a tripping time between 8 and 20 seconds.

4. Enclosure

- A. The controller shall be housed in a NEMA Type 2 (IEC IP11) drip-proof, powder baked finish, freestanding enclosure.

5. Microprocessor Control

- A. A solid state sensing and control logic panel shall be separately mounted from the power-switching portion of the transfer switch. The two sections shall be connected together by control cables and plug-in connectors. The control section shall be capable of being isolated from the power section for maintenance.
- B. The normal power source shall be set to pickup at 95% and drop out at 85% of nominal supply. The voltage sensing on the alternate supply shall be set to pickup at 90% of nominal voltage.
- C. All voltage sensing, frequency sensing, and timer set points shall be field adjustable.
- D. The transfer switch shall automatically transfer its load circuit to an emergency or alternate power supply upon failure of the normal or original supply. In order to override momentary fluctuations in the system, a time delay transfer from normal to alternate power supply shall be adjustable up to 1800 seconds. Upon restoration of the normal supply, the transfer switch shall automatically retransfer its load circuits to the normal supply. Mechanically held transfer mechanisms shall be energized only momentarily during transfer or retransfer.
- E. If the emergency / standby power should fail while carrying the load, transfer to the normal supply shall be made instantaneously upon restoration of the normal source to satisfactory conditions.
- F. The transfer switch shall come complete with five LED's to provide visual indication of the unit status, source 1 available, source 1 connected, source 2 available, and source 2 connected.
- G. An engine test button shall be provided that will initiate an engine test.
- H. A silence alarm button shall be provided that will silence the alarm buzzer.

6. Alarm Relays

- A. 2 Form-C contacts shall be provided for remote indication for source 1 connected or source 2 connected.
- B. 2 Form-A contacts shall be provided for remote indication for the alternate source-isolating switch open.

7. Manufacturer

- A. The manufacturer of the assembly shall be the manufacturer of major components and control modules installed within the assembly.
- B. The Transfer Switch Fire Pump Controller shall be of the LMR Plus type as manufactured by Eaton Corporation.
- C. Models:
 - ~~FT20 Limited Service~~
 - ~~FT30 Across the Line~~
 - ~~ET40 Part Winding~~
 - ~~FT60 Primary Resistor~~
 - ~~FT60 Autotransformer~~
 - **FT70 Wye-Delta (Star Delta) Open Transition**
 - ~~FT80 Wye-Delta (Star Delta) Closed Transition~~
 - ~~FT90 Soft Start~~

** NOTE: As of January 1, 2009 – FT20 Limited Service Transfer Switch controllers, do not carry FM Approval.

LMR PLUS



Product Description

The Automatic Transfer Switch Option may be added to any FD type Fire Pump Controller whenever automatic transfer from normal to alternate power is required.

The automatic Transfer Switch and Fire Pump Controller are mounted in the same enclosure or in separate enclosures to form one unit and interwired - depending on the horsepower and voltage required.

Engine Test Button

An engine test button is provided on the ATC-300 controller that can be used to test the Source 2 (generator) engine. The operator can select the engine run test time (0-600 minutes). As well, a silence pushbutton is provided which de-energizes the alarm bell.

Electrically and Mechanically Interlocked

The FT Series transfer switch operating mechanisms are mechanically interlocked to prevent the normal and alternate source from connecting at the same time.

The switch operates upon signals received from the ATC-300 Plus controller.

ATC-300 Plus

The panel mounted, multi-function, microprocessor based ATC-300 Plus controller accurately monitors two power sources and provides the necessary intelligence to reliably operate the transfer switch through a series of programmed sensing and timing functions.



Keypad Programming

The ATC-300 Plus controller membrane is equipped with seven keypad input buttons which are used to program the controller as well as set operating parameters.

LED Status Indication

Five LED's indicate the status of the power sources.

Source 1 Available	Source 1 Connected
Source 2 Available	Source 2 Connected
Unit Status	

Automatic Transfer

The FT Series Transfer Switches will perform an automatic transfer from Normal to Alternate source when the Voltage drops to 85% of normal, or there is a loss of any phase and/or Phase Reversal.



Voltage and Frequency Sensing

The ATC-300 Plus continuously monitors the normal source for out of range setpoint values. When the source is outside the dropout setpoints, the source will become unavailable. This prompts a transfer to the alternate source. Retransfer occurs when the normal source's frequency and/or voltage return within pickup setpoints.

Alarm Relay

The alarm relay is de-energized to indicate an absence of an alarm state and energized to indicate the presence of an alarm condition.

Alarm conditions include:

- Improper Circuit Breaker Operation
- Motor Operator Failure
- Lockout
- Failsafe Condition
- Aborted Engine Test
- Aborted Plant Exerciser
- Unsuccessful in-phase Transition

Product Features

The FT70 Transfer Switch Controllers use a method of connecting the pump motor windings into wye configuration to start, then switching to a delta configuration to run.

This reduces the starting current of the motor significantly.

Wye-Delta starting is the only method that has a starting torque efficiency of 100%. The FT70 can be programmed for either fully automatic or semi-automatic operations.

Logic Controller Board

Communication

The controller can be ordered with the option to display and output current values and status, on command, from various software protocols through the appropriate port(s).

Embedded Web Page

The web page is a multifunction tool that allows the user to view the controller's current status, data values, programmed set points and history. It is accessed using the optional ethernet port.

USB Port / USB Drive

The logic controller board is equipped with a USB port that can be used to transfer data to and from a portable USB Drive device (memory stick).



Ethernet Port

An optional ethernet port is used for direct connection to a computer for data transfer.

RS485 Serial Port

An optional RS485 serial port can be provided for communication to various external software programs.

Buzzer

A buzzer is mounted on the logic board which will operate if Fail to Start, Hardware Malfunction or any Common Alarm condition exists.

Power I/O Board

Transformers

Incoming line voltage is run directly to the I/O board from the incoming lines. The three transformers mounted on the I/O board will accept voltage inputs between 100 and 600V.

Customer Connection Terminals

Connection terminals for external customer connections, are located on the top of the Power I/O board.

Output Relays

Seven socket mount, 8 Amp, 2 Form - C (DPDT) output relays are provided standard on each power I/O board. They are designated for:

- Common Alarm,
- Phase Failure,
- Phase Reversal,
- Pump Run,
- Startup,
- Acceleration

and Future # 1.

Each socket has an LED mounted on the I/O board which indicates each relay's coil status.



Optional Output Relay Boards

There is provision to add up to eight additional relay outputs, via optional relay output boards. Each board contains a maximum of 2 additional relays. The Power I/O Board will accept a maximum of 4 optional boards which mount in a snap-on configuration.

Each board provides an area for the user to label the terminal number and relay name.

Door Mount

The membrane keypad is accessible from the front door of the controller.

NEMA Rating

The standard membrane keypad is rated for NEMA 2, 3R, 4, 4X and 12.

LCD Display

The Logic Control Board contains a 4 Line by 40 Characters wide, backlit, LCD display which is capable of generating multiple languages.

Alarm & Status LED's

A total of 20, (10 Status - 10 Alarm) LED's provide indication on the membrane keypad.



Status LED's

Power On
Pump Running
Local Start
Remote Start
Deluge Valve
Emergency Start
Interlock On
Low Pressure
Auto Shutdown Enabled
Programmable LED # 1

Alarm LED's

Phase Reversal
Phase Failure
Fail To Start
Undervoltage
Overvoltage
Low Room Temperature
Locked Rotor Trip
Low Suction Pressure
Source 2 Disconnected
Programmable LED # 2

Silence Button

A silence pushbutton on the membrane can be used to silence the buzzer. When an alarm condition exists, the alarm buzzer will sound. If the Silence Alarm button is pressed, the alarm buzzer will turn off. If a subsequent alarm condition occurs after the silence button is pressed, the buzzer will re-sound. Pressing the Silence Alarm button again, will silence the buzzer.

Motor Test Button

The motor test button on the membrane can be used to simulate an automatic start.

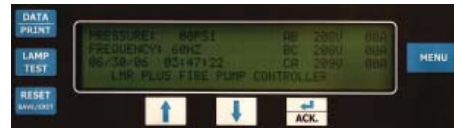
Automatic Shutdown Enabled

When the Automatic Shutdown function is enabled, a Green LED will indicate on the controller membrane.

MAIN DISPLAY

General

The main display will show the current system pressure, time and date, voltage and amps reading for all three phases, the system frequency and any custom messages, alarms or timers.



Programmed Set-Point

The set-point display will show programmed pressure start point, pressure stop point and weekly test timer setting.

Statistics

The statistics display will allow the user to scroll through all of the measured statistics stored in memory. Refer to LMR Plus operation manual IM05805020K for specific details.

Diagnostics

The diagnostics display will allow the user to scroll thorough eleven diagnostic points to assist with troubleshooting the system.

Message History

The user will be able to scroll through all of the messages stored in the memory of the controller with the most recent message being displayed first.

PRINT Menu Description

All fault and alarm information is sent to the USB and Printer ports on demand, as well as the status of each output. The LMR Plus will store up to 10K events which are time and date stamped. All information can also be retrieved and displayed on the LCD display.

Saving to USB Drive

The controller will save four separate text files, one CSV file and the embedded webpage to the USB external drive. The files, at maximum size, can be saved multiple times on one 128MB USB drive.

Files to be saved are: Status Report, Diagnostics Report, Statistics Report, Configuration File and Last 10K Messages.

Print Menu

The printer menu is accessed in order to select the desired print function. Functions include: Print Messages, Last XX Messages, Date & Time, Status Report, Diagnostics Report and Statistics Report.

Custom Messages

When this item is selected, custom messages can be cleared from memory or downloaded from the USB external drive.

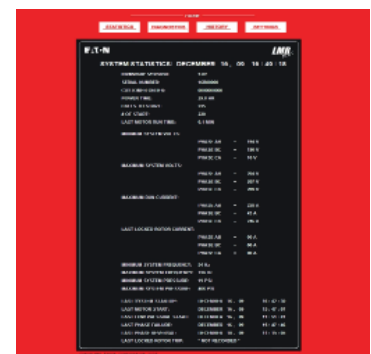
Firmware Update

Firmware revisions are updated from an external USB drive. All previously programmed settings will remain intact when updating is completed. Should there be an update failure, the controller will automatically revert back to the previous version of firmware.

Embedded Webpage

General

The embedded webpage is a multifunction tool that will allow the user to view the current status of the controller as well as display all current readings, set points, and history. An external computer can be connected via the optional Ethernet port to access the page. When connected, the controller set points can be programmed via the webpage.



Multiple Pages

There are 5 viewable pages that show the Main Display, Statistics, Diagnostics, History and Programmed Set Points.

Pressure Points

The pressure reports recorded in memory can be graphed and/or sorted based on date and time.

Programmed Set Points

All of the programmed set points and their current status can be viewed via the webpage.

Custom Messages

Users can create custom messages on a computer and upload to the controller using a USB Drive (memory stick). Up to 10 custom messages of up to 100 characters each, will continuously scroll across the fourth line of the LCD display once uploaded.



Trigger Points

The message can be programmed to appear at specific trigger points such as specific date and time, specific number of operations, specific number of hours run or at any individual alarm point.

All of the trigger points can be selected as And/ Or values.

Product Features

Programming Menu

General

The LMR Plus programming menu is divided into 8 different sub-menus. Each sub-menu contains information relative to its particular function. A brief description of each sub-menu is listed below.

Language

The language sub-menu allows the user to select English, French or Spanish or Other languages to be viewed on the LCD Display. Several other languages can be uploaded into the controller. Contact the factory for details.

Regional

Regional settings include the ability to program the date by adjusting the Month, Day, Year and Day of Week. As well, the Current Time can be adjusted on the 24 hour clock.

Pressure

A variety of pressure settings can be programmed in the pressure sub-menu. These settings include disabling the pressure transducer; setting of the start point, stop point, low pressure alarm, high pressure alarm, stop mode, proof pressure switch (for foam units), low suction shutdown (low foam shutdown), pressure deviation and hourly pressure recording. Refer to the LMR Plus operation manual IM05805020K for details.

Timers

Timers in the LMR Plus that can be programmed include: Run Period Timer (RPT), RPT Start Mode, Acceleration Timer (AT), Weekly Test Timer, Fail to Start Timer (FST) and Sequential Start Timer (SST). Refer to the LMR Plus operation manual IM05805020K for details.

Alarm Set Points

There are five settable alarm points that can be programmed by the user. They include: Phase Rotation, Over Voltage (OV), Under Voltage (UV), Over Frequency (OF) and Under Frequency (UF). Refer to the LMR Plus operation manual IM05805020K for details.

Custom Inputs / Outputs

There is provision on the Power I/O Board to accept up to 9 additional inputs and 9 additional outputs. The inputs can be labeled using one of 11 pre-set input descriptions or assigned a custom description that is programmed by the user. The optional outputs can be programmed to indicate up to 25 output conditions. As well, two optional alarm LED's can be programmed for up to 12 alarm conditions. All optional inputs, outputs and LED's can be linked, as required.

Inputs can be programmed to energize the common alarm output, link to relays and optional LED's and latch until reset by the user. Outputs can be programmed for fail safe and latch until reset by the user. Optional inputs and outputs can be programmed with time delay functions.

USB External Drive

General

When using an external USB Drive, the drive should conform to the following minimum specifications:



Min: 128mb
Max: 2 Gig
FAT16 protocol
USB 1.0 or 2.0

Drain Valve Solenoid

All LMR Plus electric controllers are equipped with a drain valve solenoid used for weekly test purposes.



NEMA 2 Enclosures

All LMR Plus controllers come standard with NEMA 2 enclosures unless otherwise ordered. Available options include: NEMA 3R, 4, 4X, 12.

Emergency Start Operator

A mechanically operated emergency start handle activates the motor contactor independent of any electrical control circuits or pressure switch input.

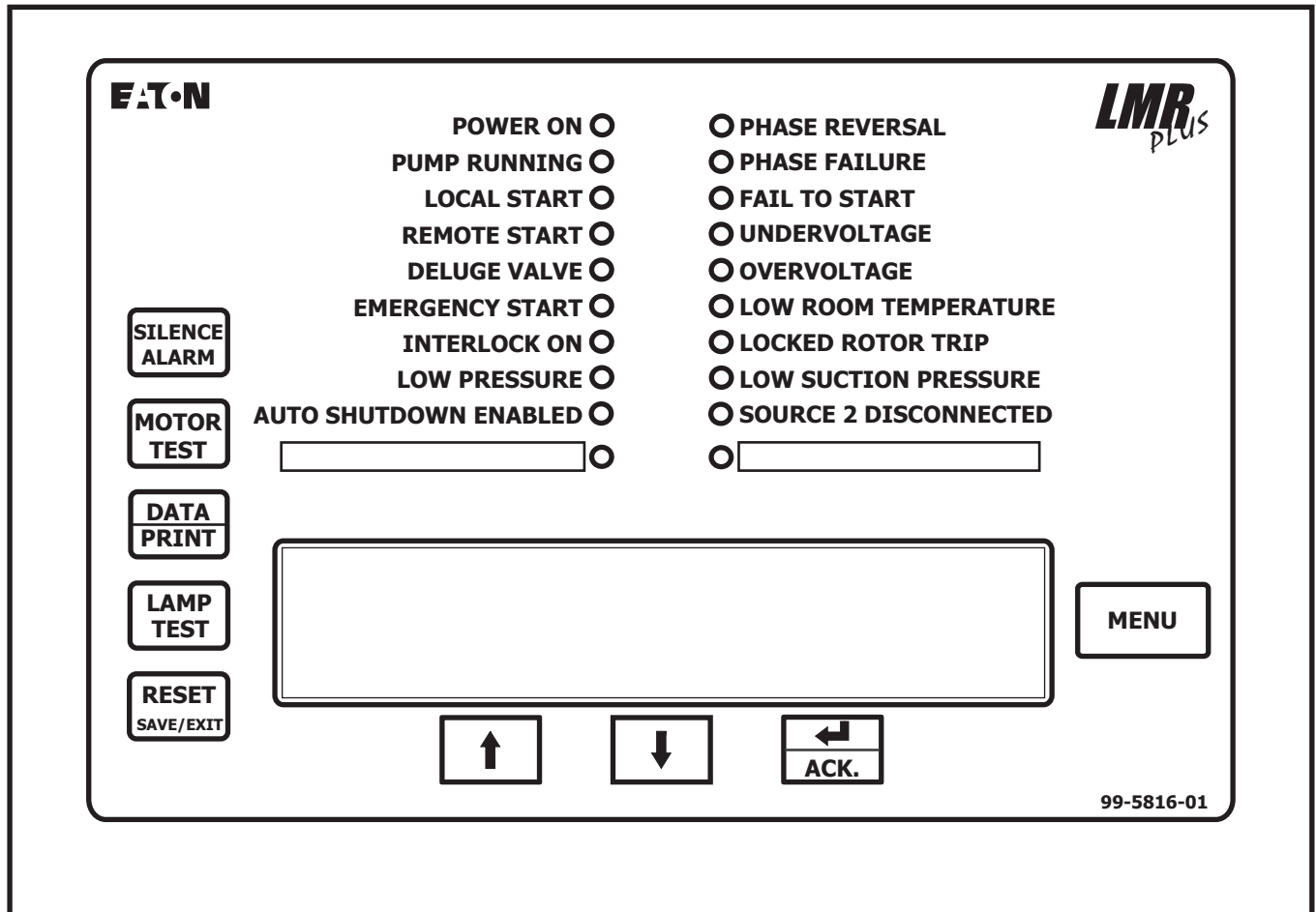


Standards & Certification

The LMR Plus Electric Fire Pump Controllers meet or exceed the requirements of Underwriters Laboratories, Underwriters Laboratories Canada, Factory Mutual, the Canadian Standards Association, New York City building code, CE mark and U.B.C / C.B.C. Seismic requirements, and are built to NFPA 20 standards.



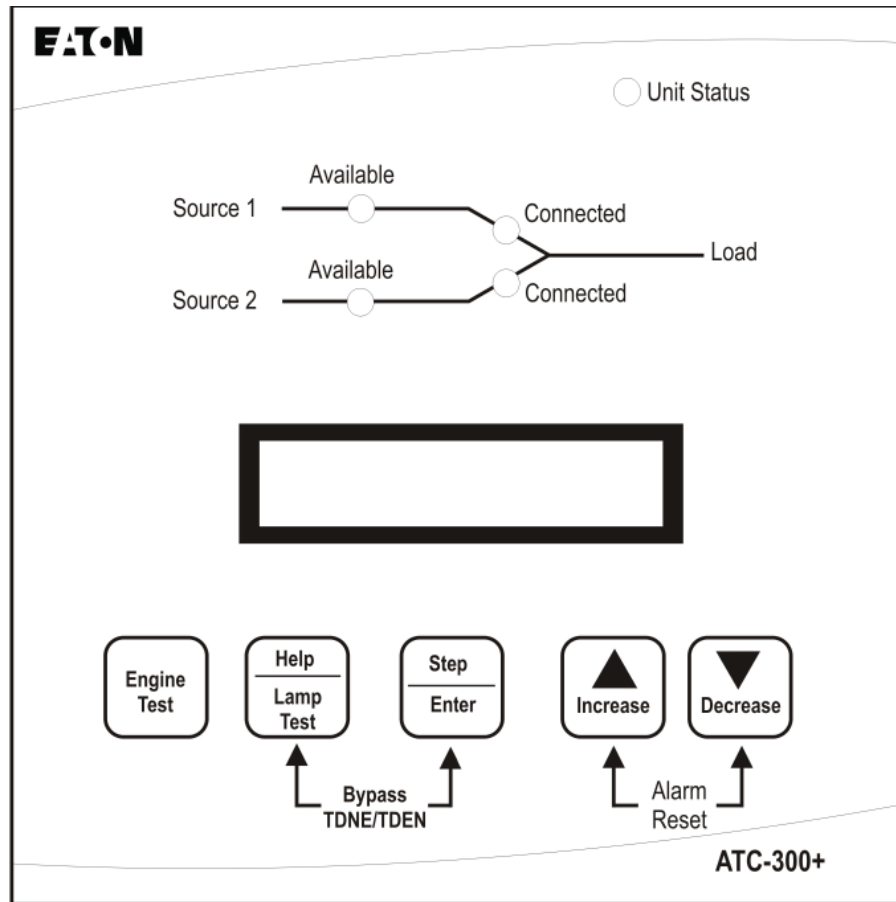
Main Display



NOTES:

1. Refer to the LMR Plus technical manual for detail and setup information, as well as programming and custom labelling for Programmable LED # 1 and Programmable LED # 2.

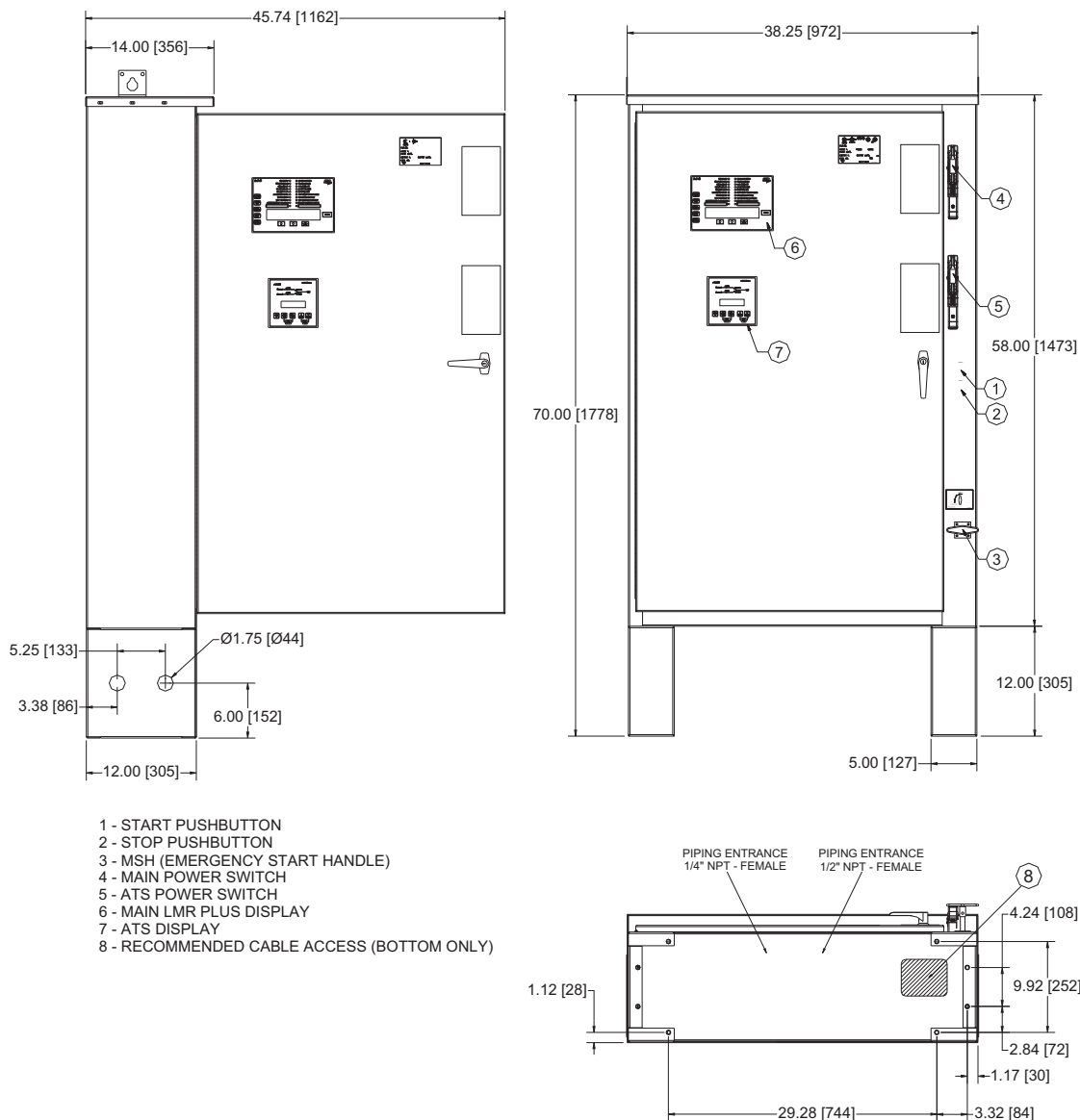
Main Display



Note: For setup and programming information, refer to the Operation Manual for the EATON ATC-300 Plus Automatic Transfer Switch Controller - IM05805022K

Dimensions

Standard Enclosure - Type NEMA 2, 3R, 4, 4X, 12



Dimensions in inches and [millimeters].

Motor Hp	Line Voltage	Withstand Rating			Approx. Weight Lbs. (Kg)
		Standard	Intermediate	High	
5 - 40	200 - 208V	100,000	150,000	200,000	425 (193)
5 - 50	220 - 240V				
5 - 75	* 380 - 415V				
5 - 100	440 - 480V				
5 - 100	550 - 600V	25,000	100,000		

* Coils Available: 380V-50Hz, 380V-60Hz, 415V-50Hz, 415V-60Hz

NOTES:

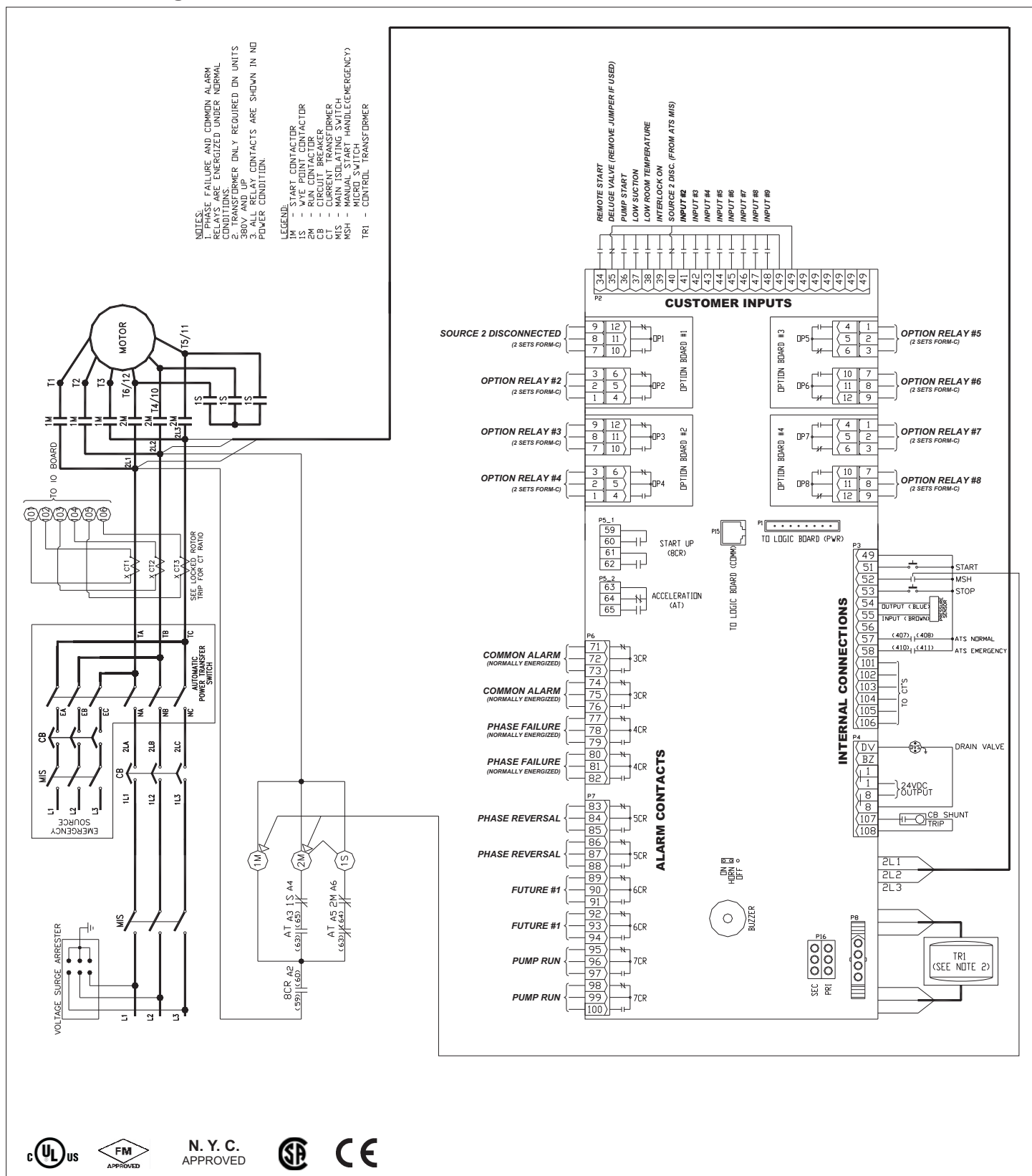
1. All enclosures finished in FirePump red.
2. Cable Entrance bottom only.
3. Standard Enclosure type NEMA 2.



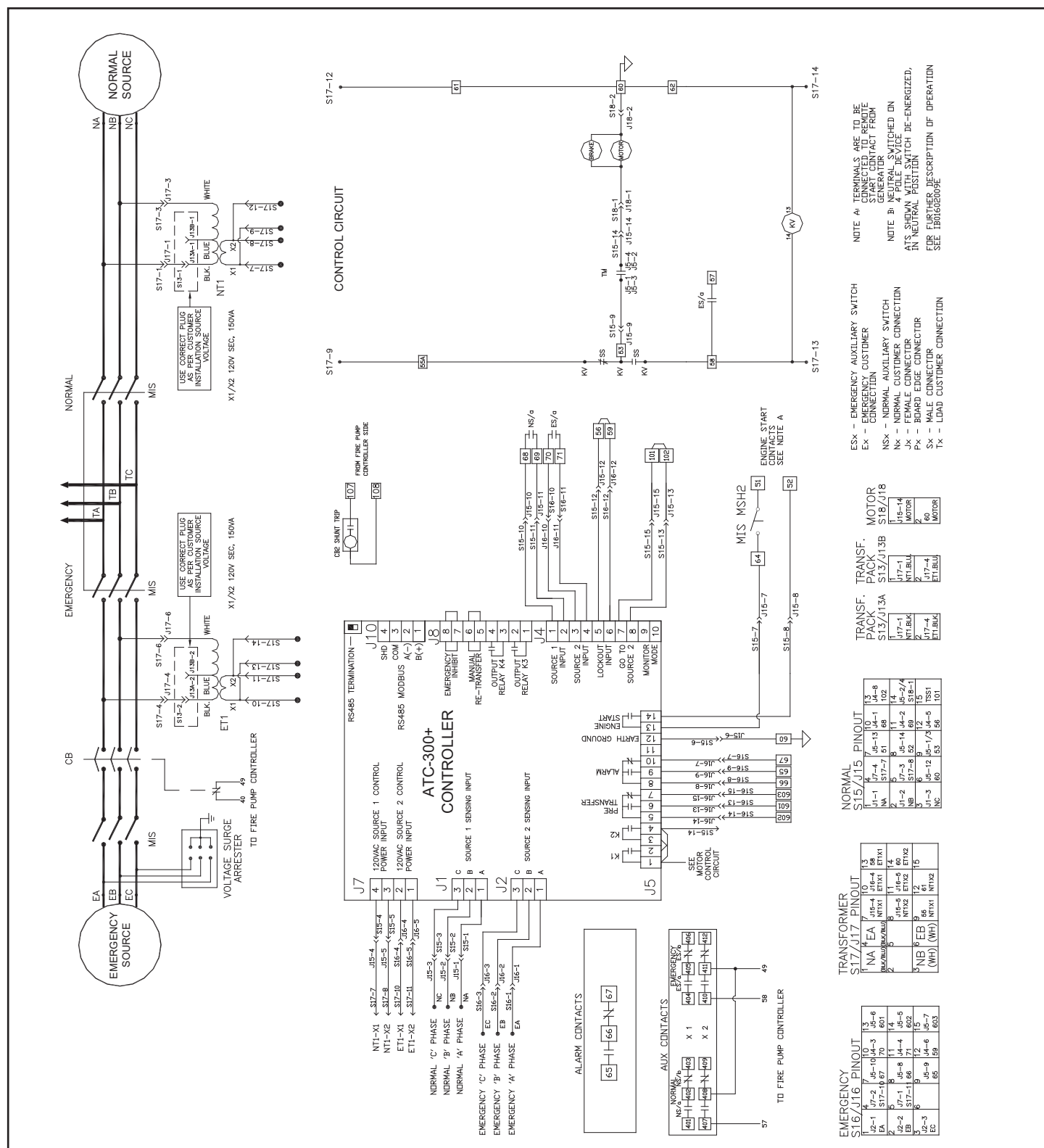
N. Y. C.
APPROVED



Electrical Wiring Schematic



Electrical Wiring Schematic





Field Connections

Line Terminals (Incoming Cables)

	Line Terminals on Main Isolation Switch (Incoming Cables)						
	LINE VOLTAGE					Qty. & Cable Sizes	Service Entrance GND. LUG Qty. & Cable Sizes
	200 - 208	220 - 240	*380 - 415	440 - 480	550 - 600		
Max HP	25	30	40	60	75	(1)#14-1/0 PER Ø (CU/AL)	(1)#14-2/0 (CU/AL)
	40	50	75	100	100	(1)#4-4/0 PER Ø (CU)	(1)#4-350MCM (CU/AL)
	75	75	150	200	200	(1)#3-350MCM PER Ø (CU/AL)	(1)#4-350MCM (CU/AL)
	100	125	200	250	300	(2)3/0-250MCM PER Ø (CU/AL)	(2)1/0-750MCM (CU/AL)
	150	200	300	400	400	(2)250-350MCM PER Ø (CU/AL)	(2)1/0-750MCM (CU/AL)
	200	-	350	450	550	(2)#1-500MCM PER Ø (CU/AL)	(2)1/0-750MCM (CU/AL)
	250	300	500	600	700	(3)3/0-400MCM PER Ø (CU/AL)	(2)1/0-750MCM (CU/AL)

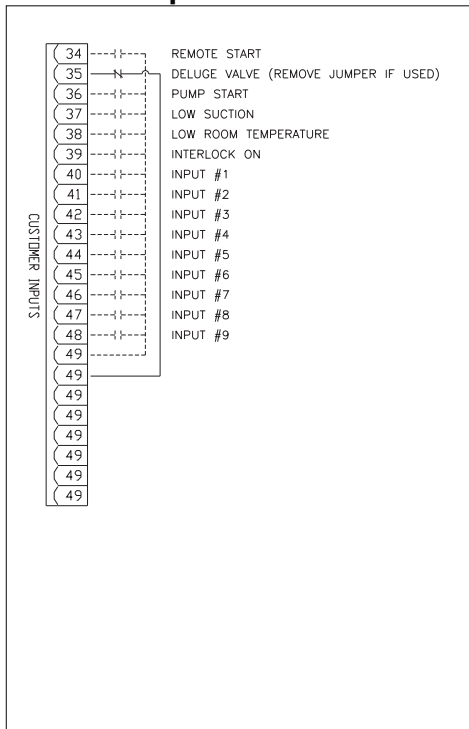
* Coils available: 380V-50Hz, 380V-60Hz, 415V-50Hz, 415V-60Hz.

Load Terminals (To Motor)

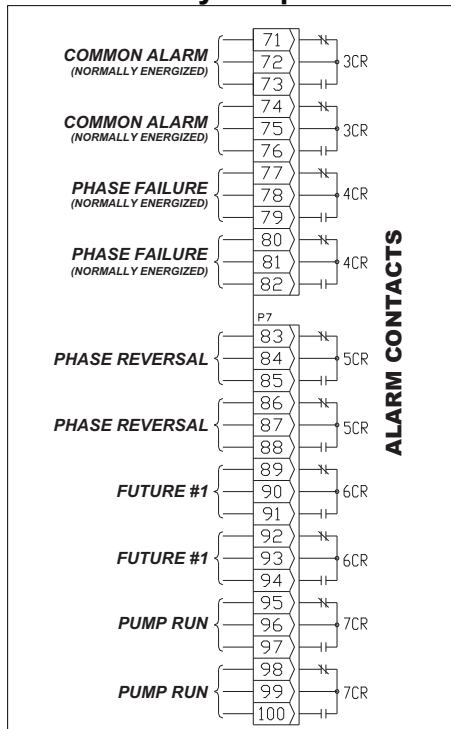
	Load Terminals (To Motor)						
	Line Voltage					Qty and Cable Sizes	
	200-208	220-240	380-415	440-480	550-600	Single Run	Double Run
Max HP	15	20	30	40	50	(1) #14 - #8 PER Ø (CU/AL)	-
	40	50	75	100	100	(1) #14 - #1 PER Ø (CU/AL)	-
	75	100	150	200	150	(1) #8 - 3/0 PER Ø (CU/AL)	-
	150	150	250	300	300	(2) #2 - 250MCM PER Ø (CU/AL)	(2) 1/0 - 250MCM PER (CU/AL)
	250	300	500	600	700	(2) 1/0 - 500MCM PER Ø (CU/AL)	(2) 1/0 - 500MCM PER (CU/AL)

For ambient temperatures above 30C (86F), the temperature rating of motor conductors is recommended to be a minimum of 90C (194F)
For Proper Cable Size Refer to National Electrical Code NFPA-70

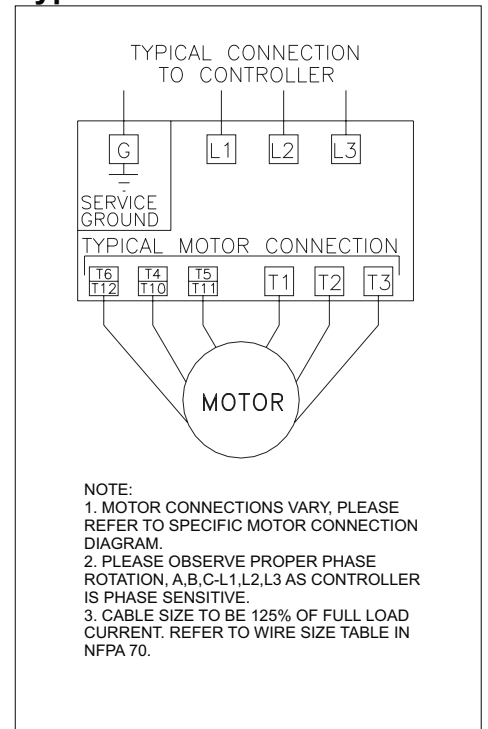
External Inputs



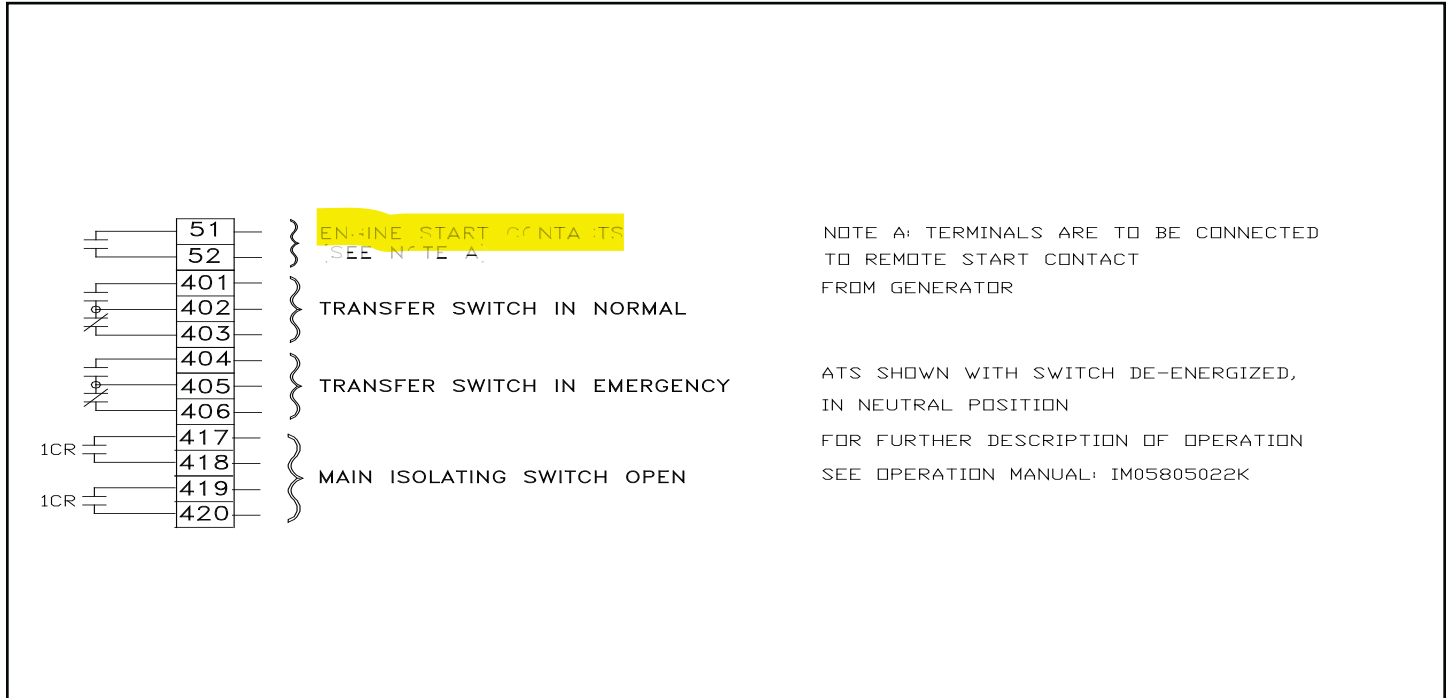
Alarm / Relay Outputs



Typical Controller Connection



Electrical Wiring Schematic



Technical Data and Specifications

Line Terminals (Incoming Cables)

	Line Terminals on Main Isolation Switch (Incoming Cables)						
	LINE VOLTAGE					Qty. & Cable Sizes	Service Entrance GND. LUG Qty. & Cable Sizes
	200 - 208	220 - 240	*380 - 415	440 - 480	550 - 600		
Max HP	25	30	40	60	75	(1)#14-1/0 PER Ø (CU/AL)	(1)#14-2/0 (CU/AL)
	40	50	75	100	100	(1)#4-4/0 PER Ø (CU)	(1)#4-350MCM (CU/AL)
	75	75	150	200	200	(1)#3-350MCM PER Ø (CU/AL)	(1)#4-350MCM (CU/AL)
	100	125	200	250	300	(2)3/0-250MCM PER Ø (CU/AL)	(2)1/0-750MCM (CU/AL)
	150	200	350	400	400	(2)250-350MCM PER Ø (CU/AL)	(2)1/0-750MCM (CU/AL)



March 2010

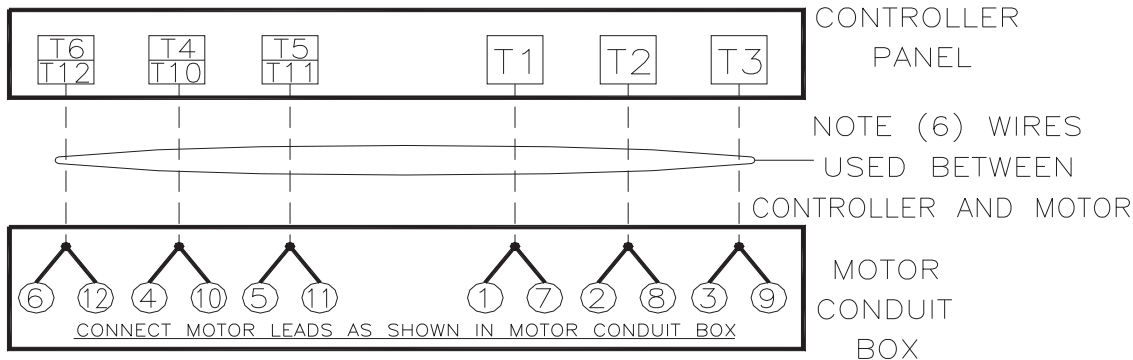


Electric Motor Connections

NOTE: 6 motor leads required.

NOTE: Field verify motor connections.

Wye-Delta Lower Nameplate Voltage

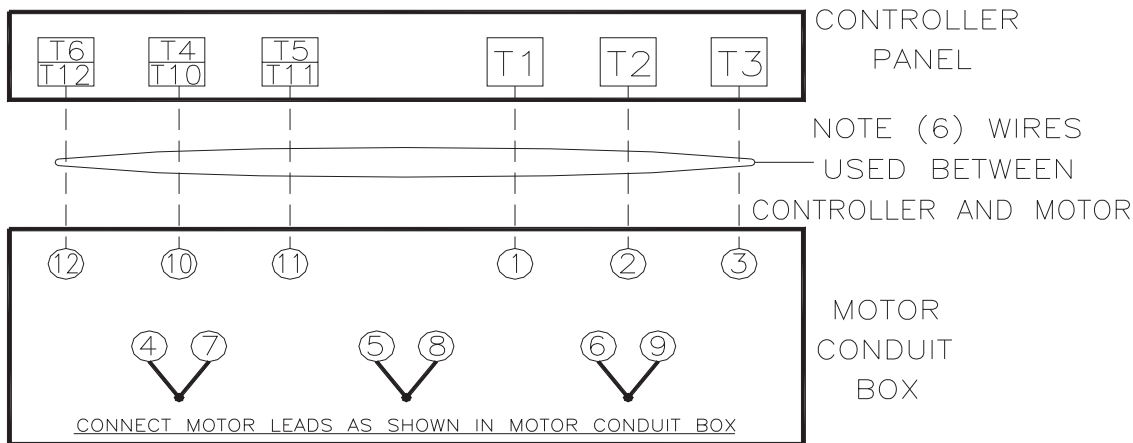


NOTE:

1. MOTOR CONNECTIONS VARY PLEASE REFER TO SPECIFIC MOTOR MANUFACTURER'S CONNECTION DIAGRAM.

→ **2. FOR SINGLE VOLTAGE 12 LEAD MOTORS USE LOWER VOLTAGE CONNECTION DIAGRAM**

Wye-Delta Higher Nameplate Voltage



NOTE:

1. MOTOR CONNECTIONS VARY PLEASE REFER TO SPECIFIC MOTOR MANUFACTURER'S CONNECTION DIAGRAM.

→ **2. FOR SINGLE VOLTAGE 12 LEAD MOTORS USE LOWER VOLTAGE CONNECTION DIAGRAM**



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A-C FIRE PUMP SYSTEMS

DIMENSIONS AND ENGINEERING DATA
VERTICAL MULTI STAGE JOCKEY PUMPS
e-SV SERIES

FP 4.0

PAGE 301

MAR 2011

SUPERSEDES ALL PREVIOUS ISSUES

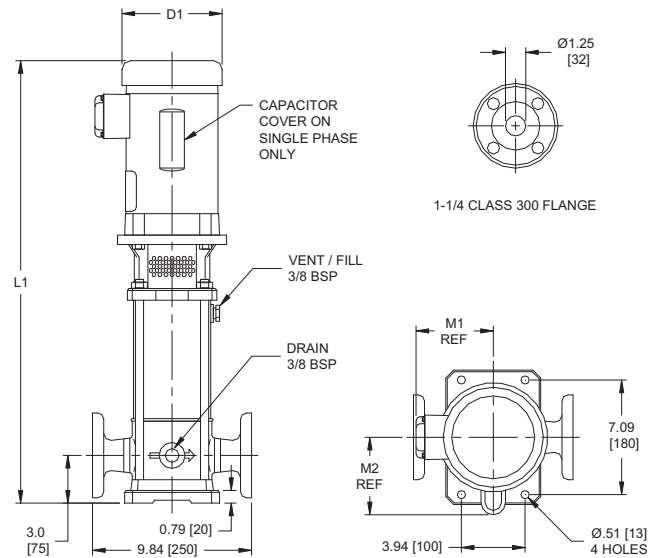
CONSTRUCTION:	304 STAINLESS STEEL
NOMINAL FLOW:	9 GPM
CAPACITIES:	2 - 12 GALLONS PER MINUTE
HEADS:	13 - 372 PSI TDH
STAGING:	2 - 30
MINIMUM FLOW:	2 GPM
MAXIMUM WORKING PRESSURE:	360 PSI (25 BAR) FOR THE ANSI FLANGE VERSION
TEMPERATURES:	STANDARD LIQUID TEMPERATURES FROM -20°F TO 250°F (-30°C TO 120°C)

1SV (e-SV)
60 Hz 3500 RPM**MOTOR**

- STANDARD NEMA TC FRAME MOTORS IN OPEN DRIP PROOF OR TOTALLY ENCLOSED FAN COOLED ENCLOSURES.
- STANDARD VOLTAGE:
 - SINGLE PHASE: 115-208/230V UP TO 3 HP OR 208-230V FOR 5 HP
 - THREE PHASE, 2 POLE: 208-230/460V, 60 HZ UP TO 75 HP

COMPONENT	MATERIAL
PUMP BODY	AISI 304 STAINLESS STEEL
IMPELLER	AISI 304 STAINLESS STEEL
DIFFUSER	AISI 304 STAINLESS STEEL
CASING	AISI 316L STAINLESS STEEL
SHAFT	AISI 316 STAINLESS STEEL
ADAPTER	ASTM CLASS 35/40B CAST IRON
BASE	A384.0-F ALUMINUM
COUPLING	A384.0-F ALUMINUM
SEAL PLATE	AISI 316L STAINLESS STEEL
ELASTOMERS	VITON (OPT. EPDM)
COUPLING GUARD	AISI 304 STAINLESS STEEL
SHAFT SLEEVE AND BUSHING	TUNGSTEN CARBIDE
FILL/DRAIN PLUGS	AISI 316 STAINLESS STEEL
TIE RODS	A29 GR. 1045 CARBON STEEL / ZINC PLATED
WEAR RING	PPS
SEAL GLAND	AISI 316 STAINLESS STEEL

MECHANICAL SEAL			
CODE NO.	ROTATING FACE 1	STATIONARY FACE 2	ELASTOMERS 3
0	CARBON	SILICON CARBIDE GRAPHITE FILLED	VITON



STAGE	MOTOR					DIMENSIONS (IN.)								WEIGHT (LBS.)				
	HP	NEMA FRAME				L1				M (REF.)	D1 (MAX.)				PUMP & MOTOR			
		ODP 1Φ	ODP 3Φ	TEFC 1Φ	TEFC 3Φ	ODP 1Φ	ODP 3Φ	TEFC 1Φ	TEFC 3Φ		TEFC 1Φ	ODP 1Φ	TEFC 3Φ	ODP 3Φ	TEFC 1Φ	ODP 1Φ	TEFC 3Φ	ODP 3Φ
5	1/2	56C				21.68		21.81		5.19	6.19				44	44	42	42
7	3/4	56C				24.88	23.25	24.00	23.38	5.19	6.19				54	52	46	46
9	1	56C				26.33	24.83	26.86	24.96	5.74	7.19	6.19			66	58	49	49
11	1 1/2	56C				27.91		28.43	27.15	5.74	7.19	6.19			68	60	56	58
13		56C				29.88		30.40	29.12	5.74		6.19			71	63	59	61
15		56C				31.46		31.98	30.70	5.74		6.19			73	65	61	63
17	2	56C				33.54		34.42	33.15	5.74	7.19		6.19		88	80	70	69
19		56C				35.12		36.00	34.73	5.74					90	82	72	71
20		56C				35.91		36.79	35.52	6.52					91	83	73	72
22	3	56C				37.87	37.48	39.74	37.46	5.75	7.19	6.62	7.19	7.16	106	91	86	83
24		56C				38.66	38.27	40.53	38.25	5.75					110	95	90	87
26		56C				41.42	41.03	43.29	41.01	6.53					112	97	92	89
28		56C				42.99	42.60	44.86	42.58	6.53					114	99	94	91
30		56C				44.56	44.17	46.43	44.15	7.31					115	100	95	92

NOT FOR CONSTRUCTION, INSTALLATION OR APPLICATION PURPOSES UNLESS CERTIFIED.

CERTIFIED FOR:

CUSTOMER ORDER NO:				IDENTIFICATION NO:				FLANGES	
PUMP DATA	SIZE	MODEL	CURVE NO.	GPM	HEAD (FT)	ROTATION		SUCTION	DISCHARGE
	1.25x1.25	e1SV	7	10	65 PSI	CW		300 #	300 #
MOTOR DATA	HP	RPM	VOLTS	PHASE	HERTZ	FRAME SIZE		ENCLOSURE	
	3/4	3450	460	3	60	56C		TEFC	
SHOP ORDER:				CERTIFIED BY:				DATE	

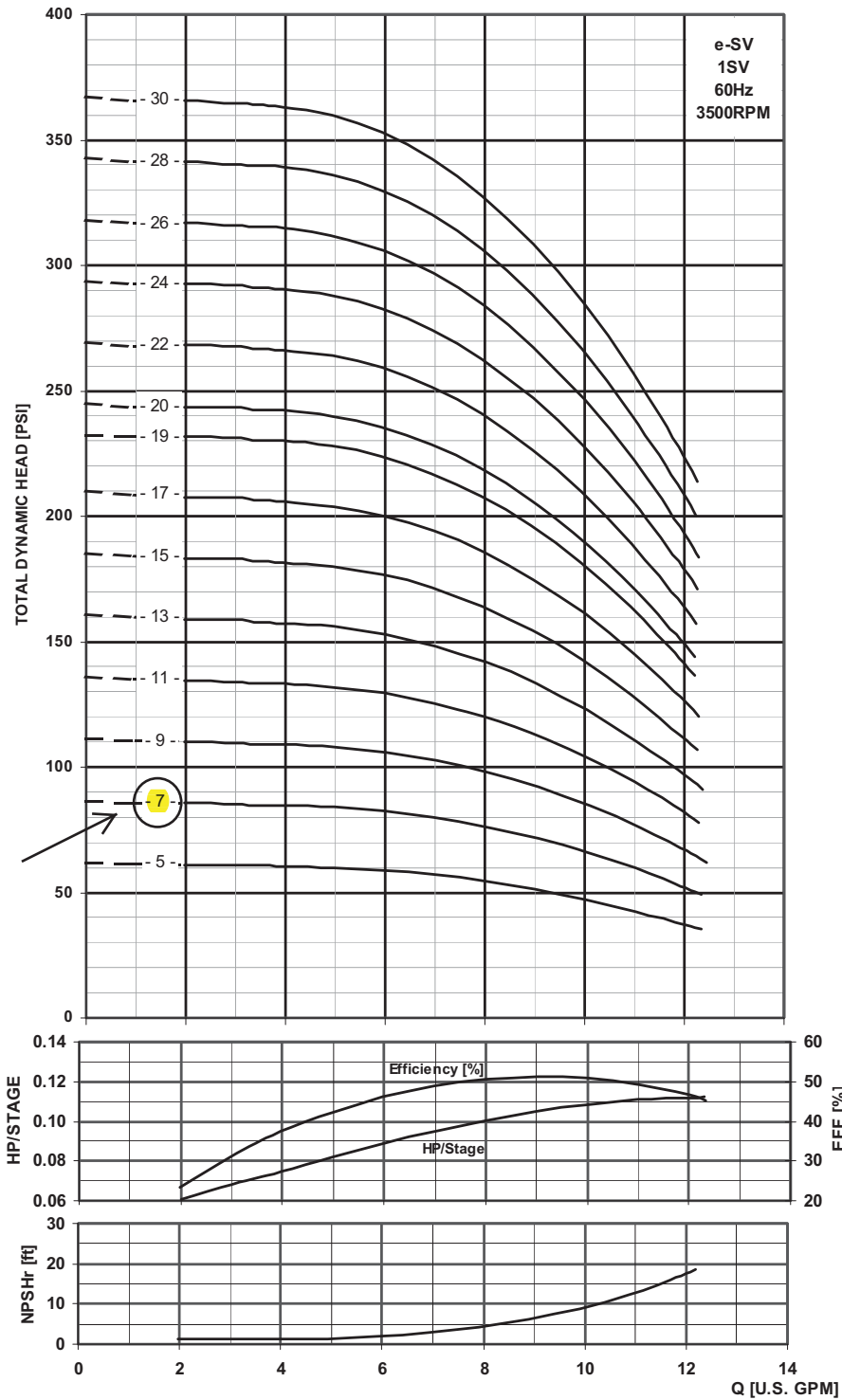


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A-C FIRE PUMP SYSTEMS
PERFORMANCE – CURVES
VERTICAL MULTI STAGE JOCKEY PUMPS
e-SV SERIES

MAR 2011

SUPERSEDES ALL PREVIOUS ISSUES



213900 - Controllers for Fire-Pump Drivers

Part Number / Options Selection Guide XTJP / XTJY Jockey Pump Controllers

XTJP XTJY

3 / 4		D	L1		
Horsepower (KW)				Options	
1/3	(0.25)			C1	Extra Contacts "Pump Run"
1/2	(0.373)			C2	Extra Contacts "AC Power Failure"
3/4	(0.56)			E1	NEMA 3R - Raintight Enclosure
1	(0.75)			E2	NEMA 4 - Watertight Enclosure
1.5	(1.1)			E3	NEMA 12 - Industrial Dust Tight Enclosure
2	(1.5)			E5	NEMA 4X - Stainless Steel Enclosure
3	(2.25)			E8	Tropicalization
4	(2.94)			E9	NEMA 4X - Painted Steel
5	(3.75)			E10	NEMA 4X - 316 Stainless Steel Enclosure
7.5	(5.6)			EX	Export Crating
10	(7.5)			POL	"Power-On" Light
15	(11)			PRL	"Pump Run" Light
20	(15)			P7	Low Suction Pressure Switch and Alarm Pilot Light
25	(18.6)			P8	Low Suction Shutdown (Requires P7)
30	(22)			P10	Pressure Switch (0-500psi) - Sea Water
40	(30)			R1	Space Heater (120 / 220V)
50	(37)			R2	Space Heater c/w Thermostat
				R3	Space Heater c/w Humidistat
				S	Sequential Start
				T	Running Period Timer
				Z	Elapsed Run Time Meter
Voltage				Languages	
A =	200 - 208V 60 HZ			L1	English Language *
B =	220 - 240V 60 HZ			L2	French Language *
C =	380 - 50 / 60 HZ			L5	Spanish Language *
D =	440 - 480V 60 HZ			L11	Turkish Language *
E =	550 - 600V 60 HZ				
F =	415 - 50 / 60 HZ				
G1 =	120V Single Phase (XTJP only)				
G2 =	240V Single Phase (XTJP only)				

* Other languages available. Consult factory for details.



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XTJP / XTJY Jockey Pump Controllers

Typical Jockey Pump Controller Specifications

Approvals

The Jockey Pump Controller shall meet the requirements of the latest edition of NFPA 20 as well as meeting CE mark requirements. It shall meet or exceed the requirements of UL 508 [Underwriters Laboratories (UL)] standards and be approved by [Canadian Standards Association (CSA)].

Starting Type

The controller shall be Across-the-Line or ~~Wye-Delta (Star-Delta)~~ type designed for full voltage starting.

Ratings

The Controller shall have a minimum withstand rating of 10,000 symmetrical amperes @ ~~[208V] [240V] [380V] [400V] [415V] [480V] [600V] [120V Single Phase] [240V Single Phase]~~

The horsepower rating of the controller shall not exceed 50Hp for three (3) phase units or 10Hp on single phase units.

Construction

The controller shall include a combination Circuit Breaker / Overload Motor Protector.

The motor circuit protector shall be mechanically interlocked such that the enclosure door cannot be opened when the handle is in the on position except by a tool operated defeater mechanism.

The controller manufacturer shall manufacture the contactor, motor circuit protector, touchscreen display, and enclosure. Brand-labeled components will not be accepted.

Supply Voltage

The jockey pump controller shall auto-detect three phase voltage supply from 200VAC to 600VAC, 50/60Hz and single phase from 110VAC to 240VAC, 50/60Hz, without the use of a control transformer.

Coil Voltages

The jockey pump controller shall have the following available coil voltages
120VAC 50/60 Hz or 24VDC

Enclosure

The controller shall be housed in a NEMA Type 2 (IEC IP11) drip-proof, powder baked finish, freestanding enclosure.

Optional Enclosures

1. NEMA 3R (IEC IP14) rain-tight enclosure.
2. NEMA 4 (IEC IP66) watertight enclosure.
3. NEMA 4X (IEC IP66) watertight 304 stainless steel enclosure.
4. NEMA 4X (IEC IP66) watertight 316 stainless steel enclosure.
5. NEMA 4X (IEC IP66) watertight corrosion resistant enclosure.
6. NEMA 12 (IEC IP52) dust-tight enclosure.

Languages

The controller shall be available in a variety of languages including, but not limited to:
English, French, Spanish, Portuguese, Turkish.

Touchscreen Display

The controller shall be supplied with a color touchscreen display that shall indicate the following: Supply Voltage on all phases, Current Pressure, Start Pressure and Stop Pressure.

The touchscreen display shall be supplied with a solid-state 4-20mA pressure sensor. The pressure Start and Stop points shall be adjustable in increments of one (1) PSI or 0.1 BAR.

The touchscreen display shall be a door-mount type that permits exterior programming with the controller door secured.

Options

The jockey pump controller shall have provision to be supplied with the following options:

- C1 Extra Contacts " Pump Run"
- C2 Extra Contacts "AC Power Failure"
- CX Extra Contacts (One Form-C; Specify Function)
- E1 NEMA 3R – Raintight Enclosure
- E2 NEMA 4 – Watertight Enclosure
- E3 NEMA 12 – Industrial Dust Tight Enclosure
- E5 NEMA 4X – 304 Stainless Steel Enclosure
- E8 Tropicalization
- E9 NEMA 4X - Painted Steel
- E10 NEMA 4X - 316 Stainless Steel Enclosure
- EX Export Crating
- FTS Extra Contacts "Fail to Start"
- LX Virtual LED (Specify Description)
- POL "Power On" Virtual LED
- PRL "Pump Run" Virtual LED
- P7 Low Suction Pressure Switch and Alarm Virtual LED
- P8 Low Suction Shutdown (Requires P7)
- P10 Pressure Transducer – Sea Water
- R1 Space Heater (120 / 220V)
- R2 Space Heater c/w Thermostat
- R3 Space Heater c/w Humidistat

Manufacturer

The controller shall be of the XTJP Across-the-Line or XTJY Wye Delta (Star-Delta) type as manufactured by EATON.

Jockey Pump Controllers



Microprocessor Based with Color Touchscreen



Product Description

ACROSS THE LINE

JOCKEY PUMP CONTROLLERS

The JOCKEY Touch - Jockey Pump Controllers operate across-the-line. Full voltage is applied to the motor for starting by the use of a single motor starter. Starting inrush current is approximately 600% of rated full load amperes.

WYE-DELTA (Star-Delta)

JOCKEY PUMP CONTROLLERS

When six or twelve-lead delta connected jockey pump motors are started wye (star) connected, approximately 58% of line voltage is applied to each winding. The motor develops 33% of full-voltage starting torque and draws 33% of normal locked-rotor current from the line. After an adjustable time delay (during which the motor accelerates), it is reconnected for normal operation.

Product Features

Combination Motor Controllers

All JOCKEY Touch controllers are supplied with EATON combination motor controllers, which combine the circuit breaker and overload in one device.



Sealed Rotary Handle Mechanism

The rotary handle mechanism can be padlocked in the OFF position.

XT Power Controls

The JOCKEY Touch - Jockey Pump Controllers incorporate Eaton's XT Power Controls which are designed for the global marketplace. The XT controls carry global ratings, are small in size and are available in a wide variety of operating voltages. They are easy to install and maintain, due to their modular, plug-in design.

Universal Supply Voltage

The controllers will auto-detect three phase voltage supply from 200VAC to 600VAC, 50/60Hz and single phase from 110VAC to 240VAC, 50/60Hz, without the use of a control transformer.

NEMA 2 Enclosures

Enclosures have an oven baked powder paint finish and are supplied with NEMA 2 rating, unless otherwise ordered. Available options include: NEMA 3R, 4, 4X, 12.

Programmable Functions

Inputs, Outputs, Timers and Virtual LED's are programmable via the touchscreen display.

Starting Methods

There are four methods of starting the controller: Auto, Hand, Remote Start and Pump Start.

Diagnostics / Statistics

Eight diagnostics and seven statistics parameters can be monitored.

Alarm Setpoints

Four alarm setpoints can be programmed from the Alarm Setpoints sub-menu.

Color Touchscreen Display

The JOCKEY Touch - Jockey Pump Controllers are supplied with a microprocessor based, color touchscreen. The touchscreen display allows the user to monitor and program functions and values.

Pressure input is provided by a 4-20mA pressure sensor.



Technical Data

ACROSS-THE-LINE (Direct On Line)

JOCKEY PUMP CONTROLLERS

Line Voltage						
200-208V	220-240V	380-415V	440-480V	550-600V	120V-1Ph	240V-1Ph
Motor Horsepower						
1/3-20Hp	1/3-20Hp	1/3-40Hp	1/3-50Hp	1/3-50Hp	1/3-2Hp	1/3-5Hp

WYE-DELTA (Star-Delta)

JOCKEY PUMP CONTROLLERS

Line Voltage				
200-208V	220-240V	380-415V	440-480V	550-600V
Motor Horsepower				
1/3-40Hp (0.74-29.42Kw)	1/3-40Hp (0.74-29.42Kw)	1/3-50Hp (0.74-36.78Kw)	1/3-50Hp (0.74-36.78Kw)	1/3-50Hp (0.74-36.78Kw)

Standards & Certification

The JOCKEY Touch - Jockey Pump Controllers meet the requirements of the latest edition of NFPA 20 as well as meeting CE mark requirements. They meet or exceed the requirements of UL 508 [Underwriters Laboratories (UL)] and are approved by [Canadian Standards Association (CSA)].



Powering Business Worldwide

Microprocessor - Color Touchscreen Display

Supply Voltage

3 phase – 200VAC to 600VAC, 50/60Hz
1 phase – 110VAC to 240VAC, 50/60Hz
True RMS measurement of 3 phase voltage inputs

Power Supply Output

Two 24VDC outputs
1 Power the pressure sensor
2 Energize the contactor coil

Ratings

NEMA 4 / 4X

Memory

Programmed settings saved in Non Volatile memory

Battery Backup

Real Time Clock kept intact during power failures

Ambient Temperature Rating

0C to 55C

Languages *

English
French
Spanish
Portuguese
Turkish

* Other languages available - consult factory for details

USB Port

Download Message History
Upload Firmware Updates

Programmable Inputs (2)

Each input can be programmed for one of seven different functions.

1 Interlock
2 Motor Overload
3 Fail to Start
4 Remote Start
5 Pump Start
6 Input = Output
7 Disabled

Programmable Outputs (2)

Each output can be programmed for one of twenty three different functions.

1 Power On	13 Undervoltage
2 Pump Run	14 Transducer Failure
3 Hand Mode	15 Motor Overload
4 Off Mode	16 Common Alarm
5 Auto Mode	17 Acceleration Timer
6 Low Pressure Alarm	18 Remote Start
7 High Pressure Alarm	19 Pump Start
8 Below Start Point	20 Interlock On
9 Phase Reversal	21 Input #1
10 Phase Failure	22 Input # 2
11 Fail to Start	23 Disabled
12 Undervoltage	

Timers (5)

Programmable Types

1 Minimum Run Timer
2 Sequential Start Timer
3 Pump Run Restart Timer
4 Acceleration Timer
5 Fail to Start Timer

Virtual LED's (2)

Programmable Functions (22)

1 Power On	12 Undervoltage
2 Pump Run	13 Overvoltage
3 Hand Mode	14 Transducer Failure
4 Off Mode	15 Motor Overload
5 Auto Mode	16 Common Alarm
6 Low Pressure Alarm	17 Remote Start
7 High Pressure Alarm	18 Pump Start
8 Below Start Point	19 Interlock On
9 Phase Reversal	20 Input #1
10 Phase Failure	21 Input # 2
11 Fail to Start	22 Disabled

Programmable Indication (5)

1 Red
2 Orange
3 Yellow
4 Green
5 Blue

Operation

Starting Methods (4)

1 Auto
2 Hand
3 Remote Start
4 Pump Start

Alarm Set Points (4)

1 Phase Reversal
2 Phase Failure
3 Over Voltage Alarm
4 Under Voltage Alarm

Message History (10K)

Messages time and date stamped

Diagnostics (8)

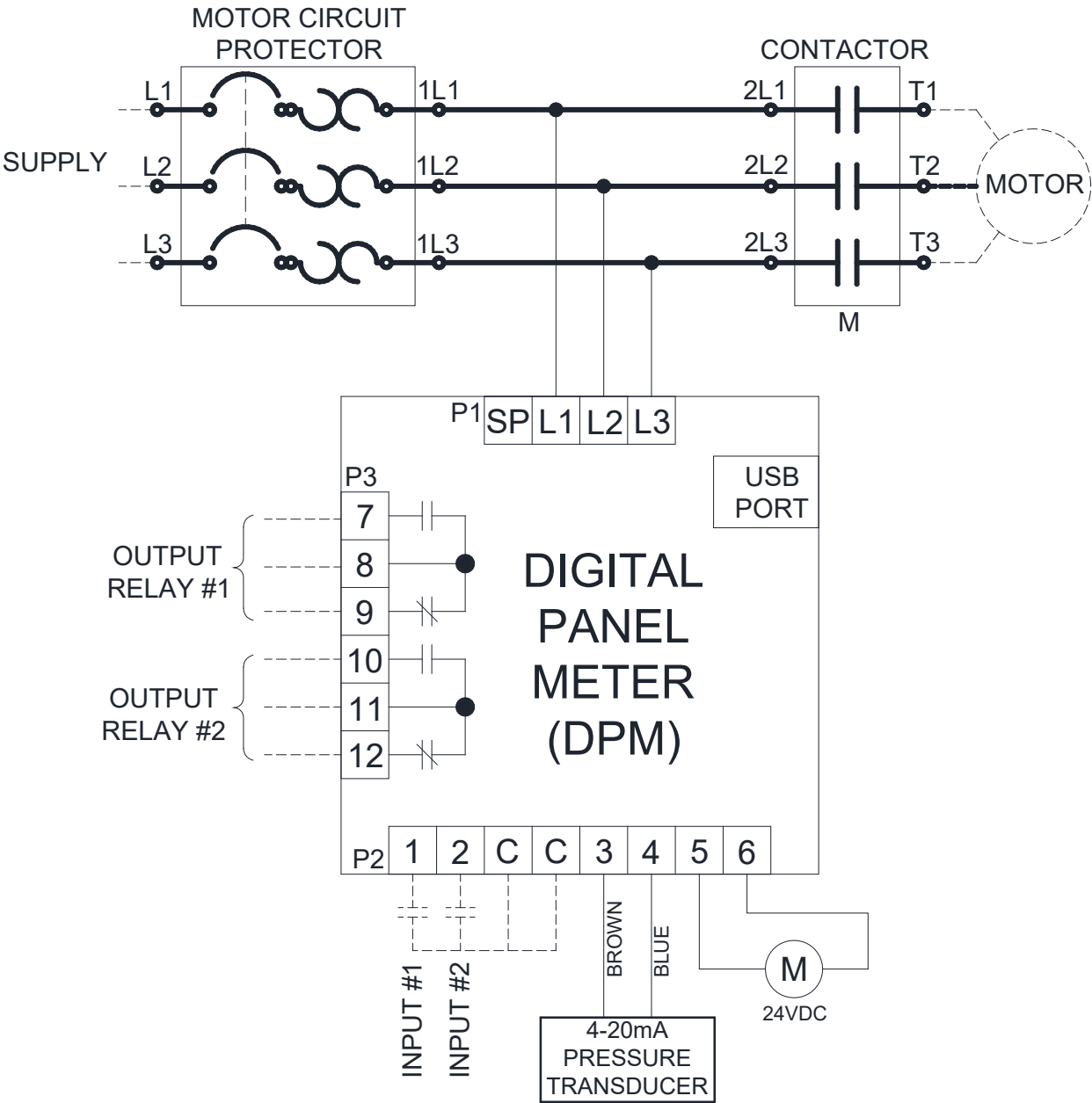
1 Firmware Version
2 Transducer Output
3 Transducer Current 1
4 Transducer Current 2
5 Input #1 Status
6 Input #2 Status
7 Relay #1 Status
8 Relay #2 Status
9 24VDC Output

Statistics (7)

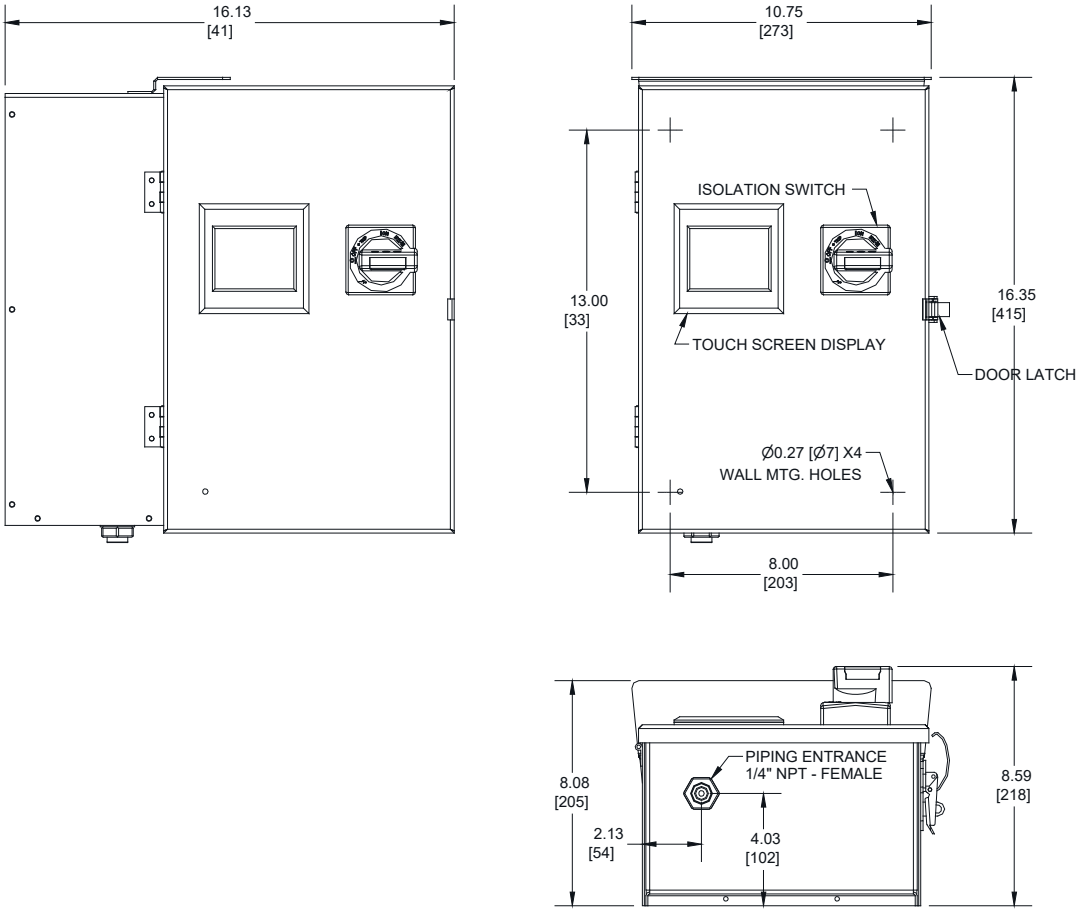
1 Total Powered Time
2 Pump Run Total Time
3 Motor Starts
4 Minimum Voltage
5 Maximum Voltage
6 Minimum Pressure
7 Maximum Pressure



JOCKEY
Touch™



JOCKEY
Touch™



200-208V		220-240V		380-415V		440-480V		550-600V	
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)
0.33 - 0.75	50	0.33 - 0.75	50	0.33 - 1.5	50	0.33 - 2	50	0.33 - 7.5	50
1 - 2	65	1 - 3	65	2 - 5	65	3 - 5	65	10 - 30	10 *
3 - 4	42	4 - 5	42	7.5	42	7.5 - 10	42		
5 - 10	18	7.5 - 10	18	10 - 15	18	15 - 20	18		

120V 1ph		208V 1ph		240V 1ph		Approx. Weight
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Lbs (Kg)
0.33 - 0.5	65	0.33 - 1	65	0.33	50	18 (8)
0.75 - 1	42	1.5 - 2	42	0.5 - 1.5	65	
1.5 - 2	18	3 - 4	18	2	42	
				3 - 5	18	

- NOTES:
- 1. * Upstream circuit breaker required to maintain kA rating.
 - 2. All enclosures finished in FirePump red.
 - 3. Cable Entrance either top or bottom.
 - 4. Standard Enclosure type NEMA 2

SPECIFICATIONS

PUMP TEST CONNECTION

Cast brass body with end inlet, size and number of outlets as selected by model number. Brass plate lettered "PUMP TEST CONNECTION," Brass NRS hose gate valves with loose bonnets, 3" female, NPT inlet x 2-1/2" Male hose thread outlet, with caps and chains.

VARIATIONS

-1 - Ductile Iron Body with red glossy polyester coating. Inlet size, location and number of outlets as selected by model number and as indicated on Variation Chart.

-2, -3 - Brass or ductile iron body. Inlet size, location and number of outlets as selected by model number and as indicated on Variation Chart.

-4, -5 - Square four way brass or ductile iron body. Back or angle inlet as selected and indicated on Variation Chart.

-6 - Male 2-1/2" hose thread snoots with cap and chain instead of affixed valves. Number of outlets as selected by model number and as indicated on Variation Chart.

-7 - Male 2-1/2" hose thread snoots, caps and chains, and removable swivel hose gate valves.

MODEL SELECTION

- ☐ 5862
☐ 5863
☒ **5864 6" X 4 Way**
☐ 5865

VARIATION SELECTION

BODY MATERIAL:

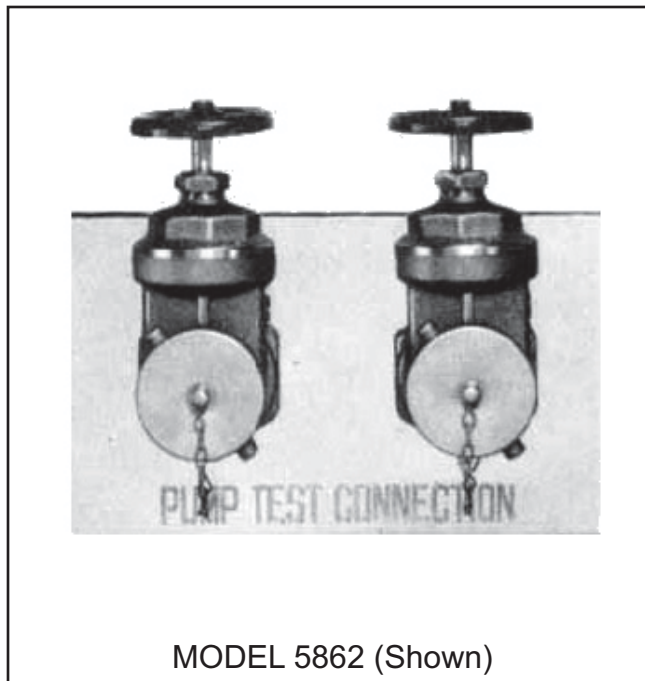
- ☐ -1 Ductile Iron
☒ **-1.5 Steel**

BODY INLET: **Confirm Inlet Style**

- ☐ -2 Back
☒ **-3 Angle**
☐ -4 Square Back, Brass or Ductile
☐ -5 Square Angle, Brass or Ductile

OUTLETS:

- ☐ -6 Male Snoots, Caps, and Chains
☐ -7 Male Snoots, Caps, and Chains and Removable Swivel Hose Gate Valves (Valves normally furnished rough brass)



PRODUCT OPTIONS

FINISHES:

- ☐ -B Polished Brass
☐ -C Polished Chrome Trim, Rough Chrome Valves
☒ **-D Polished Chrome Plated**

THREADS:

- ☒ **N.S.T.**
☐ Other _____

Call Potter Roemer - Fire Pro for current listings and approvals. Dimensions are subject to manufacturer's tolerance and may change without notice. Potter Roemer - Fire Pro assumes no responsibility for use of void or superseded data. © Copyright Potter Roemer - Fire Pro, Member of Morris Group International™ Please visit potterroemer.com for most current specifications.

5862-5865 SERIES Date: 07/09/15

MEMBERSHIP



FIRE EQUIPMENT
MANUFACTURERS'
ASSOCIATION



CASPE
American Society of
Plumbing Engineers

ONFSA
NATIONAL FIRE SPRINKLER ASSOCIATION, INC.



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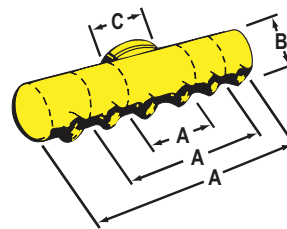
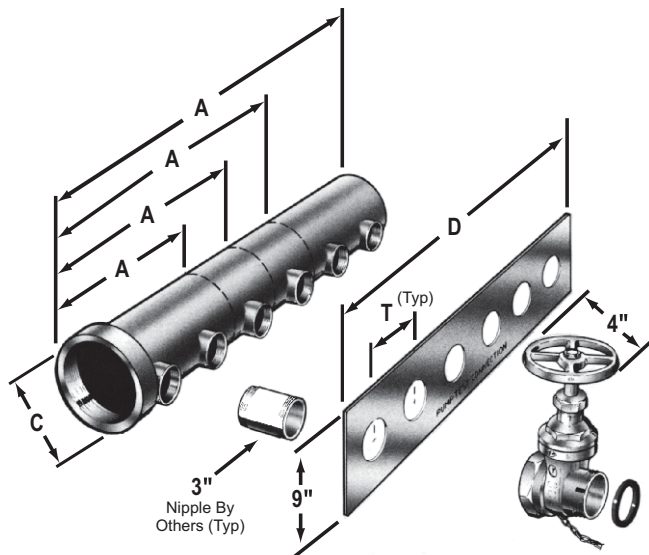
www.potterroemer.com

AVAILABLE VARIATIONS BY MODEL NUMBER

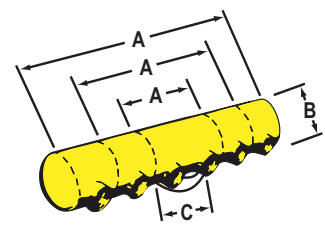
Suffix No.	Model No.			
	5862	5863	5864	5865
Body Material				
-1 Ductile	Yes	No	Yes	No
Body Inlet				
-2 Back	Yes	No	Yes	Yes
-3 Angle	Yes	No	Yes	Yes
-4 Sq. Back, Brass or Ductile	No	No	Yes	No
-5 Sq. Angle, Brass or Ductile	No	No	Yes	No
Outlets				
-6 Male Snoots, Caps, and Chains	Yes	Yes	Yes	Yes
-7 Male Snoots, Caps and Chains, and Removable Swivel Hose Gate Valves	Yes	Yes	Yes	Yes

MODEL DIMENSIONS

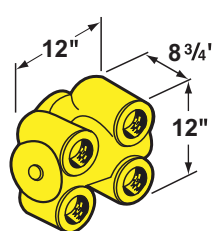
Model No.	Pump Size G.P.M.	Inlet Size	Number Outlets	A	B	C	D
5862	500	4"	2	15-1/4"	5-1/4"	6"	16"
5863	750	6"	3	22-1/4"	6-1/4"	6-3/4"	23"
5864	1000	6"	4	28-3/4"	7-3/4"	7-3/4"	30"
5865	2000	8"	6	43"	7-3/4"	9-3/4"	44"



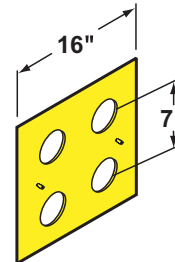
-2 BACK INLET



-3 ANGLE INLET



**-4 SQUARE BODY
BACK INLET**



**-5 SQUARE BODY
ANGLE INLET**

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5862-5865 SERIES Date: 07/09/15

MEMBERSHIP



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ASSOCIATION



ONFSA
NATIONAL FIRE SPRINKLER ASSOCIATION, INC.



POTTER ROEMER/FIRE PRO

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Miami (866) 961-3473
Dallas (866) 644-3473

www.potterroemer.com

55L-60 — MODEL —

Pressure Relief Valve/ Pump Casing Relief Valve



- **UL Listed**
- **Factory Mutual Approved**
- **UL Listed/FM Approved for use as a fire pump casing relief valve**
- **Direct Acting - Precise Pressure Control**
- **Positive Dependable Opening**
- **Drip Tight Closure**
- **No Packing Glands or Stuffing Boxes**
- **Sensitive to Small Pressure Variations**

The Cla-Val Model 55L-60 (**UL Listed, FM approved**) Pressure Relief Valve is a direct-acting, spring loaded, diaphragm type relief valve. The valve may be installed in any position and will open and close within very close pressure limits. The bottom plug may be removed and installed in the inlet to convert it to an angle pattern flow path.

The Model 55L-60 is normally held closed by the force of the compression spring above the diaphragm. When the controlling pressure applied under the diaphragm exceeds the spring setting, the disc is lifted off its seat, permitting flow through the control. When control pressure drops below the spring setting, the spring forces the control back to its normally closed position. The controlling pressure is applied to the chamber beneath the diaphragm through an internal passage. Gauge Port is provided for accurate pressure setting.

Pressure adjustment is done by turning the adjusting screw to vary the spring load on the diaphragm. The 55L-60 is available in pressure ranges suited to agency approval tests. To prevent tampering, the adjustment cap can be wire sealed by using the lock wire holes provided in the cap and cover.

Available in a wide range of materials including nickel aluminum bronze and stainless steel.
Certified to meet low lead requirements



Fire Protection System Service

The **Model 55L-60** is typically used in a fire protection system to trim water pressure, thus preventing pressure build-up whenever line pressure exceeds the setting of the spring.

The 55L-60 will relieve excess pressure to atmosphere to prevent damage to the distribution network.

NOTE: Model 55L-60 is not suitable for discharging the full-rated pump capacity of a fire pump. See Model 50B-4KG1 Fire Pump Relief Valve for such applications.

Typical Application for Fresh Water or Seawater Service



Fire Pump Casing Relief Valve

Specifications

Size	3/4" Threaded NPT
Temperature Range	Water, Air: to 180°F Max.
Materials	
Body & Cover:	Cast Bronze UNS C87850 Stainless Steel ASTM A743-CF-16Fa
Trim:	303 Stainless Steel
Rubber:	Buna-N® Synthetic Rubber
Pressure Ratings	Cast Bronze 400 psi Max. Stainless Steel 400 psi Max.
Other Materials	Available on special order
Adjustment Ranges	
UL Listed & FM Approved	0 to 75 psi 20 to 200 psi 100 to 300 psi
UL Listed	20 to 175 psi

UL Listed/FM Approved 55L-60 Range psi	Approximate Increase for Each Clockwise Turn of Adjusting Screw
0 to 75	8.5 psi
20 to 200	28.0 psi
100 to 300	18.0 psi

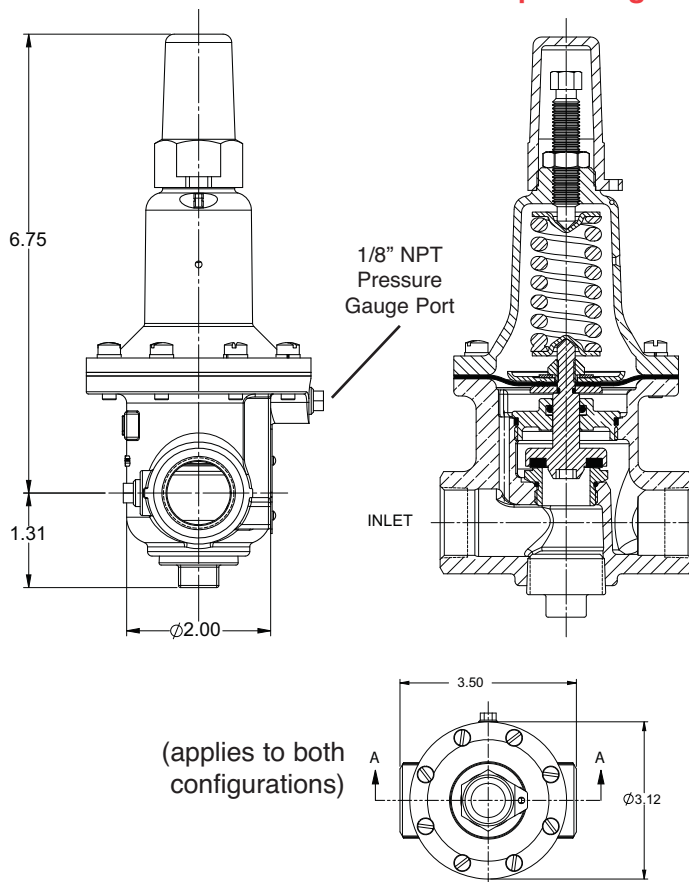
Pressure Drop Chart (Full Open Valve)

Valve Size	C _v Factor	Flow of Water - Gallons Per Minute				
		5	10	16	20	30
1/2"	6	0.7	2.7	6	11	--
3/4"	8.5	0.3	1.4	3.1	5.5	12.2

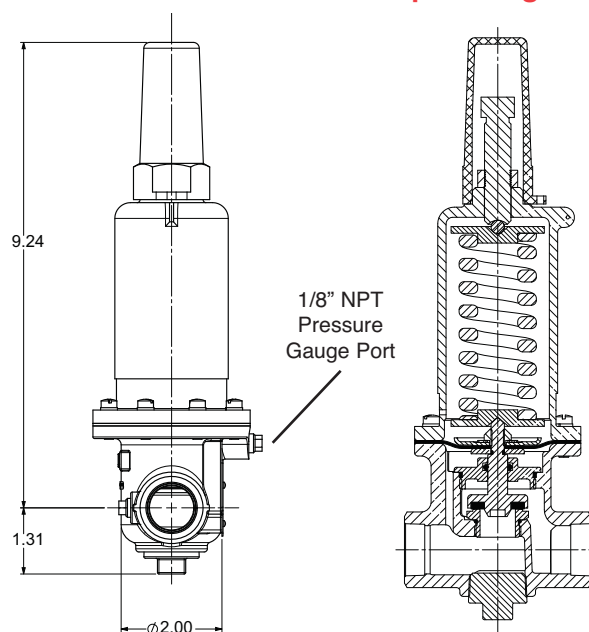
When Ordering, Please Specify

1. Catalog No. 55L-60
2. Valve Size
3. Adjustment Range Desired
4. Optional Materials

Dimensions: 0 to 75 and 20 to 200 psi design



Dimensions: 100 - 300 psi design



E-55L-60 (R-05/2014)

CLA-VAL

PO Box 1325 Newport Beach CA 92659-0325
800-942-6326 • Fax: 949-548-5441 • Web Site: cla-val.com • E-mail: claval@cla-val.com

CLA-VAL CANADA

4687 Christie Drive
Beamsville, Ontario
Canada L0R 1B4
Phone: 905-563-4963
Fax: 905-563-4040
E-mail: sales@cla-val.ca

CLA-VAL EUROPE

Chemin des Mésanges 1
CH-1032 Romanel/
Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50
E-mail: cla-val@cla-val.ch

CLA-VAL UK

Dainton House, Goods Station Road
Tunbridge Wells
Kent TN11 2 DH England
Phone: 44-1892-514-400
Fax: 44-1892-543-423
E-mail: info@cla-val.co.uk

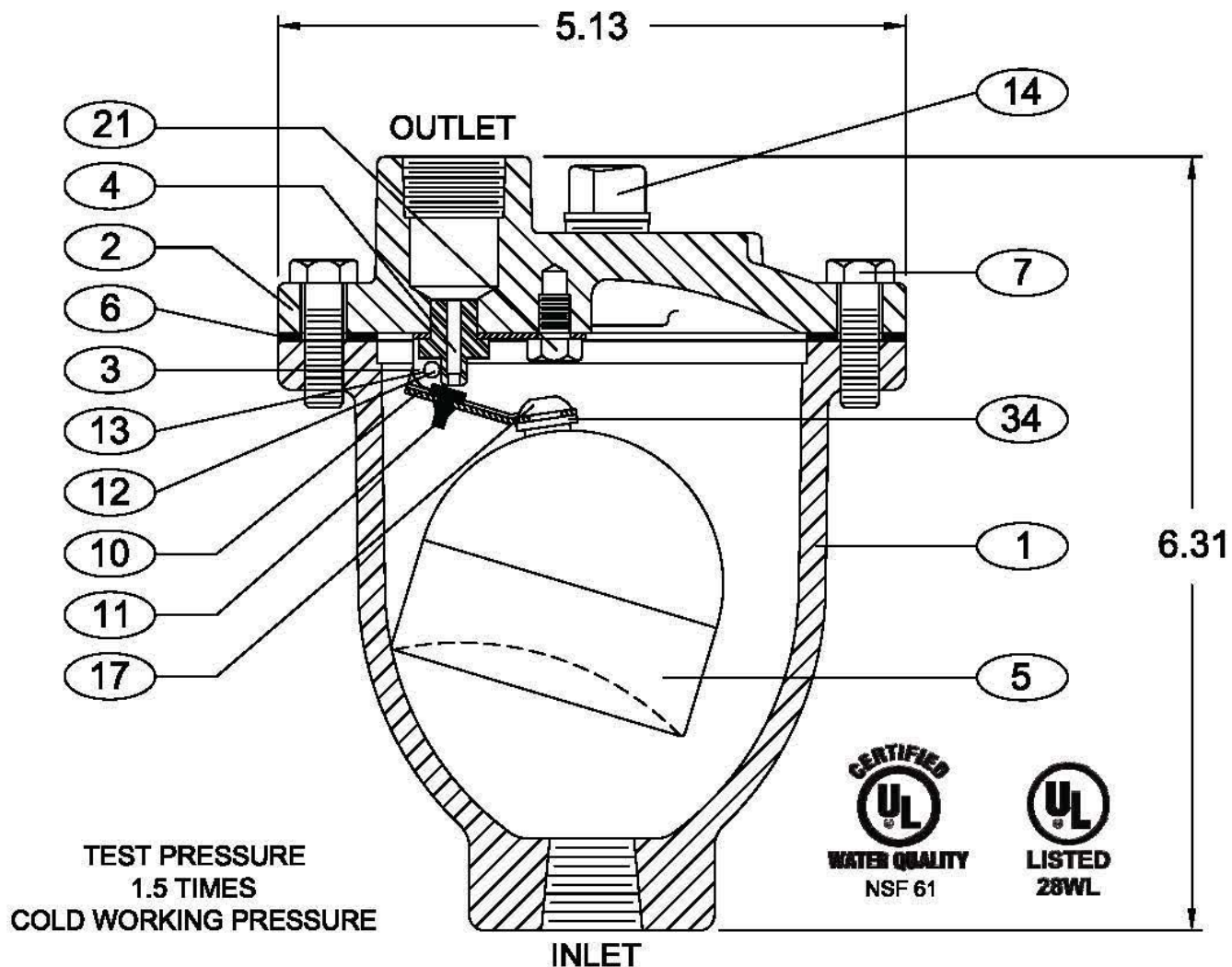
CLA-VAL FRANCE

Porte du Grand Lyon 1
ZAC du Champ du Pérrier
France - 01700 Neyron
Phone: 33-4-72-25-92-93
Fax: 33-4-72-25-04-17
E-mail: cla-val@cla-val.fr

CLA-VAL PACIFIC

45 Kennaway Road
Woolston, Christchurch, 8023
New Zealand
Phone: 64-39644860
Fax: 64-39644786
E-mail: gnuthall@cla-val.com

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SEE DRAWING NO. VM-22-M FOR STANDARD MATERIALS OF CONSTRUCTION

VALVE SIZE	MODEL NUMBER	INLET SIZE	OUTLET SIZE	MAX. W.P. P.S.I.	ORIFICE SIZE
1/2" - 3/4"	22.4	3/4" NPT	1/2" NPT	175	3/32"
1"	22.3	1" NPT	1/2" NPT	175	3/32"
1/2"	22.7	1/2" NPT	1/2" NPT	300	1/16"
→ 1/2"-3/4"-1"	22.9	1" NPT	1/2" NPT	300	1/16"

WHEN MULTIPLE SIZE INLETS ARE INDICATED FOR A SPECIFIC MODEL NUMBER, THE VALVE IS THREADED FOR THE LARGEST SIZE INDICATED AND A REDUCER BUSHING IS PROVIDED FOR THE SMALLER SIZES.

- | | |
|---------------|-------------------------------|
| 1 BODY | 11 ORIFICE BUTTON |
| 2 COVER | 12 PIVOT PIN |
| 3 LEVER FRAME | 13 RETAINING RING (NOT SHOWN) |
| 4 SEAT | 14 PIPE PLUG |
| 5 FLOAT | 17 FLOAT RETAINER |
| 6 GASKET | 21 LOCATOR |
| 7 COVER BOLT | 34 LOCK WASHER |
| 10 FLOAT ARM | |



AIR RELEASE VALVE

DATE 1-18-11

VAL-MATIC

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VMC-22

ALLENCO®

Allenco Series AG-1000L

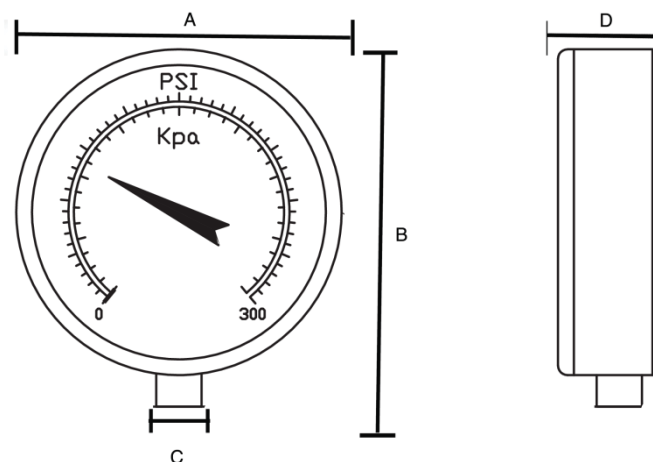
Liquid Filled Fire Pump Suction and Discharge Gauges

Our Allenco Series AG-1000L-FP liquid filled gauges were specifically designed for use with fire pumps. These high quality gauges are 1% accurate over the entire gauge range and are manufactured to conform to both ANSI B40.1 Grade 1A standards and NFPA 20-2013(14.2.6.1.2.2) as it relates to gauge accuracy requirements for field acceptance testing.

The standard glycerin filling helps dampen the effects of pump vibration while also lubricating the gauge movement which helps to extend the gauge life. Gauges are labeled on the dial face as "Fire Pump Suction" for the 30"/0/150 PSI range and "Fire Pump Discharge" for other available ranges.

Specifications

- Dial Size: 4"
- Connection Size: 1/4" (M) NPT
- Stainless Steel Case and Bezel
- Brass Internals and Connection
- Phosphor Bronze Bourdon Tube
- Liquid Filled
- Accuracy: 1%
- Dual Scale: PSI & BAR (x100=kPa)
- Ambient Temperature: 30°F to 160°F

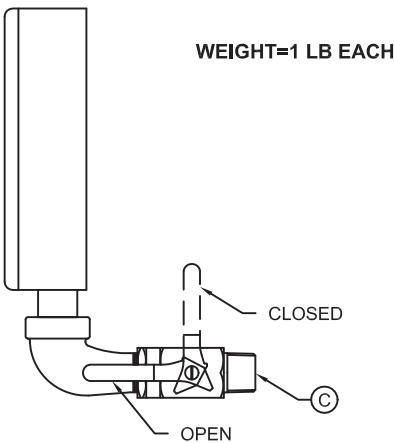
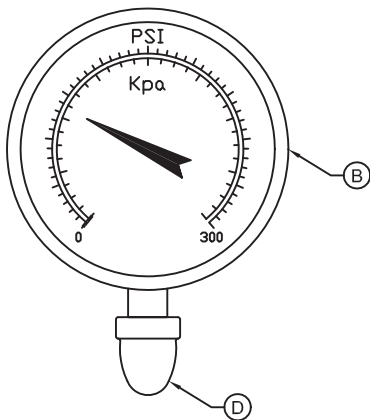
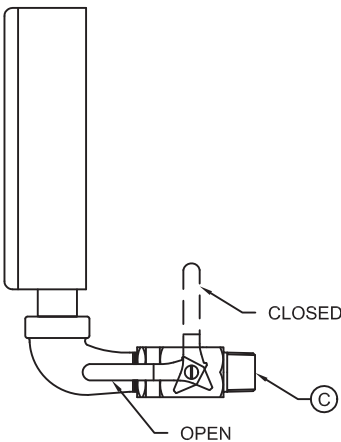
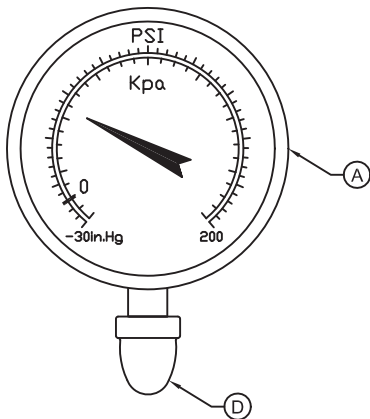


PSI Range	Major Inc.	Minor Inc.
30"/0/150	20	2
0/300	50	5
0/400	50	5
0/600	100	10

	A	B	C	D
In.	4.32"	5.57"	1/4"	1.25"
MM	110	141	MNPT	32



SUCTION AND DISCHARGE GAUGE ASSEMBLY



ITEM	DESCRIPTION
A	SUCTION PRESSURE GAUGE
B	DISCHARGE PRESSURE GAUGE
C	1/4" NPT TWO WAY BALL VALVE
D	1/4" NPT STREET ELBOW

NOT FOR CONSTRUCTION, INSTALLATION OR APPLICATION PURPOSES UNLESS CERTIFIED		
CERTIFIED FOR:		
CUSTOMER ORDER NO.:	TAG NO.	
SHOP ORDER:	CERTIFIED BY:	DATE:



CONNECTIONS (FDC) FLUSH FIRE PUMP TEXT CONNECTIONS AND VARIATIONS

Model/Series No.
**5862-5865
SERIES**

SPECIFICATIONS

PUMP TEST CONNECTION

Cast brass body with end inlet, size and number of outlets as selected by model number. Brass plate lettered "PUMP TEST CONNECTION," Brass NRS hose gate valves with loose bonnets, 3" female, NPT inlet x 2-1/2" Male hose thread outlet, with caps and chains.

VARIATIONS

-1 - Ductile Iron Body with red glossy polyester coating. Inlet size, location and number of outlets as selected by model number and as indicated on Variation Chart.

-2, -3 - Brass or ductile iron body. Inlet size, location and number of outlets as selected by model number and as indicated on Variation Chart.

-4, -5 - Square four way brass or ductile iron body. Back or angle inlet as selected and indicated on Variation Chart.

-6 - Male 2-1/2" hose thread snoots with cap and chain instead of affixed valves. Number of outlets as selected by model number and as indicated on Variation Chart.

-7 - Male 2-1/2" hose thread snoots, caps and chains, and removable swivel hose gate valves.

MODEL SELECTION

- ☐ 5862
- ☐ 5863
- ☒ 5864
- ☐ 5865

VARIATION SELECTION

BODY MATERIAL:

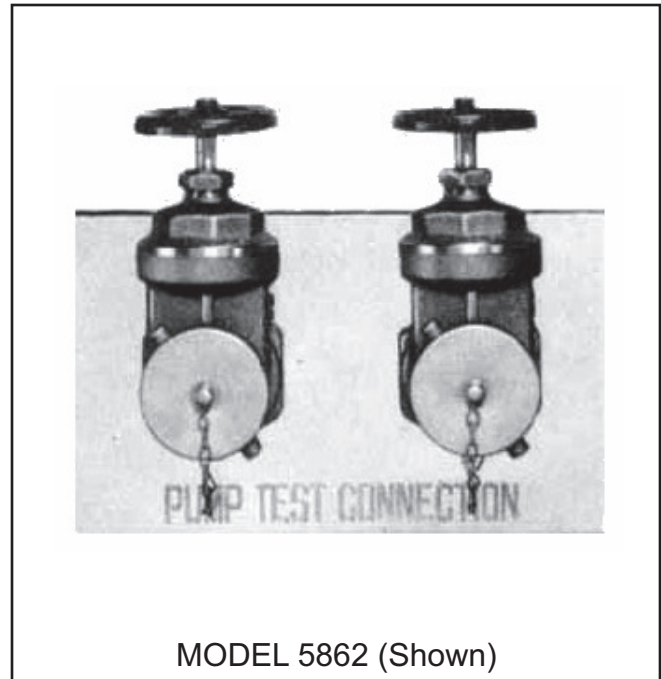
- ☐ -1 Ductile Iron
- ☐ -1.5 Steel

BODY INLET:

- ☐ -2 Back
- ☐ -3 Angle
- ☐ -4 Square Back, Brass or Ductile
- ☐ -5 Square Angle, Brass or Ductile

OUTLETS:

- ☒ -6 Male Snoots, Caps, and Chains
- ☐ -7 Male Snoots, Caps, and Chains and Removable Swivel Hose Gate Valves (Valves normally furnished rough brass)



PRODUCT OPTIONS

FINISHES:

- ☐ -B Polished Brass
- ☐ -C Polished Chrome Trim, Rough Chrome Valves
- ☒ -D Polished Chrome Plated

THREADS:

- ☒ N.S.T.
- ☐ Other _____

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5862-5865 SERIES Date: 07/09/15

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FIRE EQUIPMENT
MANUFACTURERS'
ASSOCIATION



ONFSA
NATIONAL FIRE SPRINKLER ASSOCIATION, INC.



POTTER ROEMER/FIRE PRO

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Los Angeles Area
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626-855-4890

Also in:
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Atlanta (800) 762-0542
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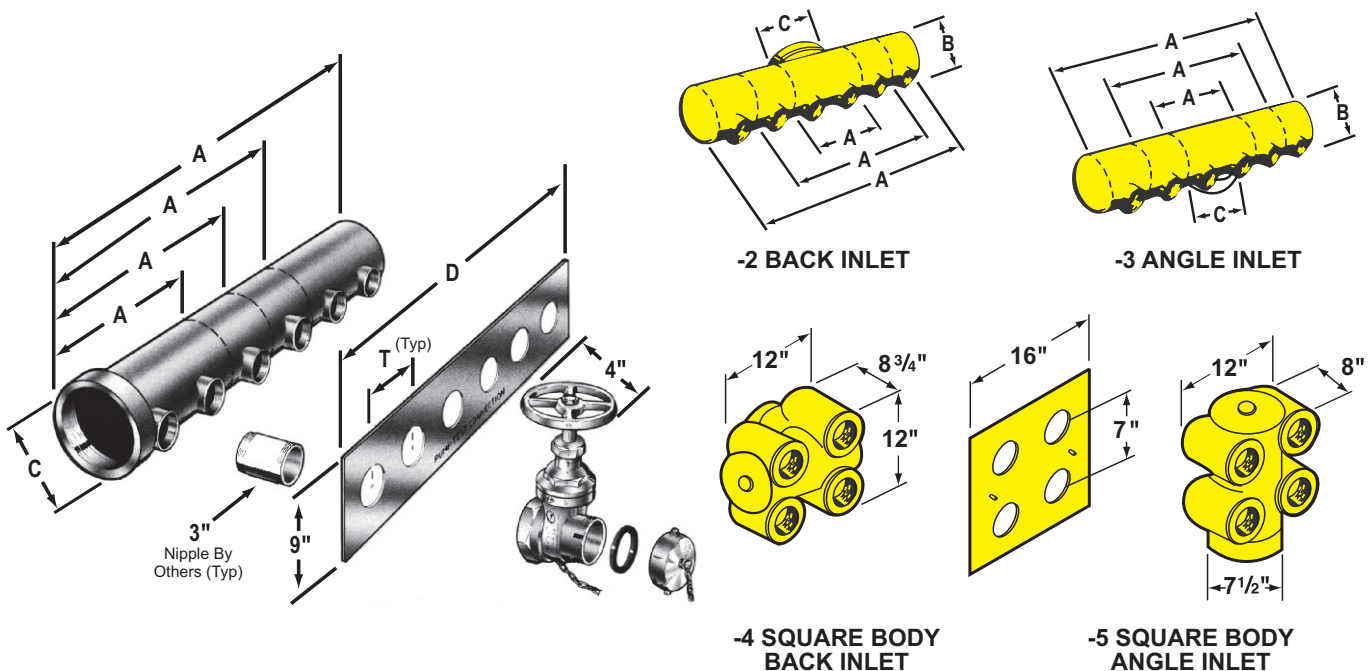
www.potterroemer.com

AVAILABLE VARIATIONS BY MODEL NUMBER

Suffix No.	Model No.			
	5862	5863	5864	5865
Body Material				
-1 Ductile	Yes	No	Yes	No
Body Inlet				
-2 Back	Yes	No	Yes	Yes
-3 Angle	Yes	No	Yes	Yes
-4 Sq. Back, Brass or Ductile	No	No	Yes	No
-5 Sq. Angle, Brass or Ductile	No	No	Yes	No
Outlets				
-6 Male Snoots, Caps, and Chains	Yes	Yes	Yes	Yes
-7 Male Snoots, Caps and Chains, and Removable Swivel Hose Gate Valves	Yes	Yes	Yes	Yes

MODEL DIMENSIONS

Model No.	Pump Size G.P.M.	Inlet Size	Number Outlets	A	B	C	D
5862	500	4"	2	15-1/4"	5-1/4"	6"	16"
5863	750	6"	3	22-1/4"	6-1/4"	6-3/4"	23"
5864	1000	6"	4	28-3/4"	7-3/4"	7-3/4"	30"
5865	2000	8"	6	43"	7-3/4"	9-3/4"	44"



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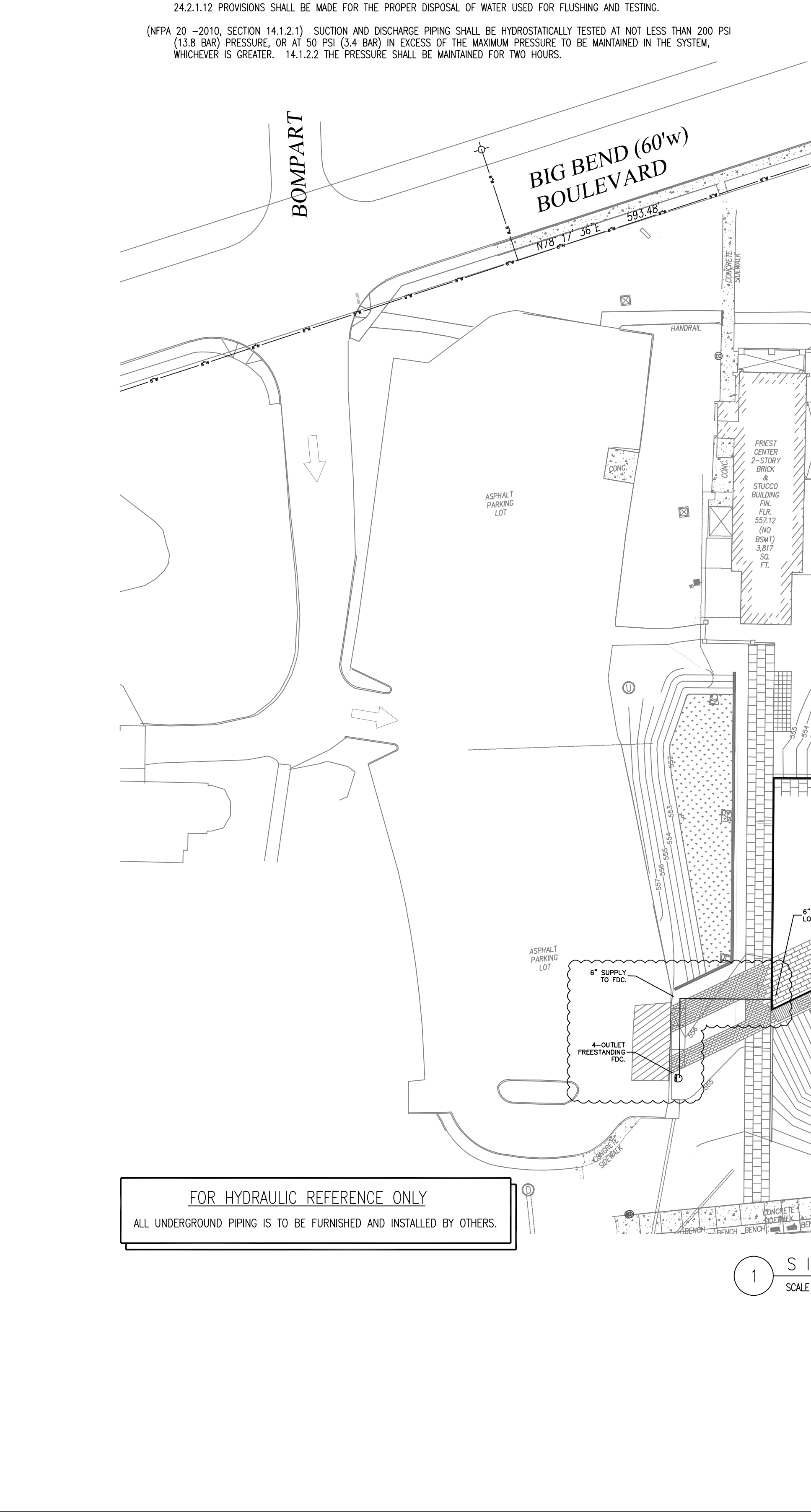
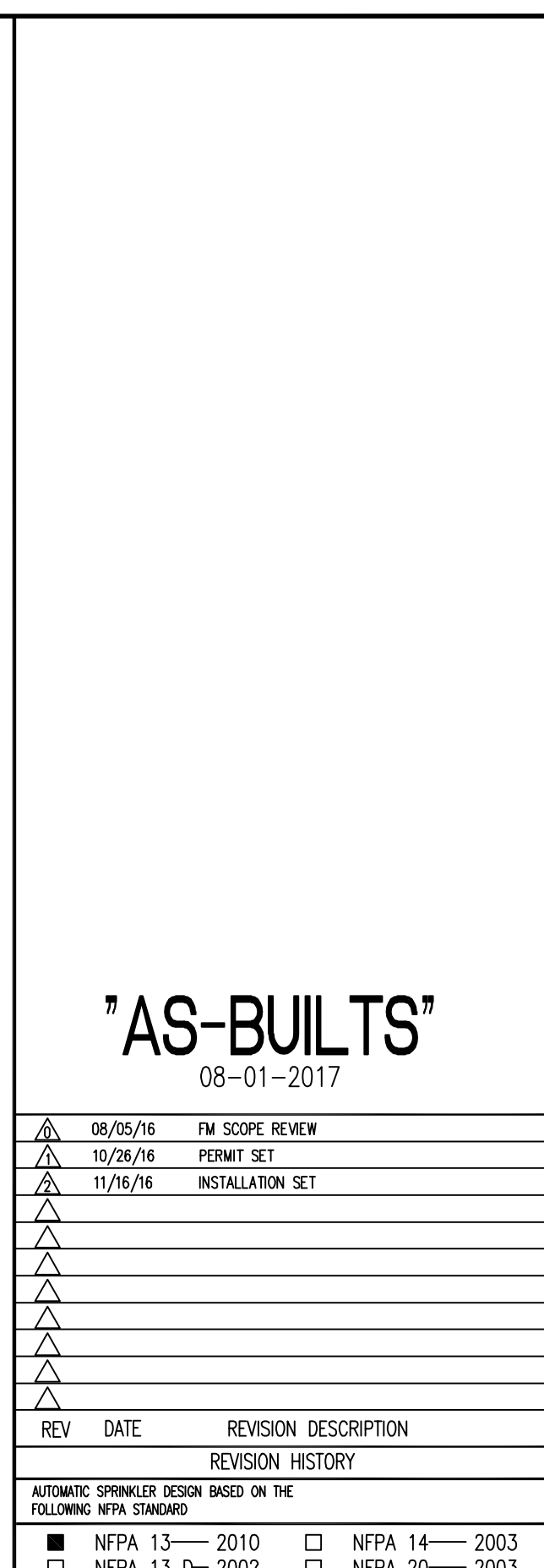
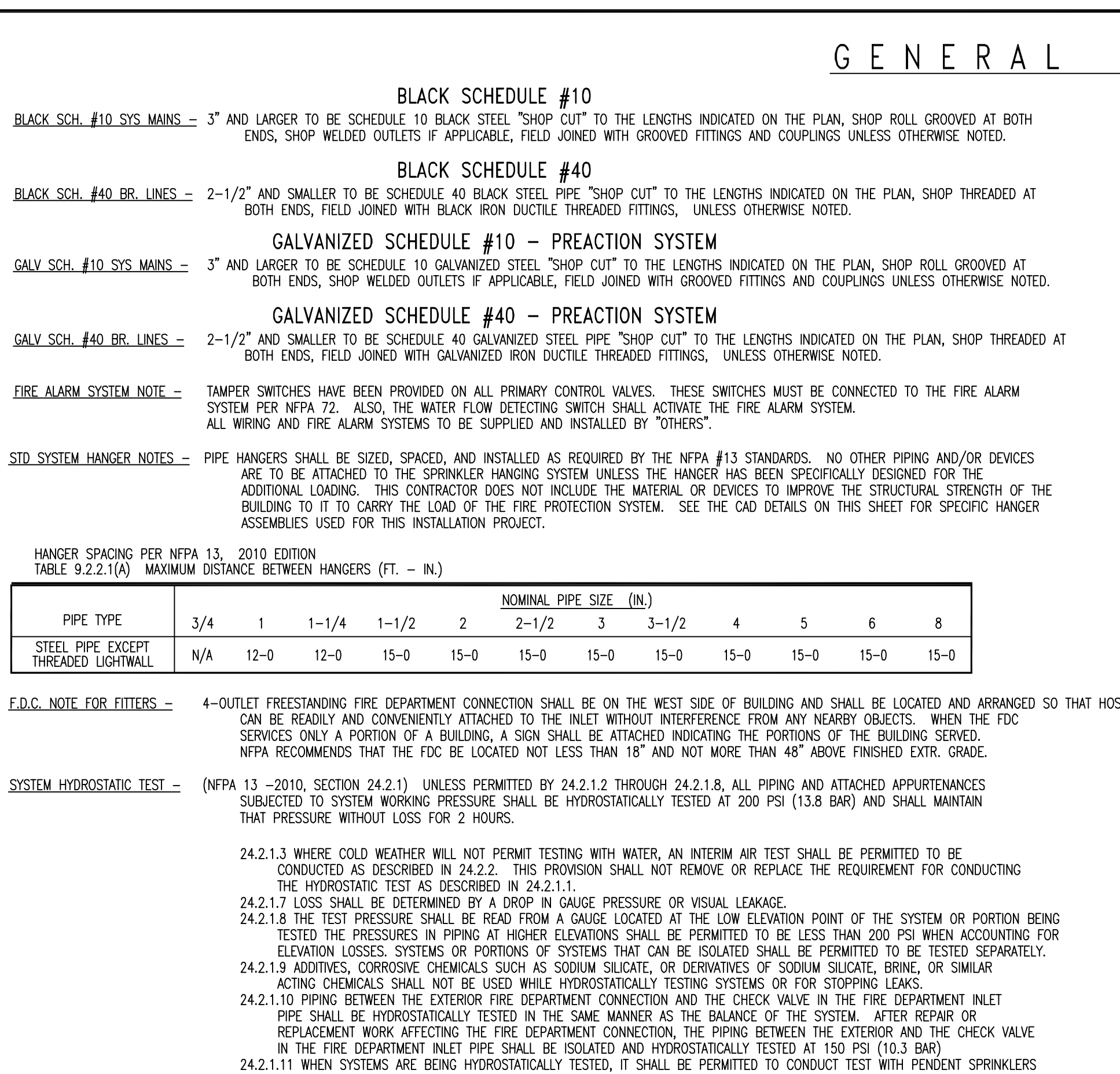


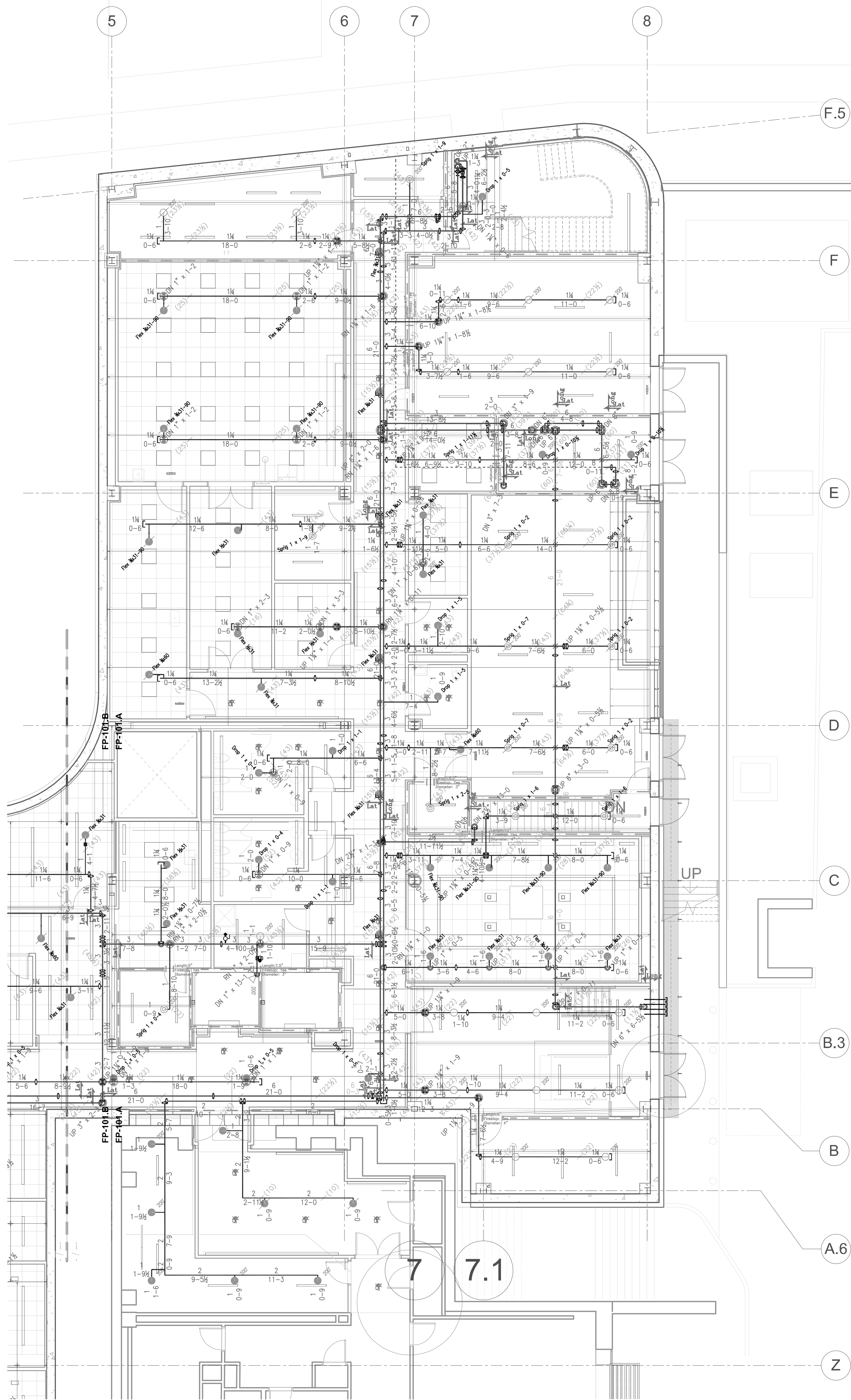
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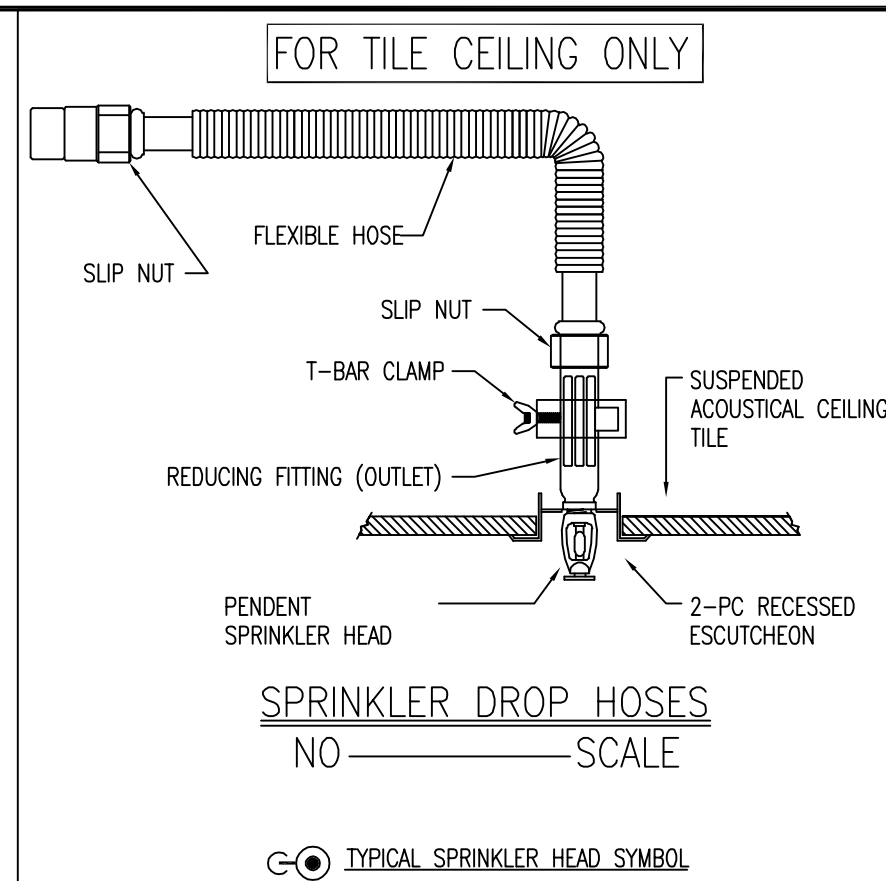
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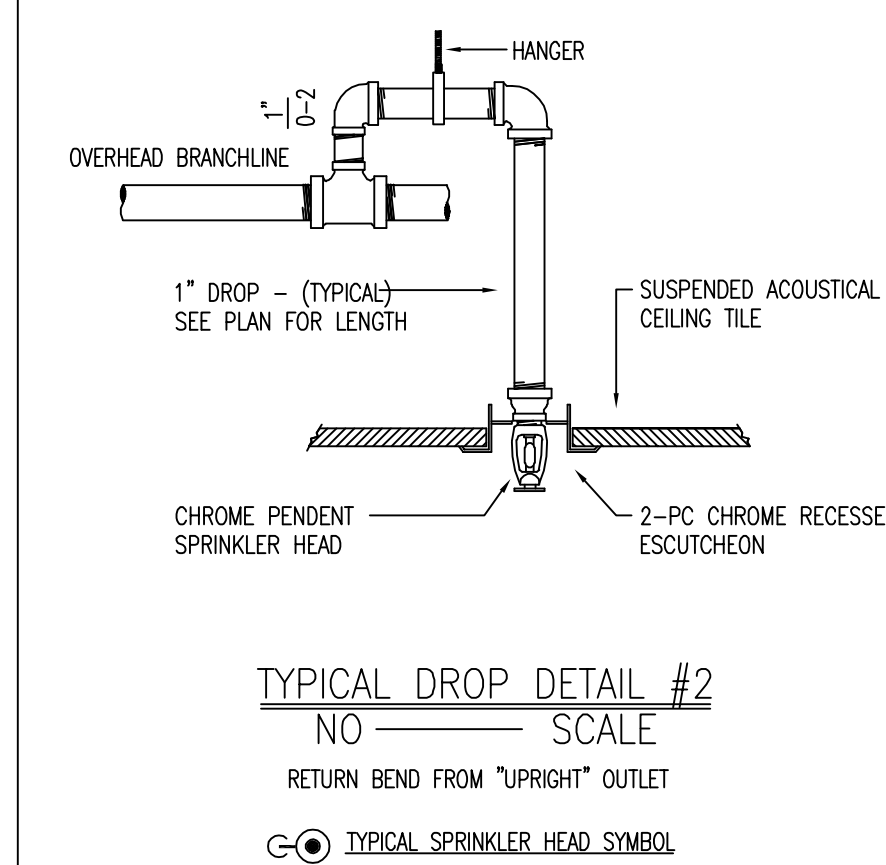


AUTOMATIC SPRINKLER SYSTEM PLAN
SCALE 1/8" = 1'-0"



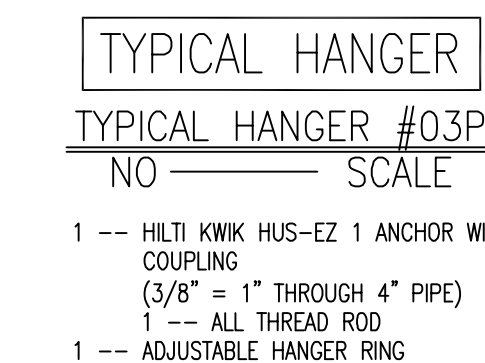
SPRINKLER DROP HOSES
NO SCALE

TYPICAL SPRINKLER HEAD SYMBOL



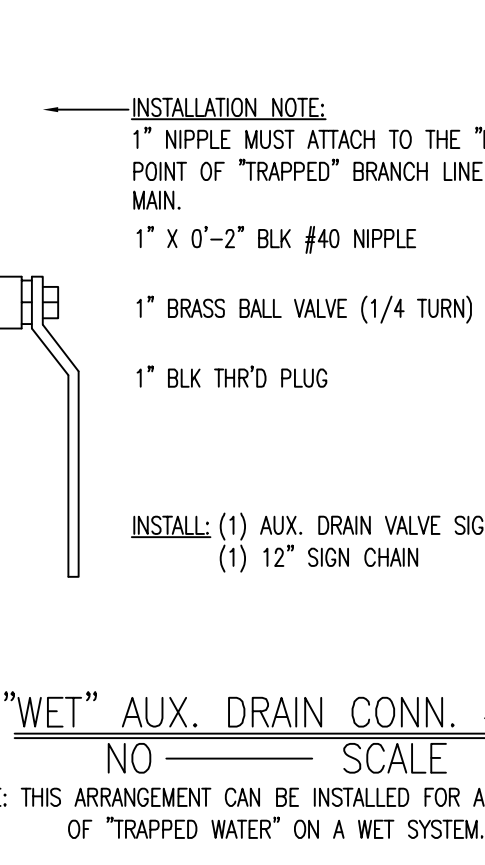
TYPICAL DROP DETAIL #2
NO SCALE

TYPICAL SPRINKLER HEAD SYMBOL



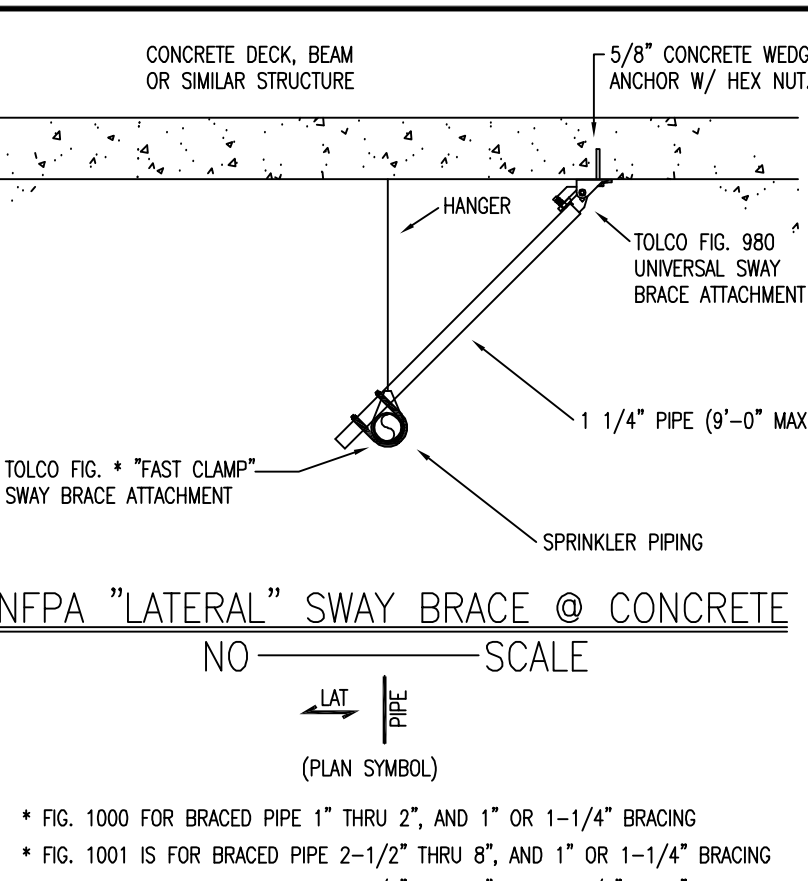
TYPICAL HANGER #03P
NO SCALE

- 1 --- 1/2\"/>



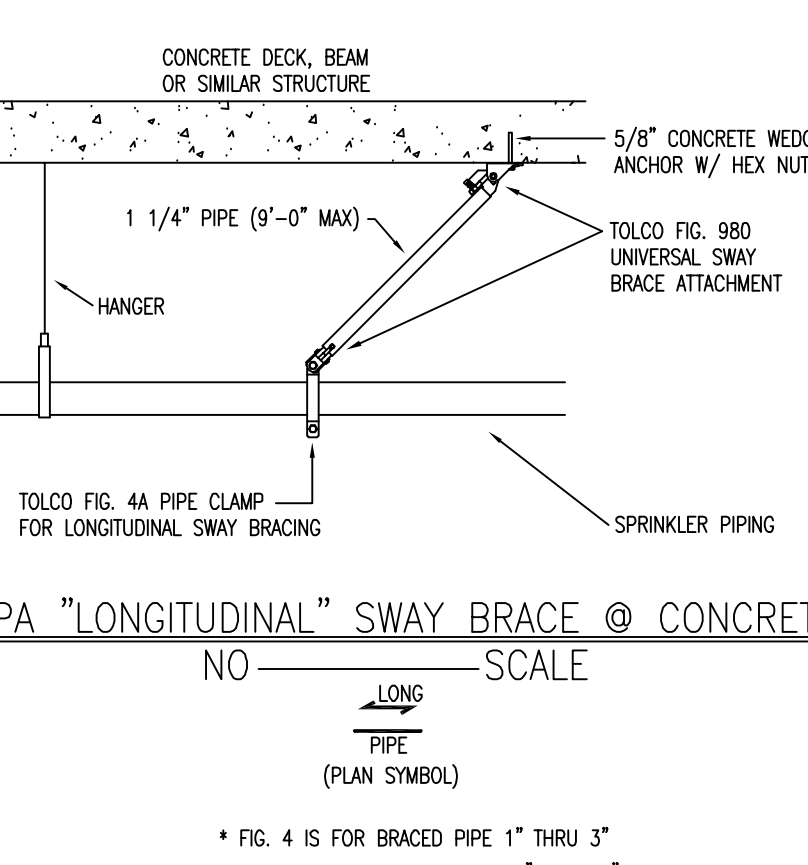
"WET" AUX. DRAIN CONN. #3A
NO SCALE

NOTE: THIS ARRANGEMENT CAN BE INSTALLED FOR ANY VOLUME OF "TRAPPED WATER" ON A WET SYSTEM.
AUX. DRAINS ARE INDICATED ON THE PLAN BY THIS SYMBOL:



NFPA "LATERAL" SWAY BRACE @ CONCRETE
NO SCALE

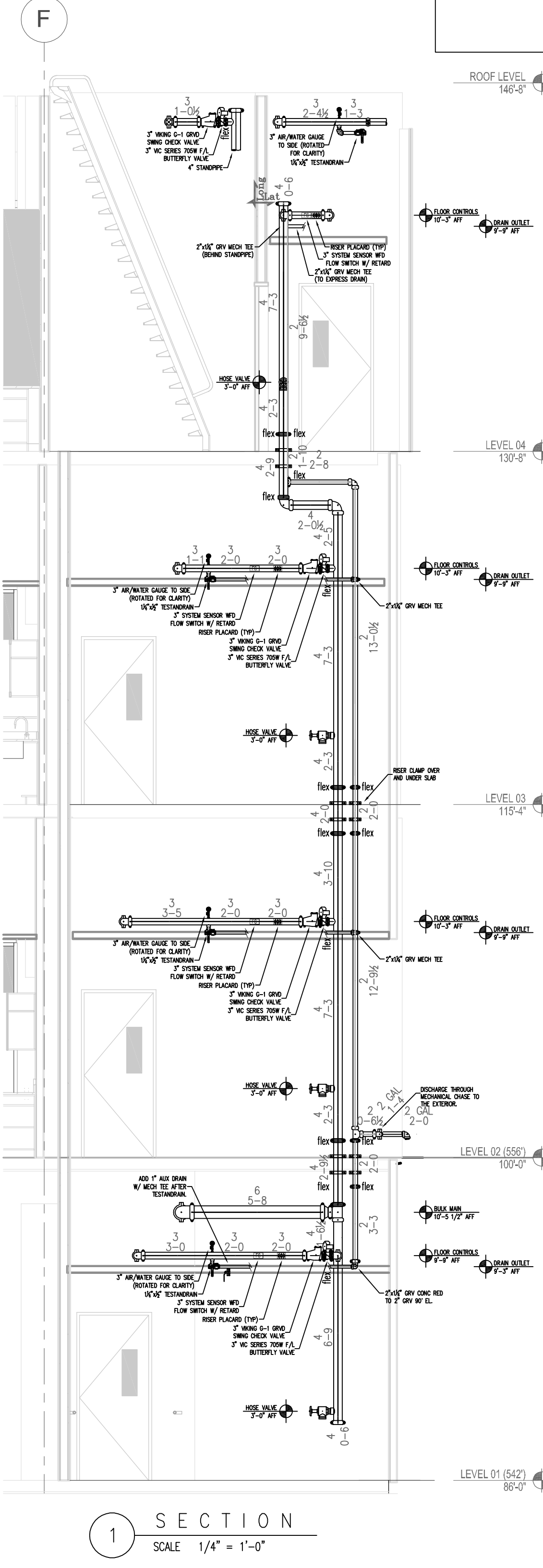
- * FIG. 1000 FOR BRACED PIPE 1" THRU 2", AND 1" OR 1-1/4" BRACING
- * FIG. 1001 IS FOR BRACED PIPE 2-1/2" THRU 8", AND 1" OR 1-1/4" BRACING
- * FIG. 2002 IS FOR BRACED PIPE 2-1/2" THRU 8", AND 1-1/2" OR 2" BRACING



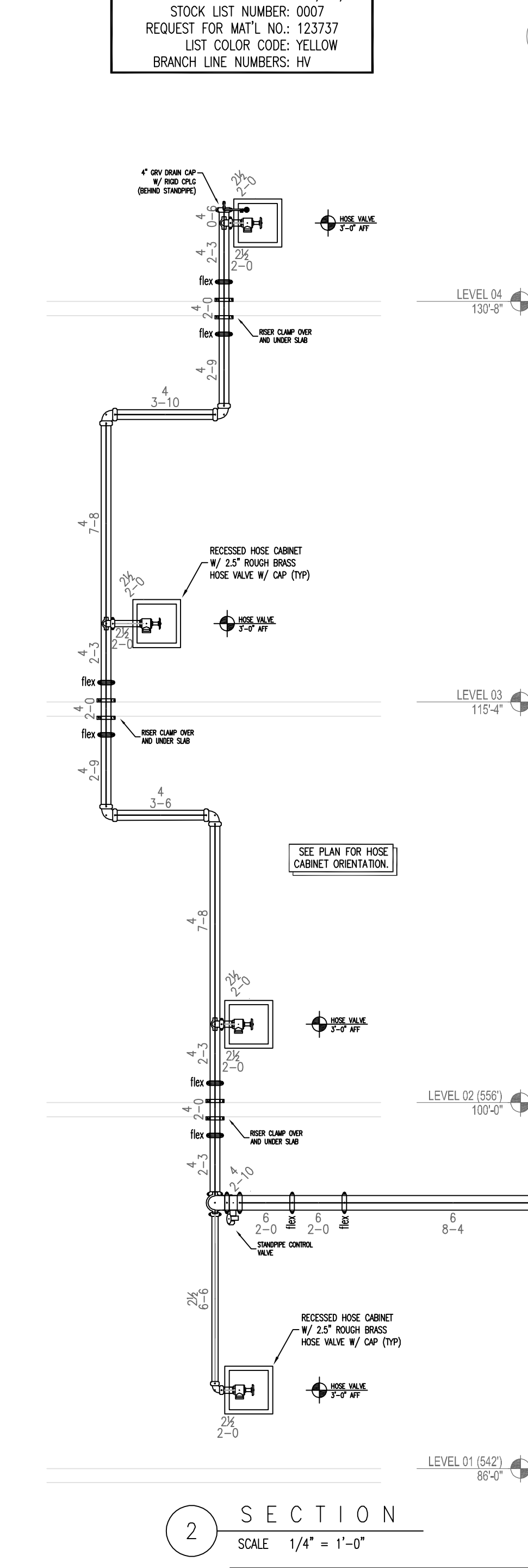
NFPA "LONGITUDINAL" SWAY BRACE @ CONCRETE
NO SCALE

- * FIG. 4 IS FOR BRACED PIPE 1" THRU 3"
- * FIG. 4A IS FOR BRACED PIPE 4" THRU 8"

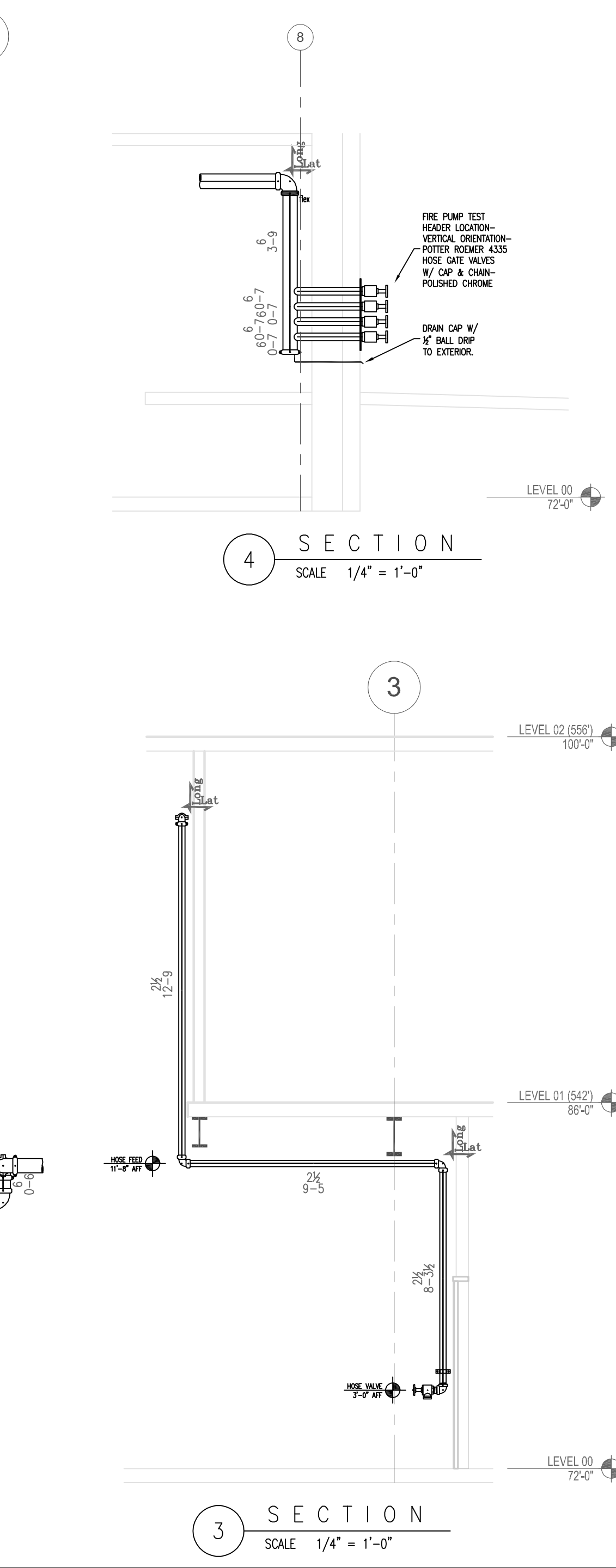
STOCKLIST NOTES
PRELIST NUMBER: 1
SYSTEM MAIN LETTERS: STA,STB,XD
STOCK LIST NUMBER: 0007
REQUEST FOR MAT'L NO: 123737
LIST COLOR CODE: YELLOW
BRANCH LINE NUMBERS: HV



SECTION 1
SCALE 1/4" = 1'-0"



SECTION 2
SCALE 1/4" = 1'-0"



SECTION 3
SCALE 1/4" = 1'-0"

SPRINKLERS													
MAKE / VENDOR	MODEL	SIN	TYPE	RESPONSE TYPE	THREAD SIZE	NOM. "X"	CALC'D COVERAGE	DEFLECT. DISTANCE	TEMP.	FINISH	ESC.	WRENCH	SYMB.
Viking	M	WK300	UPR	QR	1/2"	5.6	225 SQ FT	1-12"	155	BRZ	N/A	1089SW/B	13
Viking	M	WK350	UPR	QR	3/4"	8.0	130 SQ FT	1-12"	200	BRZ	N/A	1089SW/B	15
Viking	EC	WK332	UPR	QR	3/4"	11.2	400 SQ FT	1-12"	200	BRZ	N/A	05118SW/B	15
Viking	MIRAGE	WK462	PND	QR	1/2"	5.6	225 SQ FT	1-12"	155	WHI	CNCLD	14047W/B	14
Viking	MIRAGE	WK464	PND	QR	3/4"	8.0	130 SQ FT	1-12"	200	WHI	CNCLD	14047W/B	17
Viking	MIRAGE	WK634	PND	QR	3/4"	8.0	400 SQ FT	1-12"	155	WHI	CNCLD	14047W/B	20
Viking	DRY	WK194	PND	QR	1"	5.6	225 SQ FT	1-12"	155	WHI	DOME CNCLD	0756SW/B	1
Viking	M	WK305	HSW	QR	1/2"	5.6	196 SQ FT	4-6"	200	BRZ	N/A	1089SW/B	1
TOTAL SPRINKLERS ON THIS CONTRACT:													560
TOTAL SPRINKLERS ON THIS SHEET:													80

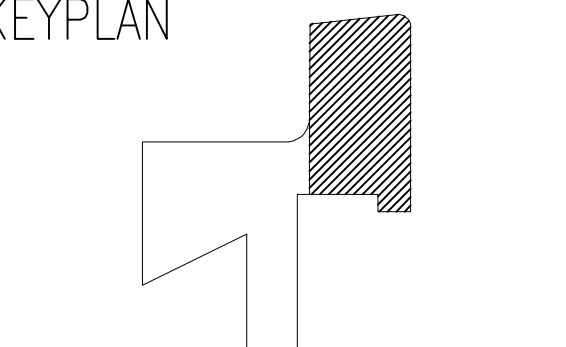
"AS-BUILTS"
08-01-2017

REV	DATE	REVISION DESCRIPTION
1	08/05/16	FW SCOPE REVIEW
2	10/25/16	PERMIT SET
3	12/2/16	INSTALLATION SET
4	12/2/16	HANGER REVISION
5	1/3/17	INSTALLATION - STANDPIPES
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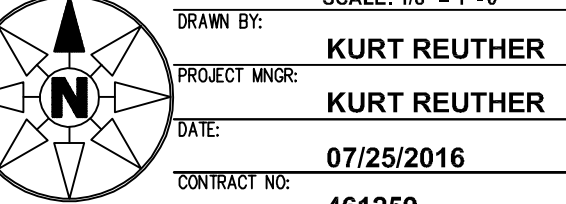
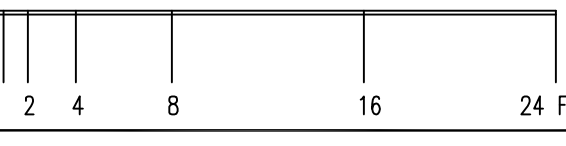


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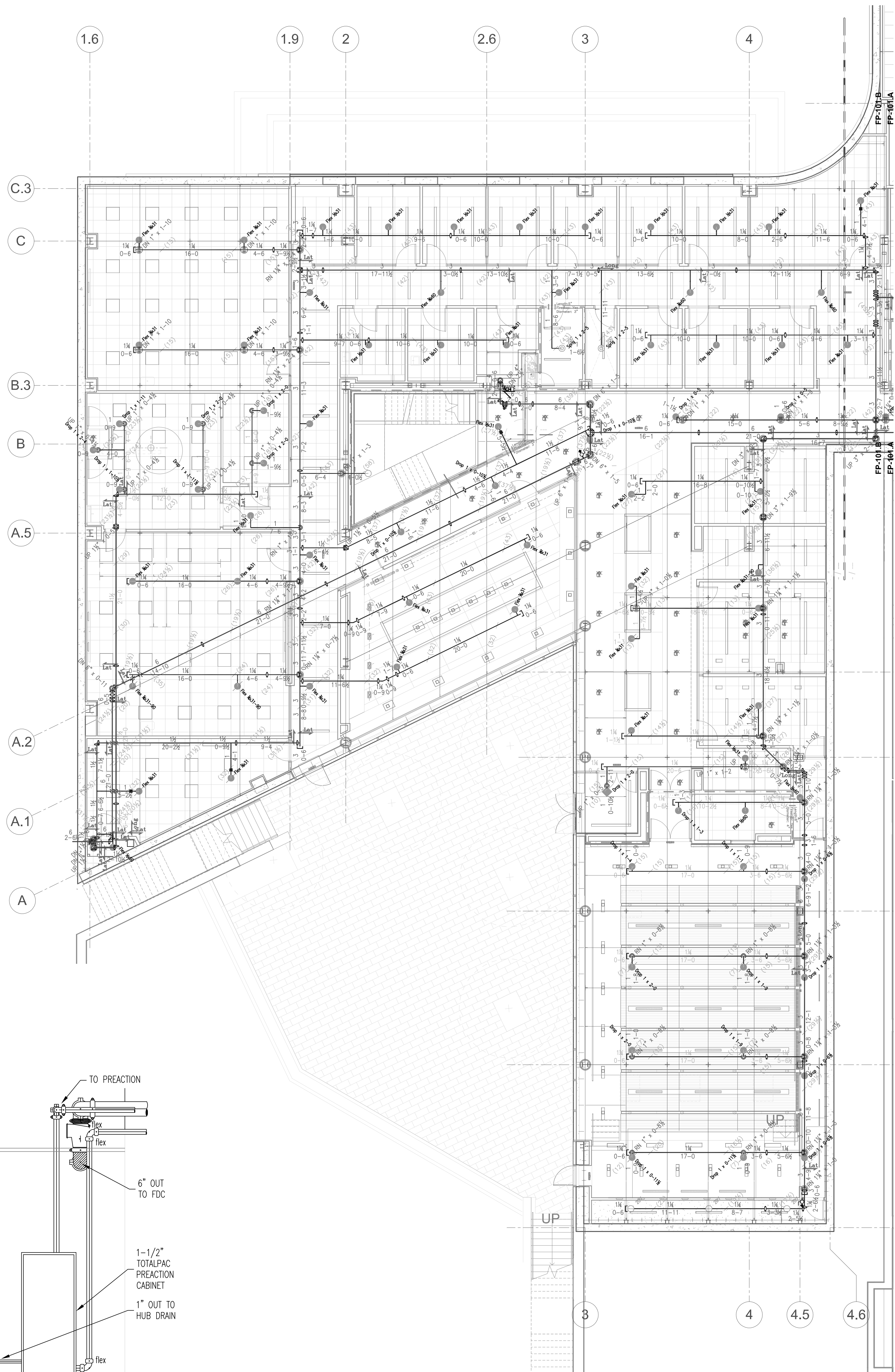


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SCIENCE BUILDING
8274 BIG BEND BLVD.
WEBSTER GROVES, MO

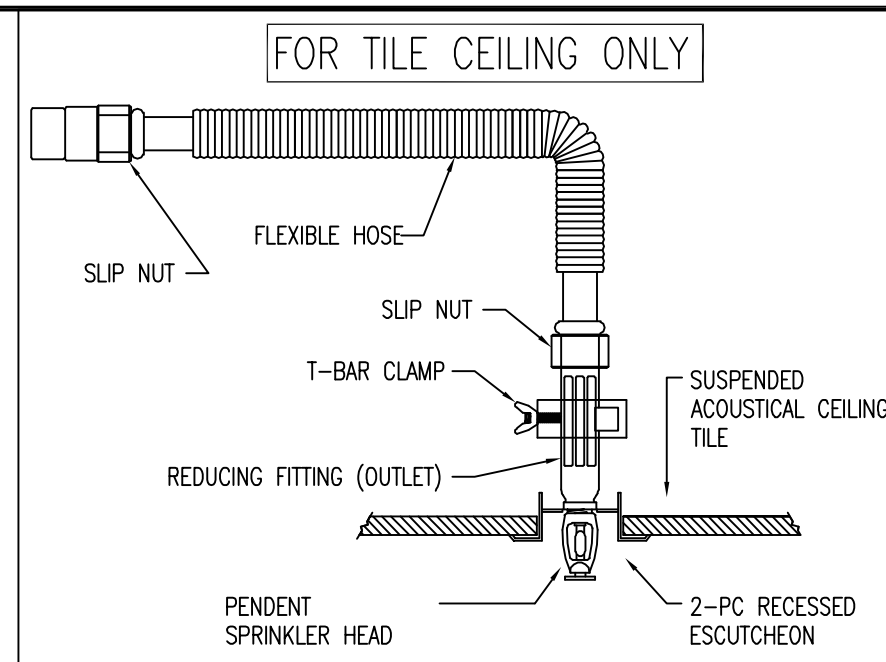
FIRE PROTECTION PLAN - LEVEL 1 - AREA A



CONSTRUCTION DOCUMENTS
FP-101.A



1/8" = 1'-0"



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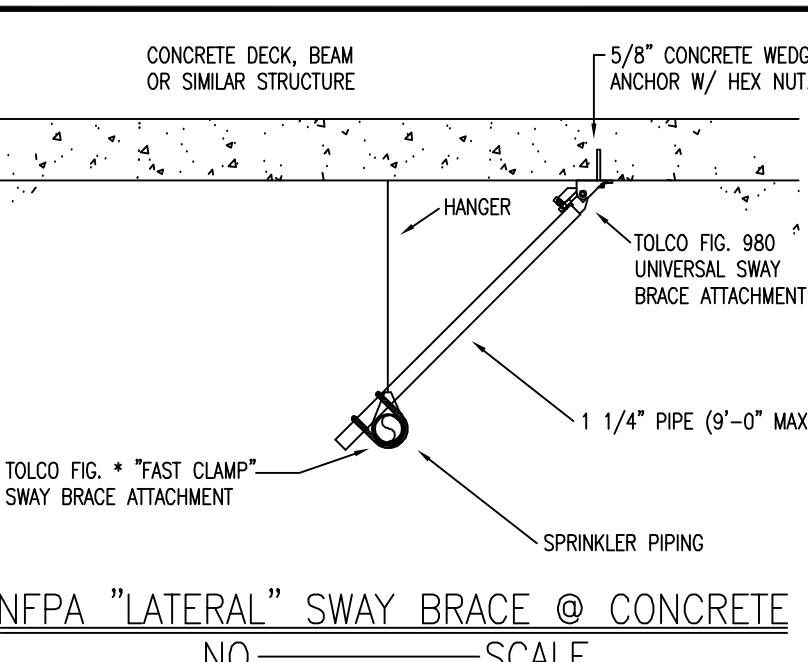
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"AS-BUILTS"

08-01-2017

08/05/16 PM SCOPE REVIEW

10/25/16 PERMIT SET

12/2/16 INSTALLATION SET

12/9/16 HANGER REVISION

1/3/17 INSTALLATION - STANDPIPES

1/6/17 INSTALLATION - PUMP ROOM

REV DATE REVISION DESCRIPTION

REVISION HISTORY

1 N/A 13-2010 1 N/A 14-2003

1 N/A 13 D-2002 1 N/A 20-2003

1 N/A 13 R-2002 1 OTHER

1 N/A 13 R-2002 1 OTHER

1 N/A 13 R-2002 1 OTHER

1 N/A 13 R-2002 1 OTHER

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- 1 FIRELOCK GALV GRVD 90° ELL
- 2 FIRELOCK GALV GRVD TEE
- 3 FIRELOCK GALV GRVD CAP
- 4 GALV GRVD DRAIN CAP & GALV AUX DRAIN
- 5 PIPE STAND ASSEMBLY
- 6 GALV GRVD CONC REDUCER
- 7 WILKENS 350AOSYG BACKFLOW GxG W/ OS&Y TAMPERS
- 8 FIRELOCK STYLE 75 FLEX COUPLING
- 9 FIRELOCK GRVD 90° ELL
- 10 FIRELOCK GRVD TEE
- 11 -
- 12 1/4" OUTLETS FOR JOCKEY PUMP CONNECTION
- 13 8 TYCO 510 GRV 90 ELL
- 14 FIRELOCK STYLE 744 GRVD FLANGE
- 15 8 NIBCO RW GATE VALVE W/ OS&Y TAMPER
- 16 A-C FIRE 8X6X12F - 8100 SERIES 1000 GPM FIRE PUMP - 40HP/460V - 1/4" JOCKEY PUMP
- 17 6 VIKING C-1 GRVD CHECK VALVE
- 18 6 VIC SERIES 705-W F/L BUTTERFLY VALVE
- 19 2 ANGLE VALVE (MAIN DRAIN PIPE TO HUB DRAIN)
- 20 MOP SINK (ROUTE PACKING GLAND DRAIN-CPVC)
- 21 AUXILIARY DRAIN
- 22 6 FIRELOCK GRVD CAP
- 23 1/4" SYSTEM AIR/WATER PRESS. GAUGE ASSM
- 24 6 SYSTEM SENSOR WFD SERIES FLOW SWITCHES
- 25 JOCKEY PUMP CONTROLLER
- 26 FIRE PUMP CONTROLLER

PRESSURE REGULATION SETTINGS

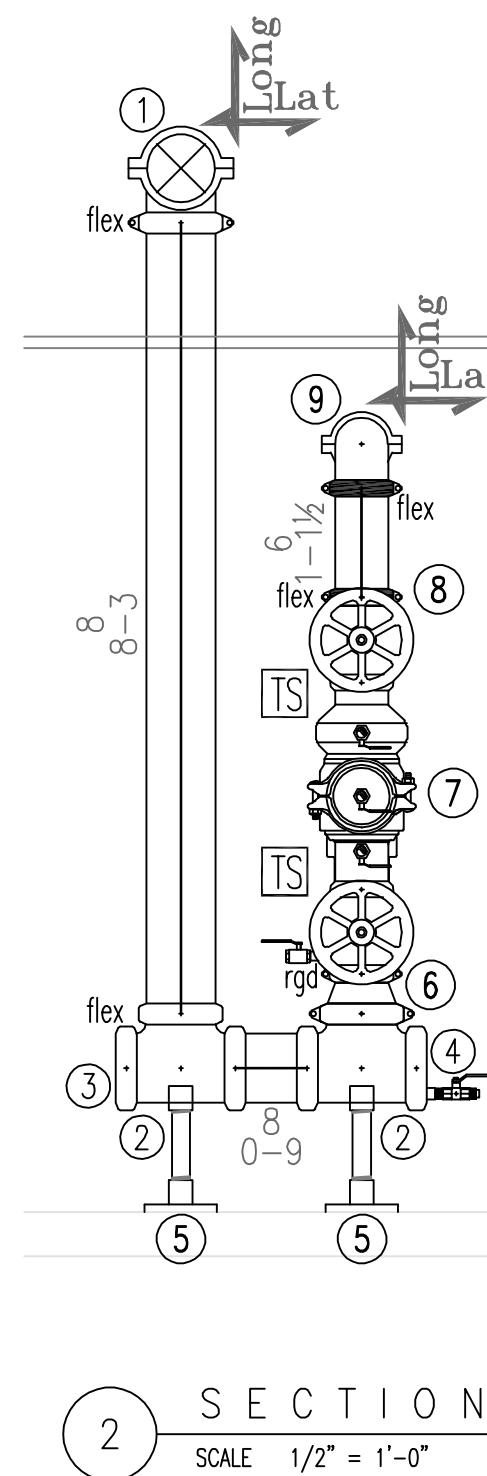
SMALL SYSTEM PRV'S @ 175 PSI
JOCKEY PUMP OFF @ 161 PSI
JOCKEY PUMP ON @ 150 PSI
FIRE PUMP ON @ 145 PSI

SPRINKLER POWER REQUIREMENTS

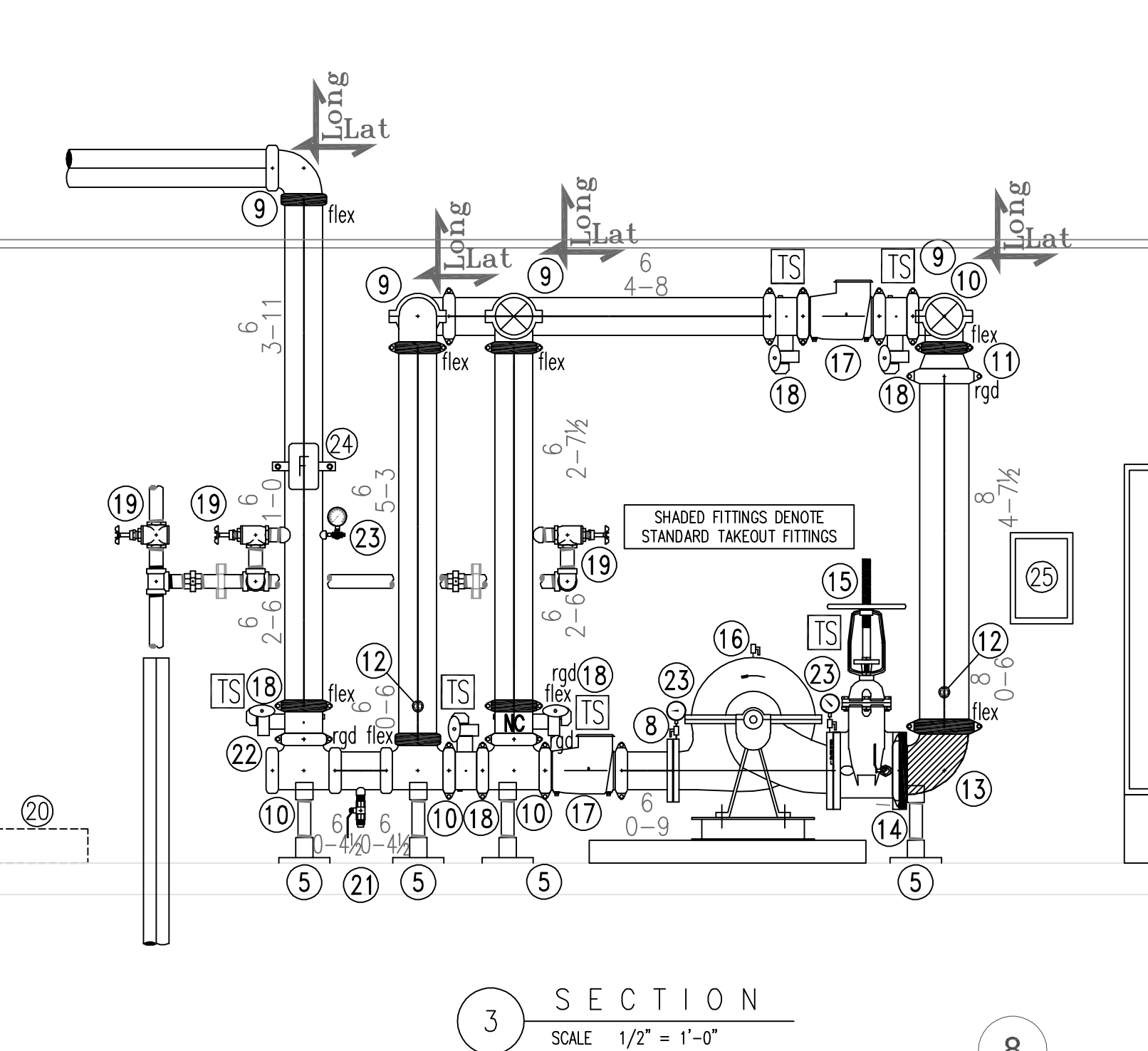
@ PUMP ROOM
FIRE PUMP 460 VAC, 3 PHASE, 40 HP
JOCKEY PUMP 460 VAC, 3 PHASE, .75 HP
HORN STROBE 120 VAC, SINGLE PHASE

STOCKLIST NOTES

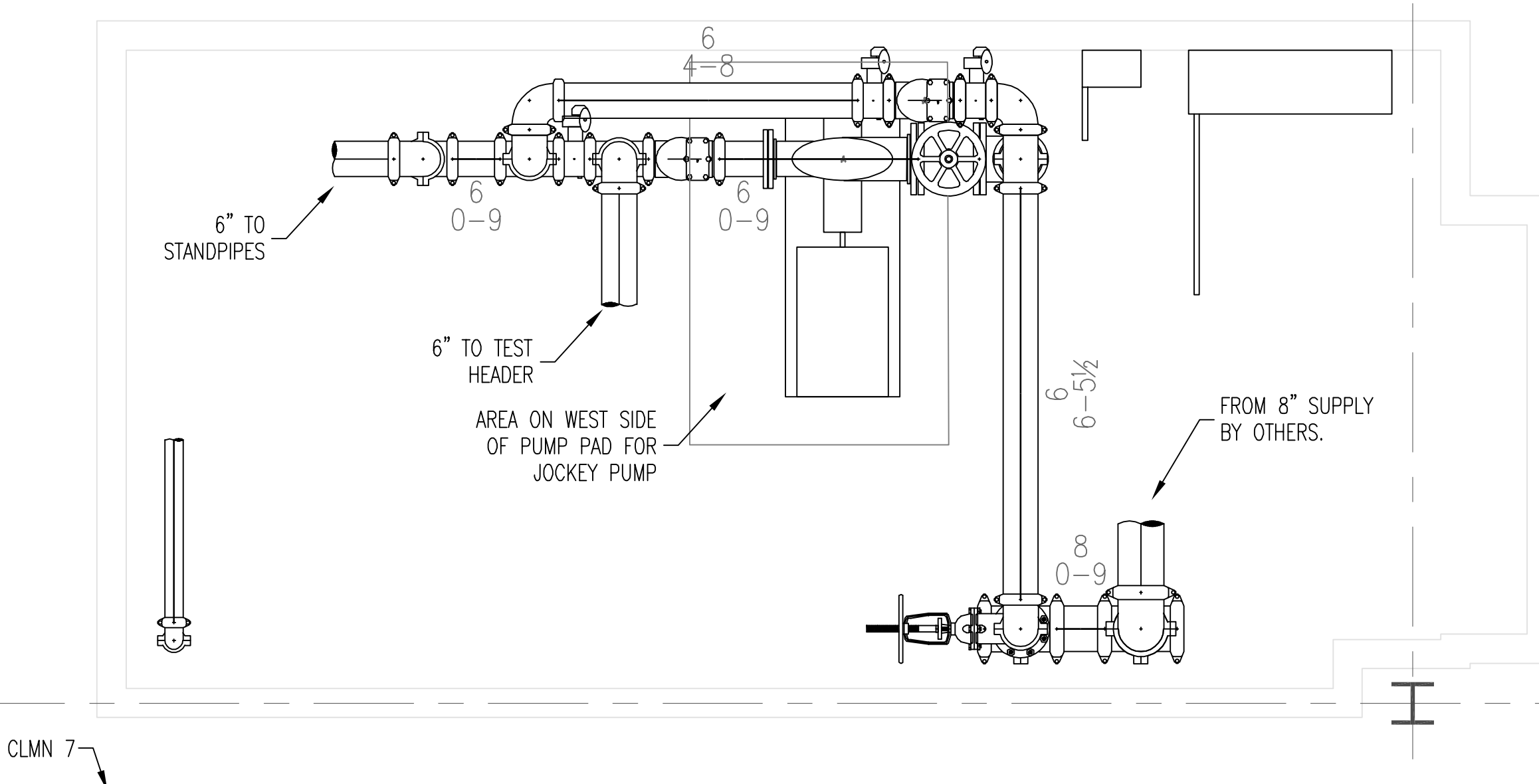
PRELIST NUMBER: 1
SYSTEM MAIN LETTERS: S
STOCK LIST NUMBER: 0008
REQUEST FOR MAT'L NO.: N/A
LIST COLOR CODE: BROWN
BRANCH LINE NUMBERS: DRN



1/2" = 1'-0"



1/2" = 1'-0"



1/2" = 1'-0"

MAKE / VENDOR	MODEL	SIN	TYPE	RESPONSE TYPE	THREAD SIZE	NOM. "X"	CALC'D COVERAGE	DEFLECT. DISTANCE	TEMP.	FINISH	ESC.	WRENCH	SYMB.	QUANTITY
VIKING	M	VK300	UPR	QR	1/2"	5.6	225 SQ FT	1-12"	155	BRZ	N/A	10895W/B	1	1
VIKING	M	VK350	UPR	QR	3/4"	8.0	130 SQ FT	1-12"	200	BRZ	N/A	10895W/B	3	3
VIKING	EC	VK512	UPR	QR	3/4"	11.2	400 SQ FT	1-12"	200	BRZ	N/A	05118W/B	2	2
VIKING	MIRAGE	VK462	PND	QR	1/2"	5.6	225 SQ FT	1-12"	155	WHI	CONCLD	14047W/B	30	30
VIKING	MIRAGE	VK464	PND	QR	3/4"	8.0	130 SQ FT	1-12"	200	WHI	CONCLD	14047W/B	1	1
VIKING	MIRAGE	VK634	PND	QR	3/4"	8.0	400 SQ FT	1-12"	155	WHI	CONCLD	14047W/B	46	46
VIKING	DRY	VK194	PND	QR	1"	5.6	225 SQ FT	1-12"	155	WHI	DOME CNCLD	07565W/B	1	1
VIKING	M	VK305	HSW	QR	1/2"	5.6	196 SQ FT	4-6"	200	BRZ	N/A	10895W/B	1	1
TOTAL SPRINKLERS ON THIS CONTRACT: 560														84
TOTAL SPRINKLERS ON THIS SHEET: 84														

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WEBSTER GROVES, MO

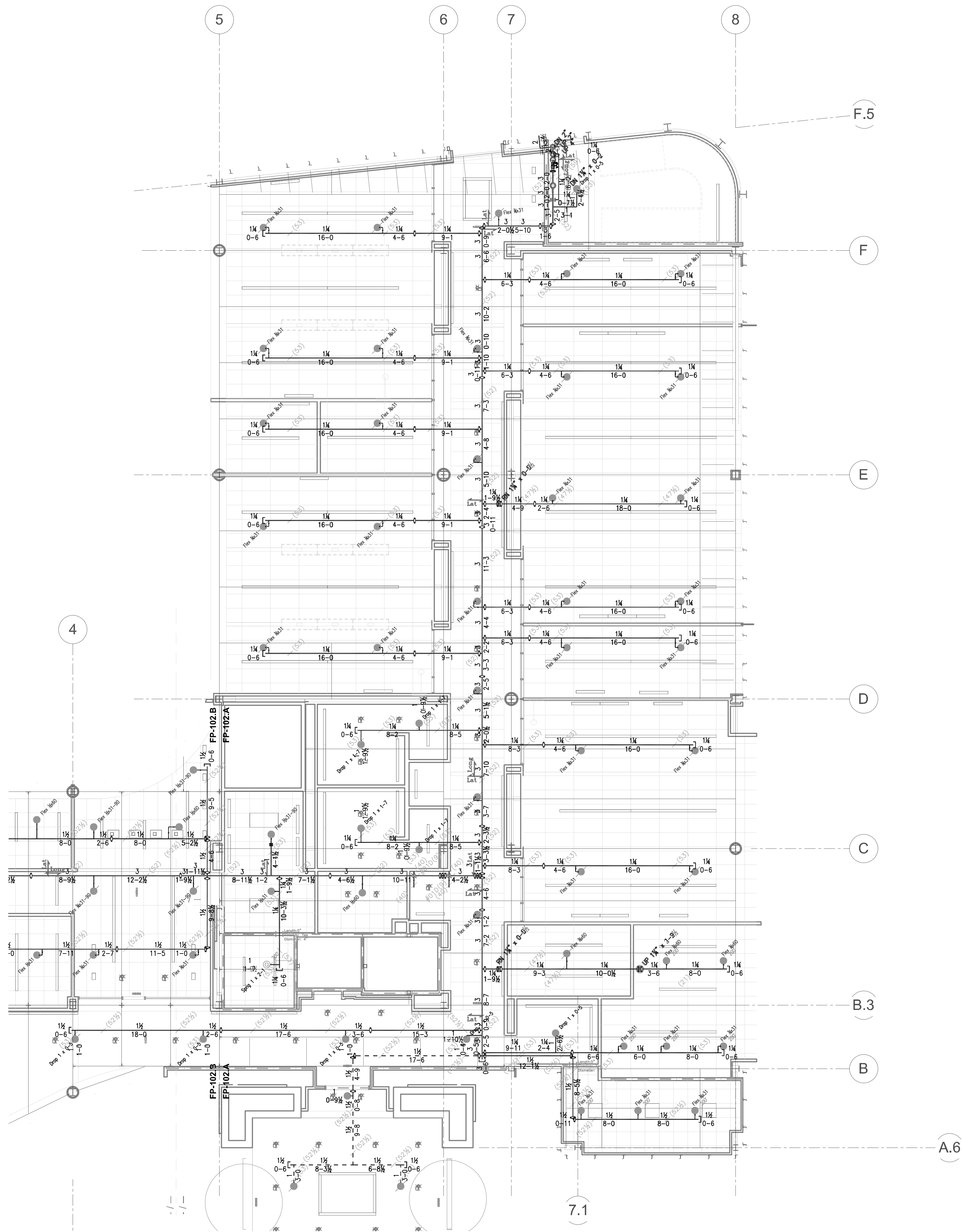
FIRE PROTECTION PLAN - LEVEL 1 - AREA B

0 2 4 8 16 24 FT

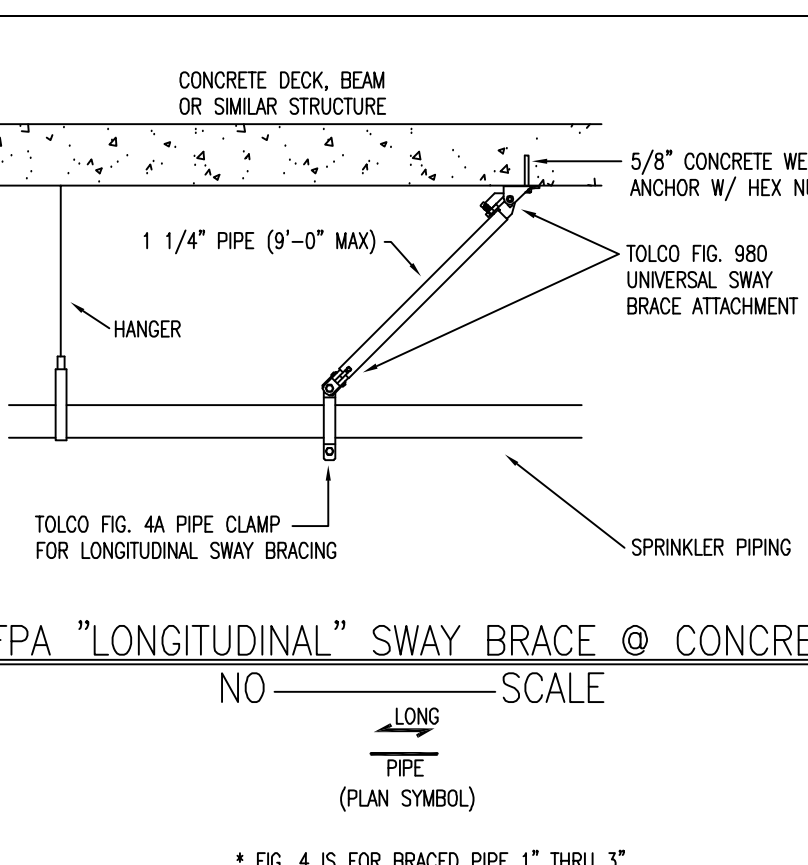
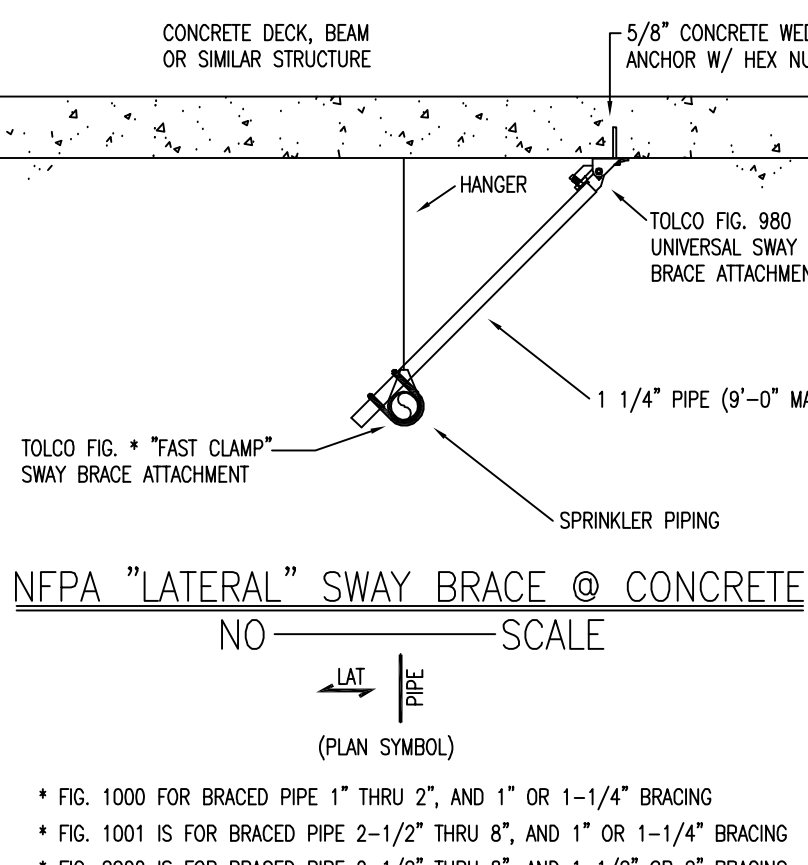
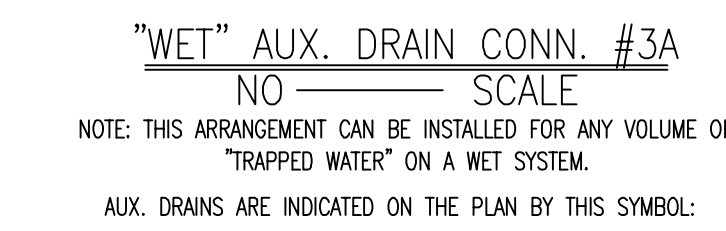
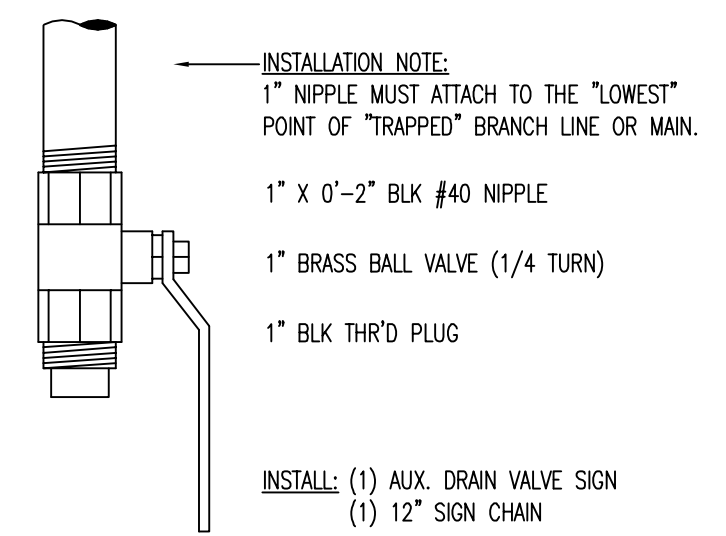
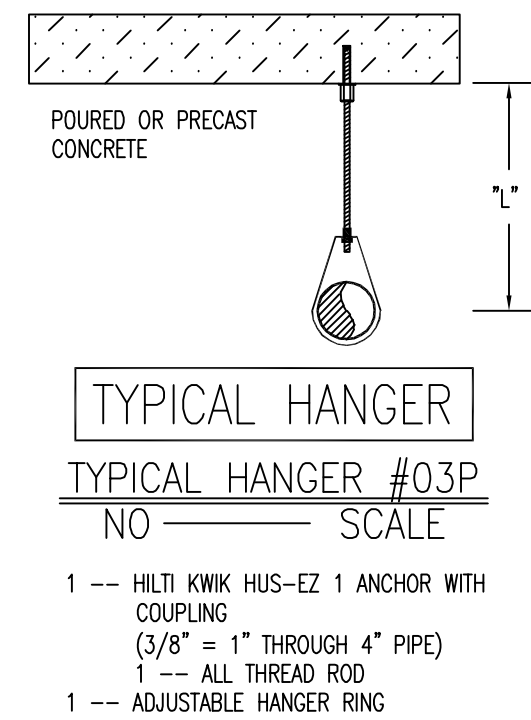
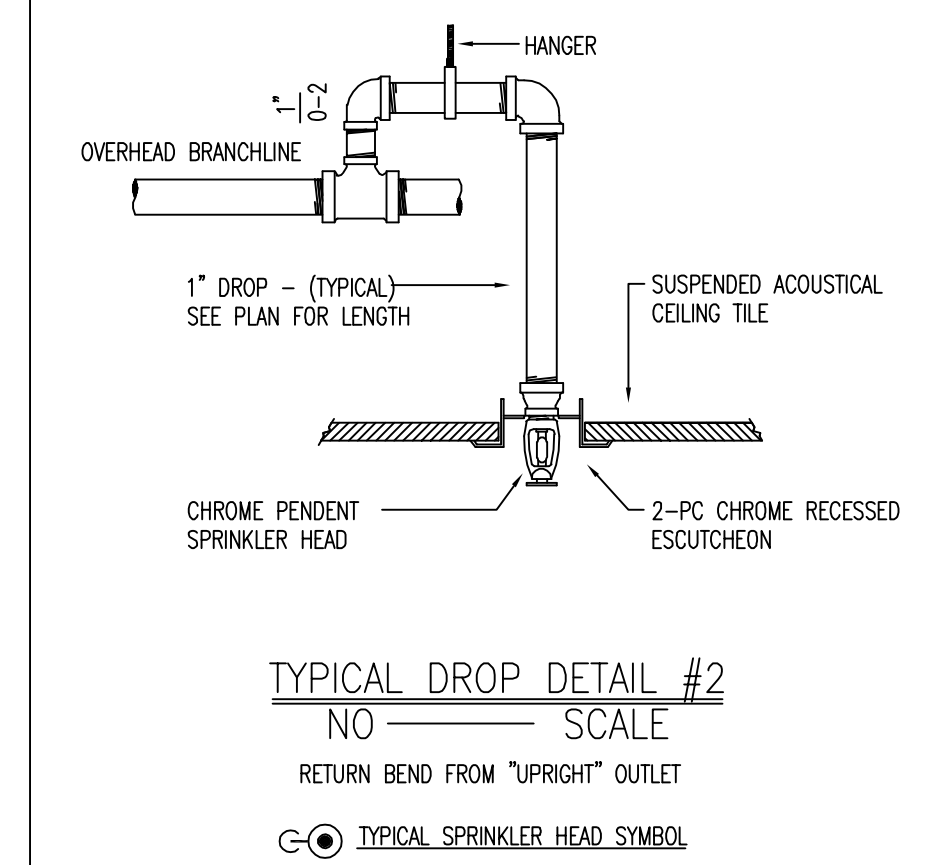
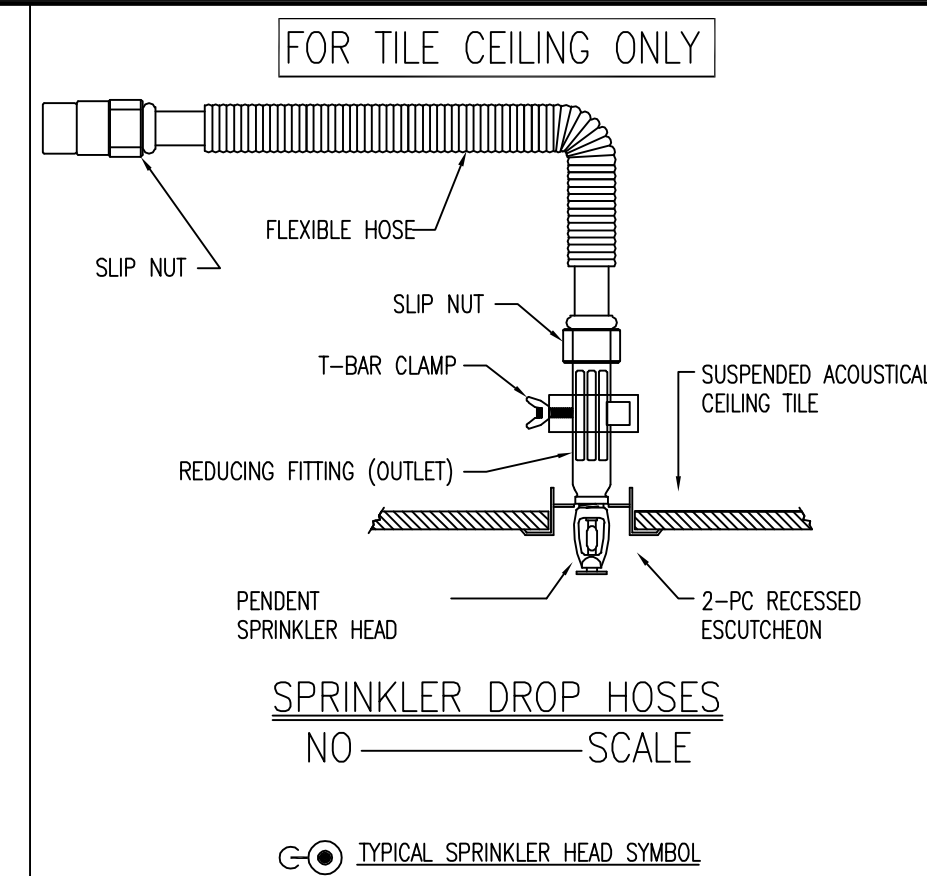
SCALE: 1/8" = 1'-0"

CONSTRUCTION DOCUMENTS

FP-101.B



AUTOMATIC SPRINKLER SYSTEM PLAN
SCALE 1/8" = 1'-0"



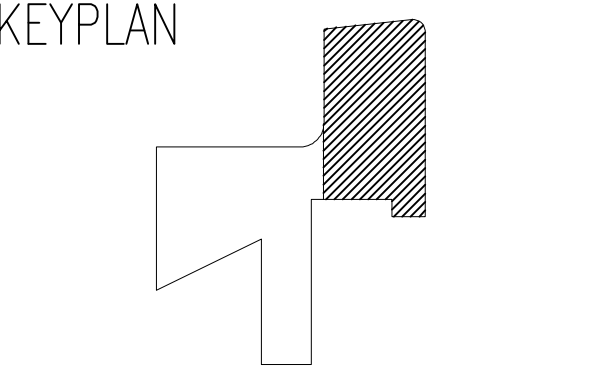
"AS-BUILTS"
08-01-2017

REV	DATE	REVISION DESCRIPTION
1	08/05/16	FW SCOPE REVIEW
2	10/26/16	PERMIT SET
3	12/06/16	INSTALLATION SET
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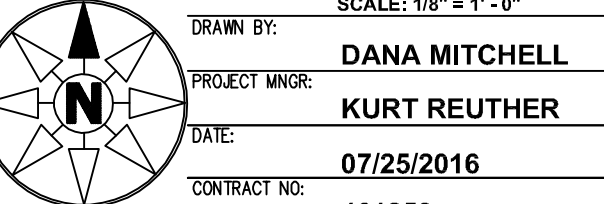


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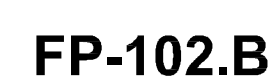
WEBSTER UNIV - INTER. SCIENCE BUILDING
8274 BIG BEND BLVD.
WEBSTER GROVES, MO

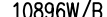
FIRE PROTECTION PLAN - LEVEL 2 - AREA A

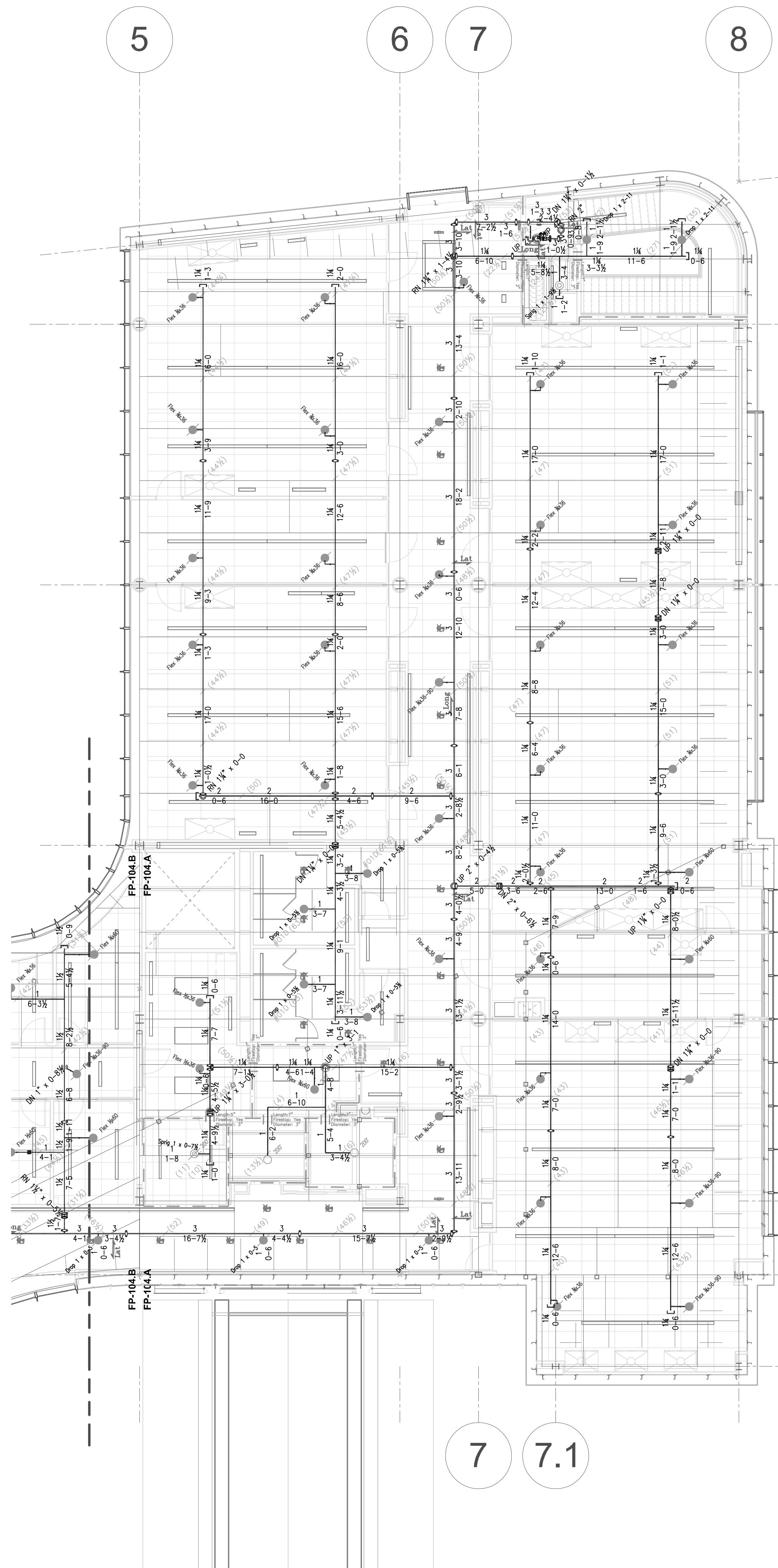


CONSTRUCTION DOCUMENTS
FP-102.A

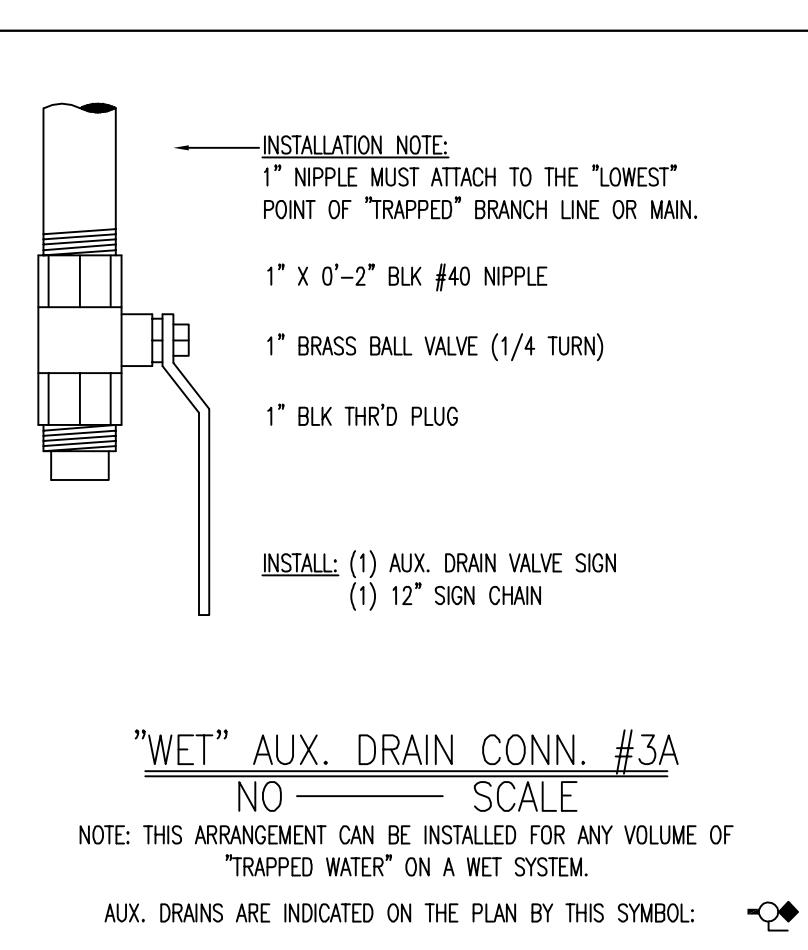
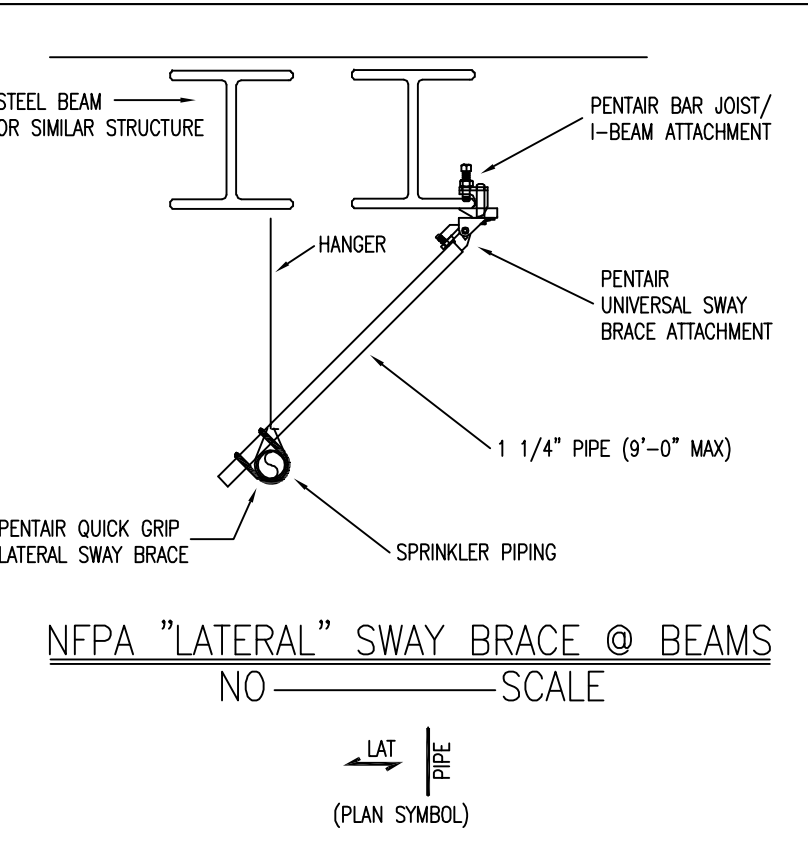
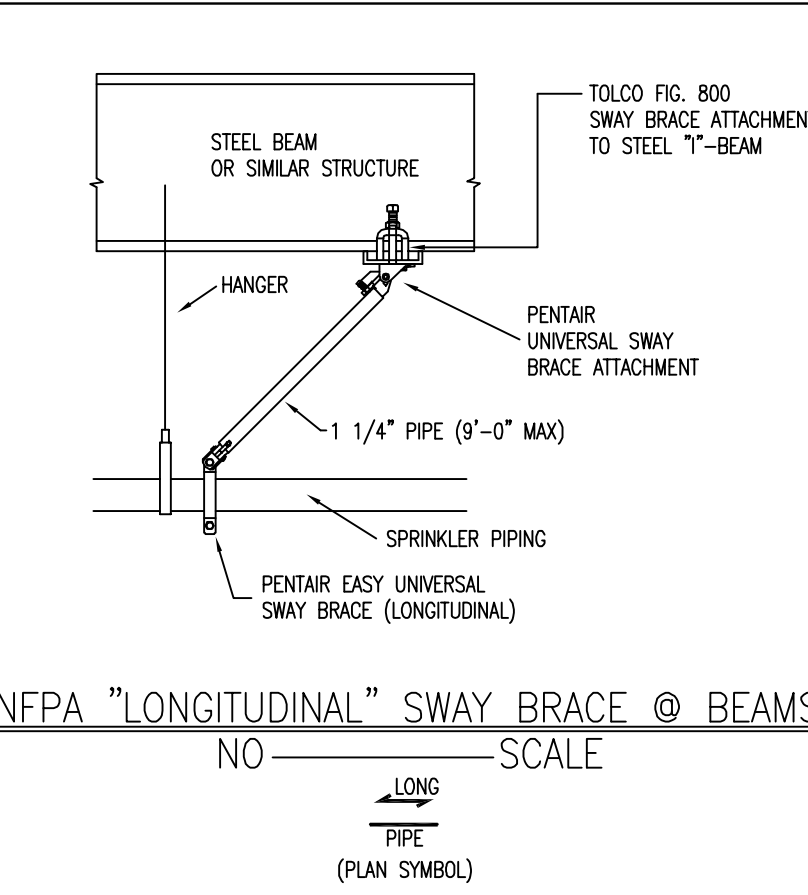
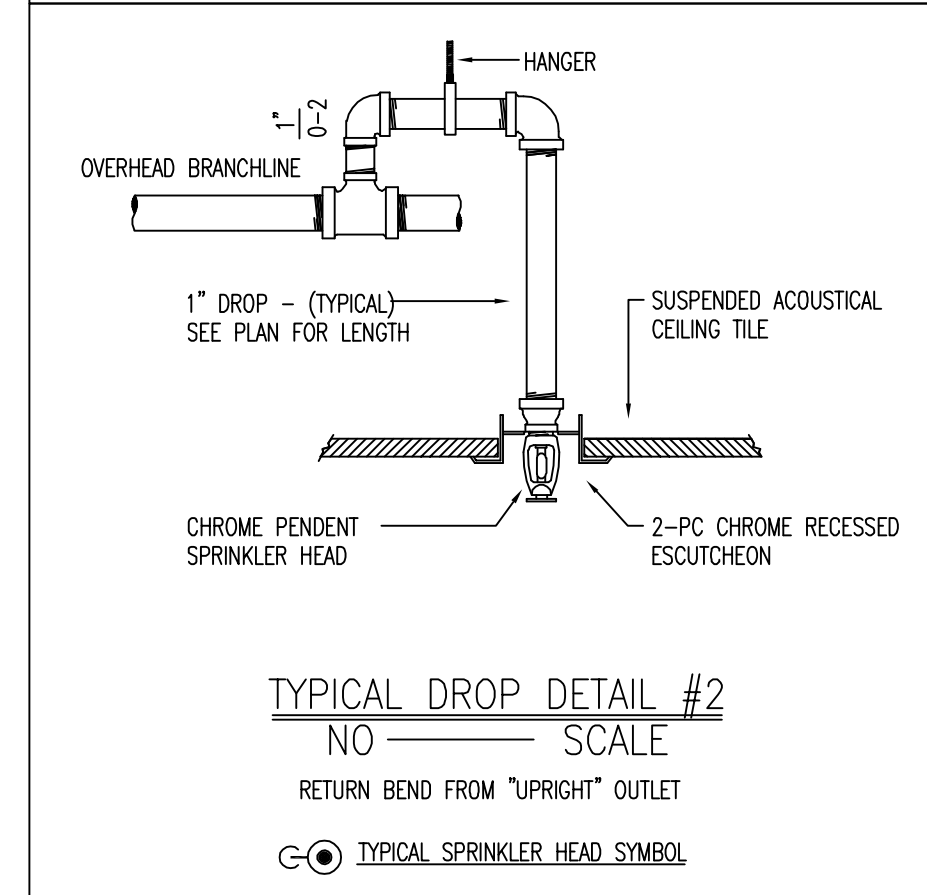
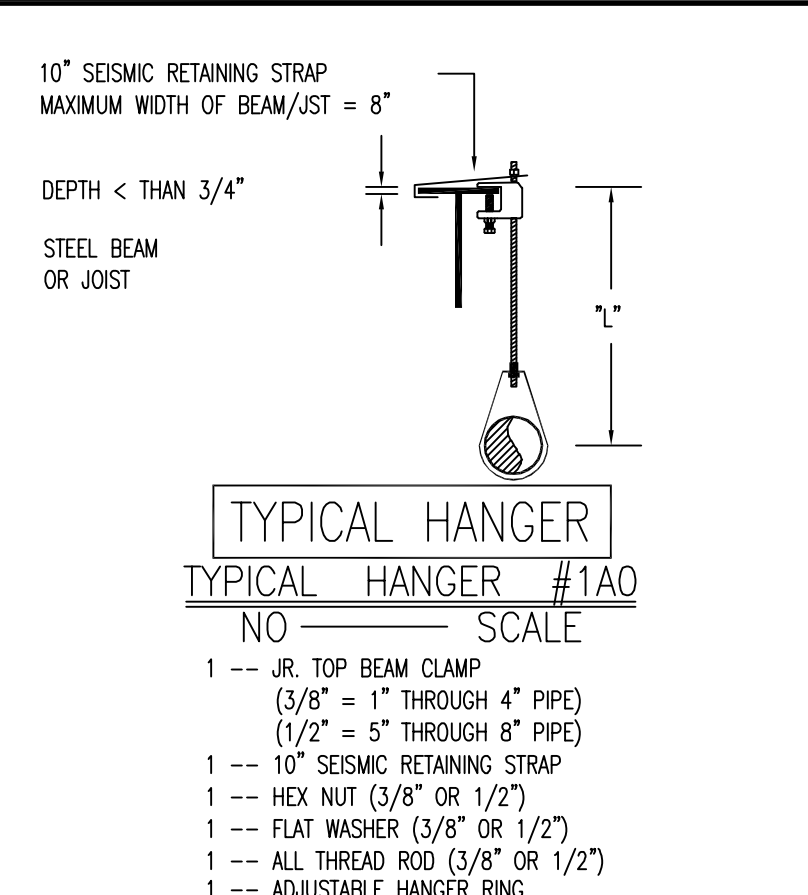
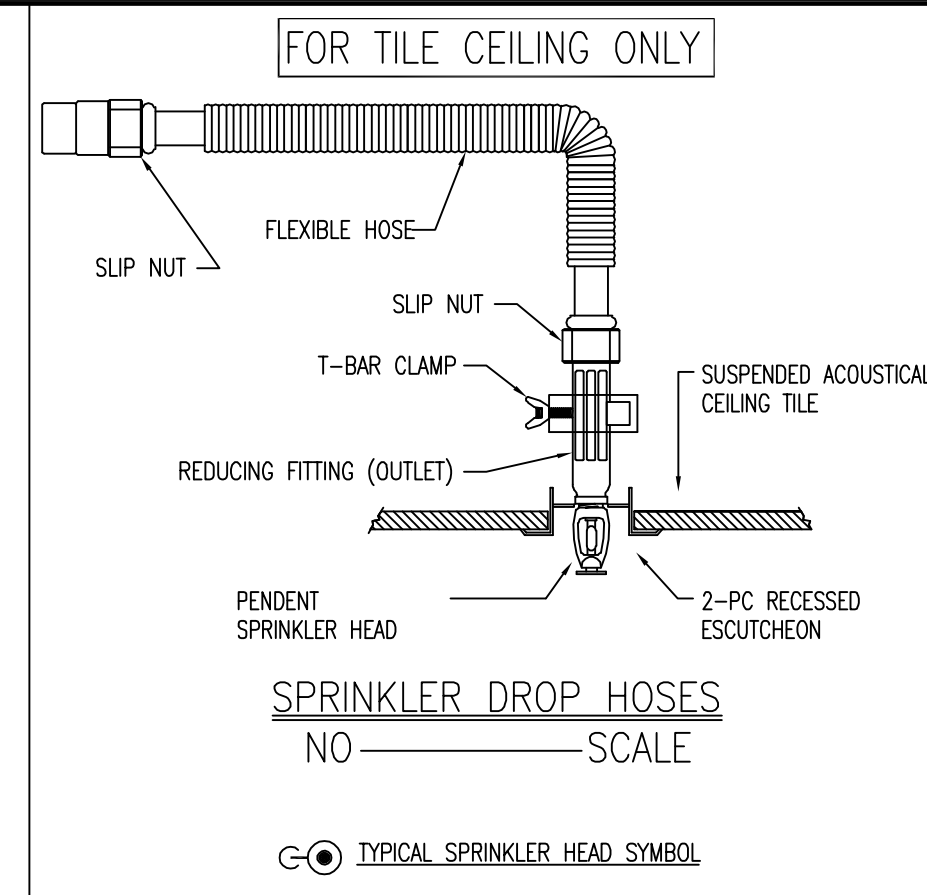
SPRINKLERS											
MAKE / VENDOR	MODEL	SIN	TYPE	RESPONSE TYPE	THREAD SIZE	NOM. "K"	CALC'D COVERAGE	DEFLECT. DISTANCE	TEMP.	FINISH	ESC.
Viking	M	VK300	UPR	QR	1/2"	5.6	225 SQ FT	1-12"	155	BRZ	N/A
Viking	M	VK350	UPR	QR	3/4"	8.0	130 SQ FT	1-12"	200	BRZ	N/A
Viking	EC	VK532	UPR	QR	3/4"	11.2	400 SQ FT	1-12"	200	BRZ	N/A
Viking	MIRAGE	VK462	PND	QR	1/2"	5.6	225 SQ FT	1-12"	155	WHI	CONCLD
Viking	MIRAGE	VK464	PND	QR	3/4"	8.0	130 SQ FT	1-12"	200	WHI	CONCLD
Viking	MIRAGE EC	VK634	PND	QR	3/4"	8.0	400 SQ FT	1-12"	155	WHI	CONCLD
RELIABLE	G5-S6 DRY	RA5114	PND	QR	1"	5.6	225 SQ FT	1-12"	155	WHI	CONCLD
Viking	M	VK305	HSW	QR	1/2"	5.6	196 SQ FT	4-6"	200	BRZ	N/A
TOTAL SPRINKLERS ON THIS CONTRACT: 560											TOTAL SPRINKLERS ON THIS SHEET: 55



SPRINKLERS														
MAKE / VENDOR	MODEL	SIN	TYPE	RESPONSE TIME	THREAD SIZE	NOM. "K"	OMC/D COVERAGE	DEFLECT. DISTANCE	TEMP.	FINISH	ESC.	WRENCH	SYMB.	QUAN- TITY
VIKING	M	VK300	UPR	GR	1/2"	5.6	225 SQ FT	1-1/2"	155°	BRZ	N/A	1089N/8" B		4
VIKING	M	VK650	UPR	GR	3/4"	8.0	130 SQ FT	1-1/2"	200°	BRZ	N/A	1089N/8" B		3
VIKING	EC	VK632	UPR	GR	3/4"	11.2	245 SQ FT	1-1/2"	200°	WHIT	CONCLD	1047N/7" B		13
VIKING	MIRAGE	VK462	PND	GR	3/4"	5.6	225 SQ FT	1-1/2"	155°	WHIT	CONCLD	1047N/7" B		3
VIKING	MIRAGE	VK464	PND	GR	3/4"	8.0	130 SQ FT	1-1/2"	200°	WHIT	CONCLD	1047N/7" B		3
VIKING	MIRAGE EC	VK634	PND	GR	3/4"	8.0	400 SQ FT	1-1/2"	155°	WHIT	CONCLD	1047N/7" B		33
RELIABLE VIKING	CS-56 DRY	BA114	PND	GR	1/2"	5.6	225 SQ FT	1-1/2"	155°	WHIT	CONCLD	1089N/8" B		1
VIKING	M	VK305	HSW	GR	1/2"	5.6	198 SQ FT	4-6"	200°	BRZ	N/A	1089N/8" B		1
TOTAL SPRINKLERS ON THIS SHEET: 560														
TOTAL SPRINKLERS ON THIS SHEET: 71														



AUTOMATIC SPRINKLER SYSTEM PLAN
SCALE 1/8" = 1'-0"



SPRINKLERS											
MAKE / VENDOR	MODEL	SIN	TYPE	RESPONSE TYPE	THREAD SIZE	NOM. "K"	CALC'D COVERAGE	DEFLECT. DISTANCE	TEMP.	FINISH	ESC.
VIKING	M	VK300	UPR	QR	1/2"	5.6	225 SQ FT	1-12"	155	BRZ	N/A
VIKING	M	VK350	UPR	QR	3/4"	8.0	130 SQ FT	1-12"	200	BRZ	N/A
VIKING	EC	VK532	UPR	QR	3/4"	11.2	400 SQ FT	1-12"	200	BRZ	N/A
VIKING	MIRAGE	VK462	PND	QR	1/2"	5.6	225 SQ FT	1-12"	155	WHI	CONCLD
VIKING	MIRAGE	VK464	PND	QR	3/4"	8.0	130 SQ FT	1-12"	200	WHI	CONCLD
VIKING	MIRAGE EC	VK634	PND	QR	3/4"	8.0	400 SQ FT	1-12"	155	WHI	CONCLD
VIKING	DRY	VK194	PND	QR	1"	5.6	225 SQ FT	1-12"	155	WHI	DOME CNCLD
VIKING	M	VK305	HSW	QR	1/2"	5.6	196 SQ FT	4-6"	200	BRZ	N/A
TOTAL SPRINKLERS ON THIS CONTRACT:							560				
								TOTAL SPRINKLERS ON THIS SHEET:			

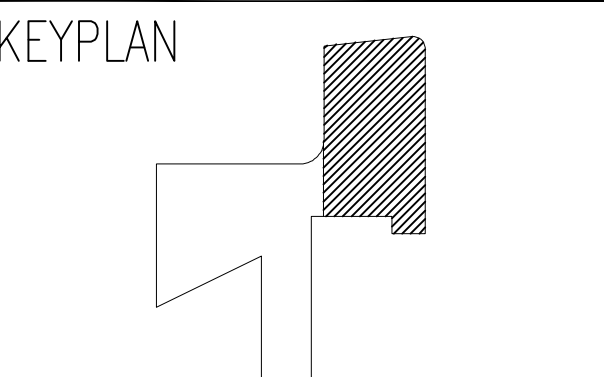
"AS-BUILTS"
08-01-2017

REV	DATE	REVISION DESCRIPTION
1	08/05/16	FM SCOPE REVIEW
2	10/26/16	PERMIT SET
3	12/29/16	INSTALLATION SET
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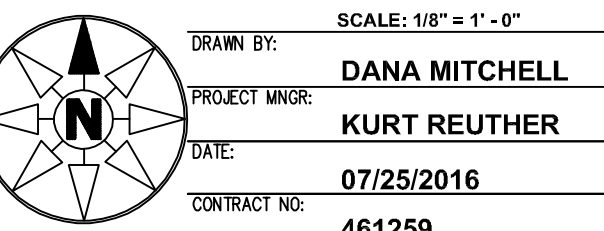


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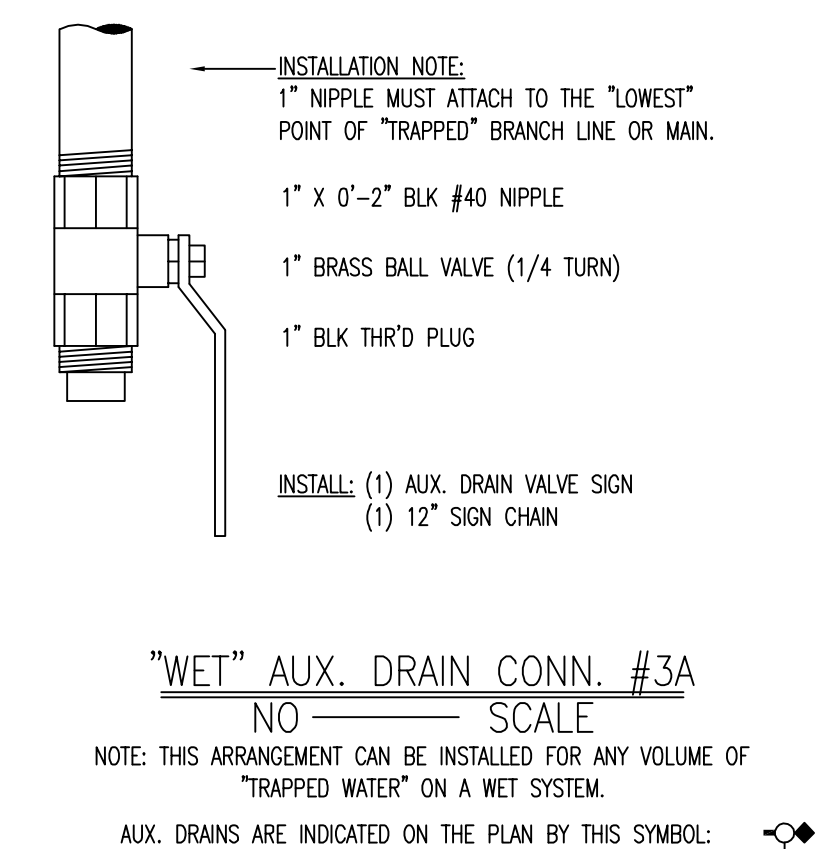
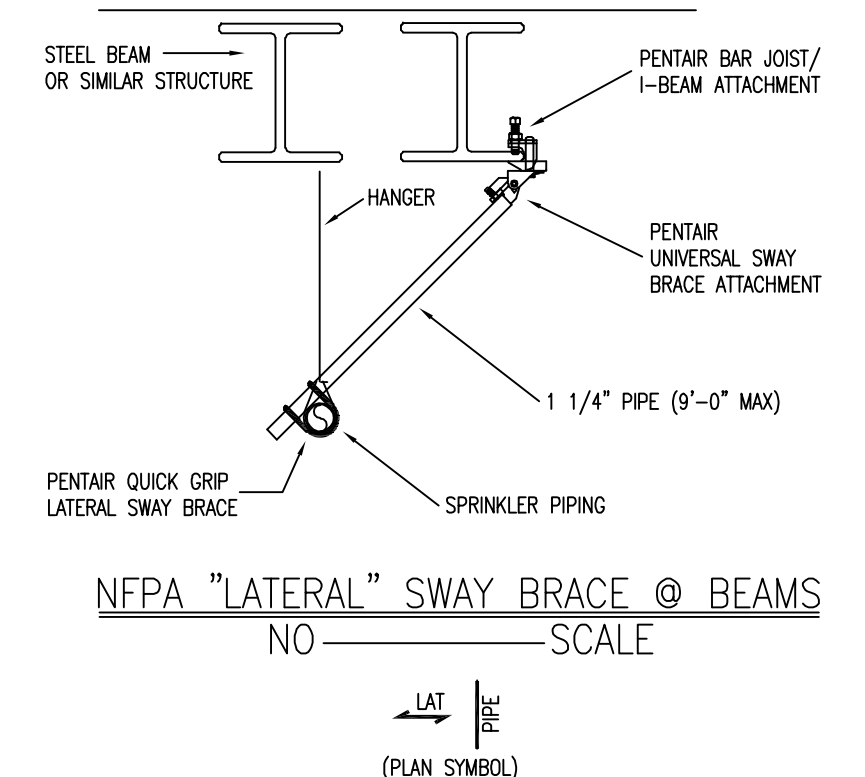
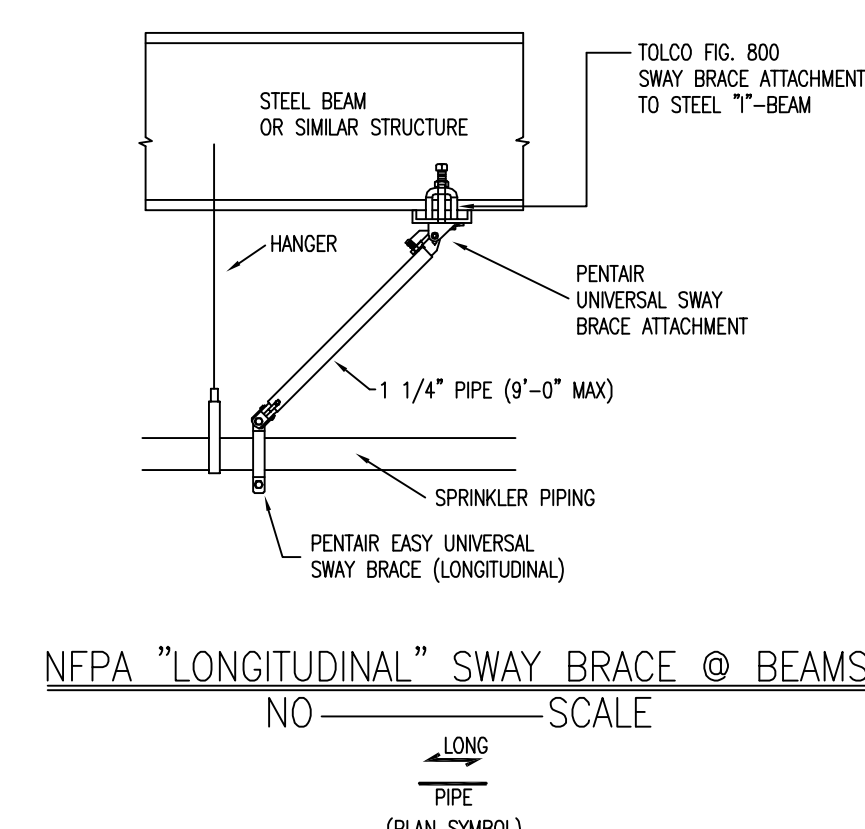
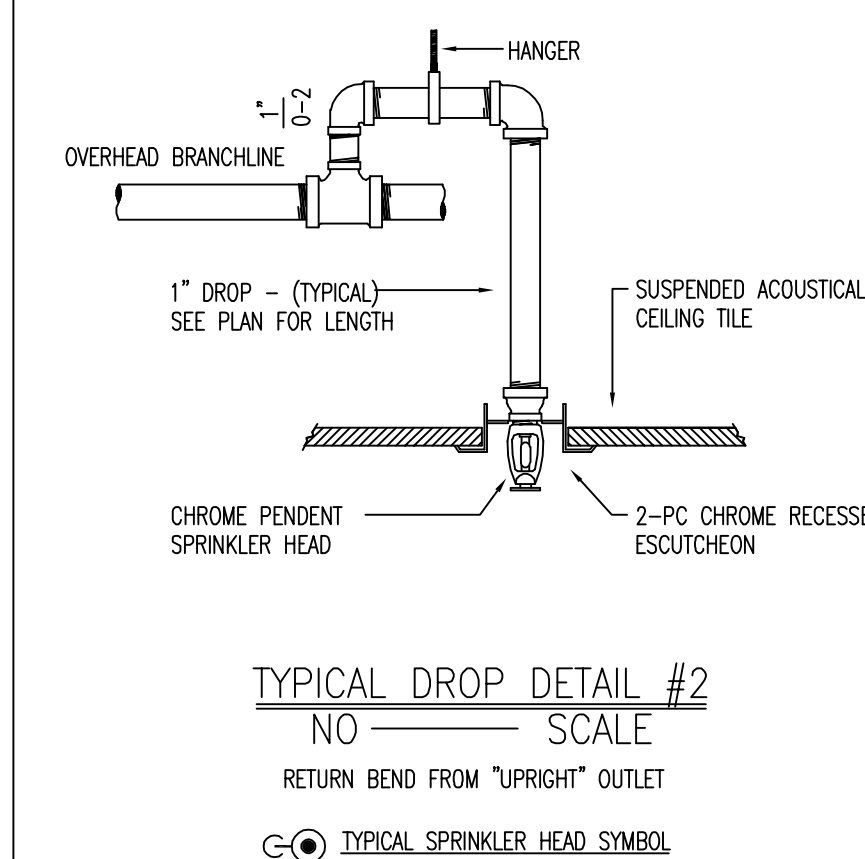


WEBSTER UNIV - INTER. SCIENCE BUILDING
8274 BIG BEND BLVD.
WEBSTER GROVES, MO

FIRE PROTECTION PLAN - LEVEL 4 - AREA A



CONSTRUCTION DOCUMENTS
FP-104.A



SPRINKLERS														
MAKE / VENDOR	MODEL	SIN	TYPE	RESPONSE TIME	THREAD SIZE	NOM. "K"	OMC'D COVERAGE	DEFLECT. DISTANCE	TEMP.	FINISH	ESC.	WRENCH	SYMB.	QUANTITY
VIKING	M	VK300	UPR	GR	1/2"	5.6	225 SQ FT	1'-12"	155°	BRZ	N/A	10899A/B		2
VIKING	M	VK350	UPR	GR	3/4"	8.0	130 SQ FT	1'-12"	200°	BRZ	N/A	10899A/B		18
VIKING	EC	VK634	PND	GR	3/4"	8.0	130 SQ FT	1'-12"	155°	WHIT	CONCLD	10470A/B		27
VIKING	MIRAGE	VK462	PND	GR	3/4"	5.6	225 SQ FT	1'-12"	155°	WHIT	CONCLD	10470A/B		18
VIKING	MIRAGE	VK464	PND	GR	3/4"	8.0	130 SQ FT	1'-12"	200°	WHIT	CONCLD	10470A/B		2
VIKING	MIRAGE EC	VK634	PND	GR	3/4"	8.0	400 SQ FT	1'-12"	155°	WHIT	CONCLD	10470A/B		18
VIKING	DRY	VK134	PND	GR	1/2"	5.6	225 SQ FT	1'-12"	155°	WHIT	DOMS CONCLD	07659A/B		2
VIKING	M	VK355	HSW	GR	1/2"	5.6	198 SQ FT	4'-6"	200°	BRZ	N/A	10899A/B		4
TOTAL SPRINKLERS ON THIS SHEET: 560														
TOTAL SPRINKLERS ON THIS SHEET:												2		

[illegible]

Terrence D. Shofner, P.E.
2675 Scott Avenue
Suite C
St. Louis, MO 63103

DATE: _____

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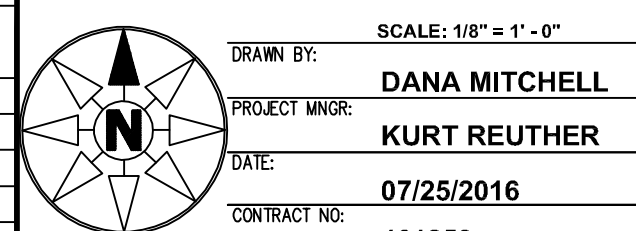
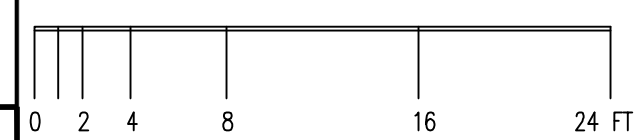


J. F. AHERN CO.
FIRE PROTECTION
CONTRACTORS
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
(314) 535-4544 p (314) 535-0144 f
www.jfahern.com

KEYPLAN

WEBSTER UNIV - INTER.
SCIENCE BUILDING
8274 BIG BEND BLVD.
WEBSTER GROVES, MO

**FIRE PROTECTION
PLAN - LEVEL 4 -
AREA B**



461259
CONSTRUCTION DOCUMENTS

FP-104.B



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125900 Webster ISB - Basement Lvl - RA3
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS1
Contract : 461259
Data File : 46125900 Webster ISB - Basement Lvl - RA3.WXF

Hydraulic Design Information Sheet

Name - 46125900 Webster ISB - Basement Lvl - RA3 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS1
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-100.A
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-2

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC-2
T Specific Ruling Made By Date
E

M	Area of Sprinkler Operation - 2506	System Type	Sprinkler/Nozzle
	Density - .20	(X) Wet	Make Viking
D	Area Per Sprinkler - 130	() Dry	Model VK350
E	Elevation at Highest Outlet - 84.458	() Deluge	Size 3/4"
S	Hose Allowance - Inside - 50	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance - n/a	() Other	Temp.Rat.200
G	Hose Allowance - Outside - 200		

N
Note

Calculation Flow Required - 643.33 Press Required - 106.307 SYS1
Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05/23/16		Cap. -
T	Time of Test - 2:30 PM	Rated Cap.- 1000	Elev.-
E	Static Press - 90	@ Press - 55	
R	Residual Press - 86	Elev. - 87.375	Well
	Flow - 1140		Proof Flow
S	Elevation - 104		

U
P Location - 8274 Big Bend Blvd

P
L Source of Information - Ahern Fire Protection
Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	Solid Piled %	Palletized % Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf
O			
R	Flue Spacing	Clearance:Storage to Ceiling	
A	Longitudinal	Transverse	
G			
E	Horizontal Barriers Provided:		

Water Supply Curve C

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

Page 2
Date 09/22/16

City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

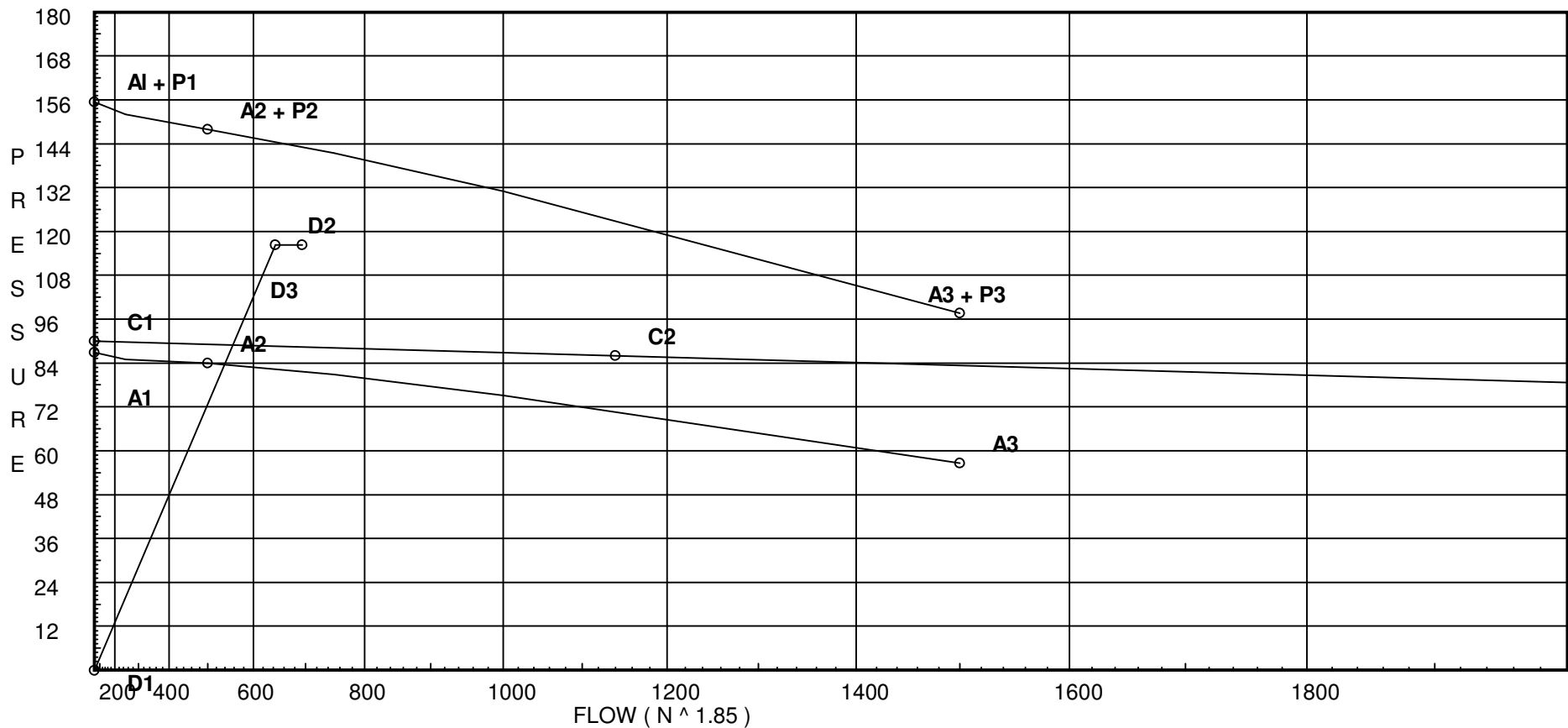
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.879 @ 500
A3 - Adj Resid : 56.554 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : -8.463
D2 - System Flow : 643.329
D2 - System Pressure : 116.240
Hose (Demand) : 50
D3 - System Demand : 693.329
Hose (Adj City) : 200
Safety Margin : 26.839



Fittings Used Summary

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Date 09/22/16

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Jx	Standard Grooved Tee	0	0	4.5	4.8	5.8	8.0	9.8	12.2	17	16.3	20.5	24.8	32.8	41.3	49.7	65	78	88	98	120
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Date 09/22/16

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	84.04	8	17.68	na	33.64	0.2	110	7.0
S2	84.04	8	18.07	na	34.0	0.2	110	7.0
S4	84.46	8	10.56	na	26.0	0.2	130	7.0
S5	84.46	8	10.91	na	26.43	0.2	130	7.0
S6	84.04	8	12.97	na	28.81	0.2	130	7.0
S9	84.46	8	11.91	na	27.61	0.2	130	7.0
S10	84.46	8	12.31	na	28.07	0.2	130	7.0
S11	84.04	8	14.01	na	29.95	0.2	130	7.0
S12	84.46	8	12.28	na	28.03	0.2	130	7.0
S13	84.46	8	12.68	na	28.49	0.2	130	7.0
S14	84.46	8	10.93	na	26.45	0.2	130	7.0
S15	84.46	8	11.29	na	26.88	0.2	130	7.0
S16	84.04	8	12.88	na	28.71	0.2	130	7.0
S17	84.46	8	13.35	na	29.23	0.2	130	7.0
S18	84.46	8	13.79	na	29.71	0.2	130	7.0
S19	84.46	8	11.39	na	27.0	0.2	130	7.0
S20	84.46	8	11.77	na	27.44	0.2	130	7.0
S21	84.04	8	13.41	na	29.29	0.2	130	7.0
S22	84.46	8	15.41	na	31.4	0.2	130	7.0
X1	83.54		19.77	na				
X2	83.54		20.19	na				
S3	83.54	8	21.73	na	37.29	0.2	130	7.0
X4	83.62		12.16	na				
X5	83.62		12.55	na				
X6	83.62		14.54	na				
Z1	83.62		14.82	na				
S7	83.62	8	13.37	na	29.26	0.2	130	7.0
S8	83.62	8	13.72	na	29.63	0.2	130	7.0
X9	83.62		13.66	na				
X10	83.62		14.09	na				
X11	83.62		15.68	na				
Z2	83.62		16.0	na				
X12	83.62		14.06	na				
X13	83.62		14.51	na				
X14	83.62		12.56	na				
X15	83.62		12.96	na				
X16	83.62		14.44	na				
Z3	83.62		17.32	na				
Z4	83.62		19.53	na				
X17	83.62		15.25	na				
X18	83.62		15.73	na				
X19	83.62		13.08	na				
X20	83.62		13.49	na				
X21	83.62		15.02	na				
Z5	83.62		18.02	na				
X22	83.62		17.52	na				
D1	79.75		30.45	na				
D2	79.75		30.51	na				
D3	79.75		31.32	na				
D4	79.75		33.72	na				
D5	79.75		40.9	na				
D6	79.75		56.45	na				
D7	94.0		58.55	na				
B10	95.75		79.07	na				
B11	95.75		99.3	na				
SYS2	110.25		102.38	na				
HV12	103.0		105.52	na				
HV11	89.0		109.22	na	50.0			
SYS1	95.75		106.31	na				
BLK1	97.625		107.84	na				
BLK2	98.167		109.47	na				

Flow Summary - Standard

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TOR	96.167		111.09	na				
BOR	87.375		115.64	na				
PO	87.375		116.24	na				
PI	87.375		81.68	na				
BYPS	94.0		78.91	na				
BKFL	87.5		86.54	na				
SPIG	96.875		82.96	na				
UG1	96.875		87.8	na	200.0			
TEST	104.0		87.45	na				

The maximum velocity is 27.92 and it occurs in the pipe between nodes D4 and D5

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* S1 to X1										
	33.64	1.049	T	5.0	0.500	17.681			K Factor = 8.00	
		120.0		0.0	5.000	0.217				
	33.64	0.3405		0.0	5.500	1.873			Vel = 12.49	
	0.0									
	33.64					19.771			K Factor = 7.57	
S2 to X2										
	34.00	1.049	T	5.0	0.500	18.066			K Factor = 8.00	
		120.0		0.0	5.000	0.217				
	34.0	0.3473		0.0	5.500	1.910			Vel = 12.62	
	0.0									
	34.00					20.193			K Factor = 7.57	
S4 to X4										
	26.00	1.049	T	5.0	0.830	10.562			K Factor = 8.00	
		120.0		0.0	5.000	0.364				
	26.0	0.2115		0.0	5.830	1.233			Vel = 9.65	
	0.0									
	26.00					12.159			K Factor = 7.46	
S5 to X5										
	26.43	1.049	T	5.0	0.830	10.914			K Factor = 8.00	
		120.0		0.0	5.000	0.364				
	26.43	0.2178		0.0	5.830	1.270			Vel = 9.81	
	0.0									
	26.43					12.548			K Factor = 7.46	
S6 to X6										
	28.82	1.049	T	5.0	0.420	12.973			K Factor = 8.00	
		120.0		0.0	5.000	0.182				
	28.82	0.2557		0.0	5.420	1.386			Vel = 10.70	
	0.0									
	28.82					14.541			K Factor = 7.56	
S9 to X9										
	27.61	1.049	T	5.0	0.830	11.914			K Factor = 8.00	
		120.0		0.0	5.000	0.364				
	27.61	0.2362		0.0	5.830	1.377			Vel = 10.25	
	0.0									
	27.61					13.655			K Factor = 7.47	
S10 to X10										
	28.06	1.049	T	5.0	0.830	12.307			K Factor = 8.00	
		120.0		0.0	5.000	0.364				
	28.06	0.2434		0.0	5.830	1.419			Vel = 10.42	
	0.0									
	28.06					14.090			K Factor = 7.48	
S11 to X11										
	29.95	1.049	T	5.0	0.420	14.013			K Factor = 8.00	
		120.0		0.0	5.000	0.182				
	29.95	0.2745		0.0	5.420	1.488			Vel = 11.12	
	0.0									
	29.95					15.683			K Factor = 7.56	
S12 to X12										
	28.03	1.049	T	5.0	0.830	12.278			K Factor = 8.00	
		120.0		0.0	5.000	0.364				
	28.03	0.2429		0.0	5.830	1.416			Vel = 10.41	
	0.0									
	28.03					14.058			K Factor = 7.48	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S13 to X13	28.49 28.49	1.049 120.0 0.2504	T	5.0 0.0 0.0	0.830 5.000 5.830	12.682 0.364 1.460			K Factor = 8.00 Vel = 10.58	
	0.0 28.49						14.506		K Factor = 7.48	
S14 to X14	26.45 26.45	1.049 120.0 0.2182	T	5.0 0.0 0.0	0.830 5.000 5.830	10.928 0.364 1.272			K Factor = 8.00 Vel = 9.82	
	0.0 26.45						12.564		K Factor = 7.46	
S15 to X15	26.88 26.88	1.049 120.0 0.2247	T	5.0 0.0 0.0	0.830 5.000 5.830	11.291 0.364 1.310			K Factor = 8.00 Vel = 9.98	
	0.0 26.88						12.965		K Factor = 7.47	
S16 to X16	28.71 28.71	1.049 120.0 0.2541	T	5.0 0.0 0.0	0.420 5.000 5.420	12.877 0.182 1.377			K Factor = 8.00 Vel = 10.66	
	0.0 28.71						14.436		K Factor = 7.56	
S17 to X17	29.24 29.24	1.049 120.0 0.2628	T	5.0 0.0 0.0	0.830 5.000 5.830	13.354 0.364 1.532			K Factor = 8.00 Vel = 10.85	
	0.0 29.24						15.250		K Factor = 7.49	
S18 to X18	29.71 29.71	1.049 120.0 0.2705	T	5.0 0.0 0.0	0.830 5.000 5.830	13.792 0.364 1.577			K Factor = 8.00 Vel = 11.03	
	0.0 29.71						15.733		K Factor = 7.49	
S19 to X19	27.00 27.0	1.049 120.0 0.2268	T	5.0 0.0 0.0	0.830 5.000 5.830	11.389 0.364 1.322			K Factor = 8.00 Vel = 10.02	
	0.0 27.00						13.075		K Factor = 7.47	
S20 to X20	27.44 27.44	1.049 120.0 0.2336	T	5.0 0.0 0.0	0.830 5.000 5.830	11.766 0.364 1.362			K Factor = 8.00 Vel = 10.19	
	0.0 27.44						13.492		K Factor = 7.47	
S21 to X21	29.29 29.29	1.049 120.0 0.2637	T	5.0 0.0 0.0	0.420 5.000 5.420	13.409 0.182 1.429			K Factor = 8.00 Vel = 10.87	
	0.0 29.29						15.020		K Factor = 7.56	
S22 to X22	31.40 31.4	1.049 120.0 0.2998	T	5.0 0.0 0.0	0.830 5.000 5.830	15.409 0.364 1.748			K Factor = 8.00 Vel = 11.66	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 31.40					17.521			K Factor = 7.50	
*										
X1	33.64	1.61		0.0	10.000	19.771				
to		120.0		0.0	0.0	0.0				
X2	33.64	0.0422		0.0	10.000	0.422			Vel = 5.30	
X2	34.00	1.61		0.0	10.000	20.193				
to		120.0		0.0	0.0	0.0				
S3	67.64	0.1540		0.0	10.000	1.540			Vel = 10.66	
S3	37.30	1.61	2lx	4.6	7.810	21.733			K Factor = 8.00	
to		120.0	T	8.0	12.600	1.641				
D1	104.94	0.3468		0.0	20.410	7.079			Vel = 16.54	
	0.0 104.94					30.453			K Factor = 19.02	
*										
X4	26.00	1.61		0.0	14.840	12.159				
to		120.0		0.0	0.0	0.0				
X5	26.0	0.0262		0.0	14.840	0.389			Vel = 4.10	
X5	26.43	1.61	2lx	4.6	16.140	12.548				
to		120.0		0.0	4.600	0.0				
X6	52.43	0.0961		0.0	20.740	1.993			Vel = 8.26	
X6	28.81	1.61		0.0	1.270	14.541				
to		120.0		0.0	0.0	0.0				
Z1	81.24	0.2165		0.0	1.270	0.275			Vel = 12.80	
Z1	58.89	1.61	lx	2.3	7.570	14.816				
to		120.0	Jx	5.8	16.100	1.676				
D2	140.13	0.5922	T	8.0	23.670	14.017			Vel = 22.08	
	0.0 140.13					30.509			K Factor = 25.37	
*										
S7	29.26	1.61		0.0	10.500	13.373			K Factor = 8.00	
to		120.0		0.0	0.0	0.0				
S8	29.26	0.0327		0.0	10.500	0.343			Vel = 4.61	
S8	29.62	1.61		0.0	9.230	13.716			K Factor = 8.00	
to		120.0		0.0	0.0	0.0				
Z1	58.88	0.1192		0.0	9.230	1.100			Vel = 9.28	
	0.0 58.88					14.816			K Factor = 15.30	
*										
X9	27.61	1.61		0.0	14.830	13.655				
to		120.0		0.0	0.0	0.0				
X10	27.61	0.0293		0.0	14.830	0.435			Vel = 4.35	
X10	28.07	1.61		0.0	14.830	14.090				
to		120.0		0.0	0.0	0.0				
X11	55.68	0.1074		0.0	14.830	1.593			Vel = 8.77	
X11	29.94	1.61		0.0	1.320	15.683				
to		120.0		0.0	0.0	0.0				
Z2	85.62	0.2379		0.0	1.320	0.314			Vel = 13.49	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
Z2 to D3	56.53 142.15	1.61 120.0 0.6081	Ix Jx T	2.3 5.8 8.0	6.340 16.100 22.440	15.997 1.676 13.646			Vel = 22.40	
	0.0 142.15					31.319			K Factor = 25.40	
*										
X12 to X13	28.03 28.03	1.61 120.0 0.0302		0.0 0.0 0.0	14.830 0.0 14.830	14.058 0.0 0.448			Vel = 4.42	
X13 to Z2	28.49 56.52	1.61 120.0 0.1104		0.0 0.0 0.0	13.510 0.0 13.510	14.506 0.0 1.491			Vel = 8.91	
	0.0 56.52					15.997			K Factor = 14.13	
*										
X14 to X15	26.45 26.45	1.61 120.0 0.0270		0.0 0.0 0.0	14.830 0.0 14.830	12.564 0.0 0.401			Vel = 4.17	
X15 to X16	26.88 53.33	1.61 120.0 0.0992		0.0 0.0 0.0	14.830 0.0 14.830	12.965 0.0 1.471			Vel = 8.40	
X16 to Z3	28.71 82.04	1.61 120.0 0.2199	Jx	5.8 0.0 0.0	7.320 5.800 13.120	14.436 0.0 2.885			Vel = 12.93	
Z3 to Z4	58.94 140.98	2.067 120.0 0.1774	J	8.5 0.0 0.0	3.960 8.500 12.460	17.321 0.0 2.210			Vel = 13.48	
Z4 to D4	115.14 256.12	2.067 120.0 0.5353	I T	3.5 10.0 0.0	9.880 13.500 23.380	19.531 1.676 12.515			Vel = 24.49	
	0.0 256.12					33.722			K Factor = 44.10	
*										
X17 to X18	29.24 29.24	1.61 120.0 0.0326		0.0 0.0 0.0	14.830 0.0 14.830	15.250 0.0 0.483			Vel = 4.61	
X18 to Z3	29.70 58.94	1.61 120.0 0.1193	Jx	5.8 0.0 0.0	7.510 5.800 13.310	15.733 0.0 1.588			Vel = 9.29	
	0.0 58.94					17.321			K Factor = 14.16	
*										
X19 to X20	27.00 27.0	1.61 120.0 0.0281		0.0 0.0 0.0	14.830 0.0 14.830	13.075 0.0 0.417			Vel = 4.26	
X20 to X21	27.44 54.44	1.61 120.0 0.1030		0.0 0.0 0.0	14.830 0.0 14.830	13.492 0.0 1.528			Vel = 8.58	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
X21 to Z5	29.29 83.73	1.61 120.0 0.2284	Jx	5.8 0.0 0.0	7.320 5.800 13.120	15.020 0.0 2.997			Vel = 13.20	
Z5 to Z4	31.41 115.14	2.067 120.0 0.1219	J	8.5 0.0 0.0	3.920 8.500 12.420	18.017 0.0 1.514			Vel = 11.01	
	0.0 115.14					19.531			K Factor = 26.05	
*										
X22 to Z5	31.40 31.4	1.61 120.0 0.0373	Jx	5.8 0.0 0.0	7.510 5.800 13.310	17.521 0.0 0.496			Vel = 4.95	
	0.0 31.40					18.017			K Factor = 7.40	
*										
D1 to D2	104.94 104.94	3.068 120.0 0.0149		0.0 0.0 0.0	3.750 0.0 3.750	30.453 0.0 0.056			Vel = 4.55	
D2 to D3	140.12 245.06	3.068 120.0 0.0721		0.0 0.0 0.0	11.230 0.0 11.230	30.509 0.0 0.810			Vel = 10.64	
D3 to D4	142.15 387.21	3.068 120.0 0.1680		0.0 0.0 0.0	14.300 0.0 14.300	31.319 0.0 2.403			Vel = 16.80	
D4 to D5	256.12 643.33	3.068 120.0 0.4298		0.0 0.0 0.0	16.710 0.0 16.710	33.722 0.0 7.182			Vel = 27.92	
D5 to D6	0.0 643.33	3.068 120.0 0.4298	I J	5.0 13.0 0.0	18.170 18.000 36.170	40.904 0.0 15.546			Vel = 27.92	
D6 to D7	0.0 643.33	3.068 120.0 0.4298	I	5.0 0.0 0.0	14.250 5.000 19.250	56.450 -6.172 8.274			Vel = 27.92	
D7 to B10	0.0 643.33	3.068 120.0 0.4298	2I J	10.0 13.0 0.0	26.500 23.000 49.500	58.552 -0.758 21.275			Vel = 27.92	
B10 to B11	0.0 643.33	3.068 120.0 0.4298	2I	10.0 0.0 0.0	37.083 10.000 47.083	79.069 0.0 20.236			Vel = 27.92	
B11 to SYS1	0.0 643.33	4.026 120.0 0.1144	I T B C	6.8 20.0 12.0 13.0	9.390 51.800 61.190	99.305 0.0 7.002			Vel = 16.21	
	0.0 643.33					106.307			K Factor = 62.40	
*										

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
SYS2 to HV12	0.0	4.026 120.0		0.0	7.250 0.0	102.376 3.140	0.0 0.0			
HV12 to BLK1	0.0	4.026 120.0	J	16.0	5.375 16.000	105.516 2.328	0.0 0.0	Vel = 0		
	0.0	0.0		0.0	21.375	0.0	0.0	Vel = 0		
	0.0					107.844		K Factor = 0		
HV11 to SYS1	50.00	4.026 120.0		0.0	6.750 0.0	109.224 -2.923		Qa = 50		
	50.0	0.0009		0.0	6.750	0.006		Vel = 1.26		
SYS1 to BLK1	643.33	4.026 120.0	J	16.0	1.875 16.000	106.307 -0.812				
	693.33	0.1314		0.0	17.875	2.349		Vel = 17.47		
BLK1 to BLK2	0.0	6.065 120.0	2I H	20.0 5.0	46.209 58.000	107.844 -0.235				
	693.33	0.0179	B J	8.0 25.0	104.209	1.862		Vel = 7.70		
BLK2 to TOR	0.0	6.065 120.0	2I	20.0	22.083 20.000	109.471 0.866				
	693.33	0.0179		0.0	42.083	0.752		Vel = 7.70		
TOR to BOR	0.0	6.065 120.0	B J	8.0 25.0	8.792 33.000	111.089 3.808				
	693.33	0.0179		0.0	41.792	0.746		Vel = 7.70		
BOR to PO	0.0	6.065 120.0	B C	8.0 20.0	5.417 28.000	115.643 0.0				
	693.33	0.0179		0.0	33.417	0.597		Vel = 7.70		
	0.0									
	693.33					116.240		K Factor = 64.31		
System Demand Pressure						116.240				
Safety Margin						26.839				
Continuation Pressure						143.079				
Pressure @ Pump Outlet						143.079				
Pressure From Pump Curve						-61.397				
Pressure @ Pump Inlet						81.682				
*										
PI to BYPs	0.0	7.981 120.0	lx	13.1	8.292 13.100	81.682 -2.869				
	693.33	0.0047		0.0	21.392	0.100		Vel = 4.45		
BYPs to BKFL	0.0	6.065 120.0	2J I	50.0 10.0	13.417 60.000	78.913 6.315		** Fixed Loss = 3.5		
	693.33	0.0179	Zib	0.0	73.417	1.312		Vel = 7.70		
BKFL to SPIG	0.0	7.981 120.0	G lx	4.0 13.1	85.291 17.100	86.540 -4.060				
	693.33	0.0047		0.0	102.391	0.480		Vel = 4.45		
SPIG to UG1	0.0	8.39 140.0	2G Zac	13.572 0.0	80.000 134.023	82.960 4.251		** Fixed Loss = 4.251		
	693.33	0.0028	2V	61.074	214.023	0.592		Vel = 4.02		

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125900 Webster ISB - Basement Lvl - RA3

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
			X	59.377						
UG1	200.00	8.39	2G	13.572	500.000	87.803			Qa = 200	
to		140.0	3U	45.805	118.754	-3.086				
TEST	893.33	0.0044	X	59.377	618.754	2.735			Vel = 5.18	
	0.0									
	893.33					87.452			K Factor = 95.53	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125901 Webster ISB - 1st Lvl - RA1
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS1
Contract : 461259
Data File : 46125901 Webster ISB - 1st Lvl - RA1.WXF

Hydraulic Design Information Sheet

Name - 46125901 Webster ISB - 1st Lvl - RA1 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS1
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-101.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC-1
T Specific Ruling Made By Date
E

M	Area of Sprinkler Operation - 1542	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make Viking
D	Area Per Sprinkler - 400	() Dry	Model VK632
E	Elevation at Highest Outlet - 95	() Deluge	Size 3/4"
S	Hose Allowance - Inside - 50	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance - n/a	() Other	Temp.Rat.155
G	Hose Allowance - Outside - 200		

N
Note

Calculation Flow Required - 402.75 Press Required - 130.188 SYS1
Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05/23/16		Cap. -
T	Time of Test - 2:30 PM	Rated Cap.- 1000	Elev.-
E	Static Press - 90	@ Press - 55	
R	Residual Press - 86	Elev. - 87.375	Well
	Flow - 1140		Proof Flow
S	Elevation - 104		

U
P Location - 8274 Big Bend Blvd

P
L Source of Information - Ahern Fire Protection
Y

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	Solid Piled %	Palletized % Rack
M			
	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf
O			
R	Flue Spacing	Clearance:Storage to Ceiling	
A	Longitudinal	Transverse	
G			
E	Horizontal Barriers Provided:		

Water Supply Curve C

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA1

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

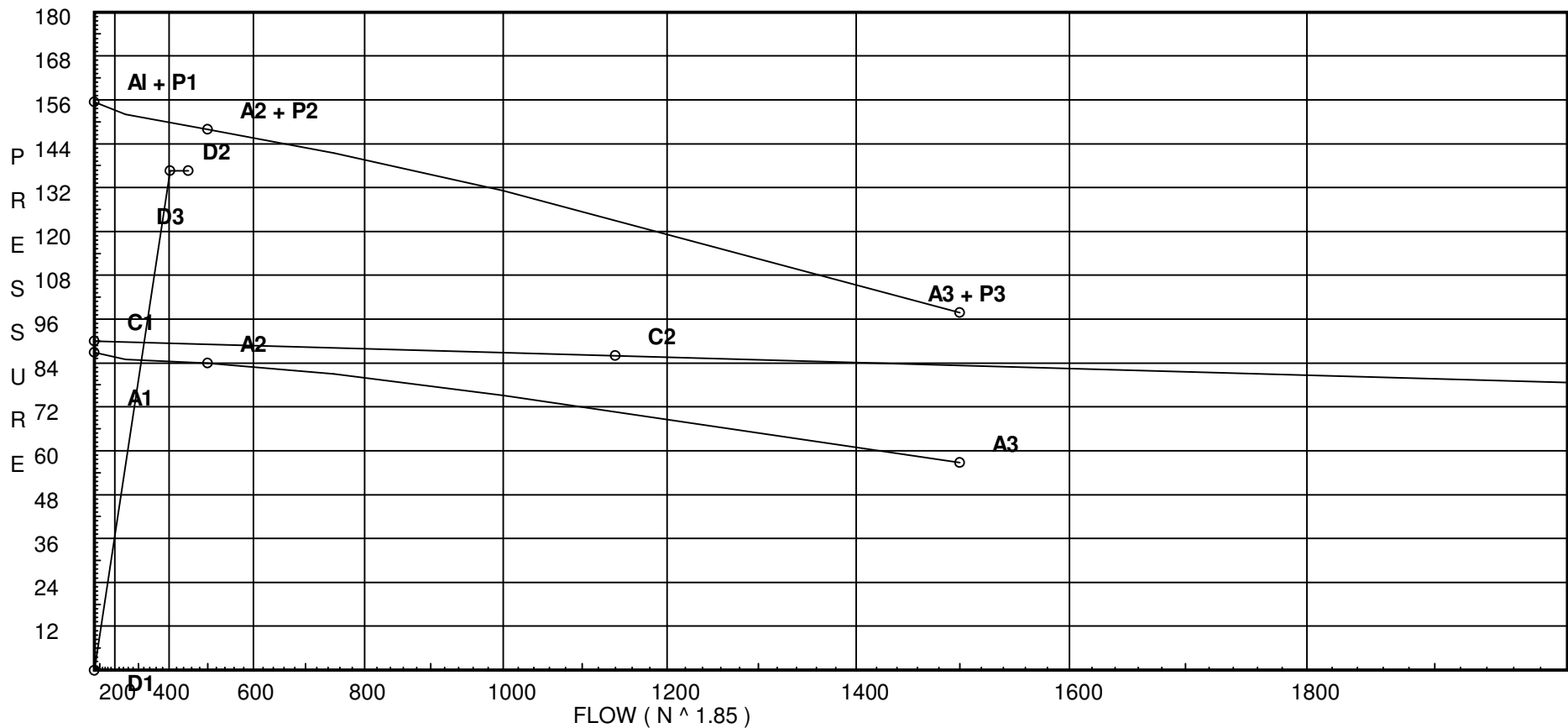
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : -3.898
D2 - System Flow : 402.751
D2 - System Pressure : 136.518
Hose (Demand) : 50
D3 - System Demand : 452.751
Hose (Adj City) : 200
Safety Margin : 12.512



Fittings Used Summary

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA1

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
Hx	Standard Grooved 45 Ell	0	0	.8	1.0	1.2	1.6	2.0	2.4	0	3.3	4.1	5.0	6.6	8.3	9.9	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA1

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Date 09/22/16

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	95.0	8	41.54	na	51.56	0.1	400	25.0
S2	95.0	8	35.95	na	47.97	0.1	400	25.0
S3	95.0	8	38.36	na	49.55	0.1	400	25.0
S4	95.0	8	35.51	na	47.67	0.1	400	25.0
S5	95.0	8	37.89	na	49.24	0.1	400	25.0
S6	95.0	8	25.0	na	40.0	0.1	400	25.0
S7	95.0	5.6	33.8	na	32.56	0.1	82	7.0
S8	95.0	8	25.85	na	40.67	0.1	256	10.6
S9	95.0	8	29.61	na	43.53	0.1	256	10.6
X2	95.75		52.49	na				
X3	95.75		55.95	na				
X4	95.75		51.87	na				
X5	95.75		55.28	na				
X6	96.21		43.48	na				
X7	96.21		44.16	na				
X8	96.21		44.92	na				
X9	96.21		51.3	na				
Z1	96.21		57.58	na				
A1	95.75		71.6	na				
A2	95.75		71.61	na				
A3	95.75		71.8	na				
A4	95.75		72.41	na				
A5	95.75		78.1	na				
A6	95.4		95.7	na				
A7	95.4		100.92	na				
C1	95.29		95.75	na				
C2	95.29		95.75	na				
C3	95.29		95.75	na				
C4	95.29		95.75	na				
C5	95.29		95.75	na				
C6	95.29		95.75	na				
C7	95.29		95.75	na				
C8	95.29		95.75	na				
C9	98.0		94.57	na				
C10	95.75		95.55	na				
B1	95.75		106.33	na				
B2	95.75		106.33	na				
B3	95.75		106.33	na				
B4	95.75		106.33	na				
B5	95.75		106.33	na				
B6	95.75		106.33	na				
B7	95.75		106.51	na				
B8	95.75		107.6	na				
B9	95.75		107.94	na				
B10	95.75		115.81	na				
B11	95.75		122.6	na				
SYS2	110.25		124.95	na				
HV12	103.0		128.09	na				
HV11	89.0		133.11	na	50.0			
SYS1	95.75		130.19	na				
BLK1	97.625		130.42	na				
BLK2	98.167		130.95	na				
TOR	96.167		132.12	na				
BOR	87.375		136.26	na				
PO	87.375		136.52	na				
PI	87.375		84.33	na				
BYPS	94.0		81.51	na				
BKFL	87.5		88.4	na				
SPIG	96.875		84.55	na				
UG1	96.875		90.13	na	200.0			
TEST	104.0		88.57	na				

Flow Summary - Standard

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46125901 Webster ISB - 1st Lvl - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
-------------	-----------	--------	--------------	----	----------------	---------	------	---------------

The maximum velocity is 24.7 and it occurs in the pipe between nodes X9 and Z1

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
*DROPS										
S1	51.56	1.049	T	5.0	0.001	41.539			K Factor = 8.00	
to		120.0	Eq	35.5	40.500	-0.325				
A1	51.56	0.7504		0.0	40.501	30.390			Vel = 19.14	
	0.0									
	51.56					71.604			K Factor = 6.09	
S2	47.96	1.049	T	5.0	0.001	35.948			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-0.325				
X2	47.96	0.6564		0.0	25.701	16.871			Vel = 17.80	
	0.0									
	47.96					52.494			K Factor = 6.62	
S3	49.55	1.049	T	5.0	0.001	38.357			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-0.325				
X3	49.55	0.6971		0.0	25.701	17.915			Vel = 18.39	
	0.0									
	49.55					55.947			K Factor = 6.62	
S4	47.67	1.049	T	5.0	0.001	35.510			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-0.325				
X4	47.67	0.6490		0.0	25.701	16.681			Vel = 17.70	
	0.0									
	47.67					51.866			K Factor = 6.62	
S5	49.24	1.049	T	5.0	0.001	37.891			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-0.325				
X5	49.24	0.6892		0.0	25.701	17.714			Vel = 18.28	
	0.0									
	49.24					55.280			K Factor = 6.62	
S6	40.00	1.049	T	5.0	0.001	25.000			K Factor = 8.00	
to		120.0	Eq	35.5	40.500	-0.524				
X6	40.0	0.4691		0.0	40.501	19.000			Vel = 14.85	
	0.0									
	40.00					43.476			K Factor = 6.07	
S7	32.56	1.049	T	5.0	5.420	33.805			K Factor = 5.60	
to		120.0	Eq	23.5	28.500	-0.524				
X7	32.56	0.3206		0.0	33.920	10.874			Vel = 12.09	
	0.0									
	32.56					44.155			K Factor = 4.90	
S8	40.67	1.049	T	5.0	0.001	25.846			K Factor = 8.00	
to		120.0	Eq	35.5	40.500	-0.524				
X8	40.67	0.4838		0.0	40.501	19.594			Vel = 15.10	
	0.0									
	40.67					44.916			K Factor = 6.07	
S9	43.53	1.049	T	5.0	0.001	29.609			K Factor = 8.00	
to		120.0	Eq	35.5	40.500	-0.524				
X9	43.53	0.5486		0.0	40.501	22.219			Vel = 16.16	
	0.0									
	43.53					51.304			K Factor = 6.08	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
*BRANCHLINES										
*										
X2	47.96	1.38		0.0	20.000	52.494				
to		120.0		0.0	0.0	0.0				
X3	47.96	0.1726		0.0	20.000	3.453			Vel = 10.29	
X3	49.55	1.38	lx	1.9	15.510	55.947				
to		120.0	Hx	1.0	8.900	0.0				
A2	97.51	0.6415	T	6.0	24.410	15.659			Vel = 20.92	
	0.0									
	97.51					71.606			K Factor = 11.52	
*										
X4	47.67	1.38		0.0	20.000	51.866				
to		120.0		0.0	0.0	0.0				
X5	47.67	0.1707		0.0	20.000	3.414			Vel = 10.23	
X5	49.25	1.38	lx	1.9	17.140	55.280				
to		120.0	Hx	1.0	8.900	0.0				
A3	96.92	0.6343	T	6.0	26.040	16.516			Vel = 20.79	
	0.0									
	96.92					71.796			K Factor = 11.44	
*										
X6	40.00	1.61		0.0	11.660	43.476				
to		120.0		0.0	0.0	0.0				
X7	40.0	0.0582		0.0	11.660	0.679			Vel = 6.30	
X7	32.56	1.61		0.0	4.340	44.155				
to		120.0		0.0	0.0	0.0				
X8	72.56	0.1753		0.0	4.340	0.761			Vel = 11.43	
X8	40.67	1.61		0.0	16.000	44.916				
to		120.0		0.0	0.0	0.0				
X9	113.23	0.3992		0.0	16.000	6.388			Vel = 17.84	
X9	43.53	1.61		0.0	8.608	51.304				
to		120.0		0.0	0.0	0.0				
Z1	156.76	0.7287		0.0	8.608	6.273			Vel = 24.70	
Z1	0.0	1.61	2lx	4.6	7.482	57.577				
to		120.0	T	8.0	12.600	0.199				
A4	156.76	0.7288		0.0	20.082	14.636			Vel = 24.70	
	0.0									
	156.76					72.412			K Factor = 18.42	
*MAINS										
A1	51.56	3.26		0.0	0.790	71.604				
to		120.0		0.0	0.0	0.0				
A2	51.56	0.0025		0.0	0.790	0.002			Vel = 1.98	
A2	97.51	3.26		0.0	8.900	71.606				
to		120.0		0.0	0.0	0.0				
A3	149.07	0.0213		0.0	8.900	0.190			Vel = 5.73	
A3	96.92	3.26		0.0	11.400	71.796				
to		120.0		0.0	0.0	0.0				
A4	245.99	0.0540		0.0	11.400	0.616			Vel = 9.46	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A4 to A5	156.76 402.75	3.26 120.0 0.1345		0.0 0.0 0.0	42.330 0.0 42.330	72.412 0.0 5.692			Vel = 15.48	
A5 to A6	0.0 402.75	3.26 120.0 0.1345	J 3I	17.471 20.159 0.0	92.110 37.630 129.740	78.104 0.152 17.445			Vel = 15.48	
A6 to A7	0.0 402.75	3.26 120.0 0.1344	J	17.471 0.0 0.0	21.370 17.471 38.841	95.701 0.0 5.222			Vel = 15.48	
A7 to B6	0.0 402.75	3.26 120.0 0.1345	2H J	6.989 17.471 0.0	16.860 24.460 41.320	100.923 -0.152 5.557			Vel = 15.48	
	0.0 402.75					106.328			K Factor = 39.06	
*										
C1 to C2	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	4.740 0.0 4.740	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C2 to C3	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	0.810 0.0 0.810	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C3 to C4	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	11.690 0.0 11.690	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C4 to C5	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	2.910 0.0 2.910	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C5 to C6	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	12.090 0.0 12.090	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C6 to C7	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	3.240 0.0 3.240	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C7 to C8	0.0 0.0	3.26 120.0 0.0	I	6.72 0.0 0.0	28.260 6.720 34.980	95.748 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C8 to C9	0.0 0.0	3.26 120.0 0.0	4I 2H	26.879 6.989 0.0	57.440 33.868 91.308	95.748 -1.174 0.0	0.0 0.0 0.0		Vel = 0	
C9 to C10	0.0 0.0	3.26 120.0 0.0	2I	13.44 0.0 0.0	22.280 13.440 35.720	94.574 0.974 0.0	0.0 0.0 0.0		Vel = 0	
C10 to A6	0.0 0.0	3.26 120.0 0.0	2H J	6.989 17.471 0.0	18.800 24.460 43.260	95.549 0.152 0.0	0.0 0.0 0.0		Vel = 0	
	0.0									

Final Calculations - Hazen-Williams

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46125901 Webster ISB - 1st Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.		Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0					95.701		K Factor = 0		
* 										
B1 to B2	0.0	3.26 120.0		0.0 0.0	1.040 0.0	106.328 0.0	0.0 0.0			
B2 to B3	0.0	0.0		0.0	1.040	0.0	0.0		Vel = 0	
B2 to B3	0.0	3.26 120.0		0.0 0.0	2.370 0.0	106.328 0.0	0.0 0.0			
B3 to B4	0.0	0.0		0.0	2.370	0.0	0.0		Vel = 0	
B3 to B4	0.0	3.26 120.0		0.0 0.0	8.130 0.0	106.328 0.0	0.0 0.0			
B4 to B5	0.0	0.0		0.0	8.130	0.0	0.0		Vel = 0	
B4 to B5	0.0	3.26 120.0		0.0 0.0	6.130 0.0	106.328 0.0	0.0 0.0			
B5 to B6	0.0	0.0		0.0	6.130	0.0	0.0		Vel = 0	
B5 to B6	0.0	3.26 120.0		0.0 0.0	3.160 0.0	106.328 0.0	0.0 0.0			
B6 to B7	402.75	3.26 120.0		0.0 0.0	1.340 0.0	106.328 0.0				
B7 to B8	402.75	0.1343		0.0	1.340	0.180			Vel = 15.48	
B7 to B8	0.0	3.26 120.0		0.0 0.0	8.100 0.0	106.508 0.0				
B8 to B9	402.75	0.1344		0.0	8.100	1.089			Vel = 15.48	
B8 to B9	0.0	3.26 120.0		0.0 0.0	2.560 0.0	107.597 0.0				
B9 to B10	402.75	0.1344		0.0	2.560	0.344			Vel = 15.48	
B9 to B10	0.0	3.26 120.0		0.0 0.0	58.497 0.0	107.941 0.0				
B10 to B11	402.75	0.1345		0.0	58.497	7.866			Vel = 15.48	
B10 to B11	0.0	3.26 120.0	2I	13.44 0.0	37.083 13.440	115.807 0.0				
B11 to SYS1	402.75	0.1345		0.0	50.523	6.793			Vel = 15.48	
B11 to SYS1	0.0	3.26 120.0	I T	6.72 20.159	9.390 47.039	122.600 0.0				
	402.75	0.1345	B C	6.72 13.44	56.429	7.588			Vel = 15.48	
	0.0 402.75					130.188		K Factor = 35.30		
* 										
SYS2 to HV12	0.0	4.26 120.0		0.0 0.0	7.250 0.0	124.949 3.140	0.0 0.0			
HV12 to BLK1	0.0	0.0		0.0	7.250	0.0	0.0		Vel = 0	
HV12 to BLK1	0.0	4.26 120.0	J	21.067 0.0	5.375 21.067	128.089 2.328	0.0 0.0			
	0.0	0.0		0.0	26.442	0.0	0.0		Vel = 0	
	0.0									

Final Calculations - Hazen-Williams

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46125901 Webster ISB - 1st Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0					130.417			K Factor = 0	
HV11 to SYS1	50.00 50.0	4.26 120.0 0.0007		0.0 0.0 0.0	6.750 0.0 6.750	133.106 -2.923 0.005			Qa = 50 Vel = 1.13	
SYS1 to BLK1	402.75 452.75	4.26 120.0 0.0454	J	21.067 0.0 0.0	1.875 21.067 22.942	130.188 -0.812 1.041			Vel = 10.19	
BLK1 to BLK2	0.0 452.75	6.357 120.0 0.0065	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	130.417 -0.235 0.769			Vel = 4.58	
BLK2 to TOR	0.0 452.75	6.357 120.0 0.0065	2I	25.147 0.0 0.0	22.083 25.147 47.230	130.951 0.866 0.306			Vel = 4.58	
TOR to BOR	0.0 452.75	6.357 120.0 0.0064	B J	10.059 31.433 0.0	8.792 41.492 50.284	132.123 3.808 0.324			Vel = 4.58	
BOR to PO	0.0 452.75	6.357 120.0 0.0065	B C	10.059 25.147 0.0	5.417 35.206 40.623	136.255 0.0 0.263			Vel = 4.58	
	0.0 452.75					136.518			K Factor = 38.75	
System Demand Pressure						136.518				
Safety Margin						12.512				
Continuation Pressure						149.030				
Pressure @ Pump Outlet						149.030				
Pressure From Pump Curve						-64.697				
Pressure @ Pump Inlet						84.332				
*										
PI to BYP	0.0 452.75	8.249 120.0 0.0018	lx	15.386 0.0 0.0	8.292 15.386 23.678	84.332 -2.869 0.043			Vel = 2.72	
BYP to BKFL	0.0 452.75	6.357 120.0 0.0065	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	81.506 6.315 0.575			** Fixed Loss = 3.5 Vel = 4.58	
BKFL to SPIG	0.0 452.75	7.981 120.0 0.0021	G lx	4.0 13.1 0.0	85.291 17.100 102.391	88.396 -4.060 0.218			Vel = 2.90	
SPIG to UG1	0.0 452.75	8.39 140.0 0.0013	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	84.554 5.307 0.269			** Fixed Loss = 5.307 Vel = 2.63	
UG1 to TEST	200.00 652.75	8.39 140.0 0.0025	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	90.130 -3.086 1.530			Qa = 200 Vel = 3.79	
	0.0 652.75					88.574			K Factor = 69.36	

Final Calculations - Hazen-Williams

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46125901 Webster ISB - 1st Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
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Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125901 Webster ISB - 1st Lvl - RA2
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS1
Contract : 461259
Data File : 46125901 Webster ISB - 1st Lvl - RA2.WXF

Hydraulic Design Information Sheet

Name - 46125901 Webster ISB - 1st Lvl - RA2 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS1
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-101.A
Construction: () Combustible (X) Non-Combustible Ceiling Height - 13-5 1/2
Occupancy - HC-2

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC-2
T Specific Ruling Made By Date
E

M Area of Sprinkler Operation - 2506 System Type Sprinkler/Nozzle
Density - .20 (X) Wet Make Viking
D Area Per Sprinkler - 130 () Dry Model VK350
E Elevation at Highest Outlet - 98.458 () Deluge Size 3/4"
S Hose Allowance - Inside - 50 () Preaction K-Factor 8.0
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.200
G Hose Allowance - Outside - 200
N

Note

Calculation Flow Required - 742.16 Press Required - 111.267 SYS1
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104
U

P Location - 8274 Big Bend Blvd
P
L Source of Information - Ahern Fire Protection
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf
R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse
G
E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

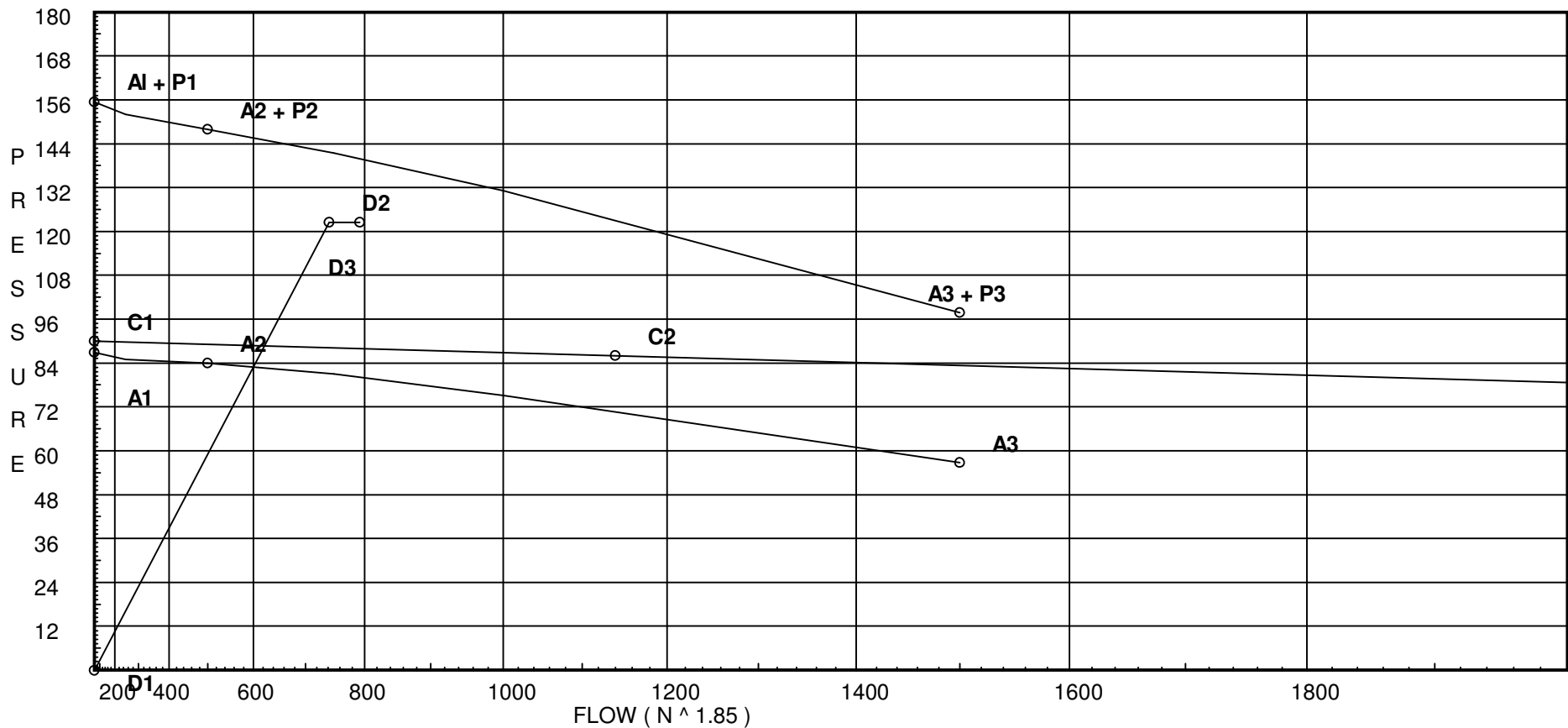
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : -3.898
D2 - System Flow : 742.163
D2 - System Pressure : 122.501
Hose (Demand) : 50
D3 - System Demand : 792.163
Hose (Adj City) : 200
Safety Margin : 17.561



Fittings Used Summary

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
E	90' Standard Elbow Thrd	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Jx	Standard Grooved Tee	0	0	4.5	4.8	5.8	8.0	9.8	12.2	17	16.3	20.5	24.8	32.8	41.3	49.7	65	78	88	98	120
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S11	95.0	8	23.89	na	39.1	0.1	324	17.0
S17	95.0	8	25.0	na	40.0	0.1	400	25.0
S21	95.5	8	11.91	na	27.61	0.2	102	7.0
S22	95.5	8	12.23	na	27.98	0.2	96	7.0
S23	95.5	8	13.41	na	29.3	0.2	96	7.0
S24	95.5	8	16.0	na	32.0	0.2	96	7.0
S25	97.5	8	32.14	na	45.35	0.2	107	7.0
S26	95.0	8	26.93	na	41.52	0.1	400	25.0
S27	94.33	5.6	26.91	na	29.05	0.1	139	7.0
S28	94.33	5.6	30.5	na	30.93	0.1	118	7.0
S29	95.5	8	11.92	na	27.62	0.2	102	7.0
S30	95.5	8	12.2	na	27.95	0.2	96	7.0
S31	95.5	8	13.25	na	29.12	0.2	96	7.0
S32	95.5	8	15.53	na	31.52	0.2	96	7.0
X11	97.5		34.36	na				
S12	97.5	8	20.66	na	36.36	0.2	122	7.0
S13	97.5	8	21.92	na	37.46	0.2	122	7.0
S14	97.5	8	17.11	na	33.09	0.2	117	7.0
S15	97.5	8	18.08	na	34.02	0.2	117	7.0
S16	97.5	8	21.67	na	37.24	0.2	117	7.0
S18	97.5	8	17.31	na	33.29	0.2	117	7.0
S19	97.5	8	18.3	na	34.22	0.2	117	7.0
S20	97.5	8	21.92	na	37.46	0.2	117	7.0
X21	96.75		18.37	na				
X22	96.75		18.86	na				
X23	96.75		20.68	na				
X24	96.75		24.65	na				
X27	95.75		37.51	na				
X28	95.75		38.19	na				
X29	96.21		21.18	na				
X30	96.21		21.68	na				
X31	96.21		23.5	na				
X32	96.21		27.45	na				
A1	95.75		38.85	na				
A2	95.75		38.85	na				
A3	95.75		38.85	na				
A4	95.75		38.85	na				
A5	95.75		38.85	na				
A6	95.4		39.0	na				
A7	95.4		39.07	na				
C1	95.29		38.97	na				
C2	95.29		38.97	na				
C3	95.29		38.97	na				
C4	95.29		38.97	na				
C5	95.29		38.97	na				
C6	95.29		38.97	na				
C7	95.29		38.97	na				
C8	95.29		38.97	na				
C9	98.0		37.8	na				
C10	95.75		38.77	na				
B1	95.75		37.75	na				
B2	95.75		37.76	na				
B3	95.75		37.83	na				
B4	95.75		38.18	na				
B5	95.75		38.73	na				
B6	95.75		39.23	na				
B7	95.75		39.52	na				
B8	95.75		41.56	na				
B9	95.75		42.34	na				
B10	95.75		66.71	na				
B11	95.75		87.76	na				

Flow Summary - Standard

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46125901 Webster ISB - 1st Lvl - RA2

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
SYS2	110.25		107.92	na				
HV12	103.0		111.06	na				
HV11	89.0		114.18	na	50.0			
SYS1	95.75		111.27	na				
BLK1	97.625		113.38	na				
BLK2	98.167		115.32	na				
TOR	96.167		117.04	na				
BOR	87.375		121.76	na				
PO	87.375		122.5	na				
PI	87.375		80.24	na				
BYPS	94.0		77.5	na				
BKFL	87.5		85.43	na				
SPIG	96.875		81.98	na				
UG1	96.875		86.67	na	200.0			
TEST	104.0		86.91	na				

The maximum velocity is 28.53 and it occurs in the pipe between nodes B9 and B10

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
*DROPS										
S11	39.10	1.049	T	5.0	0.001	23.886			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-1.083				
X11	39.1	0.4498		0.0	25.701	11.560			Vel = 14.51	
	0.0									
	39.10					34.363			K Factor = 6.67	
S17	40.00	1.049	T	5.0	2.333	25.000			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-0.325				
B3	40.0	0.4691		0.0	28.033	13.151			Vel = 14.85	
	0.0									
	40.00					37.826			K Factor = 6.50	
S21	27.61	1.049	E	2.0	1.917	11.911			K Factor = 8.00	
to		120.0	T	5.0	27.700	-0.541				
X21	27.61	0.2362	Eq	20.7	29.617	6.997			Vel = 10.25	
	0.0									
	27.61					18.367			K Factor = 6.44	
S22	27.98	1.049	E	2.0	1.917	12.233			K Factor = 8.00	
to		120.0	T	5.0	27.700	-0.541				
X22	27.98	0.2422	Eq	20.7	29.617	7.172			Vel = 10.39	
	0.0									
	27.98					18.864			K Factor = 6.44	
S23	29.30	1.049	E	2.0	1.917	13.411			K Factor = 8.00	
to		120.0	T	5.0	27.700	-0.541				
X23	29.3	0.2637	Eq	20.7	29.617	7.809			Vel = 10.88	
	0.0									
	29.30					20.679			K Factor = 6.44	
S24	32.00	1.049	E	2.0	1.917	15.998			K Factor = 8.00	
to		120.0	T	5.0	27.700	-0.541				
X24	32.0	0.3104	Eq	20.7	29.617	9.193			Vel = 11.88	
	0.0									
	32.00					24.650			K Factor = 6.45	
S25	45.35	1.049	E	2.0	3.170	32.141			K Factor = 8.00	
to		120.0	T	5.0	7.000	0.910				
A7	45.35	0.5917		0.0	10.170	6.018			Vel = 16.84	
	0.0									
	45.35					39.069			K Factor = 7.26	
S26	41.52	1.049	T	5.0	0.001	26.930			K Factor = 8.00	
to		120.0	Eq	20.7	25.700	-0.325				
B7	41.52	0.5025		0.0	25.701	12.915			Vel = 15.41	
	0.0									
	41.52					39.520			K Factor = 6.60	
S27	29.05	1.049	T	5.0	0.001	26.911			K Factor = 5.60	
to		120.0	Eq	38.2	43.200	-0.615				
X27	29.05	0.2596		0.0	43.201	11.215			Vel = 10.78	
	0.0									
	29.05					37.511			K Factor = 4.74	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S28 to X28	30.93 30.93	1.049 120.0 0.2915	T Eq	5.0 23.5 0.0	0.001 28.500 28.501	30.501 -0.615 8.308			K Factor = 5.60 Vel = 11.48	
	0.0 30.93						38.194		K Factor = 5.00	
S29 to X29	27.62 27.62	1.049 120.0 0.2364	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	11.918 -0.308 9.575			K Factor = 8.00 Vel = 10.25	
	0.0 27.62						21.185		K Factor = 6.00	
S30 to X30	27.95 27.95	1.049 120.0 0.2417	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	12.203 -0.308 9.788			K Factor = 8.00 Vel = 10.38	
	0.0 27.95						21.683		K Factor = 6.00	
S31 to X31	29.12 29.12	1.049 120.0 0.2607	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	13.246 -0.308 10.558			K Factor = 8.00 Vel = 10.81	
	0.0 29.12						23.496		K Factor = 6.01	
S32 to X32	31.52 31.52	1.049 120.0 0.3020	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	15.527 -0.308 12.230			K Factor = 8.00 Vel = 11.70	
	0.0 31.52						27.449		K Factor = 6.02	
*BRANCHLINES										
X11 to C10	39.10 39.1	1.38 120.0 0.1183	2Jx	9.6 0.0 0.0	21.250 9.600 30.850	34.363 0.758 3.649			Vel = 8.39	
	0.0 39.10						38.770		K Factor = 6.28	
*										
S12 to S13	36.36 36.36	1.38 120.0 0.1035		0.0 0.0 0.0	12.170 0.0 12.170	20.661 0.0 1.259			K Factor = 8.00 Vel = 7.80	
S13 to B1	37.46 73.82	1.38 120.0 0.3833	3lx T	5.7 6.0 0.0	27.620 11.700 39.320	21.920 0.758 15.072			K Factor = 8.00 Vel = 15.83	
	0.0 73.82						37.750		K Factor = 12.01	
*										
S14 to S15	33.09 33.09	1.38 120.0 0.0869		0.0 0.0 0.0	11.170 0.0 11.170	17.109 0.0 0.971			K Factor = 8.00 Vel = 7.10	
S15 to S16	34.02 67.11	1.38 120.0 0.3213		0.0 0.0 0.0	11.170 0.0 11.170	18.080 0.0 3.589			K Factor = 8.00 Vel = 14.40	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S16 to B2	37.24 104.35	1.38 120.0 0.7272	2lx T	3.8 6.0 0.0	11.280 9.800 21.080	21.669 0.758 15.329			K Factor = 8.00 Vel = 22.38	
	0.0 104.35					37.756			K Factor = 16.98	
*										
S18 to S19	33.29 33.29	1.38 120.0 0.0878		0.0 0.0 0.0	11.170 0.0 11.170	17.314 0.0 0.981			K Factor = 8.00 Vel = 7.14	
S19 to S20	34.21 67.5	1.38 120.0 0.3248		0.0 0.0 0.0	11.170 0.0 11.170	18.295 0.0 3.628			K Factor = 8.00 Vel = 14.48	
S20 to B4	37.46 104.96	1.38 120.0 0.7352	2lx T	3.8 6.0 0.0	11.280 9.800 21.080	21.923 0.758 15.497			K Factor = 8.00 Vel = 22.51	
	0.0 104.96					38.178			K Factor = 16.99	
*										
X21 to X22	27.61 27.61	1.38 120.0 0.0621		0.0 0.0 0.0	8.000 0.0 8.000	18.367 0.0 0.497			Vel = 5.92	
X22 to X23	27.98 55.59	1.38 120.0 0.2269		0.0 0.0 0.0	8.000 0.0 8.000	18.864 0.0 1.815			Vel = 11.92	
X23 to X24	29.30 84.89	1.38 120.0 0.4964		0.0 0.0 0.0	8.000 0.0 8.000	20.679 0.0 3.971			Vel = 18.21	
X24 to B5	31.99 116.88	1.38 120.0 0.8970	lx T	1.9 6.0 0.0	7.310 7.900 15.210	24.650 0.433 13.643			Vel = 25.07	
	0.0 116.88					38.726			K Factor = 18.78	
*										
X27 to X28	29.05 29.05	1.38 120.0 0.0683		0.0 0.0 0.0	10.000 0.0 10.000	37.511 0.0 0.683			Vel = 6.23	
X28 to B8	30.93 59.98	1.38 120.0 0.2610	T	6.0 0.0 0.0	6.910 6.000 12.910	38.194 0.0 3.370			Vel = 12.87	
	0.0 59.98					41.564			K Factor = 9.30	
*										
X29 to X30	27.62 27.62	1.38 120.0 0.0622		0.0 0.0 0.0	8.000 0.0 8.000	21.185 0.0 0.498			Vel = 5.92	
X30 to X31	27.94 55.56	1.38 120.0 0.2266		0.0 0.0 0.0	8.000 0.0 8.000	21.683 0.0 1.813			Vel = 11.92	

Final Calculations - Hazen-Williams

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46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
X31 to X32	29.12 84.68	1.38 120.0 0.4941		0.0 0.0 0.0	8.000 0.0 8.000	23.496 0.0 3.953				
								Vel =	18.16	
X32 to B9	31.52 116.2	1.38 120.0 0.8873	2lx T	3.8 6.0 0.0	6.760 9.800 16.560	27.449 0.199 14.694				
								Vel =	24.93	
	0.0 116.20					42.342		K Factor =	17.86	
*MAINS										
A1 to A2	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	0.790 0.0 0.790	38.848 0.0 0.0	0.0 0.0 0.0			Vel = 0
A2 to A3	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	8.900 0.0 8.900	38.848 0.0 0.0	0.0 0.0 0.0			Vel = 0
A3 to A4	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	11.400 0.0 11.400	38.848 0.0 0.0	0.0 0.0 0.0			Vel = 0
A4 to A5	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	42.330 0.0 42.330	38.848 0.0 0.0	0.0 0.0 0.0			Vel = 0
A5 to A6	0.0 0.0	3.26 120.0 0.0	J 3l	17.471 20.159 0.0	92.110 37.630 129.740	38.848 0.152 0.0	0.0 0.0 0.0			Vel = 0
A6 to A7	39.10 39.1	3.26 120.0 0.0018	J	17.471 0.0 0.0	21.370 17.471 38.841	39.000 0.0 0.069				Vel = 1.50
A7 to B6	45.35 84.45	3.26 120.0 0.0075	2H J	6.989 17.471 0.0	16.860 24.460 41.320	39.069 -0.152 0.310				Vel = 3.25
	0.0 84.45					39.227		K Factor =	13.48	
*										
C1 to C2	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	4.740 0.0 4.740	38.970 0.0 0.0	0.0 0.0 0.0			Vel = 0
C2 to C3	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	0.810 0.0 0.810	38.970 0.0 0.0	0.0 0.0 0.0			Vel = 0
C3 to C4	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	11.690 0.0 11.690	38.970 0.0 0.0	0.0 0.0 0.0			Vel = 0
C4 to C5	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	2.910 0.0 2.910	38.970 0.0 0.0	0.0 0.0 0.0			Vel = 0
C5 to C6	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	12.090 0.0 12.090	38.970 0.0 0.0	0.0 0.0 0.0			Vel = 0

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
C6 to C7	0.0	3.26 120.0		0.0	3.240	38.970	0.0			
	0.0	0.0		0.0	3.240	0.0	0.0	Vel = 0		
C7 to C8	0.0	3.26 120.0	I	6.72	28.260	38.970	0.0			
	0.0	0.0		0.0	6.720	0.0	0.0	Vel = 0		
C8 to C9	0.0	3.26 120.0	4I 2H	26.879 6.989	57.440 33.868	38.970 -1.174	0.0			
	0.0	0.0		0.0	91.308	0.0	0.0	Vel = 0		
C9 to C10	0.0	3.26 120.0	2I	13.44	22.280	37.796	0.0			
	0.0	0.0		0.0	13.440	0.974	0.0	Vel = 0		
C10 to A6	39.10	3.26 120.0	2H J	6.989 17.471	18.800 24.460	38.770 0.152				
	39.1	0.0018		0.0	43.260	0.078		Vel = 1.50		
	0.0 39.10					39.000		K Factor = 6.26		
*										
B1 to B2	73.82	3.26 120.0		0.0	1.040	37.750				
	73.82	0.0058		0.0	1.040	0.006		Vel = 2.84		
B2 to B3	104.35	3.26 120.0		0.0	2.370	37.756				
	178.17	0.0295		0.0	2.370	0.070		Vel = 6.85		
B3 to B4	40.00	3.26 120.0		0.0	8.130	37.826				
	218.17	0.0433		0.0	8.130	0.352		Vel = 8.39		
B4 to B5	104.96	3.26 120.0		0.0	6.130	38.178				
	323.13	0.0894		0.0	6.130	0.548		Vel = 12.42		
B5 to B6	116.88	3.26 120.0		0.0	3.160	38.726				
	440.01	0.1585		0.0	3.160	0.501		Vel = 16.91		
B6 to B7	84.46	3.26 120.0		0.0	1.340	39.227				
	524.47	0.2187		0.0	1.340	0.293		Vel = 20.16		
B7 to B8	41.51	3.26 120.0		0.0	8.100	39.520				
	565.98	0.2523		0.0	8.100	2.044		Vel = 21.75		
B8 to B9	59.98	3.26 120.0		0.0	2.560	41.564				
	625.96	0.3039		0.0	2.560	0.778		Vel = 24.06		
B9 to B10	116.20	3.26 120.0		0.0	58.497	42.342				
	742.16	0.4166		0.0	58.497	24.370		Vel = 28.53		
B10 to B11	0.0	3.26 120.0	2I	13.44	37.083	66.712				
	742.16	0.4166		0.0	50.523	21.047		Vel = 28.53		

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
B11 to SYS1	0.0 742.16	3.26 120.0 0.4166	I T B C	6.72 20.159 6.72 13.44	9.390 47.039 56.429	87.759 0.0 23.508			Vel = 28.53	
	0.0 742.16					111.267			K Factor = 70.36	
*										
SYS2 to HV12	0.0 0.0	4.26 120.0 0.0		0.0 0.0 0.0	7.250 0.0 7.250	107.917 3.140 0.0	0.0 0.0 0.0		Vel = 0	
HV12 to BLK1	0.0 0.0	4.26 120.0 0.0	J	21.067 0.0 0.0	5.375 21.067 26.442	111.057 2.328 0.0	0.0 0.0 0.0		Vel = 0	
	0.0 0.0					113.385			K Factor = 0	
HV11 to SYS1	50.00 50.0	4.26 120.0 0.0007		0.0 0.0 0.0	6.750 0.0 6.750	114.185 -2.923 0.005			Qa = 50 Vel = 1.13	
SYS1 to BLK1	742.16 792.16	4.26 120.0 0.1277	J	21.067 0.0 0.0	1.875 21.067 22.942	111.267 -0.812 2.929			Vel = 17.83	
BLK1 to BLK2	0.0 792.16	6.357 120.0 0.0182	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	113.384 -0.235 2.167			Vel = 8.01	
BLK2 to TOR	0.0 792.16	6.357 120.0 0.0182	2I	25.147 0.0 0.0	22.083 25.147 47.230	115.316 0.866 0.859			Vel = 8.01	
TOR to BOR	0.0 792.16	6.357 120.0 0.0182	B J	10.059 31.433 0.0	8.792 41.492 50.284	117.041 3.808 0.914			Vel = 8.01	
BOR to PO	0.0 792.16	6.357 120.0 0.0182	B C	10.059 25.147 0.0	5.417 35.206 40.623	121.763 0.0 0.738			Vel = 8.01	
	0.0 792.16					122.501			K Factor = 71.57	
System Demand Pressure						122.501				
Safety Margin						17.561				
Continuation Pressure						140.062				
Pressure @ Pump Outlet						140.062				
Pressure From Pump Curve						-59.818				
Pressure @ Pump Inlet						80.244				
*										
PI to BYP	0.0 792.16	8.249 120.0 0.0051	lx	15.386 0.0 0.0	8.292 15.386 23.678	80.244 -2.869 0.121			Vel = 4.76	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BYPS to BKFL	0.0 792.16	6.357 120.0 0.0182	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	77.496 6.315 1.616			* * Fixed Loss = 3.5 Vel = 8.01	
BKFL to SPIG	0.0 792.16	7.981 120.0 0.0060	G lx	4.0 13.1 0.0	85.291 17.100 102.391	85.427 -4.060 0.614			Vel = 5.08	
SPIG to UG1	0.0 792.16	8.39 140.0 0.0035	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	81.981 3.933 0.757			* * Fixed Loss = 3.933 Vel = 4.60	
UG1 to TEST	200.00 992.16	8.39 140.0 0.0054	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	86.671 -3.086 3.321			Qa = 200 Vel = 5.76	
	0.0 992.16					86.906			K Factor = 106.43	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125901 Webster ISB - 1st Lvl - RA4
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS1
Contract : 461259
Data File : 46125901 Webster ISB - 1st Lvl - RA4.WXF

Hydraulic Design Information Sheet

Name - 46125901 Webster ISB - 1st Lvl - RA4 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS1
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-101.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 10-2
Occupancy - HC-1,HC-2

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve

S Other Factory Mutual - HC-1,HC-2

T Specific Ruling

Made By

Date

E

M Area of Sprinkler Operation - 1527 System Type Sprinkler/Nozzle
Density - .10\ .20 (X) Wet Make Viking
D Area Per Sprinkler - 400 () Dry Model VK632
E Elevation at Highest Outlet - 96.125 () Deluge Size 3/4"
S Hose Allowance - Inside - 50 () Preaction K-Factor 8.0
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.155
G Hose Allowance - Outside - 200

N

Note

Calculation Flow Required - 374.92 Press Required - 93.937 SYS1
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104

U

P Location - 8274 Big Bend Blvd

P

L Source of Information - Ahern Fire Protection

Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M () Single Row () Conven. Pallet () Auto. Storage () Encap.
S R () Double Row () Slave Pallet () Solid Shelf () Non
T A () Mult. Row () Open Shelf
O C

R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse

G

E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA4

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

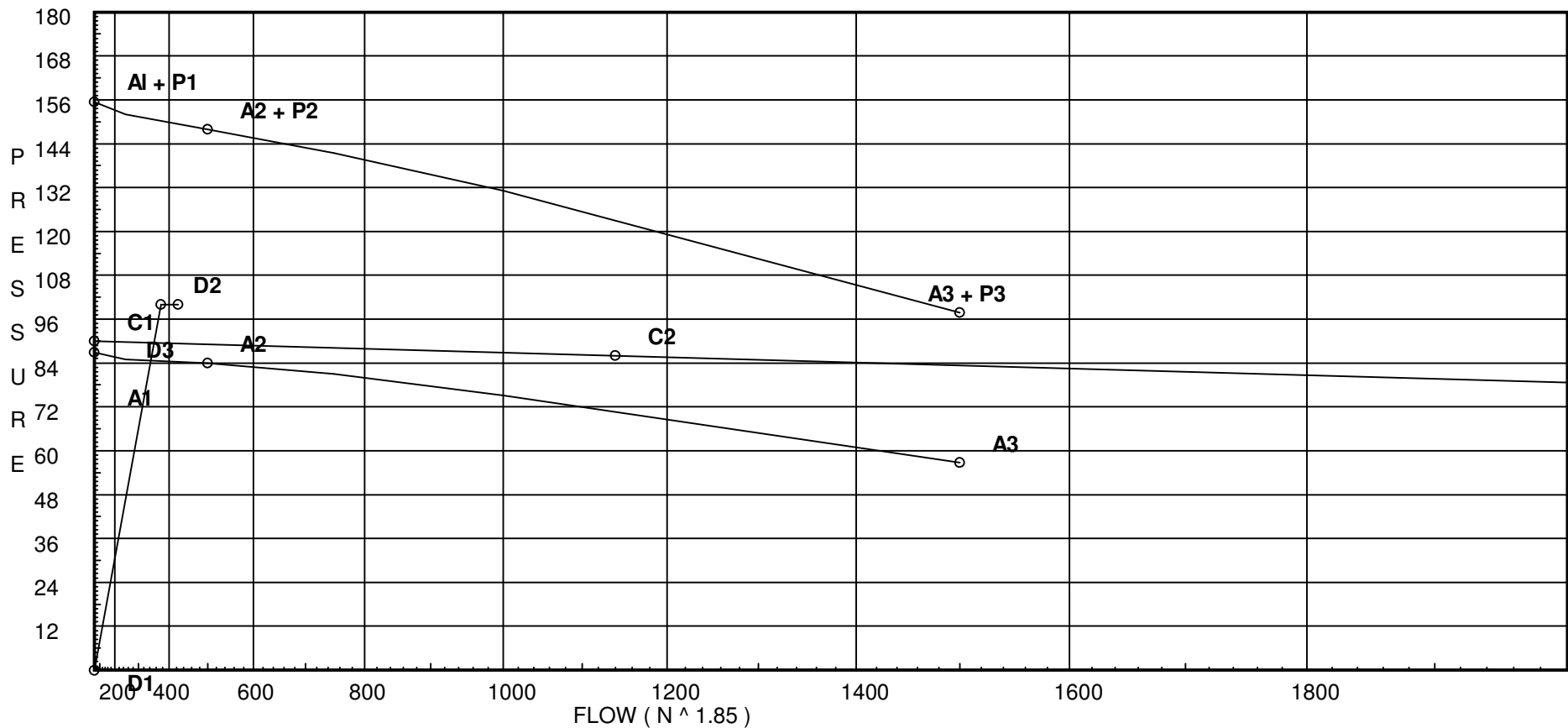
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : -3.608
D2 - System Flow : 374.917
D2 - System Pressure : 99.968
Hose (Demand) : 50
D3 - System Demand : 424.917
Hose (Adj City) : 200
Safety Margin : 49.672



Fittings Used Summary

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA4

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S44	94.0	5.6	30.06	na	30.7	0.1	75	7.0
S45	95.67	8	17.0	na	32.98	0.1	324	17.0
S46	95.67	8	17.85	na	33.8	0.1	324	17.0
S47	94.0	5.6	30.44	na	30.9	0.1	100	7.0
S48	95.04	8	17.41	na	33.38	0.1	324	17.0
S49	95.04	8	18.28	na	34.21	0.1	324	17.0
S50	94.0	5.6	31.34	na	31.35	0.1	100	7.0
S51	95.04	8	21.36	na	36.97	0.1	324	17.0
S41	96.12	8	19.03	na	34.9	0.2	41	7.0
S42	95.86	8	20.28	na	36.03	0.2	41	7.0
S43	95.62	8	24.62	na	39.7	0.2	41	7.0
X45	96.25		30.05	na				
X46	96.25		31.51	na				
X48	96.68		30.3	na				
X49	96.41		31.91	na				
X51	96.41		37.19	na				
A1	95.75		63.6	na				
A2	95.75		63.6	na				
A3	95.75		63.6	na				
A4	95.75		63.6	na				
A5	95.75		63.6	na				
A6	95.4		63.75	na				
A7	95.4		68.32	na				
C1	95.29		37.64	na				
C2	95.29		37.7	na				
C3	95.29		37.71	na				
C4	95.29		38.17	na				
C5	95.29		38.32	na				
C6	95.29		39.3	na				
C7	95.29		39.62	na				
C8	95.29		43.74	na				
C9	98.0		53.32	na				
C10	95.75		58.5	na				
B1	95.75		73.04	na				
B2	95.75		73.04	na				
B3	95.75		73.04	na				
B4	95.75		73.04	na				
B5	95.75		73.04	na				
B6	95.75		73.04	na				
B7	95.75		73.19	na				
B8	95.75		74.15	na				
B9	95.75		74.45	na				
B10	95.75		81.34	na				
B11	95.75		87.29	na				
SYS2	110.25		88.58	na				
HV12	103.0		91.72	na				
HV11	89.0		96.86	na	50.0			
SYS1	95.75		93.94	na				
BLK1	97.625		94.05	na				
BLK2	98.167		94.5	na				
TOR	96.167		95.64	na				
BOR	87.375		99.73	na				
PO	87.375		99.97	na				
PI	87.375		84.56	na				
BYPS	94.0		81.73	na				
BKFL	87.5		88.56	na				
SPIG	96.875		84.69	na				
UG1	96.875		90.36	na	200.0			
TEST	104.0		88.68	na				

The maximum velocity is 23.73 and it occurs in the pipe between nodes S43 and C1

Final Calculations - Hazen-Williams

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46125901 Webster ISB - 1st Lvl - RA4

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
*DROPS										
S44 to C2	30.70 30.7	1.049 120.0 0.2876	T Eq	5.0 23.5 0.0	0.001 28.500 28.501	30.058 -0.559 8.196			K Factor = 5.60 Vel = 11.40	
	0.0 30.70						37.695		K Factor = 5.00	
S45 to X45	32.98 32.98	1.049 120.0 0.3284	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	17.000 -0.251 13.299			K Factor = 8.00 Vel = 12.24	
	0.0 32.98						30.048		K Factor = 6.02	
S46 to X46	33.80 33.8	1.049 120.0 0.3435	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	17.851 -0.251 13.914			K Factor = 8.00 Vel = 12.55	
	0.0 33.80						31.514		K Factor = 6.02	
S47 to C4	30.90 30.9	1.049 120.0 0.2909	T Eq	5.0 23.5 0.0	0.001 28.500 28.501	30.441 -0.559 8.292			K Factor = 5.60 Vel = 11.47	
	0.0 30.90						38.174		K Factor = 5.00	
S48 to X48	33.38 33.38	1.049 120.0 0.3357	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	17.410 -0.710 13.596			K Factor = 8.00 Vel = 12.39	
	0.0 33.38						30.296		K Factor = 6.06	
S49 to X49	34.21 34.21	1.049 120.0 0.3512	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	18.282 -0.593 14.223			K Factor = 8.00 Vel = 12.70	
	0.0 34.21						31.912		K Factor = 6.06	
S50 to C6	31.35 31.35	1.049 120.0 0.2989	T Eq	5.0 23.5 0.0	0.001 28.500 28.501	31.344 -0.559 8.520			K Factor = 5.60 Vel = 11.64	
	0.0 31.35						39.305		K Factor = 5.00	
S51 to X51	36.97 36.97	1.049 120.0 0.4056	T Eq	5.0 35.5 0.0	0.001 40.500 40.501	21.360 -0.593 16.426			K Factor = 8.00 Vel = 13.72	
	0.0 36.97						37.193		K Factor = 6.06	
*BRANCHLINES										
S41 to S42	34.90 34.9	1.38 120.0 0.0958		0.0 0.0 0.0	11.900 0.0 11.900	19.028 0.113 1.140			K Factor = 8.00 Vel = 7.49	
S42 to S43	36.02 70.92	1.38 120.0 0.3560		0.0 0.0 0.0	11.900 0.0 11.900	20.281 0.104 4.236			K Factor = 8.00 Vel = 15.21	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA4

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S43 to C1	39.70 110.62 0.0 110.62	1.38 120.0 0.8101	2lx T	3.8 6.0 0.0	6.090 9.800 15.890	24.621 0.143 12.873			K Factor = 8.00 Vel = 23.73	
						37.637			K Factor = 18.03	
*										
X45 to X46	32.98 32.98	1.38 120.0 0.0863		0.0 0.0 0.0	16.980 0.0 16.980	30.048 0.0 1.466			Vel = 7.07	
X46 to C3	33.81 66.79 0.0 66.79	1.38 120.0 0.3185	lx T	1.9 6.0 0.0	10.250 7.900 18.150	31.514 0.416 5.781			Vel = 14.33	
						37.711			K Factor = 10.88	
*										
X48 to X49	33.38 33.38	1.38 120.0 0.0883		0.0 0.0 0.0	16.980 0.0 16.980	30.296 0.117 1.499			Vel = 7.16	
X49 to C5	34.21 67.59 0.0 67.59	1.38 120.0 0.3256	lx T	1.9 6.0 0.0	10.300 7.900 18.200	31.912 0.485 5.926			Vel = 14.50	
						38.323			K Factor = 10.92	
*										
X51 to C7	36.97 36.97 0.0 36.97	1.38 120.0 0.1067	lx T	1.9 6.0 0.0	10.300 7.900 18.200	37.193 0.485 1.942			Vel = 7.93	
						39.620			K Factor = 5.87	
*MAINS										
A1 to A2	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	0.790 0.0 0.790	63.596 0.0 0.0	0.0 0.0 0.0		Vel = 0	
A2 to A3	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	8.900 0.0 8.900	63.596 0.0 0.0	0.0 0.0 0.0		Vel = 0	
A3 to A4	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	11.400 0.0 11.400	63.596 0.0 0.0	0.0 0.0 0.0		Vel = 0	
A4 to A5	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	42.330 0.0 42.330	63.596 0.0 0.0	0.0 0.0 0.0		Vel = 0	
A5 to A6	0.0 0.0	3.26 120.0 0.0	J 3l	17.471 20.159 0.0	92.110 37.630 129.740	63.596 0.152 0.0	0.0 0.0 0.0		Vel = 0	
A6 to A7	374.92 374.92	3.26 120.0 0.1178	J	17.471 0.0 0.0	21.370 17.471 38.841	63.748 0.0 4.575			Vel = 14.41	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA4

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A7 to B6	0.0 374.92	3.26 120.0 0.1178	2H J	6.989 17.471 0.0	16.860 24.460 41.320	68.323 -0.152 4.867			Vel = 14.41	
	0.0 374.92					73.038			K Factor = 43.87	
*										
C1 to C2	110.62 110.62	3.26 120.0 0.0122		0.0 0.0 0.0	4.740 0.0 4.740	37.637 0.0 0.058			Vel = 4.25	
C2 to C3	30.70 141.32	3.26 120.0 0.0198		0.0 0.0 0.0	0.810 0.0 0.810	37.695 0.0 0.016			Vel = 5.43	
C3 to C4	66.79 208.11	3.26 120.0 0.0396		0.0 0.0 0.0	11.690 0.0 11.690	37.711 0.0 0.463			Vel = 8.00	
C4 to C5	30.89 239.0	3.26 120.0 0.0512		0.0 0.0 0.0	2.910 0.0 2.910	38.174 0.0 0.149			Vel = 9.19	
C5 to C6	67.59 306.59	3.26 120.0 0.0812		0.0 0.0 0.0	12.090 0.0 12.090	38.323 0.0 0.982			Vel = 11.78	
C6 to C7	31.35 337.94	3.26 120.0 0.0972		0.0 0.0 0.0	3.240 0.0 3.240	39.305 0.0 0.315			Vel = 12.99	
C7 to C8	36.98 374.92	3.26 120.0 0.1178	I	6.72 0.0 0.0	28.260 6.720 34.980	39.620 0.0 4.120			Vel = 14.41	
C8 to C9	0.0 374.92	3.26 120.0 0.1178	4I 2H	26.879 6.989 0.0	57.440 33.868 91.308	43.740 -1.174 10.754			Vel = 14.41	
C9 to C10	0.0 374.92	3.26 120.0 0.1178	2I	13.44 0.0 0.0	22.280 13.440 35.720	53.320 0.974 4.207			Vel = 14.41	
C10 to A6	0.0 374.92	3.26 120.0 0.1178	2H J	6.989 17.471 0.0	18.800 24.460 43.260	58.501 0.152 5.095			Vel = 14.41	
	0.0 374.92					63.748			K Factor = 46.96	
*										
B1 to B2	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	1.040 0.0 1.040	73.038 0.0 0.0	0.0 0.0 0.0		Vel = 0	
B2 to B3	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	2.370 0.0 2.370	73.038 0.0 0.0	0.0 0.0 0.0		Vel = 0	
B3 to B4	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	8.130 0.0 8.130	73.038 0.0 0.0	0.0 0.0 0.0		Vel = 0	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA4

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
B4 to B5	0.0	3.26 120.0		0.0	6.130	73.038	0.0			
	0.0	0.0		0.0	6.130	0.0	0.0	Vel = 0		
B5 to B6	0.0	3.26 120.0		0.0	3.160	73.038	0.0			
	0.0	0.0		0.0	3.160	0.0	0.0	Vel = 0		
B6 to B7	374.92	3.26 120.0		0.0	1.340	73.038				
	374.92	0.1172		0.0	1.340	0.157		Vel = 14.41		
B7 to B8	0.0	3.26 120.0		0.0	8.100	73.195				
	374.92	0.1178		0.0	8.100	0.954		Vel = 14.41		
B8 to B9	0.0	3.26 120.0		0.0	2.560	74.149				
	374.92	0.1180		0.0	2.560	0.302		Vel = 14.41		
B9 to B10	0.0	3.26 120.0		0.0	58.497	74.451				
	374.92	0.1178		0.0	58.497	6.890		Vel = 14.41		
B10 to B11	0.0	3.26 120.0	2I	13.44	37.083	81.341				
	374.92	0.1178		0.0	13.440	0.0		Vel = 14.41		
B11 to SYS1	0.0	3.26 120.0	I T B C	6.72 20.159 6.72 13.44	9.390 47.039 56.429	87.291 0.0				
	374.92	0.1178				6.646		Vel = 14.41		
	0.0 374.92					93.937		K Factor = 38.68		
*										
SYS2 to HV12	0.0	4.26 120.0		0.0	7.250	88.583	0.0			
	0.0	0.0		0.0	7.250	0.0	0.0	Vel = 0		
HV12 to BLK1	0.0	4.26 120.0	J	21.067	5.375	91.723	0.0			
	0.0	0.0		0.0	21.067	2.328	0.0	Vel = 0		
	0.0 0.0									
						94.051		K Factor = 0		
HV11 to SYS1	50.00	4.26 120.0		0.0	6.750	96.855		Qa = 50		
	50.0	0.0007		0.0	6.750	-2.923 0.005		Vel = 1.13		
SYS1 to BLK1	374.92	4.26 120.0	J	21.067	1.875	93.937				
	424.92	0.0404		0.0	21.067 22.942	-0.812 0.926		Vel = 9.56		
BLK1 to BLK2	0.0	6.357 120.0	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	94.051 -0.235 0.684				
	424.92	0.0057						Vel = 4.30		

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - 1st Lvl - RA4

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BLK2 to TOR	0.0 424.92	6.357 120.0 0.0058	2I	25.147 0.0 0.0	22.083 25.147 47.230	94.500 0.866 0.272			Vel = 4.30	
TOR to BOR	0.0 424.92	6.357 120.0 0.0057	B J	10.059 31.433 0.0	8.792 41.492 50.284	95.638 3.808 0.288			Vel = 4.30	
BOR to PO	0.0 424.92	6.357 120.0 0.0058	B C	10.059 25.147 0.0	5.417 35.206 40.623	99.734 0.0 0.234			Vel = 4.30	
	0.0 424.92					99.968			K Factor = 42.50	
System Demand Pressure						99.968				
Safety Margin						49.672				
Continuation Pressure						149.640				
Pressure @ Pump Outlet						149.640				
Pressure From Pump Curve						-65.080				
Pressure @ Pump Inlet						84.560				
*										
PI to BYP	0.0 424.92	8.249 120.0 0.0016	lx	15.386 0.0 0.0	8.292 15.386 23.678	84.560 -2.869 0.038			Vel = 2.55	
BYP to BKFL	0.0 424.92	6.357 120.0 0.0058	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	81.729 6.315 0.511			** Fixed Loss = 3.5 Vel = 4.30	
BKFL to SPIG	0.0 424.92	7.981 120.0 0.0019	G lx	4.0 13.1 0.0	85.291 17.100 102.391	88.555 -4.060 0.194			Vel = 2.73	
SPIG to UG1	0.0 424.92	8.39 140.0 0.0011	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	84.689 5.430 0.239			** Fixed Loss = 5.43 Vel = 2.47	
UG1 to TEST	200.00 624.92	8.39 140.0 0.0023	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	90.358 -3.086 1.412			Qa = 200 Vel = 3.63	
	0.0 624.92					88.684			K Factor = 66.36	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125902 Webster ISB - 2nd Lvl - RA1
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS2
Contract : 461259
Data File : 46125902 Webster ISB - 2nd Lvl - RA1.WXF

Hydraulic Design Information Sheet

Name - 46125902 Webster ISB - 2nd Lvl - RA1 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS2
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-102.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve

S Other Factory Mutual - HC1
T Specific Ruling

Made By

Date

M Area of Sprinkler Operation - 1552 System Type Sprinkler/Nozzle
Density - .10 (X) Wet Make Viking
D Area Per Sprinkler - 400 () Dry Model VK634
E Elevation at Highest Outlet - 109.5 () Deluge Size 3/4"
S Hose Allowance - Inside - 50 () Preaction K-Factor 8.0
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.155
G Hose Allowance - Outside - 200

N
Note

Calculation Flow Required - 426.86 Press Required - 118.909 SYS2
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104

U
P Location - 8274 Big Bend Blvd

P
L Source of Information - Ahern Fire Protection
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse

G
E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Date 09/22/16

City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

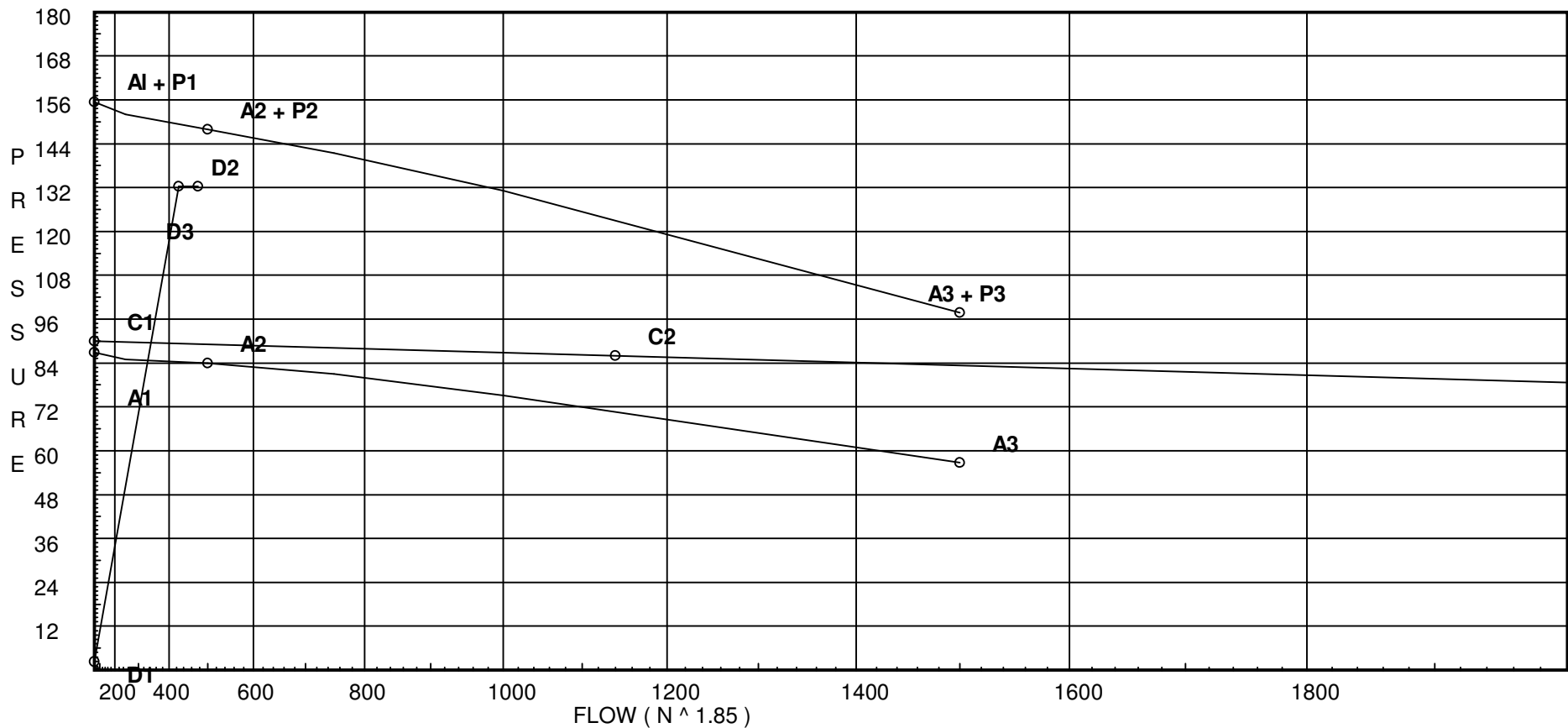
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 2.382
D2 - System Flow : 426.86
D2 - System Pressure : 132.261
Hose (Demand) : 50
D3 - System Demand : 476.86
Hose (Adj City) : 200
Safety Margin : 16.209



Fittings Used Summary

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Date 09/22/16

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	109.5	8	17.0	na	32.98	0.1	324	17.0
S2	109.5	8	17.28	na	33.26	0.1	324	17.0
S3	109.5	8	18.83	na	34.72	0.1	324	17.0
S4	109.5	8	22.22	na	37.71	0.1	324	17.0
S5	109.5	8	19.62	na	35.43	0.1	256	10.6
S6	109.5	8	19.98	na	35.76	0.1	324	17.0
S7	109.5	8	21.61	na	37.19	0.1	256	10.6
S8	109.5	8	23.69	na	38.94	0.1	324	17.0
S9	109.5	8	33.64	na	46.4	0.1	256	10.6
S10	109.5	8	34.47	na	46.97	0.1	256	10.6
S11	109.5	8	35.26	na	47.5	0.1	256	10.6
X1	110.71		29.81	na				
X2	110.71		30.3	na				
X3	110.71		32.97	na				
X4	110.71		38.78	na				
Z1	110.71		42.26	na				
X5	110.71		34.32	na				
X6	110.71		34.93	na				
X7	110.71		35.16	na				
X8	110.71		41.28	na				
Z2	110.71		50.11	na				
A2	110.25		63.19	na				
A3	110.25		63.23	na				
A4	110.25		63.32	na				
A5	110.25		64.34	na				
A6	110.25		64.82	na				
A7	110.25		66.27	na				
A8	110.25		68.67	na				
A9	110.25		94.31	na				
A10	110.25		107.98	na				
SYS2	110.25		118.91	na				
HV12	103.0		122.34	na	50.0			
HV11	89.0		129.73	na				
SYS1	95.75		126.8	na				
BLK1	97.625		125.99	na				
BLK2	98.167		126.6	na				
TOR	96.167		127.81	na				
BOR	87.375		131.97	na				
PO	87.375		132.26	na				
PI	87.375		84.12	na				
BYPS	94.0		81.3	na				
BKFL	87.5		88.25	na				
SPIG	96.875		84.43	na				
UG1	96.875		89.92	na	200.0			
TEST	104.0		88.48	na				

The maximum velocity is 23.22 and it occurs in the pipe between nodes X8 and Z2

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* 										
S1 to X1	32.98 32.98	1.049 120.0 0.3284	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	17.000 -0.524 13.332			K Factor = 8.00 Vel = 12.24	
	0.0 32.98						29.808		K Factor = 6.04	
S2 to X2	33.26 33.26	1.049 120.0 0.3334	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	17.285 -0.524 13.538			K Factor = 8.00 Vel = 12.35	
	0.0 33.26						30.299		K Factor = 6.04	
S3 to X3	34.72 34.72	1.049 120.0 0.3610	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	18.833 -0.524 14.656			K Factor = 8.00 Vel = 12.89	
	0.0 34.72						32.965		K Factor = 6.05	
S4 to X4	37.71 37.71	1.049 120.0 0.4207	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	22.222 -0.524 17.079			K Factor = 8.00 Vel = 14.00	
	0.0 37.71						38.777		K Factor = 6.06	
S5 to X5	35.43 35.43	1.049 120.0 0.3749	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	19.618 -0.524 15.221			K Factor = 8.00 Vel = 13.15	
	0.0 35.43						34.315		K Factor = 6.05	
S6 to X6	35.76 35.76	1.049 120.0 0.3812	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	19.976 -0.524 15.478			K Factor = 8.00 Vel = 13.28	
	0.0 35.76						34.930		K Factor = 6.05	
S7 to X7	37.19 37.19	1.049 120.0 0.4100	T Eq	5.0 20.7 0.0	8.625 25.700 34.325	21.612 -0.524 14.074			K Factor = 8.00 Vel = 13.81	
	0.0 37.19						35.162		K Factor = 6.27	
S8 to X8	38.94 38.94	1.049 120.0 0.4463	T Eq	5.0 35.5 0.0	0.100 40.500 40.600	23.688 -0.524 18.121			K Factor = 8.00 Vel = 14.46	
	0.0 38.94						41.285		K Factor = 6.06	
S9 to A4	46.40 46.4	1.049 120.0 0.6173	T Eq	5.0 43.5 0.0	0.100 48.500 48.600	33.639 -0.325 30.003			K Factor = 8.00 Vel = 17.22	
	0.0 46.40						63.317		K Factor = 5.83	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S10 to A6	46.97 46.97	1.049 120.0 0.6314	T Eq	5.0 43.5 0.0	0.100 48.500 48.600	34.466 -0.325 30.684			K Factor = 8.00 Vel = 17.44	
	0.0 46.97					64.825			K Factor = 5.83	
S11 to A7	47.50 47.5	1.049 120.0 0.6448	T Eq	5.0 43.5 0.0	0.100 48.500 48.600	35.258 -0.325 31.337			K Factor = 8.00 Vel = 17.63	
	0.0 47.50					66.270			K Factor = 5.83	
*										
X1 to X2	32.98 32.98	1.61 120.0 0.0407	lx	2.3 0.0 0.0	9.750 2.300 12.050	29.808 0.0 0.491			Vel = 5.20	
X2 to X3	33.26 66.24	1.61 120.0 0.1481		0.0 0.0 0.0	18.000 0.0 18.000	30.299 0.0 2.666			Vel = 10.44	
X3 to X4	34.72 100.96	1.61 120.0 0.3229		0.0 0.0 0.0	18.000 0.0 18.000	32.965 0.0 5.812			Vel = 15.91	
X4 to Z1	37.71 138.67	1.61 120.0 0.5810		0.0 0.0 0.0	6.000 0.0 6.000	38.777 0.0 3.486			Vel = 21.85	
Z1 to A2	0.0 138.67	1.61 120.0 0.5809	4l T	10.4 8.0 0.0	17.280 18.400 35.680	42.263 0.199 20.726			Vel = 21.85	
	0.0 138.67					63.188			K Factor = 17.44	
*										
X5 to X6	35.43 35.43	1.61 120.0 0.0466	lx	2.3 0.0 0.0	10.910 2.300 13.210	34.315 0.0 0.615			Vel = 5.58	
X6 to X7	35.76 71.19	1.61 120.0 0.1693		0.0 0.0 0.0	1.370 0.0 1.370	34.930 0.0 0.232			Vel = 11.22	
X7 to X8	37.19 108.38	1.61 120.0 0.3682		0.0 0.0 0.0	16.630 0.0 16.630	35.162 0.0 6.123			Vel = 17.08	
X8 to Z2	38.94 147.32	1.61 120.0 0.6496		0.0 0.0 0.0	13.590 0.0 13.590	41.285 0.0 8.828			Vel = 23.22	
Z2 to A3	0.0 147.32	1.61 120.0 0.6497	2lx T	4.6 8.0 0.0	7.280 12.600 19.880	50.113 0.199 12.916			Vel = 23.22	
	0.0 147.32					63.228			K Factor = 18.53	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.		Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* 										
A2 to A3	138.67	3.26 120.0		0.0 0.0	2.110 0.0	63.188 0.0				
A3 to A4	138.67	0.0190		0.0	2.110	0.040		Vel =	5.33	
A3 to A4	147.32	3.26 120.0		0.0 0.0	1.250 0.0	63.228 0.0				
A4 to A5	285.99	0.0712		0.0	1.250	0.089		Vel =	10.99	
A4 to A5	46.40	3.26 120.0		0.0 0.0	10.830 0.0	63.317 0.0				
A5 to A6	332.39	0.0943		0.0	10.830	1.021		Vel =	12.78	
A5 to A6	0.0	3.26 120.0		0.0 0.0	5.170 0.0	64.338 0.0				
A6 to A7	332.39	0.0942		0.0	5.170	0.487		Vel =	12.78	
A6 to A7	46.97	3.26 120.0		0.0 0.0	12.000 0.0	64.825 0.0				
A7 to A8	379.36	0.1204		0.0	12.000	1.445		Vel =	14.58	
A7 to A8	47.50	3.26 120.0		0.0 0.0	16.030 0.0	66.270 0.0				
A8 to A9	426.86	0.1497		0.0	16.030	2.400		Vel =	16.41	
A8 to A9	0.0	3.26 120.0	4I J	26.879 17.471	126.920 44.350	68.670 0.0				
A9 to A10	426.86	0.1497		0.0	171.270	25.644		Vel =	16.41	
A9 to A10	0.0	3.26 120.0		0.0 0.0	91.250 0.0	94.314 0.0				
A10 to SYS2	426.86	0.1497		0.0	91.250	13.663		Vel =	16.41	
A10 to SYS2	0.0	3.26 120.0	2I B C T	13.44 6.72 13.44 20.159	19.250 53.759 73.009	107.977 0.0 10.932		Vel =	16.41	
						0.0				
						426.86	118.909	K Factor =	39.15	
* 										
SYS2 to HV12	426.86	4.26 120.0		0.0 0.0	7.250 0.0	118.909 3.140				
HV12 to BLK1	426.86	0.0407		0.0	7.250	0.295		Vel =	9.61	
HV12 to BLK1	50.00	4.26 120.0	J	21.067 0.0	5.375 21.067	122.344 2.328		Qa = 50		
						0.0		Vel =	10.73	
						476.86	125.992	K Factor =	42.48	
HV11 to SYS1	0.0	4.26 120.0		0.0 0.0	6.750 0.0	129.728 -2.923	0.0 0.0			
SYS1 to BLK1	0.0	0.0		0.0	6.750	0.0	0.0	Vel =	0	
SYS1 to BLK1	0.0	4.26 120.0	J	21.067 0.0	1.875 21.067	126.804 -0.812	0.0 0.0			
						0.0		Vel =	0	
						22.942	0.0			

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BLK1 to BLK2	476.86	6.357 120.0	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	125.992 -0.235 0.848			Vel = 4.82	
BLK2 to TOR	0.0	6.357 120.0	2I	25.147 0.0	22.083 25.147	126.605 0.866			Vel = 4.82	
TOR to BOR	476.86	0.0071		0.0	47.230	0.336			Vel = 4.82	
TOR to BOR	0.0	6.357 120.0	B J	10.059 31.433	8.792 41.492	127.807 3.808			Vel = 4.82	
BOR to PO	476.86	0.0071		0.0	50.284	0.357			Vel = 4.82	
BOR to PO	0.0	6.357 120.0	B C	10.059 25.147	5.417 35.206	131.972 0.0			Vel = 4.82	
	0.0 476.86					132.261			K Factor = 41.46	
System Demand Pressure						132.261				
Safety Margin						16.209				
Continuation Pressure						148.470				
Pressure @ Pump Outlet						148.470				
Pressure From Pump Curve						-64.349				
Pressure @ Pump Inlet						84.122				
*										
PI to BYPS	0.0	8.249 120.0	lx	15.386 0.0	8.292 15.386	84.122 -2.869			Vel = 2.86	
BYPS to BKFL	476.86	0.0020		0.0	23.678	0.047			Vel = 4.82	** Fixed Loss = 3.5
BYPS to BKFL	0.0	6.357 120.0	2J I	62.867 12.573	13.417 75.440	81.300 6.315			Vel = 4.82	
BKFL to SPIG	476.86	0.0071	Zib	0.0	88.857	0.631			Vel = 3.06	
BKFL to SPIG	0.0	7.981 120.0	G lx	4.0 13.1	85.291 17.100	88.246 -4.060			Vel = 3.06	
SPIG to UG1	476.86	0.0023		0.0	102.391	0.240			Vel = 2.77	** Fixed Loss = 5.201
SPIG to UG1	0.0	8.39 140.0	2G Zac	13.572 0.0	80.000 134.023	84.426 5.201			Vel = 2.77	
UG1 to TEST	476.86	0.0014	2V X	61.074 59.377	214.023	0.297			Qa = 200	
UG1 to TEST	200.00	8.39 140.0	2G 3U	13.572 45.805	500.000 118.754	89.924 -3.086			Vel = 3.93	
TEST	676.86	0.0026	X	59.377	618.754	1.638			Vel = 3.93	
	0.0 676.86					88.476			K Factor = 71.96	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125902 Webster ISB - 2nd Lvl - RA2
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS2
Contract : 461259
Data File : 46125902 Webster ISB - 2nd Lvl - RA2.WXF

Hydraulic Design Information Sheet

Name - 46125902 Webster ISB - 2nd Lvl - RA2 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS2
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-102.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 11-2
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC1
T Specific Ruling Made By Date
E

M	Area of Sprinkler Operation - 1542	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make Viking
D	Area Per Sprinkler - 225	() Dry	Model VK178
E	Elevation at Highest Outlet - 111.167	() Deluge	Size 1/2"
S	Hose Allowance - Inside - 50	() Preaction	K-Factor 5.6
I	Rack Sprinkler Allowance - n/a	() Other	Temp.Rat.155
G	Hose Allowance - Outside - 200		

N Note

Calculation Flow Required - 212.37 Press Required - 47.074 SYS2
Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05/23/16		Cap. -
T	Time of Test - 2:30 PM	Rated Cap.- 1000	Elev.-
E	Static Press - 90	@ Press - 55	
R	Residual Press - 86	Elev. - 87.375	Well
	Flow - 1140		Proof Flow
S	Elevation - 104		

U Location - 8274 Big Bend Blvd

P Source of Information - Ahern Fire Protection

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	Solid Piled %	Palletized % Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R	K	Flue Spacing	Clearance:Storage to Ceiling
A		Longitudinal	Transverse

G Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Date 09/22/16

City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

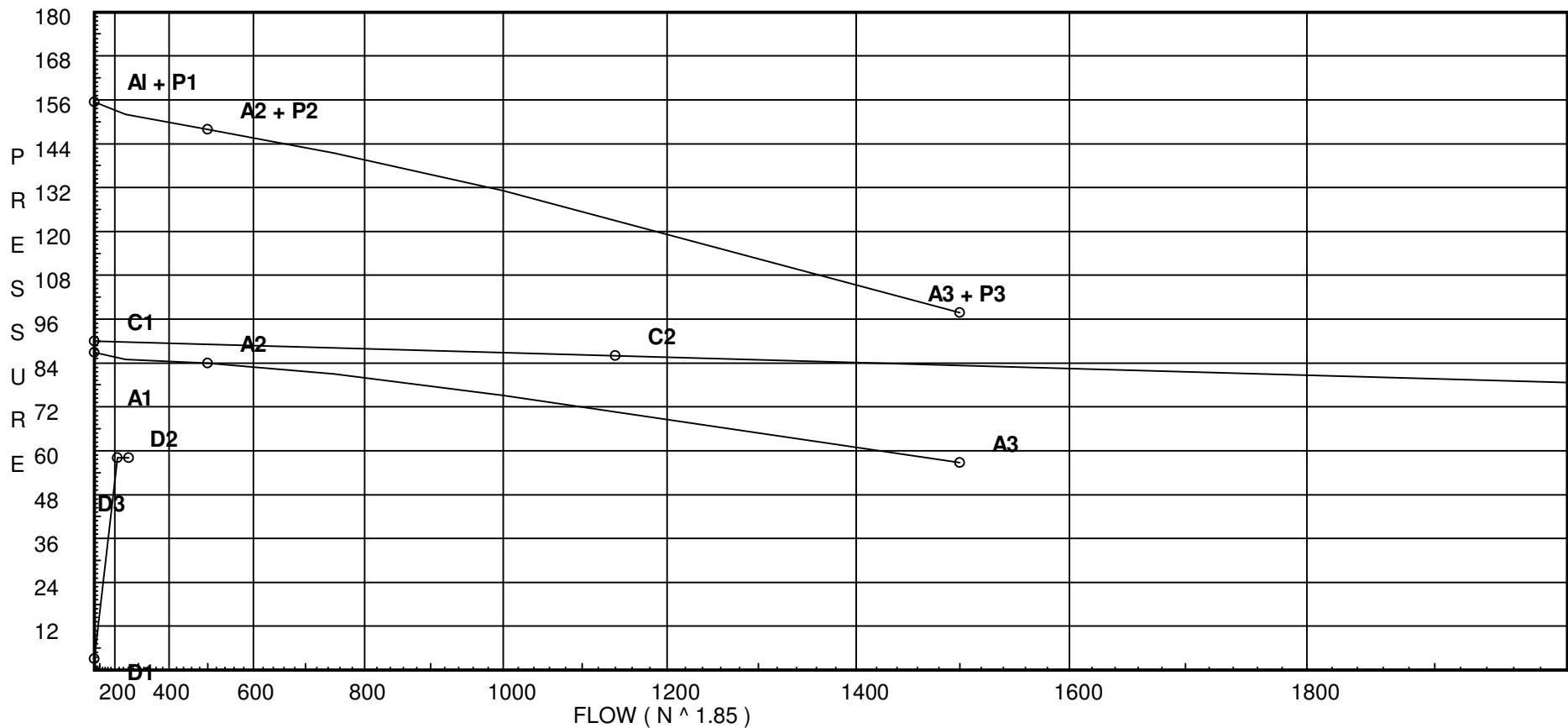
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 3.105
D2 - System Flow : 212.371
D2 - System Pressure : 58.105
Hose (Demand) : 50
D3 - System Demand : 262.371
Hose (Adj City) : 200
Safety Margin : 94.106



Fittings Used Summary

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Date 09/22/16

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
E	90' Standard Elbow Thrd	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Jx	Standard Grooved Tee	0	0	4.5	4.8	5.8	8.0	9.8	12.2	17	16.3	20.5	24.8	32.8	41.3	49.7	65	78	88	98	120
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Date 09/22/16

Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S21	111.17	5.6	7.01	na	14.82	0.1	104	7.0
S22	111.17	5.6	7.2	na	15.03	0.1	119	7.0
S23	111.17	5.6	8.05	na	15.89	0.1	116	7.0
S24	111.17	5.6	9.91	na	17.63	0.1	117	7.0
S25	111.17	5.6	12.77	na	20.01	0.1	117	7.0
S26	111.17	5.6	7.0	na	14.82	0.1	104	7.0
S27	111.17	5.6	7.41	na	15.24	0.1	146	7.0
S28	111.17	5.6	7.68	na	15.52	0.1	150	7.0
S29	111.17	5.6	8.32	na	16.16	0.1	147	7.0
S30	111.17	5.6	8.63	na	16.45	0.1	147	7.0
S31	111.17	5.6	20.23	na	25.19	0.1	147	7.0
S32	111.17	5.6	20.93	na	25.62	0.1	147	7.0
X21	113.25		7.1	na				
X22	113.25		7.32	na				
X23	113.25		8.28	na				
X24	113.25		10.39	na				
X25	113.25		13.61	na				
Z3	113.25		18.77	na				
X26	113.25		7.87	na				
X27	113.25		8.01	na				
X29	113.25		9.1	na				
Z4	113.25		9.52	na				
Z5	110.25		23.6	na				
X31	113.38		23.08	na				
Z6	113.38		23.31	na				
Z7	113.38		26.47	na				
A1	110.25		31.53	na				
A2	110.25		31.55	na				
A3	110.25		31.6	na				
A4	110.25		31.63	na				
A5	110.25		31.9	na				
A6	110.25		32.11	na				
A7	110.25		32.61	na				
A8	110.25		33.27	na				
A9	110.25		40.31	na				
A10	110.25		44.07	na				
SYS2	110.25		47.07	na				
HV12	103.0		50.3	na	50.0			
HV11	89.0		56.8	na				
SYS1	95.75		53.87	na				
BLK1	97.625		53.06	na				
BLK2	98.167		53.11	na				
TOR	96.167		54.08	na				
BOR	87.375		58.01	na				
PO	87.375		58.1	na				
PI	87.375		85.32	na				
BYPS	94.0		82.46	na				
BKFL	87.5		89.26	na				
SPIG	96.875		85.28	na				
UG1	96.875		91.52	na	200.0			
TEST	104.0		89.25	na				

The maximum velocity is 17.89 and it occurs in the pipe between nodes X25 and Z3

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* -----										
S21 to X21	14.82 14.82	1.049 120.0 0.0747	2T	10.0 0.0 0.0	3.380 10.000 13.380	7.006 -0.901 1.000			K Factor = 5.60 Vel = 5.50	
	0.0 14.82						7.105		K Factor = 5.56	
S22 to X22	15.03 15.03	1.049 120.0 0.0767	2T	10.0 0.0 0.0	3.380 10.000 13.380	7.199 -0.901 1.026			K Factor = 5.60 Vel = 5.58	
	0.0 15.03						7.324		K Factor = 5.55	
S23 to X23	15.89 15.89	1.049 120.0 0.0850	2T	10.0 0.0 0.0	3.380 10.000 13.380	8.047 -0.901 1.137			K Factor = 5.60 Vel = 5.90	
	0.0 15.89						8.283		K Factor = 5.52	
S24 to X24	17.63 17.63	1.049 120.0 0.1031	2T	10.0 0.0 0.0	3.380 10.000 13.380	9.915 -0.901 1.380			K Factor = 5.60 Vel = 6.54	
	0.0 17.63						10.394		K Factor = 5.47	
S25 to X25	20.01 20.01	1.049 120.0 0.1303	2T	10.0 0.0 0.0	3.380 10.000 13.380	12.768 -0.901 1.743			K Factor = 5.60 Vel = 7.43	
	0.0 20.01						13.610		K Factor = 5.42	
S26 to X26	14.82 14.82	1.049 120.0 0.0747	E 2T	2.0 10.0 0.0	11.750 12.000 23.750	7.000 -0.901 1.774			K Factor = 5.60 Vel = 5.50	
	0.0 14.82						7.873		K Factor = 5.28	
S27 to X27	15.24 15.24	1.049 120.0 0.0787	2T	10.0 0.0 0.0	9.080 10.000 19.080	7.407 -0.901 1.502			K Factor = 5.60 Vel = 5.66	
	0.0 15.24						8.008		K Factor = 5.39	
S28 to X27	15.52 15.52	1.049 120.0 0.0814	2T	10.0 0.0 0.0	5.080 10.000 15.080	7.681 -0.901 1.228			K Factor = 5.60 Vel = 5.76	
	0.0 15.52						8.008		K Factor = 5.48	
S29 to X29	16.16 16.16	1.049 120.0 0.0877	2T	10.0 0.0 0.0	9.080 10.000 19.080	8.325 -0.901 1.673			K Factor = 5.60 Vel = 6.00	
	0.0 16.16						9.097		K Factor = 5.36	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S30 to X29	16.45 16.45	1.049 120.0 0.0906	2T	10.0 0.0 0.0	5.080 10.000 15.080	8.631 -0.901 1.367			K Factor = 5.60 Vel = 6.11	
	0.0 16.45					9.097			K Factor = 5.45	
S31 to X31	25.19 25.19	1.049 120.0 0.1994	2T	10.0 0.0 0.0	9.080 10.000 19.080	20.229 -0.957 3.804			K Factor = 5.60 Vel = 9.35	
	0.0 25.19					23.076			K Factor = 5.24	
S32 to X31	25.62 25.62	1.049 120.0 0.2058	2T	10.0 0.0 0.0	5.080 10.000 15.080	20.930 -0.957 3.103			K Factor = 5.60 Vel = 9.51	
	0.0 25.62					23.076			K Factor = 5.33	
*										
X21 to X22	14.82 14.82	1.38 120.0 0.0197		0.0 0.0 0.0	11.130 0.0 11.130	7.105 0.0 0.219			Vel = 3.18	
X22 to X23	15.03 29.85	1.38 120.0 0.0718		0.0 0.0 0.0	13.360 0.0 13.360	7.324 0.0 0.959			Vel = 6.40	
X23 to X24	15.88 45.73	1.38 120.0 0.1581		0.0 0.0 0.0	13.350 0.0 13.350	8.283 0.0 2.111			Vel = 9.81	
X24 to X25	17.64 63.37	1.38 120.0 0.2889		0.0 0.0 0.0	11.130 0.0 11.130	10.394 0.0 3.216			Vel = 13.59	
X25 to Z3	20.01 83.38	1.38 120.0 0.4802		0.0 0.0 0.0	10.750 0.0 10.750	13.610 0.0 5.162			Vel = 17.89	
Z3 to A1	0.0 83.38	1.38 120.0 0.4802	3lx T	5.7 6.0 0.0	12.160 11.700 23.860	18.772 1.299 11.457			Vel = 17.89	
	0.0 83.38					31.528			K Factor = 14.85	
*										
X26 to X27	14.82 14.82	1.38 120.0 0.0197		0.0 0.0 0.0	6.850 0.0 6.850	7.873 0.0 0.135			Vel = 3.18	
X27 to Z4	30.76 45.58	1.38 120.0 0.1571		0.0 0.0 0.0	9.610 0.0 9.610	8.008 0.0 1.510			Vel = 9.78	
	0.0 45.58					9.518			K Factor = 14.77	
X29 to Z4	32.61 32.61	1.38 120.0 0.0847		0.0 0.0 0.0	4.970 0.0 4.970	9.097 0.0 0.421			Vel = 6.99	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
Z4 to Z5	45.58 78.19	1.38 120.0 0.4263	2lx Jx	3.8 4.8 0.0	21.390 8.600 29.990	9.518 1.299 12.785			Vel = 16.77	
Z5 to A2	0.0 78.19	1.61 120.0 0.2012	lx T	2.3 8.0 0.0	29.180 10.300 39.480	23.602 0.0 7.945			Vel = 12.32	
	0.0 78.19					31.547			K Factor = 13.92	
*										
X31 to Z6	50.81 50.81	1.38 120.0 0.1918		0.0 0.0 0.0	1.220 0.0 1.220	23.076 0.0 0.234			Vel = 10.90	
Z6 to Z7	0.0 50.81	1.38 120.0 0.1920	Jx	4.8 0.0 0.0	11.667 4.800 16.467	23.310 0.0 3.162			Vel = 10.90	
Z7 to A5	0.0 50.81	1.61 120.0 0.0906	2lx T	4.6 8.0 0.0	32.313 12.600 44.913	26.472 1.356 4.071			Vel = 8.01	
	0.0 50.81					31.899			K Factor = 9.00	
*										
A1 to A2	83.38 83.38	3.26 120.0 0.0072		0.0 0.0 0.0	2.625 0.0 2.625	31.528 0.0 0.019			Vel = 3.20	
A2 to A3	78.18 161.56	3.26 120.0 0.0251		0.0 0.0 0.0	2.110 0.0 2.110	31.547 0.0 0.053			Vel = 6.21	
A3 to A4	0.0 161.56	3.26 120.0 0.0240		0.0 0.0 0.0	1.250 0.0 1.250	31.600 0.0 0.030			Vel = 6.21	
A4 to A5	0.0 161.56	3.26 120.0 0.0248		0.0 0.0 0.0	10.830 0.0 10.830	31.630 0.0 0.269			Vel = 6.21	
A5 to A6	50.81 212.37	3.26 120.0 0.0412		0.0 0.0 0.0	5.170 0.0 5.170	31.899 0.0 0.213			Vel = 8.16	
A6 to A7	0.0 212.37	3.26 120.0 0.0412		0.0 0.0 0.0	12.000 0.0 12.000	32.112 0.0 0.494			Vel = 8.16	
A7 to A8	0.0 212.37	3.26 120.0 0.0412		0.0 0.0 0.0	16.030 0.0 16.030	32.606 0.0 0.660			Vel = 8.16	
A8 to A9	0.0 212.37	3.26 120.0 0.0412	4l J	26.879 17.471 0.0	126.920 44.350 171.270	33.266 0.0 7.048			Vel = 8.16	
A9 to A10	0.0 212.37	3.26 120.0 0.0412		0.0 0.0 0.0	91.250 0.0 91.250	40.314 0.0 3.755			Vel = 8.16	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A10 to SYS2	0.0 212.37	3.26 120.0 0.0412	2I B C T	13.44 6.72 13.44 20.159	19.250 53.759 73.009	44.069 0.0 3.005			Vel = 8.16	
	0.0 212.37					47.074			K Factor = 30.95	
*										
SYS2 to HV12	212.37	4.26 120.0		0.0 0.0	7.250 0.0	47.074 3.140				
	212.37	0.0112		0.0	7.250	0.081			Vel = 4.78	
HV12 to BLK1	50.00 262.37	4.26 120.0 0.0165	J	21.067 0.0	5.375 21.067 26.442	50.295 2.328 0.437			Qa = 50 Vel = 5.91	
	0.0 262.37					53.060			K Factor = 36.02	
HV11 to SYS1	0.0	4.26 120.0 0.0		0.0 0.0 0.0	6.750 0.0 6.750	56.796 -2.923 0.0	0.0 0.0 0.0		Vel = 0	
SYS1 to BLK1	0.0	4.26 120.0 0.0	J	21.067 0.0 0.0	1.875 21.067 22.942	53.872 -0.812 0.0	0.0 0.0 0.0		Vel = 0	
BLK1 to BLK2	262.37 262.37	6.357 120.0 0.0024	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	53.060 -0.235 0.281			Vel = 2.65	
BLK2 to TOR	0.0 262.37	6.357 120.0 0.0024	2I	25.147 0.0 0.0	22.083 25.147 47.230	53.106 0.866 0.111			Vel = 2.65	
TOR to BOR	0.0 262.37	6.357 120.0 0.0023	B J	10.059 31.433 0.0	8.792 41.492 50.284	54.083 3.808 0.118			Vel = 2.65	
BOR to PO	0.0 262.37	6.357 120.0 0.0024	B C	10.059 25.147 0.0	5.417 35.206 40.623	58.009 0.0 0.096			Vel = 2.65	
	0.0 262.37					58.105			K Factor = 34.42	
System Demand Pressure						58.105				
Safety Margin						94.106				
Continuation Pressure						152.211				
Pressure @ Pump Outlet						152.211				
Pressure From Pump Curve						-66.892				
Pressure @ Pump Inlet						85.319				
*										
PI to BYP	0.0 262.37	8.249 120.0 0.0006	lx	15.386 0.0 0.0	8.292 15.386 23.678	85.319 -2.869 0.015			Vel = 1.58	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125902 Webster ISB - 2nd Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BYPS to BKFL	0.0 262.37	6.357 120.0 0.0024	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	82.465 6.585 0.209			* * Fixed Loss = 3.77 Vel = 2.65	
BKFL to SPIG	0.0 262.37	7.981 120.0 0.0008	G lx	4.0 13.1 0.0	85.291 17.100 102.391	89.259 -4.060 0.079			Vel = 1.68	
SPIG to UG1	0.0 262.37	8.39 140.0 0.0005	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	85.278 6.147 0.099			* * Fixed Loss = 6.147 Vel = 1.52	
UG1 to TEST	200.00 462.37	8.39 140.0 0.0013	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	91.524 -3.086 0.809			Qa = 200 Vel = 2.68	
	0.0 462.37					89.247			K Factor = 48.94	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125903 Webster ISB - 3rd Lvl - RA1
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS3
Contract : 461259
Data File : 46125903 Webster ISB - 3rd Lvl - RA1.WXF

Hydraulic Design Information Sheet

Name - 46125903 Webster ISB - 3rd Lvl - RA1 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS3
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-103.A
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-1,HC-2,HC-3

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC-1,HC-2,HC-3
T Specific Ruling Made By Date
E

M Area of Sprinkler Operation - 1536 System Type Sprinkler/Nozzle
Density - .1/.2/.3 (X) Wet Make Viking
D Area Per Sprinkler - 100 () Dry Model VK534
E Elevation at Highest Outlet - 124.833 () Deluge Size 3/4"
S Hose Allowance - Inside - 100 () Preaction K-Factor 11.2
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.200
G Hose Allowance - Outside - 400
N

Note

Calculation Flow Required - 600.28 Press Required - 85.557 SYS3
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104
U

P Location - 8274 Big Bend Blvd
P
L Source of Information - Ahern Fire Protection
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf
R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse
G
E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Date 09/22/16

City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

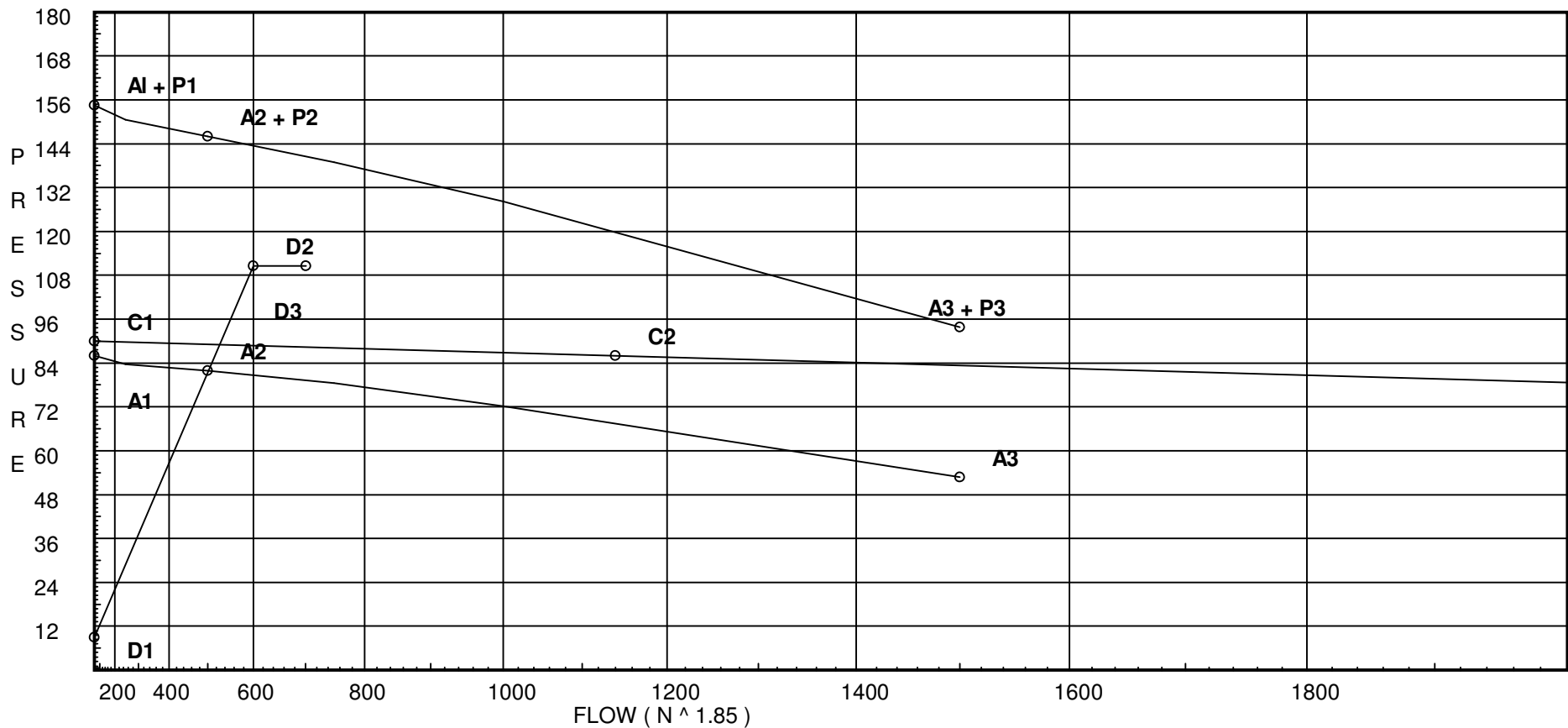
A1 - Adjusted Static: 86.006
A2 - Adj Resid : 81.917 @ 500
A3 - Adj Resid : 52.814 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 9.021
D2 - System Flow : 600.28
D2 - System Pressure : 110.629
Hose (Demand) : 100
D3 - System Demand : 700.28
Hose (Adj City) : 400
Safety Margin : 29.899



Fittings Used Summary

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Date 09/22/16

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	124.83	11.2	7.72	na	31.13	0.3	100	7.0
S2	124.83	11.2	8.05	na	31.78	0.3	100	7.0
S3	124.83	11.2	9.36	na	34.26	0.3	100	7.0
S4	124.83	8	25.0	na	40.0	0.1	400	25.0
S5	124.83	5.6	22.18	na	26.37	0.1	151	7.0
S6	124.83	5.6	22.72	na	26.69	0.1	167	7.0
S7	124.83	5.6	24.05	na	27.46	0.1	101	7.0
S8	124.83	8	26.12	na	40.89	0.1	400	25.0
S9	124.83	8	20.18	na	35.94	0.1	324	17.0
S10	124.83	8	21.44	na	37.04	0.1	324	17.0
S11	124.83	8	26.82	na	41.43	0.1	400	25.0
S12	124.33	8	27.54	na	41.99	0.2	104	7.0
S13	124.33	5.6	26.24	na	28.68	0.1	139	7.0
S14	124.33	5.6	29.64	na	30.49	0.1	94	7.0
S15	124.83	5.6	22.61	na	26.63	0.1	196	7.0
S16	124.83	5.6	23.24	na	27.0	0.1	196	7.0
S17	124.83	5.6	27.62	na	29.43	0.1	113	7.0
S18	124.83	8	28.99	na	43.08	0.1	400	25.0
X1	125.58		15.01	na				
X2	125.58		15.63	na				
X3	125.58		18.12	na				
X4	125.58		36.78	na				
X5	125.58		28.06	na				
X6	125.58		28.75	na				
X7	125.58		30.41	na				
X9	125.58		29.79	na				
X10	125.58		31.61	na				
X13	125.58		36.67	na				
X14	125.58		37.22	na				
X15	126.58		28.82	na				
X16	126.58		29.63	na				
X17	126.58		31.69	na				
A6	125.58		40.24	na				
B1	125.58		38.32	na				
B2	125.58		38.33	na				
B3	125.58		38.34	na				
B4	125.58		38.4	na				
B5	125.58		38.97	na				
B6	125.58		39.41	na				
B7	125.58		40.34	na				
B8	125.58		40.99	na				
B9	125.58		41.08	na				
B10	125.58		42.55	na				
B11	125.58		65.96	na				
SYS3	125.583		85.56	na				
HV13	118.333		89.25	na	100.0			
SYS2	110.25		93.57	na				
HV12	103.0		97.45	na				
HV11	89.0		106.2	na				
SYS1	95.75		103.28	na				
BLK1	97.625		102.47	na				
BLK2	98.167		103.96	na				
TOR	96.167		105.51	na				
BOR	87.375		110.04	na				
PO	87.375		110.63	na				
PI	87.375		79.24	na				
BYPS	94.0		76.47	na				
BKFL	87.5		84.07	na				
SPIG	96.875		80.5	na				
UG1	96.875		85.32	na	400.0			
TEST	104.0		86.25	na				

Flow Summary - Standard

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
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The maximum velocity is 23.07 and it occurs in the pipe between nodes B10 and B11

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* 										
S1 to X1	31.13 31.13	1.049 120.0 0.2950	T EqL	5.0 20.7 0.0	0.100 25.700 25.800	7.724 -0.325 7.611			K Factor = 11.20 Vel = 11.56	
	0.0 31.13						15.010		K Factor = 8.04	
S2 to X2	31.78 31.78	1.049 120.0 0.3065	T EqL	5.0 20.7 0.0	0.100 25.700 25.800	8.049 -0.325 7.907			K Factor = 11.20 Vel = 11.80	
	0.0 31.78						15.631		K Factor = 8.04	
S3 to X3	34.26 34.26	1.049 120.0 0.3522	T EqL	5.0 20.7 0.0	0.100 25.700 25.800	9.357 -0.325 9.088			K Factor = 11.20 Vel = 12.72	
	0.0 34.26						18.120		K Factor = 8.05	
S4 to X4	40.00 40.0	1.049 120.0 0.4691	T EqL	5.0 20.7 0.0	0.100 25.700 25.800	25.000 -0.325 12.104			K Factor = 8.00 Vel = 14.85	
	0.0 40.00						36.779		K Factor = 6.60	
S5 to X5	26.37 26.37	1.049 120.0 0.2171	T EqL	5.0 23.5 0.0	0.100 28.500 28.600	22.178 -0.325 6.209			K Factor = 5.60 Vel = 9.79	
	0.0 26.37						28.062		K Factor = 4.98	
S6 to X6	26.69 26.69	1.049 120.0 0.2220	T EqL	5.0 23.5 0.0	0.100 28.500 28.600	22.723 -0.325 6.349			K Factor = 5.60 Vel = 9.91	
	0.0 26.69						28.747		K Factor = 4.98	
S7 to X7	27.46 27.46	1.049 120.0 0.2340	T EqL	5.0 23.5 0.0	0.100 28.500 28.600	24.046 -0.325 6.691			K Factor = 5.60 Vel = 10.19	
	0.0 27.46						30.412		K Factor = 4.98	
S8 to B4	40.89 40.89	1.049 120.0 0.4885	T EqL	5.0 20.7 0.0	0.100 25.700 25.800	26.120 -0.325 12.604			K Factor = 8.00 Vel = 15.18	
	0.0 40.89						38.399		K Factor = 6.60	
S9 to X9	35.94 35.94	1.049 120.0 0.3849	T EqL	5.0 20.7 0.0	0.100 25.700 25.800	20.182 -0.325 9.930			K Factor = 8.00 Vel = 13.34	
	0.0 35.94						29.787		K Factor = 6.59	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S10 to X10	37.04 37.04	1.049 120.0 0.4069	T Eq	5.0 20.7 0.0	0.100 25.700 25.800	21.435 -0.325 10.499			K Factor = 8.00 Vel = 13.75	
	0.0 37.04						31.609		K Factor = 6.59	
S11 to B6	41.43 41.43	1.049 120.0 0.5007	T Eq	5.0 20.7 0.0	0.100 25.700 25.800	26.822 -0.325 12.917			K Factor = 8.00 Vel = 15.38	
	0.0 41.43						39.414		K Factor = 6.60	
S12 to A6	41.98 41.98	1.049 120.0 0.5131	T Eq	5.0 20.7 0.0	0.100 25.700 25.800	27.543 -0.541 13.238			K Factor = 8.00 Vel = 15.58	
	0.0 41.98						40.240		K Factor = 6.62	
S13 to X13	28.68 28.68	1.049 120.0 0.2535	T Eq	5.0 38.2 0.0	0.100 43.200 43.300	26.235 -0.541 10.978			K Factor = 5.60 Vel = 10.65	
	0.0 28.68						36.672		K Factor = 4.74	
S14 to X14	30.49 30.49	1.049 120.0 0.2838	T Eq	5.0 23.5 0.0	0.100 28.500 28.600	29.640 -0.541 8.118			K Factor = 5.60 Vel = 11.32	
	0.0 30.49						37.217		K Factor = 5.00	
S15 to X15	26.63 26.63	1.049 120.0 0.2210	T Eq	5.0 23.5 0.0	3.000 28.500 31.500	22.612 -0.758 6.961			K Factor = 5.60 Vel = 9.89	
	0.0 26.63						28.815		K Factor = 4.96	
S16 to X16	27.00 27.0	1.049 120.0 0.2267	T Eq	5.0 23.5 0.0	3.000 28.500 31.500	23.245 -0.758 7.142			K Factor = 5.60 Vel = 10.02	
	0.0 27.00						29.629		K Factor = 4.96	
S17 to X17	29.43 29.43	1.049 120.0 0.2659	2T	10.0 0.0 0.0	8.167 10.000 18.167	27.619 -0.758 4.831			K Factor = 5.60 Vel = 10.93	
	0.0 29.43						31.692		K Factor = 5.23	
S18 to B10	43.08 43.08	1.049 120.0 0.5380	T Eq	5.0 20.7 0.0	0.100 25.700 25.800	28.993 -0.325 13.881			K Factor = 8.00 Vel = 15.99	
	0.0 43.08						42.549		K Factor = 6.60	

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Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
X1 to X2	31.13	1.38 120.0		0.0 0.0	8.010 0.0	15.010 0.0				
X2 to X3	31.13	0.0775		0.0	8.010	0.621		Vel =	6.68	
X2 to X3	31.77	1.38 120.0		0.0 0.0	8.730 0.0	15.631 0.0				
X3 to B1	62.9	0.2851		0.0	8.730	2.489		Vel =	13.49	
X3 to B1	34.26	1.38 120.0	2I T	4.2 6.0	21.490 10.200	18.120 0.0				
	97.16	0.6373		0.0	31.690	20.195		Vel =	20.84	
	0.0 97.16					38.315		K Factor =	15.70	
*										
X4 to B2	40.00	1.61 120.0	T	8.0 0.0	18.670 8.000	36.779 0.0				
	40.0	0.0582		0.0	26.670	1.553		Vel =	6.30	
	0.0 40.00					38.332		K Factor =	6.46	
*										
X5 to X6	26.37	1.38 120.0		0.0 0.0	12.000 0.0	28.062 0.0				
X6 to X7	26.37	0.0571		0.0	12.000	0.685		Vel =	5.66	
X6 to X7	26.70	1.38 120.0		0.0 0.0	8.000 0.0	28.747 0.0				
X7 to B3	53.07	0.2081		0.0	8.000	1.665		Vel =	11.38	
X7 to B3	27.46	1.38 120.0	T	6.0 0.0	11.610 6.000	30.412 0.0				
	80.53	0.4503		0.0	17.610	7.929		Vel =	17.27	
	0.0 80.53					38.341		K Factor =	13.01	
*										
X9 to X10	35.94	1.38 120.0		0.0 0.0	18.000 0.0	29.787 0.0				
X10 to B5	35.94	0.1012		0.0	18.000	1.822		Vel =	7.71	
X10 to B5	37.04	1.38 120.0	T	6.0 0.0	13.610 6.000	31.609 0.0				
	72.98	0.3753		0.0	19.610	7.359		Vel =	15.65	
	0.0 72.98					38.968		K Factor =	11.69	
*										
X13 to X14	28.68	1.38 120.0		0.0 0.0	8.170 0.0	36.672 0.0				
X14 to B8	28.68	0.0667		0.0	8.170	0.545		Vel =	6.15	
X14 to B8	30.49	1.38 120.0	T	6.0 0.0	8.830 6.000	37.217 0.0				
	59.17	0.2546		0.0	14.830	3.776		Vel =	12.69	
	0.0									

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	59.17					40.993			K Factor = 9.24	
*										
X15	26.63	1.38		0.0	14.000	28.815				
to		120.0		0.0	0.0	0.0				
X16	26.63	0.0581		0.0	14.000	0.814			Vel = 5.71	
X16	27.00	1.38		0.0	9.720	29.629				
to		120.0		0.0	0.0	0.0				
X17	53.63	0.2122		0.0	9.720	2.063			Vel = 11.50	
X17	29.43	1.38	lx	1.9	10.880	31.692				
to		120.0	T	6.0	7.900	0.433				
B9	83.06	0.4767		0.0	18.780	8.953			Vel = 17.82	
	0.0									
	83.06					41.078			K Factor = 12.96	
*										
A6	41.98	3.26	4H	13.977	17.730	40.240				
to		120.0	J	17.471	31.448	0.0				
B7	41.98	0.0021		0.0	49.178	0.101			Vel = 1.61	
	0.0									
	41.98					40.341			K Factor = 6.61	
*										
B1	97.16	3.26		0.0	1.730	38.315				
to		120.0		0.0	0.0	0.0				
B2	97.16	0.0098		0.0	1.730	0.017			Vel = 3.73	
B2	40.00	3.26		0.0	0.500	38.332				
to		120.0		0.0	0.0	0.0				
B3	137.16	0.0180		0.0	0.500	0.009			Vel = 5.27	
B3	80.53	3.26		0.0	1.350	38.341				
to		120.0		0.0	0.0	0.0				
B4	217.69	0.0430		0.0	1.350	0.058			Vel = 8.37	
B4	40.89	3.26		0.0	9.600	38.399				
to		120.0		0.0	0.0	0.0				
B5	258.58	0.0593		0.0	9.600	0.569			Vel = 9.94	
B5	72.98	3.26		0.0	4.760	38.968				
to		120.0		0.0	0.0	0.0				
B6	331.56	0.0937		0.0	4.760	0.446			Vel = 12.74	
B6	41.43	3.26		0.0	7.940	39.414				
to		120.0		0.0	0.0	0.0				
B7	372.99	0.1168		0.0	7.940	0.927			Vel = 14.34	
B7	41.98	3.26		0.0	4.590	40.341				
to		120.0		0.0	0.0	0.0				
B8	414.97	0.1420		0.0	4.590	0.652			Vel = 15.95	
B8	59.17	3.26		0.0	0.470	40.993				
to		120.0		0.0	0.0	0.0				
B9	474.14	0.1809		0.0	0.470	0.085			Vel = 18.22	
B9	83.06	3.26		0.0	6.000	41.078				
to		120.0		0.0	0.0	0.0				
B10	557.2	0.2452		0.0	6.000	1.471			Vel = 21.42	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
B10 to B11	43.08 600.28	3.26 120.0 0.2813		0.0 0.0 0.0	83.200 0.0 83.200	42.549 0.0 23.408				
								Vel =	23.07	
B11 to SYS3	0.0 600.28	3.26 120.0 0.2813	2I B C T	13.44 6.72 13.44 20.159	15.910 53.759 69.669	65.957 -0.001 19.601				
								Vel =	23.07	
	0.0 600.28					85.557		K Factor =	64.90	
*										
SYS3 to HV13	600.28 600.28	4.26 120.0 0.0764		0.0 0.0 0.0	7.250 0.0 7.250	85.557 3.140 0.554				
								Vel =	13.51	
HV13 to SYS2	100.00 700.28	4.26 120.0 0.1016		0.0 0.0 0.0	8.083 0.0 8.083	89.251 3.501 0.821				
								Qa =	100	
								Vel =	15.76	
SYS2 to HV12	0.0 700.28	4.26 120.0 0.1017		0.0 0.0 0.0	7.250 0.0 7.250	93.573 3.140 0.737				
								Vel =	15.76	
HV12 to BLK1	0.0 700.28	4.26 120.0 0.1017	J	21.067 0.0 0.0	5.375 21.067 26.442	97.450 2.328 2.689				
								Vel =	15.76	
	0.0 700.28					102.467		K Factor =	69.18	
HV11 to SYS1	0.0 0.0	4.26 120.0 0.0		0.0 0.0 0.0	6.750 0.0 6.750	106.202 -2.923 0.0	0.0 0.0 0.0			
								Vel =	0	
SYS1 to BLK1	0.0 0.0	4.26 120.0 0.0	J	21.067 0.0 0.0	1.875 21.067 22.942	103.279 -0.812 0.0	0.0 0.0 0.0			
								Vel =	0	
BLK1 to BLK2	700.28 700.28	6.357 120.0 0.0145	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	102.467 -0.235 1.724				
								Vel =	7.08	
BLK2 to TOR	0.0 700.28	6.357 120.0 0.0145	2I	25.147 0.0 0.0	22.083 25.147 47.230	103.956 0.866 0.684				
								Vel =	7.08	
TOR to BOR	0.0 700.28	6.357 120.0 0.0145	B J	10.059 31.433 0.0	8.792 41.492 50.284	105.506 3.808 0.728				
								Vel =	7.08	
BOR to PO	0.0 700.28	6.357 120.0 0.0144	B C	10.059 25.147 0.0	5.417 35.206 40.623	110.042 0.0 0.587				
								Vel =	7.08	
	0.0 700.28					110.629		K Factor =	66.58	
System Demand Pressure						110.629				
Safety Margin						29.899				
Continuation Pressure						140.528				

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
Pressure @ Pump Outlet						140.528				
Pressure From Pump Curve						-61.290				
Pressure @ Pump Inlet						79.238				
*										
PI	0.0	8.249	lx	15.386	8.292	79.238				
to		120.0		0.0	15.386	-2.869				
BYPS	700.28	0.0041		0.0	23.678	0.096			Vel = 4.20	
BYPS	0.0	6.357	2J	62.867	13.417	76.465				
to		120.0	I	12.573	75.440	6.315			* * Fixed Loss = 3.5	
BKFL	700.28	0.0145	Zib	0.0	88.857	1.286			Vel = 7.08	
BKFL	0.0	7.981	G	4.0	85.291	84.066				
to		120.0	lx	13.1	17.100	-4.060				
SPIG	700.28	0.0048		0.0	102.391	0.489			Vel = 4.49	
SPIG	0.0	8.39	2G	13.572	80.000	80.495				
to		140.0	Zac	0.0	134.023	4.220			* * Fixed Loss = 4.22	
UG1	700.28	0.0028	2V	61.074	214.023	0.603			Vel = 4.06	
			X	59.377						
UG1	400.00	8.39	2G	13.572	500.000	85.318			Qa = 400	
to		140.0	3U	45.805	118.754	-3.086				
TEST	1100.28	0.0065	X	59.377	618.754	4.022			Vel = 6.39	
	0.0									
	1100.28					86.254			K Factor = 118.47	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125903 Webster ISB - 3rd Lvl - RA2
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS3
Contract : 461259
Data File : 46125903 Webster ISB - 3rd Lvl - RA2.WXF

Hydraulic Design Information Sheet

Name - 46125903 Webster ISB - 3rd Lvl - RA2 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS3
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-103.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 17-7
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC-1
T Specific Ruling Made By Date
E

M Area of Sprinkler Operation - 1555 System Type Sprinkler/Nozzle
Density - .10 (X) Wet Make Viking
D Area Per Sprinkler - 400 () Dry Model VK634
E Elevation at Highest Outlet - 132.916 () Deluge Size 3/4"
S Hose Allowance - Inside - 50 () Preaction K-Factor 8.0
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.155
G Hose Allowance - Outside - 200
N Note

Calculation Flow Required - 354.10 Press Required - 106.269 SYS3
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104
U
P Location - 8274 Big Bend Blvd
P
L Source of Information - Ahern Fire Protection
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf
R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse
G
E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

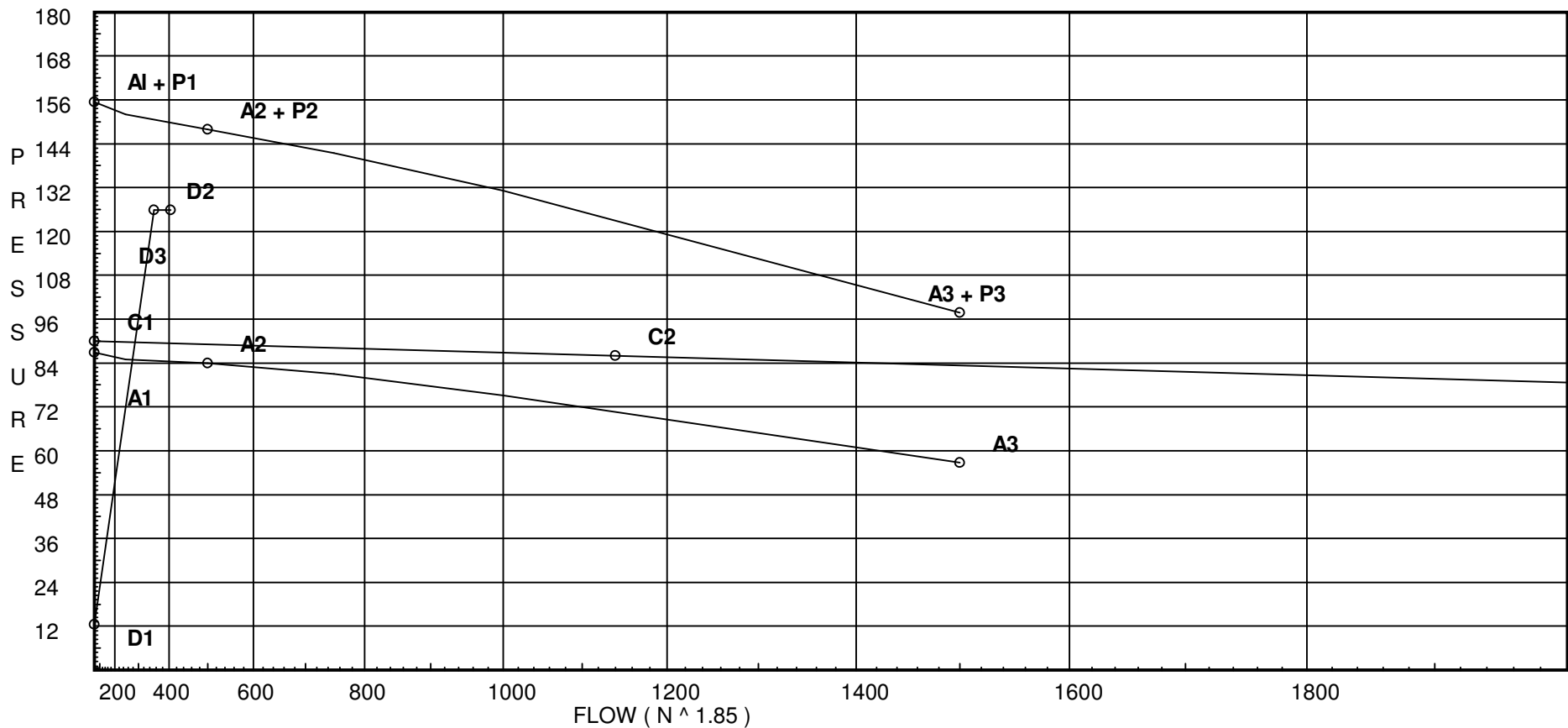
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 12.525
D2 - System Flow : 354.097
D2 - System Pressure : 125.908
Hose (Demand) : 50
D3 - System Demand : 404.097
Hose (Adj City) : 200
Safety Margin : 24.165



Fittings Used Summary

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
E	90' Standard Elbow Thrd	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S21	132.92	8	17.0	na	32.98	0.1	324	17.0
S22	131.46	8	17.79	na	33.75	0.1	256	10.6
S23	130.17	8	19.35	na	35.19	0.1	256	10.6
S24	129.12	5.6	25.86	na	28.48	0.1	121	7.0
S25	124.83	8	25.61	na	40.48	0.1	400	25.0
S26	124.83	8	26.22	na	40.97	0.1	400	25.0
S27	124.83	8	28.59	na	42.77	0.1	400	25.0
S28	124.83	8	38.29	na	49.5	0.1	324	17.0
S29	124.83	8	39.01	na	49.97	0.1	256	10.6
X21	134.83		25.65	na				
X22	133.35		26.86	na				
X23	132.07		29.22	na				
X24	131.01		32.96	na				
Z1	131.01		48.84	na				
X25	128.33		45.8	na				
X26	128.33		46.9	na				
X27	128.33		51.1	na				
X28	125.58		55.92	na				
X29	125.58		56.96	na				
A1	125.58		61.95	na				
A2	125.58		61.98	na				
A3	125.58		63.29	na				
A4	125.58		67.72	na				
A5	125.58		79.05	na				
A6	125.58		85.13	na				
B7	125.58		88.86	na				
B8	125.58		89.35	na				
B9	125.58		89.4	na				
B10	125.58		90.04	na				
B11	125.58		98.85	na				
SYS3	125.583		106.27	na				
HV13	118.333		109.62	na	50.0			
SYS2	110.25		113.42	na				
HV12	103.0		116.82	na				
HV11	89.0		123.86	na				
SYS1	95.75		120.93	na				
BLK1	97.625		120.12	na				
BLK2	98.167		120.51	na				
TOR	96.167		121.62	na				
BOR	87.375		125.7	na				
PO	87.375		125.91	na				
PI	87.375		84.72	na				
BYP5	94.0		81.89	na				
BKFL	87.5		88.67	na				
SPIG	96.875		84.78	na				
UG1	96.875		90.52	na	200.0			
TEST	104.0		88.76	na				

The maximum velocity is 20.55 and it occurs in the pipe between nodes X24 and Z1

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* 										
S21 to X21	32.98 32.98	1.049 120.0 0.3284	E T Eq	2.0 5.0 20.7	1.167 27.700 28.867	17.000 -0.827 9.479			K Factor = 8.00 Vel = 12.24	
	0.0 32.98						25.652		K Factor = 6.51	
S22 to X22	33.75 33.75	1.049 120.0 0.3425	E T Eq	2.0 5.0 20.7	1.167 27.700 28.867	17.793 -0.819 9.888			K Factor = 8.00 Vel = 12.53	
	0.0 33.75						26.862		K Factor = 6.51	
S23 to X23	35.19 35.19	1.049 120.0 0.3702	E T Eq	2.0 5.0 20.7	1.167 27.700 28.867	19.353 -0.823 10.686			K Factor = 8.00 Vel = 13.06	
	0.0 35.19						29.216		K Factor = 6.51	
S24 to X24	28.48 28.48	1.049 120.0 0.2502	E T Eq	2.0 5.0 23.5	1.167 30.500 31.667	25.858 -0.819 7.923			K Factor = 5.60 Vel = 10.57	
	0.0 28.48						32.962		K Factor = 4.96	
S25 to X25	40.48 40.48	1.049 120.0 0.4796	E T Eq	2.0 5.0 35.5	2.750 42.500 45.250	25.607 -1.516 21.704			K Factor = 8.00 Vel = 15.03	
	0.0 40.48						45.795		K Factor = 5.98	
S26 to X26	40.97 40.97	1.049 120.0 0.4903	E T Eq	2.0 5.0 35.5	2.750 42.500 45.250	26.224 -1.516 22.188			K Factor = 8.00 Vel = 15.21	
	0.0 40.97						46.896		K Factor = 5.98	
S27 to X27	42.77 42.77	1.049 120.0 0.5311	E T Eq	2.0 5.0 35.5	2.750 42.500 45.250	28.588 -1.516 24.031			K Factor = 8.00 Vel = 15.88	
	0.0 42.77						51.103		K Factor = 5.98	
S28 to X28	49.50 49.5	1.049 120.0 0.6959	T Eq	5.0 20.7 0.0	0.100 25.700 25.800	38.291 -0.325 17.955			K Factor = 8.00 Vel = 18.38	
	0.0 49.50						55.921		K Factor = 6.62	
S29 to X29	49.97 49.97	1.049 120.0 0.7081	T Eq	5.0 20.7 0.0	0.100 25.700 25.800	39.014 -0.325 18.268			K Factor = 8.00 Vel = 18.55	
	0.0 49.97						56.957		K Factor = 6.62	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* *****										
X21 to X22	32.98	1.61 120.0		0.0	13.970	25.652				
				0.0	0.0	0.641				
X22 to X23	32.98	0.0407		0.0	13.970	0.569		Vel =	5.20	
X22 to X23	33.75	1.61 120.0		0.0	11.990	26.862				
				0.0	0.0	0.554				
X23 to X24	66.73	0.1501		0.0	11.990	1.800		Vel =	10.52	
X23 to X24	35.19	1.61 120.0		0.0	10.000	29.216				
				0.0	0.0	0.459				
X24 to Z1	101.92	0.3287		0.0	10.000	3.287		Vel =	16.06	
X24 to Z1	28.48	1.61 120.0		0.0	30.625	32.962				
				0.0	0.0	0.0				
Z1 to A1	130.4	0.5184		0.0	30.625	15.876		Vel =	20.55	
Z1 to A1	0.0	2.067 120.0	3lx T	9.6	50.510	48.838				
				10.0	19.600	2.352				
A1	130.4	0.1535		0.0	70.110	10.764		Vel =	12.47	
	0.0									
	130.40					61.954		K Factor =	16.57	
* *****										
X25 to X26	40.48	1.61 120.0		0.0	18.500	45.795				
				0.0	0.0	0.0				
X26 to X27	40.48	0.0595		0.0	18.500	1.101		Vel =	6.38	
X26 to X27	40.97	1.61 120.0		0.0	19.380	46.896				
				0.0	0.0	0.0				
X27 to A2	81.45	0.2171		0.0	19.380	4.207		Vel =	12.84	
X27 to A2	42.77	1.61 120.0	lx T	2.3	10.150	51.103				
				8.0	10.300	1.191				
A2	124.22	0.4739		0.0	20.450	9.691		Vel =	19.58	
	0.0									
	124.22					61.985		K Factor =	15.78	
* *****										
X28 to X29	49.50	1.61 120.0		0.0	12.000	55.921				
				0.0	0.0	0.0				
X29 to A3	49.5	0.0863		0.0	12.000	1.036		Vel =	7.80	
X29 to A3	49.97	1.61 120.0	T	8.0	12.160	56.957				
				0.0	8.000	0.0				
A3	99.47	0.3142		0.0	20.160	6.334		Vel =	15.68	
	0.0									
	99.47					63.291		K Factor =	12.50	
* *****										
A1 to A2	130.40	3.26 120.0		0.0	1.850	61.954				
				0.0	0.0	0.0				
A2 to A3	130.4	0.0168		0.0	1.850	0.031		Vel =	5.01	
A2 to A3	124.22	3.26 120.0		0.0	22.680	61.985				
				0.0	0.0	0.0				
A3	254.62	0.0576		0.0	22.680	1.306		Vel =	9.79	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A3 to A4	99.48 354.1	3.26 120.0 0.1060		0.0 0.0 0.0	41.750 0.0 41.750	63.291 0.0 4.424				Vel = 13.61
A4 to A5	0.0 354.1	3.26 120.0 0.1060	J	17.471 0.0 0.0	89.490 17.471 106.961	67.715 0.0 11.334				Vel = 13.61
A5 to A6	0.0 354.1	3.26 120.0 0.1060		0.0 0.0 0.0	57.420 0.0 57.420	79.049 0.0 6.085				Vel = 13.61
A6 to B7	0.0 354.1	3.26 120.0 0.1060	J	17.471 0.0 0.0	17.730 17.471 35.201	85.134 0.0 3.730				Vel = 13.61
	0.0 354.10					88.864				K Factor = 37.56
*										
B7 to B8	354.10 354.1	3.26 120.0 0.1059		0.0 0.0 0.0	4.590 0.0 4.590	88.864 0.0 0.486				Vel = 13.61
B8 to B9	0.0 354.1	3.26 120.0 0.1064		0.0 0.0 0.0	0.470 0.0 0.470	89.350 0.0 0.050				Vel = 13.61
B9 to B10	0.0 354.1	3.26 120.0 0.1060		0.0 0.0 0.0	6.000 0.0 6.000	89.400 0.0 0.636				Vel = 13.61
B10 to B11	0.0 354.1	3.26 120.0 0.1060		0.0 0.0 0.0	83.200 0.0 83.200	90.036 0.0 8.816				Vel = 13.61
B11 to SYS3	0.0 354.1	3.26 120.0 0.1060	2I T B C	13.44 20.159 6.72 13.44	16.250 53.759 70.009	98.852 -0.001 7.418				Vel = 13.61
	0.0 354.10					106.269				K Factor = 34.35
*										
SYS3 to HV13	354.10 354.1	4.26 120.0 0.0288		0.0 0.0 0.0	7.250 0.0 7.250	106.269 3.140 0.209				Vel = 7.97
HV13 to SYS2	50.00 404.1	4.26 120.0 0.0367		0.0 0.0 0.0	8.083 0.0 8.083	109.618 3.501 0.297			Qa = 50	Vel = 9.10
SYS2 to HV12	0.0 404.1	4.26 120.0 0.0367		0.0 0.0 0.0	7.250 0.0 7.250	113.416 3.140 0.266				Vel = 9.10
HV12 to BLK1	0.0 404.1	4.26 120.0 0.0368	J	21.067 0.0 0.0	5.375 21.067 26.442	116.822 2.328 0.972				Vel = 9.10

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 404.10					120.122			K Factor = 36.87	
HV11 to SYS1	0.0 0.0	4.26 120.0 0.0		0.0 0.0 0.0	6.750 0.0 6.750	123.858 -2.923 0.0	0.0 0.0 0.0		Vel = 0	
SYS1 to BLK1	0.0 0.0	4.26 120.0 0.0	J	21.067 0.0 0.0	1.875 21.067 22.942	120.934 -0.812 0.0	0.0 0.0 0.0		Vel = 0	
BLK1 to BLK2	404.10 404.1	6.357 120.0 0.0052	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	120.122 -0.235 0.624			Vel = 4.08	
BLK2 to TOR	0.0 404.1	6.357 120.0 0.0052	2I	25.147 0.0 0.0	22.083 25.147 47.230	120.511 0.866 0.247			Vel = 4.08	
TOR to BOR	0.0 404.1	6.357 120.0 0.0052	B J	10.059 31.433 0.0	8.792 41.492 50.284	121.624 3.808 0.263			Vel = 4.08	
BOR to PO	0.0 404.1	6.357 120.0 0.0052	B C	10.059 25.147 0.0	5.417 35.206 40.623	125.695 0.0 0.213			Vel = 4.08	
	0.0 404.10					125.908			K Factor = 36.01	
System Demand Pressure						125.908				
Safety Margin						24.165				
Continuation Pressure						150.073				
Pressure @ Pump Outlet						150.073				
Pressure From Pump Curve						-65.352				
Pressure @ Pump Inlet						84.721				
*										
PI to BYP	0.0 404.1	8.249 120.0 0.0015	lx	15.386 0.0 0.0	8.292 15.386 23.678	84.721 -2.869 0.035			Vel = 2.43	
BYP to BKFL	0.0 404.1	6.357 120.0 0.0052	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	81.887 6.315 0.465			** Fixed Loss = 3.5 Vel = 4.08	
BKFL to SPIG	0.0 404.1	7.981 120.0 0.0017	G lx	4.0 13.1 0.0	85.291 17.100 102.391	88.667 -4.060 0.177			Vel = 2.59	
SPIG to UG1	0.0 404.1	8.39 140.0 0.0010	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	84.784 5.522 0.218			** Fixed Loss = 5.522 Vel = 2.35	
UG1 to TEST	200.00 604.1	8.39 140.0 0.0021	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	90.524 -3.086 1.327			Qa = 200 Vel = 3.51	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125903 Webster ISB - 3rd Lvl - RA2

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 604.10				88.765			K Factor =	64.12



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125904 Webster ISB - 4th Lvl - RA1
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS4
Contract : 461259
Data File : 46125904 Webster ISB - 4th Lvl - RA1.WXF

Hydraulic Design Information Sheet

Name - 46125904 Webster ISB - 4th Lvl - RA1 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS4
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-104.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HCL
T Specific Ruling Made By Date
E

M	Area of Sprinkler Operation - 1536	System Type	Sprinkler/Nozzle
	Density - .10	(X) Wet	Make Viking
D	Area Per Sprinkler - 400	() Dry	Model VK634
E	Elevation at Highest Outlet - 140.667	() Deluge	Size 3/4"
S	Hose Allowance - Inside - 50	() Preaction	K-Factor 8.0
I	Rack Sprinkler Allowance - n/a	() Other	Temp.Rat.155
G	Hose Allowance - Outside - 200		

N Note

Calculation Flow Required - 405.01 Press Required - 104.329 SYS4
Summary C-Factor Used: 120 Overhead 140 Underground

W	Water Flow Test:	Pump Data:	Tank or Reservoir:
A	Date of Test - 05/23/16		Cap. -
T	Time of Test - 2:30 PM	Rated Cap.- 1000	Elev.-
E	Static Press - 90	@ Press - 55	
R	Residual Press - 86	Elev. - 87.375	Well
	Flow - 1140		Proof Flow
S	Elevation - 104		

U Location - 8274 Big Bend Blvd

P Source of Information - Ahern Fire Protection

C	Commodity	Class	Location
O	Storage Ht.	Area	Aisle W.
M	Storage Method:	Solid Piled %	Palletized % Rack
M	() Single Row	() Conven. Pallet	() Auto. Storage () Encap.
S	() Double Row	() Slave Pallet	() Solid Shelf () Non
T	() Mult. Row		() Open Shelf

R	K	Flue Spacing	Clearance:Storage to Ceiling
A		Longitudinal	Transverse

G Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA1

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Date 09/22/16

City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

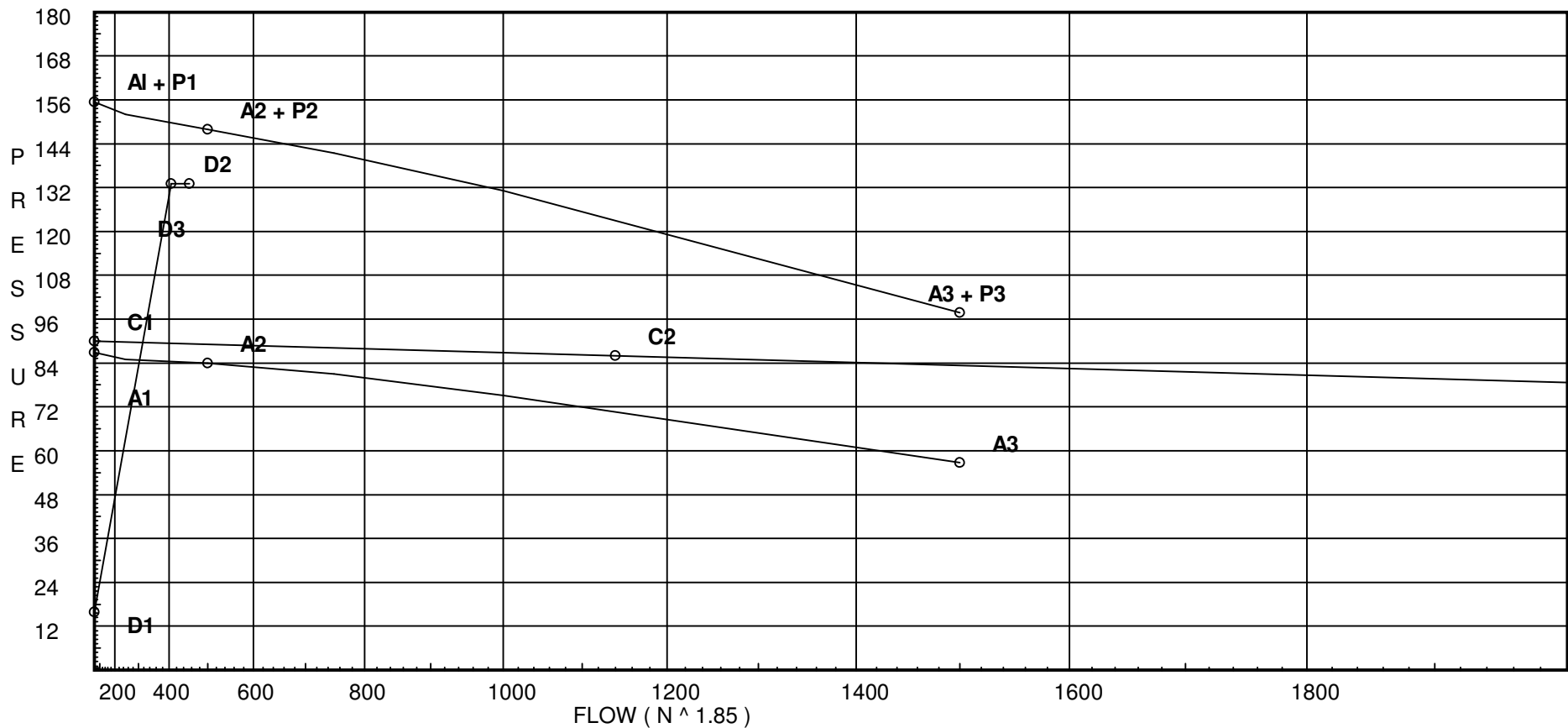
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 15.880
D2 - System Flow : 405.01
D2 - System Pressure : 133.014
Hose (Demand) : 50
D3 - System Demand : 455.01
Hose (Adj City) : 200
Safety Margin : 15.963



Fittings Used Summary

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA1

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Date 09/22/16

Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
E	90' Standard Elbow Thrd	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
Jx	Standard Grooved Tee	0	0	4.5	4.8	5.8	8.0	9.8	12.2	17	16.3	20.5	24.8	32.8	41.3	49.7	65	78	88	98	120
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S1	140.667	5.6	18.82	na	24.29	0.1	153	7.0
S2	140.667	5.6	19.16	na	24.51	0.1	138	7.0
S3	140.667	5.6	20.57	na	25.4	0.1	126	7.0
S4	140.667	5.6	23.39	na	27.08	0.1	134	7.0
S5	140.667	5.6	28.72	na	30.01	0.1	128	7.0
S6	140.667	8	25.0	na	40.0	0.1	400	25.0
S7	140.667	8	28.11	na	42.41	0.1	400	25.0
S8	140.667	8	31.19	na	44.68	0.1	400	25.0
S9	140.667	5.6	32.48	na	31.92	0.1	137	7.0
S10	140.667	5.6	33.13	na	32.23	0.1	124	7.0
S11	140.667	5.6	35.68	na	33.45	0.1	124	7.0
S12	140.667	8	37.55	na	49.02	0.1	400	25.0
X1	141.58		23.74	na				
X2	141.58		24.17	na				
X3	141.58		25.95	na				
X4	141.58		29.5	na				
X5	141.58		36.18	na				
X6	140.92		41.01	na				
X7	140.92		41.44	na				
X8	140.92		45.87	na				
X9	141.58		40.89	na				
X10	141.58		41.7	na				
X11	141.58		44.89	na				
A1	141.58		54.16	na				
A2	140.92		54.86	na				
A3	140.92		55.01	na				
A4	140.92		55.59	na				
A5	140.92		65.03	na				
A6	140.92		77.08	na				
A7	140.92		82.79	na				
A8	140.92		94.6	na				
SYS4	140.92		104.33	na				
HV14	133.667		107.74	na	50.0			
SYS3	125.583		112.54	na				
HV13	118.333		116.02	na				
SYS2	110.25		119.89	na				
HV12	103.0		123.36	na				
HV11	89.0		130.63	na				
SYS1	95.75		127.71	na				
BLK1	97.625		126.9	na				
BLK2	98.167		127.44	na				
TOR	96.167		128.61	na				
BOR	87.375		132.75	na				
PO	87.375		133.01	na				
PI	87.375		84.31	na				
BYPS	94.0		81.49	na				
BKFL	87.5		88.38	na				
SPIG	96.875		84.54	na				
UG1	96.875		90.11	na	200.0			
TEST	104.0		88.57	na				

The maximum velocity is 28.16 and it occurs in the pipe between nodes X5 and A1

Final Calculations - Hazen-Williams

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46125904 Webster ISB - 4th Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* S1 to X1										
	24.29	1.049	T	5.0	0.001	18.818			K Factor = 5.60	
		120.0	Eq	23.5	28.500	-0.395				
	24.29	0.1864		0.0	28.501	5.314			Vel = 9.02	
	0.0									
	24.29					23.737			K Factor = 4.99	
S2 to X2										
	24.51	1.049	T	5.0	0.001	19.160			K Factor = 5.60	
		120.0	Eq	23.5	28.500	-0.395				
	24.51	0.1896		0.0	28.501	5.403			Vel = 9.10	
	0.0									
	24.51					24.168			K Factor = 4.99	
S3 to X3										
	25.40	1.049	T	5.0	0.001	20.571			K Factor = 5.60	
		120.0	Eq	23.5	28.500	-0.395				
	25.4	0.2025		0.0	28.501	5.771			Vel = 9.43	
	0.0									
	25.40					25.947			K Factor = 4.99	
S4 to X4										
	27.08	1.049	T	5.0	0.001	23.392			K Factor = 5.60	
		120.0	Eq	23.5	28.500	-0.395				
	27.08	0.2280		0.0	28.501	6.499			Vel = 10.05	
	0.0									
	27.08					29.496			K Factor = 4.99	
S5 to X5										
	30.01	1.049	T	5.0	0.001	28.717			K Factor = 5.60	
		120.0	Eq	23.5	28.500	-0.395				
	30.01	0.2756		0.0	28.501	7.856			Vel = 11.14	
	0.0									
	30.01					36.178			K Factor = 4.99	
S6 to X6										
	40.00	1.049	E	2.0	6.667	25.000			K Factor = 8.00	
		120.0	T	5.0	27.700	-0.110				
	40.0	0.4691	Eq	20.7	34.367	16.123			Vel = 14.85	
	0.0									
	40.00					41.013			K Factor = 6.25	
S7 to X7										
	42.41	1.049	T	5.0	0.001	28.108			K Factor = 8.00	
		120.0	Eq	20.7	25.700	-0.110				
	42.41	0.5228		0.0	25.701	13.437			Vel = 15.74	
	0.0									
	42.41					41.435			K Factor = 6.59	
S8 to X8										
	44.68	1.049	T	5.0	0.001	31.188			K Factor = 8.00	
		120.0	Eq	20.7	25.700	-0.110				
	44.68	0.5756		0.0	25.701	14.794			Vel = 16.59	
	0.0									
	44.68					45.872			K Factor = 6.60	
S9 to X9										
	31.92	1.049	T	5.0	0.001	32.480			K Factor = 5.60	
		120.0	Eq	23.5	28.500	-0.395				
	31.92	0.3089		0.0	28.501	8.805			Vel = 11.85	
	0.0									
	31.92					40.890			K Factor = 4.99	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
S10 to X10	32.23 32.23	1.049 120.0 0.3146	T Eq	5.0 23.5 0.0	0.001 28.500 28.501	33.130 -0.395 8.967			K Factor = 5.60 Vel = 11.96	
	0.0 32.23					41.702			K Factor = 4.99	
S11 to X11	33.45 33.45	1.049 120.0 0.3370	T Eq	5.0 23.5 0.0	0.001 28.500 28.501	35.683 -0.395 9.604			K Factor = 5.60 Vel = 12.42	
	0.0 33.45					44.892			K Factor = 4.99	
S12 to A3	49.02 49.02	1.049 120.0 0.6835	T Eq	5.0 20.7 0.0	0.001 25.700 25.701	37.550 -0.110 17.566			K Factor = 8.00 Vel = 18.20	
	0.0 49.02					55.006			K Factor = 6.61	
*										
X1 to X2	24.29 24.29	1.38 120.0 0.0491		0.0 0.0 0.0	8.780 0.0 8.780	23.737 0.0 0.431			Vel = 5.21	
X2 to X3	24.51 48.8	1.38 120.0 0.1783		0.0 0.0 0.0	9.980 0.0 9.980	24.168 0.0 1.779			Vel = 10.47	
X3 to X4	25.40 74.2	1.38 120.0 0.3870		0.0 0.0 0.0	9.170 0.0 9.170	25.947 0.0 3.549			Vel = 15.92	
X4 to X5	27.09 101.29	1.38 120.0 0.6882		0.0 0.0 0.0	9.710 0.0 9.710	29.496 0.0 6.682			Vel = 21.73	
X5 to A1	30.01 131.3	1.38 120.0 1.1123	T	6.0 0.0 0.0	10.170 6.000 16.170	36.178 0.0 17.986			Vel = 28.16	
	0.0 131.30					54.164			K Factor = 17.84	
*										
X6 to X7	40.00 40.0	1.61 120.0 0.0582		0.0 0.0 0.0	7.250 0.0 7.250	41.013 0.0 0.422			Vel = 6.30	
X7 to X8	42.41 82.41	1.61 120.0 0.2218		0.0 0.0 0.0	20.000 0.0 20.000	41.435 0.0 4.437			Vel = 12.99	
X8 to A2	44.68 127.09	1.61 120.0 0.4943	T	8.0 0.0 0.0	10.180 8.000 18.180	45.872 0.0 8.986			Vel = 20.03	
	0.0 127.09					54.858			K Factor = 17.16	
*										

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
X9 to X10	31.92	1.38 120.0		0.0 0.0	10.000 0.0	40.890 0.0				
X10 to X11	31.92	0.0812		0.0	10.000	0.812		Vel =	6.85	
X10 to X11	32.23	1.38 120.0		0.0 0.0	10.792 0.0	41.702 0.0				
X11 to A4	64.15	0.2956		0.0	10.792	3.190		Vel =	13.76	
X11 to A4	33.45	1.38 120.0	lx Jx	1.9 4.8	9.500 6.700	44.892 0.286				
	97.6	0.6426		0.0	16.200	10.410		Vel =	20.94	
	0.0 97.60					55.588		K Factor =	13.09	
*										
A1 to A2	131.30	3.26 120.0	2l	13.44 0.0	10.708 13.440	54.164 0.286				
A2 to A3	131.3	0.0169		0.0	24.148	0.408		Vel =	5.05	
A2 to A3	127.09	3.26 120.0		0.0 0.0	2.500 0.0	54.858 0.0				
A3 to A4	258.39	0.0592		0.0	2.500	0.148		Vel =	9.93	
A3 to A4	49.02	3.26 120.0		0.0 0.0	7.130 0.0	55.006 0.0				
A4 to A5	307.41	0.0816		0.0	7.130	0.582		Vel =	11.82	
A4 to A5	97.60	3.26 120.0	2l	13.44 0.0	56.042 13.440	55.588 0.0				
A5 to A6	405.01	0.1359		0.0	69.482	9.440		Vel =	15.57	
A5 to A6	0.0	3.26 120.0	l	6.72 0.0	81.958 6.720	65.028 0.0				
A6 to A7	405.01	0.1359		0.0	88.678	12.048		Vel =	15.57	
A6 to A7	0.0	3.26 120.0		0.0 0.0	42.035 0.0	77.076 0.0				
A7 to A8	405.01	0.1359		0.0	42.035	5.711		Vel =	15.57	
A7 to A8	0.0	3.26 120.0	l	6.72 0.0	80.245 6.720	82.787 0.0				
A8 to SYS4	405.01	0.1359		0.0	86.965	11.815		Vel =	15.57	
A8 to SYS4	0.0	3.26 120.0	2l T	13.44 20.159	17.840 53.759	94.602 0.0				
	405.01	0.1359	B C	6.72 13.44	71.599	9.727		Vel =	15.57	
	0.0 405.01					104.329		K Factor =	39.65	
*										
SYS4 to HV14	405.01	4.26 120.0		0.0 0.0	7.250 0.0	104.329 3.141				
HV14 to SYS3	405.01	0.0370		0.0	7.250	0.268		Vel =	9.12	
HV14 to SYS3	50.00	4.26 120.0	2l	17.907 0.0	10.580 17.907	107.738 3.501		Qa =	50	
	455.01	0.0458		0.0	28.487	1.305		Vel =	10.24	

Final Calculations - Hazen-Williams

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46125904 Webster ISB - 4th Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
SYS3 to HV13	0.0 455.01	4.26 120.0 0.0458		0.0	7.250	112.544 3.140				
				0.0	0.0	0.332		Vel = 10.24		
HV13 to SYS2	0.0 455.01	4.26 120.0 0.0458		0.0	8.083	116.016 3.501				
				0.0	0.0	0.370		Vel = 10.24		
SYS2 to HV12	0.0 455.01	4.26 120.0 0.0458		0.0	7.250	119.887 3.140				
				0.0	0.0	0.332		Vel = 10.24		
HV12 to BLK1	0.0 455.01	4.26 120.0 0.0458	J	21.067	5.375	123.359 2.328				
				0.0	21.067	1.210		Vel = 10.24		
	0.0 455.01					126.897		K Factor = 40.39		
HV11 to SYS1	0.0 455.01	4.26 120.0 0.0		0.0	6.750	130.633 -2.923	0.0 0.0			
				0.0	0.0	0.0	0.0	Vel = 0		
SYS1 to BLK1	0.0 455.01	4.26 120.0 0.0	J	21.067	1.875	127.709 -0.812	0.0 0.0			
				0.0	21.067	0.0	0.0	Vel = 0		
BLK1 to BLK2	455.01	6.357 120.0 0.0065	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	126.897 -0.235 0.777			Vel = 4.60	
BLK2 to TOR	0.0 455.01	6.357 120.0 0.0065	2I	25.147	22.083	127.439 0.866				
				0.0	25.147	0.308		Vel = 4.60		
TOR to BOR	0.0 455.01	6.357 120.0 0.0065	B J	10.059 31.433	8.792 41.492	128.613 3.808				
				0.0	50.284	0.328		Vel = 4.60		
BOR to PO	0.0 455.01	6.357 120.0 0.0065	B C	10.059 25.147	5.417 35.206	132.749 0.0				
				0.0	40.623	0.265		Vel = 4.60		
	0.0 455.01					133.014		K Factor = 39.45		
System Demand Pressure						133.014				
Safety Margin						15.963				
Continuation Pressure						148.977				
Pressure @ Pump Outlet						148.977				
Pressure From Pump Curve						-64.665				
Pressure @ Pump Inlet						84.312				
*										
PI to BYP	0.0 455.01	8.249 120.0 0.0018	lx	15.386	8.292	84.312 -2.869				
				0.0	15.386	0.043		Vel = 2.73		
BYP to BKFL	0.0 455.01	6.357 120.0 0.0065	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	81.486 6.315 0.580			** Fixed Loss = 3.5 Vel = 4.60	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BKFL to SPIG	0.0 455.01	7.981 120.0 0.0021	G lx	4.0 13.1 0.0	85.291 17.100 102.391	88.381 -4.060 0.220			Vel = 2.92	
SPIG to UG1	0.0 455.01	8.39 140.0 0.0013	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	84.541 5.298 0.271			* * Fixed Loss = 5.298 Vel = 2.64	
UG1 to TEST	200.00 655.01	8.39 140.0 0.0025	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	90.110 -3.086 1.541			Qa = 200 Vel = 3.80	
	0.0 655.01					88.565			K Factor = 69.60	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125904 Webster ISB - 4th Lvl - RA2
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : SYS4
Contract : 461259
Data File : 46125904 Webster ISB - 4th Lvl - RA2.WXF

Hydraulic Design Information Sheet

Name - 46125904 Webster ISB - 4th Lvl - RA2 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - SYS4
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-104.A
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve
S Other Factory Mutual - HC1
T Specific Ruling Made By Date
E

M Area of Sprinkler Operation - 1629 System Type Sprinkler/Nozzle
Density - .10 (X) Wet Make Viking
D Area Per Sprinkler - 324 () Dry Model VK634
E Elevation at Highest Outlet - 140.17 () Deluge Size 3/4"
S Hose Allowance - Inside - 50 () Preaction K-Factor 8.0
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.155
G Hose Allowance - Outside - 200
N

Note

Calculation Flow Required - 285.49 Press Required - 111.043 SYS4
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104
U

P Location - 8274 Big Bend Blvd
P
L Source of Information - Ahern Fire Protection
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf
R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse
G
E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

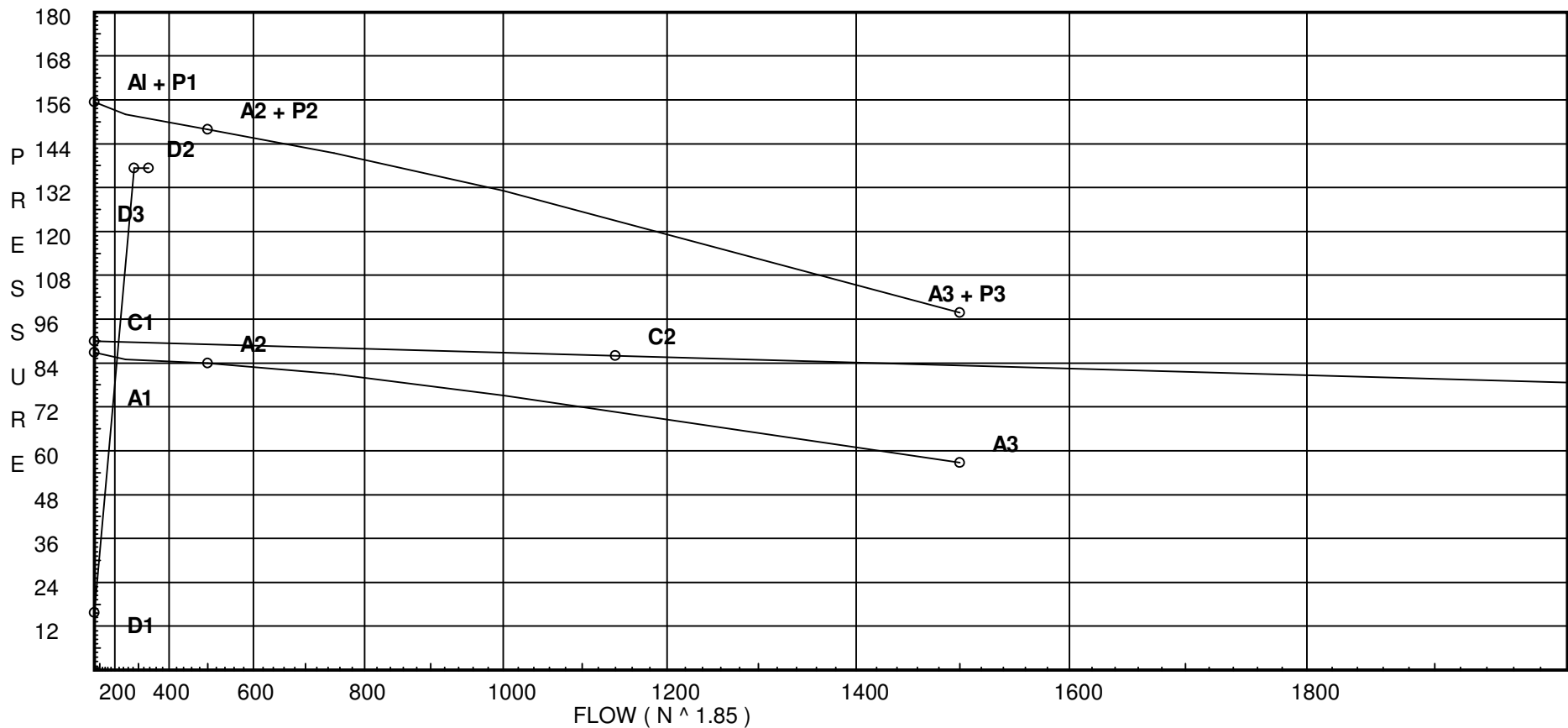
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 15.665
D2 - System Flow : 285.489
D2 - System Pressure : 137.348
Hose (Demand) : 50
D3 - System Demand : 335.489
Hose (Adj City) : 200
Safety Margin : 14.030



Fittings Used Summary

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S21	140.17	8	17.0	na	32.98	0.1	324	17.0
S22	140.17	8	18.01	na	33.95	0.1	324	17.0
S23	140.17	8	23.07	na	38.43	0.1	324	17.0
S24	140.17	8	30.77	na	44.38	0.1	324	17.0
S25	140.17	8	29.27	na	43.28	0.1	324	17.0
S26	140.17	8	30.71	na	44.33	0.1	324	17.0
S27	140.17	8	36.21	na	48.14	0.1	324	17.0
X21	140.92		25.12	na				
X22	140.92		26.59	na				
X23	140.92		33.95	na				
X24	140.92		45.06	na				
X25	140.92		42.9	na				
X26	140.92		44.97	na				
X27	140.92		52.87	na				
B1	140.92		73.65	na				
B2	140.92		76.72	na				
A7	140.92		99.76	na				
A8	140.92		105.95	na				
SYS4	140.92		111.04	na				
HV14	133.667		114.32	na	50.0			
SYS3	125.583		118.57	na				
HV13	118.333		121.9	na				
SYS2	110.25		125.61	na				
HV12	103.0		128.94	na				
HV11	89.0		135.69	na				
SYS1	95.75		132.77	na				
BLK1	97.625		131.95	na				
BLK2	98.167		132.16	na				
TOR	96.167		133.2	na				
BOR	87.375		137.2	na				
PO	87.375		137.35	na				
PI	87.375		85.21	na				
BYPS	94.0		82.37	na				
BKFL	87.5		88.99	na				
SPIG	96.875		85.06	na				
UG1	96.875		91.04	na	200.0			
TEST	104.0		89.01	na				

The maximum velocity is 32.12 and it occurs in the pipe between nodes X24 and B1

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* 										
S21 to X21	32.98 32.98	1.049 120.0 0.3284	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	17.000 -0.325 8.443			K Factor = 8.00 Vel = 12.24	
	0.0 32.98						25.118		K Factor = 6.58	
S22 to X22	33.95 33.95	1.049 120.0 0.3463	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	18.007 -0.325 8.904			K Factor = 8.00 Vel = 12.60	
	0.0 33.95						26.586		K Factor = 6.58	
S23 to X23	38.43 38.43	1.049 120.0 0.4356	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	23.073 -0.325 11.198			K Factor = 8.00 Vel = 14.27	
	0.0 38.43						33.946		K Factor = 6.60	
S24 to X24	44.38 44.38	1.049 120.0 0.5685	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	30.768 -0.325 14.615			K Factor = 8.00 Vel = 16.48	
	0.0 44.38						45.058		K Factor = 6.61	
S25 to X25	43.28 43.28	1.049 120.0 0.5429	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	29.272 -0.325 13.957			K Factor = 8.00 Vel = 16.07	
	0.0 43.28						42.904		K Factor = 6.61	
S26 to X26	44.33 44.33	1.049 120.0 0.5674	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	30.710 -0.325 14.589			K Factor = 8.00 Vel = 16.46	
	0.0 44.33						44.974		K Factor = 6.61	
S27 to X27	48.14 48.14	1.049 120.0 0.6608	T Eq	5.0 20.7 0.0	0.010 25.700 25.710	36.208 -0.325 16.990			K Factor = 8.00 Vel = 17.87	
	0.0 48.14						52.873		K Factor = 6.62	
* 										
X21 to X22	32.98 32.98	1.38 120.0 0.0864		0.0 0.0 0.0	17.000 0.0 17.000	25.118 0.0 1.468			Vel = 7.07	
X22 to X23	33.95 66.93	1.38 120.0 0.3198	4lx	7.6 0.0 0.0	15.417 7.600 23.017	26.586 0.0 7.360			Vel = 14.36	
X23 to X24	38.43 105.36	1.38 120.0 0.7403		0.0 0.0 0.0	15.010 0.0 15.010	33.946 0.0 11.112			Vel = 22.60	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
X24 to B1	44.38 149.74	1.38 120.0 1.4184	T	6.0 0.0 0.0	14.160 6.000 20.160	45.058 0.0 28.594			Vel = 32.12	
	0.0 149.74					73.652			K Factor = 17.45	
*										
X25 to X26	43.28	1.38 120.0		0.0 0.0	14.500 0.0	42.904 0.0			Vel = 9.28	
X26 to X27	44.34 87.62	1.38 120.0 0.5262		0.0 0.0 0.0	15.010 0.0 15.010	44.974 0.0 7.899			Vel = 18.79	
X27 to B2	48.13 135.75	1.38 120.0 1.1831	T	6.0 0.0 0.0	14.160 6.000 20.160	52.873 0.0 23.852			Vel = 29.12	
	0.0 135.75					76.725			K Factor = 15.50	
*										
B1 to B2	149.74 149.74	2.067 120.0 0.1983		0.0 0.0 0.0	15.500 0.0 15.500	73.652 0.0 3.073			Vel = 14.32	
B2 to A7	135.75 285.49	2.067 120.0 0.6543	T 4l	10.0 14.0 0.0	11.208 24.000 35.208	76.725 0.0 23.037			Vel = 27.30	
	0.0 285.49					99.762			K Factor = 28.58	
*										
A7 to A8	285.49	3.26 120.0	I	6.72 0.0	80.245 6.720	99.762 0.0			Vel = 10.97	
A8 to SYS4	0.0 285.49	3.26 120.0 0.0711	2l T B C	13.44 20.159 6.72 13.44	17.840 53.759 71.599	105.949 0.0 5.094			Vel = 10.97	
	0.0 285.49					111.043			K Factor = 27.09	
*										
SYS4 to HV14	285.49	4.26 120.0		0.0 0.0	7.250 0.0	111.043 3.141			Vel = 6.43	
HV14 to SYS3	285.49 50.00	0.0193 4.26 120.0		0.0 0.0	7.250 17.907	0.140 114.324 3.501			Qa = 50	
SYS3 to HV13	335.49 0.0	0.0261 4.26 120.0		0.0 0.0	28.487 7.250	0.743 118.568 3.140			Vel = 7.55	
	335.49	0.0261		0.0	7.250	0.189			Vel = 7.55	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
HV13 to SYS2	0.0 335.49	4.26 120.0 0.0260		0.0 0.0 0.0	8.083 0.0 8.083	121.897 3.501 0.210			Vel = 7.55	
SYS2 to HV12	0.0 335.49	4.26 120.0 0.0261		0.0 0.0 0.0	7.250 0.0 7.250	125.608 3.140 0.189			Vel = 7.55	
HV12 to BLK1	0.0 335.49	4.26 120.0 0.0261	J	21.067 0.0 0.0	5.375 21.067 26.442	128.937 2.328 0.689			Vel = 7.55	
	0.0 335.49					131.954			K Factor = 29.21	
HV11 to SYS1	0.0 0.0	4.26 120.0 0.0		0.0 0.0 0.0	6.750 0.0 6.750	135.689 -2.923 0.0	0.0 0.0 0.0		Vel = 0	
SYS1 to BLK1	0.0 0.0	4.26 120.0 0.0	J	21.067 0.0 0.0	1.875 21.067 22.942	132.766 -0.812 0.0	0.0 0.0 0.0		Vel = 0	
BLK1 to BLK2	335.49 335.49	6.357 120.0 0.0037	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	131.954 -0.235 0.442			Vel = 3.39	
BLK2 to TOR	0.0 335.49	6.357 120.0 0.0037	2I	25.147 0.0 0.0	22.083 25.147 47.230	132.161 0.866 0.175			Vel = 3.39	
TOR to BOR	0.0 335.49	6.357 120.0 0.0037	B J	10.059 31.433 0.0	8.792 41.492 50.284	133.202 3.808 0.187			Vel = 3.39	
BOR to PO	0.0 335.49	6.357 120.0 0.0037	B C	10.059 25.147 0.0	5.417 35.206 40.623	137.197 0.0 0.151			Vel = 3.39	
	0.0 335.49					137.348			K Factor = 28.63	
System Demand Pressure						137.348				
Safety Margin						14.030				
Continuation Pressure						151.378				
Pressure @ Pump Outlet						151.378				
Pressure From Pump Curve						-66.168				
Pressure @ Pump Inlet						85.210				
*										
PI to BYP	0.0 335.49	8.249 120.0 0.0011	lx	15.386 0.0 0.0	8.292 15.386 23.678	85.210 -2.869 0.025			Vel = 2.01	
BYP to BKFL	0.0 335.49	6.357 120.0 0.0037	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	82.366 6.295 0.329			** Fixed Loss = 3.48 Vel = 3.39	
BKFL to SPIG	0.0 335.49	7.981 120.0 0.0012	G lx	4.0 13.1 0.0	85.291 17.100 102.391	88.990 -4.060 0.126			Vel = 2.15	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125904 Webster ISB - 4th Lvl - RA2

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
SPIG to UG1	0.0 335.49	8.39 140.0 0.0007	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	85.056 5.826 0.154			* * Fixed Loss = 5.826 Vel = 1.95	
UG1 to TEST	200.00 535.49	8.39 140.0 0.0017	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	91.036 -3.086 1.062			Qa = 200 Vel = 3.11	
	0.0 535.49					89.012			K Factor = 56.76	



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125901 Webster ISB - Preaction - RA1
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : Preaction
Contract : 461259
Data File : 46125901 Webster ISB - Preaction - RA1.WXF

Hydraulic Design Information Sheet

Name - 46125901 Webster ISB - Preaction - RA1 Date - 10/17/16
Location - 8274 Big Bend Blvd
Building - Webster ISB System No. - Preaction
Contractor - Ahern Fire Protection Contract No. - 461259
Calculated By - Dana Mitchell Drawing No. - FP-101.B
Construction: () Combustible (X) Non-Combustible Ceiling Height - 9-6
Occupancy - HC-1

S () NFPA 13 () Lt. Haz. Ord.Haz.Gp. () 1 () 2 () 3 () Ex.Haz.
Y () NFPA 231 () NFPA 231C () Figure Curve

S Other Factory Mutual - HC-1
T Specific Ruling

Made By

Date

M Area of Sprinkler Operation - 583 System Type Sprinkler/Nozzle
Density - .10 (X) Wet Make Viking
D Area Per Sprinkler - 225 () Dry Model VK302
E Elevation at Highest Outlet - 95 () Deluge Size 1/2"
S Hose Allowance - Inside - 50 () Preaction K-Factor 5.6
I Rack Sprinkler Allowance - n/a () Other Temp.Rat.155
G Hose Allowance - Outside - 200

N
Note

Calculation Flow Required - 109.80 Press Required - 57.927 PA
Summary C-Factor Used: 120 Overhead 140 Underground

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap. -
T Time of Test - 2:30 PM Rated Cap.- 1000 Elev.-
E Static Press - 90 @ Press - 55
R Residual Press - 86 Elev. - 87.375 Well
Flow - 1140 Proof Flow
S Elevation - 104

U
P Location - 8274 Big Bend Blvd

P
L Source of Information - Ahern Fire Protection
Y

C Commodity Class Location
O Storage Ht. Area Aisle W.
M Storage Method: Solid Piled % Palletized % Rack
M
S R () Single Row () Conven. Pallet () Auto. Storage () Encap.
T A () Double Row () Slave Pallet () Solid Shelf () Non
O C () Mult. Row () Open Shelf

R K Flue Spacing Clearance:Storage to Ceiling
A Longitudinal Transverse

G
E Horizontal Barriers Provided:

Water Supply Curve C

Ahern Fire Protection
46125901 Webster ISB - Preaction - RA1

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

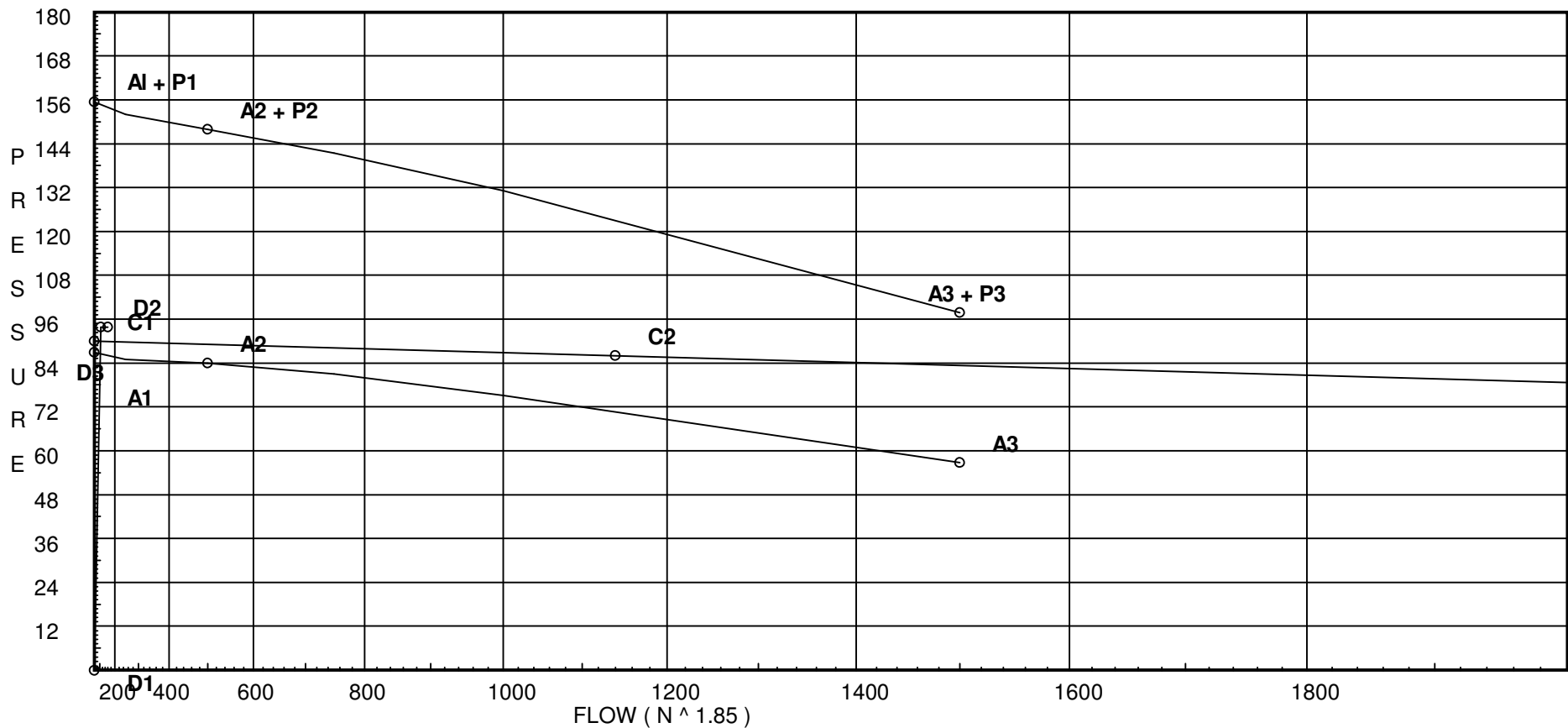
A1 - Adjusted Static: 86.869
A2 - Adj Resid : 83.909 @ 500
A3 - Adj Resid : 56.783 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : -3.898
D2 - System Flow : 109.802
D2 - System Pressure : 93.823
Hose (Demand) : 50
D3 - System Demand : 159.802
Hose (Adj City) : 200
Safety Margin : 58.540



Fittings Used Summary

Ahern Fire Protection
46125901 Webster ISB - Preaction - RA1

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
E	90' Standard Elbow Thrd	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125901 Webster ISB - Preaction - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
S61	95.0	5.6	7.23	na	15.06	0.1	99	7.0
S62	95.0	5.6	7.78	na	15.62	0.1	100	7.0
S63	95.0	5.6	8.14	na	15.97	0.1	120	7.0
S64	95.0	5.6	8.91	na	16.71	0.1	144	7.0
S65	95.0	5.6	7.13	na	14.95	0.1	120	7.0
S66	95.0	5.6	7.0	na	14.82	0.1	31	7.0
S67	95.0	5.6	8.86	na	16.67	0.1	145	7.0
X61	97.583		7.09	na				
X62	97.583		7.7	na				
X63	97.583		8.09	na				
X64	97.583		8.95	na				
X65	97.583		6.96	na				
X66	97.583		7.26	na				
X67	97.583		8.89	na				
D1	97.583		10.5	na				
D2	97.583		10.81	na				
D3	97.583		12.44	na				
PA	86.75		57.93	na				
BLK4	95.75		81.69	na				
A1	95.75		84.33	na				
A2	95.75		84.34	na				
A3	95.75		84.44	na				
A4	95.75		84.58	na				
A5	95.75		85.1	na				
A6	95.4		86.82	na				
A7	95.4		87.3	na				
C1	95.29		86.87	na				
C2	95.29		86.87	na				
C3	95.29		86.87	na				
C4	95.29		86.87	na				
C5	95.29		86.87	na				
C6	95.29		86.87	na				
C7	95.29		86.87	na				
C8	95.29		86.87	na				
C9	98.0		85.7	na				
C10	95.75		86.67	na				
B1	95.75		87.65	na				
B2	95.75		87.65	na				
B3	95.75		87.65	na				
B4	95.75		87.65	na				
B5	95.75		87.65	na				
B6	95.75		87.65	na				
B7	95.75		87.66	na				
B8	95.75		87.76	na				
B9	95.75		87.79	na				
B10	95.75		88.5	na				
B11	95.75		89.12	na				
SYS2	110.25		83.67	na				
HV12	103.0		86.81	na				
HV11	89.0		92.72	na	50.0			
SYS1	95.75		89.8	na				
BLK1	97.625		89.14	na				
BLK2	98.167		89.02	na				
TOR	96.167		89.93	na				
BOR	87.375		93.78	na				
PO	87.375		93.82	na				
PI	87.375		84.52	na				
BYPS	94.0		81.65	na				
BKFL	87.5		91.22	na				
SPIG	96.875		87.2	na				
UG1	96.875		92.1	na	200.0			

Flow Summary - Standard

Ahern Fire Protection
46125901 Webster ISB - Preaction - RA1

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
TEST	104.0		89.53	na				

The maximum velocity is 17.3 and it occurs in the pipe between nodes D3 and PA

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - Preaction - RA1

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
*DROPS										
S61	15.06	1.049	2E	4.0	3.624	7.234			K Factor = 5.60	
to		120.0	T	5.0	9.000	-1.119				
X61	15.06	0.0770		0.0	12.624	0.972			Vel = 5.59	
	0.0									
	15.06					7.087			K Factor = 5.66	
S62	15.62	1.049	2E	4.0	3.624	7.782			K Factor = 5.60	
to		120.0	T	5.0	9.000	-1.119				
X62	15.62	0.0824		0.0	12.624	1.040			Vel = 5.80	
	0.0									
	15.62					7.703			K Factor = 5.63	
S63	15.97	1.049	2E	4.0	3.500	8.137			K Factor = 5.60	
to		120.0	T	5.0	9.000	-1.119				
X63	15.97	0.0859		0.0	12.500	1.074			Vel = 5.93	
	0.0									
	15.97					8.092			K Factor = 5.61	
S64	16.71	1.049	2E	4.0	3.458	8.906			K Factor = 5.60	
to		120.0	T	5.0	9.000	-1.119				
X64	16.71	0.0934		0.0	12.458	1.163			Vel = 6.20	
	0.0									
	16.71					8.950			K Factor = 5.59	
S65	14.95	1.049	2E	4.0	3.458	7.129			K Factor = 5.60	
to		120.0	T	5.0	9.000	-1.119				
X65	14.95	0.0759		0.0	12.458	0.946			Vel = 5.55	
	0.0									
	14.95					6.956			K Factor = 5.67	
S66	14.82	1.049	3E	6.0	7.458	7.000			K Factor = 5.60	
to		120.0	T	5.0	11.000	-1.119				
X66	14.82	0.0747		0.0	18.458	1.379			Vel = 5.50	
	0.0									
	14.82					7.260			K Factor = 5.50	
S67	16.66	1.049	2E	4.0	3.416	8.856			K Factor = 5.60	
to		120.0	T	5.0	9.000	-1.119				
X67	16.66	0.0929		0.0	12.416	1.153			Vel = 6.18	
	0.0									
	16.66					8.890			K Factor = 5.59	
*BRANCHLINES										
*										
X61	15.06	1.049		0.0	8.000	7.087				
to		120.0		0.0	0.0	0.0				
X62	15.06	0.0770		0.0	8.000	0.616			Vel = 5.59	
X62	15.62	1.049	T	5.0	4.750	7.703				
to		120.0		0.0	5.000	0.0				
D1	30.68	0.2873		0.0	9.750	2.801			Vel = 11.39	
	0.0									
	30.68					10.504			K Factor = 9.47	

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.		Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* 										
X63 to X64	15.97	1.049 120.0		0.0 0.0	10.000 0.0	8.092 0.0				
X64 to D2	15.97	0.0858		0.0	10.000	0.858		Vel =	5.93	
X64 to D2	16.72	1.049 120.0	T	5.0 0.0	0.750 5.000	8.950 0.0				
	32.69	0.3230		0.0	5.750	1.857		Vel =	12.14	
	0.0 32.69					10.807		K Factor =	9.94	
* 										
X65 to X66	14.95	1.049 120.0		0.0 0.0	4.000 0.0	6.956 0.0				
X66 to X67	14.95	0.0760		0.0	4.000	0.304		Vel =	5.55	
X66 to X67	14.82	1.049 120.0		0.0 0.0	6.000 0.0	7.260 0.0				
X67 to D3	29.77	0.2717		0.0	6.000	1.630		Vel =	11.05	
X67 to D3	16.66	1.049 120.0	T	5.0 0.0	0.750 5.000	8.890 0.0				
	46.43	0.6181		0.0	5.750	3.554		Vel =	17.24	
	0.0 46.43					12.444		K Factor =	13.16	
*MAINS 										
D1 to D2	30.68	1.61 120.0		0.0 0.0	8.500 0.0	10.504 0.0				
D2 to D3	30.68	0.0356		0.0	8.500	0.303		Vel =	4.83	
D2 to D3	32.69	1.61 120.0		0.0 0.0	12.000 0.0	10.807 0.0				
D3 to PA	63.37	0.1364		0.0	12.000	1.637		Vel =	9.99	
D3 to PA	46.43	1.61 120.0	5lx EqI	11.5 27.9	68.750 39.400	12.444 4.692				
PA to BLK4	109.8	0.3772		0.0	108.150	40.791		Vel =	17.30	
PA to BLK4	0.0	1.61 120.0	4lx T	9.2 8.0	56.125 17.200	57.927 -3.898				
BLK4 to A1	109.8	0.3772		0.0	73.325	27.657		Vel =	17.30	
BLK4 to A1	0.0	1.682 120.0		0.0 0.0	8.667 0.0	81.686 0.0				
	109.8	0.3047		0.0	8.667	2.641		Vel =	15.85	
	0.0 109.80					84.327		K Factor =	11.96	
* 										
A1 to A2	109.80	3.26 120.0		0.0 0.0	0.790 0.0	84.327 0.0				
A2 to A3	109.8	0.0127		0.0	0.790	0.010		Vel =	4.22	
A2 to A3	0.0	3.26 120.0		0.0 0.0	8.900 0.0	84.337 0.0				
	109.8	0.0121		0.0	8.900	0.108		Vel =	4.22	

Final Calculations - Hazen-Williams

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46125901 Webster ISB - Preaction - RA1

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
A3 to A4	0.0 109.8	3.26 120.0 0.0122		0.0 0.0 0.0	11.400 0.0 11.400	84.445 0.0 0.139			Vel = 4.22	
A4 to A5	0.0 109.8	3.26 120.0 0.0121		0.0 0.0 0.0	42.330 0.0 42.330	84.584 0.0 0.514			Vel = 4.22	
A5 to A6	0.0 109.8	3.26 120.0 0.0121	J 3l	17.471 20.159 0.0	92.110 37.630 129.740	85.098 0.152 1.575			Vel = 4.22	
A6 to A7	0.0 109.8	3.26 120.0 0.0122	J	17.471 0.0 0.0	21.370 17.471 38.841	86.825 0.0 0.472			Vel = 4.22	
A7 to B6	0.0 109.8	3.26 120.0 0.0121	2H J	6.989 17.471 0.0	16.860 24.460 41.320	87.297 -0.152 0.502			Vel = 4.22	
	0.0 109.80					87.647			K Factor = 11.73	
*										
C1 to C2	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	4.740 0.0 4.740	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C2 to C3	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	0.810 0.0 0.810	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C3 to C4	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	11.690 0.0 11.690	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C4 to C5	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	2.910 0.0 2.910	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C5 to C6	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	12.090 0.0 12.090	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C6 to C7	0.0 0.0	3.26 120.0 0.0		0.0 0.0 0.0	3.240 0.0 3.240	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C7 to C8	0.0 0.0	3.26 120.0 0.0	I	6.72 0.0 0.0	28.260 6.720 34.980	86.873 0.0 0.0	0.0 0.0 0.0		Vel = 0	
C8 to C9	0.0 0.0	3.26 120.0 0.0	4l 2H	26.879 6.989 0.0	57.440 33.868 91.308	86.873 -1.174 0.0	0.0 0.0 0.0		Vel = 0	
C9 to C10	0.0 0.0	3.26 120.0 0.0	2l	13.44 0.0 0.0	22.280 13.440 35.720	85.699 0.974 0.0	0.0 0.0 0.0		Vel = 0	
C10 to A6	0.0 0.0	3.26 120.0 0.0	2H J	6.989 17.471 0.0	18.800 24.460 43.260	86.673 0.152 0.0	0.0 0.0 0.0		Vel = 0	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0									
	0.0					86.825			K Factor = 0	
*										
B1	0.0	3.26		0.0	1.040	87.647	0.0			
to		120.0		0.0	0.0	0.0	0.0			
B2	0.0	0.0		0.0	1.040	0.0	0.0		Vel = 0	
B2	0.0	3.26		0.0	2.370	87.647	0.0			
to		120.0		0.0	0.0	0.0	0.0			
B3	0.0	0.0		0.0	2.370	0.0	0.0		Vel = 0	
B3	0.0	3.26		0.0	8.130	87.647	0.0			
to		120.0		0.0	0.0	0.0	0.0			
B4	0.0	0.0		0.0	8.130	0.0	0.0		Vel = 0	
B4	0.0	3.26		0.0	6.130	87.647	0.0			
to		120.0		0.0	0.0	0.0	0.0			
B5	0.0	0.0		0.0	6.130	0.0	0.0		Vel = 0	
B5	0.0	3.26		0.0	3.160	87.647	0.0			
to		120.0		0.0	0.0	0.0	0.0			
B6	0.0	0.0		0.0	3.160	0.0	0.0		Vel = 0	
B6	109.80	3.26		0.0	1.340	87.647				
to		120.0		0.0	0.0	0.0				
B7	109.8	0.0119		0.0	1.340	0.016			Vel = 4.22	
B7	0.0	3.26		0.0	8.100	87.663				
to		120.0		0.0	0.0	0.0				
B8	109.8	0.0122		0.0	8.100	0.099			Vel = 4.22	
B8	0.0	3.26		0.0	2.560	87.762				
to		120.0		0.0	0.0	0.0				
B9	109.8	0.0121		0.0	2.560	0.031			Vel = 4.22	
B9	0.0	3.26		0.0	58.497	87.793				
to		120.0		0.0	0.0	0.0				
B10	109.8	0.0121		0.0	58.497	0.710			Vel = 4.22	
B10	0.0	3.26	2I	13.44	37.083	88.503				
to		120.0		0.0	13.440	0.0				
B11	109.8	0.0122		0.0	50.523	0.614			Vel = 4.22	
B11	0.0	3.26	I	6.72	9.390	89.117				
to		120.0	T	20.159	47.039	0.0				
SYS1	109.8	0.0121	B	6.72	56.429	0.685			Vel = 4.22	
			C	13.44						
	0.0									
	109.80					89.802			K Factor = 11.59	
*										
SYS2	0.0	4.26		0.0	7.250	83.674	0.0			
to		120.0		0.0	0.0	3.140	0.0			
HV12	0.0	0.0		0.0	7.250	0.0	0.0		Vel = 0	
HV12	0.0	4.26	J	21.067	5.375	86.814	0.0			
to		120.0		0.0	21.067	2.328	0.0			
BLK1	0.0	0.0		0.0	26.442	0.0	0.0		Vel = 0	

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 0.0					89.142			K Factor = 0	
HV11 to SYS1	50.00 50.0	4.26 120.0 0.0007		0.0 0.0 0.0	6.750 0.0 6.750	92.720 -2.923 0.005			Qa = 50	Vel = 1.13
SYS1 to BLK1	109.80 159.8	4.26 120.0 0.0066	J	21.067 0.0 0.0	1.875 21.067 22.942	89.802 -0.812 0.152				Vel = 3.60
BLK1 to BLK2	0.0 159.8	6.357 120.0 0.0009	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	89.142 -0.235 0.112				Vel = 1.62
BLK2 to TOR	0.0 159.8	6.357 120.0 0.0010	2I	25.147 0.0 0.0	22.083 25.147 47.230	89.019 0.866 0.045				Vel = 1.62
TOR to BOR	0.0 159.8	6.357 120.0 0.0009	B J	10.059 31.433 0.0	8.792 41.492 50.284	89.930 3.808 0.047				Vel = 1.62
BOR to PO	0.0 159.8	6.357 120.0 0.0009	B C	10.059 25.147 0.0	5.417 35.206 40.623	93.785 0.0 0.038				Vel = 1.62
	0.0 159.80					93.823			K Factor = 16.50	
System Demand Pressure						93.823				
Safety Margin						58.540				
Continuation Pressure						152.363				
Pressure @ Pump Outlet						152.363				
Pressure From Pump Curve						-67.845				
Pressure @ Pump Inlet						84.518				
*										
PI to BYP	0.0 159.8	8.249 120.0 0.0003	lx	15.386 0.0 0.0	8.292 15.386 23.678	84.518 -2.869 0.006				Vel = 0.96
BYP to BKFL	0.0 159.8	6.357 120.0 0.0009	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	81.655 9.486 0.084			** Fixed Loss = 6.671	Vel = 1.62
BKFL to SPIG	0.0 159.8	7.981 120.0 0.0003	G lx	4.0 13.1 0.0	85.291 17.100 102.391	91.225 -4.060 0.032				Vel = 1.02
SPIG to UG1	0.0 159.8	8.39 140.0 0.0002	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	87.197 4.868 0.039			** Fixed Loss = 4.868	Vel = 0.93
UG1 to TEST	200.00 359.8	8.39 140.0 0.0008	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	92.104 -3.086 0.509			Qa = 200	Vel = 2.09

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 359.80				89.527			K Factor =	38.03



Ahern Fire Protection
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
314-535-4544

Job Name : 46125901 Webster ISB - Standpipes
Building : Webster ISB
Location : 8274 Big Bend Blvd
System : Standpipe
Contract : 461259
Data File : 46125901 Webster ISB - Standpipes.WXF

HYDRAULIC DESIGN INFORMATION SHEET

Name - 46125901 Webster ISB - Standpipes
Location - 8274 Big Bend Blvd
Building - Webster ISB
Contractor - Ahern Fire Protection
Calculated By - Dana Mitchell
Occupancy - n/a

Date - 10/17/16

System No. - Standpipe
Contract No. - 461259
Drawing No. - FP-101.A

S () NFPA 14 Number of Standpipes () 1 (X) 2 () 3 () 4 ()
Y () Other
S () Specific Ruling Made by Date

T
E Flow at Top Most Outlet - 500 Gpm System Type
M Pres. at Top Most Outlet - 100 Psi (X) Wet () Dry
Flow For Ea. Additional Standpipe - 250 Gpm
D Total Additional Flow - 750 Gpm
E Elevation at Highest Outlet - 133-8 Feet
S Hose Valve Connection () 1 1/2" (X) 2 1/2"
I Class Service (X) I () II () III
G Note:
N

Calculation Gpm Required 750 Psi Required 131.630 BOR
Summary C-Factor Used: Overhead 120 Underground 140

W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - 05/23/16 Cap.
T Time of Test - 2:30 PM Rated Cap. 1000 Elev.
E Static (Psi) - 90 @ Psi 55
R Residual (Psi) - 86 Elev. 87.375 Well
Flow (Gpm) - 1140 Proof Flow Gpm
S Elevation - 104

U
P Location: 8274 Big Bend Blvd
P
L Source of Information: Ahern Fire Protection
Y

Water Supply Curve C

Ahern Fire Protection
46125901 Webster ISB - Standpipes

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City Water Supply:

C1 - Static Pressure : 90
C2 - Residual Pressure: 86
C2 - Residual Flow : 1140

City Water Adjusted to Pump Inlet for Pf - Elev - Hose Flow

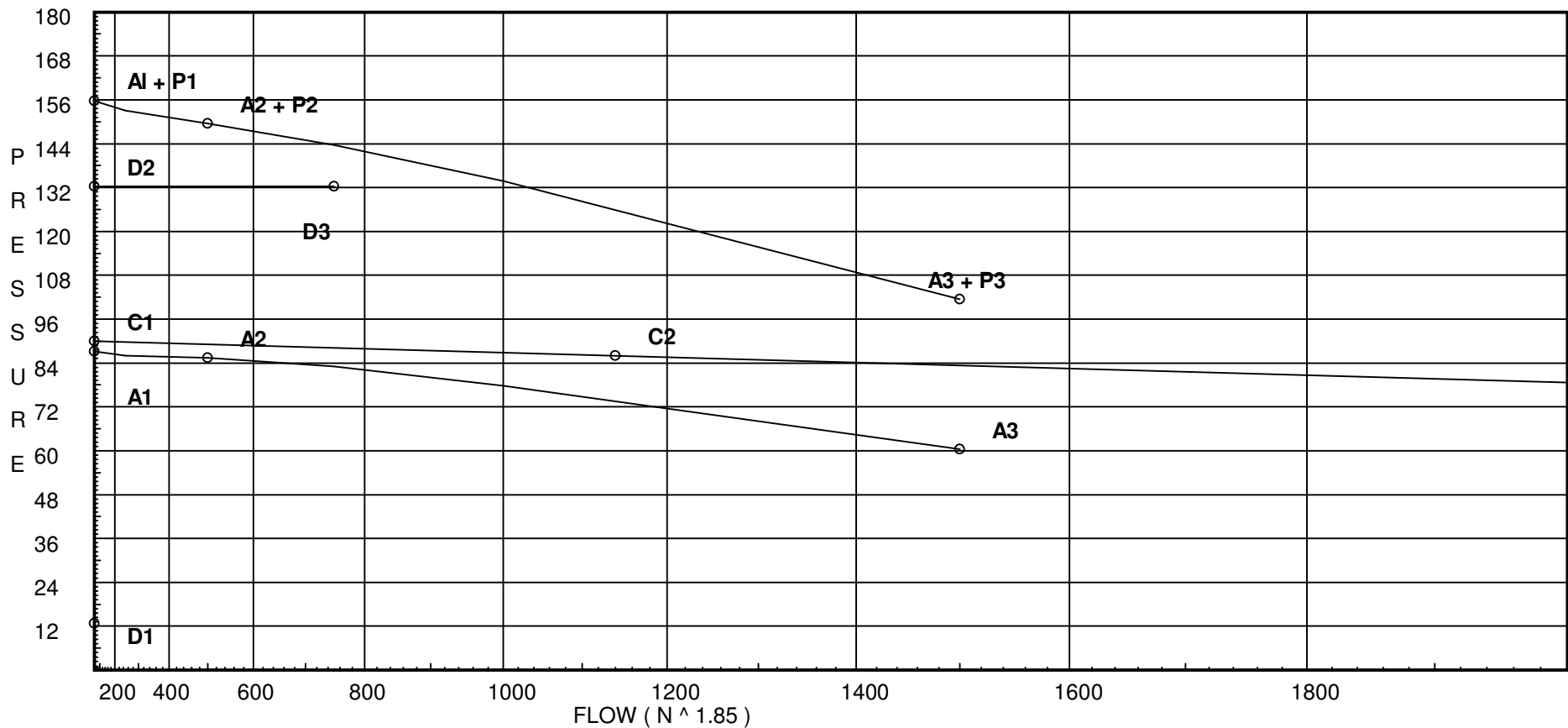
A1 - Adjusted Static: 87.200
A2 - Adj Resid : 85.468 @ 500
A3 - Adj Resid : 60.373 @ 1500

Pump Data:

P1 - Pump Churn Pressure : 68.5
P2 - Pump Rated Pressure : 64
P2 - Pump Rated Flow : 500
P3 - Pump Pressure @ Max Flow : 41
P3 - Pump Max Flow : 1500
City Residual Flow @ 0 = 6135.00
City Residual Flow @ 20 = 5355.71
City Water @ 150% of Pump = 83.35

Demand:

D1 - Elevation : 12.849
D2 - System Flow :
D2 - System Pressure : 132.298
Hose (Demand) : 750
D3 - System Demand : 750
Safety Margin : 11.270



Fittings Used Summary

Ahern Fire Protection
46125901 Webster ISB - Standpipes

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Fitting Legend

Abbrev.	Name	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24
B	Victaulic Grvd. Butterfly Valve	0	0	0	1.4	1	1.2	5	5	0	12	8	8	11	12	14	0	0	0	0	0
C	Swing Check Vlv Vkg Grv	0	0	0	0	0	0	6	10	0	13	0	20	23	0	0	0	0	0	0	0
E	90' Standard Elbow Thrd	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Flanged Gate Valve	0	0	0	0	0	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
H	45' Grvd Firelock Elbow	0	0	0	1.1	1.3	1.8	2.2	2.6	0	3.4	4.2	5	5.0	0	0	0	0	0	0	0
I	90' Grvd Firelock Elbow	0	0	0	2.1	2.6	3.5	4.3	5	0	6.8	8.5	10	13	0	0	0	0	0	0	0
Ix	Standard Grooved 90 ELL	0	0	1.7	1.9	2.3	3.2	3.9	4.9	0	6.5	8.2	9.9	13.1	16.5	19.9	0	0	0	0	0
J	90' Grvd Vic Firelock Tee	0	0	0	5.3	6.35	8.5	10.8	13	0	16	21	25	33	0	0	0	0	0	0	0
T	90' Flow Thru Thread Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	45' Flanged Elbow	0	0	1	1	2	2	3	3	3	4	5	7	9	11	13	12.5	14	16	18	22
V	90' Flanged Elbow	1	2	2	3	4	5	6	7	8	10	12	14	18	22	27	25	28	32	36	44
X	Flanged Tee 90' Turn	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	44	51	58	65	80
Zac	Ames 2000SS	Fitting generates a Fixed Loss Based on Flow																			
Zib	Wilkins 350A	Fitting generates a Fixed Loss Based on Flow																			

Units Summary

Diameter Units Inches
Length Units Feet
Flow Units US Gallons per Minute
Pressure Units Pounds per Square Inch

Fittings Used Summary

Pressure / Flow Summary - STANDARD

Ahern Fire Protection
46125901 Webster ISB - Standpipes

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Node No.	Elevation	K-Fact	Pt Actual	Pn	Flow Actual	Density	Area	Press Req.
HF14	133.667		105.86	na	250.0			
HF13	118.333		115.73	na				
HF24	133.667		100.0	na	250.0			
HF23	118.333		107.16	na	250.0			
HV24	133.667		104.27	na				
HV23	118.333		111.48	na				
HV22	103.0		120.16	na				
HV21	89.0		127.13	na				
BLK4	96.167		124.03	na				
BLK3	97.583		123.88	na				
HV14	133.667		108.55	na				
SYS3	125.583		112.48	na				
HV13	118.333		115.73	na				
SYS2	110.25		119.36	na				
HV12	103.0		122.6	na				
HV11	89.0		129.07	na				
SYS1	95.75		126.14	na				
BLK1	97.625		125.33	na				
BLK2	98.167		125.35	na				
TOR	96.167		127.0	na				
BOR	87.375		131.63	na				
PO	87.375		132.3	na				
PI	87.375		83.07	na				
BYPS	94.0		80.31	na				
BKFL	87.5		88.08	na				
SPIG	96.875		84.58	na				
UG1	96.875		89.26	na				
TEST	104.0		88.16	na				

The maximum velocity is 16.75 and it occurs in the pipe between nodes HF14 and HV14

Final Calculations - Hazen-Williams

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
* HF14 to HV14										
	250.00	2.469	T	12.0	0.500	105.858			Qa = 250	
		120.0		0.0	12.000	0.0				
	250.0	0.2154		0.0	12.500	2.692			Vel = 16.75	
	0.0									
	250.00					108.550			K Factor = 24.00	
* HF13 to HV13										
	0.0	2.469	T	12.0	0.500	115.732	0.0			
		120.0		0.0	12.000	0.0	0.0			
	0.0	0.0		0.0	12.500	0.0	0.0		Vel = 0	
	0.0									
	0.0					115.732			K Factor = 0	
* HF24 to HV24										
	250.00	2.469	E	6.0	1.833	100.000			Qa = 250	
		120.0	T	12.0	18.000	0.0				
	250.0	0.2154		0.0	19.833	4.272			Vel = 16.75	
	0.0									
	250.00					104.272			K Factor = 24.48	
* HF23 to HV23										
	250.00	2.469	E	6.0	2.084	107.158			Qa = 250	
		120.0	T	12.0	18.000	0.0				
	250.0	0.2154		0.0	20.084	4.326			Vel = 16.75	
	0.0									
	250.00					111.484			K Factor = 23.68	
* HV24 to HV23										
	250.00	4.26	2I	17.907	19.832	104.272				
		120.0		0.0	17.907	6.641				
	250.0	0.0151		0.0	37.739	0.571			Vel = 5.63	
* HV23 to HV22										
	250.00	4.26	2I	17.907	19.500	111.484				
		120.0		0.0	17.907	6.641				
	500.0	0.0545		0.0	37.407	2.039			Vel = 11.25	
* HV22 to BLK4										
	0.0	4.26	I	8.954	7.666	120.164				
		120.0		0.0	8.954	2.959				
	500.0	0.0545		0.0	16.620	0.906			Vel = 11.25	
	0.0									
	500.00					124.029			K Factor = 44.90	
* HV21 to BLK4										
	0.0	2.469	T	12.0	7.167	127.134	0.0			
		120.0	B	5.0	17.000	-3.104	0.0			
	0.0	0.0		0.0	24.167	0.0	0.0		Vel = 0	
* BLK4 to BLK3										
	500.00	6.357	3I	37.72	22.334	124.029				
		120.0		0.0	37.720	-0.613				
	500.0	0.0078		0.0	60.054	0.466			Vel = 5.05	
* BLK3 to BLK2										
	0.0	6.357	J	31.433	171.916	123.882				
		120.0	H	6.287	50.293	-0.253				
	500.0	0.0078	I	12.573	222.209	1.725			Vel = 5.05	
	0.0									
	500.00					125.354			K Factor = 44.66	
* BLK4 to BLK3										
	500.00	6.357	3I	37.72	22.334	124.029				
		120.0		0.0	37.720	-0.613				
	500.0	0.0078		0.0	60.054	0.466			Vel = 5.05	
* BLK3 to BLK2										
	0.0	6.357	J	31.433	171.916	123.882				
		120.0	H	6.287	50.293	-0.253				
	500.0	0.0078	I	12.573	222.209	1.725			Vel = 5.05	
	0.0									
	500.00					125.354			K Factor = 44.66	
* BLK4 to BLK3										
	500.00	6.357	3I	37.72	22.334	124.029				
		120.0		0.0	37.720	-0.613				
	500.0	0.0078		0.0	60.054	0.466			Vel = 5.05	
* BLK3 to BLK2										
	0.0	6.357	J	31.433	171.916	123.882				
		120.0	H	6.287	50.293	-0.253				
	500.0	0.0078	I	12.573	222.209	1.725			Vel = 5.05	
	0.0									
	500.00					125.354			K Factor = 44.66	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - Standpipes

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
HV14 to SYS3	250.00 250.0	4.26 120.0 0.0151	2I	17.907 0.0 0.0	10.580 17.907 28.487	108.550 3.501 0.431			Vel = 5.63	
SYS3 to HV13	0.0 250.0	4.26 120.0 0.0152		0.0 0.0 0.0	7.250 0.0 7.250	112.482 3.140 0.110			Vel = 5.63	
HV13 to SYS2	0.0 250.0	4.26 120.0 0.0151		0.0 0.0 0.0	8.083 0.0 8.083	115.732 3.501 0.122			Vel = 5.63	
SYS2 to HV12	0.0 250.0	4.26 120.0 0.0150		0.0 0.0 0.0	7.250 0.0 7.250	119.355 3.140 0.109			Vel = 5.63	
HV12 to BLK1	0.0 250.0	4.26 120.0 0.0151	J	21.067 0.0 0.0	5.375 21.067 26.442	122.604 2.328 0.400			Vel = 5.63	
	0.0 250.00					125.332			K Factor = 22.33	
HV11 to SYS1	0.0 0.0	4.26 120.0 0.0		0.0 0.0 0.0	6.750 0.0 6.750	129.068 -2.923 0.0	0.0 0.0 0.0		Vel = 0	
SYS1 to BLK1	0.0 0.0	4.26 120.0 0.0	J B	21.067 15.8 0.0	1.875 36.867 38.742	126.144 -0.812 0.0	0.0 0.0 0.0		Vel = 0	
BLK1 to BLK2	250.00 250.0	6.357 120.0 0.0022	2I H B J	25.147 6.287 10.059 31.433	46.209 72.926 119.135	125.332 -0.235 0.257			Vel = 2.53	
BLK2 to TOR	500.00 750.0	6.357 120.0 0.0164	2I	25.147 0.0 0.0	22.083 25.147 47.230	125.354 0.866 0.776			Vel = 7.58	
TOR to BOR	0.0 750.0	6.357 120.0 0.0164	B J	10.059 31.433 0.0	8.792 41.492 50.284	126.996 3.808 0.826			Vel = 7.58	
BOR to PO	0.0 750.0	6.357 120.0 0.0164	B C	10.059 25.147 0.0	5.417 35.206 40.623	131.630 0.0 0.668			Vel = 7.58	
	0.0 750.00					132.298			K Factor = 65.21	
System Demand Pressure						132.298				
Safety Margin						11.270				
Continuation Pressure						143.568				
Pressure @ Pump Outlet						143.568				
Pressure From Pump Curve						-60.500				
Pressure @ Pump Inlet						83.068				
*										
PI to BYP	0.0 750.0	8.249 120.0 0.0046	lx	15.386 0.0 0.0	8.292 15.386 23.678	83.068 -2.869 0.109			Vel = 4.50	

Final Calculations - Hazen-Williams

Ahern Fire Protection
46125901 Webster ISB - Standpipes

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Date 09/22/16

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
BYPS to BKFL	0.0 750.0	6.357 120.0 0.0164	2J I Zib	62.867 12.573 0.0	13.417 75.440 88.857	80.308 6.315 1.460			** Fixed Loss = 3.5 Vel = 7.58	
BKFL to SPIG	0.0 750.0	7.981 120.0 0.0054	G lx	4.0 13.1 0.0	85.291 17.100 102.391	88.083 -4.060 0.555			Vel = 4.81	
SPIG to UG1	0.0 750.0	8.39 140.0 0.0032	2G Zac 2V X	13.572 0.0 61.074 59.377	80.000 134.023 214.023	84.578 4.000 0.685			** Fixed Loss = 4 Vel = 4.35	
UG1 to TEST	0.0 750.0	8.39 140.0 0.0032	2G 3U X	13.572 45.805 59.377	500.000 118.754 618.754	89.263 -3.086 1.979			Vel = 4.35	
	0.0 750.00					88.156			K Factor = 79.88	



2675 Scott Ave., Suite C
St. Louis, MO 63103
main 314.535.4544 | fax 314.535.0144
www.ahernfire.com

Webster University

8274 Big Bend Blvd
Webster Groves, MO 63119

Fire Suppression Operating & Maintenance Manual

OPERATING & MAINTENANCE MANUAL

***Webster University ISB
8274 Big Bend Blvd.
Webster Groves, MO 63119***

Preaction Detection Added to Provided TotalPac with Built-In Panel

AFP #391073

TABLE OF CONTENTS

1. Warranty Letter
2. Commissioning Reports
 - Fire Suppression and Detection System Test Report
 - Confirmation of Arming
3. Equipment Data Sheets
4. As-Built Drawings FX-1 thru FX-2
5. Inspection Requirements – Preaction



2675 Scott Ave., Suite C
St. Louis, MO 63103
main 314.535.4544 | fax 314.535.0144
www.ahernfire.com

July 6, 2017

Mr. Doug Mayhew
Webster University ISB
8274 Big Bend Blvd
Webster Groves, MO 63119
Phone: 636.561.9500

**RE: PREACTION DETECTION ADDED TO PROVIDED TOTALPAC WITH BUILT-IN PANEL
WEBSTER UNIVERSITY ISB
8274 BIG BEND BLVD
WEBSTER GROVES, MO 63119
AHERN FIRE PROTECTION CONTRACT NO. 391073**

Dear Mr. Mayhew:

Please be hereby advised that our above-referenced Preaction Detection added to Provided TotalPac with built-in panel was placed in service on June 29, 2017.

Beginning with the above installation date, the system's materials and workmanship will be under warranty for one (1) year. However, we do not guarantee the operation of the installation due to factors beyond our control such as disabled devices or depleted municipal water supply.

Thank you once again for this opportunity to be of service.

Respectfully Submitted,

AHERN FIRE PROTECTION
A division of J. F. Ahern Co.

William Cavill

William Cavill
Special Hazards Project Manager

BJC/mmd

\\JFAHERN\LOCAL\UNIVERSAL\FDL\SHARED\FIRE\319DATA\391073 - WEBSTER UNIVERSITY ISB\DESIGN ADMIN\O&M\TEMPLATES\1. WARRANTY LETTER.DOC



Contract/ WO # 391073

LID

Type of Tests

- ☒ Commission New Installation
☐ Semi-Annual ☐ Annual Inspection, Testing and Maintenance
☐ Other, Explain

FIRE SUPPRESSION AND DETECTION SYSTEM TEST

Invoice To:				Phone #:	
Street:			City, State, Zip:		
Location:	Webster University ISB		Building Name:		
Street:	8274 Big Bend Blvd		City, State, Zip:	Webster Groves, MO 63119	
Phone #:		Fax #:		Foreman:	
Date:		Signature:			

Protected Area:

System Type(s): Preaction

Manufacturer(s): Viking

Control Panel(s): Total Pack/VFR 400

Mechanical Section	OK	N/A	Comments
Agent Containers Secure:	☐	☒	
Agent Piping Secure:	☐	☒	
Pipe Gauge and Size:	☒	☐	
Nozzles Installed:	☒	☐	
Deluge Valves:	☐	☒	
Preaction Valves:	☒	☐	
Solenoid/Pilot Actuators:	☒	☐	
Pilot Controls:	☒	☐	
Waterflow Switches:	☒	☐	
Tamper Switches:	☒	☐	
Selector Valves:	☐	☒	
Pneumatic Release:	☒	☐	
Gauges/Hoses, etc.:	☒	☐	
System Alterations:	☐	☒	
Room Sealed Properly:	☐	☒	
Equipment Condition:	☒	☐	
Valves Trip Tested:	☒	☐	
Low Air Switches Adjusted:	☒	☐	
Normal Air: 35	Alarm Point: 20	Trip: 0	
Field Device Tests	OK	N/A	Comments
Audible Alarm Devices:	☐	☒	
Visual Alarm Devices:	☐	☒	
Remote Annunciators:	☐	☒	
Audible Trouble Devices:	☐	☒	
Visual Trouble Devices:	☐	☒	
Pressure Switches:	☐	☒	
Abort Switches:	☐	☒	
Electric Release Stations:	☐	☒	
Auxiliary Control Lockouts:	☐	☒	
Remote/Aux. Relays:	☐	☒	
Main/Reserve Switches:	☐	☒	
Initiator/Solenoid Devices:	☒	☐	
Addressable Devices:	☐	☒	
System Alterations:	☐	☒	
Equipment Condition:	☒	☐	
Foam System Testing	Report Attached		N/A
Foam Test:	☐		☒



Contract/WO # 391073

LID

Type of Tests

- ☒ Commission New Installation
☐ Semi-Annual ☐ Annual Inspection, Testing and Maintenance
☐ Other, Explain

FIRE SUPPRESSION AND DETECTION SYSTEM TEST

Control Panel Tests	OK	N/A	Comments				
AC Power (<u>120</u>) VAC:	☒	☐					
Panel 24 V Power Supply (<u>27</u>) VDC:	☒	☐					
Battery Load Test:	☒	☐					
<u>13</u> VDC at <u>8</u> (time) to <u>13</u> VDC at <u>8</u> (time)							
Lamp Test:	☒	☐					
Fuses/Wiring:	☒	☐					
Alarm Tests:	☒	☐					
Supervisory Tests:	☒	☐					
Trouble Tests (Ground/Open):	☒	☐					
Dip Switch:	☒	☐					
System Program:	☒	☐					
Sequence of Operation:	☒	☐					
System Time Delays:	☐	☒					
Printers:	☐	☒					
Modem Control:	☐	☒					
Equipment Condition:	☒	☐					
Interlocks	OK	N/A	Comments				
Air Conditioners:	☐	☒					
Air Handlers/Heaters:	☐	☒					
Process Interlock:	☐	☒					
Fuel Shutoff:	☐	☒					
Computer Shutdown:	☐	☒					
EPO Switches:	☐	☒					
Door Closers:	☐	☒					
Door Strikes:	☐	☒					
Dampers:	☐	☒					
Other:	☐	☒					
Important							
Please see comments section on Page 3 for notes pertaining to those items containing a number in the comment box. A number in this box indicates a possible problem or a situation in which a particular device or function was not tested due to inaccessibility or the potential for business interruption. Ahern Fire Protection assumes no liability for those items identified.							
Remote Monitor	OK	N/A	Comments				
Alarm:	☒	☐					
Supervisory:	☒	☐					
Trouble:	☒	☐					
Pre-Release:	☐	☒					
Release:	☐	☒					
Agency:							
Building Fire Alarm:							
Other:							
*System has been tested for remote monitoring only. Receipt of the correct signal to the central monitoring station shall be by others.							
Detection Devices							
Devices Tested	OK	Qty.	Comments	Devices Tested	OK	Qty.	Comments
Photoelectric Smoke Detector:	☐			Spark Detectors:	☐		
Ionization Smoke Detectors:	☐			Beam Smoke Detectors:	☐		
Heat Detectors, Temp:	☒	2	5601P 135°	Combustible Gas Detectors:	☐		
Flame-UV/IR:	☐			Incipient Fire Detectors:	☐		
Duct Smoke Detectors:	☐			Water Leak Detectors:	☐		
See addressable panel test history (file name):							
Was sensitivity test performed on smoke detectors:				Last known date of smoke detector sensitivity test:			



Contract/WO # 391073

LID

Type of Tests

- ☒ Commission New Installation
☐ Semi-Annual ☐ Annual Inspection, Testing and Maintenance
☐ Other, Explain

FIRE SUPPRESSION AND DETECTION SYSTEM TEST**Linear Heat Detection**

Zone Number	Protected Area	Temp	Test Method	Resistance	Length

Fire Extinguishing Cylinder Record

Serial #	Gross	Net	Tare	PSI	Temp	LLI	Hydro	Act. Date	Location

Service/Checkout List

System(s) Armed:

Control Interlocks Rearmed:

System(s) Status Normal:

Customer Training:

Authorities Notified:

Monitoring Systems Armed:

Building Systems Armed:

Solenoids/Cylinders Connected:

Warning Signs in Place:

OK☒☒☒☐☒☒☒☒☐**N/A**☐☐☐☒☐☐☐☐☒**Comments****Service Notes: Describe Special Disarming procedures****System Comments****Ahern Fire Protection Technician:**

Signature: _____

Fire Department:

Fire Inspector:

Signature: _____

Customer or Owner:

Customer or Owner Rep:

Signature: _____

Insurance Company:

Representative:

Signature: _____

Customer Copy:☐

Yes

☐

No

Comments:



CONFIRMATION OF ARMING

AFP CONTRACT / WO #: 391073

SYSTEM TYPE: Preaction

JOB NAME: Webster University ISB

OF SYSTEMS:

ADDRESS: 8274 Big Bend Blvd

LOCATION OF SYSTEM(S):

Webster Groves, MO 63119

EQUIPMENT MANUFACTURER:

Ahern Fire Protection has completed the installation and testing of the Clean Agent, Preaction, Deluge or Foam Fire Suppression Systems. ~~At your request, the automatic release mechanism of the system(s) was left disabled.~~ Ahern Fire Protection was on site today to arm the system(s) and place your system(s) into full service. By signing and dating this correspondence, you are confirming your system(s) are now complete and in-service.

Steve Ray

Building Owner Representative Signature

06/29/2017

Date

Ahern Fire Protection Representative Signature

06/29/2017

Date

Fire Suppression Equipment Submittal

Webster University ISB

8274 Big Bend Blvd

Webster Groves, MO 63119



FIRE SUPPRESSION EQUIPMENT DATA

AHERN FIRE PROTECTION

2675 Scott Ave., Suite C
St. Louis, Missouri 63103
main: 314.535.4544 | fax: 314.535.0144
www.ahernfire.com

NAME OF PROJECT:

**Webster University ISB
8274 Big Bend Blvd
Webster Groves, MO 63119**

**Preaction Detection added to
Provided TotalPac with built-in panel**

AHERN FIRE PROTECTION CONTRACT NO.: **391073**

SPECIFICATION NO.:

SUBMITTAL NO.:

STAMP

Prepared By: *William Cavill*
Special Hazards Design/ Project Manager

BJC/abc

EQUIPMENT/MANUFACTURER DATA LIST

ITEM	PART NUMBER	DESCRIPTION	MANUFACTURER
1	5601P	135 Degree Heat Detector	System sensor
2	S-1275	12V 7.5 AH Batteries	Sbs



5600 Series Mechanical Heat Detectors

System Sensor's 5600 series mechanical heat detectors offer a low-cost means for property protection against fire, and for non-life-safety installations where smoke detectors are inappropriate.



Features

- Multiple configurations for installations:
 - Single- and dual-circuit models
 - Fixed temp and combination fixed- temp/rate-of-rise 135°F or 194°F ratings.
- Plain housing for residential installations (Model 5601P)
- Easy-to-use terminal screws
- A broad range of back box mounting options:
 - Single gang
 - 3.5" and 4" Octagonal
 - 4" square with square to round plaster ring
- Reversible mounting bracket

Multiple configurations. The 5600 series offers a full-line of configurations to accommodate a broad range of applications. Both single- and dual-circuit models are available for low- and high-temperature ratings with either fixed temperature or combination fixed temperature/rate-of-rise (ROR) activation. The ROR element of the fixed/ROR models is restorable to accommodate field-testing.

Installation flexibility. To satisfy a variety of installation needs, the 5600 series easily mounts to single-gang and octagonal back boxes. And these models accommodate four-square back boxes, when used with a square to round plaster ring. The reversible mounting bracket permits both flush- and surface-mount back box installations.

Visual identification. The 5600 series provides clear markings on the exterior of the unit to ensure that the proper detector is being used. Alphanumeric characters identify the activation method, as well as the temperature rating, in Fahrenheit and Celsius degrees. Fixed temperature models are identified FX, while combination fixed/rate-of-rise units are marked FX/ROR. The 5600 series also provides a post-activation indicator in the form of a collector. When the detector is activated, the collector drops from the unit, making it easy to identify the unit in alarm.

Agency Listings



Specifications

Architectural/Engineering Specifications

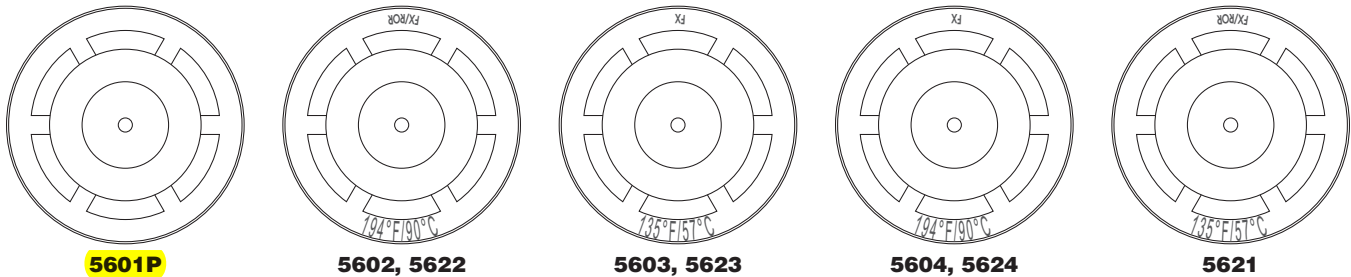
Mechanical heat detector shall be a System Sensor 5600 series model number _____, listed to Underwriters Laboratories UL 521 for Heat Detectors for Fire Protective Signaling Systems. The detector shall be either a single-circuit or a dual-circuit type, normally open. The detector shall be rated for activation at either 135°F (57°C) or 194°F (90°C), and shall activate by means of a fixed temperature thermal sensor, or a combination fixed temperature/rate-of-rise thermal sensor. The rate-of-rise element shall be activated by a rapid rise in temperature, approximately 15°F (8.3°C) per minute. The detector shall include a reversible mounting bracket for mounting to 3½-inch and 4-inch octagonal, single gang, and 4-inch square back boxes with a square to round plaster ring. Wiring connections shall be made by means of SEMS screws that shall accommodate 14–22AWG wire. The detector shall contain alphanumeric markings on the exterior of the housing to identify its temperature rating and activation method. The rate-of-rise element of combination fixed temperature/rate-of-rise models shall be restorable, to allow for field-testing. The detectors shall include an external collector that shall drop upon activation to identify the unit in alarm.

Physical/Operating Specifications

Maximum Installation Temperature	5601P, 5603, 5621, and 5623: 100°F (38°C) 5602, 5604, 5622, and 5624: 150°F (65.6°C)
Operating Humidity Range	5 to 95% RH non-condensing
Dimensions with mounting bracket	Diameter: 4.57 inches (11.6cm) Height: 1.69 inches (4.3cm)
Alarm Temperature	5601P, 5603, 5621, and 5623: 135°F (57°C) 5602, 5604, 5622, and 5624: 194°F (90°C)
Weight	6 oz. (170 grams)
Rate-of-Rise Threshold	15°F (8.3°C) rise per minute (models 5601P, 5602, 5621, and 5622 only)
Mounting	3½-inch octagonal back box 4-inch octagonal back box Single gang back box 4-inch square back box with a square to round plaster ring

Electrical Specifications

Operating Voltage / Contact Ratings	6–125VAC / 3A 6–28VDC / 1A 125VDC / 0.3A 250VDC / 0.1A
Input Terminals	14–22 AWG



Ordering Information

Model	Circuit	Identification Method on Exterior	Temperature Rating	Activation	UL Protected Spacing – 10 Foot Ceiling*
5601P	Single	None	135°F (57°C)	Fixed Temperature / Rate-of-Rise	50 feet x 50 feet (15.24m x 15.2m)
5602	Single	Lettering	194°F (90°C)	Fixed Temperature / Rate-of-Rise	50 feet x 50 feet (15.24m x 15.2m)
5603	Single	Lettering	135°F (57°C)	Fixed Temperature	25 feet x 25 feet (7.62m x 7.62m)
5604	Single	Lettering	194°F (90°C)	Fixed Temperature	25 feet x 25 feet (7.62m x 7.62m)
5621	Dual	Lettering	135°F (57°C)	Fixed Temperature / Rate-of-Rise	50 feet x 50 feet (15.24m x 15.2m)
5622	Dual	Lettering	194°F (90°C)	Fixed Temperature / Rate-of-Rise	50 feet x 50 feet (15.24m x 15.2m)
5623	Dual	Lettering	135°F (57°C)	Fixed Temperature	25 feet x 25 feet (7.62m x 7.62m)
5624	Dual	Lettering	194°F (90°C)	Fixed Temperature	25 feet x 25 feet (7.62m x 7.62m)

*NOTE: Refer to NFPA72 guidelines for spacing reductions when ceiling heights exceed 10 feet.



3825 Ohio Avenue • St. Charles, IL 60174
Phone: 800-SENSOR2 • Fax: 630-377-6495
www.systemsensor.com

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Product specifications subject to change without notice. Visit systemsensor.com
for current product information, including the latest version of this data sheet.
SPDS30001 • 7/13

SBS S Series Batteries

1.2AH - 200AH AGM (6V and 12V)



The sealed construction of the SBS "VRLA" series battery allows trouble-free, safe operation in any position. There is no need to add electrolyte since gases generated during charging are recombined in a unique "Oxygen Cycle."

Applications:

- UPS systems
- Switchgear/controls
- Telecommunications
- Emergency lighting
- Alarm systems
- Machine tools

Features:

- Maintenance-free operation
- Economical
- Low self-discharge (long shelf life)
- Spill-proof construction
- Compact
- Wide operating temperature
- Deep discharge recovery
- 100% memory-free
- Non-restricted for air transportation
- UL recognized #MH19767
- Design life of 4-8 years in float service
- 1 year warranty

Construction	
Plates	Lead-tin-calcium alloy
Separator	Microporous glass fiber (AGM)
Casing Material	ABS
Float Voltage	2.25-2.30V/cell
Equalize Voltage	2.35-2.48V/cell
Temperature Range	5°F to +122°F (-15°C to +50°C)
Service Life	4-8 years

Terminals	
F1:	.187" Spade
F2:	250" Spade
F3:	5.5mm Lug
F4:	6.5mm Lug
F5:	8.0mm Lug
F8:	10.0mm Lug
F10:	9.0mm Lug
F11:	10.5mm Lug
F12:	10 x M5 Button
F13:	14 x M6 Button
F14:	5 x M6 Button
F15:	16 x M6 Button
F16:	20 x M6 Button
F17:	20 x M8 Button

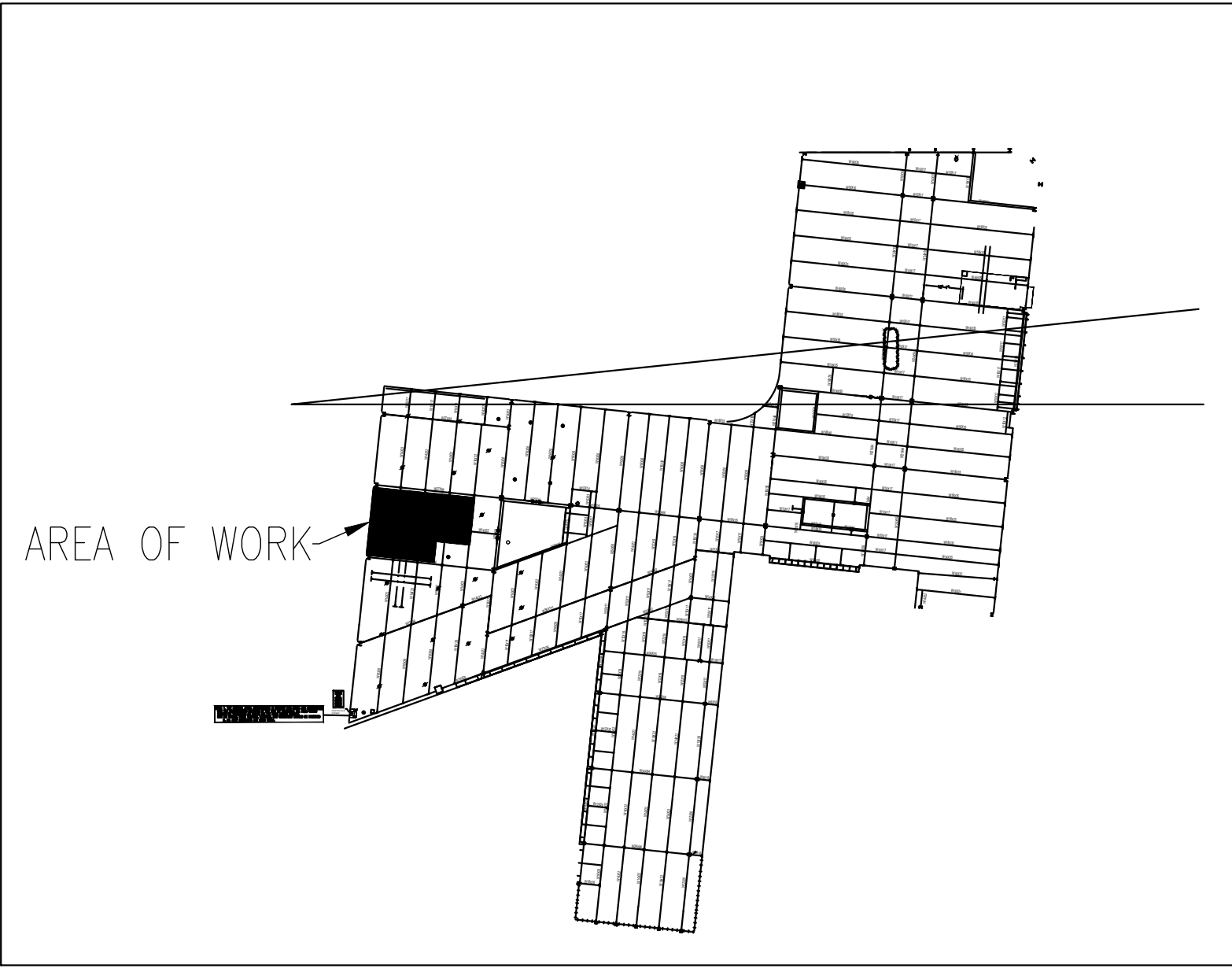
Technical Data*													
Part No.	Volt (V)	Ah/20HR	Length		Width		Height		Weight (Approx)		L.R.	Terminal Type	Assembly Figure
			in	mm	in	mm	in	mm	lb	kg	mOhms		
S-612	6	1.2	3.82	97	0.94	24	2.28	58	0.68	0.31	39.0	F1	+ -
S-650A	6	5	2.76	70	1.85	47	4.21	107	2.05	0.93	16.0	F1	+ -
S-675	6	7.5	5.94	151	1.34	34	3.98	101	3.09	1.40	11.0	F1	+ -
S-6120	6	12	5.94	151	1.97	50	3.98	101	4.56	2.07	7.00	F1	+ -
S-6600	6	60	7.24	184	4.41	112	8.35	212	21.4	9.70	4.00	F17	+ -
S-6V180	6	180	12.05	306	6.65	169	8.90	226	66.8	30.3	1.60	F17	- +
S-6V220	6	220	12.68	322	6.97	177	9.06	230	79.4	36.0	1.50	F17	+ -
S-1213	12	1.3	3.82	97	1.69	43	2.28	58	1.30	0.59	39.0	F1	- +
S-1250	12	5	3.54	90	2.76	70	4.21	107	4.03	1.83	33.0	F1	+ -
S-1275	12	7.5	5.94	151	2.56	65	3.98	101	6.02	2.73	19.0	F1	+ -
S-12120	12	12	5.94	151	3.90	99	3.98	101	9.26	4.20	14.0	F1	+ -
S-12180	12	18	7.13	181	3.03	77	6.57	167	13.9	6.30	12.0	F3	- +
S-12220	12	22	7.13	181	3.03	77	6.57	167	14.8	6.70	11.0	F12	- +
S-12260	12	26	6.54	166	4.96	126	6.85	174	20.1	9.10	10.0	F13	+ -
S-12330	12	33	7.72	196	5.16	131	7.09	180	180	11.0	9.00	F5	+ -
S-12400	12	40	7.80	198	6.54	166	6.85	174	33.1	15.0	9.00	F13	- +
S-12550	12	55	9.02	229	5.43	138	8.35	212	39.7	18.0	8.00	F15	+ -
S-12750	12	75	10.24	260	6.65	169	8.46	215	62.2	28.2	5.00	F15	+ -
S-12900	12	90	12.09	307	6.65	169	8.46	215	67.5	30.6	4.00	F15	+ -
S-12V100	12	100	13.03	331	6.89	175	9.41	239	75.6	34.3	3.50	F11	+ -
S-12V120	12	120	13.03	331	6.89	175	9.41	239	77.2	35.0	3.00	F11	- +
S-12V200	12	200	20.87	530	8.23	209	8.58	218	144	65.5	2.30	F17	- +



PARENT JOB #461259



FIRST FLOOR PLAN VIEW
SCALE: 1/4" = 1'-0"



KEYPLAN
SCALE: N.T.S.

SYMBOLS AND ABBREVIATION LEGEND	
	PREACTION RELEASE PANEL
	ALARM PRESSURE SWITCH
	LOW AIR PRESSURE SWITCH
	PRE-ACTION SPRINKLER SOLENOID VALVE
	TAMPER SWITCH
	135° HEAT DETECTOR

KEYPLAN

AS-BUILTS
07/05/2017

REV.	DATE	REVISION DESCRIPTION
1	7/5/17	AS BUILT
REVISION HISTORY		
THE PROTECTION DESIGN BASED ON THE CURRENTLY ADOPTED FOLLOWING NFPA STANDARDS:		
☐ NFPA 12	☐ NFPA 70	
☐ NFPA 13	☐ NFPA 72	
☐ NFPA 17	☐ NFPA 2001	



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J. F. AHERN CO.
FIRE PROTECTION
CONTRACTORS
2675 Scott Ave., Suite C
St. Louis, MO 63103-3047
(314) 535-4544 p (314) 535-0144 f
www.jfahern.com

WEBSTER UNIV - INTER
SCIENCE BUILDING
8274 BIG BEND BLVD.
WEBSTER GROVES, MO

1ST FLOOR PLAN
VIEW LAYOUT

IF DRAWING IS PLOTTED CORRECTLY
THIS BAR SHOULD MEASURE 2"

DESIGNED BY:	APA
PROJECT MANAGER:	BJC
DATE:	1/16/17
CONTRACT NO.:	391073
CONSTRUCTION DOCUMENTS	



Job No.: 391073

Date: July 6, 2017

Type of System: Preaction

Manufacturer: Viking

Type of Control Panel: VFR-400

System Component	Weekly	Monthly	Quarterly	Semi Annual	Annual	Other
Control Panel(s):						
Control Panel(s)					T	
Function					T	
Fuses					T	
Interfaced Equipment (Dialer)					T	
Lamps, LEDs					T	
Power Supplies					T	
Battery Charger					T	
2 Hour Battery Test					T	
Battery Load Voltage Test					T	
Battery Replacement						4 to 5 yrs.
Devices:						
Smoke Detectors				V	T	
Heat Detectors				V	T	
Pull Stations				V	T	
Abort Stations				V	T	
Horns and Strobes				V	T	
Alarm Switches						
Alarm Switches				T		
Solenoids					T	
Supervisory Switches			T			
Tamper Switches				T		
Note: If system is not connected to a supervising station, control panel function tests are required quarterly. T = Test V = Visual Inspection (by owner)						



2675 Scott Ave., Suite C
St. Louis, MO 63103
main 314.535.4544 | fax 314.535.0144
www.ahernfire.com

Inspection Services

Ahern Fire Protection performs inspection services for all types of fire protection systems. Inspections are conducted in accordance with NFPA standards, including full testing of systems and devices to ensure that components are in prime working condition. We offer inspection services geared to provide automatic periodic inspections required by authorities having jurisdiction and insurance carriers. **Ahern Fire Protection** maintains your inspection schedule so you do not have to. Our full-range inspection packages are cost effective. We offer the following inspections and services:

- **Wet Fire Sprinkler System Inspection**
- **Dry Fire Sprinkler System Inspection**
- **Backflow Device Inspection and filing with the Proper Authorities**
- **Fire Pump Inspection**
- **Preaction Sprinkler System Inspection**
- **Deluge Fire Sprinkler System Inspection**
- **Anti-Freeze Loop Inspections**
- **Private Fire Hydrant Inspections**
- **Foam System Testing and Inspections**
- **MIC® (Microbiologically Influenced Corrosion) Testing and Inspections**

Regulations for inspections of fire safety systems are determined by the National Fire Protection Association. Cities and states use these regulations as a guideline, and then make appropriate amendments according to their needs.

Required Inspections

How often should your fire sprinkler suppression system be tested? The National Fire Protection Association publishes NFPA 25 Inspection, Testing and Maintenance of Water-Based Fire Protection Systems; this document will provide recommendations on proper testing of your system. You may call **Ahern Fire Protection**, check with NFPA 25 or the manufactures' literature for details.

At least once each year, a full sprinkler system inspection should be performed by a knowledgeable professional. **Ahern Fire Protection** offers economical long-term service agreements. We will provide you with inspection reports and test certificates which will comply with your insurance company and local fire department inspection requirements.

You can contact our Service Department for the proper requirements in your area.

Ahern Fire Protection
2675 Scott Ave. Suite C
St. Louis, MO 63103
T-314/535-4544
After hours: 877/237-1785



Water Based Fire Protection Systems Code Requirements for Visual Inspection

Weekly

- Cold Weather Enclosures (daily/weekly)
- Fire Pumps
 - Pump House heating & ventilation
 - Pump system visual observation
 - Casing Relief Valves
 - Pressure Relief Valves
- Valves, Valve Components, & Trim
 - Sealed control valves
- Gauges (dry, preaction, deluge systems & standpipe)

Monthly

- Valves, Valve Components, & Trim
 - Locked/Supervised control valves
 - Alarm Valves/System Riser Check Valves
 - Exterior
 - Preaction & Deluge Valves
 - Exterior
 - Dry Pipe Valve/Quick-Opening Device
 - Exterior
- Backflow Prevention Assemblies
 - Reduced Pressure
 - Reduced Pressure Detector
- Gauges (wet system)
- Waterflow alarm devices
- Supervisory alarm devices

Quarterly

- Valves, Valve Components, & Trim
 - Pressure Reducing & Relief Valves
 - System Valves
- Fire Department Connections
- Private Fire Service
 - Hose Houses
- Hydraulic Nameplate
- Standpipe & Hose Systems
 - Hose Valves

Semi-Annually

- Private Fire Service
 - Monitor Nozzles

Annually

- Valves, Valve Components, & Trim
 - Preaction & Deluge Valves
 - Interior (internal reset valves)
 - Dry Pipe Valve/Quick-Opening Device
 - Interior
 - Pressure Reducing & Relief Valves
 - Hose Connection & Rack Assembly
- Building Temperatures (min 40 degrees areas of water filled pipe)
- Pipe & Fittings (from floor level)
- Hangers & Seismic Bracing (from floor level)
- Sprinklers (from floor level)
- Spare Sprinklers
- Information Sign
- Standpipe & Hose Systems
 - Cabinet
 - Hose
 - Hose Storage Device
 - Hose Nozzle
 - Hydraulic design information sign
- Private Fire Service
 - Hydrants
 - Mainline Strainers

5-Year

- Valves, Valve Components, & Trim
 - Alarm Valves
 - Interior
 - Strainers
 - Filters
 - Orifices
 - Preaction & Deluge Valves
 - Interior (external reset valves)
 - Strainers
 - Filters
 - Orifices
 - Dry Pipe Valve/Quick-Opening Device
 - Strainers
 - Filters
 - Orifices
 - Check Valves
 - Interior
- Pipe (interior)

Water Based Fire Protection Systems Code Requirements for Functional Testing & Maintenance

Weekly

Fire Pumps
No-Flow churn test (diesel)

Monthly

Fire Pumps
No-Flow churn test (electric)

Quarterly

Waterflow alarm devices (mechanical)
Main Drain
Valves, Valve Components, & Trim
 Preaction & Deluge Valves
 Priming Water
 Low Air Pressure Alarm
Dry Pipe Valve
 Priming Water
 Low Air Pressure Alarm
 Quick- Opening Device
Pressure Reducing & Relief Valves
 Master Pressure Reducing Valve (partial flow)

Semi-Annually

Waterflow alarm devices (vane & pressure)
Valves, Valve Components, & Trim
 Control Valves
 Supervisory alarm devices

Annually

Air Pressure Maintenance Device
Valves, Valve Components, & Trim
 Control Valves
 Position & Operation
 Maintenance
Preaction & Deluge Valves
 Full Flow
Dry Pipe Valve
 Trip Test (short trip)
Pressure Reducing & Relief Valves
 Master Pressure Reducing Valve (full flow)
 Circulation Relief
 Pressure Relief Valve

Annually

- Backflow Prevention Assemblies
 - Full Forward Flow Test
 - Backflow Test (check local AHJ)
- Antifreeze Solution
- Standpipe & Hose Systems
 - Hose Storage Device
 - Hose Valve (operation & position)
- Private Fire Service
 - Monitor Nozzles (flow)
 - Hydrants (flow & maintenance)
- Sprinklers protecting cooking and ventilation systems (inspect/replace)
- Fire Pumps
 - Full Flow Condition Test
 - Alarm Signals
 - Annual Maintenance

3-Year

- Valves, Valve Components, & Trim
 - Dry Pipe Valve
 - Full Flow Trip Test
 - Air Leakage Test
- Standpipe & Hose Systems
 - Hose

5-Year

- Valves, Valve Components, & Trim
 - Pressure Reducing & Relief Valves
 - System Valves (full flow)
 - Hose Connection & Rack Assembly (full flow)
- Gauges
- Sprinklers-Extra High Temperature
- Standpipe & Hose Systems
 - Hose
 - Hydrostatic Test
 - Flow Test
- Private Fire Service
 - Piping Underground & Exposed (flow test)

10-Year & Greater

- Sprinklers- Dry (10 years and every 10 years thereafter)
- Sprinklers- Fast Response (20 years and every 10 years thereafter)
- Sprinklers- Standard Response (50 years and every 10 years thereafter)
- Sprinklers- Standard Response (75 years and every 5 years thereafter)

Other Required Maintenance & Testing

- Low Point Drains
- Air Compressors
- Water Storage Tanks, Water Spray Systems & Foam Systems (not included in list)

Inspection and Testing Requirements for Fire Sprinkler Systems

[illegible]

	Obstruction Investigation						14.2.1	Systems shall be examined internally for obstructions where conditions exist that could cause obstructed piping. If the condition has not been corrected or the condition is one that could result in obstruction of piping despite any previous flushing procedures.
	Valves	Monthly	Quarterly	Semi-annual	Annual	Other		
	Inspection							
	Control Valves						13.3.2.1	All valves shall be inspected weekly.
	Alarm Valves						13.4.1.1	Alarm valves shall be externally inspected monthly.
	Check Valves						13.4.2.1	Valves shall be inspected internally every 5 years to verify that all components operate properly, move freely, and are in good condition.
	Preaction/Deluge Valves						13.4.3.1.7	The interior of the preaction or deluge valve and the condition of detection devices shall be inspected annually when the trip test is conducted.
	Dry Pipe Valves/Quick						13.4.4.1.5	The interior of the dry pipe valve shall be inspected annually when the trip test is conducted.
	Backflow Prevention Assemblies						13.6.2	All backflow preventers installed in fire protection system piping shall be tested annually...
	Testing							
	Main Drain						13.2.5	A main drain test shall be conducted quarterly at each water-based fire protection system riser to determine whether there has been a change in the condition of the water supply piping and control valves.
	Waterflow Alarm						13.2.6	All waterflow alarms shall be tested quarterly in accordance with the manufacturer's instructions.
	Control Valves						13.3.1	Each control valve shall be operated annually through its full range and returned to its normal position.
	Preaction/Deluge Valves						13.4.3	Each deluge or preaction valve shall be trip tested annually at full flow in warm weather and in accordance with the manufacturer's instructions.
	Dry Pipe Valves/Quick						13.4.4	Each dry pipe valve shall be trip tested annually during warm weather.
	Backflow Prevention Assemblies						13.6.2	All backflow preventers installed in fire protection system piping shall be tested annually...
	Maintenance							
	Control Valves						13.3.4.1	The operating stems of outside screw and yoke valves shall be lubricated annually.
	Preaction/Deluge Valves						13.4.3.3.2	During the annual trip test, the interior of the preaction or deluge valve shall be cleaned thoroughly and the parts replaced or repaired as necessary.
	Dry Pipe Valves/Quick Opening Devices						13.4.4.3.1	During the annual trip test, the interior of the dry pipe valve shall be cleaned thoroughly and parts replaced or repaired as necessary.



Before It's Too Late.

Fire Sprinkler Facts

- Approximately 4,000 people die in buildings without fire sprinkler systems every year. In buildings equipped with sprinkler systems, the number drops to about 20.*
- Of those 20 deaths, 18% are due to the fact that the fire originated in an area of the building with no fire sprinklers.*
- Fire sprinkler systems must be installed, inspected, and serviced properly to ensure peak operation.
- Ahern Fire Protection offers complete fire protection solutions for your facility.

Don't Wait Until It's Too Late!

Wisconsin
Appleton Area
Tel: 920-954-8242

Eau Claire Area
Tel: 715-233-1841

Fond du Lac Area
Tel: 920-921-9020

Madison Area
Tel: 608-216-0283

Milwaukee Area
Tel: 262-252-5921

Illinois
Chicago Area
Tel: 630-775-0670

Rockford Area
Tel: 815-633-9372

Indiana
Fort Wayne Area
Tel: 877-815-1551

Iowa
Quad Cities Area
Tel: 563-388-0060

Michigan
Grand Rapids Area
Tel: 616-647-0054

Minnesota
Twin Cities Area
Tel: 763-268-0515

Missouri
St. Louis Area
Tel: 314-535-4544

Nebraska
Omaha Area
Tel: 402-894-1045



Customers

Our

Ahern has the resources to tackle projects of all sizes, from \$100 to over \$50 million. No matter which Ahern trade you hire, our qualified experts give you the personalized service that has made us an industry leader for over 125 years.

We work in a variety of business sectors including:
Commercial | Industrial | Institutional | Municipal

We execute projects in both the private and public sectors, and are equally comfortable in the role of a prime contractor or subcontractor.

The majority of J. F. Ahern Co.'s contracting projects are concentrated in the upper Midwest. However, the Company has worked throughout the United States and will continue to do so for selected projects. In addition to general contractors and construction managers, the Company regularly performs work for commercial and industrial business owners and developers.

Some of our clients include:

- General Motors
- Alliant Energy
- Quad/Graphics
- Agnesian Health Care
- Charter Steel
- Mercury Marine
- John Deere
- Target stores
- ACE Ethanol
- Aurora Health Care
- State of Wisconsin
- Harley-Davidson
- Milwaukee Metropolitan Sewerage District (MMSD)

Experience

Our

Beginning as a storefront steam heat and plumbing shop in 1880, J. F. Ahern Co. has since become one of the largest, most respected mechanical contractors in the nation. Over 125 years of commitment to excellence and continued growth set us apart from the competition.

We consistently rank among the largest mechanical contractors in the country, according to surveys compiled by *Engineering News Record* and *Contractor* magazine. J. F. Ahern Co. posted sales of \$212 million for fiscal year 2008.

Safety

J. F. Ahern Co.'s excellent safety record has earned us numerous safety awards, including:

- Wisconsin Corporate Safety Award – Three time winner of this honor.
- Fond du Lac Area Safety Council — Achieved best safety record among specialty trade contractors; Safety Honor Roll since 1985.
- Milwaukee Construction Industry Safety Council — “Best of the Best” award for an accident rate less than one-half the industry average.
- Associated General Contractors (AGC) — 12 consecutive years of achieving one of the best safety records in the state for specialty contractors; five consecutive years of maintaining a loss ratio 50% below national average.



Mission

Our

In striving for excellence, J. F. Ahern Co. must be a reliable, cost-effective and performance-oriented member of the construction team.

By working with and not just for our customers, and by utilizing our experienced management team of recognized industry leaders, J. F. Ahern Co. provides constructive solutions to our customers' mechanical and fire protection needs.

This commitment to excellence — a vision shared by all employees of the Company — assures the success of our customers' projects and continued success of the J. F. Ahern Co.

www.jfahern.com

