



Farabaugh Engineering and Testing Inc.

Project No. T122-13

Report Date: February 20, 2013

No. Pages: 5 (inclusive)

AIR LEAKAGE TEST

6" GREENSEAM PLUS PIPE

Vs

6" SNAPLOCK PIPE

FOR

DUCTMATE

1502 INDUSTRIAL DRIVE
EAST MONONGAHELA, PA 15063

Prepared by:

Paul G. Farabaugh

Approved by:

Patrick J. Farabaugh



Project No. T122-13

AIR LEAKAGE TESTING

Purpose

The purpose of this test is to establish air leakage rates on 6" diameter circular duct using 6" Greenseam Plus Pipe vs 6" Snaplock Pipe.

Test Date

2/6/13

Test Specimen

Manufacturer: Ductmate
1502 Industrial Dr.
East Monongahela, PA 15063

Test Specimens:

6" dia Greenseam Plus

6" Circular Ducts , 26 ga (with factory applied sealant and grease). The ducts had factory applied foam-in-place gasket sealant and red grease located on the inside perimeter of the female joint. A factory applied foam –in-place gasket was also on the full length of the interlocking longitudinal joint.

6" dia Snaplock

6" Circular Ducts, 26 ga (with unsealed joints). There were no sealed joints at the male/female intersection and along the interlocking longitudinal joints.

All ducts were 5' long (nominal) sections.

Test Apparatus

Manometer: Extech digital manometers.

Air Flow Meter: Laminar Flow Element

LP ROUND DUCT

Project No. T122-13

Installation

The circular duct sections were assembled with male / female end laps using #10 self drill fasteners. The 6" circular duct used 5 screws per end lap joint. Two screws were located at the top where the longitudinal seam joint was located. One screw was located at 45 degrees down both sides of the duct and then one screw was located at the bottom of the duct. The outer most end of the duct mock-up was capped and sealed. Each specimen consisted of five sections with each section being 5' long duct sections with four endlap joints. A positive blower was connected to one end and a pressure tap was added in the middle of each specimen. The end of each specimen was capped and sealed closed.

(Note: Prior to the installing of the Greenseam Plus ducts, the male end longitudinal seam was hammered flat the last 2" of the joint. And the female end is swiped with red grease around the interior perimeter.)

Procedure

The tests were conducted using a blower to induce a positive pressure inside the duct mock-up. A laminar flow element was used to measure the air flow at various pressures. The duct joints were taped off to determine the air leakage in the set-up apparatus. Additional air leakage readings were taken at the various pressures with the tape removed to determine the air leakage through the duct mock-up. The air leakage values reported here-in are the net air leakage values (Total Air Leakage minus Set-up Apparatus Leakage).

LP ROUND DUCT

Project No. T122-13

Test Data

Specimen: GreenSeam Plus Pipe, 6" dia. X 26 ga Circular Duct (with sealed joints)

SPECIMEN	TEST #	TEST PRESSURE (IN OF H2O)	LEAKAGE CFM
6" GREENSEAM PLUS	1	0.5	0.661
6" GREENSEAM PLUS	1	1	1.19
6" GREENSEAM PLUS	1	2	1.85
6" GREENSEAM PLUS	1	4	2.91
6" GREENSEAM PLUS	2	0.5	0.925
6" GREENSEAM PLUS	2	1	1.59
6" GREENSEAM PLUS	2	2	2.51
6" GREENSEAM PLUS	2	4	4.09
6" GREENSEAM PLUS	3	0.5	0.661
6" GREENSEAM PLUS	3	1	1.19
6" GREENSEAM PLUS	3	2	1.98
6" GREENSEAM PLUS	3	4	3.04

Specimen: Snaplock Pipe, 6" dia. X 26 ga Circular Duct (with unsealed joints)

SPECIMEN	TEST #	TEST PRESSURE (IN OF H2O)	LEAKAGE CFM
6" SNAPLOCK	1	0.5	11.03
6" SNAPLOCK	1	1	17.65
6" SNAPLOCK	1	2	28.09
6" SNAPLOCK	1	4	45.52
6" SNAPLOCK	2	0.5	13.64
6" SNAPLOCK	2	1	21.59
6" SNAPLOCK	2	2	34.03
6" SNAPLOCK	2	4	51.09
6" SNAPLOCK	3	0.5	10.76
6" SNAPLOCK	3	1	17.30
6" SNAPLOCK	3	2	27.43
6" SNAPLOCK	3	4	42.14

MATERIAL SAFETY DATA SHEET

ISSUE DATE: 03/30/2010

REVISED DATE: 03/30/2010

Supersedes: Any previous M.S.D.S. on this product

EMERGENCY TELEPHONE NUMBER: CHEM-TEL, INC 1-800-255-3924

I. IDENTIFICATION

PRODUCT NAME: GreenSeam Integral Gasket**PRODUCT CLASS:** Hot-Melt Foam Elastomer

DUCTMATE INDUSTRIES, INC.

210 5th St

Charleroi, PA 15022

II. HAZARDOUS INGREDIENTS

REPORTING REQUIREMENTS:

OSHA Hazard Communication Standard (29CFR1910.1200) hazard class.....None

EPA SARA Title III Section 312 (40CFR370) hazard class.....None

EPA SARA Title III Section 313 (40CFR372) toxic chemicals above "de minimis" level are.....None

CALIFORNIA PROP 65 substances listed by the State of California under the "Safe Drinking Water and Toxic Enforcement Act of 1986".

No such substances are present in reportable amounts for occupational exposure as per OSHA's approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

The composition of this mixture is proprietary information. In the event of a medical emergency, compositional information will be provided to a physician or nurse.

III. PHYSICAL DATA

APPEARANCE: black foam**SOLUBILITY IN WATER:** Insoluble**VOLATILE BY WEIGHT:** .001**EVAPORATION RATE:** Not applicable**ODOR:** None**PHYSICAL STATE:** Solid**Specific Gravity (Water=1):** .90**VOC Content:** 0 g/L

IV. HEALTH HAZARD DATA

INGESTION: Not expected to be an ingestion hazard**SKIN:** May cause irritation to sensitive skin**EYE:** Particles may cause irritation**INHALATION:** Unlikely route of entry**CHRONIC EFFECTS:** None known**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** None known**CARCINOGENICITY INFORMATION:** None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTC, OSHA, or ACGIH as a carcinogen.

V. FIRE HAZARD DATA

FLASH POINT: None.**METHOD:** Pensky Marten closed cup**EXTINGUISHING MEDIA:** Foam, Carbon dioxide, dry chemical**FIRE-FIGHTING PROCEDURES:** Do not enter confined space without proper protective equipment. Do not use water; material floats.**PRODUCT OF COMBUSTION:** May yield Carbon Monoxide and/or Carbon Dioxide.

VI. FIRST AID PROCEDURES

INGESTION: Consult a physician if vomiting occurs**SKIN:** May cause irritation to sensitive skin**EYE:** Flush with water. Consult a physician if irritation persists**INHALATION:** Remove to fresh air

LP ROUND DUCT

VII. SPECIAL PROTECTION

PERSONAL PROTECTION: After handling, wash hands before eating, smoking, or using washroom. Adhere to the sanitation requirements of 29CFR1910.141 and 29CFR1910.142.

VIII. REGULATORY INFORMATION

SECTION 313 SUPPLIER INFORMATION: This product contains no known toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR372

CANADIAN WHMIS: To the best of our knowledge, this material is classified as a NONCONTROLLED PRODUCT.

IX. REACTIVITY DATA

STABILITY: Stable under normal conditions of handling and use.

INCOMPATIBILITY: Do not store near strong oxidizers or open flames.

HAZARDOUS DECOMPOSITION: Carbon monoxide, Carbon dioxide

HAZARDOUS POLYMERIZATION: Will not occur.

X. SPECIAL PRECAUTIONS

D.O.T. SHIPPING INFORMATION: Not regulated

I.M.O. SHIPPING INFORMATION: Not regulated

DISPOSAL: Dispose of according to local, state, and federal regulations for nonhazardous solid waste.

This information is taken from sources or based upon data believed to be reliable; however, DUCTMATE INDUSTRIES, INC. makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist, as all materials may present unknown health hazards.

Shop Drawing Submittal Review

Transmitted To: Cannon Design

Date: September 22, 2016

Attention: stl-cac@cannondesign.com

Contact Person / WTA Field Inspector:
Patrick Garner

Project Name: Webster University-**ISB**

Reviewed by: Mark Schaefer

Project No. WT 14127.01

☐

UPS

☐

Courier

☒

Email

Copies	No.	Description
1 PDF	238800M05	(Submittal No.'s) (R&B CxSRC)
		(Cannon #238800-008) - (Paric #15051-0203) - (WES #607)
		• Ductwork Product Data

***Remarks: Please see PAGE 2 for remarks.**

c: **Kelvin Patel**
Kpatel@cannondesign.com

☐ Furnish as Submitted

☒ ***Furnish as Noted**

☐ Rejected

☐ Revise & Resubmit

☐ Reviewed

☐

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for review of general conformance with the design concept of project and general compliance with information given in contract documents. Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

Shop Drawing Submittal Review

Submittal Review Comments

1. Replace material list for sheet metal with the following:

Webster University ISB Job # 5768

Ductwork Specification Submittal

DUCT SYSTEM	SHAPE	MATERIAL	JOINTS	NOTES
LOW PRESSURE SUPPLY	Round	G-60	Gasketed	1,7,8
	Rectangular	G-90	Slip & Drive	
RETURN, OUTDOOR AIR, RELIEF, EXHAUST	Round	G-90	Gasketed	1,7,8
	Rectangular	G-90	Slip & Drive	
MEDIUM PRESSURE SUPPLY DUCT	Round	G-90	Gasketed	2,7,8
	Rectangular	G-90	Slip & Drive	
RANGE HOOD KITCHEN EXHAUST DUCT (CONCEALED)	Round	16 Gauge Carbon Steel	Welded and Flanged	3
	Rectangular	16 Gauge Carbon Steel	Welded and Flanged	
RANGE HOOD KITCHEN EXHAUST DUCT (EXPOSED)	Round	14 Gauge 304 Stainless Steel	Welded and Flanged	3
	Rectangular	14 Gauge 304 Stainless Steel	Welded and Flanged	
ACID RESISTANT FUME HANDLING DUCT	Round	304L Stainless Steel	Welded and Flanged	4,5,6
	Rectangular	304L Stainless Steel	Welded and Flanged	

NOTES

1. ALL RETURN, EXHAUST, OUTDOOR AIR, MAKEUP, RELIEF, AND SUPPLY DUCT WORK DOWNSTREAM FROM VAVS SHALL BE CONSTRUCTED OF GAUGES AND REINFORCEMENT TO +/- 2" W.G.
2. ALL MEDIUM PRESSURE SUPPLY DUCTWORK, UNLESS SPECIFIED OTHERWISE, SHALL BE CONSTRUCTED OF GAUGES AND REINFORCEMENT TO 4" W.G. STATIC PRESSURE.
3. RANGE HOOD KITCHEN EXHAUST DUCTS WILL COMPLY WITH NFPA PAMPHLET 96. ALL JOINTS WILL BE LIQUID TIGHT EXTERNALLY WELDED AND FLANGED. DUCT SHALL SLOPE TOWARDS HOODS AND BE INSTALLED WITHOUT FORMING DIPS OR TRAPS. ACCESS PANELS SHALL BE PROVIDED AT
4. ALL ACID RESISTANT FUME EXHAUST BRANCHES FROM THE FUME HOODS TO THE EXHAUST MAINS SHALL BE CONSTRUCTED 304 STAINLESS STEEL WITH A NO. 4 FINISH. SEAMS AND JOINTS SHALL BE LIQUID TIGHT EXTERANALLY WELDED AND FLANGED. THE MATERIAL WITH TRANSITION TO GALVANIZED STEEL AT THE HEADER.
5. ALL BRANCH AND HEADER ACID RESISTANT FUME EXHAUST DUCTWORK IN CHEMISTRY LAB CLASSROOM 472 SHALL BE CONTRUCTED OF A
6. TURNING VANES FOR ACID RESISTANT FUME EXHAUST DUCTS SHALL BE FABRICATED OF 304 STAINLESS STEEL. VOLUME DAMPERS SHALL HAVE
7. ALL MEDUIM PRESSURE ROUND DUCTS SHALL HAVE SPIRAL SEAMS.
8. ALL ROUND AND RECTANGULAR DUCT SHALL USE PROSEAL SEALANT WHERE SEALANT IS REQUIRED.

2. Radius elbows with centerline radius equal to 1.5 x diameter is preferred. Only use the 1 x diameter if space is not available for the 1.5 x diameter elbow.
3. Mitered elbows shall not be used except if necessary for space constraints and have turning vanes.
4. Abrupt reducers shall not be used.
5. Do not use straight pressed or saddle taps for medium pressure ductwork.
6. Do not use bullhead tees, unless no other configuration is available.
7. Avoid use cross style tees.

WTASHOP - Webster ISB - 23 8800-008

From: STL-CAC <STL-CAC@CANNONDESIGN.COM>
To: 'Patrick Garner' <pgarner@wmtao.com>, WTASHOP <wtashop@wmtao.com>
Date: 9/1/2016 9:33 AM
Subject: Webster ISB - 23 8800-008
Cc: "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>
Attachments: 238800-008 Ductwork Product Data.pdf

Attached for review.

Melissa Pirtle
Construction Admin

CANNONDESIGN

1100 Clark Ave
St. Louis, Missouri 63102
T [314.425.8797](tel:314.425.8797) • M
cannondesign.com



77 Westport Plaza
Suite 250
St. Louis, MO 63146

TRANSMITTAL

No. 15051-0203

Paric Corporation

PROJECT: 15051-Webster University Interdisciplinary Science Building

DATE: 08/31/2016

TO: Cannon Design
1100 Clark Ave
St Louis MO 63102

RE: DuctWork Product Data

ATTN: Kelvin Patel

JOB: 15051

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
☐ Shop Drawings	☒ Approval	☐ Approved as Submitted
☐ Letter	☐ Your Use	☐ Approved as Noted
☐ Prints	☐ As Requested	☐ Returned After Loan
☐ Change Order	☐ Review and Comment	☐ Resubmit
☐ Plans		☐ Submit
☐ Samples	SENT VIA:	☐ Returned
☐ Specifications	☐ Attached	☐ Returned for Corrections
☒ Other: Product Data	☐ Separate Cover Via:	☐ Due Date:

<i>Item</i>	<i>Package</i>	<i>Code</i>	<i>Rev.</i>	<i>Copies</i>	<i>Date</i>	<i>Description</i>	<i>Status</i>
Submittal		238800-008	1		08/31/2016	DuctWork Product Data	Submitted

NOTES:

CC:

Signed: _____
Devin Gates



Mechanical

LETTER OF TRANSMITTAL

TO: Paric Corporation

77 West Port Plaza #250

St. Louis, MO 63146

ATTN: Jason Szachnieski, Devin Gates

DATE: 8/30/16

JOB #: 5768

RE: Webster ISB

We are sending you

☒

Shop drawings

☐ Attached

☐ Prints

☐ Under separate cover

☐ Plans

☐ Samples

☐ Specifications

☐ Copy of letter

☐ Change order

☐ Other

COPIES	DATE	NO.	DESCRIPTION
1	8/30/16	238800	Sheet Metal Duct Work

These are transmitted as checked below:

☐ For signature

☐ For your use

☐ As requested

☐ For bids due

☒

For review and comment

☐ Approved as submitted

☐ Approved as noted

☐ Returned for corrections

☐ Prints returned after loan to us

☐ Other

☐ Resubmit

☒

Submit

☐ Return

☐ copies for approval

☐ copies for distribution

☐ corrected prints

Remarks: Please return by 9/12/16

COPY TO: file

SIGNED:

Alex Chambers



Mechanical

Webster University ISB Webster Groves, MO

Submittal #:

238800

Submittal Description:

Sheet Metal Duct Work

Return By:

9/12/16

Please Note: To avoid scheduling delays and equipment release delays, please submit by the "Return By" date.

CHECKED BY:			
DESIGNER:		ENGINEER:	
☒	NO EXCEPTION TAKEN	☐	MAKE CORRECTIONS NOTED
☐	SUBMIT SPECIFIED ITEM	☐	REVISE AND RESUBMIT
☐	REJECTED	☐	
Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Equipment supplier is responsible for: dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades; and satisfactory performance of his work.			
		Job #:	5768
		Date:	8/30/16
		By:	ARC



Webster University ISB Job # 5768

Ductwork Specification Submittal

See revised list in WTA comments.

DUCT SYSTEM	SHAPE	MATERIAL	JOINTS	NOTES
LOW PRESSURE SUPPLY, RETURN, OUTDOOR AIR, RELIEF, EXHAUST	Round	G-60	Gasketed	1,7,8
	Rectangular	G-60	Slip & Drive	
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	Rectangular	G-60	Slip & Drive	
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	Rectangular	14 Gauge 304 Stainless Steel	Welded and Flanged	
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	Rectangular	304L Stainless Steel	Welded and Flanged	
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3. RANGE HOOD KITCHEN EXHAUST DUCTS WILL COMPLY WITH NFPA PAMPHLET 96. ALL JOINTS WILL BE LIQUID TIGHT EXTERNALLY WELDED AND FLANGED. DUCT SHALL SLOPE TOWARDS HOODS AND BE INSTALLED WITHOUT FORMING DIPS OR TRAPS.				
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5. ALL BRANCH AND HEADER ACID RESISTANT FUME EXHAUST DUCTWORK IN CHEMISTRY LAB CLASSROOM 472 SHALL BE CONSTRUCTED OF A MINIMUM 16 GAUGE THICKNESS.				
6. TURNING VANES FOR ACID RESISTANT FUME EXHAUST DUCTS SHALL BE FABRICATED OF 304 STAINLESS STEEL. VOLUME DAMPERS SHALL HAVE STAINLESS STEEL BEARINGS AND SHAFTS WITH EPOXY COATED BLADES.				
7. ALL ROUND DUCTS SHALL HAVE SPIRAL SEAMS.				
8. ALL ROUND AND RECTANGULAR DUCT SHALL USE PROSEAL SEALANT WHERE SEALANT IS REQUIRED.				