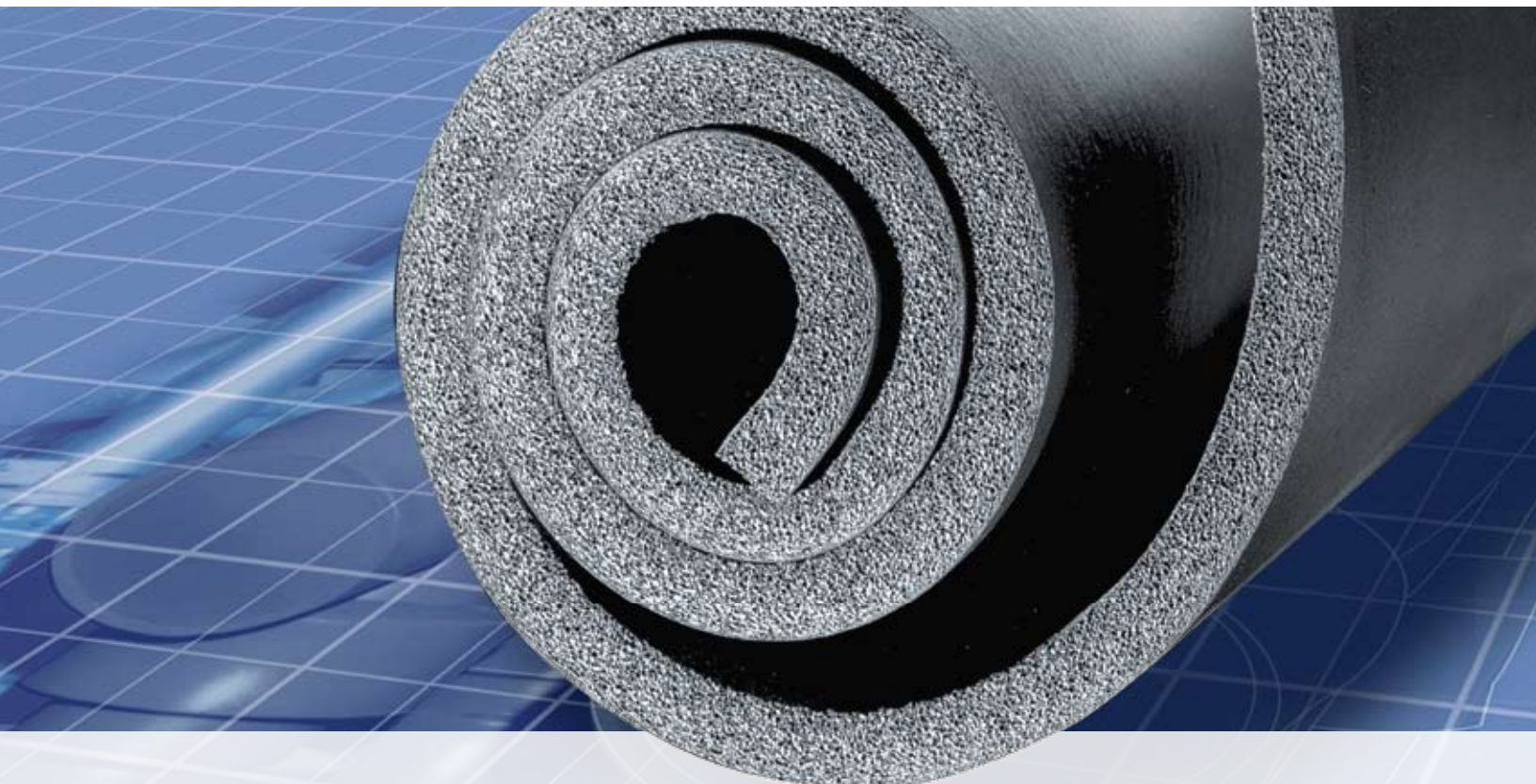


Piping & Equipment



AP/Armaflex®

Sheet & Roll Insulation

Superior Moisture Control on Large Jobs, Mold Resistant



- Closed-cell, nonwicking
- Microban® antimicrobial product protection
- The IAQ Insulation™
- Reduces HVAC noise



Sheet & Roll Insulation

AP Armaflex Sheet and Roll Insulation

AP Armaflex Sheet and Roll Insulation is the original closed cell, fiber-free elastomeric foam and the world's most recognized brand in flexible mechanical insulation.

- **Proven:** World's first choice for insulating ductwork, large piping, fittings, tanks, vessels and curved or irregular surfaces
- **Mold resistant:** Made with Microban antimicrobial product protection
- **Indoor Air Quality-friendly:** Fiber-free, formaldehyde-free, low VOCs, nonparticulating
- **Quiet:** Noise blocking and vibration damage
- **Durable:** No fragile vapor retarder

Description

AP Armaflex Sheet and Roll Insulation is a black flexible elastomeric thermal insulation. It is furnished with a smooth skin on one side which forms the outer exposed insulation surface. The expanded closed-cell structure makes it an efficient insulation. It is manufactured without the use of CFC's, HFC's or HCFC's. All AP Armaflex products are made with Microban® antimicrobial product protection for added defense against mold on the insulation. It is also effective for reducing HVAC noise.

- **AP Armaflex Sheet** is supplied in flat sheets 36" x 48" (.915m x 1.22) in nominal wall thicknesses of 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1-1/2" and 2" (3, 6, 10, 13, 19, 25, 38 and 50mm)
- **AP Armaflex Roll** is supplied in 48" wide (1.22m) continuous rolls in nominal wall thicknesses of 3/8", 1/2", 3/4", 1", 1-1/2" and 2" (10, 13, 19, 25, 38 and 50mm). Also available in 60" (1.53m) in 1" thickness

Factory Mutual (FM) Approvals

AP Armaflex is approved through continuing supervision by Factory Mutual Approvals to consistently provide actual values on these key performance criteria for mechanical system insulation:

• **Thermal Conductivity:** 0.25 BTU-in/hr. ft² °F

• **Water Vapor Transmission:** 0.05 perm-inch

- **Fire Rating:** will not contribute significantly to fire (simulated end-use testing)

As tested by ASTM E 84 "Method of Test for Surface Burning Characteristics for Building Materials", AP Armaflex in wall thickness up to and including 2" (50mm) has a flame-spread index of less than 25 and a smoke-developed index of less than 50.

Note: Numerical flammability ratings alone may not define the performance of products under actual fire conditions. They are provided only for use in the selection of products to meet limits specified.

ALL ARMACELL FACILITIES
IN NORTH AMERICA ARE
ISO 9001:2000 CERTIFIED.

Uses

- Retards heat gain and controls condensation drip from chilled-water and refrigeration systems. Efficiently reduces heat flow on hot systems
- Acceptable in wall thicknesses through 2" (50mm) for use in air plenums and conforms to NFPA 90A and NFPA 90B requirements

The recommended temperature usage range for AP Armaflex Sheet & Roll Insulation is -297°F to +220°F (-183°C to +105°C) according to method of application. With full adhesive coverage attachment, the surface to which it is applied may operate to a limit of 180°F (82°C). When used for pipe insulation with adhesive adhering seams and joints only, AP Armaflex Sheet can be applied to lines that will operate to a limit of 220°F (105°C). On cold systems, insulation thicknesses have been calculated to control condensation on the insulation outer surface, as shown in the table of thickness recommendations.

AP Armaflex Sheet and Roll Insulation meets the energy code requirements of International Energy Conservation Code (IECC) and ASHRAE for **R-Value 4.2 at 1" wall thickness** and R-Value 8 at 2" wall thickness.

Application

AP Armaflex Sheet and Roll is installed using one of our Armaflex adhesives: Armaflex 520, 520 Black or, where a low V.O.C. adhesive is required, Armaflex 520 BLV or Armaflex Spray Contact Adhesive. For application to large, flat or curved metal surfaces such as ducts, very large pipes, tanks and vessels, full adhesive coverage is used. For application as pipe insulation and fitting covers, only the seams and joints are adhered with Armaflex adhesive. 520 Adhesives are contact adhesives; therefore, in all cases, both surfaces to be joined are coated with adhesive. Exterior ductwork must be pitched to allow rainwater to run off the insulation.

For many applications, Armaflex needs no supplementary protection. Additional vapor-retarder protection may be necessary on very-low-temperature surfaces or piping where the insulation is exposed to continually high humidity conditions.

AP Armaflex is designed for installation above ground. Outdoors, a weather-resistant protective finish is to be applied and Armaflex WB Finish is recommended. Armaflex insulation products must be installed according to "Installation of Armaflex Insulations" brochure. Proper installation is required to assure Armaflex insulation performance.

Specification Compliance

AP Armaflex Sheet & Roll Insulation developed to meet:

ASTM C 534, Type II —

Sheet Grade 1
ASTM C 1534
ASTM E 84, NFPA 255, UL 723
CAN/ULC S102
NFPA 90A, 90B
ASTM G21/C1338
ASTM G22
ASTM D 1056, 2B1

MIL-P-15280J, FORM S
MIL-C-3133C (MIL STD 670B),
Grade SBE 3
MEA 107-89M
UL 181
UL 94 5V-A, V-0, File E 55798
UL 84
City of Los Angeles – RR 7642

Armaflex Sheet and Roll Insulation

www.armacell.com/us

For the latest document, please refer to our website.

Physical Properties

Specifications	Values	Test Method
Thermal Conductivity, Btu • in./h • ft ² • °F (W/mK) 75°F Mean Temperature (24°C) 90°F Mean Temperature (32°C)	0.25 (0.036) 0.256 (0.037)	ASTM C 177 or C 518
Water Vapor Permeability, Perm-in. [Kg/(s•m•Pa)]	0.05 (0.725 x 10 ⁻¹³)	ASTM E 96, Procedure A
Flame Spread and Smoke Developed Index through 2" (50mm)*	25/50	ASTM E 84 CAN/ULC S102 ^④
Mold Growth Fungi Resistance Bacterial Resistance	UL181 ASTM G21/C1338 ASTM G22	Meets requirements Meets requirements Meets requirements
Water Absorption, % by Volume	0.2%	ASTM C 209
Upper Use Limit^①	180/220°F (82/105°C)	—
Lower Use Limit^②	-297°F (-183°C)**	—
Ozone Resistance	GOOD	—
Sizes – Sheet Width and Length Thickness (nominal)	36" x 48" (.915m x 1.22m) 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1-1/2" & 2" (3, 6, 10, 13, 19, 25, 38 & 50mm)	—
Sizes – Roll Width Thickness (nominal) x Length	48" (1.22mm) and 60" (1.53m) [†] 3/8" x 100' (10mm x 30.5m) 1/2" x 70' (13mm x 21.4m) 3/4" x 50' (19mm x 15.2m) 1" x 35' (25mm x 10.7m) 1-1/2" x 25' (38mm x 7.6m) 2" x 18' (50mm x 5.4m) [†] 1" thickness only	—
Density, Typical Range^③	3.0 - 6.0 lbs./ft. ³	ASTM D 1622 or D 1667

Notes

① When AP Armaflex Sheet is installed by adhering butt joints and seams only, the upper temperature limit is 220°F (105°C) using 520, 520 black, or 520 BLV Adhesive.

AP Armaflex Sheet adhered with complete adhesive coverage on flat or curved metal surfaces may be applied to surfaces that will operate as high as 180°F (82°C) using 520, 520 Black, 520 BLV or Armaflex Low VOC Spray Contact Adhesive.

② At temperatures below -20°F (-29°C), elastomeric insulation starts to become less flexible. However, this characteristic does not affect thermal efficiency or water vapor permeability of Armaflex insulation.

③ Reference only.

④ Though 1"

* 1-1/2" and 2" available in 25/50 and non 25/50.

** For applications of -40°F to -297°F (-40°C to -183°C), contact Armacell.

Performance approved through continuing supervision by Factory Mutual Approvals.

Thickness Recommendations

For Controlling Outer Insulation Surface Condensation

(Based upon available manufactured thicknesses and not intended to supercede any state or local building codes.)

	Ducts/Tanks/Vessels/Equipment Metal Surface Temperature		
	50°F (10°C)	35°F (2°C)	0°F (-18°C)
BASED ON NORMAL DESIGN CONDITIONS AP Armaflex in the thicknesses noted and within the specified temperature ranges will control outer insulation surface condensation indoors under normal design conditions, a maximum severity of 85°F (29°C) and 70% RH . Armacell research and field experience indicate that indoor conditions anywhere in the United States seldom exceed this degree of severity.	Nom 3/8" (10mm)	Nom 3/4" (19mm)	Nom 1-1/2" (38mm)
BASED ON MILD DESIGN CONDITIONS AP Armaflex in the thicknesses noted and within the specified temperature ranges will control outer insulation surface condensation indoors under mild design conditions, a maximum severity of 80°F (27°C) and 50% RH . Typical of these conditions are most air-conditioned spaces and arid climates.	Nom 1/8" (3mm)	Nom 1/4" (6mm)	Nom 1/2" (13mm)
BASED ON SEVERE DESIGN CONDITIONS AP Armaflex in the thicknesses noted and within the specified temperature ranges will control outer insulation surface condensation indoors under severe design conditions, a maximum severity of 90°F (32°C) and 80% RH . Typical of these conditions are indoor areas in which excessive moisture is introduced or in poorly ventilated confined areas where the temperature may be depressed below ambient.	Nom 1" (25mm)	Nom 1-1/2" (38mm)	Nom 2" (50mm)
For VERY SEVERE DESIGN CONDITIONS which Armacell would consider temperatures above recommended insulation 90°F (32°C) and/or above 80% RH .	Consult Armacell for recommended insulation thickness		

Shop Drawing Submittal Review

Transmitted To: Cannon Design

Date: February 7, 2017

Attention: stl-cac@cannondesign.com

Contact Person / WTA Field Inspector:
Patrick Garner

Project Name: Webster University-**ISB**

Reviewed by: Mike Nolte

Project No. WT 14127.01

☐

UPS

☐

Courier

☒

Email

Copies	No.	Description
1 PDF	232500M01	(Submittal No.'s:) (R&B CxSRC)
		(Cannon #232500-001) - (Paric #15051-0453) - (WES #607)
		➤ Mechanical Insulation Product Data

***Remarks: See Review Comments on PAGE 2.**

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. Contractor responsible to verify that all adhesives, sealants and sealant primers meet the requirements of LEED Credit IEQ 4.1. Provide Product Data for Credit IEQ 4.1 for all adhesives, sealants and sealant primers, including printed statement of VOC content. The submittal does not appear to contain this information for all sealants submitted.
2. Provide aluminum jacketing on all exterior piping per Specification 232500-2.2-D-5: For insulation installed outdoors and insulation subject to water damage, provide an additional **0.016 inch** aluminum jacket with lock seam, longitudinal joint and gasketed bands for butted joints as required for a watertight installation. Jacket shall be complete with waterproof, laminated paper lining and shall be manufactured by ITW Insulation System or RPR Products.

14127.01 - 232500 M01
MTN TO REVIEW -
01/18/17

From: STL-CAC <STL-CAC@CANNONDESIGN.COM>
To: 'Patrick Garner' <pgarner@wmtao.com>, "WTASHOP (WTASHOP@wmtao.com)"
<WTA...
CC: "Patel, Kelvin" <kpatel@CANNONDESIGN.COM>
Date: 1/18/2017 3:01 PM
Subject: Webster ISB - 23 2500-001
Attachments: 232500-001 Mechanical Insulation Product Data.pdf

Attached for review.

Melissa Pirtle

[cid:image001.png@01D2719B.8CD710A0]
1100 Clark Ave
St. Louis, Missouri 63102
T 314.425.8797
cannondesign.com

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

PROJECT NAME	
ADDRESS	
NUMBER	
OWNER	
ARCHITECT / ENGINEER	
SUBMITTED BY	
CONTRACTOR / CM SUBMITTAL NO.	CANNON DESIGN SUBMITTAL NO.
DRAWING / DETAIL REFERENCE	SPECIFICATION SECTION / PARAGRAPH
MANUFACTURER / SUPPLIER	ITEM / PRODUCT ID
REQUIRED DATE	PRIORITY
CRITICALITY	

To be completed by Reviewer

CANNON DESIGN SUBMITTAL NUMBER
RECEIVED DATE

- ☐ **A. No Exceptions Taken**
No further review of submittal is required.
- ☐ **B. Make Corrections Noted**
Incorporate corrections in work;
resubmission is not required.
- ☐ **C. Revise and Resubmit**
Revise as noted, and resubmit for review.
- ☐ **D. Rejected**
Submittal is not in compliance with Contract Documents;
provide new submittal.
- ☐ **E. For Record / Information Only**
Submittal was reviewed for Record / Information
purposes only.
- ☐ **F. Not Required for Review**
Submittal is not required by Contract Documents
and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

ITEM BEING SUBMITTED (check only one)

- ☐ Shop Drawings ☐ Certification / Qualifications ☐ Coordination Drawing
☐ Samples ☐ Record Documents ☐ Calculations
 (_____ copies) ☐ Product Data ☐ Schedules
☐ LEED Submittal ☐ O&M Manuals
☐ Other

ITEM BEING SUBMITTED FOR (check only one)

- ☐ Action ☐ Information Only ☐ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)



PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

Ry:

By:
Devin D. Gates

REVIEWED BY	DATE

A/E COMMENTS

- ☐
- See attached sheet(s) for additional comments

REVIEWED BY	DATE



77 Westport Plaza
Suite 250
St. Louis, MO 63146

TRANSMITTAL

No. 15051-0453

Paric Corporation

PROJECT: 15051-Webster University Interdisciplinary Science Building

DATE: 01/17/2017

TO: Cannon Design
1100 Clark Ave
St Louis MO 63102

Fax;
314-241-2203

RE: Mechanical insulation 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: 08/26/2016

Item	Package	Code	Rev.	Copies	Date	Description	Status
Submittal		232500-001	1		01/17/2017	Mechanical insulation 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: 1/16/17

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	1/16/17	232500	Mechanical Insulation

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 1/24/17

COPY TO: file

SIGNED:

Alex Chambers



Mechanical

Webster University ISB Webster Groves, MO

Submittal #:

232500

Submittal Description:

Mechanical Insulation

Return By:

1/24/17

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

CHECKED BY:			
DESIGNER:		ENGINEER: X	
X	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:	1/16/17
		By:	ARC



TDK Mechanical Services

745 Merus Ct.
Fenton, Missouri 63026
636-600-1662 phone / fax

SUBMITTAL TRANSMITTAL

DATE: December 21, 2016

COMPANY: Trenholm Mechanical Insulation
ATTENTION TO: Audra Trenholm
EMAIL: audra@trenholminsulation.com

FROM: Dan Esker
PHONE: (636) 290-3733 cell / (636) 600-1662 office
EMAIL: dan@tdkmechanical.com

PROJECT: Webster University Interdisciplinary Science E
St. Louis, MO
DESCRIPTION: _____

Mechanical System	Insulation	Thickness	Occurs at
Heating Hot Water	Fiberglass ASJ Pipe Covering	1"	Indoors - Pipe Sizes Under 4"
Heating Hot Water	Fiberglass ASJ Pipe Covering	1-1/2"	Indoors - Pipe Sizes 4" & Over
Chilled Water	PolyISO Pipe Covering	1"	Indoors - All Pipe Sizes
Chilled Water Equipment	Elastomeric Sheet Rubber	1"	Indoors - Mechanical Room
PCS/PCR	PolyISO Pipe Covering	1"	Indoors - All Pipe Sizes
Glycol Piping	Elastomeric Pipe Covering	1"	Indoors - All Pipe Sizes
Refrigeration Piping	Elastomeric Pipe Covering	1"	Indoors - All Pipe Sizes
Medium Pressure Supply Air Duct	FSK Fiberglass Duct Wrap	1-1/2" / 0.75#	Indoors - Concealed
Fume Exhaust Duct	Unifrax Fyre Wrap	(1) layer of 1-1/2"	Indoors - Concealed
Kitchen Exhaust Hood Duct	Unifrax Fyre Wrap	(2) layers of 1-1/2"	Indoors - Concealed
Outside Air Duct	FSK Fiberglass Duct Board	1-1/2" / 3#	Indoors - Concealed
All Duct Work Systems	Foil Tape	4"	Indoors - Concealed
PVC Fittings	Proto PVC Fittings	N/A	At Fiberglass & PolyISO Pipe Covering Fittings
Vimasco Adhesive	WC-5	N/A	At Fiberglass Pipe Covering
Armaflex Adhesive	Armaflex 520 Adhesive	N/A	At Elastomeric Pipe Covering
PolyISO Adhesive	Childer's CP-10	N/A	At PolyISO Pipe Covering

NOTES/CLARIFICATIONS:

Low Pressure Round Supply Air Duct. FSK Fiberglass Duct Wrap. 1-1/2" / 0.75#. Indoors - Concealed