No: MC-01

SUBMITTAL COVERSHEET
Nanuet UFSD –Phase 3 Projects

Architect:
KSQ Architects
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New York, NY 10018

Owner:
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101 Church Street
Nanuet, NY 10954

Construction Manager:
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New York, NY 10019

Contractor: Joe Lombardo Plumbing & Heating of Rockland Inc

Contract: Ron Lombardo

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Suffern, New York 10901

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School Name: Nanuet Union Free School District Phase 3 Bond Projects @ Barr Middle School & Nanuet High School

Type of Submittal:

Re-submittal: [ ] No [ ] Yes

[ ] Shop Drawings **[ ]** Product Data **[ ]** Schedule **[ ]** Sample **[ ]** _____
[ ] Test Report **[ ]** Certificate **[ ]** Color Sample **[ ]** Warranty **[ ]** _____

Submittal Description: REFRIGERATION PIPING INSULATION

Product Name:

Manufacturer:

Subcontractor/ Supplier: ATLANTIC CONTRACTING AND SPECIALTIES

References:

Spec. Section No.: 230719

Drawing No(s):

Paragraph:

Rm. or Detail No(s):

Architect's/ Engineer's Review Stamp	Contractor Review Statement: These documents have been checked for accuracy and coordinated with job conditions and Contract requirements by this office and have been found to comply with the provisions of the Contract Documents. Ronald J. Lombardo 2.6.24 Name: Date: Company Name: Joe Lombardo Plumbing & Heating of Rockland Inc.

Remarks:

1/4" TO 1"

1 3/8 "

TABLE C403.2.10
MINIMUM PIPE INSULATION THICKNESS (in inches)[a, c]

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (inches)				
	Conductivity Btu · in./(h · ft² · °F)[b]	Mean Rating Temperature, °F	< 1	1 to < 1¹/₂	1¹/₂ to < 4	4 to < 8	≥ 8
> 350	0.32 – 0.34	250	4.5	5.0	5.0	5.0	5.0
251 – 350	0.29 – 0.32	200	3.0	4.0	4.5	4.5	4.5
201 – 250	0.27 – 0.30	150	2.5	2.5	2.5	3.0	3.0
141 – 200	0.25 – 0.29	125	1.5	1.5	2.0	2.0	2.0
105 – 140	0.21 – 0.28	100	1.0	1.0	1.5	1.5	1.5
40 – 60	0.21 – 0.27	75	0.5	0.5	1.0	1.0	1.0
< 40	0.20 – 0.26	50	0.5	1.0	1.0	1.0	1.5

104 DEGREES

LIQUID

40 DEGREES

SUCTION

For SI: 1 inch = 25.4 mm, °C = [(°F) - 32]/1.8.

a. For piping smaller than $1^1/_2$ inches and located in partitions within conditioned spaces, reduction of these thicknesses by 1 inch shall be permitted (before thickness adjustment required in footnote b) but not to a thickness less than 1 inch.

b. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:

$T = r\{(1 + t/r)K/k - 1\}$

where:

T = minimum insulation thickness,

r = actual outside radius of pipe,

t = insulation thickness listed in the table for applicable fluid temperature and pipe size,

K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature (Btu · in/h · ft² · °F) and

k = the upper value of the conductivity range listed in the table for the applicable fluid temperature.

c. For direct-buried heating and hot water system piping, reduction of these thicknesses by $1^1/_2$ inches shall be permitted (before thickness adjustment required in footnote b but not to thicknesses less than 1 inch.

All piping associated with HVAC systems must be insulated according to Table C403.2.10.

C403.2.10.1 Protection of piping insulation. Piping insulation exposed to weather shall be protected from damage, including that due to sunlight, moisture, equipment maintenance and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesive tape shall not be permitted.

This code text is self-explanatory. No commentary is necessary.

C403.2.11 Mechanical systems commissioning and completion requirements. Mechanical systems shall be commissioned and completed in accordance with Section C408.2.

This code text is self-explanatory. No commentary is necessary.

C403.2.12 Air system design and control. Each HVAC system having a total fan system motor nameplate horsepower (hp) exceeding 5 hp shall comply with the provisions of Sections C403.2.12.1 through C403.2.12.3.

This code text is self-explanatory. No commentary is necessary.

C403.2.12.1 Allowable fan motor horsepower. Each HVAC system at fan system design conditions shall not exceed the allowable *fan system motor nameplate hp* (Option 1) or *fan system bhp* (Option 2) as shown in Table C403.2.12.1(1). This includes supply fans, exhaust fans, return/relief fans, and fan-powered terminal units associated with systems providing heating or cooling capability. Single-*zone* variable air volume systems shall comply with the constant volume fan power limitation.

Exceptions:

1. Hospital, vivarium and laboratory systems that utilize flow control devices on exhaust or return to maintain space pressure relationships necessary for occupant health and safety or environmental control shall be permitted to use variable volume fan power limitation.
2. Individual exhaust fans with motor nameplate horsepower of 1 hp or less are exempt from the allowable fan horsepower requirement.

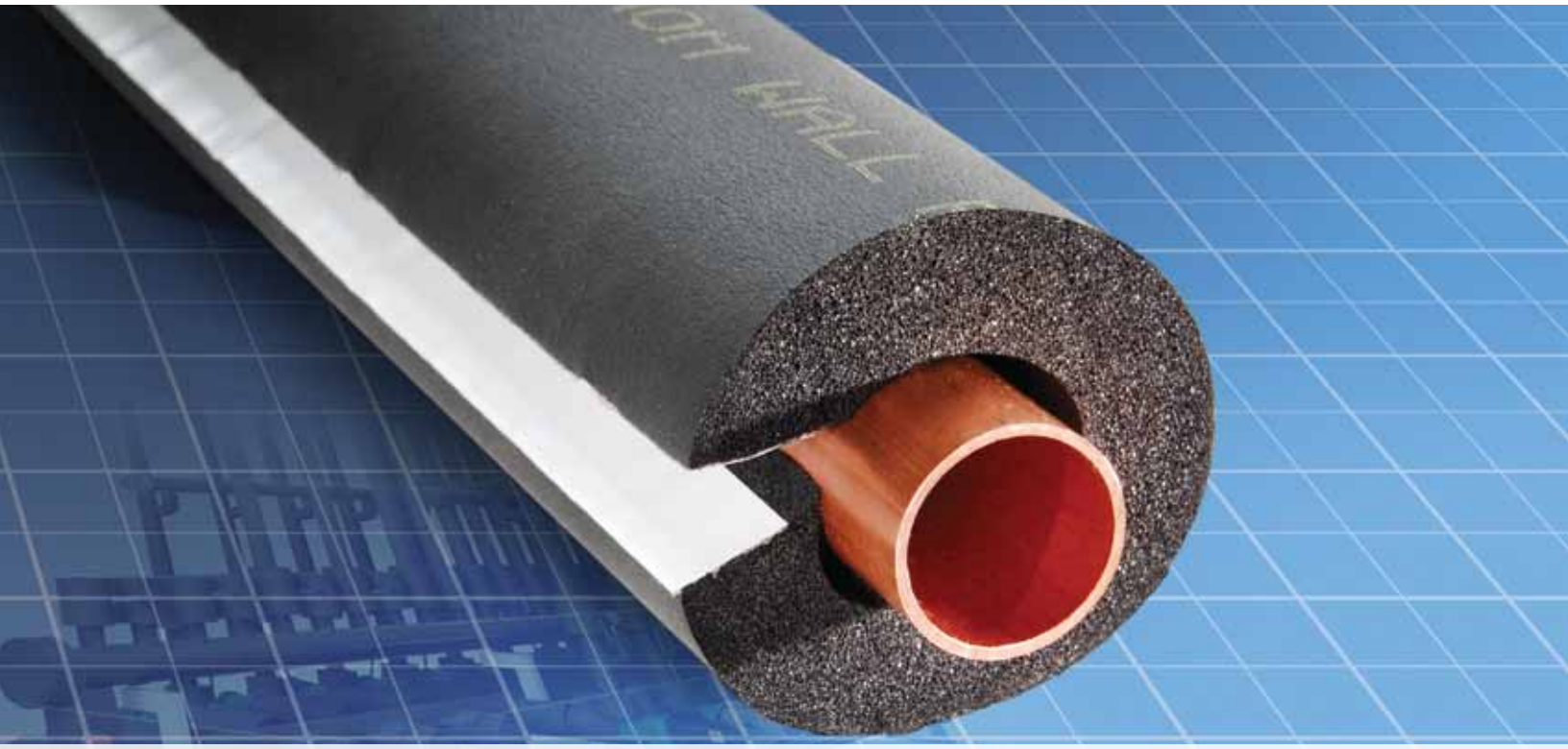
This code text is self-explanatory. No commentary is necessary.

230719- B.1 - REFRIGERATION FLEXIBLE ELASTROMERIC INSULATION - EE ENERGY CODE - SUCTION MAX 40 DEGREES = 1/2" & LIQUID -104 DEGREES = 1"

Fiber Free

armacell advanced insulation

THE MAKERS OF Armaflex®



AP/Armaflex® SS

Self-Seal Tube Insulation

Superior Moisture Control, Mold Resistant – Faster!

- Fiber Free, Closed Cell, Non-Wicking
- GREENGUARD Children and Schools Certified®
- Made with Microban® Antimicrobial Product Protection
- Thickness up to 1" Wall
- 25/50 Rated
- Self-Seal

GREENGUARD Children & Schools Indoor Air Quality Certified® · FM APPROVED · U.S. GREEN BUILDING COUNCIL MEMBER · Microban® antimicrobial product protection

AP Armaflex SS Self-Seal Pipe (Tube) Insulation

AP Armaflex SS Self-Seal Pipe (Tube) Insulation saves labor and installed costs. It is the self-sealing version of the original closed cell, fiber-free elastomeric foam, the world's most recognized brand in flexible mechanical insulation.

- **Proven:** Fewer seams to seal, faster way to insulate chilled water and refrigeration lines
- **Mold resistant:** Made with Microban antimicrobial product protection
- **Indoor Air Quality-friendly:** Fiber-free, formaldehyde-free, low VOCs, nonparticulating. GREENGUARD Indoor Air Quality Certified®.
- **Durable:** No fragile vapor retarder

Description

AP Armaflex SS Self-Seal Pipe Insulation is a 25/50-rated black flexible elastomeric thermal insulation. 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.

- Nominal wall thicknesses of 3/8″, 1/2″, 3/4″, 1″ (10, 13, 19, and 25mm)
- Popular sizes up to 4″ IPS

Factory Mutual (FM) Approvals

AP Armaflex SS is certified through ongoing 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" and CAN/ULC S-102, AP Armaflex SS Pipe Insulation wall thicknesses through 1″ (25mm) 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 9001:2008 CERTIFIED.

Uses

- Retards heat gain and controls condensation drip from chilled-water and refrigeration systems. Efficiently reduces heat flow for hot-water plumbing, liquid-heating and dual-temperature piping
- Acceptable in wall thicknesses through 1″ (25mm) for use in air plenums and conforms to NFPA 90A and NFPA 90B requirements

The recommended temperature usage range for AP Armaflex SS Pipe Insulation is -297°F to +180°F (-183°C to +82°C). For use on cold pipes, thicknesses have been calculated to control condensation on the insulation outer surface, as shown in the table of thickness recommendations. AP Armaflex meets the energy code requirements of ASHRAE 90.1, International Energy Conservation Code (IECC) and other building codes.

Application

AP Armaflex SS Pipe Insulation can be snapped over piping already connected. Fitting covers are fabricated from miter-cut tubes. Butt joints are to be sealed with one of our Armaflex adhesives: Armaflex 520, 520 Black or, where a low V.O.C. adhesive is required, 520 BLV. 520 Adhesives are contact adhesives; therefore, in all cases, both surfaces to be joined are coated with adhesive.

AP Armaflex SS is designed for installation above or below ground. For below ground applications, contact Armacell or see our Technical Bulletin No. 7 on our website, www.armacell.com. Outdoors, a weather-resistant protective finish is to be applied and Armaflex WB Finish is recommended.

AP Armaflex normally requires no supplemental vapor-retarder protection but additional vapor-retarder protection may be necessary when installed on very-low temperature piping or exposure to continually high humidity conditions. Outdoors a 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. Before starting, the temperature of the air and of the insulation should be between 40°F (4°C) and 100°F (38°C) at the time of installation.

Note: Self-Seal Armaflex features an advanced pressure sensitive adhesive (PSA) system for tight bonds. However, any factory applied PSA is susceptible to losing tack and hence loss of adhesion properties if left unused for a prolonged period. For best results, Armacell recommends applying Armaflex self seal products within one year of lamination date.

Specification Compliance

AP Armaflex SS Pipe Insulation developed to meet:

ASTM C 534, Type I – Tubular Grade 1
ASTM E 84, NFPA 255, UL 723
CAN/ULC S102
NFPA 90A, 90B
UL 181
ASTM G-21/C1338
ASTM G-22
ASTM D 1056, 2B1
MIL-P-15280J, FORM T
MIL-C-3133C (MIL STD 670B), Grade SBE 3
MEA 96-85-M
City of LA – RR 7642

Physical Properties

Specifications	Values	Test Method
Thermal Conductivity, Btu • in./h • ft² • °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 1″ (25mm)	 25/50	 ASTM E 84 CAN/ULC S102**
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 Limit①	180°F (82°C)	—
Lower Use Limit②	-297°F (-183°C)*	—
Ozone Resistance	GOOD	—
Sizes **Wall thickness, (nominal)** **Inside diameter, tubular** **Length of sections, tubular**	 3/8″, 1/2″, 3/4″, 1″ (10, 13, 19, 25mm) 5/8″ ID to 4″ IPS (15mm to 114mm) 6’ (1.8m)	—

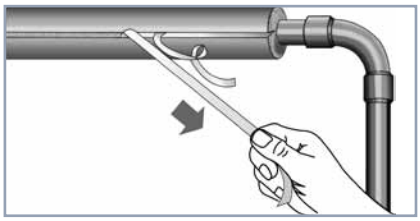
Notes

① On the heating cycle, AP Armaflex SS Pipe Insulation will with stand temperatures as high as 220°F (105°C) intermittent exposure. For continuous exposure the temperature should be limited to 180°F (82°C).

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.

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

Performance approved through continuing supervision by Factory Mutual Approvals.



Peel the protective release strips from the adhesive surface in 8″ and 12″ increments *after* insulation is snapped over pipe. The protective release strips can be removed by gently pulling at an angle. Apply firm and even pressure along the entire longitudinal seam for proper seal.

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AP Armaflex SS	Tubes	Submittal	012	Eng/USA	3/2012

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