

Part 1 General

1.1 SECTION INCLUDES

- .1 Piping insulation.

1.2 RELATED SECTIONS

- .1 Section 23 23 00 - Refrigerant Piping And Specialties: Placement of inserts.

1.3 REFERENCES

- .1 ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- .2 ASTM C177 - Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- .3 ASTM C335 - Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
- .4 ASTM C411 - Hot-Surface Performance of High-Temperature Thermal Insulation
- .5 ASTM C518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Metre Apparatus.
- .6 ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
- .7 ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- .8 ASTM D1667 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed Cell Foam).
- .9 ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
- .10 ASTM E96 - Water Vapour Transmission of Materials.
- .11 CAN/ULC-S102 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 QUALITY ASSURANCE

- .1 Materials
 - .1 Flame spread/smoke developed rating of 25/50 or less to CAN/ULC S102.
 - .2 Where in contact with or exposed to temperatures greater than 120°C, all materials shall comply with ASTM C411 or be of non-combustible materials.

1.5 QUALIFICATIONS

- .1 Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Section 21 05 00: Transport, handle, store, and protect products.

- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- .3 Store insulation in original wrapping and protect from weather and construction traffic.
- .4 Protect insulation against dirt, water, chemical, and mechanical damage.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- .2 Maintain temperature during and after installation for minimum period of 24 hours.

Part 2 Products

2.1 CELLULAR FOAM

- .1 Manufacturers:
 - .1 Armacell AP Armaflex.
 - .2 Substitutions: Refer to Section 21 05 00.
- .2 Insulation: ASTM C534; flexible, cellular elastomeric, moulded or sheet.
 - .1 'ksi' ('K') Value: ASTM C177 or C518
 - .1 based on W/mK at 24°C (Btu inch/(hr R ft²) at 75°F)
 - .2 Maximum Moisture Absorption: ASTM C209 or ASTM C1763: 0.2% by volume
 - .3 Water Vapour Permeability: ASTM E96;
 - .4 Maximum Smoke and Flame Spread: CANULC S102: 25/50
 - .5 Mold, fungi and bacterial resistance: UL181, ASTM G21/C1338, ASTM G22
 - .1 Resistance verified based on test conditions
 - .6 Temperature use limit: ASTM C534

Wall thickness	kSI ('k') value W/mK (Btu inch/(hr R ft²))	Service Temperature		Water Vapor Permeability Kg/(s m Pa) (Perm inch)
		Min.	Max	
≤ 25mm (1")	0.0353 (0.245)	-183°C (-297°F)	105°C (220°F)	0.725x10 ⁻¹³ (0.05)
≥ 32 mm (1.5")	0.040 (0.28)	-183°C (-297°F)	149°C (300°F)	1.16x10 ⁻¹³ (0.08)

- .7 Connection: Waterproof vapour barrier adhesive.
- .3 Elastomeric Foam Adhesive
 - .1 Manufacturers:
 - .1 Armstrong 520 adhesive.
 - .2 Air dried, contact adhesive, compatible with insulation.
 - .3 Outdoor insulation shall be covered with Armstrong Armaflex finish.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that piping has been tested before applying insulation materials.
- .2 Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- .1 Install materials to manufacturer's written instructions.
- .2 Finish insulation at supports, protrusions, and interruptions.
- .3 At penetrations through fire rated walls, provide firestopping at walls and run insulation to firestopping. Seal insulation ends. Where voids exist between fire stop seals within the cavity, fill void with mineral wool or alternative non-combustible insulation.
- .4 Pipe supports:
 - .1 All piping shall be supported in such a manner that neither the insulation nor the vapor/weather barrier is compromised by the hanger or the effects of the hanger.

.5 ACCESSORY MATERIALS

- .1 All accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions, and/or in conformance with the current edition of the Midwest Insulation Contractors Association (MICA) "Commercial & Industrial Insulation Standards."

3.3 TOLERANCE

- .1 Substituted insulation materials: Thermal resistance within 10 percent at normal conditions, as materials indicated.

3.4 CELLULAR FOAM PIPE INSULATION SCHEDULE

	PIPING SYSTEMS	PIPE SIZE mm (inches)	THICKNESS Mm (inches)
	Refrigerant Suction	all	25 (1")
	Refrigerant Hot Gas	all	25 (1")
	Refrigerant Liquid	all	25 (1")
	Refrigerant Expansion Line	all	25 (1")

END OF SECTION