



TECHNICAL INSULATION



HVAC Piping Insulation – FIBERGLAS™ Insulation

General Specification Guide SECTION 22 07 19

PROJECT ENGINEER RESPONSIBILITY: This is a general specification guide, intended to be used by experienced construction professionals, in conjunction with good construction practice and professional judgment. This guide is to aid in the creation of a complete building specification that is to be fully reviewed and edited by the engineer. Sections of this guide should be included, edited, or omitted based on the requirements of a specific project. It is the responsibility of both the specifier and the purchaser to determine if a product or system is suitable for its intended use. Neither Owens Corning, nor any of its subsidiary or affiliated companies, assume any responsibility for the content of this specification guide relative to actual projects and specifically disclaim any and all liability for any errors or omissions in design, detail, structural capability, attachment details, shop drawings or other construction related details, whether based upon the information provided by Owens Corning or otherwise.

SECTION 22 07 19

HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide the following:

Note to Specifier: The following temperature ranges are typical for these systems. However, if project requirements call for service temperatures outside the ranges listed, consult the manufacturer's published data to determine operating temperature limitations of the insulation product or products under consideration.

1. Cold Piping Systems (chilled water, brine, refrigerant), 32°F (0°C) to 65°F (18°C).
2. Dual Temperature Systems, 32°F (0°C) to 220°F (104°C).
3. Heating Systems (steam, steam condensate, hot water), ambient up to 450°F (232°C).
4. Domestic and Service Hot Water Systems, ambient up to 180°F (82°C).

- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

1.2 REFERENCES

- A. Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:

1. American Society for Testing of Materials (ASTM):
 - a. ASTM C547, Standard Specification for Mineral Fiber Pipe Insulation.
 - b. ASTM C585, Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
 - c. ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - d. ASTM C921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
 - e. ASTM C1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
 - f. ASTM C1393, Standard Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks.
 - g. ASTM C1729, Standard Specification for Aluminum Jacketing for Insulation.
 - h. ASTM C1767, Standard Specification for Stainless Steel Jacketing for Insulation.

- i. ASTM D1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- j. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- 2. Underwriters Laboratories (UL)
 - a. UL 723, Test for Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

- A. The term "mineral fiber" as defined by the above specifications includes fibers manufactured of glass, rock, or slag processed from a molten state, with or without binder.

1.4 SYSTEM PERFORMANCE

- A. Insulation materials furnished and installed hereunder should meet the minimum thickness requirements of American Society of Heating, Refrigeration, and Air Conditioning Engineers ASHRAE 90.1 (2010), "Energy Efficient Design of New Buildings." However, if other factors such as condensation control or personnel protection are to be considered, the selection of the thickness of insulation should satisfy the controlling factor.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate size and location of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports of HVAC Piping and Equipment."
 - 1. Coordinate clearance requirements with piping installer for piping insulation application.
 - 2. Coordinate installation and testing of heat tracing.
- B. Scheduling: Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing.

1.6 SUBMITTALS

- A. Product Data: Submit product characteristics, performance criteria, and limitations, including installation instructions, for each type of product indicated.
 - 1. For adhesives and sealants, submit documentation including printed statement of VOC content.
- B. Shop Drawings:
 - 1. Detail application of protective shields, saddles, and inserts at hangers.
- C. Sustainable Design Submittals: Submit manufacturer's sustainable design certifications as specified.
- D. Qualification Data: For Installer.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who has been trained by and is acceptable to manufacturer to install manufacturer's products.

1.8 DELIVERY AND STORAGE OF MATERIALS

- A. Delivery: Deliver materials in manufacturer's original packaging.
- B. Storage: Store in a dry indoors location. Protect insulation materials from moisture and soiling.

- C. Do not install insulation that has been damaged or wet. Remove it from jobsite.
 - 1. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Owens Corning Insulating Systems, LLC, Toledo, OH 43659; www.owenscorning.com.

2.2 INSULATION MATERIALS

- A. General:
 - 1. Products shall not contain asbestos, lead, mercury, or mercury compounds.
 - 2. Owens Corning® pipe insulation is not known to contain penta-, octa, or deca-brominated diphenyl flame retardant substances, such as deca-Bromine (deca-BDE).
 - 3. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C795.
- B. Certifications:
 - 1. Only Owens Corning® SSL II® with ASJ Max pipe insulation is GREENGUARD Indoor Air Quality Certified® and GREENGUARD Gold Certified.
 - 2. Owens Corning® pipe products are certified by SCS Global Services to contain a minimum of 53% recycled glass content, 31% pre-consumer and 22% post-consumer (except Flexwrap® Insulation).
 - 3. Owens Corning® pipe products are UL listed and labeled (except Flexwrap® Insulation and Pipe and Tank Insulation).
 - 4. No Wrap FIBERGLAS™ Pipe Insulation and SSL II® with ASJ Max Jacketed FIBERGLAS™ Pipe Insulation have received the Cradle to Cradle Products Innovation Institute's Bronze Level Material Health Certificate.
 - 5. These products Environmental Product Declaration (EPD) has been certified by UL Environment.
- C. Molded Fibrous Glass Pipe Insulation: Comply with ASTM C547, Type I, Grade A; and Type IV, Grade B; and ASTM C585, for sizes required and of a type suitable for installation on piping systems as required. One of the following types shall be used:
 - 1. For indoor systems operating at temperatures from 0°F (-18°C) to +850°F (454°C), no heat-up schedule required:
 - a. Owens Corning® SSL II® with ASJ Max FIBERGLAS™ Pipe Insulation.
 - b. Owens Corning® No-Wrap Pipe Insulation.
 - 2. For systems operating at temperatures +850°F (232°C) to 1000°F (535°C), heat-up schedule required:
 - a. Owens Corning® SSL II® with ASJ Max FIBERGLAS™ Pipe Insulation.
 - b. Owens Corning® No-Wrap Pipe Insulation
- D. Perpendicular Oriented Mineral Fiber Insulation: ASTM C1393, Type IIIB, Category 2:
 - 1. For piping equal to or larger than 10 in (250 mm) diameter operating at temperatures up to +850°F (454°C):
 - a. Owens Corning® Flexwrap® FIBERGLAS™ Insulation.
- E. Perpendicular Oriented Mineral Fiber Insulation: ASTM C1393, Type II, Category 1:

1. For piping equal to or larger than 10 in (250 mm) diameter operating at temperatures up to +650°F (343°C):
 - a. Owens Corning® FIBERGLAS™ Pipe and Tank Insulation.

2.3 FIELD-APPLIED JACKETS

- A. General: Field-applied jackets shall comply with ASTM C1136; Type I or Type II.
 1. At Below-Ambient Temperatures: Type I.
 2. At Above-Ambient Temperatures: Type II, where a vapor barrier is not required.
- B. PVC Jackets: ASTM D1784, Class 16354-C; 0.020 in thick PVC jacketing and fitting covers.
 1. Acceptable Manufacturer: Proto Corp., Clearwater, FL 33762; www.protocorporation.com
- C. Aluminum Jackets: ASTM C1729, Class A, 0.016 in thick aluminum jacket with 3 mil thick polyfilm moisture barrier factory-heat-laminated to the interior surface.
 1. Acceptable Manufacturer: ITW Insulation Systems, Houston, TX 77022; www.itwinsulation.com
- D. Stainless Steel Jackets: ASTM C1767, Class A, minimum 0.010 in thick stainless steel jacket with 3 mil thick polyfilm moisture barrier factory-heat-laminated to the interior surface.
 1. Acceptable Manufacturer: ITW Insulation Systems, Houston, TX 77022; www.itwinsulation.com

2.4 ACCESSORY MATERIALS

- A. Accessories: Provide accessories per insulating system manufacturer's recommendations, including the following:
 1. Closure Materials: Butt strips, bands, wires, staples, mastics, adhesives, and pressure-sensitive tapes.
 - a. Mold resistant mastics are recommended for chilled water applications.
 2. Field-Applied Jacketing Materials: Sheet metal, plastic, canvas, fiberglass cloth, insulating cement, PVC fitting covers.
 3. Support Materials: Hanger straps, hanger rods, saddles, support rings, and high density inserts.
- B. Adhesives For Indoor Applications: VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that materials and accessories can be installed in accordance with Contract Documents and material manufacturers' recommendations.
- B. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.
- C. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.

3.2 PREPARATION

- A. Ensure that surfaces over which insulation is to be installed are clean and dry.
- B. Ensure that insulation is clean, dry, and in good mechanical condition with factory-applied vapor or weather barriers intact and undamaged. Wet, dirty, or damaged insulation shall not be acceptable for installation.
- C. Ensure that pressure testing of piping and fittings has been completed prior to installing insulation.

3.3 SAFETY PRECAUTIONS

- A. Insulation contractor's employees shall be properly protected during installation of insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include, but not be limited to, disposable dust respirators, gloves, hard hats, and eye protection.

3.4 INSTALLATION

- A. General: Install insulation materials and accessories in accordance with Contract Documents and manufacturer's published instructions to ensure that it will serve its intended purpose.
 - 1. Install insulation on piping subsequent to painting and acceptance tests.
 - 2. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use cut pieces or scraps abutting each other. Butt insulation joints firmly to ensure complete, tight fit over piping surfaces.
 - 3. Maintain the integrity of factory-applied vapor retarder jacketing on pipe insulation, protecting it against puncture, tears or other damage. Seal circumferential joints with butt strips that are compatible with ASJ Max facing. Stapling is not required to complete the closure.
 - 4. On cold systems, seal penetrations of the ASJ Max and exposed ends of insulation with vapor barrier mastic. Coat staples used on cold pipe insulation with suitable sealant to maintain vapor barrier integrity. Mastic pipe section ends at every fourth pipe section joint and at each fitting to provide isolation of water incursion. For complete recommended instructions on installation consult NAIMA **GUIDE TO INSULATING CHILLED WATER PIPING SYSTEMS WITH MINERAL FIBER PIPE INSULATION 33°F to 60°F (0.5°C to 15.6°C)** (PUB. No. C1228 dated 6/15).
 - 5. When multiple layers are required, all inner layer(s) shall be No Wrap.
- B. Support piping so that the insulation is not compromised by the hanger or the effects of the hanger. Provide hanger spacing so that the circumferential joint may be made outside the hanger. Cover the evaporating holes with sealing tape for the length of the metal saddle.
 - 1. Piping systems 3 in (75 mm) in diameter or less, insulated with fiberglass pipe insulation, may be supported by placing saddles of the proper length and spacing under the insulation.
 - 2. For hot or cold piping systems larger than 3 in (75 mm) in diameter, operating at temperatures less than +200°F (93°C) and insulated with fiberglass, provide inserts such as foam or high-density fiberglass with sufficient compressive strength to support the weight of the piping system.
 - 3. At vertical runs, provide insulation support rings, as indicated on Drawings.
- C. Fittings:
 - 1. For systems operating below ambient temperature, wrap valves, fittings, and similar items in each piping system with wicking material to ensure a continuous path (100% coverage) for the removal of condensation, prior to installing insulation.
 - 2. Cover valves, fittings, and similar items in each piping system using one of the following:
 - a. Mitered sections of insulation equivalent in thickness and composition to that installed on straight pipe runs.
 - b. Insulation cement, equal in thickness to the adjoining insulation.

- c. PVC Fitting Covers insulated with material equal in thickness and composition to adjoining insulation.
- 3. Seal fitting joints with vapor retarder sealing tapes or mastics.
- 4. Use standard oversizing practices for valves and flanges.
- D. Penetrations: Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise specified.
- E. Joints: Butt pipe insulation against hanger inserts. For hot pipes, stagger joints when operating temperature is over 400°F (204°C) double layer. Seal jacketing according to type being used. Seal self-sealing laps by firmly rubbing down surface of tape and flap.
 - 1. Taper and seal pipe insulation ends, regardless of service.
- F. Vertical Piping: Protect vertical piping to a height of 8 ft -0 in (2.4 m) above the floor. Jacket insulated, exposed vertical piping within the building and insulated piping exposed to the outdoors with minimum 0.016 in thick (0.4 mm) aluminum.
- G. Accessory Materials (Midwest): Install in conformance with the current edition of the Midwest Insulation Contractors Association (MICA) "Commercial & Industrial Insulation Standards."

3.5 FIELD QUALITY ASSURANCE

- A. Upon completion of insulation work, visually inspect the work and verify that it has been correctly installed. This may be done while work is in progress, to assure compliance with requirements herein to cover and protect insulation materials during installation.

3.6 PROTECTION

- A. Replace damaged insulation, which cannot be satisfactorily repaired, including insulation with vapor barrier damage and moisture-saturated insulation.
- B. The insulation contractor shall advise the general and the mechanical contractor as to requirements for protection of the insulation work during the remainder of the construction period, to avoid damage and deterioration of the finished insulation work.

END OF SECTION