INSULATING CHILLED-WATER AND COLD-WATER PIPING SYSTEMS

WITH FIBERGLASS PIPE INSULATION INSTALLATION INSTRUCTIONS

33°F TO 60°F (0.5°C TO 15.6°C)

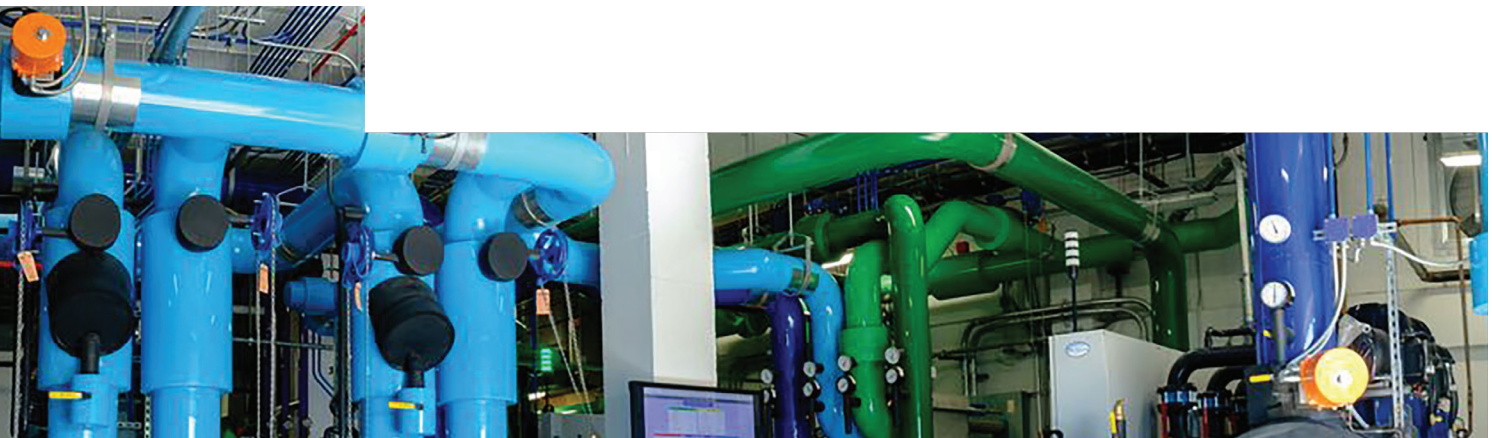


TABLE OF CONTENTS

SECTION 1: PERFORMANCE CRITERIA

SECTION 2: INSULATION SYSTEM INSTALLATION

SECTION 1: PERFORMANCE CRITERIA

1.0 ROLE OF PIPE INSULATION

Pipe insulation is designed to do one or more of the following on chilled systems:

- Conserve energy and help reduce the building operating cost
- Control condensation
- Stabilize process performance (process control)
- Protect personnel by reducing surface temperatures
- Reduce emissions
- Reduce noise

2.0 ROLE OF PIPE INSULATION FOR CHILLED-WATER SYSTEMS 33°F TO 60°F (0.5°C TO 15.6°C)

Pipe insulation for chilled-water and cold-water systems is specified and installed primarily for process control, condensation control, and energy conservation. Insulating chilled-water and cold-water systems requires special attention. When piping and equipment operate at temperatures lower than the ambient air, moisture in the air can condense on the cold surface, or when insulated incorrectly, on or within the insulation system. The pipe system must be protected by an insulation system with sufficient insulation thickness, an adequate vapor retarder, and be installed correctly for the system to perform. If not, the insulation system can become wet, which can lead to a number of issues, such as:

- A degradation of the insulation system service life and performance
- Corrosion of pipes, valves, and fittings contained within the insulation system
- The potential for mold growth and water-related damage to surrounding materials.

Cold-water systems include drain systems from roof deck.

3.0 PIPE INSULATION DESCRIPTION

Fiberglass pipe insulation is a molded one- or multiple-piece insulation made from fiberglass fibers bonded with thermosetting resins. It is produced in 36-inch (0.92 m) lengths with or without a factory-applied jacket.

3.1 STANDARD PIPE AND TUBE SIZES

Fiberglass pipe insulation is manufactured to fit a wide range of standard pipe and tube sizes.

- Standard iron pipe sizes: ½ inch to 36 inches (15 mm to 914 mm) nominal pipe size
- Standard copper tube sizes: from ½ inch to 6 inches (15 mm to 150 mm)

3.2 INSULATION WALL THICKNESS

Fiberglass pipe insulation comes in standard, single-layer thicknesses from ½ inch to 5 inches (15 mm to 127 mm) in ½-inch (15 mm) increments. Requirements for thicker wall materials can be achieved using multiple layers of insulation, commonly known as nesting.

3.3 VAPOR RETARDER CLOSURE SYSTEM

An All Service Jacket (ASJ Max) is the factory-applied vapor retarder covering. The jackets include an adhesive closure system that provides a positive, mechanical vapor sealing of the longitudinal jacket seam. Pressure-sensitive butt strips are used to seal the circumferential joints between sections of pipe.

3.4 FIBERGLASS INSULATION WITHOUT FACTORY-APPLIED JACKETING

Some fiberglass pipe insulations are available without a factory-applied jacket. These pipe insulations will have a shop or field-applied jacketing system. For the purpose of this guide, the shop or field-applied jacket must meet the same general requirements as the factory-applied ASJ Max jacket.

4.0 INSULATION THICKNESS

4.1 DETERMINING INSULATION THICKNESS

The ASHRAE Standard 90.1 and the International Energy Conservation Code (IECC) requirements for pipe insulation thickness are intended to serve as the minimum standard for energy efficiency in commercial buildings. In some cases, increased thickness for greater energy efficiency can be justified. These minimum pipe insulation thicknesses as listed in ASHRAE 90.1 are not intended to prevent condensation.

To specify the right insulation thickness for condensation control or energy conservation, use the NAIMA 3E Plus® insulation thickness software program. When using the program to determine the right insulation thickness for condensation control, use the design criteria (temperature and humidity) that represents the worst-case scenario for the conditions.

The program can be downloaded free of charge from NAIMA at www.pipeinsulation.org or obtained from Owens Corning at www.owenscorning.com. An online version of 3E Plus is also available at www.3EPlus.org.

In most cases, condensation control as calculated by 3E Plus can be thicker than what may be stated in the energy tables of ASHRAE Standard 90.1 and the IECC. In all cases, install the thicker requirement between energy recommendation or 3E Plus recommendation for condensation control. This ensures that insulation thickness will be sufficient to avoid condensation in design conditions.

4.2 DESIGN CONDITIONS

When specifying pipe insulation thickness for condensation control as determined by NAIMA 3E Plus, this thickness is calculated and recommended per set building temperature and humidity conditions given and used by the 3E Plus program. If the building conditions were to change (i.e., temperature and/or humidity would go up due to HVAC unit not running, doors and windows left open to the outside atmosphere, etc.), the chilled, insulated pipe sections, exposed to these changes for a period of time, could start to "sweat" or produce condensation.

When using 3E Plus for condensation control, it is recommended to use the known worst-case temperature and humidity conditions the location/region can have to avoid condensation.

5.0 FITTINGS, VALVES, AND HANGERS

5.1 FITTINGS

For the insulation system to perform, fittings must be insulated to at least the same thermal performance as the pipe insulation applied to the straight pipe section. See Figures 2.6 through 2.11.

5.2 VALVES

For the insulation system to perform, valves must be insulated to at least the same thermal performance as the pipe insulation applied to the straight pipe section. See Figures 2.10 and 2.12.

5.3 HANGERS

The pipe insulation should be continuous through hanging supports. In order to prevent damage to the insulation, a rigid insert and/or metal saddle should be installed at hanger support. See Figures 2.14 through 2.16.

NOTE: It is recommended that split ring/contact pipe hangers NOT be used for chilled systems. If split ring/contact hangers are used, insulation is to be applied on the hanger itself with the thickness of insulation on hanger substrate.

6.0 ADDITIONAL INFORMATION

6.1 METRIC PIPE SIZES

Applications using metric pipe sizes shall use insulation sized in accordance with ASTM C585 for use with metric pipe sizes.

Consult "Owens Corning Fiberglas™ Pipe Sizing Manual; Pub No. 10018079, Metric Section" for proper pipe insulation sizing.

6.2 STAPLING — NOT RECOMMENDED

Owens Corning does not recommend stapling of the SSL II Closure or the ASJ Max Tapes at any time.

The ASJ Max jacket polymer surface and the SSL II Closure are designed and formulated to fuse together, forming a tight vapor barrier seal.

6.3 FILLETING/DIGGING/CHANNELING INSULATION — NOT RECOMMENDED

Owens Corning does not recommend filleting/digging/channeling insulation on chilled systems. Removing insulation and not maintaining desired thickness could result in condensation issues.

Filleting/digging/channeling is a procedure when insulation is removed to accommodate pipe components, such as valves, cuppings, and hangers. This procedure reduces the thermal performance.

6.4 MASTIC FOR VAPOR STOPS/DAMS RECOMMENDATIONS

When mastics for vapor stops/dams are used in this Guide, the following mastics are recommended for use:

1. Fosters/Childers CP 33 water-based, https://fosterproducts.com/childers-products/
2. Vimasco Ultrafinish 739 brushseal water-based, https://vimasco.com/wp-content/uploads/2019/06/739-Ultra-Finish-Data-Sheet-2016.pdf
3. Design Poly (DP) 3040 water-based, https://designpoly.com/wp-content/uploads/MASTIC/DP3040/DP3040tsb.pdf

6.4.1 REASON FOR MASTIC VAPOR STOPS/DAMS

Mastic vapor stops/dams throughout the system are required to aid in isolating and containing moisture if there is a breach in the jacket due to damage. The mastic vapor stops/dams will isolate condensation in small areas and not allow condensation water to contaminate larger areas possibly causing additional issues.

Additionally, if external liquid (water) is allowed to run over the system and the jacket system is compromised, the vapor stops/dams will aid in containing/localizing the water in only the affected areas.

6.5 TAPE RECOMMENDATIONS

Recommended tapes for piping insulation applications include the following products:

1. Avery Dennison FASSON – 0839, https://tapes.averydennison.com/content/dam/averydennison/pt/na/en/Literature/Product%20Information/Fasson%200839/FASSON-0839-WMP-ASJ-TDS-ADPT.pdf
2. 3M/Venture Film Faced ASJ Tape 106FXP, https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Venture-Tape-Film-Faced-ASJ-Buttstrip-Tape106FXP/?N=5002385+3293086976&rt=rud
3. ABI/Ideal Cold Seal 729+, https://www.abitape.com/product/cold-seal-729-asj/

6.6 MICA MANUAL PLATES

When possible, figures contained within this manual have been linked to a corresponding Plate listed in the Midwest Insulation Contractors Association (MICA) National Commercial & Industrial Insulation Standards (also referred to as MICA Plate).

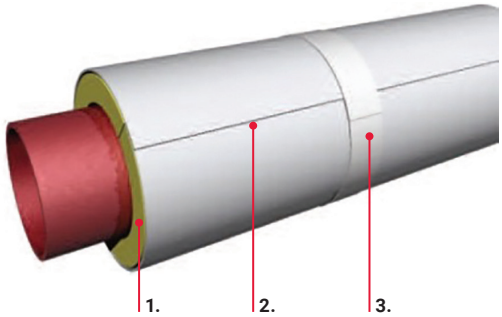
SECTION 2: INSULATION SYSTEM INSTALLATION

PIPE INSULATION WITH FACTORY-APPLIED ASJ JACKET — STRAIGHT PIPE, SINGLE LAYER

Verify that all inspection and acceptance testing of the piping, as required by the specification, has been completed and that the piping is ready for installation of insulation (e.g., leak/ pressure tests).

- Store in a dry indoor location. Protect insulation materials from moisture and soiling.
- Do not install insulation that has been damaged or wet due to ground water. Remove it from job site. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation, when fully dried out from clean water contamination (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.
- Verify all surfaces are clean, dry, and free from dirt, scale, moisture, oil, and grease, and any required coatings are applied.
- Verify there is adequate clearance to install the fiberglass pipe insulation in accordance with project drawings of operation performance parameters of the specification, such as access to controls, valves, and for maintenance and repair. Reduced insulation from what is specified can lead to condensation issues.
- Install pipe insulation per Figure 2.1.
- Verify all pipe hangers, supports, and anchors are installed in accordance with the project specification per Figures 2.11 through 2.13.
- All pipe insulation longitudinal and circumferential joints must be sealed using the self-seal lap and butt strips. All SSL II closure self-seal laps and butt strips must be firmly rubbed with a sealing tool, such as a squeegee, to ensure proper adhesion. The butt strip must be centered on the circumferential joint, and the end of the strip should overlap itself by a minimum of 1 inch (25.4 mm). See Figures 2.1 and 2.2.
- Stapling of the ASJ Max jacket or self-sealing joints is not required or recommended.
- The outermost ASJ Max vapor retarder must have a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces must be adequately insulated and vapor-sealed to prevent condensation.
- Vapor retarder mastic shall be applied to the butt end of every fourth pipe insulation section, the ends or raw edges of insulation terminations at equipment connections, and fittings.
- When a vapor retarder mastic is required, a maximum water vapor permeance of 0.02 per ASTM E-96 Procedure B must be achieved. Follow the mastic manufacturer's recommendations for application to achieve the 0.02 perm rating.
- If the insulation or jacketing is damaged during or after installation, the system must be restored to its original condition. The insulation must retain its original thickness, and the jacketing must be repaired to restore jacket integrity and prevent moisture intrusion.
- 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 ensure compliance with requirements herein to cover and protect insulation materials during installation.
- All work shall conform to accepted industry standards and to manufacturer recommendations. Owens Corning recommends the use of certified mechanical insulation inspectors who maintain current certification by the National Insulation Association (NIA) or the British Columbia Insulation Contractors Association (BCICA) Quality Assurance Certificate Program throughout the project. They will inspect and verify that the materials and the total insulation systems have been installed correctly in accordance with the specifications.

FIGURE 2.1 (MICA PLATE 1-100)

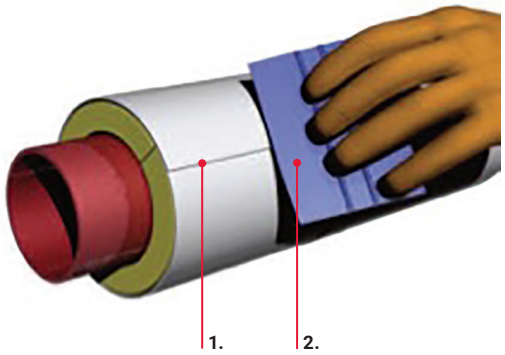


1. Preformed fiberglass pipe insulation with factory-applied ASJ Max jacket

2. Factory-applied SSL II closure self-seal tape joint

3. Butt strip tape; end of strip overlaps itself by a minimum of 1 inch (25.4 mm)

FIGURE 2.2



1. SSL II closure self-seal lap and factory-applied butt strips must be firmly rubbed with sealing tool, such as a plastic squeegee

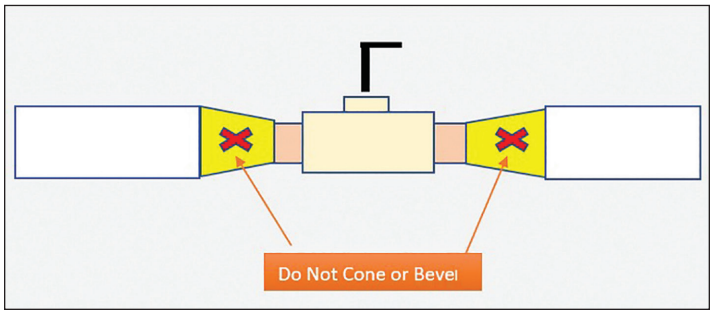
2. Squeegee

VAPOR DAMS — STRAIGHT PIPE (SINGLE LAYER AND MULTI-LAYER)

- Vapor stops/dams should be used on all chilled-water systems. Vapor stops/dams shall be installed at every fourth section and at the termination of all fittings or as indicated in the project specifications.
- The butt end of every fourth pipe insulation section should have the ends of insulation terminations vapor-sealed with vapor retarder mastic. Extend the mastic onto the pipe, and extend the mastic up and onto the ASJ Max jacket not less than 1 inch.
- For multi-layer systems, the staggered ends must be terminated at the vapor dam and a vapor retarder applied to the entire exposed raw edges of the insulation as shown in Figure 2.5.
- When installing the next section of insulation on the pipe, make sure the insulation butts up closely to the joint with the vapor dam. Seal the butt joint with butt strip tape.
- At the termination, make sure that the vapor retarder mastic extends all the way to the ASJ Max jacket, ensuring that all exposed insulation and the joint where the insulation meets the pipe are covered.

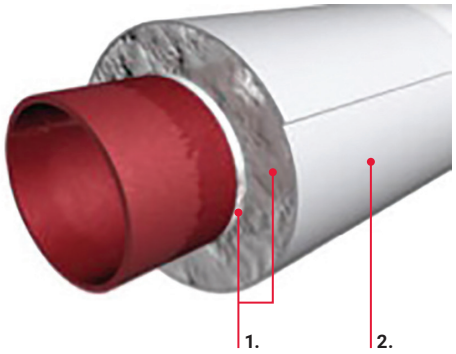
At the termination, do not bevel or cone (as shown in Figure 2.3). Cut the pipe insulation square as shown in Figure 2.4.

FIGURE 2.3 CONE OR BEVEL NOT RECOMMENDED



Note: Coning or beveling the ends of pipe insulation is typically done for appearance and takes away thermal performance. Coning or beveling was done at fittings such as valves and couplings, where now these fittings need to be insulated, canceling the need for appearance.

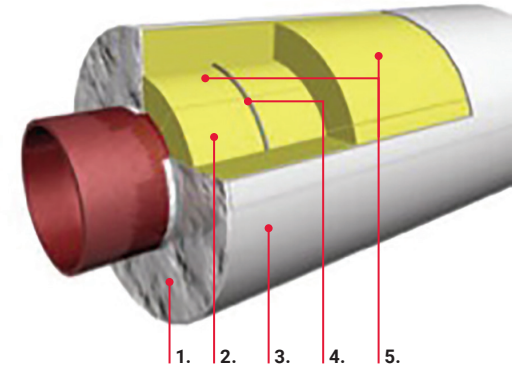
FIGURE 2.4 SINGLE LAYER (MICA PLATE 1-660, DETAIL B)



1. Vapor retarder mastic (vapor dam every fourth section)

2. ASJ Max or vapor retarder jacket

FIGURE 2.5 MULTI-LAYER (MICA PLATE 1-660, DETAIL A)



1. Vapor retarder mastic

2. Preformed pipe insulation without vapor retarder jacket

3. Preformed pipe insulation with factory-applied ASJ Max jacket

4. Secure the inner pipe insulation layer

5. Staggered insulation joints

INSULATION OF PIPE SYSTEM FITTINGS: FLANGES/ UNIONS, COUPLINGS, ELBOWS, TEES, AND VALVES

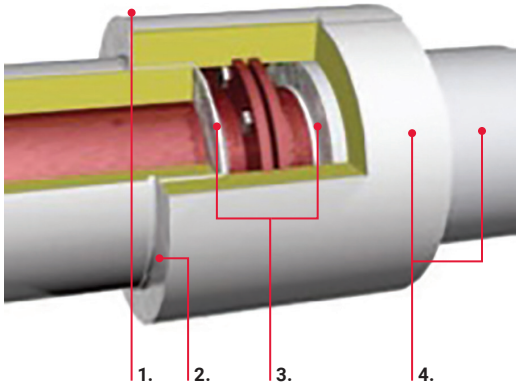
Condensation control and energy conservation require that the insulation cover the entire length of the chilled-water pipe distribution system, including all fittings installed in the system.

The thermal performance of the insulation at the fittings should be consistent with the insulation applied to the straight pipe section as indicated by the project specification. This is accomplished by using a nested oversized insulation as shown in Figure 2.6.

A vapor dam or vapor stop must be installed at the terminations of all pipe sections, flanges, or pipe joints connected to a fitting or as indicated in the project specification.

INSULATING FLANGES

FIGURE 2.6 FLANGES/UNIONS (MICA PLATE 2-135)



1. Nested insulation size

2. Vapor dam

3. Vapor dam at straight section of pipe on joints and terminations

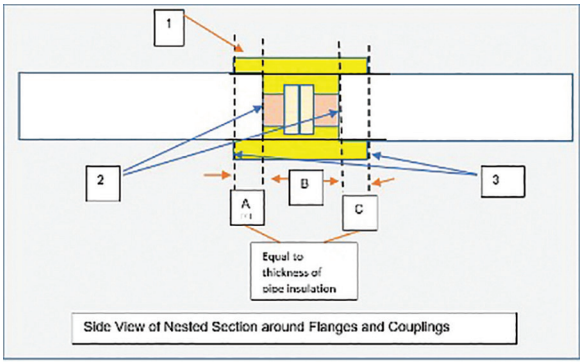
4. Factory-applied jacket

Note: When nesting, ensure that there are no air spaces between the nested pipe insulation sections.

CALCULATING NESTED SIZE LENGTH

The nesting pipe section length to cover flange area is calculated as follows:

FIGURE 2.7 NESTED OVERSIZED FLANGE INSULATION (MICA PLATE 2-135)



1. PVC molded fitting cover

2. Fiberglass insulation

3. Vapor dam

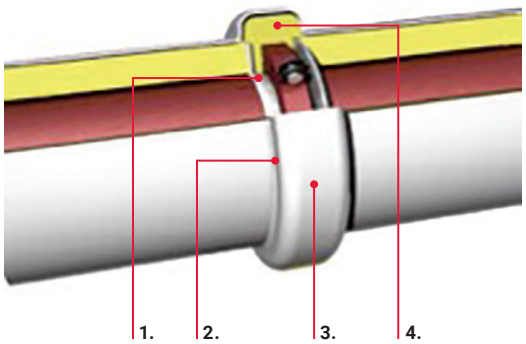
4. Vapor retarder mastic or PVC tape on joints

Insulation Thickness (A) + Uninsulated Space Around Flange (B)+ Insulation Thickness (C) (see Figure 2.7)

INSULATING COUPLINGS

METHOD NO. 1: PER BELOW

FIGURE 2.8 PVC MOLDED FITTING COVER (MICA PLATE 2-535)



1. Vapor dam

2. Vapor retarder mastic or PVC tape on joints

3. PVC molded fitting cover

4. Fiberglass insulation

METHOD NO. 2: NESTED

Use nested size insulation as described in Insulated Flanges and shown in Figure 2.6.

INSULATING 45- AND 90-DEGREE ELBOWS

Elbows can be insulated using preformed or molded insulation, field-fabricated from a straight section of pipe insulation, or insulated using fiberglass blanket inserts.

- A vapor dam or vapor stop must be installed at the butt joint at every fourth section, and at the termination of all fittings or as indicated in the project specification.
- Insulate fittings to the same thermal performance as the adjacent insulation with either pre-cut fiberglass inserts(1), or molded segmented pipe insulation that has been mitered to conform to the PVC fitting cover.
- Apply a vapor retarder mastic around the edges of the adjoining pipe insulation and on the fitting cover throat overlap.
- Install a PVC cover as recommended by the manufacturer.
- After the cover is in place, seal the throat seam and circumferential edges with PVC vapor seal tape, adhesive/solvent, or mastic to all joints.

NOTE:
*All surfaces to be taped should first be cleaned with a cloth to remove all dust, dirt, and grease in order to provide the pressure-sensitive adhesive with a good bonding surface.

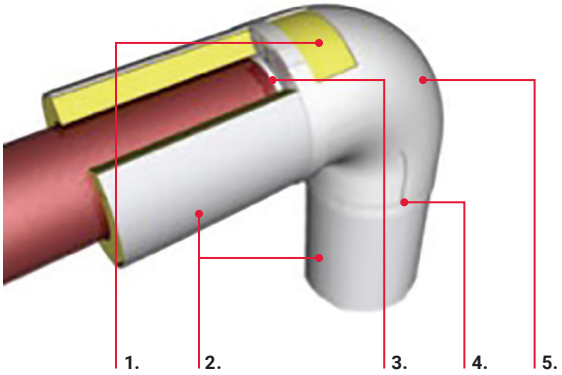
*Do not pull too hard when applying PVC tape as it has a tendency to creep. Apply the tape to bridge or cover the gap, or contour and give it a smooth, flat finish.

Recommended Manufacturers(2) of PVC Covers:

- Proto Corp., Clearwater, FL 33762; www.protocorporation.com
- PIC Plastics Carthage, MO 64836; http://pic-plastics.com/

1. Pre-cut fiberglass inserts must be installed to PVC cover manufacturer's recommendation.
2. Other manufacturers of PVC cover with equal performance are acceptable.

FIGURE 2.9 MICA PLATE 2-500



1. Fabricated, mitered, molded, or pre-cut fiberglass insert pipe insulation

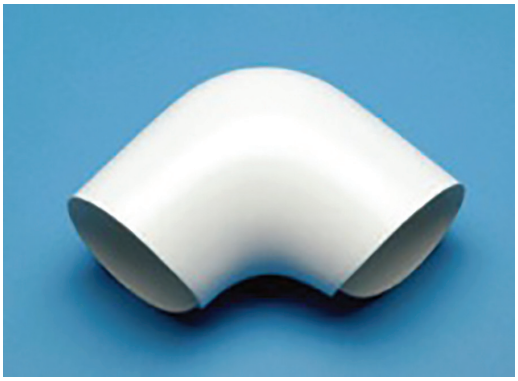
2. Preformed fiberglass pipe insulation with vapor retarder jacket

3. Vapor dam

4. Apply PVC vapor seal tape, adhesive/solvent, or mastic to all joints

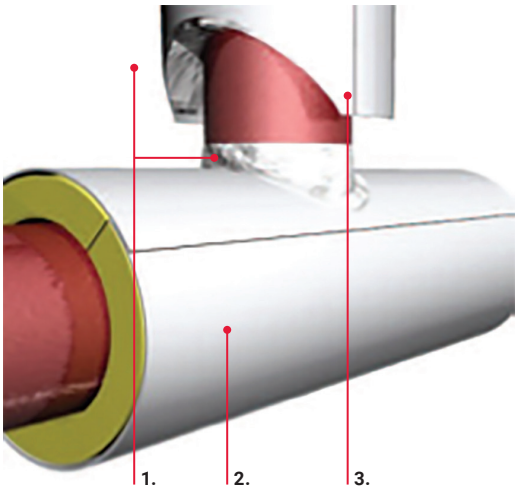
5. PVC fitting cover (See Photo 2.1)

PHOTO 2.1 PVC ELBOW COVER



INSULATING TEES

FIGURE 2.10 TEES (MICA PLATE 2-520)

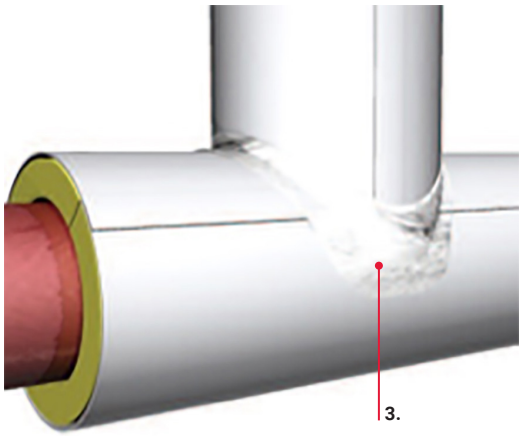


1. All terminations must be finished with vapor dams.

2. Preformed pipe insulation should be continued through the tee. The insulation and jacket in straight sections should be cut to fit around the vertical pipe.

3. Vertical section of pipe insulation should be cut to fit flush with the straight pipe insulation. The ASJ Max jacket should then be sealed and finished with vapor retarder mastic.

FIGURE 2.11 FINISHED TEES (MICA PLATE 2-520)



NOTE: A vapor dam must be installed at the butt joint of every fourth section, and at the termination of all fittings or as indicated in the project specification.

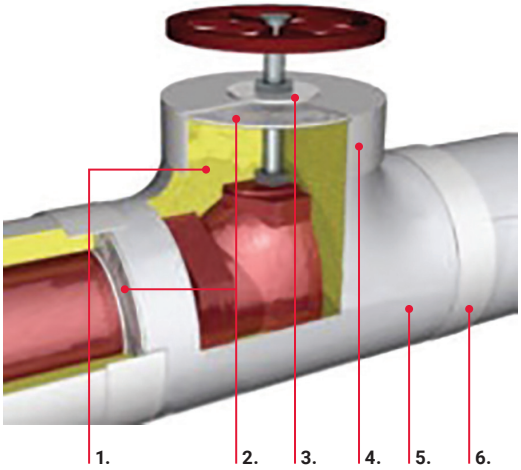
INSULATING VALVES

- Valves must be installed using the correct thickness in insulation as outlined by project specification and/or applicable codes to maintain thermal performance throughout the system.
- Coning or beveling, shown in Figure 2.3, compromises the thermal performance of the system and should be avoided. When terminating, cut pipe insulation square.
- Use valve handle extensions to maintain insulation thickness. Ensure proper detailing of the valve stem to prevent moisture intrusion.
- Removable pads or covers are an acceptable means of insulation and should be used where appropriate.

Following are two ways to insulate valves.

(1) MOLDED VALVE COVERS

FIGURE 2.12 MOLDED VALVE COVERS (MICA PLATES 2-130 AND 2-530)



1. Fiberglass insulation wrapped around valve, filling void space

2. Vapor dam applied at ends of preformed fiberglass insulation.

3. Vapor retarder mastic

4. Molded PVC end cap (see Photo 2.4). It is possible for the PVC valve cover to incorporate an end cap. If the end cap has a penetration to accommodate the valve stem, the hole must then be sealed with a vapor retarder mastic.

5. Molded PVC valve fitting cover (see Photo 2.3)

6. PVC vapor seal tape

PHOTO 2.3 MOLDED PVC VALVE FITTING COVER

PHOTO 2.4 PVC END CAP

- A vapor dam or vapor stop must be installed at the butt joint of every fourth section, and at the termination of all fittings or as indicated in the project specification.
- The void around the valve stem must be filled with insulation.

INSULATING VALVES

(2) NESTED OVERSIZED VALVE INSULATION

INSULATING VALVE:

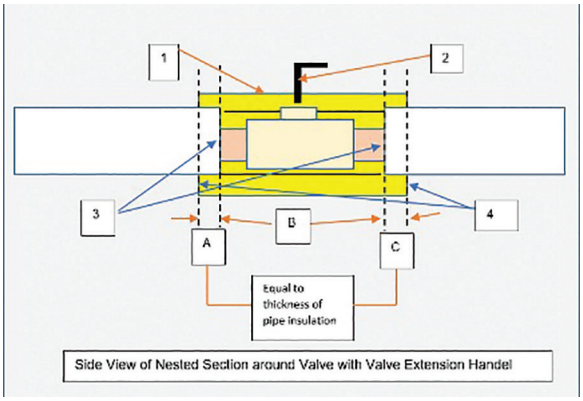
- Use nesting pipe section around valves to minimize energy loss.

1. The nesting pipe section length to cover valve area is calculated:

   Insulation Thickness (A) + Uninsulated Space Around Valve (B) + Insulation Thickness (C) (see Figure 2.13)

Note: The overlap of insulation (A and C) is, at a minimum, the installed insulation thickness.

FIGURE 2.13 NESTED OVERSIZED VALVE INSULATION (MICA PLATE 2-135)



1. Preformed nested oversized fiberglass pipe insulation with ASJ Max jacket

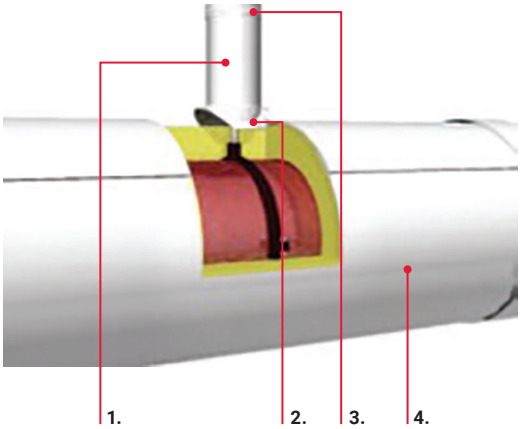
2. Valve extension handle with fiberglass insulation wrapped around valve, filling void space

3. Vapor dam applied at ends of preformed fiberglass insulation

4. Vapor retarder mastic

PIPE SUPPORTS

FIGURE 2.14 SPLIT RING (CONTACT) HANGER (MICA PLATE 1-600)



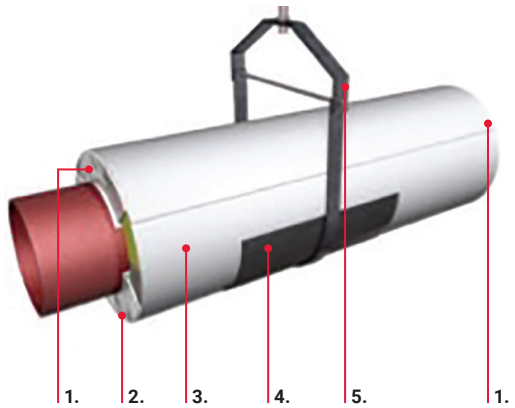
1. Insulate support rod with preformed fiberglass pipe insulation as required to prevent condensation. See Insulation Support Rod below.
2. Vapor retarder mastic
3. Add vapor dam at butt joints of pipe section and termination of insulation on support rod
4. Preformed fiberglass pipe insulation with factory-applied ASJ Max jacket

Insulation Support Rod to Prevent Condensation

1. Insulate support rod with preformed ½ x 1 fiberglass pipe insulation.
2. From the top of the pipe insulation, insulate 6 inches up the support rod. If support rod is less than 6 inches from support hanger, insulate the entire rod.
3. The ½ x 1 pipe insulation should be cut to fit flush with the straight pipe insulation. The ASJ Max jacket is then sealed with and finished with vapor retarder mastic.
4. At the top of the ½ x 1 rod insulation, fill at least 1 inch down the space between the rod and pipe insulation with fiberglass and seal finished with vapor retarder mastic.

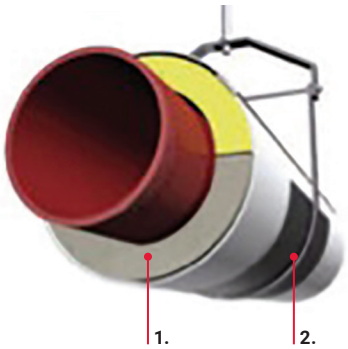
NOTE: It is recommended that split ring/contact pipe hangers NOT be used for chilled systems. If split ring/contact hangers are used, insulation is to be applied over the hanger itself with the thickness of insulation on hanger substrate.

FIGURE 2.15 CLEVIS HANGER (MICA PLATE 1-620)



1. Add vapor dam at butt joints of pipe section.
2. High-density as required
3. Preformed fiberglass pipe insulation with factory-applied ASJ Max jacket
4. Metal pipe saddle
5. Clevis hanger

FIGURE 2.16 CLEVIS HANGER HIGH-DENSITY INSULATION/ INSERT DETAIL (WHEN REQUIRED) (MICA PLATES 1-610 AND 1-640)



1. High-density insulation half section insert of either Foamglas®, high compression foam, or structural fiberglass. At a minimum, the high-density insert must be at least as long as the saddle.
2. Metal pipe saddle

FIELD-APPLIED JACKETS

Install PVC or metal jacket as indicated in the project specification. PVC or metal jackets are installed over factory-applied ASJ Max jacket in order to provide abuse protection, cleanable surface, or a specific appearance as required by the space or area of the installation.

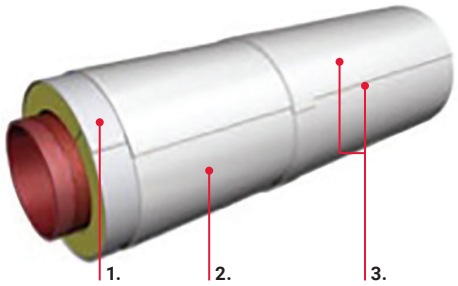
NOT A VAPOR RETARDER SYSTEM

Please note that field-applied jackets, such as PVC & metal jacketing, are not a vapor retarder system.

DO NOT USE SCREWS OR TACKS

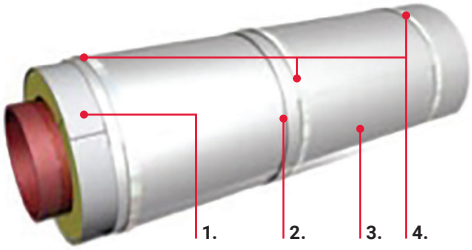
When applying field jacketing over a chilled-water system, screws and/or tacks should not be used as they will damage the insulation vapor retarder system below.

FIGURE 2.17 PVC JACKET (MICA PLATE 1-500 AND 1-510)



1. **ASJ Max jacket**
2. **Field-applied PVC jacket**
3. **PVC jacket with overlap at all joints. Secure and seal joints with PVC tape or solvent weld adhesive.**

FIGURE 2.18 METAL JACKET (MICA PLATE 1-400)



1. **ASJ Max jacket**
2. **Installed metal jacket with overlap at all joints**
3. **Field-applied metal jacket**
4. **Metal jacket secured using bands per manufacturer's instructions (typically three per section)**

DOUBLE-LAYER (NESTED/MULTI-LAYER) INSTALLATION

STRAIGHT SECTIONS

FIGURE 2.19

Overlap/offset the first-layer circumferential seam with the second layer of pipe insulation by a minimum 2 inches.

- For chilled systems, the butt end of every fourth pipe insulation section should have the ends of insulation terminations vapor-sealed with vapor retarder mastic as shown on MICA Plate 1-660, Detail A. Extend the mastic onto the pipe, and extend the mastic up and onto the second layer pipe insulation ASJ Max jacket not less than 1 inch.
- It is noted that, around valves, fittings, and hangers, this overlap could be less.

FIGURE 2.19 OVERLAP OF CIRCUMFERENTIAL SEAM (MICA PLATE 1-660, DETAIL A)

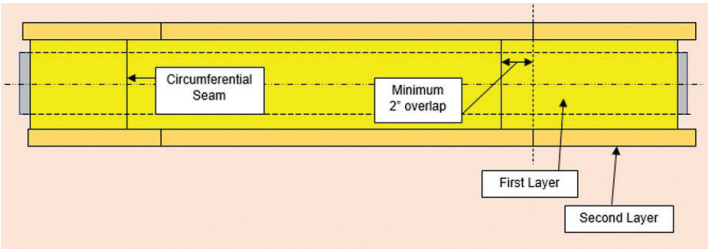
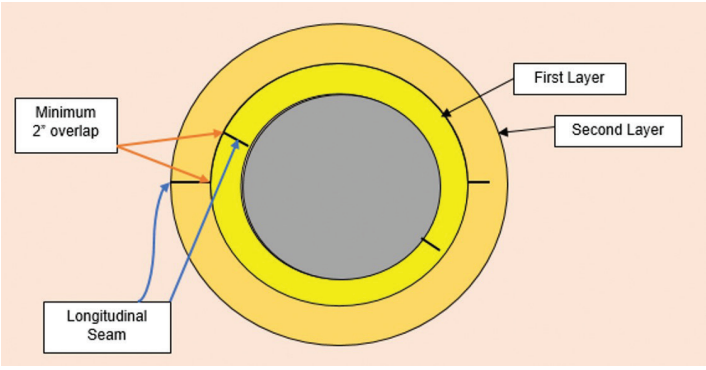


FIGURE 2.20

The first-layer pipe section longitudinal (hinge) seam shall be overlapped/offset by the second layer of pipe insulation by a minimum 2 inches.

- It is noted that, around valves, fittings, and hangers, this overlap could be less than 2 inches, and due to the positioning of the valves, fittings, and hangers, the longitudinal (hinge) seams of the two sections may be across from each other.

FIGURE 2.20 OVERLAP OF LONGITUDINAL SEAM



NOTE: Longitudinal seams between the two layers that come close together due to install conditions, but are tightly butted together, will still thermally perform.

ELBOWS

When installing into elbows, overlapping the insulation layer joints will usually not be possible.

USING PVC COVERS

Both layers are cut square at the pipe/elbow joint.
Install PVC covers per PVC cover manufacturer's recommendation.

CUTTING 45° AT THE ELBOWS

Both layers are cut square at the center of the bend of the elbow.

TEES

USING PVC COVERS

Both layers are cut square at the pipe/tee joint.

PIPE SECTIONS AROUND THE TEES

If installing pipe sections around the tees as described in the section on Insulating Tees, offsetting the seams can be difficult to accomplish. Install insulation such that joints are butted tightly together.

VALVES AND HANGERS

Installing pipe sections around valves and hangers, as described in the section on Insulating Valves and Hangers, offsetting the seams can be difficult to accomplish.

APPENDIX

How This Guide Was Developed

This Guide was developed from testing conducted by the North American Insulation Manufacturers Association (NAIMA) at Oklahoma State University (OSU).

This Guide was developed using reliable engineering principles and research, plus consultation obtained from manufacturers, contractors, testing laboratories, and others having specialized experience.

This Guide is subject to revision as further experience and investigation may show it necessary or desirable. Installation methods and products that comply with this Guide will not necessarily be acceptable if, when examined and tested, they are found to have other features that impair the result intended by these requirements.

In testing conducted at OSU, the thermal conductivity of fiberglass pipe insulation was measured over time on piping that operated at below-ambient temperatures. The tests were conducted with the following criteria:

1. The pipe temperatures on the chilled-water HVAC systems were typical of those used in commercial construction.
2. The ambient conditions for the temperature and humidity were set to those typically found in indoor, conditioned commercial building spaces.
3. The tests were conducted over a continuous, extended period of time.
4. The thermal conductivity of the pipe insulation was monitored over the duration of the test.

The OSU test results demonstrated that the thermal conductivity of the installed fiberglass pipe insulation with an ASJ type jacket system remained constant throughout the duration of the test. There were no signs of condensation on the surface of the ASJ jacket and no signs of increased moisture gain as demonstrated by the thermal conductivity.

This Guide is not intended to preclude alternate methods of installation when such methods and materials can be documented as providing equivalent performance.

NOTES

NOTES

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