SECTION 22 07 21
PLUMBING INSULATION CLADDING

Note to Editor: If you choose to edit this specification into one or two medium scope Section(s), then delete number and title above and retain one of the following for each section, then edit each section accordingly. Also, edit numbers and titles in each header accordingly.

SECTION 22 07 23
PLUMBING EQUIPMENT INSULATION CLADDING
SECTION 22 07 33
PLUMBING PIPINGI INSULATION CLADDING

Specify these products as high performance and lightweight alternatives to rigid aluminium or galvanized steel Jacketing. These products are vapor impermeable (zero permeability) barriers, have high strengths, flame spreads smoke development complying as Class A products, extreme low and high service temperatures, are fungi resistant, and can be used in LEED accredited construction.

This guide specification can be used to prepare a specification for plumbing equipment and plumbing piping cladding (including jacketing and tapes) applied to insulation specified elsewhere. The language in this specification could be inserted into the specifications for insulation instead of this separate specification.

Where [] are indicated, edit the specification by selecting one or more of the bracketed choices, or delete the bracketed choices and insert project specific language.

Throughout this specification the Architect is referenced as administrative and authoritative entity. If other entity is required then add or substitute [Engineer] [AIE] [Contractor] [Construction Manage] and or [Owner] as required.

PART 1 - GENERAL

1.01 GENERAL INSTRUCTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes

1. Insulation jacketing for plumbing services, including, plumbing equipment and plumbing piping.

Note to Editor: Retain either subparagraph above or below.

2. Insulation jacketing and tapes for plumbing services, including, but not limited to:

a. Domestic water storage tanks.
b. Domestic water heaters.
c. Domestic water softeners.
d. Domestic cold-water piping.
e. Domestic hot-water piping.
f. Domestic recirculating hot-water piping.
g. Domestic chilled-water piping for drinking fountains.
h. Sanitary waste piping exposed to freezing conditions.
i. Storm-water piping exposed to freezing conditions.
j. Roof drains and rainwater leaders.
k. Water supply and drain lines below handicap-accessible lavatories and sinks.

1.03 RELATED REQUIREMENTS

Note to Editor: If you choose to make this specification a medium scope Section, then delete the following 2 subparagraphs. Otherwise, edit this section accordingly and retain one of the following 2 if appropriate.

A. Section 22 07 21 - Plumbing Equipment Insulation Jacketing

B. Section 22 07 31 - Plumbing Piping Insulation Jacketing

Note to Editor: Retain or delete the following Section references that apply.

C. Section 23 07 21 - HVAC Insulation Jacketing

D. Section 23 07 23 - HVAC Duct Insulation Jacketing

E. Section 23 07 33 - HVAC Equipment Insulation Jacketing

F. Section 23 07 43 - HVAC Piping Insulation Jacketing

G. Section 40 42 21 - Process Piping and Equipment Insulation Jacketing

H. Section 40 42 26 - Process Piping Insulation Jacketing

I. Section 40 42 29 - Process Equipment Insulation Jacketing

1.04 REFERENCES

A. For reference standards specified the most current standard shall apply, unless otherwise indicated in this specification.

B. ASTM International (ASTM)

1. ASTM C921-10 Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation
2. ASTM C1371, Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
3. ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
4. ASTM D1000, Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications
5. ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials

6. ASTM E162, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
7. ASTM E662, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
8. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials

C. International Code Council (ICC)

1. ICC A117.1 *[Insert the date of the applicable ICC for the project jurisdiction, if desired],* Standard for Accessible and Usable Buildings and Facilities.

D. International Building Code (IBC)

1. [Insert the applicable IBC for the project jurisdiction.]

Note to Editor: Retain the following for projects which require LEED certification.

E. Leadership in Energy and Environmental Design (LEED), under the U S Green Building Council's (USGBC) Green Building Rating System Standards

F. Pressure Sensitive Tape Council (PSTC)

1. PSTC-101 and AFERA 5001, Test Equipment, Machines & Fixtures - Peel Adhesion of Pressure-Sensitive Tape (PSA)
2. PSTC-107, Shear Adhesion of Pressure Sensitive Tape
3. PSTC-131, Breaking Strength and Elongation of Pressure Sensitive Tapes
4. PSTC-133, Thickness (Caliper) of Pressure Sensitive Tapes

G. International Maritime Organization (IMO)

1. IMO Resolution MSC61(67) Annex 1 Part 2 and Annex 2
2. IMO Resolution MSC61(67) Annex 1 Part 5 and Annex 2
3. IMO Resolution A653 (16)

.

H. Underwriters Laboratory (UL)

1. UL 723, Standard for Test for Surface Burning Characteristics of Building Materials
2. ULC S102 Classified (Canada)

I. US Coast Guard (USCG)

1. US Coast Guard Approved

J. British Standards (BS)

1. BS 476, Summary Class '0'

K. Meets FDA compositional requirements for indirect food contact (21 CFR 175.105 and CFR 175.125; Indirect Food additives; adhesive and components of coating.

L. Accepted for use by the Canadian Food Inspection Agency (CFIA).

1.05 ACTION SUBMITTALS

A. Provide in accordance with Section 01 33 00 - Submittal Procedures

1. Product Data: Provide manufacturer's materials literature for insulation jacketing and other accessories indicating material thickness, water-vapor permeance, adhesion values, structural values, fire resistance compliance, service temperatures, and compatibility with insulation specified in other Sections.

2. Samples: For each type of insulation jacketing specified submit minimum 12 inches square sample indentifying each sample and its intended use and location.

a. Manufacturer's Color Charts: For products where color is specified, furnish manufacturer's color chart indicating the full range of colors available for each type of finish material.

3. Copy of warranties when applicable, for review by Architect, stating obligations, remedies, limitations, and exclusions of warranty.

Note to Editor: Include all or portions of the following for projects which are LEED certified and edit the subparagraph according to project requirements.

4. Sustainable Design Submittals: Submit the following for LEED Certification:

a. Product Data for Credit IEQ 4.1 Low-Emitting Materials: Adhesives and Sealants: For adhesives, sealants, and sealant primers used inside the weatherproofing system, documentation including printed statement of VOC content.

b. Laboratory Test Reports for Credit IEQ 4: Documentation for sealants, adhesives, and primers used, including printed statement of VOC content indicating that products comply with the testing and product requirements of the [California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers] [New Construction and Major Renovations V2.2.] [Commercial Interiors V2.0.] [Core and Shell V2.0.]

1.06 INFORMATIONAL SUBMITTALS

Note to Editor: Retain the following subparagraph if required.

A. Material Safety Data Sheets (MSDS): When requested by the Architect.

B. Certifications: When requested by the Architect showing compliance with specified standards.

Note to Editor: Retain subparagraph below if surface-burning characteristics specified in "Quality Assurance" Article are specified to be verified by an independent testing agency.

C. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of jacketing materials with requirements indicated. Include dates of tests and test methods employed.

Note to Editor: Retain the following subparagraph if required and edit accordingly.

D. Field Quality Control Submittal: Reports indicating results of post construction testing specified in Article 3.03.

Note to Editor: Retain the following paragraph if a Qualification Data from the installing (sub)contractor is required. Coordinate this Qualification Data with the requirements in Article "Quality Assurance" and requirements in other Division 01 sections.

E. Qualification Data: For qualified Installer.

Note to Editor: Retain one or both to the Sections numbers indicated below for closeout as appropriate for the Project.

1.07 CLOSEOUT SUBMITTALS

A. Provide in accordance with Section [01 77 00 – Closeout Procedures] [01 78 00 – Closeout Submittals]:

1. Warranty: Manufacturer's fully executed warranty forms with authorized signatures and endorsements indicating obligations, remedies, limitations, and exclusions of warranty and date of Substantial Completion.

1.08 QUALITY ASSURANCE

A. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

B. Single Source Responsibility: Provide each type of jacketing and tapes by a single manufacturer.

C. Installer’s Qualifications

1. Company acceptable to manufacturer for installation of the specified insulation jacketing products, with minimum 5 years experience in installing specified products, and having completed 5 installations of similar scope and type as proposed Project.

Note to Editor: Retain the following subparagraph if required at Project location. Apprenticeship programs are usually associated with union shops. Edit and insert other available craft training programs if required by the project parameters.

2. Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

Note to Editor: If retaining "Mockups" Paragraph below, edit locations, sizes, and other details of mockups on Drawings or by inserts.

D. Mockups: Before starting installation of insulation jacketing, and in accordance with Section 01 40 00 – Quality Requirements, construct mockups for each type of jacketing and finish listed below. Mockups will be used to demonstrate quality of application and finishes. Build mockups in the location indicated or, if not indicated, [as directed by Architect, Engineer, A/E, Contractor, installer, and Owner.] [where agreed to between the Architect, Engineer, A/E, Contractor, installer, and Owner.] Use materials indicated for the completed Work.

1. Piping Mockups:

   a. One 10-foot (3-meter) section of straight pipe.
   b. One each 90-degree threaded, welded, and flanged elbow.
   c. One each threaded, welded, and flanged tee fitting.
   d. One each threaded strainer and one flanged strainer with removable portion of insulation.
   e. One each threaded reducer and one welded reducer.
   f. One pressure temperature tap.
   g. One small valve and one large valve.
   h. One mechanical coupling.
   i. Four support hangers including hanger shield and insert.

Note to Editor: Retain and edit the following if mockup of equipment is required.

2. Equipment Insulation Cladding Mockups

3. For each mockup, fabricate section to allow observation of application details for jacketing materials, adhesives, sealants, and tapes.

4. Notify Architect seven days in advance of dates and times when mockups will be constructed.

5. Obtain Architect's approval of mockups before starting insulation application.

6. Submit one copy of report to Architect describing tests, results, and any modifications made to correct deficiencies or to improve performance.

7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

8. Mockup may remain part of the overall work and remain in place if approved by the Architect and manufacturer's technical field representative.

Note to Editor: Retain subparagraph above if mockup may be applied to the work. Otherwise, delete and retain the following 2 subparagraphs if the mockup may NOT be part to the work.

9. Mockup shall not be a part of the finished work, but shall remain at the Project site protected during the work with weather-resistant jacket, and removed when directed, or upon completion of the work.

Note to Editor: Retain subparagraph below if mockups are not only for establishing appearance factors.

10. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless specifically approved in writing by Architect of such deviations.

1.09 DELIVERY, STORAGE, PRODUCT HANDLING

A. Deliver materials, products, and equipment to the Project site in manufacturer's original containers, clearly marked with proper identification with manufacturer's name, equipment type, and model numbers.

B. Store materials in accordance with manufacturer's instructions, above ground in a clean and dry location, and protected from weather, construction activities, and other causes of damage. Store at temperature of between 40 to 80 degrees F (4 to 26 degrees C) and between 40 to 50% relative humidity.

C. Handle materials at the Project site to prevent damage in accordance with manufacturer's requirements.

D. Immediately remove from the Project site damaged and otherwise unsuitable material when determined and replace with new. Do not incorporate damaged or otherwise unsuitable material into the Project.

1.10 COORDINATION

Note to Editor: Select the appropriate Section to coordinate jacketing installation.

A. Coordinate installation of insulation jacketing with installation of insulation products specified in [Section 22 07 21 - Plumbing Insulation.] [Section 22 07 16 - Plumbing Equipment Insulation.] [Section 22 07 19 - Plumbing Piping Insulation.]

B. Coordinate installation and testing of heat tracing.

1.11 SCHEDULING

A. Schedule jacketing application after pressure testing of systems and, where required, after installing and testing heat tracing are complete and approved. Jacketing application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.12 FIELD CONDITIONS

A. Refer to each jacketing and tape product specified in PART 2 for optimum application and service temperatures.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. 3M, 3M Center, Building 225-3S-06, St. Paul, MN 55144-1000 (800) 362 3550.

A. No Substitutions

2.02 PERFORMANCE CRITERIA

A. Surface-Burning Characteristics: For insulation jacketing and related materials when identical products are tested in accordance with ASTM E84/ UL 723 or equivalent test method by a testing agency acceptable to authorities having jurisdiction. Factory label insulation jacketing, tapes, sealants, primers, adhesion promoters, cleaning solvents, and other accessories with appropriate markings of applicable testing agency.
   1. Refer to specific products for exact flame-spread indexes and smoke-developed indexes.

2.03 INSULATION JACKETING MATERIALS

A. Comply with requirements in "[Equipment] [Piping] Insulation Jacketing Schedule" article for where jacketing materials shall be applied.

B. Field-Applied Jackets: Comply with ASTM C921, Type I, unless otherwise indicated, for use over insulation on equipment and piping operating at below-ambient temperatures at least part of the time or where a vapor barrier is required.

Note to Editor: Select the following jacketing materials if the insulation cladding requires a zero permeable, exterior, aluminum coated insulation jacket.

1. This product is applicable for use over foam glass, mineral fiber, nitrile, rubber and foam insulation; for interior and exterior use.
2. Select the 1577CW-E" for stucco embossed surface finish.

C. "3M VentureClad 1577CW-EMJ" [3M VentureClad 1577CWE-EMJ" stucco embossed surface finish]: A zero permeable, all weather, multi-layered laminate coated with a cold weather acrylic adhesive, resistance to weathering, fungi, UV and extreme environmental conditions.

Note to Editor: Retain the following codes and standards that apply to the project requirements.

1. Complies with the following codes and standards:
   a. International Code Council (ICC): ICC A117.1
   b. International Building Code (IBC), *[Insert the applicable IBC for the project jurisdiction.]*
   c. International Maritime Organization (IMO)
      1) IMO Resolution MSC61 (67), Annex 1, Part 2 and Annex 2
      2) IMO Resolution MSC61(67) Annex 1, Part 5 and Annex 2
      3) IMO Resolution A653(16)
   d. Underwriters laboratory (UL)
      1) UL 723
   e. US Coast Guard Approval Number 164.112/63/0
   f. British Standards BS 476

Note to Editor: Select 7.0 mils for 1577CW-EMJ smooth finish. Select 9.0 mils for 1577CWE-EMJ embossed finish.

2. Thickness; PSTC 133: [7.0 mils (0.18 mm)] [9.0 mils (0.23 mm)] , without release paper.

3. Water Vapor Transmission Rate; ASTM E96: 0.00 perm.

4. Fire, Flame, and Smoke Resistance

a. Flame Spread; ASTM E84 and UL 723: Flame Spread 25
b. Smoke Development; ASTM E84 and UL 723: Smoke Develop 45
c. Surface Flammability; ASTM E162: Zero.
d. Smoke Optical Density; ASTM E662: Zero.

5. Peel Adhesion; PSTC 101: 80 ounces per inches (22 N per 25 mm).

6. Shear Strength; PSTC 107: Greater than 72 hrs at 2.2 psi (Greater than 72 hrs at 15.2 kPa).

7. Tensile Strength; PSTC 131: 100 pounds per inches (445 N per 25 mm).

8. Puncture; ASTM D1000: 35 pounds.

9. Fungi Resistance; ASTM C1338: Passes.

10. Service Temperature: -94 degrees F. to 248 degrees F (-70 degrees C to 120 degrees C).

11. Application Temperature: -10 degrees F. (-23 degrees C).

Note to Editor: Select the smooth or stucco embossed surface finish.

12. Surface Finish: [Smooth.] [Stucco embossed.]

13. Color: Aluminum.

14. Roll Widths: 4 inches, 6 inches. 23 inches, 35-1/2 inches, 46 inches (101.6 mm, 152mm, 584 mm, 902 mm, 1168 mm).

15. Roll Lengths: 50 yards (45.7 m)

Note to Editor: This product is applicable for use over foam glass, mineral fiber, nitrile, rubber and foam insulation; for interior and exterior use.

D. "3M VentureClad 1577CW-WM": ["3M VentureClad 1577CW-WME" stucco embossed surface finish:] A zero permeable, all weather, multi-layered white laminate,-coated with a cold weather acrylic adhesive, resistance to weathering, fungi, UV and extreme environmental conditions.

Note to Editor: Retain the following codes and standards that apply to the project requirements.

1. Complies with the following codes and standards:
   a. International Code Council (ICC): ICC A117.1
   b. International Building Code (IBC), *[Insert the applicable IBC for the project jurisdiction.]*
   c. International Maritime Organization (IMO)

      1) IMO Resolution MSC61, Annex 1, Parts 2 and Annex 2
      2) IMO Resolution MSC61(67) Annex 1 Part 5 and Annex 2
      3) IMO Resolution A653 (16)
      .

   d. Underwriters laboratory (UL)

1) ULC S102 Classified (Canada)

e. US Coast Guard Approved
f. British Standards BS 476
g. Meets FDA compositional requirements for indirect food contact (21 CFR 175.105 and 21 CFR 175.125; FDA: Indirect food additives and components of coatings)
h. Accepted for use by the Canadian Food Inspection Agency (CFIA).

Note to Editor: Select 7.0 mils for 1577CW-WM smooth finish. Select 9.0 mils for 1577CW-WM-E embossed finish.

2. Thickness; PSTC 133: [7.0 mils (0.18 mm).] [9 mils (0.23 mm)], without release paper.

3. Water Vapor Transmission Rate; ASTM E96: 0.00 perm.

4. Fire, Flame, and Smoke Resistance

a. Flame Spread; ASTM E84: Flame Spread 25.
b. Smoke Development; ASTM E84: Smoke Develop 45.
.

5. Peel Adhesion; PSTC 101: 80 ounces per inches (22 N per 25 mm).

6. Shear Strength; PSTC 107: Greater than 72 hrs at 2.2 psi (Greater than 72 hrs at 15.2 kPa).

7. Tensile Strength; PSTC 131: 100 pounds per inches (445 N per 25 mm).

8. Puncture; ASTM D1000: 35 pounds.

9. Fungi Resistance; ASTM C1338: Passes.

10. Emittance; ASTM C1371: 0.80

11. Service Temperature: -94 degrees F. to 248 degrees F (-70 degrees C to 120 degrees C).

12. Application Temperature: -10 degrees F. (-23 degrees C).

Note to Editor: Select the smooth or stucco embossed surface finish.

13. Surface Finish: [Smooth.] [Stucco embossed.]

14. Color: White.

15. Roll Widths: 4 inches, 6 inches, 23 inches, 35-1/2 inches, 46 inches (101.6 mm, 152mm, 584 mm, 902 mm, 1168 mm).

16. Roll Lengths: 25 yards, 50 yards (22.86 m, 45.7 m).

Note to Editor: Select the following jacketing materials if the insulation cladding requires an extra heavy duty (thicker) zero permeable, exterior, aluminum coated insulation jacket.

1. This product is applicable for use over foam glass, mineral fiber, nitrile, rubber and foam insulation; for interior and exterior use.
2. Select the 1579GCWE-EMJ" for stucco embossed surface finish.

E. "3M VentureClad Plus 1579GCW-EMJ": ["3M VentureClad Plus 1579GCWE-EMJ" stucco embossed surface finish:] A zero permeable, extra heavy duty, all weather, multi-layered, reinforced, laminate coated with a cold weather acrylic adhesive, resistance to weathering, UV and extreme environmental conditions.

Note to Editor: Retain the following codes and standards that apply to the project requirements.

1. Complies with the following codes and standards:
   a. International Code Council (ICC): ICC A117.1
   b. International Building Code (IBC), [Insert the applicable IBC for the project jurisdiction.]
   c. International Maritime Organization (IMO)
      1) IMO Resolution MSC61, Annex 1, Parts 2 and Annex 2
      2) IMO Resolution MSC61(67) Annex 1 Part 5 and Annex 2
      3) IMO Resolution A653 (16)
   d. US Coast Guard Approved

Note to Editor: Select 15.0 mils for the 1579GCW-EMJ smooth finish. Select 16.0 mils for 1579GCWE-EMJ embossed finished.

2. Thickness; PSTC 133: [15.0 mils (0.38 mm)] [16.0 mil (0.40 mm)], without release paper.

3. Water Vapor Transmission Rate; ASTM E96: 0.00 perm.

4. Peel Adhesion; PSTC 101: 100 ounces per inches (445 N per 25 mm).

5. Shear Strength; PSTC 107: Greater than 72 hrs at 2.2 psi (Greater than 72 hrs at 15.2 kPa).

6. Tensile Strength; PSTC 131: 130 pounds per inches (578 N per 25 mm).

7. Puncture; ASTM D1000: 55 pounds (245 N)

8. Service Temperature: -94 degrees F. to 248 degrees F (-70 degrees C to 120 degrees C).

9. Application Temperature: -10 degrees F. (-23 degrees C).

Note to Editor: Select the smooth or stucco embossed surface finish.

10. Surface Finish: [Smooth.] [Stucco embossed.]

11. Color: Aluminum.

12. Roll Widths: 4 inches, 6 inches, 23 inches, 35-1/2 inches, 46 inches (101.6mm, 152.4mm, 584 mm, 902 mm, 1168 mm).

13. Roll Length: 25 yards (22.86 m)

Note to Editor: Select the following jacketing materials if the insulation cladding requires an extra heavy duty (thicker) zero permeable, multi-layered white laminate insulation jacket.

1. *This product is applicable for use over foam glass, mineral fiber, nitrile, rubber and foam insulation; for interior and exterior use.*
2. *Select the 1579GCW-WME" for stucco embossed surface finish.*

F. "3M VentureClad Plus 1579GCW-WM": ["3M VentureClad Plus 1579GCW-WME" stucco embossed surface finish:] A zero permeable, extra heavy duty, all weather, multi-layered White laminate coated with a cold weather acrylic adhesive, resistance to weathering, UV and extreme environmental conditions.

Note to Editor: Retain the following codes and standards that apply to the project requirements.

1. Complies with the following codes and standards:
   a. International Code Council (ICC): ICC A117.1
   b. International Building Code (IBC), *[Insert the applicable IBC for the project jurisdiction.]*
   c. International Maritime Organization (IMO)

      1) IMO Resolution MSC61(67), Annex 1 Parts 2 and Annex 2
      2) IMO Resolution MSC61(67), Annex 1, Parts 5 and Annex 2
      3) IMO Resolution A653(16)

Note to Editor: Select 17.5mils for the 1579GCW-WM smooth finish. Select 24.0 mils for 1579GCW-WME embossed finished.

2. Thickness; PSTC 133: [15 mils (0.38 mm)] [16.0 mils (0.40mm)], without release paper.

3. Water Vapor Transmission Rate; ASTM E96: 0.00 perm.

4. Fire, Flame, and Smoke Resistance

   a. Flame Spread; ASTM E84: Flame spread 20.
   b. Smoke Development; ASTM E84: Smoke develop 25.

5. Peel Adhesion; PSTC 101: 100 ounces per inches (445 N per 25 mm).

6. Shear Strength; PSTC 107: Greater than 72 hrs at 2.2 psi (Greater than 72 hrs at 15.2 kPa).

7. Tensile Strength; PSTC 131: 130 pounds per inches (588 N per 25 mm).

8. Puncture; ASTM D1000: 55 pounds (244 N)

9. Elongation; PSTC 131: 50 percent.

10. Emittance; ASTM C1371: 0.80

11. Service Temperature: -94 degrees F. to 248 degrees F (-70 degrees C to 120 degrees C).

12. Application Temperature: -10 degrees F. (-23 degrees C).

Note to Editor: Select the smooth or stucco embossed surface finish.

13. Surface Finish: [Smooth.] [Stucco embossed.]

14. Color: White.

15. Roll Widths: 4 inches, 6 inches, 23 inches, 35-1/2 inches, 46 inches (101.6mm, 152.4mm, 584 mm, 902 mm, 1168 mm).

16. Roll Lengths: 25 yards (22.86 m).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Notify the [Contractor] [Construction Manager] of conditions detrimental to performance of the Work and recommended corrections. Where the installation and its completion may be delayed due to existing conditions, follow notification immediately with a written report. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Verify that insulated scheduled to receive jacketing have been tested and are free of defects that prevent adhesion and proper installation of jacketing.

2. Verify that surfaces to receive jacketing are clean and dry, free of dust, dirt, contaminants, oils, grease, etc.

3.02 INSTALLATION

A. Install jackets compatible with insulation materials and suitable for the service. Install jackets that do not corrode, soften, or otherwise attack insulation in either wet or dry state.

B. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

C. If more than one jacketing material is specified, selection from materials specified is Contractor's option.

D. Install jackets at thicknesses specified for each item of pipe [and equipment] system as specified in insulation system schedules.

E. Install jacketing materials, accessories, and tapes with smooth, straight, and even surfaces; free of voids, bubbles, and open edges throughout the length of piping including fittings, valves, and specialties.

F. Keep jacket materials dry during application and finishing.

G. Install jacketing with least number of joints practical, and with tight overlapping seams and end joints. Tape seams and joints with specified or manufacturers' recommended tapes.

1. Install jacketing continuously around hanger and anchor attachments.
2. Extend jacketing and taping onto anchor legs from point of attachment to supported item to point of attachment to structure. Tape and seal ends at attachment to structure with vapor-barrier mastic.
3. Overlap jacketing to ensure water-shedding.

H. Where vapor barrier is required, tape joints, seams, and penetrations at hangers, supports, anchors, and other projections with vapor-barrier tapes.

1. Cover joints with tape strips of same material as, or compatible with jacketing in accordance with manufacturer's requirements.
2. Clean and dry surface to receive self-sealing lap.
3. Overlap jacket seams at least 1-1/2 inches (38 mm).
4. Overlap jacketing to ensure water-shedding.

I. Cut jacketing in a manner to avoid compressing insulation.

J. Repair damaged jacket facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas.

K. Do not install jacketing to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.03 FIELD QUALITY CONTROL

Note to Editor: Inspections in this article are destructive. Retain if workmanship quality is an important requirement. Architect should be prepared to reject all work if defective work is discovered in sample inspection.

A. Perform specified tests and inspections.

B. Tests and Inspections:

1. Inspect equipment, pipes, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation.

Note to Editor: Select or insert the number of locations for this destructive testing / inspection. Retain equipment if required.

2. Limit inspections to the following locations and quantities for each [equipment and] pipe service defined in the "Piping Insulation Cladding Schedule".

a. [Three] *[Insert number]* at straight pipe.
b. [Three] *[Insert number]* at threaded fittings.
c. [Three] *[Insert number]* at welded fittings.
d. [Two] *[Insert number]* threaded strainers.
e. [Two] *[Insert number]* at welded strainers.
f. [Three] *[Insert number]* at threaded valves.

g. [Three] *[Insert number]* at flanged valves.

Note to Editor: Refer to Section 01 40 00 - "Quality Requirements" for retesting and re-inspecting requirements and Section 01 73 00 - "Execution" for requirements for correcting the Work.

C. All insulation jacketing and taping applications will be considered defective Work if sample inspection reveals noncompliance with specified requirements and manufacturer's requirements.

3.04 EQUIPMENT INSULATION CLADDING SCHEDULE

Note to Editor: Select or insert other plumbing equipment, insulation code, insulation thickness/density jacket code, and notes if any, for the particular type of equipment that requires insulating and jacketing. Refer to Insulation and Jacketing Codes following this schedule.

Equipment Label	Equipment Description	Insulation Code	Insulation Thickness / Density	Jacket Code	Notes
DWH	Domestic Water Heater				
DWS	Domestic Water Softener				
DWST	Domestic Water Storage Tank				1, 3

Schedule Notes:

1. For outdoor installations, apply an aluminum jacket (Code [ ]) over specified jacket.
2. For outdoor installations, provide two coats of weatherproof finish as recommended by the jacketing manufacturer.

Note to Editor: Insert insulation code number / letter designation that match the Article / Paragraph number of the insulation specified in the equipment insulation specification; for example 2.01.B. for Flexible Elastomeric Insulation. Then insert this code number / letter into the Schedule above.

Equipment Insulation Codes:

[Insert number / letter designation of insulation]: Calcium Silicate Insulation
[Insert number / letter designation of insulation]: Flexible Elastomeric Insulation
[Insert number / letter designation of insulation]: Rigid Mineral Fiber Insulation
[Insert number / letter designation of insulation]: Flexible Fiberglass Insulation
[Insert number / letter designation of insulation]: Rigid Fiberglass Insulation
[Insert number / letter designation of insulation]: Phenolic Insulation
[Insert number / letter designation of insulation]: Polyisocyanurate Insulation
[Insert number / letter designation of insulation]: Polyolefin Insulation

Note to Editor: Select and edit the following equipment jacketing codes as required for the Project requirements. Then insert this Code number / letter into the Schedule above.

Equipment Jacket Codes:

2.03.C.: Aluminum; [Smooth] [Stucco Embossed]
2.03.E.: White; [Smooth] [Stucco Embossed]
2.03.G.: Heavy Duty Aluminum; [Smooth] [Stucco Embossed]
2.03.H.: Heavy Duty White; [Smooth] [Stucco Embossed]

3.05 PIPING INSULATION CLADDING SCHEDULE

Note to Editor: Insert pipe sizes, insulation code, insulation thickness and jacket code for the particular type of piping that requires insulating and jacketing. Refer to Insulation and Jacketing Codes following this schedule.

Pipe Label	Piping Description	Pipe Size	Insulation Code	Insulation Thickness	Jacket Code	Schedule Notes
DHW	Domestic Hot Water					1, 3, 4
DHWR	Domestic Hot Water Recirculation					1, 3, 4
TW	Tempered Water					1, 3, 4
DCW	Domestic Cold Water					1, 3, 4
DSCW	Domestic Softened Cold Water					1, 3, 4
Varies	Cold Water (All water below ambient temperature not other-wise scheduled.)					1, 3, 4, 5
RD	Roof Drain					1, 2, 3
OD	Overflow Drain					1, 2, 3
RWL	Rainwater Leaders					1, 3, 4, 6
ORWL	Overflow Rainwater Leaders					1, 3, 4, 6
	Sanitary with Heat Trace					
	Hot Service Drains					

General Notes:

1. PVC jacket will NOT be allowed in air plenum ceilings.

Schedule Notes:

1. For outdoor installations, apply multi-layer laminate jacket (Code [ ]) over specified insulation.
2. For outdoor installations, provide two coats of weatherproof finish as recommended by the manufacturer.
3. PVC jacket (Code [ ]) required below 10’ – 0" A.F.F in exposed areas.
4. PVC jacket (Code [ ]) required for all piping in exposed finished areas.
5. Includes river water, well water, city water, white water, recycled water, lab water, non-potable water, deionized water, etc.
6. RWL/ORWL shall be insulated only on horizontal runs.

Note to Editor: Insert Pipe Insulation Code number / letter designation that match the Article / Paragraph number of the insulation specified in the pipe insulation specification; for example 2.01.B. for Flexible Elastomeric Insulation. Then insert this code number / letter into the Schedule above.

Piping Insulation Codes:

[Insert number / letter designation of insulation]: Flexible Elastomeric Insulation
[Insert number / letter designation of insulation]: Mineral Fiber Insulation
[Insert number / letter designation of insulation]: Phenolic Insulation
[Insert number / letter designation of insulation]: Polyisocyanurate Insulation
[Insert number / letter designation of insulation]: Polyolefin Insulation

Note to Editor: Select and edit the following pipe jacketing codes as required for the Project requirements. Then insert this Code number / letter into the Schedule above.

Piping Jacket Codes:

2.03.C.: Aluminum; [Smooth] [Stucco Embossed]
2.03.E.: White; [Smooth] [Stucco Embossed]
2.03.G.: Heavy Duty Aluminum; [Smooth] [Stucco Embossed]
2.03.H.: Heavy Duty White; [Smooth] [Stucco Embossed]

END OF SECTION 22 07 21

Note to Editor: If you choose to edit this specification into one or two medium scope Section(s), then delete number and title above and retain one of the following for each section accordingly.

END OF SECTION 22 07 23
END OF SECTION 22 07 33