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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | November 16, 2009 | Modified ‘Related Sections’ |
| 3 | March 16, 2011 | Minor changes |
| 4 | August 11, 2014 | First draft review comments (AV). |
| 5 | June 8, 2015 | Second Draft for Review (AV) |
| **4** | **September 16, 2015** | **Updated, Finalized Specification – Reference eDOCS #5823642-v4 (AV)** |
| 5 | June 29,2017 | Updated References to Standards ASTM C518-15, ASTM E84-16, ASTM E96/E96M-16, ANSI/ASHRAE/IES Standard 90.1-2016 (AAM) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# General

## Related Sections

### *[Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.*

### *Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.*

### *Contractor is responsible for coordination of the Work.*

### *This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]*

### *[List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### *[List Sections specifying products installed but not supplied under this Section and indicate specific items.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### *[List Sections specifying related requirements.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

#### Section 01300 – Submittals

#### Section 09900 – Painting and Protective Coatings

#### Section 15201 - Piping Support System

## References

### Comply with the latest edition of the statutes, codes, standards cited in the specifications, and all amendments thereto.

#### American Society of Heating, Refrigerating and Air Conditioning Engineers Inc. (ASHRAE):

##### ANSI/ASHRAE/IES Standard 90.1-2016 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

#### ASTM International (ASTM):

##### ASTM C518-15, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

##### ASTM C177-13, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

##### ASTM C547-15, Standard Specification for Mineral Fiber Pipe Insulation.

##### ASTM E84-16, Standard Test Method for Surface Burning Characteristics of Building Materials.

##### ASTM E96/E96M-16, Standard Test Methods for Water Vapor Transmission of Materials.

#### Underwriters Laboratories (UL and ULC - Canada)

##### *[Consultant to determine what UL/ULC codes are to be added based on project requirements]*

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

.1 The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

.1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

*If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.*]

## Submittals

### Action and Informational submittals shall be in accordance with Section 01300 - Submittals

### Action Submittals:

#### Shop Drawings: Manufacturer’s descriptive literature.

### Informational Submittals: Maintenance information.

# PRODUCTS

## Pipe Insulation

### Type 1: *[Consultant to define Type 1 pipe insulation if other than Flat Block, Grades 1 and 2]*

#### Material: Flexible elastomeric pipe insulation, closed cell structure.

#### Temperature Rating: -40°C to 82°C (-40°F to 180°F).

#### Density: [     ] kg/m3.

#### Conductivity in accordance with ASHRAE 90.1-2016 and minimum of [     ] Btu in/hr sq ft °F at [     ] °F) in accordance with ASTM C177-13 or ASTM C518-15.

#### Minimum water vapour transmission of 0.10 perm inch in accordance with ASTM E96/E96M-16.

#### Seal joints with manufacturer’s adhesive.

#### Flame Spread Rating: Less than 25 in accordance with ASTM E84-16.

#### Manufacturers and Products:

##### *[Consultant to provide names of three approved products]*

##### Approved Equivalent

### Type 2:

#### *[Consultant to define Type 2 pipe insulation if other than Pipe and Tubing, Fabricated, Grades 1 and 2]*

#### Material: UL/ULC rated, preformed, sectional rigid fibreglass with factory applied, Kraft paper with aluminum foil vapour barrier jacket with pressure sensitive, self-sealing lap.

#### Temperature Rating: 17.8°C to 454°C (Zero to 850°F).

#### Conductivity in accordance with ASHRAE 90.1-2016 and minimum of [     ] Btu in/hr sq ft °F.

#### Minimum water vapour transmission for jacket of 0.02 perm inch in accordance with ASTM E96/E96M-16.

#### Joints: Matching pressure sensitive butt strips for sealing circumferential joints.

#### Manufacturers and Products:

##### *[Consultant to provide names of three approved products]*

##### Approved Equivalent.

### Type 3:

#### *[Consultant to define Type 3 pipe insulation if other than Special Fabricated Shapes, Grades 1 an 2]*

#### Material: Cellular glass.

#### Temperature Rating: -179°C to 482°C (- 290°F to 900°F).

#### Follow the manufacturer’s direction based upon temperature of piping to be insulated.

#### Manufacturers and Products:

##### *[Consultant to provide names of three approved products]*

##### Approved Equivalent.

## Fitting Insulation

### Type 1: Same as pipe.

### Type 2:

#### Wired in place premolded insulation or mitered segments, or soft fibreglass insulation inserts covered with premolded 20 mil minimum thickness PVC fitting covers a minimum of 20 mil in thickness .

#### Manufacturers:

##### *[To be identified by Consultant and approved by Region].*

##### Approved Equivalent.

### Type 3: Same as pipe.

## Roof Drain and Overflow Drain Sump Insulation

### Type 2: [     ] mm ([     ] inch) thick, [     ] kg ([     ] pound) density, rigid fibreglass insulation.

## Insulation at Pipe Hangers and Supports

### Refer to Section 15201 - Piping Support System.

### Type 1:

#### Copper and Non-metallic Pipe 50mm (2 Inches) and Smaller and Steel Pipe 38mm (1.5 Inches) and Smaller: Use insulation shields.

#### Larger Sizes: Use insulation saddles or Type 3 rigid insulation insert 250mm (10 inches) long.

### Type 2: UL/ULC rated, preformed rigid pipe insulation inserts of thickness equal to adjoining insulation, 250mm (10 inches) in length, with factory applied, vinyl coated and embossed vapour barrier jacket with self sealing lap.

### Type 3: Same as specified for Type 2 (2.3.3).

## Aluminum Jacket

### Thickness: [     ] mm ([     ] inch).

### Fittings: Preformed aluminum jackets, two piece elbows and flange covers, secured with stainless steel bands.

### Manufacturers:

#### *[To be identified by Consultant and approved by Region]*

#### Approved Equivalent.

# EXECUTION

## Application

### General:

#### Insulate valve bodies, flanges, and pipe couplings.

#### Insulate and vapour seal hangers, supports, anchors, and other piping appurtenances that are secured directly to cold surfaces.

#### Do not insulate flexible pipe couplings and expansion joints.

#### Piping to be insulated shall be prime coated in accordance with Section 09900 – Painting and Protective Coatings. Finish coating is not required.

### Pipe Insulation Schedule: *[To be completed by Consultant]*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PIPING SCHEDULE INSULATION | | | | | | |
| Legend | Service | Pipe Size | Indoor\* Thickness | Indoor Type | Outdoor Thickness | Outdoor Type |
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| Notes: | | | | | | |

### 

### Aluminum Jackets: Install on exterior above grade piping and fittings, and interior Type 3.

### PVC Fitting Covers: Install on Type 2 insulated interior piping and fittings.

### Buried Type 3: Jacket system shall be manufacturer’s standard Pittwarp bituminous resin with woven, glass fabric, aluminum foil layer, and plastic film coating, heat sealed at overlap.

## Installation

### General:

#### Install in accordance with the manufacturer’s instructions and as specified in this Section.

#### Install insulation after piping system has been pressure tested and leaks corrected.

#### Apply insulation over clean finish painted and dry surfaces.

#### Do not allow insulation to cover nameplates or code inspection stamps.

#### Run insulation continuously through pipe hangers and supports, wall openings, ceiling openings, and pipe sleeves, unless shown otherwise on the Contract Drawings.

#### Install removable insulation sections on devices that require access for maintenance of equipment or removal, such as unions and strainer end plates.

#### Use insulating cements, lagging adhesives, and weatherproof mastics recommended by the insulation manufacturer.

### Connection to Existing Piping: Cut back existing insulation to remove portion damaged by piping revisions. Install new insulation.

### Cold Surfaces: Provide continuous vapour seal on insulation on cold surfaces where vapour barrier jackets are used.

### Placement:

#### Slip insulation on pipe or tubing before assembly, when practical, to avoid longitudinal seams.

#### Insulate valves and fittings with sleeved or cut pieces of same material.

#### Seal and tape joints.

### Insulation at Hangers and Supports: Install under piping, centred at each hanger or support.

### Heat Traced Piping: Apply insulation after heat tracing work is completed and reviewed by Consultant.

### Roof Drains: Insulate vertical drops from roof drain to horizontal pipe, exposed and concealed horizontal piping, and [     ] m ([     ] feet) down on vertical risers from horizontal pipe.

### Roof and Overflow Drain Sumps: Insulate the underside.

### Vapour Barrier:

#### Provide continuous vapour barrier at joints between rigid insulation and pipe insulation.

#### Install vapour barrier jackets with pipe hangers and supports outside jacket.

#### Do not use staples and screws to secure vapour sealed system components.

### Aluminum Jacket:

#### Use continuous friction type joint to hold jacket in place, providing positive weatherproof seal over entire length of jacket.

#### Secure circumferential joints with preformed snap straps containing weatherproof sealant.

#### On exterior piping, apply coating over insulation and vapour barrier to prevent damage when aluminum fitting covers are installed.

#### Do not use screws or rivets to fasten the fitting covers.

#### Install removable prefabricated aluminum covers on exterior flanges and unions.

#### Caulk and seal all exterior joints to make watertight.

## Field Finishing

### Apply coating of insulating cement where needed to obtain a smooth and continuous appearance.

### Colour coded finish shall be applied to insulation surfaces not having aluminum jackets. The finish coat shall conform to the requirements of Section 09900 – Painting. Where PVC jackets are specified, the Contractor may elect to use coloured PVC if available colours match the specified colour scheme.

**END OF SECTION**