

SECTION 10: INDUSTRIAL PIPING

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SECTION 10

INDUSTRIAL PIPING

10.1 APPLICATION

A. HOT PIPING

Specification Code No.

1601-H Hot Application

- Piping: Single layer pipe covering without integral jacket shall be held in place with wire for pipe 300 mm diameter or less and banding and wing seals on larger pipe. Double layer staggered joint pipe covering without integral jacket shall have the first layer held in place with wire and the outer layer held in place with banding and wing seals.
- Fittings: Insulate fittings 75mm diameter and less with insulating cement or flexible insulation secured in place with 1.62 mm stainless steel wire and finished with insulating cement to thickness of adjacent pipe covering. Insulate fittings over 75 mm diameter with sections of pipe covering mitred to fit tightly with each mitred section secured in place with a minimum of one loop of 1.62 mm stainless steel wire. All voids and cracks to be filled with insulating cement.
- Valves, Flanges: Insulate valve bodies and flanges with fitted oversized pipe covering, or mitred blocks to thickness of adjacent pipe covering. Expansion joints, steam trap assemblies, unions, slag pocket drain piping & valves, safety relief valves and orifice flanges shall be left uncovered. **(See Note 1)**.
- Insulation Termination Points: Insulation shall be terminated 75 mm from fittings to provide working clearance, and bevel insulation at a 45 degree angle.

Note 1: The use of this code number does not include insulation application on valves and flanges. The specifying authority must specify in the project specification, if valves and flanges are to be insulated.

B. ANTI SWEAT PIPING

Specification Code No.

1601-A Anti Sweat Application

- Piping: Apply pipe covering with integral vapour retarder jacket to piping and hold in place by securing the jacket flap with staples on 75 mm centres. Pipe covering with integral self-sealing jacket will not require additional fastening. Seal all flaps and butt strips with vapour retarder adhesive or alternatively secure with staples and cover with a heavy brush coat of retarder coating.
- Fittings: Insulate fittings 75 mm diameter and less with flexible insulation secured in place with 1.62 mm stainless steel wire and finish with reinforcing membrane embedded in a heavy brush coat of retarder coating. Insulate fittings over 75 mm diameter with sections of pipe covering mitred to fit tightly with each mitred section secured in place with a minimum of one loop of 1.62 mm stainless steel wire. All voids and cracks to be filled with insulating cement, then cover the entire fitting with reinforcing membrane embedded in a heavy brush coat of retarder coating.
- Valves, Flanges: Insulate valve bodies and flanges with fitted over sized pipe covering, or mitred blocks to thickness of adjacent pipe covering, then apply reinforcing membrane embedded in retarder coating. Alternatively, insulate with tightly placed flexible insulation covered with reinforcing membrane, stapled in place and covered with a retarder coating. Drains, blow-off plugs and caps shall be left uncovered. **(See Note 1)**.

Note 1: The use of this code number does not include insulation application on valve bodies, valve bonnets, strainers or flanges. However, it is recommended that valve bodies, valve bonnets, strainers and flanges be insulated. A specifier must include in the project specifications if valve bodies, valve bonnets, strainers or flanges are to be insulated.

C. COLD PIPING

Specification Code No.

1601-C Cold Piping Application (Closed Cell Material)

- Piping: Apply single layer pipe covering to piping (cellular glass insulation to firstly have been prepared with a layer of bore coating in areas of vibration) with all joints coated with a layer of manufacturers approved retarder coating and held in place with 12 mm wide reinforced filament tape at approximately 150 mm centres for piping under 100 mm or secured with banding and wing seals located on 225 mm centres for piping over 100 mm size. Over the insulation apply a vapour retarder jacket recommended by the insulation manufacturer or apply a heavy brush layer of vapour retarder coating at the rate of 1.2 L/ m², embed a layer of reinforcing membrane and then apply another heavy brush layer of vapour retarder coating at the rate of 1.0 L/ m². Multiple layer staggered joint pipe covering shall have the first layers (cellular glass insulation to firstly have been prepared with a layer of bore coating in areas of vibrations) with all joints coated with a layer of manufacturers approved retarder coating and inner layers for piping 200 mm and under held in place with 12 mm wide reinforced filament tape tightly spiral wrapped at approximately 75 mm centres or banded with 0.40 mm thick by 12 mm wide stainless steel banding and wing seals located on 300 m centres for piping over 200 mm. The outer layer shall be secured with 0.40 mm by 12 mm wide stainless steel banding and wing seals. Over the insulation apply a vapour retarder jacket as recommended by the manufacturer or apply a heavy brush layer of vapour retarder coating at the rate of 1.2 L/ m², embed a layer of reinforcing membrane and then apply another heavy brush layer of vapour retarder coating at the rate of 1.0 L/ m².
- Fittings: Insulate fittings with sections of pipe covering mitred to fit tightly or pre-moulded fitting covers, with each mitred section or cover secured in place with a minimum of one loop of 12 mm wide reinforced filament tape and all joints shall be sealed with a heavy brush coat of manufacturers approved vapour retarder. Over the insulation apply a heavy brush layer of vapour retarder coating at the rate of 1.2 L/ m², embed a layer of reinforcing membrane and then apply another heavy brush layer of vapour retarder coating at the rate of 1.0 L/ m².
- Valves, Flanges: Insulate valve bodies, valve bonnets, and flanges with fitted over sized pipe covering or mitred blocks to thickness of adjacent pipe covering with all joints sealed with a heavy brush coat of manufacturers approved vapour retarder. Over the insulation apply a heavy brush layer of vapour retarder coating at the rate of 1.2 L/ m², embed a layer of reinforcing membrane and then apply another heavy brush layer of vapour retarder coating at the rate of 1.0 L/ m².

Note 1: On straight runs of pipe over 15 m and every 15 m, an expansion joint of flexible insulation 50 mm wide to the thickness of the pipe covering shall be installed and finished with the same vapour retarder coating as the piping.

10.2 FINISHES

Application Code No.

IPF-1 Piping:

- Piping: Over the insulation apply metal jacket with 50 mm circumferential and 50 mm longitudinal laps placed against the weather and shall be secured with banding with wing seals or screws. Vertical or inclined lines shall have S-clips installed every 10 m to prevent slipping.
- Elbows: Shall be finished with pre-formed covers or field fabricated gore type fitting covers made in a first quality workmanship manner and secured with stainless steel sheet metal screws.

- Fittings, Valves, Flanges: Shall be finished with field fabricated fitting covers and secured with stainless steel screws and/or stainless steel banding and wing seal

Note 1: The specifying authority must specify in the project specifications if removable valve or flange covers are required.

10.3 PIPING FORMAT

A. PIPE INSULATION

- Rigid Mineral Fibre - Low & Medium Temperature
- Flexible Mineral Fibre - Low & Medium Temperature
- Calcium Silicate - High Temperature
- Rigid Mineral Fibre - High Temperature
- Flexible Mineral Fibre - High Temperature
- Polyisocyanurate
- Cellular Glass
- Perlite

B. PIPE INSULATION

The following systems shall be insulated:

System	Material	Thickness
1.		
2.		
3.		
4.		

C. INSULATION ATTACHMENT

Material	Size	Spacing
<input type="checkbox"/> Galvanized Wire	<input type="checkbox"/> 18 Gauge	<input type="checkbox"/> 150 mm on centre
<input type="checkbox"/> Stainless Steel Wire	<input type="checkbox"/> 16 gauge	<input type="checkbox"/> 225 mm on centre
<input type="checkbox"/> Aluminum Band	<input type="checkbox"/> 14 gauge	<input type="checkbox"/> 300 mm on centre
<input type="checkbox"/> Stainless Steel Band	<input type="checkbox"/> 12mm x .38 mm	
<input type="checkbox"/> Filament Tape	<input type="checkbox"/> 12 mm x .50 mm	
<input type="checkbox"/> Wing Seals		
<input type="checkbox"/> Closed Seals		

D. INSULATION FINISHES

Material	Thickness	Material	Form
<input type="checkbox"/> Aluminum	<input type="checkbox"/> 0.250 mm		<input type="checkbox"/> Smooth
<input type="checkbox"/> Acrylic	<input type="checkbox"/> 0.400 mm		<input type="checkbox"/> Stucco Embossed
<input type="checkbox"/> Stainless Steel	<input type="checkbox"/> 0.500 mm		<input type="checkbox"/> Corrugated
<input type="checkbox"/> Type 316 <input type="checkbox"/> Type 304			
<input type="checkbox"/> Glass fabric and mastic			

E. INSULATION FINISH ATTACHMENT

Material	Size	Spacing
<input type="checkbox"/> Stainless Steel Screws	<input type="checkbox"/> 12 mm x #8	<input type="checkbox"/> 150 mm on centre
<input type="checkbox"/> Stainless Steel Bands	<input type="checkbox"/> 12 mm x 0.38 mm	<input type="checkbox"/> 225 mm on centre
<input type="checkbox"/> Wing Seals	<input type="checkbox"/> 12 mm x 0.50mm	<input type="checkbox"/> 300 mm on centre
<input type="checkbox"/> Closed Seals		

F. GENERAL

- Removable Valve Covers
- Removable Flange Covers
- Valves and Strainers
- Valve Bonnets
- Flanges

10.4 GENERAL

1. The application of insulation shall not begin prior to testing. Should it become necessary to commence work prior to such testing, written permission shall be given by the project manager, engineer or superintendent.
2. If direction is given to commence work prior to the testing, all welds, threads, unions, fittings and flanged joints shall be left uncovered until such tests are completed.
3. All instrument assemblies requiring insulation and attached to insulated piping shall be insulated for the operating temperature of the piping to which it is attached using the insulation thicknesses required in the specification if the work is listed in the project specification.
4. There shall be sufficient clearance between insulation surfaces and any obstruction such as stairs, platforms, railings or other piping to allow for the insulation and for normal operational movements.
5. Piping insulated for personnel protection shall be determined on site by the owners representative and paid for on a unit price basis, work order or other arranged method.

6. Insulation shall be protected as best possible from the weather prior to and during application.
7. Insulation shall be applied with all joints fitted to eliminate voids. All voids or open cracks shall be filled in an acceptable manner.
8. Hot piping over 300 C insulated for heat conservation or when insulation thickness is greater than 75 mm thick, the insulation shall be applied using double layer construction with all joints staggered.
9. Cold piping insulation greater than 75 mm thick shall be applied using double layer construction with all joints staggered.
10. Tracer leads, drains and loops that are to be insulated shall be paid for on a unit price basis, work order or other arranged method.