



## COLD SERVICE SPECIFICATIONS

### 1. Scope

This specification covers the requirements for design, fabrication and use of load bearing low temperature insulated pipe supports. It is applicable for pipes having a surface temperature ranges of -475 ° F (-281 ° C) to 275 ° F (135 ° C)

### 2. General requirements

1. All insulated piping shall be supported with insulated pipe supports.
2. Insulated pipe supports shall comply with the latest edition of the following:  
**ANSI/ASME B31.1 & B31.3.**  
**Manufactures Standardization Society (MSC) SP-58, 69 & 89.**
3. Considerations shall be given to the following criteria in the selection of insulated pipe supports:
  - a. Vertical, lateral and axial support design load limits.
  - b. Vertical, lateral and axial support design travel limits.
  - c. Support temperature design limit both at the pipe and support outside ambient temperature.
  - d. Any test or installation loading or displacements that may exceed normal system operating conditions.
  - e. Required dimensional clearances needed during installation and system operation should be specified.
  - f. Localized lugs and pipe stresses for insulated pipe supports requiring lugs or welded attachments welded to the pipe. Material of the welded attachments should compatible with the pipe.
  - g. Consideration should be given to loading and displacement resulting from seismic, water hammer and similar conditions.
4. At the request of the owner or his designee, calculations and other related documentation which all demonstrate adequacy and compliance of the insulated support with the design requirements shall be made available for his review.
5. At the request of the owner or his designee, localized stress calculations for lugs or other welded pipe attachments shall be made available for his review.
6. Any special requirements, such as material test reports or certified mill test reports shall be specified in advance.

### 3. Design criteria

1. The load bearing insulating material used in the supplied insulated support shall be of the same material that was used to load rate the support.
2. At the request of the owner or his designee, supplier shall make available compressive strength and thermal conductivity testing results of high-density polyurethane by an independent laboratory in a format provided for in MSS SP-89. Testing of material shall take place at a maximum temperature of -260 ° F (-176 ° C).
3. At the request of the owner or his designee, a description of the basis used to load rate the insulated pipe support shall be provided for evaluation. A minimum safety factor of 5 at the system design temperature shall be used in determine the insulate pipe support load rating.
4. The testing used to establish load bearing insulation compressive properties shall comply with ASTM D 1621, Standard Test Method for Compressive Properties of Rigid Cellular plastics.

5. The testing used to establish thermal conductivity properties of high density polyurethane shall comply with ASTM C 177-85, Steady State Heat Flux Measurement and Thermal Transmission Properties by means of the Guard Hot Plate Apparatus.
6. The load bearing element load capacity shall be demonstrated at the piping system design temperature and load.
7. The insulated pipe support assembly shall exert a minimum clamping force on the pipe to assure that the assembly will move axially with the pipe and not slip relatively to the pipe when subjected to the design conditions.
8. All sliding surfaces shall be designed in such a manner as to limit the coefficient of friction to 0.1 for the system design life without requiring lubrication. Care shall be exercised in the selection of the sliding surface material to assure that corrosion of the sliding surface will not adversely affect the coefficient of friction over time. Any friction reducing material used that requires bonding shall be bonded to the backing structure prior to shipment.
9. High density polyurethane shall have the following maximum thermal conductivity:
  - a. 6 & 10 lb./cubic ft. foam : .16 BTU-in./hr-ft<sup>2</sup>- ° F (0.023 W/meter\*K)
  - b. 15 lb./cubic ft. foam : .20 BTU-in./hr-ft<sup>2</sup>- ° F (0.0238W/meter\*K)
  - c. 20 lb./cubic ft. foam : .25 BTU-in./hr-ft<sup>2</sup>- ° F (0.035 W/meter\*K)
10. High density polyurethane shall not contain or use during fabrication environmentally hazardous CFC's

#### 4. Fabrications

1. The insulated pipe supports shall
  - a. be pre-assembled with sufficient insulation extending beyond the support outer metal jacket so as to allow the pipe insulator to make a standard insulation butt joint.
  - b. have exposed surfaces coated with a mastic to support the foam from moisture and ultraviolet light degradation. Mastic shall have a minimum perm rating of .02 (ASTM E-9
  - c. have a vapor barrier between the jacket and the insulating material with a maximum perm rating of .02
  - d. have the insulation ID and OD dimensions per ASTM Specification C585 unless otherwise specified
2. Designs having sliding surfaces shall incorporate two slide plates at each sliding surface. Each slide plate shall be composed of a 3/32" (2.5 mm) thick glass filled reinforced Teflon bonded to a 10 GA. carbon steel backing plate. On these to be welded plates, the Teflon should be recessed 1/4" (6.5 mm) from the edge.
3. All welding shall comply with the requirements Section IX of the ASME Boiler and Pressure Vessel code and AWS D1.1.
4. the following items, unless otherwise noted on contract drawings, shall be in accordance with the following:
  - a. Structure shape and plate: ASTM A-36
  - b. Bolts/studs greater than 1/4" (6.5mm): ASTM A-193 Grade B7
  - c. Bolts and nuts less than or equal to 1/4" (6.5mm): ASTM A-307

#### 5. Shipping and Handling

1. Each insulated support assembly shall be clearly and permanently marked with the support identification number. The marking shall withstand water and fading when exposed to sun light.
2. The support marking number should be placed in a location where it is visible before and after installation.
3. Supports are to shipped in either reinforced cardboard or strap board crated with a cover. Each container shall be clearly marked with a unique number. All supports shall be individually wrapped by plastic sheets.
4. Each container shall have 2 copies of the packing slip. One of which is placed inside and the other is taped on the outside.

5. Prior to installation, the supports will be stored in a dry covered area to avoid exposure to sunlight, rain and moisture.

**6. Extent of work**

1. Work included:  
Furnish the insulated pipe support assembly, encompassing the insulating materials, metal jacket, fabricating steel housing, guide clips, associated hardware including clamps, bolts and nuts, screws, slide plates and other components that may be required to make a complete assembly.
2. Work not included:
  - a. Structural steel parts which are not integral parts of the insulated pipe support assembly.
  - b. Receiving, unloading and installing of the insulated pipe supports.