



# SPECIFICATION

## Specification for Piping Thermal Insulation

| APPROVALS   | DATE   | REV | DCN NO.          | BY | CHECK | DCC | DATE |
|-------------|--------|-----|------------------|----|-------|-----|------|
| AUTHOR:     | 3/2/11 | V1  | For Installation |    |       |     |      |
| CHECKED:    |        |     |                  |    |       |     |      |
| APPROVED:   |        |     |                  |    |       |     |      |
| DCC RELEASE |        |     |                  |    |       |     |      |

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# SPECIFICATION

## Specification for Piping Thermal Insulation

### 1.0 SCOPE/GENERAL

**1.1 This document outlines methods and procedures for the fabrication and installation of insulation systems which are defined as follows:**

Cold Insulation - Polyisocyanurate foam (-)320<sup>0</sup>F to 300<sup>0</sup>F

Hot/Cold - Polyisocyanurate foam

Insulation for Outer Layer, Fiberglass Blanket for Inner Layer (-)320<sup>0</sup>F to 350<sup>0</sup>F

All material shall be suitable for continuous outdoor and indoor service.

Ambient Temperature: 10<sup>0</sup>F to 100<sup>0</sup>F

Relative Humidity: 50 to 100%

**1.3 Insulation identification can be determined from the following legend:**

**Insulation Classes**

C = Cold Conservation

HC = Hot/Cold Conservation

PC = Personnel Protection Cold

PH = Personnel Protection Hot

**1.4 The extent of surfaces to be insulated shall be defined by one or more of the following:**

Piping and Instrumentation Diagrams

General Piping Isometrics / Arrangement Drawings

The Buyer

In addition to piping; insulation shall be applied to all pipe nipples, fittings, flanges, unions, valves and projections through the base insulation unless otherwise noted.

**SPECIFICATION****Specification for Piping Thermal Insulation****1.5 SPECIFICATION COMPLIANCE**

This Specification details the original LIGO system Insulations requirements. The Seller may suggest substitute insulations systems that are equal or better to the Buyer. All Substitutions must be approved by the Buyer prior to use.

Any applicable national, state, or local codes or regulations shall be considered as part of this specification. The Vendor is responsible for compliance with such standards, specifications, codes and requirements.

**2.0 MATERIALS**

Acceptable insulation materials are listed in Paragraph 5.5 of this specification. Vendor may quote equivalent materials. However, all "equivalent" materials must be approved by the Purchaser prior to use.

**3.0 THICKNESS OF INSULATION**

Insulation thickness shall be as designated on the Piping and Instrumentation Diagrams and Line Numbers. Any discrepancies shall be brought to the attention of Buyer for resolution. The other documents provided are for arrangement and dimension information.

**3.1 Special Insulation Codes**

|      |  |
|------|--|
| FP3  | 1" Fiberglass inner<br>2" Polyisocyanurate outer |
| F1.5 | 1 1/2" Fiberglass                                |

**4.0 INSTALLATION****4.1 GENERAL**

1. The attached illustrations are included as a guide for fabrication and installation of insulation systems.
2. Insulating materials shall be protected from moisture at all times.
3. All insulation shall be installed butted together.
4. Insulation showing any evidence of moisture shall be rejected.
5. Insulation shall not be applied to any surface where there is any evidence of moisture or frost.
6. All material applied in one day shall have the vapor barrier applied in the same day. Exposed ends shall be temporarily protected by extending the vapor barrier over the exposed ends and onto the bare pipe or equipment.
7. All outer surfaces of insulation shall be covered with a continuous vapor barrier.
8. There shall be no discontinuities in the vapor barrier.



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9. Plastic pipe jacketing shall be installed as the final covering on the insulation.

### 4.2 VALVES, FLANGES, AND PIPE FITTINGS

- a. Valves and flanges shall be insulated to provide coverings that can be removed easily without destroying the covering or the pipe insulation and its vapor barrier. Pipe insulation shall extend to the flange or valve and shall be vapor sealed against the pipe. Insulation shall be beveled so that bolts may be removed without damage to adjacent insulation. Insulation thickness shall be equal to the pipe insulation thickness where clearances are sufficient. Where clearances are inadequate, the insulation may be trimmed as required.
- b. Valve stems on cryogenic valves shall be insulated half way between the pipe centerline and packing flange.
- c. All horizontal surfaces shall be sloped to prevent trapped water or puddling.

### 4.3 PIPE SUPPORTS

The piping at support points (i.e. TEE Posts) is to rest above support steel, on high density insulation inserts and have the continuous insulation and outer jacket protected by a rolled sheet metal cradle outside the insulation at the support point.

### 4.4 MATERIALS DESCRIPTION

All materials must comply with the following requirements. Caution shall be exercised in job site storage and handling to assure that the completed system will be dry, mechanically sound and meet all requirements of this specification. Defective materials shall be replaced.

#### 4.4.1 Preformed Section 2 lb/cu. ft. Polyisocyanurate

Acceptable Materials:

- a. Dow Trymer 2000 or PSI approved equal.

#### 4.4.2 Preformed Section Fiberglass

Acceptable Material:

Owens Corning SSL-II Pipe Insulation



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### 4.4.3 Joint Sealant and Vapor Stop Mastic

Acceptable Material:

a. B.F. 95-44 Elastolar Sealant, manufactured by H.B. Fuller Company, Foster Division, Houston, Texas.

- 5 gallon containers - for trowel
- 11 fluid ounce tubes - for hand caulking guns

b. Dow Corning Silastic 736 or approved equal.

c. Pittseal 111, manufactured by Pittsburgh Corning Corporation.

d. Foamseal 30-45, manufactured by Foster Division of Amchem.

e. S-31 Sealant, manufactured by Mastics and Adhesives Company.

f. CHIL-BYL CP-76 Sealant manufactured by Childers Coatings and Adhesive.

g. CHIL-PERM CP-35 Vapor Retarder Coating.

### 4.4.4 Filament Tape 1" Wide Rolls

Acceptable Material:

3-M Scotch Brand Filament Tape No. 898 manufactured by Minnesota Mining and Manufacturing Company.

Mystic Tape No. 6491, manufacturing by Mastik Tape, Division of Borden Chemicals, Borden, Inc., Northfield, Illinois.

### 4.4.5 Membrane

Polyester fabric cloth having an 8 x 8 or similar size weave pattern. Glass cloth is not suitable for use with the B.F. 60-30 vapor barrier mastic.

Acceptable Material:

MAST-A-FAB, polyester fabric, 8 x 8 weave pattern. Manufacture by Foster Division of Amchem Products.

### 4.4.6 Vapor Barrier Mastic

Acceptable Material:

B.F. 60-30 (dark brown - trowel grade) manufactured by H.B. Fuller Company, Foster Products Division.

Rust-Ban Vapalon FR manufactured by Matcole Company, Inc.

Elastometric Coating EC-26 manufactured by Mastics and Adhesives Company



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### 4.4.7 3 PCF Fiberglass Blanket

Industrial glass blanket without backing, 3 lb/cu. foot density, 1" thick or as required.

### 4.4.8 1 PCF Fiberglass Blanket

Industrial glass blanket without backing, 1 lb/cu. foot density, 1/2" thick (to fill voids).

### 4.4.9 Tie Wire

16 gauge, soft annealed galvanized wire.

### 4.4.10 Plastic Pipe Jacketing

Plastic pipe jacketing shall be Zeston 2000 PVC (white) or approved equal.

Jacketing form and thickness to be used shall be as follows:

Piping - 0.03" cut and curled.

Fittings -0.03" preformed.

Jacket bonding adhesive shall be Perma-bond solvent welding adhesive, or approved equal