

GP 14-01-01	External Insulation	May 2004
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External Insulation

GP 14-01-01

Scope

[I] This Global Practice (GP) covers the design, material selection, and application of thermal insulation systems for hot and cold services. These systems are intended for use on external surfaces of equipment (including piping and tankage) as follows:

- 1) Hot Thermal Insulation:
 - a) Energy conservation
 - b) Temperature above the atmospheric dew point and not operating more than 10 percent of the time below the atmospheric dew point
 - c) Personnel protection
- 2) Cold Thermal Insulation:
 - a) Energy conservation
 - b) Temperature between ambient and cryogenic service
 - c) Operates for more than 10 percent of the time below the atmospheric dew point

[I] The requirements of this GP also apply to the application of acoustic, fire protection, and winterizing thermal insulation systems.

[S] Asbestos containing materials shall not be used.

[I] An asterisk (*) indicates that additional information is required. This information should be included in the Job Specification.

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1. Required References

- 1) [I] This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.
- 2) [I] Other national standards or codes may be substituted for those listed as directed by the Purchaser.
- 3) * [I] The recommendations of the paint, insulation, and vapor barrier manufacturers shall be followed in addition to the requirements of this GP. All conflicts with this GP shall be submitted to Purchaser for approval by Owner's Engineer.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 02-01-01	Plant Noise Design Criteria
GP 14-03-01	Fireproofing
GP 19-01-01	Paint and Protective Coatings

1.2. ASTM–American Society for Testing and Materials

ASTM A 167	Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A 463/A 463M	Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 653/A 653M	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B 209	Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM C 450	Standard Practice for Prefabrication and Field Fabrication of Thermal Insulating Fitting Covers for NPS Piping, Vessel Lagging, and Dished Head Segments
ASTM C 533	Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation
ASTM C 547	Standard Specification for Mineral Fiber Pipe Insulation
ASTM C 549	Standard Specification for Perlite Loose Fill Insulation
ASTM C 552	Standard Specification for Cellular Glass Thermal Insulation
ASTM C 591	Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C 592	Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type)

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ASTM C 610	Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation
ASTM C 612	Standard Specification for Mineral Fiber Block and Board Thermal Insulation
ASTM C 795	Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
ASTM C 892	Standard Specification for High-Temperature Fiber Blanket Thermal Insulation
ASTM E 84	Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E 96	Standard Test Methods for Water Vapor Transmission of Materials

2. Definitions

Term	[I] Description
Combustible Liquid	Liquids having a flash point of 100°F (38°C) or higher
Flammable Liquid	Low-flash liquids [flash point below 100°F (38°C)] and combustible liquids when handled at temperatures above or within 15°F (8°C) of their closed cup flash points
Flammable Material	Materials that are readily ignitable when released to the atmosphere. Flammable materials include flammable liquids, hydrocarbon vapors, and other vapors, such as hydrogen and carbon disulfide. Such materials are readily ignitable when released to the atmosphere.
Hydrogen Service	Service in which the design temperature is greater than the carbon steel curve in API RP 941 for the given hydrogen partial pressure
Intermittent Service	Service in which the process temperature cycles into and out of the 25°F to 300°F (–4°C to 150°C) range on a recurrent basis
Steel Jacket	Jackets made from aluminum coated, galvanized, or stainless steel, as specified by this document or the Owner's Engineer

3. Documentation

* [I] Proposal information: The following data, as applicable, shall be submitted to Purchaser for approval by Owner's Engineer.

- 1) Product descriptions for all system components including reference specifications, manufacturer's data sheets and Material Safety Data Sheets where applicable.
- 2) Material storage requirements, including shelf life and temperature.

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- 3) Design and application details of insulation systems shall include (but not be limited to):
 - a) Insulation expansion and contraction joints, attachments, clips and banding.
 - b) Typical designs of insulating weather jackets, vapor barriers and flashing to prevent water intrusion at piping and equipment valves, supports, insulation termination points, and flanges.
 - c) For storage tanks: floating roofs; junction of tank shell to roof; junction of insulation system to fireproofing on sphere supports; tank appurtenances, walkway areas to tank roof appurtenances, termination of insulation system on the first shell course of cylindrical tanks on grade or on low foundations.
 - d) Design of thermal insulation systems including dual layer systems.
 - e) Design of pipe and vessel insulation supports for vertical and horizontal piping and vessels.
 - f) Design and location of removable insulation systems required for access to equipment and piping and vessels.
 - g) Design and intended use of insulating and finishing cement systems.
- 4) Repair procedures for damaged areas.
- 5) Recommended health and safety precautions.
- 6) Installer's field quality control methods and inspection procedures.

4. Design

- 1) [O] Hot service insulation shall be installed to conserve heat. Hot service insulation may not be used solely for personnel protection unless approved by Owner's Engineer. Any use of thermal insulation for personnel protection must be in accordance with the requirements and limitations of Sections 4.3 and 4.4. Cold service insulation shall be installed to limit surface condensation or icing and conserve refrigeration.
- 2) [O] Where insulation material type and thickness is specified, alternative materials may be used, provided that the thermal conductivity at the mean temperature (T_m) falls within 10 percent of the design thermal conductivity (K_{des}) given in Table 1.

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