



PROCESS  
INDUSTRY  
PRACTICES

COMPLETE REVISION  
*August 2018*

***Insulation***

**PIP INSH1000  
Hot Service Insulation Materials  
and Installation Specification**

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## PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

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# PIP INSH1000 Hot Service Insulation Materials and Installation Specification

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## Data Forms

- INSH1000-D001** – Documentation Requirements Sheet
- The following data forms shall be part of this Practice only if indicated on the purchaser's completed Documentation Requirements Sheet.*
- INSH1000-D002** – Hot Service Insulation System Project-Specific Requirements
- INSH1000-D003** – Extent of Hot-Service Insulation
- INSH1000-D010** – Calcium Silicate Insulation System for Pipe and Equipment
- INSH1000-D011** – Expanded Perlite Insulation System for Pipe and Equipment
- INSH1000-D012** – Mineral Wool Preformed Pipe Sections Insulation System
- INSH1000-D013** – Mineral Wool Board Insulation System for Equipment
- INSH1000-D014** – Mineral Wool Blanket Insulation System for Pipe and Equipment
- INSH1000-D015** – Glass Fiber Preformed Pipe Sections Insulation System
- INSH1000-D016** – Glass Fiber Board Insulation System for Equipment
- INSH1000-D017** – Glass Fiber Blanket Insulation System for Pipe and Equipment
- INSH1000-D018** – Cellular Glass Block and Fabricated Sections Insulation System

- INSH1000-D019** – Polyisocyanurate Insulation System
- INSH1000-D020** – Ceramic Fiber Blanket Insulation System
- INSH1000-D021** – Glass Fiber Needled Blanket Insulation System
- INSH1000-D022** – Flexible Elastomeric Cellular Thermal Insulation System for Pipe and Equipment
- INSH1000-D023** – Rigid Cellular Phenolic Thermal Insulation System for Pipe and Equipment
- INSH1000-D024** – User-Defined Thermal Insulation System for Pipe and Equipment
- INSH1000-D025** – Silica Aerogel Insulation System for Pipe and Equipment
- INSH1000-F001** – Calcium Silicate Insulation for HC ASTM C533 Type I (inches)
- INSH1000-F002** – Calcium Silicate Insulation for PP ASTM C533 Type I (inches)
- INSH1000-F003** – Calcium Silicate Insulation – Combined Table ASTM C533 Type I (inches)
- INSH1000-F004** – Cellular Glass Insulation for HC ASTM C552 (inches)
- INSH1000-F005** – Cellular Glass Insulation for Pp ASTM C552 (inches)
- INSH1000-F006** – Cellular Glass Insulation – Combined Table ASTM C552 (inches)
- INSH1000-F007** – Fiberglass Insulation for HC ASTM C547, Type 1 / C612, Type I (inches)
- INSH1000-F008** – Fiberglass Insulation for PP ASTM C547, Type 1 / C612, Type I (inches)
- INSH1000-F009** – Fiberglass Insulation – Combined Table ASTM C547, Type 1 / C612, Type I (inches)
- INSH1000-F010** – Mineral Wool Insulation for HC ASTM C547, Type II or III / C612, Type IVB (inches)
- INSH1000-F011** – Mineral Wool Insulation for PP ASTM C547, Type II or III / C612, Type IVB (inches)
- INSH1000-F012** – Mineral Wool Insulation – Combined Table ASTM C547, Type II or III / C612, Type IVB (inches)
- INSH1000-F013** – Expanded Perlite Insulation for HC ASTM C610 (inches)
- INSH1000-F014** – Expanded Perlite Insulation for PP ASTM C610 (inches)
- INSH1000-F015** – Expanded Perlite Insulation – Combined Table ASTM C610 (inches)
- INSH1000-F016** – Polyisocyanurate for HC ASTM C591, Type II or IV (inches)
- INSH1000-F017** – Polyisocyanurate Insulation for PP ASTM C591, Type II or IV (inches)
- INSH1000-F018** – Polyisocyanurate Insulation – Combined Table ASTM C591, Type II or IV (inches)
- INSH1000-F019** – Elastomeric Foam Insulation for HC ASTM C534, Grade 3 (inches)
- INSH1000-F020** – Elastomeric Foam Insulation for PP ASTM C534, Grade 3 (inches)
- INSH1000-F021** – Elastomeric Foam Insulation – Combined Table ASTM C534, Grade 3 (inches)
- INSH1000-F022** – Phenolic Foam Insulation for HC ASTM C1126, Type III, Grade 1 (inches)
- INSH1000-F023** – Phenolic Foam Insulation for PP ASTM C1126, Type III, Grade 1 (inches)
- INSH1000-F024** – Phenolic Foam Insulation – Combined Table ASTM C1126, Type III, Grade 3 (inches)
- INSH1000-F025** – User-Defined Insulation for HC (inches)
- INSH1000-F026** – User-Defined Insulation for PP (inches)
- INSH1000-F027** – User-Defined Insulation – Combined Table (inches)
- INSH1000-F028** – Silica Aerogel Insulation for HC (inches)
- INSH1000-F029** – Silica Aerogel Insulation for PP (inches)
- INSH1000-F030** – Silica Aerogel Insulation – Combined Table (inches)
- INSH1000-FM001** – Calcium Silicate Insulation for HC ASTM C533 Type I (mm)
- INSH1000-FM002** – Calcium Silicate Insulation for PP ASTM C533 Type I (mm)
- INSH1000-FM003** – Calcium Silicate Insulation – Combined Table ASTM C533 Type I (mm)
- INSH1000-FM004** – Cellular Glass Insulation for HC ASTM C552 (mm)
- INSH1000-FM005** – Cellular Glass Insulation for PP ASTM C552 (mm)
- INSH1000-FM006** – Cellular Glass Insulation – Combined Table ASTM C552 (mm)
- INSH1000-FM007** – Fiberglass Insulation for HC ASTM C547, Type 1 / C612, Type I (mm)
- INSH1000-FM008** – Fiberglass Insulation for PP ASTM C547, Type 1 / C612, Type I (mm)
- INSH1000-FM009** – Fiberglass Insulation – Combined Table ASTM C547, Type 1 / C612, Type I (mm)
- INSH1000-FM010** – Mineral Wool Insulation for HC ASTM C547, Type II or III / C612, Type IVB (mm)
- INSH1000-FM011** – Mineral Wool Insulation for PP ASTM C547, Type II or III / C612, Type IVB (mm)

- INSH1000-FM012** – Mineral Wool Insulation –  
Combined Table ASTM C547, Type II or III /  
C612, Type IVB (mm)
- INSH1000-FM013** – Expanded Perlite Insulation  
for HC ASTM C610 (mm)
- INSH1000-FM014** – Expanded Perlite Insulation  
for PP ASTM C610 (mm)
- INSH1000-FM015** – Expanded Perlite Insulation  
– Combined Table ASTM C610 (mm)
- INSH1000-FM016** – Polyisocyanurate for HC  
ASTM C591, Type II or IV (mm)
- INSH1000-FM017** – Polyisocyanurate Insulation  
for PP ASTM C591, Type II or IV (mm)
- INSH1000-FM018** – Polyisocyanurate Insulation –  
Combined Table ASTM C591, Type II or IV  
(mm)
- INSH1000-FM019** – Elastomeric Foam Insulation  
for HC ASTM C534, Grade 3 (mm)
- INSH1000-FM020** – Elastomeric Foam Insulation  
for PP ASTM C534, Grade 3 (mm)
- INSH1000-FM021** – Elastomeric Foam Insulation –  
Combined Table ASTM C534, Grade 3 (mm)
- INSH1000-FM022** – Phenolic Foam Insulation for  
HC ASTM C1126, Type III, Grade 1 (mm)
- INSH1000-FM023** – Phenolic Foam Insulation for  
PP ASTM C1126, Type III, Grade 1 (mm)
- INSH1000-FM024** – Phenolic Foam Insulation –  
Combined Table ASTM C1126, Type III,  
Grade 3 (mm)
- INSH1000-FM025** – User-Defined Insulation for  
HC (mm)
- INSH1000-FM026** – User-Defined Insulation for  
PP (mm)
- INSH1000-FM027** – User-Defined Insulation –  
Combined Table (mm)
- INSH1000-FM028** – Silica Aerogel Insulation for  
HC (mm)
- INSH1000-FM029** – Silica Aerogel Insulation for  
PP (mm)
- INSH1000-FM030** – Silica Aerogel Insulation –  
Combined Table (mm)

## 1. Scope

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This Practice provides requirements for materials and installation of hot service insulation systems on the external surfaces of piping and equipment, ambient to 649°C (1200°F).

This Practice describes requirements for hot service insulation materials and accessories, storage and handling of materials, insulation application, extent of insulation, and documentation.

*Comment:* Use of this Practice for contractual purposes requires the purchaser to make specific choices and to assemble additional supporting documents. Listing of or reference to supporting documents within this Practice does not imply suitability for specific designs.

## 2. References

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Applicable parts of the following Practices, industry codes and standards, and references shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate.

### 2.1 Process Industry Practices (PIP)

- PIP INTG1000 – *Insulation Inspection Checklist*

### 2.2 Industry Codes and Standards

- American Petroleum Institute (API)
  - API 521 – *Guide for Pressure-Relieving and Depressuring Systems*  
*American Petroleum Institute*
- American Society for Testing and Materials (ASTM)
  - ASTM C450 – *Prefabrication and Field Fabrication of Thermal Insulating Fitting Covers for NPS Piping, Vessel Lagging, and Dished Head Segments*
  - ASTM C692 – *Test Method for Evaluating the Influence of Thermal Insulation on the External Stress Corrosion Cracking Tendency of Austenitic Steel*
  - ASTM C795 – *Specification for Wicking-Type Thermal Insulation for Use over Austenitic Stainless Steel*
  - ASTM C871 – *Chemical Analysis of Thermal Insulation Materials for Leachable Chloride, Fluoride, Silicate and Sodium Ions*
  - ASTM C1728 – *Standard Specification for Flexible Aerogel Insulation*

## 3. Definitions

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*owner:* Party who owns the facility wherein the insulation system will be used

*purchaser:* Party who awards the contract to the supplier. The purchaser may be the owner or the owner's authorized agent.

*supplier:* Party responsible for providing the insulation materials and installing the insulation system