PROCESS INDUSTRY PRACTICES

May 2022

Insulation

PIP INEG5000
Design Guide for Insulation in Hygienic Facilities

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.

This Practice is subject to revision at any time.

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1. Scope

This Practice provides guidance for the design of insulation systems used in a hygienic environment requiring clean or Current Good Manufacturing Practices (CGMP) design. This Practice describes the types of insulation systems that are indicated by the type code on the Piping and Instrumentation Diagrams (P&IDs), data sheets, and other design documents. This Practice provides guidance on insulation design criteria, insulation materials, extent of insulation, determination of insulation thickness, and insulation material properties. Insulation in non-hygienic facilities/non-CGMP areas should refer to *PIP INEG1000*.

2. References

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 will be used herein where appropriate.

2.1 Process Industry Practices (PIP)

- PIP CTSH1000 – *Application of External Coatings in Hygienic Facilities*
- PIP INEG1000 – *Insulation Design Guide*
- PIP INIC1000 – *Cold Insulation Installation Details*
- PIP INSC1000 – *Cold Service Insulation Materials and Installation Specification*
- PIP INSR1000 – *Installation of Flexible, Removable/Reusable Insulation Covers for Hot Insulation Service*
- PIP PHS0001 – *Clean-in-Place (CIP) Skid-Mounted System Specification*
- PIP PHSF0001 – *Hygienic Pipe Support Details*

2.2 Industry Codes and Standards

- American Society of Testing and Materials (ASTM)
  - ASTM C533 – *Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation*
  - ASTM C534 – *Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form*
  - ASTM C547 – *Standard Specification for Mineral Fiber Pipe Insulation*
  - ASTM C552 – *Standard Specification for Cellular Glass Thermal Insulation*
  - ASTM C553 – *Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications*
  - ASTM C591 – *Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation*
  - ASTM C592 – *Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation*