PROCESS INDUSTRY PRACTICES

COMPLETE REVISION
February 2019

Piping

PIP PNC00004
Piping Stress Analysis Criteria for ASME B31.3 Metallic Piping

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.

PUBLISHING HISTORY

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1. Scope

This Practice describes the minimum requirements for piping flexibility analysis parameters and applications, and documentation requirements.

2. References

Applicable parts of the following Practices and industry codes and standards 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 PNFS0001 - *Miscellaneous Pipe Support Details*
- PIP RECE002 - *Design of Piping Loads on Rotating Machinery Nozzles*

2.2 Industry Codes and Standards

- American Petroleum Institute (API)
  - API 560 - *Fired Heaters for General Refinery Service*
  - API 610 - *Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries*
  - API 618 - *Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services*
  - API 650 - *Welded Tanks for Oil Storage*
  - API 661 - *Air-Cooled Heat Exchangers for General Refinery Services*
- American Society of Civil Engineers (ASCE)
  - ASCE 7 - Minimum Design Loads for Buildings and Other Structures
- American Society of Mechanical Engineers (ASME)
  - ASME Boiler and Pressure Vessel Code Section VIII - *Pressure Vessels*
  - ASME B31.1 - *Power Piping*
  - ASME B31.3 - *Process Piping*
  - ASME B31E - *Standard for the Seismic Design and Retrofit of Above-Ground Piping Systems*
  - ASME B31J - *Stress Intensification Factors (i-Factors), Flexibility Factors (k-Factors), and their Determination for Metallic Piping Components*
- Welding Research Council (WRC)
  - WRC 107 (see WRC 537)
  - WRC 537 - *Precision equations and enhanced diagrams for local stresses in spherical and cylindrical shells due to external loadings for implementation of WRC Bulletin 107*
  - WRC 297 - *Local Stresses in Cylindrical Shells Due to External Loadings on Nozzles (Supplement to WRC 107)*