PROCESS INDUSTRY PRACTICES

COMPLETE REVISION
October 2017

Piping

PIP PNE00012
Piping Examination and Leak Test Guide

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.

PRINTING HISTORY

February 1998	*Issued*	*November 2011*	*Complete Revision*
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1. Scope

This Practice provides guidelines for specifying the requirements for the examination and leak testing of metallic, lined metallic, and nonmetallic piping systems designed in accordance with *ASME B31.3* Process Piping, hereinafter referred to as the Code. The requirements include examination of piping materials, components, fabrication, assembly, installation; and associated documentation. This Practice also covers the extent of examination, criteria for acceptance, and correction of defective work. It describes the types of leak tests, bases for selecting the appropriate tests, and arrangements for testing piping.

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 are used herein where appropriate.

2.1 Process Industry Practices (PIP)

- PIP PNSC0001 – *ASME B31.3 Metallic Piping Fabrication and Examination Specification*
- PIP PNSC0021 – *Leak Testing of Piping Systems*

2.2 Industry Codes and Standards

- American Society of Mechanical Engineers (ASME)
  - ASME B16.5 – *Pipe Flanges and Flanged Fittings*
  - ASME B31.3 – *Process Piping (Code)*
  - ASME PCC-2 – *Repair of Pressure Equipment and Piping*

3. Definitions

For definitions of terms used in this Practice, see the *Code*, Paragraph 300.2.

4. Scope of Examination

4.1 The *Code* requires that each pipeline be examined to the extent specified using the methods specified.

4.2 The purpose of this practice is to specify the minimum leak tightness requirements for post-fabrication testing of pressure piping systems, and to obtain consistency in the leak testing process.

4.3 Piping systems should be examined for conformance with design drawings and project specifications.

The following design and construction requirements should be verified:

a. P&ID Conformance

(1) Line number

(2) Line size(s)

(3) Terminals, nozzle connections

(4) Shut-off valves, other valves

(5) In-line equipment, instruments, blinds

(6) Vents and drains

(7) Conformance to all notes on drawings

b. Line Class Conformance

Pipe, fittings, flanges, valves, and piping specialties should be verified in regard to the following characteristics. Nipples, bolts, gaskets, and joining materials should be similarly verified, to the extent possible.

(1) Material (e.g., ASTM Standard and grade)

(2) Rating or wall thickness

(3) Type and end connection

(4) Standard if applicable (e.g., ASME, MSS, API)

(5) Dimensions if applicable

(6) Freedom from visible defects or damage

(7) Freedom from defects in metallic components that are examined by radiography or other means

c. Joints and Fabrication Conformance

(1) Condition and make-up of threaded joints

(2) Alignment and make-up of flanged joints and other bolted joints

(3) Freedom from visible defects in welds; brazed, soldered, and bonded joints; bends; formed and machined work

(4) Freedom from defects in metallic welds examined by radiography or other means

(5) Condition and tightness of packing glands

d. Installation Conformance

(1) Piping location, in accordance with drawings or model

(2) Locations and details of anchors, guides, and supports

(3) Clearances from other piping

(4) Clearances from electrical and instrument lines, equipment, other structures, and spaces reserved for personnel and vehicle traffic

(5) Clearances at operating temperature

(6) Accessibility for operation and maintenance