PROCESS INDUSTRY PRACTICES

April 2021

Pipeline Systems

PIP PLE00005
Pipeline System Bends

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

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1. Scope

This Practice provides guidance for evaluation, selection, and specification of pipe bends for on-shore metallic pipelines designed and constructed to *ASME B31.8 Gas Transmission and Distribution Piping Systems* and *ASME B31.4 Pipeline Transportation Systems for Liquids and Slurries.* This Practice covers the following types of bends:

a. Manufactured fittings

b. Induction (hot) bends formed off-site

c. Cold bends formed on-site

This Practice provides guidance for evaluation of which bend type to select by providing pros and cons based on specific site rights-of-way, pipe size and wall thickness, shipping considerations, pipe ovality, pigging requirements, etc. Additional, more explanatory references recommendations are also provided.

2. References

Applicable parts of the following 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.

Industry Codes and Standards

- The American Society of Mechanical Engineers (ASME)
  - ASME B16.49 – *Factory-Made Wrought, Steel, Buttwelding Induction Bends for Transportation and Distribution Systems*
  - ASME B16.9 – *Factory-Made Wrought Buttwelding Fittings*
  - ASME B31.8 - *Gas Transmission and Distribution Piping Systems*
  - ASME B31.4- *Pipeline Transportation Systems for Liquids and Slurries*
- Manufacturers Standardization Society (MSS)
  - MSS SP-75 – *High-Strength, Wrought, Butt-Welding Fittings*

3. Definitions

arc: curved portion of tube bends or pipe bends

bend angle/degree: angle in degrees to which the pipe bends or tube bends are formed (i.e., 45 degrees, 90 degrees, 180 degrees, etc.)

bevel: type of end preparation of tube bends or pipe bends

centerline radius (CLR): Distance in inches from the center of curvature to the centerline axis of the tube rolling or pipe rolling bends. Often abbreviated as CLR.

cold tube bending: bending of pipe or tube to shapes by cold working methods