PROCESS INDUSTRY PRACTICES

April 2022

Vessel

PIP VESV1004
Titanium Clad Design and Fabrication Specification for Killed Carbon Steel Pressure Vessels and Shell and Tube Exchangers

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 describes the general requirements for equipment fabricated from titanium clad plate with a killed carbon steel backing.

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 awards shall be used, except as otherwise noted. Short titles are used herein where appropriate.

2.1 Process Industry Practices (PIP)

- VEDV1003 - *Documentation Requirements for Vessels ASME Code Section VIII, Divisions 1 and 2*
- VESPMI01 - *Positive Material Identification Specification*
- VESV1002 - *Design and Fabrication Specification for Vessels ASME Code Section VIII, Divisions 1 and 2*

2.2 Industry Codes and Standards

- American Society of Mechanical Engineers (ASME)
  - *ASME Boiler and Pressure Vessel Code*
    - Section V – *Nondestructive Examination*
    - Section VIII Division 1 – *Rules for Construction of Pressure Vessels*
    - Section IX – *Welding, Brazing, and Fusing Qualifications*
  - ASME SA-516/SA-516M - *Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service*
  - ASME SB-265/SB-265M - *Standard Specification for Titanium and Titanium Alloy, Strip, Sheet and Plate*
  - ASME SE-165/SE-165M - *Standard Practice for Liquid Penetrant Examination for General Industry*
- American Welding Society (AWS)
  - AWS G2.4/G2.4M - *Guide for the Fusion Welding of Titanium and Titanium Alloys*
- ASTM International (ASTM)
  - ASTM A380 - *Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems*
  - ASTM B898 - *Standard Specification for Reactive and Refractory Metal Clad Plate*
- European Standards
  - EN 10204 - *Metallic Products – Types of Inspection Documents*