

Welding Guidelines for the Chemical, Oil, and Gas Industries

API RECOMMENDED PRACTICE 582
FIRST EDITION, MARCH 2001



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Downstream Segment

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This document was initiated and developed through the joint efforts of API and Process Industry Practices (PIP).

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Welding Guidelines for the Chemical, Oil, and Gas Industries

1 Scope

1.1 This recommended practice, initiated and developed through the joint efforts of API and Process Industry Practices (PIP), provides supplementary guidelines and practices for welding and welding-related topics for shop and field fabrication, repair and modification of:

- a. Pressure-containing equipment (such as pressure vessels, heat exchangers, tankage, piping, heater tubes, pressure boundaries of rotating equipment, and attachments welded thereto).
- b. Non-removable internals for pressure vessels.
- c. Structural items attached and related to process equipment.
- d. Any other equipment or component item when referenced by an applicable purchase document.

1.2 This document is general in nature and is intended to augment the welding requirements of ASME Section IX and similar codes, standards and practices such as those listed in Section 2. The intent of this document is to be inclusive of chemical, oil and gas industry standards, although there are many areas not covered, e.g., pipeline welding and offshore structural welding.

1.3 This document is based on industry experience and any restrictions or limitations may be waived or augmented by the purchaser.

2 References

Unless stated otherwise, applicable requirements in the latest issue of the following industry codes, standards and practices shall be considered an integral part of this recommended practice. Other codes and standards are specified by the purchaser.

API

- API 510 *Pressure Vessel Inspection Code—Maintenance, Inspection, Rating, Repair, and Alteration*
- Std. 650 *Welded Steel Tanks for Oil Storage*

ASME¹

- Boiler and Pressure Vessel Code*
- Section II, “Materials Part C—Specifications for Welding Rods, Electrodes and Filler Metals”
- Section VIII, Rules for Construction of “Pressure Vessels”, Division I, and Division II—Alternative Rules”

¹American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017, www.asme.org.

Section IX, “Welding and Brazing Qualifications”.

B31.3 *Process Piping*

ASTM²

- ASTM A 833 *Standard Practice for Indentation Hardness of Metallic Materials by Comparison Hardness Testers*
- ASTM E 92 *Standard Test Method for Vickers Hardness of Metallic Materials*

AWS³

- AWS A4.2 *Standard Procedures for Calibrating Magnetic Instruments to Measure the Delta Ferrite Content of Austenitic and Duplex Ferritic-Austenitic Stainless Steel Weld Metal*
- AWS A5.32 *Specifications for Welding Shielding Gases*
- AWS A5.XX *Series of Filler Metal Specifications*
- AWS D1.1 *Structural Welding Code—Steel*
- AWS D1.6 *Structural Welding Code—Stainless Steel*

NACE⁴

- RP0472 *Standard Recommended Practice: Methods and Controls to Prevent In-Service Environmental Cracking of Carbon Steel Weldments in Corrosive Petroleum Refining Environments*

National Board⁵

- NB-23 *National Board Inspection Code*

3 Definitions

3.1 applicable code: The code or standard specified by the purchaser to which the equipment shall conform.

3.2 inspector: Purchaser’s representative.

3.3 procedure qualification record (PQR): A record of welding variables used to produce an acceptable test weldment and the results of tests conducted on the weldment to qualify a welding procedure specification.

3.4 purchaser: The party that issues the purchase order. This may be the user or owner of the equipment or component, or the purchaser’s designated agent (e.g., engineering contractor).

²American Society of Testing and Materials, 100 Barr Harbor, West Conshohocken, Pennsylvania 19428-2959, www.astm.org.

³American Welding Society, 550 NW LeJeune Road, Miami, FL 33126

⁴National Association of Corrosion Engineers-International, P.O. Box 218340, Houston, Texas 77218, www.nace.org.

⁵National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus, Ohio 43229, www.nationalboard.com.