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An American National Standard

Guide for Root Pass Welding of Pipe Without Backing

American Welding Society

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Guide for Root Pass Welding of Pipe Without Backing

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American Welding Society (AWS) D10 Committee on Piping and Tubing

Under the Direction of the
AWS Technical Activities Committee

Approved by the
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Abstract

This standard presents guidelines for welding the root pass of metal pipe butt joints with an open root or a consumable insert. Joint designs, assembly, consumable insert configurations, base metals, filler metals, and purging are discussed. Applicable arc welding processes and techniques are described.

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1. Scope

This document describes how to make root weld passes on circumferential pipe groove welds using open root joints with filler metal additions, tightly-fitted joints without the addition of filler metal, and joints with consumable inserts. Joint designs, fitting techniques, consumable insert configurations, filler and base metal combinations, purging, and welding processes are discussed. This publication does not address joints made using backing rings and techniques applicable to mechanized orbital welding.

Safety and health issues and concerns are beyond the scope of this standard, and therefore are not fully addressed herein. Safety and health information is available from other sources, including, but not limited to, ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, and applicable federal and state regulations. See Clauses 2 and 15 and Annex A for additional safety and health references.

1.1 Introduction. When the pipe system designer has determined that the use of backing rings is unacceptable due to service conditions and that complete joint penetration, including a continuous root side surface, is needed, butt joints may be made from one side using the groove designs and techniques described in this document. Although gas tungsten arc welding (GTAW) is most commonly used for precise control in root pass welding, shielded metal arc welding (SMAW) and gas metal arc welding (GMAW) are also widely used.

1.2 Units of Measure. This standard makes use of both the International System of Units (SI) and U.S. Customary Units. The latter are shown within brackets [ ] or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system must be used independently.

To identify nominal pipe sizes in both SI and U.S. Customary Units, the following designations are used:

1. DN (Diameter Nominal) is the SI designation.

2. NPS (Nominal Pipe Size) is the U.S. Customary designation.

2. Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this AWS standard. For undated references, the latest edition of the referenced standard shall apply. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply.

AWS Documents:[1]

1. AWS A3.0, *Standard Welding Terms and Definitions*

2. AWS A5.1/A5.1M, *Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding*

3. AWS A5.5/A5.5M, *Specification for Low Alloy Steel Electrodes for Shielded Metal Arc Welding*

4. AWS A5.12/A5.12M, *Specification for Tungsten and Tungsten Alloy Electrodes for Arc Welding and Cutting*

5. AWS A5.30/A5.30M, *Specification for Consumable Inserts*

6. AWS A5.32/A5.32M, *Specification for Welding Shielding Gases*

7. AWS C5.5/C5.5M, *Recommended Practices for Gas Tungsten Arc Welding*

8. AWS C5.10/C5.10M, *Recommended Practices for Shielding Gases for Welding and Plasma Arc Cutting*

9. AWS D10.4, *Recommended Practices for Welding Austenitic Chromium-Nickel Stainless Steel Piping and Tubing*

[1] AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.