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Recommended Practices for Local Heating of Welds in Piping and Tubing



American Welding Society



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Recommended Practices for Local Heating of Welds in Piping and Tubing

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Prepared by
AWS Committee on Piping and Tubing

Under the Direction of
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Approved by
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Abstract

This standard provides information on recommended practices, equipment, temperature control, insulation, and advantages and disadvantages for the methods presently available for local heating of welded joints in pipe and tubing.



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Recommended Practices for Local Heating of Welds in Piping and Tubing

1. Scope

These recommended practices describe several methods of applying controlled heat to weld joints and a limited volume of base metal adjacent to the joints, as opposed to heating the complete weldment in a furnace or oven. This standard makes use of both U.S. Customary Units and the International System of Units (SI). The measurements are not exact equivalents; therefore, each system must be used independently of the other without combining values in any way. U.S. Customary Units are listed first and SI Units are listed second in parentheses () when used in the text.

2. Reference Documents

Extensive reference to local heating requirements found in common piping codes, standards and practices is made to aid the user of this document. These referenced codes, standards and practices are listed below. Except for bake-out and postheating, specific hold temperature and time requirements are not discussed.

2.1 Piping Fabrication Codes

(1) *Power Piping* (ANSI/ASME B31.1), 1995 Edition, with addenda through 1997.

(2) *Process Piping* (ANSI/ASME B31.3), 1996 Edition, with addenda through 1997.

(3) *ASME Boiler and Pressure Vessel Code, Section III, Division 1—Subsection NB, Class 1 Components, Rules for Construction of Nuclear Power Plant Components*, 1998 Edition. (Note: Although direct reference is made to Subsection NB and its related paragraphs, Subsections NC and ND for Class 2 and 3 components have essentially the same requirements.)

(4) *British Standard Specification for Class 1 Arc Welding of Ferritic Steel Pipework for Carrying Fluids*

(BS 2633), 1987 Edition, with Amendments to No. 2, July 1992.

2.2 Repair Codes

(1) *NBIC National Board Inspection Code* (ANSI/NB-23), 1995 Edition, with Addenda through 1996.

(2) *API Piping Inspection Code [Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems]* (ANSI/API 570), June 1993 Edition, with Supplements through #1, January 1995.

2.3 Recommended Practices Regarding Service Environment

(1) *Methods and Controls to Prevent In-Service Environmental Cracking of Carbon Steel Weldments in Corrosive Petroleum Refining Environments* (NACE RP0472-95), 1995.

(2) *Avoiding Environmental Cracking in Amine Units* (ANSI/API 945), 1990.

3. Introduction

These recommended practices consider the various issues associated with local heating of welds in piping and tubing. They specifically address application of controlled heat to the weld metal, heat-affected zone (HAZ), and a limited volume of base metal adjacent to the weld, as opposed to heating the entire component (piping or tubing system) in a furnace or oven. The recommended practices generally address issues associated with circumferential butt welds. As such, primary emphasis is given to considering local 360-degree band heating. However, limited consideration of local spot heating is also provided. Although aimed at local heating, various issues common to both local and furnace heating are also discussed.