


**AWS D10.10/D10.10M:2021**  
**An American National Standard**



# **Recommended Practices for Local Heating of Welds in Piping and Tubing**



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An American National Standard**

**Approved by the  
American National Standards Institute  
February 12, 2021**

# **Recommended Practices for Local Heating of Welds in Piping and Tubing**

**4th Edition**

**Revises AWS D10.10/D10.10M:1999**

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

Under the Direction of the  
AWS Technical Activities Committee

Approved by the  
AWS Board of Directors

## **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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This standard is subject to revision at any time by the AWS D10 Committee on Piping and Tubing. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are requested and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS D10 Committee on Piping and Tubing and the author of the comments will be informed of the Committee's response to the comments. Guests are invited to attend all meetings of the AWS D10 Committee on Piping and Tubing to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

## Foreword

This foreword is not part of this standard but is included for informational purposes only.

This recommended practice is intended to supply useful information to those with a need to apply heat to welds in piping and tubing under circumstances that do not permit placing the entire component in a furnace or oven.

The first edition of the recommended practice prepared by the AWS Committee on Piping and Tubing was approved and published as AWS D10.10-75, *Local Heat Treatment of Welds in Piping and Tubing*.

The second edition, ANSI/AWS D10.10-90, was revised to bring the document abreast of the present “state-of-the-art,” and to reemphasize certain important topics; particularly, thermocouple selection and placement, proper provision for insulation, and use of the radiant heating methods.

The third edition of D10.10 was extensively revised to: identify/consider related domestic and international codes, standards, and practices; more fully recognize the range of purposes for local heating; introduce terminology for local heating; consider the issues affecting important parameters and provide recommendations for specifying these parameters; consider both local 360° band and spot heating; expand the information regarding thermocouple location, attachment, and accuracy; expand/update the information relating to insulation; expand the information regarding the thermal cycle; identify common process deviations and responses; introduce considerations regarding service environment; introduce quality assurance system considerations; and update and emphasize the heating methods most commonly used. This fourth edition applies to both new construction and repairs.

During preparation of this document, it was attempted to include recommendations based upon the best available, most current data regarding local heating. In most cases, the recommendations given are based upon published research, with extensive references provided. It is acknowledged that in some cases, the resulting recommendations may exceed the prevailing practice within industry, especially domestically. However, it is felt that the objective of this document is to present recommended practices based on an ordered assessment of available research and information, rather than a summary of current practice.

A vertical line in the margin or underlined text in clauses, tables, or figures indicates an editorial or technical change from the 1999 edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D10 Committee on Piping and Tubing, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166. A formal reply will be issued after it has been reviewed by the appropriate personnel following established procedures.

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# Recommended Practices for Local Heating of Welds in Piping and Tubing

## 1. General Requirements

**1.1 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. Additional criteria (e.g., thermocouple requirements, temperature requirements, heat placement) may be required for Creep Strength-Enhanced Ferritic (CSEF) Steels. The applicable code or standard shall take precedence in the event of conflict with this standard.

The primary purpose for the requirements in this document is to ensure that the root of the weld at the inside diameter (ID) of the pipe or tube achieves minimum postweld heat treatment (PWHT) temperature.

**1.2 Units of Measurement.** This standard makes use of both U.S. Customary Units and the International System of Units (SI). 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.

Units used for dimensions shall be consistent within any given formula.

**1.3 Safety.** Safety and health issues and concerns are beyond the scope of this standard; some safety and health information is provided, but such issues are not fully addressed herein.

Safety and health information is available from the following sources:

American Welding Society:

- (1) ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*
- (2) AWS Safety and Health Fact Sheets
- (3) Other safety and health information on the AWS website.

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers.

Applicable Regulatory Agencies

Work performed in accordance with this standard may involve the use of materials that have been deemed hazardous, and may involve operations or equipment that may cause injury or death. This standard does not purport to address all safety and health risks that may be encountered. The user of this standard should establish an appropriate safety program to address such risks as well as to meet applicable regulatory requirements. ANSI Z49.1 should be considered when developing the safety program.

## 2. Normative References

The documents listed below are referenced within this publication and are mandatory to the extent specified herein. For undated references, the latest edition of the referenced standard shall apply. For dated references, subsequent amendments or revisions of the publications may not apply since the relevant requirements may have changed.