AWS D9.1/D9.1M:2026
An American National Standard

Sheet Metal Welding Code



American Welding Society®





AWS D9.1/D9.1M:2026
An American National Standard

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Sheet Metal Welding Code

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Prepared by the
American Welding Society (AWS) D9 Committee on Welding of Sheet Metal

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This code covers the arc and braze welding requirements for nonstructural sheet metal fabrications using the commonly welded metals available in sheet form. Requirements and limitations governing procedure and performance qualification are presented, and workmanship and inspection standards are supplied. The informative annexes provide useful information on materials and processes.

American Welding Society®

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This standard is subject to revision at any time by the AWS D9 Committee on Sheet Metal. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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 required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS D9 Committee on Sheet Metal 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 D9 Committee on Sheet Metal 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.

Dedication

The AWS D9 Committee on Welding of Sheet Metal dedicates this edition of the D9.1/D9.1M, *Sheet Metal Welding Code,* to Earl (Bill) Beckman for his significant contribution to both sheet metal and welding.

Bill served as a committee member of AWS D9.1, *Sheet Metal Welding Code* and was a major contributor, bringing his vast knowledge of sheet metal and welding to the Code and the Welding Community.

Bill also served as a member of the AWS B2 Committee on Welding Procedure and Performance Qualifications. Additionally, he chaired the Subcommittee and co-wrote AWS B2.2, *Specification for Brazing Procedure and Performance Qualification,* and was a member of the ASME Task Group that adopted AWS *Standard Welding Procedure Specifications* in *ASME Section IX.*

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Foreword

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

This code was developed to provide standardized requirements for the qualification, production, and acceptance of welding or braze welding of nonstructural sheet metal components. Preparation of this document is in response to the many requests received from the sheet metal and construction industries.

The AWS Committee on Welding of Sheet Metal was organized in May 1978 and has published seven previous versions of D9.1.

The 1st edition, D9.1-80, *Specification for Welding of Sheet Metal*, was limited to the more common welding processes.

The 2nd edition, D9.1-84, bore the same title, but was augmented to provide coverage of braze welding.

The 3rd edition, D9.1-90, *Sheet Metal Welding Code*, was written to refine and clarify several areas of the standard and to upgrade it to the status of a code in order to enhance its use and to promote a minimum quality level for those who invoke it.

The 4th edition, D9.1M/D9.1:2000, *Sheet Metal Welding Code*, provides for maintenance of the document and updates to keep abreast of practices being encountered in sheet metal welding and joining processes since the last revision.

The 5th edition D9.1M/D9.1:2006, *Sheet Metal Welding Code*, also provides for maintenance of the document and presents up to date practices in sheet metal welding and joining processes since the 2000 revision.

The 6th edition D9.1M/D9.1:2012, *Sheet Metal Welding Code*, provides for maintenance of the document and incorporates many of the comments received during the balloting process for the 2006 edition.

The 7th edition D9.1/D9.1M:2018, *Sheet Metal Welding Code*, provides for maintenance of the document as well as some updates intended to enhance its use and to promote a minimum quality level for those who invoke it.

The 8th edition, D9.1/D9.1M:2026, *Sheet Metal Welding Code*, provides for the maintenance of the document, updates to provide clarity and to promote a minimum quality level for those that invoke it.

Underlined text in clauses, tables, or figures indicates an editorial or technical change from the 2018 edition. A vertical line in the margins indicates a deletion from the 7th edition, while a vertical line in the margins of tables or figures also indicates an addition or deletion from the 7th edition (D9.1/D9.1M:2018).

As new applications are developed and more experience is gathered, it is anticipated that changes in this standard will be required. Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D9 Committee on the Welding of Sheet Metal, American Welding Society, 8669 NW 36th Street, #130, Miami, FL 33166.

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Sheet Metal Welding Code

1. General Requirements

1.1 Scope. This code provides qualification, workmanship, and inspection requirements for both arc welding (Part A) and braze welding (Part B), as they apply to the fabrication, manufacture, and erection of nonstructural sheet metal components and systems.

1.1.1 This code was developed to provide standardized requirements for the qualification, production, and acceptance of welding or braze welding of nonstructural sheet metal components.

1.1.2 General applications of this code are in the following industrial areas:

(1) Heating, ventilating, and air conditioning systems

(2) Food processing equipment

(3) Architectural sheet metal and similar applications

(4) Other nonstructural sheet metal applications

This code covers sheet metal thicknesses up to and including 3 gauge or 0.250 in [6.4 mm]. Also covered are the attachment of accessories and components of the system, and joining or attachment of any member whose sole purpose is stiffening, supporting, or reinforcing the sheet metal and non-structural welding of material thicknesses up to and including 0.500 in [12.7 mm]. When welding any support to itself or to structural components, such as building steel, the welding shall be performed in accordance with the appropriate structural code(s).

1.1.2.1 Limitations/Exceptions. This code is not intended to apply:

(1) Where negative pressure or positive pressure exceeds 5 psi [30 kPa], which is approximately 120 in [3 m] of standing water.

(2) Where structural requirements apply (Note: AWS D1.3/D1.3M, Structural Welding Code—Sheet Steel is intended for such applications).

(3) Where sheet metal products related to automotive applications are concerned.

(4) Where brazing qualifications are specified to be in accordance with AWS B2.2/B2.2M, Specification for Brazing Procedure and Performance Qualification.

(5) Where soldering qualifications are specified to be in accordance with AWS B2.3/B2.3M, Specification for Soldering Procedure and Performance Qualification.

1.1.3 This code requires values to be specified by the Engineer for weld type, size, and location of the application. See subclauses 8.4.2, 8.4.3, 8.4.4, 13.4.2, and 13.4.3.

1.1.4 Symbols used in this code shall be in accordance with the latest edition of AWS A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.

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

1.3 Safety. Safety and health issues and concerns are beyond the scope of this standard and therefore are not 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.

American Welding Society (AWS) standards:

AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions*

Other documents:

ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*

3. Terms and Definitions

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions,* provides the basis for terms and definitions used herein. However, the following terms and definitions are included below to accommodate usage specific to this document.

coating. A relatively thin layer of material applied for the purpose of corrosion prevention, resistance to high-temperature scaling, wear resistance, lubrication, or other purposes.

Contractor. The party responsible for performing the welding under this code. The term is used collectively to mean contractor, fabricator, erector, or manufacturer.

Engineer. The duly designated person who acts on behalf of the Owner in all matters within the scope of this code.

Independent Third Party. An organization or agency qualified to perform inspection and testing required by this code.

weld metal grade. The description of the filler metal (e.g., mild steel, chromium-nickel steel, aluminum) to be inserted, as required, when the filler metal has no AWS classification.