AWS D1.2/D1.2M:2026
An American National Standard

Structural Welding Code—Aluminum



American Welding Society®



AWS D1.2/D1.2M:2026
An American National Standard

Approved by the
American National Standards Institute
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Structural Welding Code—Aluminum

Seventh Edition

Revises AWS D1.2/D1.2M:2014

Prepared by the
American Welding Society (AWS) D1 Committee on Structural Welding

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This code covers the welding requirements for any type structure made from aluminum structural alloys, except for aluminum pressure vessels and pressure piping. Clauses 1 through 10 constitute a body of rules for the regulation of welding in aluminum construction. A commentary on this code is also included with the document.

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Foreword

This foreword is not part of AWS D1.2/D1.2M:2026, *Structural Welding Code—Aluminum*, but is included for informational purposes only.

In the early 1970s, interest was expressed in developing a consolidated code for the structural welding of aluminum similar to the AWS D1.1, *Structural Welding Code—Steel*. Because of the interest of both The Aluminum Association and the American Welding Society, it was decided to begin in the mid-70s the task of developing a structural welding code for aluminum. Initially, the effort was undertaken by a task force of The Aluminum Association. In 1979, this task force became a subcommittee of the AWS Structural Welding Committee and the *Structural Welding Code—Aluminum* resulted from the continued activity of that subcommittee.

The first edition of the *Structural Welding Code—Aluminum* (hereafter referred to as this *code*) represented the continuing AWS policy to provide standards for structural welding. This code is provided for the fabrication, erection and manufacturing industries as a set of rules and regulations for the welding of structural aluminum. Some of the more important aspects of this code edition are outlined in the following paragraphs.

Recommended joint details have been prepared for numerous complete joint penetration groove welded joints. Herein lies one of the major differences between the *Structural Welding Code—Steel* and this code. While the steel code allows for prequalified welding procedures, this code does not. This is mainly because of the many and varied possible welding conditions that can be obtained with semiautomatic welding variables most often used with aluminum and the wide range of both heat-treatable and nonheat-treatable alloys that may be welded under this code. Therefore, all of the joint details and the welding procedures used with this code shall be individually qualified and included in the Welding Procedure Specification (WPS).

Procedures and standards are outlined for several methods of nondestructive testing. Methods included are visual, radiographic and dye-penetrant. Ultrasonic testing is permitted, but the procedure and acceptance criteria shall be specified in the contract documents.

This code does not concern itself with such design considerations as the arrangements of parts, loading, and the computation of stresses for proportioning the load-carrying members of a structure and their connection. Such considerations, it is assumed, are covered elsewhere in a general code or specification, such as the *Specification for Aluminum Structures* (The Aluminum Association).

Change in Code Requirements. Underlined text in the clauses, subclauses, tables, figures, or forms indicates a change from the 2014 edition. A vertical line in the margin of a table or figure also indicates a change from the 2014 edition.

This Code was reorganized to follow other AWS Codes. For user readability, see the summary of the clause relocation from the 2014 edition to the 2026 edition.

Summary of Clause Relocation

D1.2:2014 Clauses	D1.2:2026 Clauses
1. General Requirements	1. General Requirements
1.8 Normative References	2. Normative References
1.2 Definitions	3. Terms and Definitions
2. Design	4. Design
3. Qualification	5. Qualification
4. Fabrication	6. Fabrication
5. Inspection	7. Inspection
6. Stud Welding	8. Stud Welding
7. Friction Stir Welding	9. Friction Stir Welding
8. Strengthening and Repair of Existing Structures	10. Strengthening and Repair of Existing Structures

The following is a list of the most significant revisions in the 2026 edition:

Summary of Changes

Clause/Table/Figure/ Annex	Modification
Clause 3	Addition of new terms and definitions such as authority having jurisdiction, contract documents, Contractor drawings, and smut
4.3.1	4.3.1 A detailed list of items that must be in the contract document and Contractor drawings were added.
4.3.2	A detailed list of items that must be in the Contractor drawings were added.
4.4.2.2	The included angle in regard to the size of a PJP groove weld made with GMAW or GTAW regardless of the position of welding is the depth of preparation for V- and bevel-joints was revised.
4.4.5	Clause reworded for clarity
5.7.1.2(2)	Revised for clarity and to include Full Section Pipe
5.7.3.1	Additional language added to clarify the acceptance criteria when base metals of different tensile strengthens are used.
5.10.1	New language added in order to clarify who chooses which Soundness Test for Fillet Welds to use.
5.15.4(2)	Code requirements that used to be contained in the notes to Table 5.7 (previously 3.5) have been eliminated from the Table notes and placed in the Clause.
Table 5.1	The Base Metal Group Designations were converted into a table.
Table 5.2	The Group Numbers for AWS Filler Metal Classifications were converted into a table.
Table 5.3	The WPS Essential Variables for Items 2, 10, 17 were revised for clarity.
Table 5.4	The Table was completely revised for clarity
Table 5.7	The Table was completely revised and breaks down the number and type of tests needed depending on the size of the test groove depth
Figures 5.14 and 5.15	A new note was added to the Figure stating the preferred method of bend testing aluminum weldments is wraparound guided bend jigs.
Figures 5.17 and 5.32	The direction of force has been added to the Macroetch Test Specimen for clarity
6.21.2 and 6.21.3	Extension bars were replaced with weld tabs
6.22.4 and 6.22.4.1	Distortion correction and distortion removal were revised extensively for clarity.
6.26.1 and 6.26.2	New and revised language added regarding in-process cleaning and the cleaning of completed welds.
Table 6.4	The direction of welding can now be uphill or downhill for the GMAW and GTAW processes.
Table 6.5	Additional alloys were added to the Table 2319, 6005A-T61, 1188, 5554 and 5556
7.17	The clause was revised for clarity
10.1	The scope was revised
10.2	The clause was extensively revised for clarity
Annex B Forms	Some of the Recommended CJP Groove Welded Joint detail welding symbols were revised to be in compliance with AWS A2.4. Some of the Recommended CJP and PJP Groove Welded Joint detail angles were adjusted from 60° to 45°

Commentary. The Commentary is nonmandatory and is intended only to provide insightful information into provision rationale.

Normative Annexes. These annexes address specific subjects in this code and their requirements are mandatory requirements that supplement this code's provisions.

Informative Annexes. These annexes are not code requirements but are provided to clarify code provisions by showing examples, providing information, or suggesting alternative good practices.

Index. As in previous codes, the entries in the Index are referred to by subclause number rather than by page number. This should enable the user of the Index to locate a particular item of interest in minimum time.

Errata. It is the Structural Welding Committee's policy that all errata should be made available to users of this code. Therefore, any significant errata will be published in the Society News Section of the AWS *Welding Journal* and posted on the AWS web site at: http://www.aws.org/technical/d1/.

Suggestions. Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, D1 Structural Welding Committee. American Welding Society, 8669 NW 36th Street, #130, Miami, FL 33166.

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Structural Welding Code—Aluminum

1. General Requirements

1.1 Scope

This code contains requirements for fabricating and erecting welded aluminum structures. When this code is stipulated in contract documents, conformance with all requirements of this code is required except those that the Engineer (see 1.4.1) or contract documents modify or exempt.

1.2 Units of Measurement

This standard makes use of both U.S. Customary Units (US) 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.

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 a safety program.

1.4 Responsibilities

1.4.1 Engineer's Responsibilities. The Engineer shall be responsible for the contract documents that govern structures produced under this code. For OEM applications, the Engineer shall specify the responsibilities of the parties involved.

The Engineer shall specify the following in contract documents:

(1) Code requirements that are applicable only when specified by the Engineer.

(2) Additional NDT that is not specifically addressed in this code.

(3) Verification inspection.

(4) Weld acceptance criteria other than those specified in Clause 7.

(5) Whether the structure is statically or cyclically loaded.

(6) Whether PWHT is required and the required strength after PWHT (see C-6.28).

(7) All the items listed in 4.3.1

(8) Additional requirements that are not specifically addressed in this code.

1.4.2 Contractor's Responsibilities. The Contractor is responsible for the qualification, fabrication, and inspection required by this code and the contract documents.

1.4.3 Inspector's Responsibilities

1.4.3.1 Contractor Inspection. Contractor Inspection shall be supplied by the Contractor and shall be performed as necessary to ensure that materials and workmanship meet the requirements of the contract documents.

1.4.3.2 Verification Inspection. The Engineer shall determine if Verification Inspection shall be performed. Responsibilities for Verification Inspection shall be established between the Engineer and the Verification Inspector.

1.5 Approval

All references to approval mean approval by the Authority Having Jurisdiction or the Engineer.

1.6 Welding Symbols

Welding symbols shall be those shown in AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*. Special conditions shall be fully explained by notes or details.

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 Including Terms for Additive Manufacturing, Adhesive Bonding, Brazing, Soldering, Thermal Cutting, Thermal Spraying, and Nondestructive Examination*

AWS A5.10/A5.10M, *Specification for Bare Aluminum and Aluminum-Alloy Welding Electrodes and Rods*

AWS A5.12M/A5.12, *Specification for Tungsten and Oxide-Dispersed Tungsten Electrodes for Arc Welding and Cutting*

AWS A5.32M/A5.32, *Welding Consumables – Gases and Gas Mixtures for Fusion Welding and Allied Processes*

AWS B2.1, *Specification for Welding Procedure and Performance Qualification*

AWS B4.0, *Standard Methods for Mechanical Testing of Welds*

AWS QC1, *Specification for AWS Certification of Welding Inspectors*

Aluminum Association (AA) standards:

AA, *Aluminum Design Manual Specification for Aluminum Structures*

American Society of Mechanical Engineers (ASME) standards:

ASME, *Boiler and Pressure Vessel Code Section V Nondestructive Examination*

ASME B46.1, *Surface Texture (Surface Roughness, Waviness, and Lay)*

ASTM International (ASTM) standards:

ASTM B26/B26M, *Standard Specification for Aluminum-Alloy Sand Castings*

ASTM B108/B108M, *Standard Specification for Aluminum-Alloy Permanent Mold Castings*

ASTM B209, *Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate*

ASTM B210, *Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes*

ASTM B211, *Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire*

ASTM B221, *Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes*

ASTM B241/B241M, *Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube*

ASTM B247, *Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings*

ASTM B308/B308M, *Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles*

ASTM B313/B313M, *Standard Specification for Aluminum and Aluminum-Alloy Round Welded Tubes*

ASTM B361, *Standard Specification for Factory-Made Wrought Aluminum and Aluminum-Alloy Welding Fittings*

ASTM B429/B429M, *Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube*

ASTM B483/B483M, *Standard Specification for Aluminum and Aluminum-Alloy Drawn Tube and Pipe for General Purpose Applications*

ASTM B557, *Standard Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products*

ASTM B618/B618M, *Standard Specification for Aluminum-Alloy Investment Castings*

ASTM B686/B686M, *Standard Specification for Aluminum Alloy Castings, High-Strength*

ASTM B928/B928M, *Standard Specification for High Magnesium Aluminum-Alloy Products for Marine Service and Similar Environments*

ASTM E94/E94M, *Standard Guide for Radiographic Examination Using Industrial Radiographic Film*

ASTM E165/E165M, *Standard Practice for Liquid Penetrant Examination for General Industry*

ASTM E747, *Standard Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology*

ASTM E1032, *Standard Test Method for Radiographic Examination of Weldments*

American Society for Nondestructive Testing (ASNT) standards:

ASNT *Recommended Practice No. SNT-TC-1A: Personnel Qualification and Certification in Nondestructive Testing*

Canadian Standard Association (CSA) standards:

CSA W178.2, *Certification of Welding Inspectors*

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.

authority having jurisdiction (AHJ). Organization, political subdivision, office, or individual charged with the responsibility of administering and enforcing the provisions of this code.

Contractor. "Contractor" is the entity responsible for fabrication in conformance with this code.

contract documents. Contract plans, drawings, and specifications, prepared by the Engineer. (See 1.4.1).

Contractor drawings. Fabrication and erection drawings, prepared by the Contractor. (See 4.3.2).

Contractor's Inspector. "Contractor's Inspector" is the entity who acts for, and in behalf of, the Contractor on all inspection within the scope of this code and the contract documents.

Engineer. A duly designated individual who acts for, and on behalf of the Owner on all matters within the scope of this code.

Inspector (unmodified). When the unmodified term "Inspector" is used, it applies equally to the Contractor's Inspector and the Verification Inspector.

K-connection. Tubular connection in which forces in branch members transverse to the main member are primarily equilibrated by forces in other branch members on the same side of the main member.

may. The word "may" allows the use of requirements that are alternates to this code's requirements. The Contractor may use alternate requirements provided in this code when this code does not require the Engineer's approval.

OEM (Original Equipment Manufacturer). A Contractor that assumes some or all of the responsibilities assigned by this code to the Engineer.

Owner. "Owner" is the entity that exercises legal ownership of the structure produced under this code.

shall. Code provisions that use "shall" are mandatory.

should. Code provisions that use "should" are recommended but not mandatory.

smut. Dark oxide produced by welding.

T-connection. Tubular connection in which the branch member is perpendicular to the main member and in which forces transverse to the main member are primarily equilibrated by shear in the main member.

Verification Inspector. "Verification Inspector" is the entity who acts in behalf of the Owner or Engineer on inspection specified by the Engineer

weld access hole. An opening that permits access for welding, backgouging, or for insertion of backing.

Y-connection. Tubular connection in which the branch member is not perpendicular to the main member and in which forces transverse to the main member are primarily equilibrated by shear in the main member.