

AWS D1.8/D1.8M:2021
An American National Standard



Structural Welding Code— Seismic Supplement



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An American National Standard

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Structural Welding Code— Seismic Supplement

4th Edition

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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 supplements the requirements of AWS D1.1/D1.1M, *Structural Welding Code—Steel*. This code is intended to be applicable to welded joints in Seismic Force Resisting Systems designed in accordance with the AISC Seismic Provisions. Clauses 1–7 constitute a body of rules for the regulation of welding in Seismic Force Resisting Systems. There are seven mandatory annexes in this code. A commentary of the code is included with the document.



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Foreword

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

Background. Damage sustained by welded steel moment-frame buildings in the 1994 Northridge earthquake, and extensive research conducted by the FEMA/SAC program following that earthquake, demonstrated that in order to obtain adequate performance of welded steel structures under conditions of severe earthquake-induced inelastic straining, additional controls on design, detailing, materials, workmanship, testing, and inspection are necessary. This research resulted in substantive changes to the AISC Seismic Provisions, which control the design of steel Seismic Force Resisting Systems (SFRS) designed to withstand severe inelastic straining as well as certain aspects of the materials and detailing of these systems. The provisions contained in this standard complement the AISC Seismic Provisions and are intended to ensure that welded joints that are designed to undergo significant repetitive inelastic strains as a result of earthquakes, or that are used to connect members designed to resist such inelastic strains, have adequate strength, notch toughness, and integrity to perform as intended. This code, together with AWS D1.1/D1.1M, *Structural Welding Code—Steel*, specifies the acceptable materials, procedures, and workmanship for constructing welded joints in SFRS designed in accordance with the AISC Seismic Provisions as well as the procedures and acceptance criteria for quality control and quality assurance inspection of welded joints in the SFRS. In some regions of the U.S., with low risk of intense earthquake shaking, building codes permit design of steel Seismic Force Resisting Systems that do not conform to the requirements of the AISC Seismic Provisions. The requirements of this code apply only to the SFRS in structures designed in accordance with the AISC Seismic Provisions and need not be applied to structures not designed to those provisions.

The first edition of D1.8/D1.8M was published in 2005. The Supplement was revised in 2009 and again in 2016. This is the fourth edition of the AWS D1.8/D1.8M, *Structural Welding Code—Seismic Supplement*.

Editorial and technical revisions from the previous edition are indicated by underlining text. Changes in tables and figures have a single, vertical line in the margin. The following is a list of the most significant revisions from the 2016 edition:

Summary of Changes	
Clause/Table/ Figure/Annex	Modification
Clause 3	The definition of lowest anticipated service temperature (LAST) was revised, and a new definition was added; weld access hole.
Clause 4	Clause 4.3 was re-written to provide specific information about the mockup test. Figure 4.3 was revised and Figure 4.4, a new figure, was added for clarity. The macroetch specimen acceptance criteria was also revised for clarity.
Clause 6	Intermix of FCAW-S Filler Metal was revised to standardize the testing in accordance with Annex B. The Heat Input clause was modified to show the filler metals exempt from the heat input envelope testing in new Tables 6.4 and 6.5 rather than in the text. References to AWS A5.36 were removed as AWS A5.36 has been withdrawn. References to AWS A5.20 -D Designator were removed as they have been removed from AWS A5.20. Figure 6.2 was revised so that you can use it when working with small members and to prevent the slope of the access hole from being too large.
Annex B	Annex B was revised to describe an intermix test for FCAW-S over ESW welds. A new figure was also added to illustrate ESW, FCAW-S intermix test plate setup.

Commentary. The Commentary is nonmandatory and is intended only to provide insight, information, and provision rationale.

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

Errata. All errata to a standard shall be published in the *Welding Journal* and posted on the AWS website (www.aws.org/standards/page/errata).

Suggestions. Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, DIL Subcommittee on Seismic Structures, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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Structural Welding Code—Seismic Supplement

1. General Requirements

This clause addresses the general requirements to be applied for welded joints that are part of the Seismic Force Resisting System (SFRS).

This clause is organized as follows:

1.1 Scope and General Provisions

1.2 Standard Units of Measurement

1.3 Safety Precautions

1.4 Responsibilities

1.5 Limitations

1.6 Welding Symbols

1.1 Scope and General Provisions

The provisions of this code supplement the provisions of AWS D1.1/D1.1M, *Structural Welding Code—Steel*, and shall apply to the design, fabrication, quality control, and quality assurance of welded joints designed in accordance with the *AISC Seismic Provisions for Structural Steel Buildings*. All provisions of AWS D1.1/D1.1M for statically loaded structures shall apply to the designated welds, except as specifically modified herein.

1.2 Standard 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.

1.3 Safety Precautions

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 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