AWS D1.4/D1.4M:2018
An American National Standard

Structural Welding Code—Steel Reinforcing Bars

American Welding Society®

AWS D1.4/D1.4M:2018
An American National Standard

Approved by the
American National Standards Institute
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Structural Welding Code—Steel Reinforcing Bars

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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 covers the requirements for welding steel reinforcing bars in most reinforced concrete applications. It contains a body of rules for the regulations of welding steel reinforcing bars and provides suitable acceptance criteria for such welds.

American Welding Society®

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This standard is subject to revision at any time by the AWS D1 Committee on Structural Welding. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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 D1 Committee on Structural Welding 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 D1 Committee on Structural Welding 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.

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Foreword

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

In 1961, the American Welding Society published its first reinforcing steel welding standard, AWS D12.1-61, *Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction*. The D12 Committee was disbanded some time after publication of the 1961 code and before publication of the 1975 edition.

The 1961 document was replaced with a greatly revised version, AWS D12.1-75, *Reinforcing Steel Welding Code*, with the format patterned after the AWS D1.1-72, *Structural Welding Code*. The 1975 code was produced by the AWS Structural Welding Committee but was not renumbered to reflect this committee change. As with ANSI/AWS D1.1, AWS D12.1-75 was designed as a self-contained code, including within it the qualification of welders and procedures, and requirements for workmanship, quality, and inspection.

The listings of materials and welding processes were revised in the D12.1-75 code. Items newly introduced were the carbon equivalent method for determining preheat, the parenthetical inclusion of metric (SI) conversions, and the two different methods of joint strength determination.

The AWS D12.1-75 document was revised and the title changed to ANSI/AWS D1.4-79, *Structural Welding Code—Reinforcing Steel*. Since the 1979 edition of ANSI/AWS D1.4, *Structural Welding Code—Reinforcing Steel*, was issued, further use by designers, engineers, and fabricators has necessitated a number of changes to the requirements; the 1992, 1998, 2005, and 2011 editions reflected these changes.

The evolution of AWS D1.4/D1.4M, *Structural Welding Code—Steel Reinforcing Bars*, is shown below:

AWS D12.1-61	*Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction;*
AWS D12.1-75	*Reinforcing Steel Welding Code;*
ANSI/AWS D1.4-79	*Structural Welding Code—Reinforcing Steel*;
ANSI/AWS D1.4-92	*Structural Welding Code—Reinforcing Steel*;
ANSI/AWS D1.4-98	*Structural Welding Code—Reinforcing Steel*;
AWS D1.4/D1.4M:2005	*Structural Welding Code—Reinforcing Steel*;
AWS D1.4/D1.4M:2011	*Structural Welding Code—Reinforcing Steel*; and
AWS D1.4/D1.4M:2018	*Structural Welding Code—Steel Reinforcing Bars*.

Changes in Code Requirements. Underlined text in the subclauses, tables, or figures indicates an editorial or technical change from the 2011 edition. A vertical line in the margin indicates a revision from the 2011 edition.

Summary of Changes

Clause/Table/ Figure/Annex	Modification
Clause 1	Restructured to identify new safety and health information; new materials added. GTAW is now permitted as a prequalified welding process.
Clause 2	New clause that lists all normative references. This replaces subclause 1.9 from the 2011 edition.
Clause 3	New clause that provides terms and definitions specific to this standard. It replaces subclause 1.5 from the 2011 edition.
Clause 4	Previously Clause 2 in the 2011 edition. Base metal stresses and allowable stresses in welds were removed and replaced with new content on the design of welded joints. New Table 4.1 covers design strength and the allowable strength of welded joints.
Clause 5	Previously Clause 3 in the 2011 edition. New content on lap joints: bar diameter range, effects of eccentricity, and lap joints in an anchorage. Figures 5.1 through 5.5 modified for clarification.
Clause 6	Previously Clause 4 in the 2011 edition. New content on foreign materials and coatings, weld size. Figures 6.1 revised for clarity. Figure 6.2 extensively revised to include new schedules for weld profiles.
Clause 7	Previously Clause 5 in the 2011 edition. New content on GTAW electrodes and filler metals. Tables 7.1 revised to include several A5 filler metal specifications, most notably AWS A5.36.
Clause 8	Previously Clause 6 in the 2011 edition. Table 8.2 revised to include GTAW, bar diameter groups, and AWS A5.36. Figure 8.5 revised for clarity. Figure 8.8 is new.
Clause 9	Previously Clause 7 in the 2011 edition. Radiographic methodology shall now conform to ASTM E94.
Annex A	Sample forms now include GTAW.
Commentary	Commentary is new for this edition. This is a practice used by other D1 codes and as such will now be included as part of this standard.

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.

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 *Welding Journal* and posted on the AWS web site at: http://www.aws.org/technical/d1/.

Suggestions. Your comments for improving AWS D1.4/D1.4M:2018, *Structural Welding Code—Steel Reinforcing Bars* are welcome. Submit comments to the Managing Director, Standards Development, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166; telephone (305) 443-9353; fax (305) 443-5951; e-mail info@aws.org; or via the AWS web site <http://www.aws.org>.

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Structural Welding Code—Steel Reinforcing Bars

1. General Requirements

1.1 Scope

This code shall apply to the welding of the following:

(1) Steel reinforcing bar to steel reinforcing bar, and

(2) Steel reinforcing bar to carbon or low-alloy structural steel.

When this code is stipulated in contract documents, conformance with all provisions shall be required, except for those provisions that the Engineer or contract documents specifically modifies or exempts.

1.2 Units of Measurement

This standard makes use of both the 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

Safety and health issues and concerns are beyond the scope of this standard; some safety and health information 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 the 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.