AWS D1.3/D1.3M:2018
An American National Standard

Structural Welding Code—Sheet Steel

American Welding Society®

AWS D1.3/D1.3M:2018
An American National Standard

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

6th Edition

Supersedes AWS D1.3/D1.3M:2008

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 associated with welding sheet steel having a minimum specified yield point no greater than 80 ksi [550 MPa]. The code requirements cover any welded joint made from the commonly used structural quality low-carbon hot rolled and cold rolled sheet and strip steel with or without zinc coating (galvanized). Clause 1 includes general provisions, Clause 4 design, Clause 5 prequalification, Clause 6 qualification, Clause 7 fabrication, and Clause 8 inspection.

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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 It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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) that may be of use in improving this standard should be sent to AWS Headquarters. Any pertinent data supporting the comments are required. 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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Dedication

This 6th edition of AWS D1.3/D1.3M, *Structural Welding Code—Sheet Steel*, is dedicated by the D1H Subcommittee on Sheet Steel to John L. Uebele. The Subcommittee is gratefully indebted to John's 24 plus years of service on the subcommittee and his tireless efforts, devotion, and enthusiasm in making the last 3 revisions of D1.3/D1.3M possible. John's intelligence, mentorship, and warm good humor will be missed by all of us.

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Foreword

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

When the first edition of AWS D1.3/D1.3M, *Specification for Welding Sheet Steel in Structures*, was developed and issued in 1978, it was anticipated that changes would be needed in the specification as further research was conducted on sheet steel welded joints. After users' experience with the specification and development of new sheet steel applications, it was revised in 1981, 1989, 1998, 2008, and now in 2017. Also, in the 1981 edition, the title of the standard was changed to AWS D1.3/D1.3M, *Structural Welding Code—Sheet Steel*, to conform with the uniform titles now being given to standards developed by the AWS D1 Committee on Structural Welding. The many changes in this document reflect both experience in using the code and the results of research, principally by the American Iron and Steel Institute's Subcommittee on Sheet Steel.

One of the primary objectives of this code is to define the allowable capacities used in sheet steel applications in which transfer of calculated load occurs. The foremost examples of such applications are steel decks, panels, storage racks, and stud and joist framing members. It is a concurrent objective of this code to impose workmanship, technique, and qualification requirements so as to effect consistently sound execution of welding of joints in these categories.

Certain shielded metal arc, gas metal arc, gas tungsten, gas metal arc, and flux cored arc welding procedure specifications (WPSs) when used with certain types of joints, have been tested by users and have a history of satisfaction performance. These WPSs are designated as prequalified, may be employed without further evidence, and include most of those that are commonly used. However, the purpose of defining prequalified WPSs is not to preclude the use of other WPSs as they are qualified.

When other processes, WPSs, or joints are proposed, they are subject to the applicable provisions of this code and shall be qualified by tests. The obligation is placed on the contractor to prepare WPSs and qualify them before production use.

All WPSs (prequalified and qualified) must include the classification of the filler metal, its size, and for each type of weld, its melting rate or other suitable means of current control indicative of the melting rate, as applicable. The requirements for the qualification of welders and welding operators are also given. A Welder qualification test requires each welder to prove their ability to produce satisfactory welds using prequalified or qualified WPSs.

Although this code is essentially directed at those joints that are used to transfer loads, the quality of welds where strength is not a governing consideration should meet quality standards that will maintain the integrity of the supporting structure. The allowable capacity provisions of Clause 4 could be disregarded when the welds are not used in a loadcarrying capacity.

Underlined text in the subclauses indicates an editorial or technical change from the 2008 edition. A vertical line in the margin next to a figure or table indicates a revision from the 2008 edition.

The following is a summary of the most significant technical revisions contained in D1.3/D1.3M:2018:

Summary of Changes

Clause/Table/Figure/Annex	Modification
Clause 1	Restructured the Clause, added new safety and health information, the addition of Hollow Structural Section (HSS) with wall thickness less than 1/8 in [3 mm] to the Code and the ability to use non low-hydrogen electrodes in a qualified WPS for arc spot, arc seam, and arc plug welds of sheet metal in the flat position to primary structural members thicker than ¼ in [6 mm]. Revised Tables 1.2 and 1.3 and added a new Figure.
Clause 2	This is a new clause listing normative references. It replaces Annex G from the previous edition.
Clause 3	This is a new clause that provides terms and definitions specific to this standard. It replaces subclause 1.6 and Annex D from the previous edition.
Clause 4	Clause 4 was presented as Clause 2 in the previous edition. Provided clarification as to how to determine the load capacities in Clause 4.2. Revised Figures 4.2, 4.7, and 4.8. Added a new Figure for HSS Square Groove Weld in Butt Joint.
Clause 5	Clause 5 was presented as Clause 3 in the previous edition. Revised all the Figures in Clause 5 to indicate t = thickness.
Clause 6	Clause 6 was presented as Clause 4 in the previous edition. Added a scope to Clause 6, provided additional language to Clause 6.7.1.2 for clarification, provided conditions when weld assemblies shall be acceptable after testing, and added a provision for welder qualification regarding One and Two Sided Butt Joints. Revised Tables 6.1–6.4 and added new Figures 6.7–6.8.
Clause 7	Clause 7 was presented as Clause 5 in the previous edition. Substrate cleanliness requirements were significantly revised.
Clause 8	Clause 8 was presented as Clause 6 in the previous edition. Provided an additional requirement to Visual Inspection: Minimum Weld Throat and added language that permits welds exceeding the minimum length or size provided it is documented in the contract documents.
Annex B	The Annex B Forms were revised.

Errata: All errata to a standard shall be published in the *Welding Journal* and posted on the AWS website.

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

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1. General Requirements

1.1 Scope

This code contains the requirements for arc welding of structural sheet/strip steels, including cold formed members, hereafter collectively referred to as "sheet steel," which are equal to or less than 3/16 in [5 mm] in nominal thickness. In addition, welding hollow structural section (HSS) also called tubular members with wall thickness less than 1/8 in [3 mm] are included in the scope of this code. Design requirements for HSS member connections are not in the scope of this code. When this code is stipulated in contract documents, conformance with all its provisions shall be required, except for those provisions that the Engineer or contract documents specifically modifies or exempts.

When used in conjunction with AWS D1.1/D1.1M, conformance with the applicable provisions of Annex A of AWS D1.3/D1.3M shall apply (see also Table 1.1). Two weld types unique to sheet steel, arc spot and arc seam, are included in this code.

1.1.1 Applicable Materials. This code is applicable to the welding of structural sheet steels to other structural sheet steels or to supporting structural steel members.

1.1.2 General Requirements. The fundamental premise of the code is to provide general requirements applicable to any situation. Acceptance criteria for production welds different from those specified in the code shall be permitted for a particular application, provided they are suitably documented by the proposer and approved by the Engineer. These alternate acceptance criteria shall be based upon evaluation of suitability for service using past experience, experimental evidence, or engineering analysis considering material type, service load effects, and environmental factors.

1.1.3 Approval. All references to the need for approval shall be interpreted to mean approval by the Engineer, defined as the duly designated person who acts for and in behalf of the owner on all matters within the scope of this code. Deviations from code requirements shall require the Engineer's approval.

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. Equivalents for gages or fractions are noted within parenthesis throughout the standard.

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