AWS D15.1/D15.1M:2019-AMD1
An American National Standard

Railroad Welding Specification for Cars and Locomotives

American Welding Society®

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An American National Standard

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Railroad Welding Specification for Cars and Locomotives

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Prepared by the
American Welding Society (AWS) D15 Committee on Railroad Welding

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This specification establishes minimum welding standards for the manufacture and maintenance of railcars, locomotives, and their components, intended for North American railroad service. Clauses 4 through 17 cover the general requirements for welding in the railroad industry. Clauses 18 through 23 cover specific requirements for the welding of base metals thinner than 1/8 in [3 mm].

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R. C. Bly	*Consultant*
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S. A. Coughlin	*Consultant*
I. T. Fuller	*Progress Rail*
C. J. Gamblin	*Greenbrier Management Services*
W. Jaxa-Rozen	*Consultant*

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Foreword

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

This specification establishes minimum welding standards for the manufacture and maintenance of railcars, locomotives, and their components, intended for North American railroad service. It was developed and is maintained by the D15 Committee on Railroad Welding of the American Welding Society.

Welding of railroad components is vital to the industry. An investigating committee was formed in 1982 which recommended a Railroad Welding Committee be formed to establish minimum welding standards for the industry. This recommendation was made because of confusion and incompleteness of the existing welding specifications and guides as applied to the railroad industry needs. The committee is made up of individuals from all segments of the railroad industry: both users and suppliers, the general public, and representatives of the Association of American Railroads.

The purpose of this specification is to provide a single comprehensive document of welding data that will be used throughout the railroad industry. Also, it should contribute to improvements in welding quality and performance.

AWS D15.1-86 was titled simply *Railroad Welding Specification*. For the 1993 revision, the suffix *Cars and Locomotives* was added because the locomotive section had been introduced. A later revision was published in 2001, AWS D15.1:2001. The welding of rail is addressed in AWS D15.2/D15.2M, *Recommended Practice for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*.

Several significant modifications have been made in AWS D15.1/D15.1M:2019. A vertical line in the margin or underlined text in clauses, tables, or figures indicates an editorial or technical change from the 2012 edition. Limitations of essential variables for welding procedure qualification and welder performance qualification have been set up in table format (Tables 10.1 and 11.1, respectively). Friction stir welding has been included in the list of approved welding processes. Additional prequalified joint details for FCAW and GMAW have been added (see Figures 7.1G and 7.2A). Table 17.1 (Weld Crater Limitations) has been added. Clause 18 (Welding of Sheet Metal) has been revised.

This amendment to AWS D15.1/D15.1M:2019 includes additional changes to Table 10.1.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary of the AWS D15 Committee on Railroad Welding, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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Amendments

The following amendments have been identified and are incorporated in this reprint.

AWS Standard: D15.1/D15.1M:2019

Amendment Number: 1

Subject: Table 10.1, *PQR Essential Variable Changes Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, FW, and GTAW (See 10.1)*

Page 92—Addition of (b) to Table 10.1 (5) as follows:

Table 10.1
PQR Essential Variable Changes Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, GTAW, and FW (See 10.1)

	Process					
Essential Variable Changes to PQR Requiring Requalification:	SMAW	SAW	GMAW	FCAW	GTAW	FW
Base Metal, Backing Bar, Filler, Spacer Strips, and Run-off Tabs						
(4) For M1 material, a change to a higher group number (see AWS B2.1/B2.1M and/or Annex A for M number classifications)	X	X	X	X	X	
(5) A change from one "M" number to another "M" number or to an unlisted base metal, unless: (a) the unlisted base metal can be shown to have mechanical properties in the same range and a similar chemical composition within the same range as verified by the Fabricator's Engineer (b) the test coupon qualified as M10C to M10C, which also qualifies M1 to M1, but not vice versa	X	X	X	X	X	

Page 92—Delete "X" from FW column in Table 10.1 (5)

Pages 92–97—Change title of Table 10.1 from "*PQR Essential Variable Changes Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, FW, and GTAW (See 10.1)*" to "*PQR Essential Variable Changes Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, GTAW, and FW (See 10.1)*"

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Railroad Welding Specification for Cars and Locomotives

1. General Requirements

1.1 Scope. This specification covers the minimum welding requirements applicable to railcars, locomotives, and their components, intended for North American railroad service. For welding tank car tanks, refer to Association of American Railroads (AAR) *Manual of Standards and Recommended Practices*, *Section C-III, Specifications for Tank Cars, Specification M-1002*.

1.2 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. 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:

(1) Federal Railroad Administration

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 to, or revisions of, any of these publications do not apply.