

AWS D15.1/D15.1M:2007
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 standards for the manufacture and maintenance of railroad equipment. Clauses 4 through 17 cover the general requirements for welding in the railroad industry. Clauses 18 through 24 cover specific requirements for the welding of base metals thinner than 1/8 in [3 mm].



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Foreword

This foreword is not part of AWS D15.1/D15.1M:2007, *Railroad Welding Specification for Cars and Locomotives*, but is included for informational purposes only.

This specification establishes minimum standards for the manufacture and maintenance of railroad equipment. 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. This document includes data from AWS D1.1, *Structural Welding Code—Steel*; AWS D1.2, *Structural Welding Code—Aluminum*; AWS D1.3, *Structural Welding Code—Sheet Steel*; and AWS D1.6, *Structural Welding Code—Stainless Steel*.

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, *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:2007. A vertical line in the margin indicates a revision from the 2001 edition. The document has incorporated SI Units within the text as well as all figures and tables in order to create a dual dimension standard. The overall format of AWS D15.1/D15.1M:2007 has changed; thus, all clauses as well as figure and table notations throughout the document have been altered to comply with the new style. Also important to note, Annex A—Base Metal Groupings, Annex E—Glossary, Annex F—Safety Considerations, and finally Annex H—Metric Tables and Figures from AWS D15.1:2001 have all been removed in this edition. Additions in AWS D15.1/D15.1M:2007 include a new Annex A—Alternate Base Material Specifications (Steel) and a Figure 7.2K—Prequalified Partial Joint Penetration (PJP) Groove Weld Joint Details. The section on Inspection—General Requirements, Clauses 14 through 17, has been updated along with Figure 8.1—Weld Pass in Which Depth and Width Exceed the Width of the Weld Face, Table 8.1—Prequalified Base Metal—Filler Metal Combinations for Matching Strength, Table 8.2—Prequalified Minimum Preheat and Interpass Temperature (Steel), and Table 10.1—Procedure Qualification—Number and Type of Specimens and Range of Thickness Qualified—Complete Joint Penetration (CJP) Groove Weld.

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Railroad Welding Specification for Cars and Locomotives

1. Scope

1.1 This specification covers the minimum welding requirements applicable to welded structures used in the railroad industry. It is not intended to apply to tank car tanks nor to the welding of rails. Recommended practices for welding railroad rails and related components are included in D15.2, *Recommended Practice for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*. Specifications for welding tank car tanks and components welded directly thereto are outlined in the *AAR Manual of Standards and Specifications for Welding*, Section C—Part III, Specification M-1002 (AAR M-1002 C-III).

1.2 Welding symbols shall be those shown in the latest edition of AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*.

1.3 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 the appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system must be used independently.

1.4 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 other sources, including, but not limited to, ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, and applicable federal, state, and local regulations.

1.5 This specification may involve hazardous materials, operations, and equipment. The specification does not purport to address all of the safety problems associated with its use. It is the responsibility of the user to establish safety and health practices. The user should determine the applicability of any regulatory limitations prior to use.

2. Normative References

The standards listed below contain provisions, which, through reference in this text, constitute mandatory provisions of this AWS standard. 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.

AWS documents:¹

AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*

AWS A3.0, *Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*

AWS A5.01/A5.01M, *Filler Metal Procurement Guidelines*

AWS A5.1/A5.1M, *Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding*

AWS A5.5/A5.5M, *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*

AWS A5.9/A5.9M, *Specification for Bare Stainless Steel Welding Electrodes and Rods*

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

AWS A5.17/A5.17M, *Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding*

AWS A5.18/A5.18M, *Specification for Carbon Steel Filler Metals for Gas Shielded Arc Welding*

AWS A5.20/A5.20M, *Specification for Carbon Steel Electrodes for Flux Cored Arc Welding*

¹ AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.