



Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles



American Welding Society®



**AWS D15.2/D15.2M:2013
An American National Standard**

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American National Standards Institute
October 30, 2012**

Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles

3rd Edition

Supersedes AWS D15.2:2003

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 document recommends the minimum standards for the welding of rails and related rail components used by rail vehicles. Repair procedures for rails and austenitic manganese steel components are covered. Thermite welding and electric flash welding guidelines are discussed. Procedure qualification, welder qualification, and general welding safety procedures are addressed.



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Foreword

This foreword is not part of AWS D15.2/D15.2M:2013, *Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*, but is included for informational purposes only.

This recommended practice establishes standards for the joining, repair, maintenance and inspection of rail welds, and the welding of related rail components. It was developed and is maintained by the Subcommittee on Track Welding within the AWS Committee on Railroad Welding.

The welding of rails and related rail components for use by rail vehicles is vital to the safe and economical operation of American railroads. This subcommittee has endeavored to develop these recommended practices to serve as a guideline for the railroad and related industries in the establishment of track welding specifications. The subcommittee is made up of individuals from all segments of the railroad industry, both users and suppliers, and representatives of both the Association of American Railroads and the American Railway Engineering and Maintenance-of-Way Association.

The purpose of this document is to provide a single comprehensive source of information that will be used throughout the railroad industry. It should act as a guideline towards improving welding quality through the economical joining and repair of rail and rail components.

The evolution of AWS D15.2, *Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*, is shown below:

ANSI/AWS D15.2-94, *Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*

AWS D15.2:2003, *Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D15 Committee on Railroad Welding, American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.

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Recommended Practices for the Welding of Rails and Related Rail Components for Use by Rail Vehicles

1. General Requirements

1.1 Scope. This document recommends standards for joining, repair, maintenance, inspection of rail welds, and related rail components. For the purposes of this document, rails include railroad rails, crane rails, guard rails, electrical contact rails, girder rails, and retarder rails. Classification of rails is based on the American Railway Engineering and Maintenance-of-Way Association (AREMA) specifications governing the manufacture of rails.

Related rail components include rail crossings and turnouts which further include switch points, stock rails, switch point guards, spacer blocks, connecting rods, switch rods, plates, frogs, and frog components.

The use of track components reconditioned by welding is a decision of the rail owner outside the scope of this document. This document does not include road bed maintenance except where it affects the expected life of the repair.

Welding processes addressed in this document include shielded metal arc welding (SMAW), gas metal arc welding (GMAW), flux cored arc welding (FCAW), flash welding (FW), and thermite welding (TW). See Annex A and the *Welding Handbook*, Volumes 2 and 3, Ninth Edition for details on these processes.

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) Material Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers

Applicable Regulatory Agencies

- (1) *Code of Federal Regulations (CFR), Title 49, Part 214, Railroad Workplace Safety.*

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 standards listed below contain provisions that, 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.

American Welding Society (AWS) documents:¹

- AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination*;
- AWS A3.0M/A3.0, *Standard Welding Terms and Definitions*;
- AWS A5.13/A5.13M, *Specification for Surfacing Electrodes for Shielded Metal Arc Welding*;
- AWS A5.21/A5.21M, *Specification for Composite Surfacing Welding Rods and Electrodes*;
- AWS B1.10M/B1.10, *Guide for the Nondestructive Examination of Welds*;
- AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*;
- AWS D15.1/D15.1M, *Railroad Welding Specification for Cars and Locomotives*; and
- AWS *Welding Handbook*, Volumes 2 and 3, Ninth Edition.

American National Standards Institute (ANSI) document:²

- ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*

American Railway Engineering and Maintenance-of-Way Association (AREMA) document:³

- AREMA Manual for Railway Engineering*, Chapter 4, *Rail*.

ASTM International documents:⁴

- ASTM A36/A36M, *Standard Specification for Carbon Structural Steel*;
- ASTM E140, *Standard Hardness Conversion for Metals (Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness)*;
- ASTM E164, *Standard Practice for Contact Ultrasonic Testing of Weldments*;
- ASTM E1417, *Standard Practice for Liquid Penetrant Testing*; and
- ASTM E709, *Standard Guide for Magnetic Particle Testing*.

Code of Federal Regulations (CFR) document:⁵

- Code of Federal Regulation*, Title 49 (Transportation), Volume 4, Chapter 2, Parts 200–299.

3. Terms and Definitions

AWS A3.0M/A3.0, *Standard Welding Terms and Definitions, Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*, provides the basis for terminology used herein.

¹ AWS documents are published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.

² This ANSI standard is published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.

³ AREMA documents are published by the American Railway Engineering and Maintenance-of-Way Association, 10003 Derekwood Lane, Suite 210, Lanham, MD 20706–4875.

⁴ ASTM International standards are published by ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428–2959.

⁵ Federal regulations are published by the U.S. Government Bookstore, Wells Fargo Building, 201 West 8th, Pueblo, CO 81003, or <http://www.gpo.gov/>.