

**AWS D14.1/D14.1M:2005**  
**An American National Standard**



# **Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment**



**American Welding Society**

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**Key Words**—Cranes, industrial cranes, lifting devices, material handling equipment, mill cranes

**AWS D14.1/D14.1M:2005  
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# **Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment**

**4th Edition**

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Prepared by  
AWS D14 Committee on Machinery and Equipment

Under the Direction of  
AWS Technical Activities Committee

Approved by  
AWS Board of Directors

## **Abstract**

Requirements are presented for the design and fabrication of constructional steel weldments that are used in industrial and mill cranes, lifting devices and other material handling equipment. Requirements are also included for modification, weld repair, and postweld treatments of new and existing weldments. Filler metal and welding procedure guidelines are recommended for the applicable base metals, which are limited to carbon and low-alloy steels. Allowable unit stresses are provided for weld metal and base metal for various cyclically loaded joint designs.



**American Welding Society**

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## Foreword

(This Foreword is not a part of AWS D14.1/D14.1M:2005, *Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment*, but is included for informational purposes only.)

This specification was prepared for the overhead crane and material handling industries to continue the advancement of welding and to increase product reliability. This 4th edition provides revisions to ANSI/AWS D14.1-97, *Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment*, under the direction of the AWS Machinery and Equipment Committee.

The participating committee, representing manufacturers, users, and government, joined in the preparation of this document. It will provide all concerned, including the general public, with high quality, reliable products and an economical approach to production, consistent with the industry's capabilities.

This specification will be reviewed periodically to assure its success in serving all parties concerned with its provisions. Revisions will be issued when warranted.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D14 Committee on Machinery and Equipment, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

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# Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment

## 1. Scope and General Provisions

**1.1 Scope.** This specification applies to the welding of all principal structural weldments and all primary welds used in the manufacture of cranes for industrial, mill, power house, and nuclear facilities. Furthermore, the specification applies to other overhead material handling machinery and equipment that support and transport loads within the design rating, vertically or horizontally, during normal operations, and, when agreed upon between the Owner and Manufacturer, to loading caused by abnormal operations or environmental events, such as seismic loading.

Secondary welds that will be subjected to tensile stresses of less than 5000 psi [34.5 MPa] need only meet the requirements of Section 7, Workmanship, and Section 10, Weld Quality and Inspection. The engineering drawings shall specify the joint detail, type, and size of weld. This specification is not intended for application to construction- or crawler-type cranes. For the welding of rails, refer to AWS D15.2, *Recommended Practice for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*.

All provisions of this specification are equally applicable to the strengthening and repairing of existing overhead cranes and material handling equipment as described above.

This specification makes use of both U.S. Customary Units and the International System of Units (SI). The measurements may not be exact equivalents; therefore each system shall be used independently of the other without combining in any way. The specification with the designation D14.1 uses U.S. Customary Units. The specification D14.1M uses SI Units. The latter are shown in appropriate columns in tables and figures or within brackets [ ]. Detailed dimensions on figures are in inches. A separate tabular form that relates the U.S. Customary Units with SI Units may be used in tables and figures.

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 and state regulations. Some other sources of safety and health information can be found in Annex D.

**1.2 General Provisions.** The Manufacturer's<sup>1</sup> adherence to this specification shall include responsibility for the following:

- (1) Welding, as defined in the Scope, in accordance with this specification;
- (2) Producing the welds designated on the drawings by appropriate welding symbols and notes containing sufficient detail to show joint preparations compatible with the designated welding processes;
- (3) Providing written welding procedures;
- (4) Recording results of all procedure and welder qualification tests;
- (5) Controlling the use of designated base metals and consumables; and
- (6) Inspecting the welds to the requirements of this specification.

**1.2.1 Acceptance.** Acceptance shall be as agreed upon between the Manufacturer and the Owner (purchaser). The fundamental premise of this specification is to provide general stipulations applicable to most situations. Acceptance criteria for production welds different from those stated in this specification may be used for a particular application, provided they are suitably documented by the proposer and approved by the Engineer. These alternate acceptance criteria can 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.

<sup>1</sup> Manufacturer refers to the organization responsible for the performance of the work covered by this specification (see definition in Section 3).