

AWS D16.1M/D16.1:2018
An American National Standard

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Specification for **Robotic Arc Welding Safety**

2nd Edition

Supersedes AWS D16.1M/D16.1:2004 (R2016)

Prepared by the
American Welding Society (AWS) D16 Committee on Robotic and Automatic Welding

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This standard establishes safety requirements with respect to the design, manufacture, maintenance, and operation of arc welding robot systems and ancillary equipment. It also helps to identify and minimize hazards involved in maintaining, operating, integrating, and setting up of arc welding robot systems.



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This standard is subject to revision at any time by the AWS D16 Committee on Robotic and Automatic Welding. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS D16 Committee on Robotic and Automatic 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 D16 Committee on Robotic and Automatic 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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Foreword

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

The AWS D16 Committee on Robotic and Automatic Welding was organized in 1985 to provide a centralized source for the exchange of technical information between manufacturers, installers, integrators, and operators of robotic and automated equipment. It has developed a number of standards related to robotic arc welding systems and their applications (see Annex A).

The first edition of AWS D16.1M/D16.1:2004, *Specification for Robotic Arc Welding Safety*, was initially published in 2004. This second edition provides updated guidelines for the safe use of arc welding robots. Although safe practices for arc welding are covered in many standards, this standard focuses on safety aspects unique to robotic arc welding applications.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D16 Committee on Robotic and Automatic Welding, American Welding Society, 8669 NW 36 St, # 130, Miami FL 33166.

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Specification for Robotic Arc Welding Safety

1. General Requirements

1.1 Scope. The requirements of this standard apply to industrial robot systems that are used to perform the gas metal arc welding (GMAW) with solid or metal cored wires, and flux cored arc welding (FCAW) processes. The purpose of this standard is to establish minimum safety requirements with respect to the design, manufacture, maintenance, and operation of arc welding robot systems and ancillary equipment. It is also designed to help identify and minimize hazards involved in maintaining, operating, and setting up of arc welding robot systems. This standard includes principles that may be applied to robotic systems with other arc welding processes.

A typical industrial arc welding robot system is illustrated in Figure 1. There may be other accessories that are outside the scope of this document.

1.1.1 Applications

1.1.1.1 New or Remanufactured Installations. The requirements of this standard pertaining to design and manufacture shall apply to all new or remanufactured arc welding robot systems, fixtures, and ancillary equipment manufactured for installation or installed after the compliance date subsequent to the ANSI approval date of this standard. Compliance to the standard shall be 12 months after the ANSI approval date.

1.1.1.2 Existing or Rebuilt Installations. Existing installations or the repair or rebuilding thereof shall be compliant with the standards in effect at the time of their original installation. Modifications to fixtures, end-of-arm devices, or ancillary equipment shall be reviewed for the creation of new hazards. Such new hazards shall be safeguarded in accordance with the applicable clauses of this standard.

1.1.1.3 All Installations. The requirements of Clauses 7 and 8 of this standard pertaining to the use and maintenance of arc welding robot systems shall apply to all users subsequent to the specification of this standard.

1.1.2 Exclusions. This standard applies to arc welding robot systems and is not intended to apply to the following machines:

- (1) Non arc welding robots
- (2) Automated guided vehicle systems
- (3) Undersea and space robotics
- (4) Automatic conveyor and shuttle systems
- (5) Teleoperators
- (6) Mobile robots
- (7) Resistance welding robots

This list is not intended to be all-inclusive.

1.1.3 Responsibilities. The responsibility for the application of this standard is defined by this standard.

1.1.3.1 Manufacturer or Remanufacturer. It shall be the responsibility of the arc welding robot machine manufacturer or remanufacturer to design and construct the arc welding robot system in accordance with Clause 4 of this standard.

1.1.3.2 Rebuilder or Modifier. It shall be the responsibility of any person rebuilding or modifying arc welding robot systems to do so in accordance with portions of Clause 4 of this standard applicable to components being rebuilt or modified.