AWS D16.3M/D16.3:2009
An American National Standard

Risk Assessment Guide for Robotic Arc Welding

American Welding Society

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Risk Assessment Guide for Robotic Arc Welding

2nd Edition

Supersedes AWS D16.3M/D16.3:2001

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

AWS D16.3M/D16.3:2009, *Risk Assessment Guide for Robotic Arc Welding*, provides recommendations and guidelines for the safe implementation of robotic arc welding. Emphasis is placed on conformance of this process with prevailing industry standards for hazard analysis and proper safeguarding.

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Foreword

This foreword is not part of AWS D16.3M/D16.3:2009, *Risk Assessment Guide for Robotic Arc Welding*, 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, and operators of robotic and automated arc welding equipment.

AWS D16.3 was initially published in 2001. This second edition has been updated with the latest terms and guidelines and has been reformatted to meet the latest AWS specifications for standards.

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, 550 N.W. LeJeune Road, Miami, FL 33126.

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Risk Assessment Guide for Robotic Arc Welding

1. Scope

The purpose of D16.3M/D16.3:2009, *Risk Assessment Guide for Robotic Arc Welding,* is to identify and evaluate potential safety hazards associated with robotic arc welding. It is not intended to be a guideline for other robotic applications. This guide is intended for persons performing risk assessment and applies to arc welding robots and robot arc welding systems performing the gas metal arc welding (GMAW) or flux cored arc welding (FCAW) process.

It is not intended to be a guideline for other robotic applications, such as:

(1) Automatic guided vehicle systems,

(2) Undersea and space robots,

(3) Automatic conveyor and shuttle systems,

(4) Teleoperators,

(5) Mobile robots, and

(6) Multiple robots.

This standard makes use of both the International System of Units (SI) and U.S. Customary Units. 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.

The inclusion of all safety, health issues, and concerns are beyond the scope of any one document 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.

2. Normative References

The following standards contain provisions, which through reference in this text, constitute 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]

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

AWS A3.0, *Standard Welding Terms and Definitions*

Other Documents

RIA R15.06, *American National Standard for Industrial Robot and Robot Systems—Safety Requirements*.[2]

3. Definitions

Terms used in this document are in accordance with AWS 3.0, *Standard Welding Terms and Definitions*. In addition, for the purposes of this document, the following terms and definitions apply:

application program. The set of instructions that define the specific intended tasks of robots and robot systems. This program may be originated and modified by the robot user.

audible alarm. An electrical or mechanical signal, clearly discernible above environmental noise, indicating a condition requiring the operator's attention.

automatic mode. The robot state in which automatic operation can occur.

automatic operation. The state in which the robot is executing its programmed task as intended.

barrier. A physical means of isolating a hazard or defining a space.

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

[2] RIA standards are published by the Robotic Industries Association, 900 Victors Way, P.O. Box 3724, Ann Arbor, MI 48106.