Abstract

This guide contains recommendations for establishing a thermal spray operator qualification program. Information related to training, knowledge and skill testing, and coating system inspection methods is provided. Example thermal spray operator qualification tests (TSOQT) parameters and forms are provided, to address common engineering and corrosion control applications using arc, flame, atmospheric plasma, and high velocity oxygen fuel (HVOF) spray processes.
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Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the appropriate technical committee. Such requests should be addressed to the American Welding Society, Attention: Managing Director, Standards Development, 8669 NW 36 St, # 130, Miami, FL 33166 (see Annex D). With regard to technical inquiries made concerning AWS standards, oral opinions on AWS standards may be rendered. These opinions are offered solely as a convenience to users of this standard, and they do not constitute professional advice. Such opinions represent only the personal opinions of the particular individuals giving them. These individuals do not speak on behalf of AWS, nor do these oral opinions constitute official or unofficial opinions or interpretations of AWS. In addition, oral opinions are informal and should not be used as a substitute for an official interpretation.

This standard is subject to revision at any time by the AWS C2 Committee on Thermal Spraying. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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 requested and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS C2 Committee on Thermal Spraying 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 C2 Committee on Thermal Spraying 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 information purposes only.

The purpose of this document is to provide a guide for companies, agencies, and institutions, to create a program for qualifying thermal spray operators. Such qualification programs are frequently employer or site specific, to address a unique set of thermal spray processes, procedures, equipment, coating systems, and customer or contract requirements. The objective is to share common and best practices related to the structure, execution, and maintenance of qualification programs.

Previous editions of the document are as follows:

ANSI/AWS C2.16-78, Guide for Thermal Spray Operator and Equipment Qualification
ANSI/AWS C2.16-92, Guide for Thermal Spray Operator Qualification

This edition has been extensively revised and reformatted to clarify the intent and readability. Because of this, the vertical line in the margin or underlined text in clauses, tables, or figures common to AWS standard revisions has not been applied to indicate editorial or all technical changes from the previous edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS C2 Committee on Thermal Spraying, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.
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Guide for Thermal Spray Operator Qualification Programs

1. General Requirements

1.1 Scope. This guide contains recommendations for establishing, conducting, and maintaining a thermal spray operator qualification program. Such programs generally include training, knowledge and skill testing, and documentation requirements. The skill tests described in this guide relate to flame spraying, arc spraying, atmospheric plasma spraying, and high velocity oxygen fuel (HVOF) spraying.

While this guide does not preclude the possibility to establish a qualification program for operators of automatic thermal spray equipment, the examples in this guide assume the objective is to qualify operators who develop process parameters, apply the thermal spray process, and evaluate the effectiveness of the coating process.

This document is not to be used as a stand-alone document for operator qualification or certification. An operator would not be “qualified in accordance with AWS C2.16/C2.16M” as this document does not address relevant acceptance standards. However, a qualification program can state that it follows the guidelines of AWS C2.16/C2.16M.

Although this guide is not written with mandatory requirements, mandatory language, such as the use of “shall,” will be found in those portions of the document where failure to follow the instructions or procedures could produce inferior, misleading, or unsafe results.

1.2 Exclusion. AWS C2.16/C2.16M does not preclude an employer or contractor from continuing to qualify thermal spray operators in accordance with any established qualification program or the requirements of standards such as:

(2) MIL-STD-1687, Thermal Spray Processes for Naval Ship Machinery Applications.
(3) Various original equipment manufacturers’ (OEM) or after-market repair, thermal spray process, and spray specifications.
(4) ISO 14918, Thermal spraying—Approval testing of thermal sprayers.

1.3 Units of Measurement. This guide 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.

1.4 Safety. 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 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) Safety Data Sheets supplied by materials manufacturers
(2) Operating Manuals supplied by equipment manufacturers