AWS B2.4:2012
An American National Standard

Specification for Welding Procedure and Performance Qualification for Thermoplastics

American Welding Society®

Approved American National Standard
ANSI

AWS B2.4:2012
An American National Standard

Approved by the
American National Standards Institute
April 10, 2012

Specification for Welding Procedure and Performance Qualification for Thermoplastics

2nd Edition

Supersedes AWS B2.4:2006

Prepared by the
American Welding Society (AWS) B2 Committee on Welding Qualification

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This specification provides the requirements for qualification of welding procedure specifications, welders, and welding operators for manual, semiautomatic, mechanized, and automatic welding. The welding processes included are electrofusion, hot gas, socket fusion, butt contact fusion, infrared, extrusion welding, flow fusion welding, and solvent cement welding. Base materials, filler materials, qualification variables, and testing requirements are also included.

American Welding Society®
550 N.W. LeJeune Road, Miami, FL 33126

Statement on the Use of American Welding Society Standards

All standards (codes, specifications, recommended practices, methods, classifications, and guides) of the American Welding Society (AWS) are voluntary consensus standards that have been developed in accordance with the rules of the American National Standards Institute (ANSI). When AWS American National Standards are either incorporated in, or made part of, documents that are included in federal or state laws and regulations, or the regulations of other governmental bodies, their provisions carry the full legal authority of the statute. In such cases, any changes in those AWS standards must be approved by the governmental body having statutory jurisdiction before they can become a part of those laws and regulations. In all cases, these standards carry the full legal authority of the contract or other document that invokes the AWS standards. Where this contractual relationship exists, changes in or deviations from requirements of an AWS standard must be by agreement between the contracting parties.

AWS American National Standards are developed through a consensus standards development process that brings together volunteers representing varied viewpoints and interests to achieve consensus. While the AWS administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its standards.

AWS disclaims liability for any injury to persons or to property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this standard. AWS also makes no guarantee or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this standard available, AWS is neither undertaking to render professional or other services for or on behalf of any person or entity, nor is AWS undertaking to perform any duty owed by any person or entity to someone else. Anyone using these documents should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. It is assumed that the use of this standard and its provisions is entrusted to appropriately qualified and competent personnel.

This standard may be superseded by the issuance of new editions. This standard may also be corrected through publication of amendments or errata. It may also be supplemented by publication of addenda. Information on the latest editions of AWS standards including amendments, errata, and addenda are posted on the AWS web page (www.aws.org). Users should ensure that they have the latest edition, amendments, errata, and addenda.

Publication of this standard does not authorize infringement of any patent or trade name. Users of this standard accept any and all liabilities for infringement of any patent or trade name items. AWS disclaims liability for the infringement of any patent or product trade name resulting from the use of this standard.

The AWS does not monitor, police, or enforce compliance with this standard, nor does it have the power to do so.

On occasion, text, tables, or figures are printed incorrectly, constituting errata. Such errata, when discovered, are posted on the AWS web page (www.aws.org).

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, Technical Services Division, 550 N.W. LeJeune Road, Miami, FL 33126 (see Annex C). 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 B2 Committee on Welding Qualification. 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 B2 Committee on Welding Qualification 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 B2 Committee on Welding Qualification 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, 550 N.W. LeJeune Road, Miami, FL 33126.

Personnel

AWS B2 Committee on Procedure and Performance Qualification

J. J. Fluckiger, Chair	*Idaho National Laboratory*
J. L. Cooley, 1st Vice Chair	*J. C. and Associates, Incorporated*
E. W. Beckman, 2nd Vice Chair	*International Training Institute*
A. Diaz, Secretary	*American Welding Society*
D. M. Allbritten	*GE Equipment Services—Rail*
L. P. Connor	*Consultant*
D. W. Craig	*Computer Engineering, Incorporated*
W. D. Doty	*Doty and Associates, Incorporated*
E. H. Gray	*U.S. Nuclear Regulatory Commission*
B. J. Hable	*Ford Motor Company*
M. Herrle	*Arise, Incorporated*
K. G. Kofford	*Idaho National Laboratory*
R. A. LaFave	*Consultant*
K. Y. Lee	*U.S. Department of Transportation*
G. S. Michels	*Summit Consulting*
A. S. Olivares	*HSB Global Standards*
J. F. Pike	*NASA Langley Research Center*
W. M. Ruof	*Bechtel Plant Machinery, Incorporated*
J. J. Sekely	*Welding Services, Incorporated*
M. R. Stone	*Canadian Welding Bureau*
G. M. Wisbrock, Jr.	*Consultant*
R. K. Wiswesser	*Welder Training and Testing Institute*

Advisors to the AWS B2 Committee on Procedure and Performance Qualification

W. L. Ballis	*Consultant*
J. D. Duncan	*Consultant*
N. K. Kanaya	*BEAR Testing Laboratory*
B. B. MacDonald	*Consultant*
A. W. Sindel	*Alstom Power Thermal Systems*
C. E. Speader, Jr.	*Consultant*
W. J. Sperko	*Sperko Engineering Services*
R. F. Waite	*Consultant*

AWS B2F Subcommittee on Plastic Welding Qualification

L. T. Hutton, Chair	*ARKEMA Incorporated*
J. Leary, 1st Vice Chair	*Widos Welding*
G. Hopkins, 2nd Vice Chair	*Plastek Werks*
S. P. Hedrick, Secretary	*American Welding Society*
K. Argasinski	*Solvay Solexis Incorporated*
R. Basile	*AB Plastics*
M. Callahan	*United Association Local 290*
D. Chandler	*Engiplast Incorporated*

AWS B2F Subcommittee on Plastic Welding Qualification (Continued)

J. Craig	*McElroy Manufacturing, Incorporated*
P. Demchko	*Solvay Solexis Incorporated*
J. J. Fluckiger	*Idaho National Laboratory*
S. M Gardiner	*IPS Corporation*
D. P. Glavin	*United Association Local 449*
B. B. MacDonald	*Consultant*
P. F. Martin	*United Association*
G. Sample	*Georg Fischer*
J. Sciadini	*Tech South, Incorporated*
K. C. Thomas	*Quadrant EPP*
M. J. Troughton	*TWI*
D. Ziegler	*Wegener Welding LLC*
P. Zitkus	*Wegener Welding LLC*

Advisors to the AWS B2F Subcommittee on Plastic Welding Qualification

J. Hessel	*Hessel Ingenieurtechnik GmbH*
R. James	*International Training Institute*
A. Lopez	*Dow Chemical*
J. J. Sekely	*Welding Services, Incorporated*
G. M. Wisbrock, Jr.	*Lockheed Martin Missiles and Fire Control*

Table of Contents

List of Tables

List of Figures

Specification for Welding Procedure and Performance Qualification for Thermoplastics

1. Scope and General Provisions

1.1 Scope. This standard provides the requirements for qualification for welding thermoplastic materials. It addresses requirements for procedure and performance qualifications. This standard is intended for use where referenced by product or fabrication code, specification, contract document, or internal documents such as quality control or quality assurance manuals. The requirements imposed by the Referencing Document supersede the requirements of this standard.

This standard is intended for use with the following thermoplastic welding processes:

Socket Fusion Welding (SFW)

Heated Tool Butt Welding (HT)

Flow Fusion Welding (FFW)

Electrofusion Welding (EFW)

Infrared Welding (IRW)

Hot Gas Welding (HGW)

Speed Welding (HS)

Fan Welding (HF)

Extrusion Welding (EX)

Solvent Cement Welding (SCW)

This standard is intended for use with new construction but may be applicable for retrofit, reconstruction, or repair procedures. Thermoplastic applications that are bonded to backing materials are not addressed in this standard.

This standard makes sole use of U.S. Customary Units. Approximate mathematical equivalents in the International System of Units (SI) are provided for comparison in parentheses or in appropriate columns in tables and figures.

1.2 Responsibilities

1.2.1 Employers shall be responsible for the welding performed by their organization, including the use of the general provisions of this standard, the use of qualified welding procedures, the use of qualified welders, and the use of qualified welding operators.

1.2.2 It is the employer's responsibility to assure that Welding Procedure Specifications meet all requirements of the Referencing Document.

1.3 Effective Date. When not otherwise specified by the Referencing Document, the edition of this specification to be used should be established in accordance with the following:

(1) Editions may be used at any time after the effective date of issue;

(2) Latest edition of this document should be used for new contracts; and

(3) Editions established by contract date may be used during the entire term of the contract, or the provisions of later editions may be used when agreed upon by the contracting parties.