



# Base Metal Grouping for Welding Procedure and Performance Qualification



**American Welding Society®**



# Base Metal Grouping for Welding Procedure and Performance Qualification

3rd Edition

Supersedes AWS B2.1-B2.1M-BMG:2009-ADD1

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

Under the Direction of the  
AWS Technical Activities Committee

Approved by the  
AWS Board of Directors

## Abstract

This document provides the AWS base metal grouping for welding procedure and performance qualification and is identical to Annex C of AWS B2.1/B2.1M:2014, *Specification for Welding Procedure and Performance Qualification*.

ISBN: 978-0-87171-849-5  
© 2014 by American Welding Society  
All rights reserved  
Printed in the United States of America

**Photocopy Rights.** No portion of this standard may be reproduced, stored in a retrieval system, or transmitted in any form, including mechanical, photocopying, recording, or otherwise, without the prior written permission of the copyright owner.

Authorization to photocopy items for internal, personal, or educational classroom use only or the internal, personal, or educational classroom use only of specific clients is granted by the American Welding Society provided that the appropriate fee is paid to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, tel: (978) 750-8400; Internet: <[www.copyright.com](http://www.copyright.com)>.

## 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 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 new editions. This standard may also be corrected through publication of amendments or errata or supplemented by publication of addenda. Information on the latest editions of AWS standards including amendments, errata, and addenda is posted on the AWS web page ([www.aws.org](http://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.

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

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, 8669 NW 36 St, # 130, Miami, FL 33166. 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 required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS B2 Committee on Procedure and Performance 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 Procedure and Performance 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 required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS B2 Committee on Procedure and Performance 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, 8669 NW 36 St, # 130, Miami, FL 33166.

This page is intentionally blank.

## Personnel

### AWS B2 Committee on Procedure and Performance Qualification

J. J. Fluckiger, Chair	<i>Idaho National Laboratory</i>
J. L. Cooley, 1st Vice Chair	<i>J. C. &amp; Associates, Incorporated</i>
E. W. Beckman, 2nd Vice Chair	<i>Consultant</i>
A. L. Diaz, Secretary	<i>American Welding Society</i>
D. M. Allbritten	<i>GE Capital</i>
M. Bernasek	<i>C-SPEC</i>
K. L. Bingham	<i>Los Alamos National Laboratory</i>
H. R. Castner	<i>Edison Welding Institute</i>
D. W. Craig	<i>Computer Engineering, Incorporated</i>
E. H. Gray	<i>U.S. Nuclear Regulatory Commission</i>
M. F. Herrle	<i>Arise</i>
K. G. Kofford	<i>Idaho National Laboratory</i>
R. A. LaFave	<i>Consultant</i>
G. S. Michels	<i>Summit Consulting</i>
A. S. Olivares	<i>HSB Global Standards</i>
J. F. Pike	<i>NASA Langley Research Center</i>
W. M. Ruof	<i>Bechtel Plant Machinery, Incorporated</i>
J. J. Sekely	<i>Welding Services, Incorporated</i>
M. R. Stone	<i>URS Flint</i>
M. L. Thomas	<i>Rocky Mountain Testing, LLC</i>
G. M. Wisbrock, Jr.	<i>Consultant</i>
R. K. Wiswesser	<i>Welder Training &amp; Testing Institute</i>

### Advisors to the AWS B2 Committee on Procedure and Performance Qualification

L. P. Connor	<i>Consultant</i>
W. D. Doty	<i>Doty &amp; Associates, Incorporated</i>
B. J. Hable	<i>Ford Motor Company</i>
K. Y. Lee	<i>U.S. Department of Transportation</i>
B. B. MacDonald	<i>Consultant</i>
F. A. Schweighardt	<i>Air Liquide Industrial U.S. LP</i>
A. W. Sindel	<i>Alstom Power Steam</i>
C. E. Spaeder, Jr.	<i>Consultant</i>
W. J. Sperko	<i>Sperko Engineering Services, Incorporated</i>
R. F. Waite	<i>Consultant</i>

### AWS B2B Subcommittee on Welding Qualification

M. R. Stone, Chair	<i>URS Flint</i>
A. L. Diaz, Secretary	<i>American Welding Society</i>
D. M. Allbritten	<i>GE Capital</i>
E. W. Beckman	<i>Consultant</i>
M. Bernasek	<i>C-SPEC</i>
K. L. Bingham	<i>Los Alamos National Laboratory</i>
J. L. Cooley	<i>J. C. &amp; Associates, Incorporated</i>
D. W. Craig	<i>Computer Engineering, Incorporated</i>

### **AWS B2B Subcommittee on Welding Qualification (Continued)**

J. J. Fluckiger	<i>Idaho National Laboratory</i>
E. H. Gray	<i>U.S. Nuclear Regulatory Commission</i>
K. G. Kofford	<i>Idaho National Laboratory</i>
G. S. Michels	<i>Summit Consulting</i>
A. S. Olivares	<i>HSB Global Standards</i>
J. F. Pike	<i>NASA Langley Research Center</i>
J. J. Sekely	<i>Welding Services, Incorporated</i>
M. L. Thomas	<i>Rocky Mountain Testing, LLC</i>
G. M. Wisbrock Jr.	<i>Consultant</i>
R. K. Wiswesser	<i>Welder Training &amp; Testing Institute</i>

### **Advisors to the AWS B2B Subcommittee on Welding Qualification**

L. P. Connor	<i>Consultant</i>
W. D. Doty	<i>Doty &amp; Associates, Incorporated</i>
J. G. Feldstein	<i>Foster Wheeler North America</i>
B. J. Hable	<i>Ford Motor Company</i>
K. Y. Lee	<i>U.S. Department of Transportation</i>
A. W. Sindel	<i>Alstom Power Steam</i>
W. J. Sperko	<i>Sperko Engineering Service, Incorporated</i>

### **AWS B2C Subcommittee on Materials**

W. M. Ruof, Chair	<i>Bechtel Plant Machinery Incorporated</i>
A. L. Diaz, Secretary	<i>American Welding Society</i>
M. Bernasek	<i>C-SPEC</i>
J. J. Fluckiger	<i>Idaho National Laboratory</i>
M. F. Herrle	<i>Arise</i>
K. G. Kofford	<i>Idaho National Laboratory</i>
R. A. LaFave	<i>Consultant</i>

### **Advisors to the AWS B2C Subcommittee on Materials**

C. E. Cross	<i>Los Alamos National Laboratory</i>
A. Donlevy	<i>International Titanium Association</i>
W. D. Doty	<i>Doty &amp; Associates, Incorporated</i>
P. Pollak	<i>Pollak &amp; Associates</i>
A. W. Sindel	<i>Alstom Power Steam</i>
C. E. Spaeder, Jr.	<i>Consultant</i>
L. T. Vernam	<i>AlcoTec Wire Corporation</i>
G. M. Wisbrock, Jr.	<i>Consultant</i>

## Table of Contents

	<b>Page No.</b>
<i>Personnel</i> .....	v
<i>List of Tables</i> .....	vii
<b>1. Scope</b> .....	1
Annex <u>C</u> —Base Metal Grouping .....	3

## List of Tables

<b>Table</b>	<b>Page No.</b>
<u>C.1</u> Listing of Base Metal Specifications—Ferrous Alloys .....	4
<u>C.1</u> Listing of Base Metal Specifications—Nonferrous Alloys .....	54
<u>C.2</u> M-Number Listing of Base Metals—Ferrous Alloys.....	82
<u>C.2</u> M-Number Listing of Base Metals—Nonferrous Alloys.....	155
<u>C.3</u> Listing of Base Metal Specifications—Iron Castings.....	204