AWS A5.5/A5.5M:2026
An American National Standard

Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding

American Welding Society®

Approved American National Standard
ANSI

AWS A5.5/A5.5M:2026
An American National Standard

Approved by the
American National Standards Institute
August 11, 2026

Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding

12th Edition

Revises AWS A5.5/A5.5M:2022

Prepared by the
American Welding Society (AWS) A5 Committee on Filler Metals and Allied Materials

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This specification prescribes the requirements for classification of low-alloy steel covered electrodes used for shielded metal arc welding. The requirements include chemical composition and mechanical properties of weld metal, weld metal soundness, usability tests of electrodes, and moisture tests of the low-hydrogen electrode covering. Requirements for standard sizes and lengths, marking, manufacturing, and packaging are also included.

Optional supplemental requirements include tests for absorbed moisture in the electrode covering and for diffusible hydrogen in the weld metal.

This specification makes use of both U.S. Customary Units and the International System of Units (SI). Since these are not equivalent, each system must be used independently of the other.



American Welding Society®

ISBN Print: 978-1-64322-478-7
ISBN PDF: 978-1-64322-479-4
© 2026 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>.

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 revised, 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). 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, Standards Development, 8669 NW 36 St, # 130, Miami, FL 33166 (see Annex B). 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 A5 Committee on Filler Metals and Allied Materials. 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 A5 Committee on Filler Metals and Allied Materials 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 A5 Committee on Filler Metals and Allied Materials 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 A5 Committee on Filler Metals and Allied Materials

R. V. Decker, Chair	*Weldstar*
M. F. Sinfield, Vice Chair	*Naval Surface Warfare Center*
B. A. Pletcher, 2nd Vice Chair	*Bechtel Global Corporation*
K. R. Bulger, Secretary	*American Welding Society*
T. Anderson	*ITW—Miller Electric Manufacturing Company*
A. Boulianne	*Canadian Welding Bureau*
J. C. Bundy	*Hobart Brothers Company*
J. L. Caron	*Haynes International, Incorporated*
G. L. Chouinard	*WSI – Avail Infrastructure Solutions*
T. J. Eckardt	*Duke Energy*
D. A. Fink	*Consultant*
R. J. Fox	*Hobart Brothers LLC*
M. James	*The Lincoln Electric Company*
S. J. Knostman	*Hobart Brothers Company*
L. G. Kvidahl	*Consultant*
F. B. Lake	*Consultant*
J. S. Lee	*Consultant*
C. McEvoy	*Naval Nuclear Laboratories—Knolls Atomic Power Laboratory*
T. Melfi	*The Lincoln Electric Company*
W. C. Mosier	*Polymet Corporation*
T. C. Myers	*Consultant*
K. J. Roossinck	*Ingalls Shipbuilding*
K. Sampath	*Consultant*
J. D. Schaefer	*Consolidated Nuclear Security*
J. B. Schaeffer	*The Lincoln Electric Company*
D. Singh	*Consultant*
R. C. Sutherlin	*Richard Sutherlin PE Consulting LLC*
H. D. Wehr	*Arcos Industries*
J. Zhang	*Consultant*

AWS A5A Subcommittee on Carbon and Low-Alloy Steel Electrodes and Rods for Shielded Metal Arc and Oxyfuel Gas Welding

M. James, Chair	*The Lincoln Electric Company*
J. A. Lipko, Vice Chair	*Lipko Welding and Consulting, LLC*
K. R. Bulger, Secretary	*American Welding Society*
R. V. Decker	*Weldstar*
S. J. Knostman	*Hobart Brothers Company*
T. C. Myers	*Consultant*
K. Sampath	*Consultant*
J. Zalokar	*The Lincoln Electric Company*

Foreword

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

This document makes use of both U.S. Customary Units and the International System of Units (SI). The measurements are not exact equivalents; therefore, each system must be used independently of the other, without combining values in any way. In selecting rational metric units, AWS A1.1, *Metric Practice Guide for the Welding Industry* is used where suitable.

Substantive changes in this document are shown in italic font or a vertical line in the margin. This edition modifies Table 5 to eliminate the requirement to test multiple types of current for classification purposes. Only the most appropriate type of current is required for classification.

The current document is the 11th revision of the initial ASTM/AWS document issued in 1948. The evolution took place as follows:

ASTM A 316-48T *Tentative Specifications for Low-Alloy Steel Arc-Welding Electrodes*
AWS A5.5-48T

ASTM A 316-54T *Tentative Specifications for High Tensile and Low-Alloy Steel Covered Arc-Welding Electrodes*
AWS A5.5-54T

AWS A5.5-58T *Tentative Specification for Low-Alloy Steel Covered Arc-Welding Electrodes*
ASTM A 316-58T

AWS A5.5-64T *Tentative Specification for Low-Alloy Steel Covered Arc-Welding Electrodes*
ASTM A 316-64T

AWS A5.5-69 *Specification for Low-Alloy Steel Covered Arc-Welding Electrodes*
ANSI W3.5-1973

AWS A5.5-69 1977 *Addenda to Specification for Low-Alloy Steel Covered Arc-Welding Electrodes*
Add. 1-77

ANSI/AWS A5.5-81 *Specification for Low-Alloy Steel Covered Arc Welding Electrodes*

ANSI/AWS A5.5-96 *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*

AWS A5.5/A5.5M:2006 *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*

AWS A5.5/A5.5M:2014 *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*

AWS A5.5/A5.5M:2022 *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*

The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection there with. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.

Comments and suggestions for the improvement of this specification are welcome. They should be sent to the Secretary, Committee on Filler Metals and Allied Materials, American Welding Society, 8669 NW 36 St # 130, Miami, FL 33166.

All errata to a standard shall be published in the *Welding Journal* and posted on the AWS website.

Table of Contents

Page No.

Personnel v
Foreword vi
List of Tables viii
List of Figures viii

1. Scope 1
2. Normative References 1
3. Classification 3
4. Acceptance 4
5. Certification 4
6. Rounding Procedure 4
7. Summary of Tests 4
8. Retest 4
9. Weld Test Assemblies 4
10. Chemical Analysis 6
11. Radiographic Test 6
12. Tension Test 7
13. Impact Test 7
14. Fillet Weld Test 8
15. Moisture Test 8
16. Absorbed Moisture Test 8
17. Diffusible Hydrogen Test 9
18. Method of Manufacture 10
19. Standard Sizes and Lengths 10
20. Core Wire and Covering 10
21. Exposed Core 10
22. Electrode Identification 10
23. Packaging 10
24. Marking of Packages 10

Annex A (Informative)—Guide to AWS Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding 45
Annex B (Informative)—Requesting an Official Interpretation on an AWS Standard 61

AWS Filler Metal Specifications by Material and Welding Process 63
AWS Filler Metal Specifications and Related Documents 65

List of Tables

Table		Page No.
1	Electrode Classification	11
2	Chemical Composition Requirements for Undiluted Weld Metal	13
3	Tension Test Requirements	21
4	Charpy V-Notch Impact Test Requirements	23
5	Required Tests	25
6	Base Metal for Weld Test Assemblies	27
7	Preheat, Interpass, and Postweld Heat Treatment Temperatures	28
8	Requirements for Preparation of Fillet Weld Test Assemblies	32
9	Radiographic Soundness Requirements	33
10	Dimensional Requirements for Fillet Weld Usability Test Specimens	33
11	Moisture Content Limits for Low-Hydrogen Electrode Coverings	34
12	Diffusible Hydrogen Requirements for Weld Metal with Optional Supplemental Designators	34
A1	Comparison of Classifications	58
A2	Typical Storage and Drying Conditions for Covered Arc Welding Electrodes	59
A3	Discontinued Electrode Classifications	60

List of Figures

Figure		Page No.
1	Order of Electrode Mandatory and Optional Supplemental Designators	35
2	Pad for Chemical Analysis of Undiluted Weld Metal	36
3	Groove Weld Test Assembly for Mechanical Properties and Soundness of Weld Metal Produced by Using All Electrode Classifications Except E(X)XX18M(1)	37
4	Fillet Weld Test Assembly	39
5	Groove Weld Test Assembly for Mechanical Properties and Soundness of Weld Metal Produced by Using E(X)XX18M(1)	40
6	Welding Positions for Fillet Weld Test Assemblies	42
7A	Radiographic Acceptance Standards for Rounded Indications (Grade 1)	43
7B	Radiographic Acceptance Standards for Rounded Indications (Grade 2)	44

Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding

1. Scope

1.1. This specification prescribes requirements for the classification of low-alloy steel electrodes for shielded metal arc welding of carbon and low-alloy steels. The weld metal deposited by these electrodes are steel alloys in which no single alloying element exceeds 10.5 percent.

In addition to the low-alloy steel electrodes above, this specification also prescribes the requirements for the classification of austenitic, high manganese steel electrodes having weld metal with nominally 20% Mn.

1.2. This specification makes use of both U.S. Customary Units and the International System of Units (SI). The measurements are not exact equivalents; therefore, each system must be used independently of the other without combining in any way when referring to material properties. The specification designated A5.5 uses U.S. Customary Units. The specification designated A5.5M uses SI Units. The latter units are shown within brackets [ ] or in appropriate columns in tables and figures. Standard dimensions based on either system may be used for sizing of filler metal or packaging or both under A5.5 or A5.5M specification.

1.3. Safety and health issues and concerns are beyond the scope of this standard; some safety and health information is provided, but such issues are not fully addressed herein. Some safety and health information can be found in Annex A, Clauses A5 and A10.

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

Applicable Regulatory Agencies

Work performed in accordance with this standard may involve the use of materials that have been deemed hazardous and may involve operations or equipment that may cause injury or death. This standard does not purport to address all safety and health risks that may be encountered. The user of this standard should establish an appropriate safety program to address such risks as well as to meet applicable regulatory requirements. ANSI Z49.1 should be considered when developing the safety program.

2. Normative References

The documents listed below are referenced within this publication and are mandatory to the extent specified herein. For undated references, the latest edition of the referenced standard shall apply. For dated references, subsequent amendments or revisions of the publications may not apply since the relevant requirements may have changed.