

AWS A5.26/A5.26M:2020
An American National Standard

Specification for Carbon and Low-Alloy Steel Electrodes for Electrogas Welding



**AWS A5.26/A5.26M:2020
An American National Standard**

**Approved by the
American National Standards Institute
April 10, 2020**

Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding

4th Edition

Revises ANSI/AWS A5.26/A5.26M-97 (R2009)

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

Classification requirements are specified for solid and tubular electrodes for electrode gas welding. The requirements include chemical composition of the electrode for solid electrodes and of weld metal for tubular electrodes, in addition to the mechanical properties and soundness of weld metal taken from a groove weld made with these electrodes using the prescribed welding procedure. Additional requirements are included or referenced for standard sizes, marking, manufacturing, and packaging.

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.



ISBN Print: 978-1-64322-131-1
ISBN PDF: 978-1-64322-132-8
© 2020 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 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). 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 requested 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.

Foreword

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

This edition makes use of both U.S. Customary Units and the International System of Units (SI) throughout. The measurements are not exact equivalents; therefore, each system must be used independently of the other, without combining in any way. In selecting rational metric units the AWS A1.1, *Metric Practice Guide for the Welding Industry*, and ISO 544, *Welding consumables — Technical delivery conditions for filler materials and fluxes — Type of product, dimensions, tolerances and markings*, are used as guides. Tables and figures make use of both U.S. Customary and SI Units, which with the application of the specified tolerances provide for interchangeability of products in both the U.S. Customary and SI Units.

NOTE: 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 therewith. 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.

Substantive changes include changing the metric equivalent to 70 000 psi from 480 MPa to 490 MPa, to better align with international specifications. Two additional options for impact test temperature have been added to the open Charpy V-Notch classification system. The layout and wording of the document were updated to comply with AWS A5 general requirements and standard formats.

Document Development

The document development of this specification is as follows:

- ANSI/AWS A5.26-78 *Specification for Consumables for Electrode Gas Welding of Carbon and High Strength Low-Alloy Steels*
- ANSI/AWS A5.26-91 *Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding*
- ANSI/AWS A5.26-97 *Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding*
- ANSI/AWS A5.26-97R *Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding*
- ANSI/AWS A5.26/A5.26M-97 (R2009) *Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding*

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS A5 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.
<i>Personnel</i>	v
<i>Foreword</i>	vii
<i>List of Tables</i>	x
<i>List of Figures</i>	x
1. Scope	1
2. Normative References	1
3. Classification	2
4. Acceptance	5
5. Certification	5
6. Rounding Procedure	5
7. Summary of Tests	5
8. Retest	5
9. Weld Test Assemblies	7
10. Chemical Analysis	10
11. Radiographic Test	11
12. Tension Test	11
13. Impact Test	11
14. Method of Manufacture	13
15. Standard Sizes	13
16. Finish and Uniformity	13
17. Standard Package Forms	13
18. Winding Requirements	13
19. Filler Metal Identification	13
20. Packaging	14
21. Marking of Packages	14
Annex A (Informative)—Guide to AWS Specification for Carbon and Low-Alloy Steel Electrodes for Electrogas Welding	15
Annex B (Informative)—Requesting an Official Interpretation on an AWS Standard	21
AWS Filler Metal Specifications by Material and Welding Process	23
AWS Filler Metal Specifications and Related Documents	25

List of Tables

Table		Page No.
1	Chemical Composition Requirements for Solid Electrodes	3
2	Tension Test Requirements (As Welded)	3
3	Charpy Impact Test Requirements	4
4	Chemical Composition Requirements for Weld Metal From Tubular Electrodes	6
5	Composition Requirements for Shielding Gases	7
6	Tests Required for Classification	7
7	Base Metals for Test Assemblies	10
A.1	Comparisons of AWS A5.26/A5.26M Classifications and Classifications in Other AWS Specifications ..	15
A.2	Discontinued Classifications	20

List of Figures

Figure		Page No.
1	Classification System	4
2	Groove Weld Test Assembly for Mechanical Properties and Soundness	8
3	Weld Ingot	9
4	Radiographic Acceptance Standards	12

Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding

1. Scope

1.1 This specification prescribes requirements for the classification of carbon and low-alloy steel electrodes for electrode gas welding. It covers solid and tubular (flux cored and metal cored) electrodes, for use either with or without external gas shielding.

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 A5.26 uses U.S. Customary Units. The specification designated A5.26M uses the International System of Units (SI). The latter are shown within brackets [] or in appropriate columns in tables and figures. Standard dimensions based on either system may be used for sizing of electrodes, packaging, or both under A5.26 or A5.26M specifications.

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 the non-mandatory annex, Clauses A5 and A9.

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 AWS website

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by material 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 to, or revisions of, any of these publications do not apply.

American Welding Society (AWS) standards:

- AWS A1.1, *Metric Guide for the Welding Industry*