AWS A5.3/A5.3M:2023
An American National Standard

Specification for Aluminum and Aluminum-Alloy Electrodes for Shielded Metal Arc Welding

American Welding Society®

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An American National Standard

Approved by the
American National Standards Institute
May 19, 2023

Specification for Aluminum and Aluminum-Alloy Electrodes for Shielded Metal Arc Welding

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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 requirements for the classification of covered (flux coated) E1100, E3003, and E4043 aluminum-alloy electrodes for shielded metal arc welding. Tests conducted for classification are chemical analysis of the core wire as well as tensile and bend tests from groove weld test assemblies fabricated with each of two sizes of electrode for each classification. Standard electrode sizes, electrode identification, and chemical composition limits are specified.

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.

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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 It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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.

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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. 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.

The current document is the 7th revision of the initial joint ASTM/AWS document issued in 1943. The original document was prepared by a joint AWS/ASTM Committee and published as an ASTM standard.

Substantive changes include the addition of an EG designation to allow classification of electrodes in addition to three alloys listed. There is a change in the maximum Be limit as noted in Table 1, Chemical Composition Requirements for Core Wire. Test methods, procedures, and the general wording and layout of the document were updated to bring them up to date with current practices for AWS A5 specifications. Substantive changes are shown in italic font.

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.

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.

The document development of this specification is as follows:

AWS/ASTM B184-43T	*Tentative Specifications for Aluminum and Aluminum Alloy Arc Welding Electrodes*
AWS A5.3-62T *ASTM B184-62T*	*Tentative Specification for Aluminum and Aluminum Alloy Arc Welding Electrodes*
AWS A5.3-69 *ANSI W3.3-1973*	*Specification for Aluminum and Aluminum Alloy Arc Welding Electrodes*
ANSI/AWS A5.3-80	*Specification for Aluminum and Aluminum Alloy Covered Arc Welding Electrodes*
ANSI/AWS A5.3-88	*Specification for Aluminum and Aluminum Alloy Electrodes for Shielded Metal Arc Welding*
ANSI/AWS A5.3-91	*Specification for Aluminum and Aluminum Alloy Electrodes for Shielded Metal Arc Welding*
AWS A5.3/A5.3M:1999	*Specification for Aluminum and Aluminum-Alloy Electrodes for Shielded Metal Arc Welding*
AWS A5.3/A5.3M:1999 (R2007)	*Specification for Aluminum and Aluminum-Alloy Electrodes for Shielded Metal Arc Welding*

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Specification for Aluminum and Aluminum-Alloy Electrodes for Shielded Metal Arc Welding

1. Scope

1.1 This specification prescribes requirements for the classification of aluminum and aluminum-alloy electrodes for shielded metal arc welding.

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 weld metal properties. The specification with the designation A5.3 uses U.S. Customary Units. The specification A5.3M uses SI units. 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 electrodes, packaging or both under A5.3 or A5.3M specifications.

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. Unless otherwise defined in this document, welding terms are as defined in AWS A3.0M/A3.0. 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.

2.1 American Welding Society (AWS) documents:

(1) AWS A3.0M/A3.0, *Standard Welding Terms and Definitions, Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*

(2) AWS A5.01M/A5.01, *Welding Consumables—Procurement of Filler Metals and Fluxes*