

AWS A5.4/A5.4M:2012 (R2022)
An American National Standard

Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding



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Specification for Stainless Steel 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

Composition and other requirements are specified for more than forty classifications of covered stainless steel welding electrodes. The requirements include general requirements, testing, and packaging. Annex A provides application guidelines and other useful information about the electrodes.

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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Foreword

This foreword is not part of AWS A5.4/A5.4M:2012, *Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding*, but is included for informational purposes only.

This document is the second of the A5.4 specifications which 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, the *Metric Practice Guide for the Welding Industry* (AWS A1.1) and International Standard ISO 544, *Welding consumables—Technical delivery conditions for welding filler materials—Type of product, dimensions, tolerances, and marking* are used where suitable. Tables and figures make use of both U.S. Customary and SI Units, which with the application of the specified tolerances provides for interchangeability of products in both the U.S. Customary and SI Units.

The Major Changes Incorporated in This Revision Include Updating Clause 6 (Rounding-off Procedure), Adding “Bi” Reporting Requirement, and New Filler Metal Classification E2307-XX. These changes are shown in italic font.

This AWS specification has evolved since the mid 1940s to its present form. The specification for covered stainless steel electrodes, issued in 1946, was prepared by a joint committee of the American Society for Testing and Materials and the American Welding Society. This cooperative effort continued for about 20 years and produced three revisions. The first revision, produced exclusively by the AWS Committee on Filler Metals, was published in 1969.

The current revision represents the tenth revision of the original 1946 document as shown below:

ASTM A298-46T AWS A5.4-46T	<i>Tentative Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Welding Electrodes</i>
ASTM A298-48T AWS A5.4-48T	<i>Tentative Specifications for Corrosion-Resisting Chromium and Chromium-Nickel Steel Welding Electrodes</i>
ASTM A298-55T AWS A5.4-55T	<i>Tentative Specifications for Corrosion-Resisting Chromium and Chromium-Nickel Steel Covered Welding Electrodes</i>
AWS A5.4-62T ASTM A298-62T	<i>Tentative Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Covered Welding Electrodes</i>
AWS A5.4-69	<i>Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Covered Welding Electrodes</i>
AWS A5.4-Add. 1-75	<i>1975 Addenda to Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Covered Welding Electrodes</i>
AWS A5.4-78	<i>Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Covered Welding Electrodes</i>
ANSI/AWS A5.4-81	<i>Specification for Covered Corrosion-Resisting Chromium and Chromium-Nickel Steel Welding Electrodes</i>
ANSI/AWS A5.4-92	<i>Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding</i>
AWS A5.4/A5.4M:2006	<i>Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding</i>

In this reaffirmation, the following editorial changes were made: the American Welding Society’s address was updated; Table A.1 in the List of Tables was modified to match the actual table; The title of Clause 6 was revised to read “Rounding Procedure”; In Figure 2, the “ $45^\circ \pm 5^\circ$ ” angle was revised to read $22.5^\circ \pm 2.5^\circ$ on both sides; The text “from Cb to Nb” was added to Table 6 note a.

In this reaffirmation, the following errata was incorporated: The “H” symbol in Figure A.1 was changed to the “ ” symbol.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, A5 Committee on Filler Metals and Allied Materials, American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.

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Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding

1. Scope

1.1 This specification prescribes requirements for the classification of covered stainless steel electrodes for shielded metal arc welding.^{1,2}

The chromium content of weld metal deposited by these electrodes is not less than 10.5 percent and the iron content exceeds that of any other element. For purposes of classification, the iron content shall be derived as the balance element when all other elements are considered to be at their minimum specified values.

NOTE: No attempt has been made to classify all grades of filler metals within the limits of the above scope; only the more commonly used grades have been included.

1.2 Safety and health issues and concerns are beyond the scope of this standard and, therefore, are not fully addressed herein. Some safety and health information can be found in Annex Sections A5 and A11. Safety and health information is available from other sources, including, but not limited to ANSI Z49.1, *Safety in Welding, Cutting and Allied Processes*, and applicable state and federal regulations.

1.3 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 with the designation A5.4 uses U.S. Customary Units. The specification A5.4M uses SI Units. The latter are shown in 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 A5.4 or A5.4M specifications.

2. Normative References

2.1 The following AWS standards³ are referenced in the mandatory section of this document.

1. AWS A5.01M/A5.01 (ISO 14344 MOD). *Procurement Guidelines for Consumables – Welding and Allied Processes – Flux and Gas Shielded Electrical Welding Processes*
2. AWS A5.5, *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*
3. AWS B4.0, *Standard Methods for Mechanical Testing of Welds*
4. AWS B4.0M, *Standard Methods for Mechanical Testing of Welds*

2.2 The following ANSI standard is referenced in the mandatory section of this document:

1. ANSI Z49.1⁴, *Safety in Welding, Cutting and Allied Processes*

¹ Due to possible differences in composition, core wire from covered electrodes should not be used as bare filler wire.

² Classifications E502, E505, and E7Cr are no longer specified by this document. They are specified in AWS A5.5/A5.5M:2006, designated as follows: E502 as E801X-B6 and E801X-B6L, E505 as E801X-B8 and E801X-B8L, and E7Cr as E801X-B7 and E801X-B7L.

³ AWS standards are published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.

⁴ ANSI Z49.1 is published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.