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An American National Standard



Specification for Bare Stainless Steel Welding Electrodes and Rods



American Welding Society



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Specification for

Bare Stainless Steel Welding

Electrodes and Rods

7th Edition

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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 the requirements for classification of solid and composite stainless steel electrodes (both as wire and strip) for gas metal arc welding, submerged arc welding, and other fusion welding processes. It also includes wire and rods for use in gas tungsten arc welding. Classification is based on chemical composition of the filler metal. Additional requirements are included for manufacture, sizes, lengths, and packaging. A guide is appended to the specification as a source of information concerning the classification system employed and the intended use of the stainless steel filler 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.



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Foreword

This foreword is not part of AWS A5.9/5.9M:2006, *Specification for Bare Stainless Steel Welding Electrodes and Rods*, but is included for informational purposes only.

This document is the first of the A5.9 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 the deletion of the ER502 and ER505 classifications, new requirements for identification of straight length rods, the change from Cb to Nb in one classification, and the addition of four new classifications (ER316LMn, ER439, ER2594, and ER33-31). New classifications are shown in *italic font*.

The first specification for bare stainless steel electrodes and rods was prepared in 1953 by a joint committee of the American Society for Testing and Materials and the American Welding Society. The joint committee also prepared the 1962 revision. The first revision prepared exclusively by the AWS A5 Committee on Filler Metal and Allied Materials was published in 1969. The current revision is the seventh revision of the original 1953 document as shown below:

ASTM A371-53T AWS A5.9-53T	<i>Tentative Specifications for Corrosion Resisting Chromium and Chromium-Nickel Steel Welding Rods and Bare Electrodes</i>
ASTM A371-62T AWS A5.9-62T	<i>Tentative Specifications for Corrosion Resisting Chromium and Chromium-Nickel Steel Welding Rods and Bare Electrodes</i>
AWS A5.9-69 ANSI W3.9-1973	<i>Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Welding Rods and Bare Electrodes</i>
AWS A5.9-Add 1-75	<i>1975 Addenda to Specification for Corrosion-Resisting Chromium and Chromium-Nickel Steel Welding Rods and Bare Electrodes</i>
AWS A5.9-77	<i>Specification for Corrosion Resisting Chromium and Chromium-Nickel Steel Bare and Composite Metal Cored and Stranded Arc Welding Electrodes and Welding Rods</i>
AWS A5.9-81	<i>Specification for Corrosion Resisting Chromium and Chromium-Nickel Steel Bare and Composite Metal Cored and Stranded Welding Electrodes and Welding Rods</i>
AWS A5.9-93	<i>Specification for Bare Stainless Steel Welding Electrodes and Rods</i>

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, 550 N.W. LeJeune Road, Miami, FL 33126.

Erratum

The following Erratum has been identified and incorporated into the current reprint of this document.

Page 4, Table 1, first column: Changed AWS Classification “ER409Nbⁱ” to “ER409Nb” by deleting superscript “i” as there is no footnote “i” for this table.

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Specification for Bare Stainless Steel Welding Electrodes and Rods

1. Scope

1.1 This specification prescribes requirements for the classification of bare stainless steel wire, strip, composite metal cored, and stranded welding electrodes and rods for gas metal arc, gas tungsten arc, submerged arc, and other fusion welding processes. The chromium content of these filler metals 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.

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 Informative Annex Clauses A6 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*,¹ and applicable federal and state 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. The specification designated A5.9 uses U.S. Customary Units; and the specification designated A5.9M 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 A5.9 or A5.9M specification.

2. Normative References

2.1 The following standards contain provisions which, through reference in this text, constitute provisions of

¹ ANSI Z49.1 is published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

this AWS standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreement based on this AWS standard are encouraged to investigate the possibility of applying the most recent edition of the documents shown below. For undated references, the latest edition of the standard referred to applies.

2.2 The following AWS standard² is referenced in the normative sections of this document.

1. AWS A5.01, *Filler Metal Procurement Guidelines*

2.3 The following ANSI standard is referenced in the normative sections of this document.

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

2.4 The following ASTM standards³ are referenced in the normative sections of this document:

1. ASTM E 29, *Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications*
2. ASTM E 353, *Standard Test Methods for Chemical Analysis of Stainless, Heat Resisting, Maraging, and Other Similar Chromium-Nickel-Iron Alloys*

2.5 The following OSHA standard⁴ is referenced in the normative sections of this document:

1. OSHA Safety and Health Standards, *29CFR 1910*

² AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

³ ASTM standards are published by the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

⁴ OSHA standards are published by the U.S. Government Printing Office, Washington, DC 20402, and can also be downloaded from www.osha-slc.gov.