

AWS A5.11/A5.11M:2018
An American National Standard

**Specification for
Nickel and Nickel-
Alloy Welding
Electrodes for
Shielded Metal
Arc Welding**



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An American National Standard

Approved by the
American National Standards Institute
October 27, 2017

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

11th Edition

Supersedes AWS A5.11/A5.11M:2010

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 composition, dimensions, soundness, and properties of weld metal for more than 40 classifications of nickel and nickel-alloy covered electrodes. Major topics include general requirements, testing, manufacturing, identification, and packaging. A guide to using the specification is included in Annex A.

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 this standard but is included for informational purposes only.

This document is the fourth revision to A5.11 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, AWS A1.1, *Metric Practice Guide for the Welding Industry*, and International Standard ISO 544, *Welding consumables — Technical delivery conditions for welding filler materials and fluxes — Type of product, dimensions, tolerances and markings*, 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. This document also relates its classifications to ISO 14172, *Welding consumables — Covered electrodes for manual metal arc welding of nickel and nickel alloys — Classification*.

The first specification for nickel and nickel-alloy covered electrodes was issued in 1954 by a joint committee of the American Society for Testing and Materials and the American Welding Society. The first revision in 1964 was also the result of the cooperative effort. This revision is the eighth prepared entirely by the AWS A5 Committee on Filler Metals and Allied Materials.

Substantive changes, such as addition of new filler metal classifications ENiCrFe-15 and ENiMoCr-1 along with chemical composition change in ENiCrMo-19 are shown in Italic font.

The requester of the chemical composition change for ENiCrMo-19 classification stated that this alloy is not patented in USA, but patented in Germany (patent DE 59801333), France (patent FR 991788), and the UK (GB 991788). All of these were generated out of the European patent EP991788 and will expire on May 27, 2018.

Requirements for diameter and length, core wire and covering, exposed core, electrode identification, packaging, and marking of packages now refer to AWS A5.02/A5.02M.

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 or of any patent rights in connection therewith. If the patent holder has filed a statement of willingness to grant a license under these rights on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standard developer.

Document Development

| | |
|--------------------------------|--|
| ASTM B295-54T AWS A5.11-54T | <i>Tentative Specification for Nickel-Base Alloy Covered Welding Electrodes</i> |
| AWS A5.11-64T ASTM B295-64T | <i>Tentative Specification for Nickel and Nickel-Alloy Covered Welding Electrodes</i> |
| AWS A5.11-69 | <i>Specification for Nickel and Nickel-Alloy Covered Welding Electrodes</i> |
| AWS A5.11-Add 1-75 | <i>Addenda to Specification for Nickel and Nickel Alloy Covered Welding Electrodes</i> |
| AWS A5.11-76 | <i>Specification for Nickel and Nickel Alloy Covered Welding Electrodes</i> |
| ANSI/AWS A5.11-83 | <i>Specification for Nickel and Nickel Alloy Covered Welding Electrodes</i> |
| ANSI/AWS A5.11-90 | <i>Specification for Nickel and Nickel Alloy Welding Electrodes for Shielded Metal Arc Welding</i> |

Document Development (Continued)

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|--------------------------|--|
| ANSI/AWS A5.11/A5.11M-97 | <i>Specification for Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding</i> |
| AWS A5.11/A5.11M:2005 | <i>Specification for Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding</i> |
| AWS A5.11/A5.11M:2010 | <i>Specification for Nickel and Nickel-Alloy Welding Electrodes for Shielded Metal Arc Welding</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, 8669 NW 36 St, # 130, Miami, FL 33166.

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

1. Scope

1.1 This specification prescribes requirements for the classification of nickel and nickel-alloy covered electrodes for shielded metal arc welding. It includes those compositions in which the nickel content generally exceeds that of any other element.¹

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 with the designation A5.11 uses U.S. Customary Units. The specification A5.11M 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 of filler metal or packaging or both under A5.11 or A5.11M 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 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 AWS website

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers
- (3) Applicable federal and state regulations

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

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

¹ Nickel-base covered electrodes for welding cast iron are treated separately in AWS A5.15, *Specification for Welding Electrodes and Rods for Cast Iron*.