AWS A5.14/A5.14M:2009
An American National Standard

Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods

American Welding Society

Approved American National Standard
ANSI

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Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods

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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

The chemical compositions of 50 nickel and nickel-alloy welding electrodes and rods are specified, including three compositions not previously classified. Major topics include general requirements, testing, packaging, and application guidelines.

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 A5.14/A5.14M:2009, *Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods*, but is included for informational purposes only.

This document is the third of the A5.14 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 AWS A1.1, *Metric Practice Guide for the Welding Industry*, and International Standard ISO 544, *Welding Consumables — Technical delivery conditions for welding filler materials — 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 18274, *Welding consumables — Wire and strip electrodes, wires and rods for arc welding of nickel and nickel alloys — Classifications.*

The first specification for bare nickel and nickel-alloy welding electrodes and rods was prepared by a joint committee of the American Society for Testing and Materials and the American Welding Society and was issued in 1956. Eight years later, the first revision was prepared by the joint committee. This is the sixth revision prepared exclusively by the AWS A5 Committee on Filler Metals and Allied Materials.

Substantive changes are shown in Italic font in the body of this specification which include new classifications ERNiCr-7, ERNiCrFe-13, and ERNiCrMo-22. The amount of Ti for ERNiCrMo-21 has been changed to 0.4% maximum in this revision. The Rounding-off Procedure has been revised.

Document Development

ASTM B304-56T AWS A5.14-56T	*Tentative Specification for Nickel and Nickel-Base Alloy Bare Welding Filler Metals*
AWS A5.14-64T ASTM B304-64T	*Tentative Specification for Nickel and Nickel Alloy Bare Welding Rods and Electrodes*
AWS A5.14-69T ANSI W3.14-1973	*Specification for Nickel and Nickel-Alloy Bare Welding Rods and Electrodes*
ANSI/AWS A5.14-76	*Specification for Nickel and Nickel Alloy Bare Welding Rods and Electrodes*
ANSI/AWS A5.14-83	*Specification for Nickel and Nickel Alloy Bare Welding Rods and Electrodes*
ANSI/AWS A5.14-89	*Specification for Nickel and Nickel Alloy Bare Welding Electrodes and Rods*
ANSI/AWS A5.14/A5.14M-97	*Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods*
AWS A5.14/A5.14M:2005	*Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods*

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.

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Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods

1. Scope

1.1 This specification prescribes requirements for the classification of bare nickel and nickel-alloy welding electrodes, strip electrodes, and welding rods. It includes those compositions where the nickel content exceeds that of any other element.

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 the nonmandatory annex, Clauses A5 and A10. 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 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 when referring to material properties. The specification with the designation A5.14 uses U.S. Customary Units. The specification A5.14M 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 A5.14 or A5.14M specifications.

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 editions of the documents shown below. For undated references, the latest edition of the standard referred to applies.

2.2 The following AWS standards[1] are referenced in the mandatory sections of this document:

(1) AWS A1.1, *Metric Practice Guide for the Welding Industry*

(2) AWS A5.01M/A5.01, *Procurement Guidelines for Consumables—Welding and Allied Processes—Flux and Gas Shielded Electrical Welding Processes*

2.3 The following ANSI standard[2] is referenced in the mandatory sections of this document:

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

2.4 The following ASTM standards[3] are referenced in the mandatory 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 76, *Standard Methods for Chemical Analysis of Nickel-Copper Alloys*

(3) ASTM E 354, *Test Methods for Chemical Analysis of High-temperature, Electrical, Magnetic and Other Similar Iron, Nickel, and Cobalt Alloys*

(4) ASTM E 1019, *Methods for Determination of Carbon, Sulfur, Nitrogen, Oxygen, and Hydrogen in Steels and in Iron, Nickel and Cobalt Alloys*

(5) ASTM E 1473, *Test Methods for Chemical Analysis of Nickel, Cobalt, and High Temperature Alloys*

[1] AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.
[2] This ANSI standard is 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.