AWS A5.14/A5.14M:2024
An American National Standard

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

American Welding Society®

**AWS A5.14/A5.14M:2024**
**An American National Standard**

**Approved by the**
**American National Standards Institute**
**September 25, 2023**

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

**12th Edition**

**Revises AWS A5.14/A5.14M:2018**

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 nickel and nickel-alloy welding electrodes and rods are specified. 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 this standard but is included for informational purposes only.

This document is the eleventh revision of the A5.14 specification, 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 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 U.S. Customary and SI Units. This document also relates its classifications to ISO 18274, *Welding Consumables — Solid Wire Electrodes, Solid Strip Electrodes, Solid Wires and Solid Rods for Fusion Welding of Nickel and Nickel Alloys — Classification.*

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 ninth 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 includes a new classification ERNiCr-8.

**Document Development**

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|---|---|
| ASTM B304-56T<br>AWS A5.14-56T | *Tentative Specification for Nickel and Nickel-Base Alloy Bare Welding Filler Metals* |
| AWS A5.14-64T<br>ASTM B304-64T | *Tentative Specification for Nickel and Nickel Alloy Bare Welding Rods and Electrodes* |
| AWS A5.14-69T<br>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* |
| AWS A5.14/A5.14M:2009 | *Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods* |
| AWS A5.14/A5.14M:2011 | *Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods* |
| AWS A5.14/A5.14M:2018 | *Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods* |

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 the 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 standard developer.

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.

All errata to a standard shall be published in the *Welding Journal* and posted on the AWS website.

# Dedication

**The AWS A5 Committee on Filler Metals and Allied Materials dedicates this edition of the A5.14/A5.14M, *Specification for Nickel and Nickel-Alloy Bare Welding Electrodes and Rods*, to Damian Kotecki for his significant contribution to welding.**

**Damian became active in the American Welding Society (AWS) early in his career and served on numerous committees up until the time of his passing. In 1993 he was named a Fellow of the AWS in recognition of his distinguished contributions to the field of welding science and technology. He was elected President of the AWS, serving in the 2005–2006 term, after which he was awarded a lifetime membership to the AWS.**

**Damian was recognized many times by AWS for his achievements, including the R.D. Thomas Memorial Award (1983), the William Irrgang Memorial Award (1987), the A.F. Davis Silver Medal (1996), the Warren F. Savage Memorial Award (2001), and the Samuel Wylie Miller Memorial Award (2010). In 1996 he delivered the prestigious Comfort A. Adams lecture, a keynote address at the annual meeting of the AWS which recognizes an outstanding scientist or engineer who has achieved a new and distinctive development in the field of welding.**

**Damian was similarly active in the International Institute of Welding (IIW), beginning his commission work with IIW in 1978 and serving on the IIW Board of Directors as Member, Vice President, and then Treasurer. Through his work in the IIW, Damian made major contributions to the international scientific community, including the development and refinement of international welding standards. For his work the IIW awarded him the Henry Granjon Prize (1999), the IIW Arthur Smith Award (2007), the Yoshiaka Arata Award (2013), and the Walter Edstrom Medal (2018).**

**In 1999 Damian began writing a 'Stainless Q&A' column for the *Welding Journal*, answering technical questions from the readership. The column was published monthly until 2001, then bimonthly until 2022, and this series of columns was later compiled into its own volume by the *Welding Journal*. With coauthor John Lippold, Damian wrote Welding Metallurgy and Weldability of Stainless Steels, first published in 2005. The book was an important modern update to the literature of welding metallurgy, is in use in many collegiate engineering curriculums, and has been translated for Chinese and Indian markets.**

**Throughout his career, Damian served as an enthusiastic mentor to many younger colleagues, supporting their research and publishing efforts. He is remembered by many for his generosity of spirit, his ability to build consensus, and his vocational commitment to his work.**

# Table of Contents

**Page No.**

# List of Tables

# 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** 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.

**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 the nonmandatory 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 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. 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.

The following AWS standards are referenced in the mandatory sections of this document:

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