


**AWS A5.24/A5.24M:2005**  
**An American National Standard**



# **Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods**



**American Welding Society**



**Key Words**—Zirconium alloy wire, zirconium welding electrodes, zirconium welding rods, gas metal arc welding, gas tungsten arc welding, plasma arc welding

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**Approved by**  
**American National Standards Institute**  
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# **Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods**

**Supersedes ANSI/AWS A5.24-90R**

Prepared by  
AWS A5 Committee on Filler Metals and Allied Materials

Under the Direction of  
AWS Technical Activities Committee

Approved by  
AWS Board of Directors

## **Abstract**

This specification prescribes the requirements for classification of zirconium and zirconium alloy electrodes and rods for GTA, GMA, and PA welding. AWS A5.24/A5.24M:2005 is a revision of the zirconium welding electrode document last revised in 1990. The compositions specified for each classification represent the latest state-of-the-art. Additional requirements are included for testing procedures, 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 zirconium alloy 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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# Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods

## 1. Scope

**1.1** This specification prescribes requirements for the classification of zirconium and zirconium-alloy electrodes and rods for gas tungsten arc, gas metal arc, and plasma arc welding.

**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 Sections A5 and A9. 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 filler metal properties. The specification with the designation A5.24 uses U.S. Customary Units. The specification A5.24M 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 electrodes or packaging or both under the A5.24 or A5.24M specifications.

## 2. Normative References

**2.1** The following ANSI/AWS standards<sup>1</sup> are referenced in the mandatory sections of this document:

- (1) AWS A5.01, *Filler Metal Procurement Guidelines*

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

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

**2.2** The following ASTM standards<sup>2</sup> 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 146, *Standard Methods for Chemical Analysis of Zirconium and Zirconium-Base Alloys*

**2.3** The following ISO standard<sup>3</sup> is referenced in the mandatory sections of this document:

- (1) ISO 544, *Welding consumables—Technical delivery conditions for welding filler metals—Type of product, dimensions, tolerances, and markings*

## 3. Classification

**3.1** The welding materials covered by the A5.24/A5.24M specification are classified using a system that is independent of U.S. Customary Units and the International System of Units (SI). Classification is according to chemical composition as specified in Table 1.

**3.2** Materials classified under one classification shall not be classified under any other classification of this specification. An electrode or rod may be classified under both A5.24 and A5.24M providing it meets the requirements of both specifications.

**3.3** The filler metals classified under this specification are intended for gas tungsten arc, gas metal arc, and plasma arc welding processes, but that is not to prohibit

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

3. ISO standards are published by the American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.