AWS A5.24/A5.24M:2014
An American National Standard

Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods

American Welding Society®

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An American National Standard

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Specification for Zirconium and Zirconium-Alloy 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

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

This foreword is not part of AWS A5.24/A5.24M:2014, *Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods*, but is included for informational purposes only.

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 values in any way when referring to filler metal properties. 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 metals—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.

The first *Specification for Zirconium and Zirconium Bare Welding Rods and Electrodes* was prepared by the Subcommittee on Zirconium Filler Metal in 1976. This edition originally had three electrode classifications, ERZr1, ERZr2 and ERZr3. In the 1979 edition, the very pure grade of zirconium (ErZr1) was deleted and an additional grade, ERZr4 (with 2%–3% Niobium), was added to the specification and includes an addition to the check analysis tolerance by the joint AWS Subcommittee on Titanium and Zirconium Filler Metals. In 1990, the specification was revised to include the Acceptance and Certification clauses to the appendix. In 2005, the specification was revised to include an oxygen range for all electrode classifications. This was done to take into account the oxygen pickup during the zirconium welding process in order to create final weld strength similar to that of the parent metal. Additionally, the 2005 A5.24 specification was the first to use both the U.S. Customary Units and the International System Units (SI). AWS A5.24/A5.24M:2014, *Specification for Zirconium and Zirconium-Alloy Welding Electrodes and Rods*, is the fourth revision of the document. This revision primarily includes updates to the reference documents.

A vertical line in the margin or underlined text in clauses, tables, or figures indicates an editorial or technical change from the 2005 edition.

Previous editions of the document are as follows:
AWS A5.24-76, *Specification for Zirconium and Zirconium Alloy Bare Welding Rods and Electrodes*
AWS A5.24-79, *Specification for Zirconium and Zirconium Alloy Bare Welding Rods and Electrodes*
ANSI/AWS A5.24-90, *Specification for Zirconium and Zirconium Alloy Welding Electrodes and Rods*
AWS A5.24/A5.24M:2005, *Specification for Zirconium and Zirconium-Alloy Welding Electrode and Rods*

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS A5 Committee on Procedure and Performance Qualification, American Welding Society, 8669 NW 36 St, #130, Miami, FL 33166.

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