

AWS G2.5/G2.5M:2012
An American National Standard



Guide for the Fusion Welding of Zirconium and Zirconium Alloys



American Welding Society®



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An American National Standard**

**Approved by the
American National Standards Institute
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Guide for the Fusion Welding of Zirconium and Zirconium Alloys

1st Edition

Prepared by the
American Welding Society (AWS) G2 Committee on Joining Metals and Alloys

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

The standard *Guide for the Fusion Welding of Zirconium and Zirconium Alloys* provides instructional guidance for the welding of zirconium and zirconium alloys. This guide explains processes, equipment, materials, workshop practices, joint preparation, welding techniques, tests, and the repair of defects.



American Welding Society®

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This standard is subject to revision at any time by the AWS G2 Committee on Joining Metals and Alloys. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS G2 Committee on Joining Metals and Alloys and the author of the comments will be informed of the Committee's response to the comments. Guests are invited to attend all meetings of the AWS G2 Committee on Joining Metals and Alloys to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

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Foreword

This foreword is not part of AWS G2.5/G2.5M:2012, *Guide for the Fusion Welding of Zirconium and Zirconium Alloys*, but is included for informational purposes only.

The American Welding Society formed the G2 Committee on Joining Metals and Alloys in 1992 in response to an industry demand for information on welding the metals and alloys that have not been covered by other documents and committees. This document is written by the G2 Committee on Joining Metals and Alloys.

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

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS G2 Committee on Joining Metals and Alloys, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

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Guide for the Fusion Welding of Zirconium and Zirconium Alloys

1. General Requirements

1.1 Scope. This guide provides information on welding processes and procedures that are recommended for use in zirconium fabrication. The document presents detailed and up-to-date technical information on the “best practices” to allow first time users of zirconium as well as established fabricators to join zirconium parts into high quality components.

1.2 Units of Measure. This standard makes use of both U.S. Customary Units and the International System of Units (SI). The latter are shown within brackets ([]) or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system must be used independently.

1.3 Safety. 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. 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) Material 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 standards listed below contain provisions that, through reference in this text, constitute mandatory provisions of this AWS standard. 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.