

**AWS G2.1M/G2.1:2012**  
**An American National Standard**



# **Guide for the Joining of Wrought Nickel-Based Alloys**



**American Welding Society®**



**AWS G2.1M/G2.1:2012**  
**An American National Standard**

**Approved by the**  
**American National Standards Institute**  
**October 16, 2012**

# **Guide for the Joining of Wrought Nickel-Based Alloys**

**2nd Edition**

**Supersedes AWS G2.1M/G2.1:2002**

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

Under the Direction of the  
AWS Technical Activities Committee

Approved by the  
AWS Board of Directors

## **Abstract**

This document describes the welding of different wrought nickel-based alloys, including solid solution and precipitation hardening alloys.



**American Welding Society®**

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## Foreword

This foreword is not part of AWS G2.1M/G2.1:2012, *Guide for the Joining of Wrought Nickel-Based Alloys*, but is included for informational purposes only.

The American Welding Society formed the G2 Committee on the Joining of 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 is the second edition of this document; the first was published in 2002.

Underlined text in clauses, tables, or figures indicates an editorial or technical change from the 2002 edition. A vertical line in the margin also indicates a revision from the 2002 edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS G2 Committee on the Joining of Metals and Alloys, American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.

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# Guide for the Joining of Wrought Nickel-Based Alloys

## 1. General Requirements

**1.1 Scope.** This guide presents a description of wrought nickel-based alloys and the processes and procedures that can be used to join these materials. It stresses the process basics, parameters, applications, and safety considerations. Practical information has been included in the form of figures, tables, and graphs that should prove useful in determining capabilities and limitations in the joining of these materials.

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

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, which, 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.

American Welding Society (AWS) standards:<sup>1</sup>

- AWS A2.4, *Standard Symbols for Welding, Brazing, and Nondestructive Examination;*
- AWS A3.0M/A3.0, *Standard Welding Terms and Definitions;*

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<sup>1</sup> AWS standards are published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.