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

2nd Edition

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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.
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Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the appropriate technical committee. Such requests should be addressed to the American Welding Society, Attention: Managing Director, Technical Services Division, 8669 Doral Blvd., Suite 130, Doral, FL 33166 (see Annex B). With regard to technical inquiries made concerning AWS standards, oral opinions on AWS standards may be rendered. These opinions are offered solely as a convenience to users of this standard, and they do not constitute professional advice. Such opinions represent only the personal opinions of the particular individuals giving them. These individuals do not speak on behalf of AWS, nor do these oral opinions constitute official or unofficial opinions or interpretations of AWS. In addition, oral opinions are informal and should not be used as a substitute for an official interpretation.

This standard is subject to revision at any time by the AWS G2 Committee on the Joining of 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 It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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 the Joining of 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 the Joining of 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, 8669 Doral Blvd., Suite 130, Doral, FL 33166.
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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:

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

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