AWS G2.3M/G2.3:2019
An American National Standard

Guide for the Joining of Solid Solution Austenitic Stainless Steels

American Welding Society®

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Approved by the
American National Standards Institute
August 16, 2018

Guide for the Joining of Solid Solution Austenitic Stainless Steels

3rd Edition

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

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This guide presents a description of solid solution austenitic stainless steels and the processes and procedures that can be used for the joining of these materials. This standard discusses the welding processes and welding parameters, qualifications, inspection and repair methods, cleaning, 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 austenitic stainless steels.

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Foreword

This foreword is not part of this standard 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 document is written by the G2 Committee on the Joining of Metals and Alloys.

NOTE: The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights.

By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.

A vertical line in the margin or underlined text in clauses, tables, or figures indicates an editorial or technical change from the 2012 edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS G2 Committee on Joining of Metals and Alloys, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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Guide for the Joining of Solid Solution Austenitic Stainless Steels

1. General Requirements

1.1 Scope. This guide presents a description of solid solution austenitic stainless steels and the most commonly used welding processes and procedures for joining these materials. The most commonly used welding processes, including shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), submerged arc welding (SAW), and flux cored arc welding (FCAW), are discussed in detail; laser beam, electron beam, plasma arc, resistance, and braze welding are not covered in great detail.

The welding processes discussed in this guide include recommended welding parameters, filler metals, shielding gases, and fluxes. Procedure qualifications, inspection and repair considerations and methods, and cleaning and safety considerations are also discussed. Practical information has been included as figures, tables, and graphs that should prove useful for determining the capabilities and limitations in the joining of austenitic stainless steels. This guide does not address martensitic, ferritic, or duplex stainless steels.

Although this guide is not written with mandatory requirements, mandatory language, such as the use of "shall," will be found in those portions of the document where failure to follow the instructions or procedures could produce inferior, misleading, or unsafe results.

1.2 Units of Measure. This standard uses 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 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) 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.