

AWS D10.18M/D10.18:2018
An American National Standard

Guide for Welding Ferritic/Austenitic Duplex Stainless Steel Piping and Tubing



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Approved by the
American National Standards Institute
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Guide for Welding
Ferritic/Austenitic Duplex
Stainless Steel Piping and Tubing

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Prepared by the
American Welding Society (AWS) D10 Committee on Piping and Tubing

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This standard presents a detailed discussion of the metallurgical and welding characteristics and weldability of duplex stainless steel used in piping and tubing. A number of tables and graphs are presented in order to illustrate the text.



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This standard is subject to revision at any time by the AWS D10 Committee on Piping and Tubing. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn.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 D10 Committee on Piping and Tubing 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 D10 Committee on Piping and Tubing 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 NW 36 St, # 130, Miami, FL 33166.

Foreword

This foreword is not part of this standard but is included for informational purposes only.

This guide is intended to provide information which may be used to avoid, or at least minimize, difficulties in welding duplex stainless steel piping and tubing. The term *pipe* used in the text also includes tube.

This second edition of D10.18M/D10.18 continues as a guide for welding ferritic/austenitic duplex stainless steel piping and tubing. The duplex stainless steels are finding increased use in industry and the information contained in this guide will be most useful.

Tables listing specific chemical composition ranges for base metal and weld metal that fall under the jurisdiction of other codes or documents have been omitted. Where helpful, however, comparison data is presented.

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 2008 edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D10 Committee on Piping and Tubing, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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1. General Requirements

1.1 Scope. The ferritic/austenitic duplex stainless steels (DSSs) discussed in this document have proven to be weldable using proper welding procedures. The processes GTAW, GMAW (includes all transfer modes), SMAW, FCAW, and SAW have all been used with success on these alloys. Automatic and mechanized welding such as orbital welding with the GTAW, GMAW, and FCAW processes have also been used with success on duplex alloys. Manual welders that have experience with austenitic stainless steels should be able to apply many of the techniques they have learned from these alloys to the welding of duplex stainless steels, while of course keeping in mind the exceptions to be noted within this document.

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 within brackets ([]) or in appropriate columns in tables and figures. The measurements may not be the exact equivalents; therefore, each system must be used independently.

To identify nominal pipe sizes in both SI and U.S. Customary Units, the following designations are used:

- (1) DN (Diameter Nominal) is the SI designation, and
- (2) NPS (Nominal Pipe Size) is the U.S. Customary designation.

1.3 Safety. Safety and health issues and concerns are beyond the scope of this standard and therefore are not 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.