

Structural Welding Code—Stainless Steel

1. General Provisions

1.1 Scope

This code covers welding requirements applicable to stainless steel weldments subject to design stress. It shall be used in conjunction with any complementary code or specification for the design or construction of stainless steel weldments.

1.2 Base Metal

The base metals to be welded under this code are stainless steel with the following limits:

- I) Carbon (C) equal to or less than 0.5%
- II) Chromium (Cr) equal to or greater than 10.5%
- III) Iron (Fe) exceeds any other single element.

Stainless steel base metals may include any of the following types:

- (1) Austenitic
- (2) Ferritic
- (3) Martensitic
- (4) Precipitation Hardening (austenitic, semi-austenitic and martensitic)
- (5) Duplex
- (6) Dissimilar (any combinations of the types above or with weldable carbon steels or low alloy steels).

The stainless steel types may be in any of the following forms:

- A. Cold rolled—sheet
- B. Hot rolled—sheet, plate
- C. Shapes
- D. Structural
- E. Tubular
- F. Clad materials & combinations
- G. Castings
- H. Forgings

Stainless steel types are generally listed by American Iron and Steel Institute (AISI) Numbers, Unified Numbering System (UNS), or by American Society of Testing and Materials (ASTM) Specifications for product form.

Newer proprietary steels may not be numbered and must be identified by chemical composition or other suitable means which clearly define the steel.

1.2.1 Specified Base Metal. The contract documents shall designate the specification and classification of base metal to be used. Normally, they will be selected in accordance with the specifications. When welding to this code is involved, the base metals, as defined in 1.2, should be used wherever possible. The designer shall specify application limits for temperature in the contract documents. The provisions of this code are not intended to apply to welding base metals thinner than 1/16 in. (2 mm) or 16 gage.

1.2.2 Base Metal Prequalification. Austenitic stainless steels whose filler metals normally produce a small amount of ferrite (see Table 3.2 for prequalified limits) shall be considered prequalified, provided they are welded with filler metals in accordance with Table 3.3 and the WPSs used conform to all the applicable requirements of this code. All other stainless steels or combinations, and WPSs which are not prequalified, shall be qualified in conformance to this code.

1.2.3 Use of Unlisted Base Metals. When a stainless steel other than one of those listed in Table 3.2 is proposed for welded construction under this code, WPSs shall be established by qualification in accordance with the requirements of section 4, except as allowed in 1.2.3.1. The fabricator shall have the responsibility for establishing the WPS by qualification.

1.2.3.1 Unlisted base metals which have the same chemical composition and strength as a listed steel may be welded with a prequalified or qualified WPS for the listed steel.

1.2.4 Weldability. The Engineer may prescribe additional weldability testing of the unlisted steel. The responsibility for determining weldability is assigned to

the party who either specifies a material not listed in Table 3.2, except as permitted by 1.2.3.1, or who proposes the use of a substitute material not listed in Table 3.2. The Engineer may also prescribe additional corrosion tests, toughness tests, creep tests, etc. These tests shall be conducted by a competent organization before the award of a contract. If not, the specific test method and acceptance standards shall be specified in the contract documents.

1.3 Welding Terms

The welding terms used in this code shall be interpreted in accordance with the definitions given in the latest edition of ANSI/AWS A3.0, *Standard Welding Terms and Definitions*, supplemented by Annex E of this code.

1.4 Welding Symbols

Welding symbols shall be those shown in the latest edition of ANSI/AWS A2.4, *Symbols for Welding, Brazing, and Nondestructive Examination*. Special conditions shall be fully explained by added notes or details.

1.5 Safety Precautions

Safety precautions shall conform to applicable regulations. The latest edition of ANSI/ASC Z49.1, *Safety in Welding, Cutting, and Allied Processes*, published by the American Welding Society (also see Annex C, Safe Practices), is recommended.

Note: Work to this code may involve hazardous materials, operations, and equipment. The code does not purport to address all of the safety problems associated with its use. It is the responsibility of the user to establish appropriate safety and health practices. The user should determine the applicability of any regulatory limitations prior to use.

1.6 Standard Units of Measurement

The values stated in U.S. Customary Units are to be regarded as the standard. The metric (SI) equivalents of U.S. Customary Units given in this code may be approximate.

1.7 Acceptance Criteria

The fundamental premise of the code is to provide general acceptance criteria applicable to any situation. Acceptance criteria for production welds different from those specified in the code may be used for a particular application, provided they are suitably documented by the proposer and approved by the Engineer. These alternate acceptance criteria can be based upon evaluation of suitability for service using past experience, experimental evidence or engineering analysis considering material type, service load effects, and environmental factors.

1.8 Welding Procedure Specification (WPS)

Each contractor or fabricator shall prepare written WPSs which are qualified, prequalified or a combination of qualified and prequalified in accordance with this code. An example is shown in Annex F.

1.9 Approval

All references to the need for approval shall be interpreted to mean approval by the Engineer. Hereinafter, if the construction is under the jurisdiction of the Building Commissioner, the term Engineer shall be used, and shall be construed to mean the Building Commissioner or the Engineer.

1.10 Mandatory Provisions

Most provisions of the code are mandatory when the use of the code is specified. Certain provisions are optional and apply only when specified in contract documents for a specific project.