

**AWS C3.3:2008**  
**An American National Standard**



**Recommended  
Practices for  
the Design,  
Manufacture, and  
Examination of  
Critical Brazed  
Components**



**American Welding Society**



**AWS C3.3:2008**  
**An American National Standard**

**Approved by the**  
**American National Standards Institute**  
**April 21, 2008**

**Recommended Practices for the**  
**Design, Manufacture, and Examination**  
**of Critical Brazed Components**

**3rd Edition**

**Supersedes AWS C3.3:2002**

Prepared by the  
American Welding Society (AWS) C3 Committee on Brazing and Soldering

Under the Direction of the  
AWS Technical Activities Committee

Approved by the  
AWS Board of Directors

**Abstract**

This standard lists the necessary steps to assure the suitability of brazed components for critical applications. Although such applications vary widely, they have certain common considerations with respect to materials, design, manufacture, and inspection. It is the intent of this document to identify and explain these common considerations and the best techniques for dealing with them. It is beyond the scope of this document to provide specific details on these techniques, which the user must adapt to fit each particular application.



**American Welding Society**

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## Foreword

This foreword is not part of AWS C3.3:2008, *Recommended Practices for the Design, Manufacture, and Examination of Critical Brazed Components*, but is included for informational purposes only.

The American Welding Society (AWS) C3 Committee on Brazing and Soldering has prepared these recommended practices to provide a basic guide to ensure the suitability of brazed components for critical applications. Although such applications vary widely, certain common considerations with respect to materials, design, manufacture, and examination should not be overlooked.

It is the intent of this document to list and explain these common considerations and discuss the best techniques for dealing with them. It is beyond the scope of this document to provide specific details about these techniques, which the user must adapt to fit the particular application.

This third and present edition supersedes AWS C3.3:2002, *Recommended Practices for the Design, Manufacture, and Examination of Critical Brazed Components*. New additions to AWS C3.3:2008 include Table 1, which summarizes the filler metal selection process; Table 2, which identifies design considerations with respect to brazeability; Table 3, which identifies metallurgical aspects of brazeability; Annex D, which provides information on braze-induced discontinuities and inspection methods; Annex E, which presents brazement design criteria; and Annex F, which presents guidelines for the preparation of inquiries to AWS technical committees.

Comments and suggestions for the improvement of this standard are welcome. These should be sent to the Secretary, AWS C3 Committee on Brazing and Soldering, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

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# Recommended Practices for the Design, Manufacture, and Examination of Critical Brazed Components

## 1. Scope

These recommended practices encompass those procedures that should be followed in the design, manufacture, and examination of brazed joints for critical components in order to assure their reliability in service.

The procedures recommended represent the best current practice and are necessary to the control of brazed joint quality. These practices are applicable to all products and brazing processes. Whenever any or some of these practices are omitted when producing critical components, the omission should be the result of a rational decision, not the result of a lack of knowledge of the best practice.

This document is divided into clauses addressing materials, design, manufacturing, and examination. These clauses are followed by Annex A, which presents a list of informative references; Annex B, which presents sample specifications that are intended as guides for the preparation of the user's documents; Annex C, which presents a discussion of brazing risk management; Annex D, which presents a table relating to the quantification of the scope and magnitude of braze-induced discontinuities; Annex E, which presents systematic criteria for design of brazed components; and Annex F, which presents guidelines for the preparation of inquiries for AWS technical committees.

This standard does not require units of measure. Therefore, no equivalents or conversions are contained except when they are cited in examples.

Procedures for the protection of the safety and health of those performing brazing and related operations are of great importance. Among the potential hazards to be considered are exposure to fumes and gases, radiation, and toxic materials. Safety and health issues may not be fully addressed by this standard. Users of this standard should consult ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, applicable federal, state, and local regulations and other relevant documents concerning safety and health issues not addressed herein. Additional information on safety and health is included in the American Welding Society *Brazing Handbook*.

## 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 standard:<sup>1</sup>

AWS A3.0:2001, *Standard Welding Terms and Definitions, Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*

## 3. Terms and Definitions

AWS A3.0, *Standard Welding Terms and Definitions, Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*, provides the basis for terminology used herein.

For the purposes of this document, the following term and definition applies:

**critical component.** A component whose primary failure would cause significant danger to persons or property or would result in a significant operational penalty.

## 4. Brazing Materials

**4.1 Filler Metals.** The brazing filler metal to be used as well as its quantity, dimensions, and placement should be specified on the engineering drawing or accompanying documents and should meet the requirements of AWS A5.8, *Specification for Filler Metals for Brazing and Braze Welding*, unless otherwise specified

<sup>1</sup> AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.