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

Supersedes AWS C3.3-80

Prepared by
AWS C3 Committee on Brazing and Soldering

Under the Direction of
AWS Technical Activities Committee

Approved by
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.
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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 inspection 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 sections addressing materials, design, manufacturing, and inspection. These sections are followed by Annex A, which presents sample specifications that are intended as guides for the preparation of the user’s documents; Annex B, which presents a discussion of brazing risk management; Annex C, which presents a table relating to the quantification of the scope and magnitude of braze-induced discontinuities; and Annex D, which presents guidelines for the preparation in inquiries for AWS technical committees.

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. However, safety and health considerations are not addressed in this standard. The user is advised to consult (1) the manufacturer’s instructions and Material Safety Data Sheets (MSDSs) for the material and equipment used and (2) federal, state, and local regulations. Additional information on safety and health is included in ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes, and Chapter 10, “Safety and Health,” of the American Welding Society’s (AWS) Brazing Handbook.

2. Referenced Documents

The following standards contain provisions which, through reference in this text, constitute provisions of this AWS standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this AWS standard are encouraged to investigate the possibility of applying the most recent editions of the documents shown below. For undated references, the latest edition of the standard referred to applies.

(1) AWS BRH, Brazing Handbook
(2) ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes
(3) AWS A3.0:2001, Standard Welding Terms and Definitions
(4) AWS A5.8, Filler Metals for Brazing and Braze Welding
(5) AWS A5.31, Specification for Fluxes for Brazing and Braze Welding
(6) AWS B2.2, Standard for Brazing Procedure and Performance Qualification
(7) AWS C3.8, Recommended Practices for Ultrasonic Inspection of Brazed Joints

These documents can be obtained from the following sources:
American Welding Society (AWS), 550 N.W. LeJeune Road, Miami, FL 33126 (www.aws.org).

3. Terms and Definitions

For the purposes of this document, the following 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.