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<b>DOCUMENT SUMMARY PAGE</b>			
<i>C3.13M/C3.13: 202X, Specification for Controlled Atmosphere Brazing (CAB) of Aluminum</i>			
<b>Date</b>	<b>Draft</b>	<b>Initials</b>	<b>Action</b>
01/08/2020	PD	KRB	Prepared Preliminary Draft
09/09/2020	PD	KRB	Incorporated suggestions as per Hui Zhao email dated 03/19/2020: 1.4 Ordering Information 5.3.1 Brazing Filler Metals 5.3.2 Fluxes 5.5 Qualification of Brazing Procedure Specification (BPS) and Personnel 6.3 Sequence of Inspection and Manufacturing Operations 6.4.3.6 Dye Penetrant Examination
10/20/2020	PD	KRB	Performed final editorial review of document: Inserted latest Statement of Use, Normative References, and Terms and Definitions boilerplate text Modified fonts in Personnel and Annex B Removed all Track Changes for C3D Draft Review
10/13/2022	PD	KRB	Draft approved to go to subcommittee ballot
03/06/2023	WD1	KRB	Incorporated editorial comments from C3.13-E1-WD1-BS ballot
05/15/2023	WD2	KRB	Incorporated proposals from C3.13 Task Group teleconference
06/19/2023	WD2	KRB	Incorporated proposals from C3.13 Task Group teleconference
10/12/2023	WD2	KRB	Draft approved to go to Main Committee ballot
02/07/2024	CD2	KRB	Incorporated proposals from C3.13-E1-CD1-BM ballot
04/18/2024	CD2	KRB	Incorporated changes made during C3D meeting.
08/27/2024	CD2	KRB	Incorporated Hui Zhao's Item 16 proposal
10/10/2024	CD2	KRB	C3D Committee voted to approve draft for publication and move to the next round of balloting
10/11/2024	CD2	KRB	C3 Committee voted to approve draft for publication and move to the next round of balloting
01/23/2025	CD3	KRB	Incorporated change to Clause 4 (from C3.6 Task Group meeting)
03/27/2025	CD4	KRB	Made changes during C3D Meeting
03/28/2025	CD4	KRB	C3 Committee approves to publish, document becomes an DS1.



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**AWS C3.13M/C3.13:202X**  
**An American National Standard**

**Approved by**  
**American National Standards Institute**  
[Month, Day, Year]

**Specification**  
**For**  
**Controlled Atmosphere Brazing (CAB) of Aluminum**

**1<sup>st</sup> Edition**

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

Under the Direction of  
AWS Technical Activities Committee

Approved by  
AWS Board of Directors

**Abstract**

This specification provides the minimum fabrication, equipment, and process procedure requirements, as well as inspection requirements for the controlled atmosphere brazing (CAB) of aluminum. This specification provides criteria for classifying CAB brazed aluminum joints based on loading and the consequences of failure and quality assurance criteria defining the limits of acceptability in each class. The specification defines acceptable CAB aluminum brazing equipment, materials, and procedures, as well as the required inspection for each class of joint.





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ISBN Print: XXX-X-XXXXX-XXX-X  
ISBN PDF: XXX-X-XXXXX-XXX-X

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This standard is subject to revision at any time by the AWS C3 Committee on Brazing and Soldering. 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 requested and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS C3 Committee on Brazing and Soldering 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 C3 Committee on Brazing and Soldering 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.



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# **Personnel**

[To be inserted at typesetting]

**AWS C3 Committee on Brazing and Soldering**

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## Foreword

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

This specification is one of a series prepared at the request of the Aerospace Materials Division (AMD) of the Society of Automotive Engineers (SAE) and a number of other organizations to replace the military specification MIL-B-7883, *Brazing of Steels, Copper, Copper Alloys, Nickel Alloys, Aluminum, and Aluminum Alloys*, which addressed all brazing processes. It became both obsolete and very cumbersome as brazing technology proliferated and became more complex.

Addressing all of the diverse brazing processes in one concise, easily understood document was found to be impractical; therefore, a series of five independent specifications on brazing have been written, all in the same format. These are AWS C3.4M/C3.4, *Specification for Torch Brazing*; the present document, AWS C3.5M/C3.5, *Specification for Induction Brazing*; AWS C3.6M/C3.6, *Specification for Furnace Brazing*; AWS C3.7M/C3.7, *Specification for Aluminum Brazing*; and AWS C3.8M/C3.8, *Specification for the Ultrasonic Pulse-Echo Examination of Brazed Joints*.

This document is a response to the need of developing a specification devoted to controlled atmosphere brazing (CAB) of aluminum to provide requirements to those manufacturers considering and/or adopting this process. CAB brazing of aluminum has been very successfully used in manufacturing various products in recent years. More applications of controlled atmosphere brazing in production of aluminum parts are predicted. Current specification on aluminum brazing, AWS C3.7M/C3.7, *Specification for Aluminum Brazing*, provides limited information relating to the state-of-the-art CAB process. Therefore, it is important to provide an independent specification that addresses requirements related to the CAB aluminum brazing process for users and those new to the process.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS C3 Committee on Brazing and Soldering, American Welding Society, 8669 NW 36<sup>th</sup> St, Suite 130, Miami, FL 33166.



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# Specification for Controlled Atmosphere Brazing (CAB) of Aluminum

## 1. General Requirements

**1.1 Scope.** This specification presents the minimum fabrication and quality requirements for the furnace brazing of aluminum and aluminum alloys under controlled gas atmosphere and normally with the assistance of fluxes. Note that other processes of brazing aluminum alloys are addressed in AWS C3.7M/C3.7, *Specification for Aluminum Brazing*.

The purpose of this specification is to standardize the process requirements of controlled atmosphere brazing (CAB) of aluminum and assure the quality of the brazed joint meets the design requirement. This document establishes minimum requirements for processes and products with a minimum of explanatory information so that sources of ambiguity are minimized. It assigns responsibility for the ultimate quality of the brazed product to the Organization Having Quality Responsibility (OHQR) and permits that organization to modify requirements if appropriate to the application. It requires proper documentation of any such modifications.

**1.2 Order of Authority.** The brazing process shall be subjected to the following order of authority, least-to-highest: this specification, assembly drawing, contract or purchase order, and the Organization Having Quality Responsibility (OHQR). That is, the final responsibility for all aspects of the brazing process (including, but not limited to, materials, equipment, heating cycle, calibration, etc.) and brazed assembly quality (including, but not limited to, inspection methods, inspection criteria, rework, etc.) rests with the OHQR. The OHQR has the authority to make any modifications to the requirements document(s) and to stipulate those modifications to the brazing operator. Any such modifications shall be fully documented by the OHQR.

**1.3 Units of Measurement.** This standard makes use of both the International System of Units (SI) and U.S. Customary Units. The latter are shown in brackets ([ ]) or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore each system must be used independently.

**1.4 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 the materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers

Applicable Regulatory Agencies:

- (1) United States Department of Labor, Occupational Safety & Health Administration (OSHA)
- (2) Equivalent agencies of other countries and individual states

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.

See 5.6 for supplemental safety and health information.