AEROSPACE MATERIAL SPECIFICATION

AMS2673™	REV. F

Issued 1960-06
Reaffirmed 2018-02
Revised 2022-08

Superseding AMS2673E

Brazing, Aluminum and Aluminum Alloys Molten Flux (Dip)

RATIONALE

AMS2673F results from a Five-Year Review and update of this specification with the addition of ordering information, added reference to destructive testing to coverage (3.6.2), reworded and clarified chlorides (3.6.5.1) and fluorides (3.6.5.2) to state the same requirements as in AMS2472, changed flux removal to halide test in acceptance tests (4.2.1), deleted destructive coverage test from periodic testing (4.2.2) as it is a required acceptance test, added suspension of periodic testing per general agreement, added note 2 to Table 1 sampling for acceptance testing that requires sampling to be agreed upon when lot sizes are less than 40, and revised dimensions and properties statement to reflect that some SI units are primary (8.4).

NOTICE

ORDERING INFORMATION: The following information shall be provided to the brazing processor by the purchaser.

1. Purchase order shall specify not less than the following:
   - AMS2673F
   - Quantity of pieces to be brazed
   - Method for determining area joined by filler metal (3.6.2)
   - Standards for acceptance and method of test when proof test is required (3.6.3)
2. Parts manufacturing operations such as heat treating, forming, joining and media finishing can affect the condition of the substrate for brazing, or if performed after brazing, could adversely affect the brazed part. The sequencing of these types of operations should be specified by the cognizant engineering organization or purchaser and is not controlled by this specification.

1. SCOPE

1.1 Purpose

This specification covers the requirements for producing brazed joints of aluminum and aluminum alloys by immersion in a molten flux bath.

1.2 Application

This process has been used typically for joining aluminum and selected aluminum alloys.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS2673F/

1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards that may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS3415 Flux, Aluminum Dip Brazing, 1030 °F (554 °C) or Lower Liquidus

AMS4063 Aluminum Alloy, Clad One Side, Sheet, 1.25Mn - 0.12Cu (No. 11-0 Brazing Sheet), Annealed

AMS4064 Aluminum Alloy, Clad Two Sides Sheet, 1.25Mn - 0.12Cu (No. 12-0 Brazing Sheet), Annealed

AMS4185 Filler Metal, Aluminum Brazing, 12Si

AMS4255 Aluminum Alloy, Clad One Side Sheet, 0.6Mg - 0.35Si - 0.28Cu (No. 21 Brazing Sheet), As Fabricated

AMS4256 Aluminum Alloy, Clad Two Sides Sheet, 0.6Mg - 0.35Si - 0.28Cu (No. 22 Brazing Sheet), As Fabricated

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D1179 Fluoride Ion in Water

ASTM D1193 Reagent Water

3. TECHNICAL REQUIREMENTS

3.1 Materials

3.1.1 Filler metal shall be aluminum brazing alloy conforming to AMS4185 except as specified in 3.3.2.

3.1.2 Flux shall conform to AMS3415 or other suitable flux.

3.2 Equipment

3.2.1 Preheat furnace shall be maintained within the range 900 to 1050 °F (482 to 566 °C).

3.2.2 Salt-bath furnace shall be a ceramic-type maintained within ±10 °F (±6 °C) of a selected temperature within the range 1050 to 1200 °F (566 to 649 °C).

3.3 Preparation

3.3.1 Surface Condition

Surfaces to be joined shall be free from water breaks prior to assembly. See 8.2.

3.3.2 Assembly

Clearances between mating surfaces of detail parts to be brazed shall be held within specified tolerances. The assembly shall be supported so that the parts will be in proper alignment throughout brazing. Jigs, fixtures, and clamps shall be fabricated from material that will not significantly contaminate the flux bath. Stop-off may be used provided it does not contaminate the molten flux bath. On closed assemblies, vent holes shall be provided as specified. Except when parts are fabricated from clad brazing sheet such as AMS4063, AMS4064, AMS4255, or AMS4256, the filler metal shall be positioned at one end of the joint. Filler metal shall be placed at the blind end of each blind joint when accessible. When specified, filler metal may be placed within the joint prior to assembly for brazing. When parts are made from clad sheet, the clad surface shall be in contact with the intended mating surfaces.

3.3.3 Tack welding shall be used only when specified or permitted by the cognizant engineering organization.

3.4 Joining

Assembled details shall be preheated in a furnace to an established temperature within the range 900 to 1050 °F (482 to 566 °C) and transferred immediately into the molten flux bath. Temperature of the flux bath shall be maintained within 10 °F (6 °C) degrees of a temperature established so as to preclude incipient melting, excessive alloying of the joint, and distortion in excess of dimensional requirements. Time in flux bath should be established using a pilot assembly in order to ensure complete filler metal penetration through the joint and limiting excessive alloying or erosion.

3.4.1 Cooling

After brazing, assemblies shall be cooled in a manner that prevents cracks and minimizes internal stress, distortion, scaling, and oxidation. If solution heat treatment is to be performed in conjunction with brazing, cooling procedures may be revised accordingly.

3.5 Flux Removal

After brazing and cooling, flux shall be removed by a method that is not injurious to the surface finish and that will not remove metal below the drawing tolerances. The test of 3.6.5 shall be used to determine that flux has been adequately removed.

3.6 Properties

Brazed assemblies shall conform to the following requirements:

3.6.1 Appearance

Examination of the visible joint edges shall show a complete line or ring of filler metal between component parts at both ends of the joint.

3.6.1.1 The total accumulated length of any pinhole, void (within braze filler), or filler metal skip (no presence of braze filler), extending into the joint, shall not exceed 10% of the total length of the fillet. Individual pinholes, voids, or filler metal skips shall not exceed 3/32 inch (2.4 mm).

3.6.1.2 Cracks in filler metal or parent metal are not acceptable.

3.6.1.3 Overheating resulting in blisters on the base metal or eutectic melting is not acceptable.

3.6.1.4 Residual flux is not permissible on surfaces of the assembly.