SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

AMS 3415D

Issued 1960-06
Revised 2006-08
Reaffirmed 2011-04
Superseding AMS 3415C

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

RATIONALE

This specification revision was issued as part of the SAE Five Year Review process.

1. SCOPE

1.1 Form

This specification covers the requirements for an aluminum brazing flux in granular form.

1.2 Application

This product has been used typically for dip brazing of aluminum and aluminum alloys at temperatures above 1050 °F (564 °C), but usage is not limited to such applications.

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 which 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 canceled 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 724-776-4970 (outside USA), www.sae.org.

AMS 2673	Aluminum Molten Flux (Dip) Brazing
AMS 4001	Aluminum Sheet and Plate, 0.12Cu (11000), Annealed

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**

2.2 ANSI Publications

Available from American National Standards Institute, Inc. (ANSI), 25 West 43rd Street, New York, NY 10036, Tel: 212-642-4900, www.ansi.org

Z49.1 Safety in Welding and Cutting

2.3 AWS Publications

Available from American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126 or www.aws.org.

AWS A5.31 Specification for Fluxes for Brazing and Braze Welding

2.4 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.

29 CFR 1910.1200 OSHA's Hazard Communication Standard

3. TECHNICAL REQUIREMENTS

3.1 Material

The flux shall be a uniformly blended mixture, primarily metallic chlorides with the addition of metallic fluorides. Other metallic salts of alkaline metals are permitted as required to assist in fluxing ability.

3.1.1 The flux, used in conjunction with aluminum brazing alloys in accordance with AMS 2673, shall produce satisfactory brazed joints acceptable to purchaser.

3.2 Properties

Flux shall conform to the following requirements:

3.2.1 On heating or cooling, flux shall be fully molten at 1030 °F (554 °C). The liquidus of the flux shall be 1030 °F (554 °C) or lower.

3.2.2 Flux shall not etch parent metal to an extent greater than indicated by the following test:

3.2.2.1 A coupon of aluminum alloy 1100 or 3003, nominally 0.025 × 1 × 6 inches (0.64 × 25 × 152 mm), immersed for two minutes ± 0.2 in a bath of dehydrated molten flux at 1120 °F ± 10 (604 °C ± 6) shall not be reduced more than 0.001 inch (0.025 mm) in thickness.

3.2.3 Flux adhering to brazed assemblies shall be removable by either: 1) water at 190 °F (88 °C) or hotter or 2) by the hot water followed by immersion for not more than 15 minutes in a 10% (approx) solution of nitric acid to which 0.25% (approx) hydrofluoric acid is added, at a solution temperature not higher than 100 °F (38 °C).

3.2.4 The flux shall not contain more than 5% by weight water as determined by the water content test in accordance with AWS A5.31.

3.2.5 Flux shall pass the fluidity test in accordance with AWS A5.31.

3.2.6 Flux shall pass the flow test in accordance with AWS A5.31.

The shelf life shall be a minimum of six months from date of manufacture when stored in its original unopened container.

3.3 Quality

Flux, as received by purchaser, shall be a uniformly blended mixture free from contaminants and foreign materials detrimental to usage of the flux.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The supplier of flux shall supply all samples for supplier's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the flux conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are preproduction tests and shall be performed at a frequency as agreed upon with the purchaser.

4.3 SampLing and Testing

At least one randomly selected sample of flux from the lot selected for test; a lot shall be all flux in an identifiable quantity processed at one time and presented for inspection at one time.

4.4 Approval

Supplier shall assign to the product an identification of letters and/or numbers, traceable to a specific set of ingredients, methods of manufacture and manufacturing controls. If it is necessary to make any changes to the ingredients or proportions of ingredients, methods of manufacture, or to manufacturing controls, that unique name, number or series of letters and/or numbers shall be changed (See 5.1).

4.5 Reports

The supplier of flux shall furnish with each shipment a report stating that the flux conforms to the technical requirements. This report shall include the purchase order number, lot number, AMS 3415D, date of manufacture, and quantity.

4.5.1 A material safety data sheet conforming to 29 CFR 1910.1200, or equivalent, shall be supplied to each purchaser prior to, or concurrent with, the report of preproduction test results or, if preproduction testing be waived by purchaser, concurrent with the first shipment of flux for production use. Each request for modification of flux formulation shall be accompanied by a revised data sheet for the proposed formulation.

4.6 Resampling and Retesting

If any sample used in the above tests fails to meet the specified requirements, disposition of the flux may be based on the results of testing three additional samples for each original nonconforming sample. Failure of any retest sample to meet the specified requirements shall be cause for rejection of the flux represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Identification

Each package of flux shall be permanently and legibly marked with not less than the following information:

FLUX, ALUMINUM DIP BRAZING
AMS 3415D
WEIGHT OF CONTENTS _____
MANUFACTURER'S IDENTIFICATION _____
LOT NUMBER _____
DATE OF MANUFACTURE _____
PURCHASE ORDER NUMBER _____

5.1.1 Flux may be packaged in small quantities and delivered under basic lot approval provided lot identification is maintained.

5.1.2 Warning Label

The following label shall be prominently displayed and permanently affixed to each package of flux, including each individual unit package, with the following, as a minimum:

Warning: CONTAINS FLUORIDES. Protect yourself and others.
Read and understand this label

FUMES AND GASES can be dangerous to your health.

* Before use, read and understand the manufacturer's instructions. Material Safety Data Sheets, (MSDSs), and your employer's safety practices.
* Keep your head out of the fumes.
* Use enough ventilation to keep fumes and gases away from your breathing zone and the general area.
* Avoid contact of flux with eyes and skin.
* Do not take internally.
* Keep out of reach of children.
* See American National Standard Z49.1 and OSHA Safety and Health Standards 29 CFR 1910.

First Aid: In the case of eye contact, flush immediately with clean water for at least 15 minutes. If swallowed, induce vomiting. Never give anything by mouth to an unconscious person. Call a physician.

DO NOT REMOVE THIS LABEL

5.2 Packaging

5.2.1 Flux shall be supplied in 8 ounce (227 g), 16 ounce (454 g), or 5 pound (2.3 kg) containers, and 50 pound (22.7 kg), 100 pound (45.4 kg), 200 pound (90.7 kg), and 400 pound (181.4 kg) fiber drums with an interior polyethylene bag sealed by a twisted plastic coated wire, or the flux shall be supplied in 100 pound (45.4 kg) self-sealing 0.006 inch (0.15 mm) thick low-density polyethylene bags, stacked on a wooden pallet for bulk shipments.

5.2.2 Flux shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

6. ACKNOWLEDGMENT

The supplier shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.