



AEROSPACE MATERIAL SPECIFICATION

AMS 3411A
Superseding AMS 3411

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

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FLUX, SILVER BRAZING High Temperature

1. SCOPE:

1.1 Form: This specification covers a silver-brazing flux in paste form.

1.2 Application: Primarily for silver brazing nickel alloys, ferrous metals (including Austenitic steels), and tungsten and chromium carbides, at temperatures between 1100°F (593°C) and 1800°F (982°C). May also be used for critical heating applications involving long heating cycles for high temperature brazing, or for uneven heating cycles such as quick induction heating applications.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania, 19103.

ASTM E11 - Wire-Cloth Sieves for Testing Purposes

3. TECHNICAL REQUIREMENTS:

3.1 Material: The flux shall be an intimately blended mixture of uniform consistency and shall be an acid fluoride base containing 0.5 - 1.5% powdered metallic boron and not more than 35% water by weight. It shall not separate in the container to such an extent that it cannot be restored to uniform consistency by stirring.

3.2 Properties:

3.2.1 The flux, diluted with water as required, shall have acceptable fusibility and acceptable application and fluxing characteristics, and shall produce satisfactory brazed joints of any type on copper and nickel alloys, all types of steels including corrosion resistant types, and tungsten and chromium carbides, when used in conjunction with silver brazing filler metal. Methods of determining acceptability of flux performance shall be as agreed upon between purchaser and vendor.

3.2.2 Flux shall withstand heating in a suitable container to not lower than 1650°F (899°C) and holding at heat for 30 min. without appreciable change in physical characteristics except the loss of its black color; loss of water shall not be considered as change in characteristics. On heating, flux shall fuse at 1100°F (593°C) or lower; on cooling from 1650°F (899°C) flux shall remain in the liquid state until temperature drops to 1150°F (621°C) or lower.

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- 3.2.3 Flux placed on a U.S. Standard 30-mesh sieve conforming to ASTM E11 and worked lightly with a brush, shall pass completely through the sieve. If the flux has partially coagulated in the container, the flux may, before conducting the test, be warmed over a water bath until it has returned to its normal consistency.
- 3.2.4 Flux shall not produce, during use, a flame or smoke of sufficient intensity to obscure the work; however, the dark opaque nature of the flux is a distinctive feature when it initially fuses or melts.
- 3.2.5 Flux shall be soluble in water in 175°F (79°C) or lower after being subjected to normal brazing operations.
- 3.3 Quality: Flux shall be free from all substances which might affect its serviceability.
4. QUALITY ASSURANCE PROVISIONS:
- 4.1 Responsibility for Inspection: The vendor of flux shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the flux conforms to the requirements of this specification.
- 4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as acceptance or routine control tests.
- 4.3 Sampling: At least one randomly selected sample of flux per batch shall be used for testing. A batch shall be all flux in an identifiable quantity processed at one time and presented for inspection at one time.
- 4.4 Approval:
- 4.4.1 Sample flux shall be approved by purchaser before flux for production use is supplied, unless such approval be waived. Results of tests on production flux shall be essentially equivalent to those on the approved sample.
- 4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production flux which are essentially the same as those used on the approved sample flux. If any change is necessary in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the revised materials and processing and, when requested, sample flux. No production flux made by the revised procedure shall be shipped prior to receipt of reapproval.
- 4.5 Reports: The vendor of flux shall furnish with each shipment three copies of a report stating that the flux conforms to the technical requirements of this specification. This report shall include the purchase order number, material specification number and its revision letter, batch number, date of manufacture, and quantity.
- 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 and no additional testing shall be permitted. Results of all tests shall be reported.