



AEROSPACE MATERIAL SPECIFICATION

AMS3688™**REV. B**

Issued 1974-03
Revised 1988-10
Reaffirmed 2022-08

Superseding AMS3688A

Adhesive, Foaming, Honeycomb Core Splice, Structural
-55 to +82 °C (-65 to +180 °F)

RATIONALE

AMS3688B has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE:

1.1 **Form:** This specification covers a foaming-type, heat-curing, resin-base adhesive in the form of paste or sheet.

1.2 **Application:** Primarily for use in splicing aluminum alloy or nonmetallic honeycomb core and for providing a shear tie between core edges and inserts or edge members in honeycomb assemblies for use over the range -55° to +82°C (-65° to +180°F). It is useful for filling gaps between core faces which are inserted into channels or similar areas where bonding pressure cannot be obtained.

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

2.1 **SAE Publications:** Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

AMS 2825 - Material Safety Data Sheets

AMS 4037 - Aluminum Alloy Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn
(2024-T3 Flat Sheet, -T351 Plate)

AMS 4348 - Honeycomb Core, Aluminum Alloy, Corrosion Inhibited, for
Sandwich Construction, 5052, 350 (175)

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SAE WEB ADDRESS:

Full document details: SAE AMS3688B

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<https://www.sae.org/standards/content/AMS3688B/>

Documents

Document Sharing Hub

2.2 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.1 Military Specifications:

MIL-C-7438 - Core Material, Aluminum, for Sandwich Construction
MIL-A-25463 - Adhesive, Film Form, Metallic Structural Sandwich Construction

2.2.2 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: The adhesive shall be a heat-curing, nominally 120°C (250°F), resin
Ø system containing fillers and foaming agents necessary to meet the requirements of 3.2 and 3.3. The adhesive shall have low-sagging properties to ensure complete filling of core-splice gaps when splices are cured in a vertical position. Adhesive shall be suitable for splicing honeycomb core without damage to core node bonds located adjacent to the splice.

3.1.1 Sheet Adhesive: Shall be supplied as an unsupported sheet with a suitable nonadhering separator film on both surfaces.

3.1.2 Paste Adhesive: Shall be supplied as a thixotropic paste, single-component or two-part system, suitable for extrusion from a disposable cartridge or caulking gun.

3.2 Properties of Uncured Adhesive: Adhesive, as received, shall conform to the following requirements; tests shall be performed on the adhesive supplied and in accordance with test procedures specified herein:

3.2.1 Storage Life:

3.2.1.1 Single component adhesive, packaged as specified herein, shall meet the requirements of 3.3 after storage at a maximum temperature of -18°C (0°F) for up to 3 months from date of receipt from manufacturer.

3.2.1.2 Two-part paste system, as specified herein, shall meet the requirements of 3.3 after storage at the temperature and for the time specified by the manufacturer, but not less than 3 months. Manufacturer's specified storage life shall begin at date of receipt from manufacturer.

3.2.2 Working Life: Single-component adhesive, and two-part paste systems mixed in accordance with manufacturer's instructions, shall meet the requirements of 3.3 for any time up to 48 hr after exposure to a relative humidity of 50 - 70% and a temperature of 21 - 27°C (70° - 80°F); paste adhesive shall remain extrudable for this time period.

3.3 Properties of Cured Adhesive: Shall be as follows, determined on specimens prepared as in 4.5 and cured at 120°C ± 5 (250°F ± 10) for 60 min ± 5 using a heat-up rate of 2 - 3°C (3 - 5°F) minute.

3.3.1 Curing Properties:

3.3.1.1 Sagging, maximum 0.05 in. (1.3 mm) 4.5.1

3.3.1.2 Expansion Ratio, minimum 1.7 4.5.2 or 4.5.3

3.3.1.3 Peak Exotherm
Temperature, maximum 177°C (350°F)

3.3.2 Cured Properties:

3.3.2.1 Density, maximum 40 lb per cu ft (640 kg/m³) 4.5.5

3.3.2.2 Beam Shear
Strength, minimum 4.5.6
At -55°C (-65°F) 720 psi (4.95 MPa)
At +24°C (+75°F) 720 psi (4.95 MPa)
At +82°C (+180°F) 500 psi (3.45 MPa)

3.4 Quality: Adhesive, as received by purchaser, shall be uniform in quality and condition, smooth, homogeneous, and free from foreign materials and from imperfections detrimental to usage of the adhesive.

3.5 Tolerances of Sheet Adhesive: Thickness shall be as specified, ±0.010 inch (±0.25 mm). Width and length shall be 12 x 24 in. (300 x 600 mm) or as specified, +0.250 inch (+6 mm), -0.125 in. (-3 mm). Width and length of specially slit foam shall be as specified, ±0.030 in. (±0.75 mm).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of adhesive shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the adhesive conforms to the requirements of this specification.

4.2 Classification of Tests:

- 4.2.1 Acceptance Tests: Tests to determine conformance to requirements for expansion ratio (3.3.1.2) and beam shear strength at 24°C (75°F) (3.3.2.2) are classified as acceptance tests and shall be performed to represent each lot.
- 4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of adhesive to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.
- 4.2.2.1 For direct U.S. Military procurement, substantiating test data, and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling: Shall be as follows:

- 4.3.1 For Acceptance Tests: Sufficient adhesive shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.
- 4.3.1.1 A lot shall be all adhesive produced in a single production run from the same batches of raw materials and presented for vendor's inspection at one time. An inspection lot shall not exceed 500 lb (225 kg) and may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.
- 4.3.1.2 When a statistical sampling plan and acceptance quality level (AQL) for the adhesive have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6.1 shall state that such plan was used.
- 4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor. Only one panel need be tested for peak exotherm temperature (3.3.1.3).

4.4 Approval:

- 4.4.1 Sample adhesive shall be approved by purchaser before adhesive for production use is supplied, unless such approval be waived by purchaser. Results of tests on production adhesive shall be essentially equivalent to those on the approved sample.