AERONAUTICAL MATERIAL SPECIFICATIONS

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AMS 3692

Issued 1-15-60
Revised

ADHESIVE COMPOUND, EPOXY
High Temperature Application

1. ACKNOWLEDGMENT: A vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. FORM: The adhesive shall contain an epoxy resin as the basic ingredient. It shall consist of two components: an epoxy resin base and a hardener. Fillers and modifiers may be included in either component.

3. APPLICATION: An adhesive for non-structural bonding of aluminum, corrosion resistant steel, brass, and many thermosetting plastics to themselves and to each other. It is primarily intended as an adhesive for electrical components in devices operating at temperatures not higher than 500 F.

4. TECHNICAL REQUIREMENTS:

4.1 General:

4.1.1 Curing: When mixed and cured in accordance with manufacturer's recommendations, this formulation shall polymerize to a uniform material. The material shall require less than 10 psi pressure on the bond surface to achieve bond strength conforming to the requirements of this specification.

4.1.2 Pot Life: Material in 100 g batches, when mixed in accordance with manufacturer's recommendations, shall have a useful pot life of not less than 4 hr when maintained at not higher than 75 F.

4.1.3 Corrosion: The product shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service. Discoloration of metal shall not be considered objectionable.

4.2 Properties: The product, when cured to obtain maximum properties, shall conform to the following requirements; tests shall be performed in accordance with listed ASTM methods or as noted. Test specimens may be furnished by the vendor or fabricated by the user. The results shall be taken as the average value of not less than 5 samples, except as otherwise specified.

4.2.1 Adhesive Strength:

4.2.1.1 Tensile Shear at 75 F, psi, min		Note 1
As cured	2000	
After thermal cycling (See Note 2)	2000	
After thermal aging (See Note 3)	1000	
4.2.1.2 Tensile Shear at temperature extremes, psi, min		Note 1
At -65 F ± 2	1500	
At 500 F ± 10	1000	
At 500 F ± 10 after thermal aging (See Note 3)	1000	

Note 1. Tests shall be conducted in accordance with ASTM D1002-53T with the following modifications. Individual test pieces 1 x 5 x 1/8 in. may be used in sample preparation. The metal shall be AMS 5044 or equivalent steel. The tensile holding fixture shall allow sufficient offset to account for the metal thickness, and through-pin holding arrangement shall be allowable when 1/8 in. thick test pieces are used. The test piece width shall be 1 in. and the overlap area 0.5 sq inch. Bonding fixtures used shall give identical pressure on the adhesive joint from batch to batch. Bonding surface shall be freshly sandblasted to obtain a uniformly roughened surface and shall be thoroughly washed with a suitable solvent.

Note 2. Samples shall be subjected to 10 thermal cycles in air as described below and then tested at room temperature. Time at the temperature extremes shall be regulated to ± 5 minutes. One cycle shall consist of 1/2 hr at -65 F ± 2, 1/2 hr at 75 F ± 2, 1/2 hr at 212 F ± 2, and 1/2 hr at 75 F ± 2. The cycle may be extended during any 75 F conditioning period.

Note 3. Samples shall be maintained at 500 F ± 10 in a circulating air oven for 200 hr ± 12, removed from the oven, and allowed to stabilize at test temperature for not less than 2 hr before testing.

4.2.2 Fluid Resistance: The material shall be subjected to di-2-ethylhexyl sebacate +0.5% phenothiazine, ASTM Oil No. 3, and ASTM Reference Fuel B.

Weight change, %, max	2.0	Note 4

Note 4. Seventeen samples shall be prepared by dip, spray, or brush coating both sides and all edges of one half of a tared standard glass microscope slide with a uniform, bubble-free film of adhesive 0.005 - 0.020 in. thick. Thin sections on corners shall be acceptable. Samples shall be cured according to manufacturer's recommendations, weighed accurately to ± 0.0001 g, and the adhesive film weight calculated. Five samples shall be subjected to each test fluid for 96 hr at 212 F ± 2. Two samples shall be aged for 96 hr at 212 F ± 2 in a circulating air oven. Thermal aged samples shall be cooled, allowed to stabilize at 75 F in a desiccator, and weighed. Samples subjected to volatile solvents shall be cooled to 75 F in the solvent, removed from the solvent, wiped dry, and weighed immediately. Samples subjected to non-volatile fluids shall be cooled to 75 F, washed free of excess material with a suitable solvent, allowed to stabilize to a constant weight, and weighed immediately. The initial and final average weight of samples exposed to each fluid and to hot air shall be determined and the difference expressed as percent weight change. Results shall be recorded as the difference between the percent weight change of the air aged samples and the fluid aged samples.

5. QUALITY: The product shall be uniform in quality and condition, clean, and free from foreign materials and from imperfections detrimental to fabrication, appearance, or performance of parts.

6. REPORTS: Unless otherwise specified, the vendor of the product shall furnish with each shipment three copies of a report stating that the product conforms to the requirements of this specification. This report shall include the purchase order number, material specification number, form or part number, and quantity.