AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4142

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ALUMINUM ALLOY FORGINGS
4Cu - 2Ni - 1.5Mg - 0.7Si (B18S-F)

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

2. APPLICATION: Primarily cylinder heads.

3. COMPOSITION:

Copper	3.50 - 4.50
Nickel	1.80 - 2.30
Magnesium	1.30 - 1.80
Silicon	0.45 - 0.90
Iron	0.85 max
Zinc	0.25 max
Manganese	0.20 max
Chromium	0.10 max
Other Impurities, each	0.05 max
Other Impurities, total	0.15 max
Aluminum	remainder

4. CONDITION:

4.1 Forgings: As forged, unless otherwise specified.

4.2 Forging Stock: As fabricated.

5. TECHNICAL REQUIREMENTS:

5.1 Forgings: Material, when heat treated as specified in 5.1.1, shall be capable of meeting the requiremets in 5.1.2.

5.1.1 Heat Treatment: Material shall be solution heat treated by heating to not over 965 F, holding at temperature for not over 10 hr and quenching uniformly with air blast. Material shall then be aged by heating to not lower than 450 F, holding at that temperature for not less than 5 hr and cooling in air.

5.1.2 Physical Properties: The requirements in 5.1.2.1 are primarily for controlling forging stock and routine heat treatment of forgings and, unless otherwise specified, are not mandatory for acceptance of heat treated forgings when tests are made in accordance with 5.1.2.2.

5.1.2.1 Tensile test specimens, machined after heat treatment from separately forged coupons or from forging stock representing the forgings and heat treated with the forgings, or machined from prolongations on the heat treated forgings, shall conform to the following requirements:

Tensile Strength, psi	42,000 min
Yield Strength at 0.2% offset, psi	31,000 min
Elongation, % in 4D	8 min
Hardness, Brinell (1000 kg load, 10 mm ball)	90 min

5.1.2.2 Unless otherwise specified, tensile test specimens, machined from heat treated forgings, shall conform to the following requirements:

Tensile Strength, psi	40,000 min
Yield Strength at 0.2% offset, psi	28,000 min
Elongation, % in 4D	4 min

5.1.2.3 Heat treated forgings shall have hardness not lower than Brinell 85 using 500 kg load and 10 mm ball or equivalent, or not lower than Brinell 90 using 1000 kg load and 10 mm ball.

5.2 Forging Stock:

5.2.1 If a test coupon is forged from a sample of the stock, a test specimen taken from the coupon after proper heat treatment shall show the physical properties in 5.1.2.1 but this test is not required in routine inspection. If a test specimen taken from the stock after proper heat treatment shows the properties in 5.1.2.1, the test shall be accepted as equivalent to the test of a forged coupon, but this test is not required.

5.2.2 Unless otherwise specified, tolerances shall be in accordance with commercial practice for the class ordered.

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, smooth, and free from foreign materials and from internal and external defects detrimental to fabrication or to performance of parts.

7. REPORTS:

7.1 Unless otherwise specified, the vendor of forgings shall furnish with each shipment three copies of a notarized report stating that the chemical composition of the forgings conforms to the requirements specified, or shall include in the report copies of laboratory reports showing the results of tests on each lot of forging stock to determine conformance to the requirements specified. This report shall include the purchase order number, material specification number, part number, and quantity.

7.2 Unless otherwise specified, the vendor of forging stock shall furnish with each shipment three copies of a notarized report stating that the chemical composition of the stock conforms to the requirements specified. This report shall include the purchase order number, material specification number, size, and quantity.

7.3 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a notarized report showing the purchase order number, material specification number, contractor or other direct supplier of forgings, part number, and quantity. When forgings for making parts are produced or purchased by the parts vendor, that vendor shall inspect each lot of forgings to determine conformance to the requirements of this specification, and shall include in the report a certification that the forgings conform, or shall include copies of laboratory reports showing the results of tests to determine conformance.

8. IDENTIFICATION:

8.1 Forgings shall be identified in accordance with the latest issue of AMS 2808.

8.2 Forging stock shall be identified as agreed upon by purchaser and vendor.