

**AEROSPACE
MATERIAL
SPECIFICATION**

AMS 4142B

Issued 5-1-48
Revised 10-1-82

ALUMINUM ALLOY FORGINGS
4Cu - 2Ni - 1.5Mg - 0.7Si (2218-F)

This specification was declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of 10-1-82. It is recommended that this specification not be specified for new design.

This cover sheet should be attached to the "B" revision of the subject specification.

This specification is under the jurisdiction of AMS Committee "D".

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AERONAUTICAL MATERIAL SPECIFICATIONS

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AMS 4142B

Issued 5-1-48
Revised 1-15-58

ALUMINUM ALLOY FORGINGS 4Cu - 2Ni - 1.5Mg - 0.7Si (2218-F)

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

2. FORM: Die forgings and forging stock.

3. APPLICATION: Primarily for cylinder heads.

4. COMPOSITION:

Copper	3.5 - 4.5
Nickel	1.7 - 2.3
Magnesium	1.2 - 1.8
Silicon	0.9 max
Iron	1.0 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

5. CONDITION:

5.1 Forgings: As forged, unless otherwise specified.

5.2 Forging Stock: As fabricated.

6. TECHNICAL REQUIREMENTS:

6.1 Forgings: Material shall conform to the following requirements after being solution heat treated by heating to not higher than 965 F, holding at heat for not more than 10 hr, and quenching uniformly in an air blast and then precipitation heat treated by heating to not lower than 450 F, holding at heat for not less than 5 hr, and cooling in air.

6.1.1 Tensile Properties:

6.1.1.1 Test Specimens: Test specimens machined from prolongations on forgings or from separately forged coupons shall conform to the following requirements:

Tensile Strength, psi	42,000 min
Yield Strength at 0.2% Offset or at 0.0099 in.	
in 2 in. Extension Under Load (E = 10,500,000), psi	31,000 min
Elongation, % in 4D	8 min

- 6.1.1.2 Forgings, With Grain Flow: Test specimens machined from forgings, with axes approximately parallel to the forging flow lines, shall conform to the following requirements:

Tensile Strength, psi	40,000 min
Yield Strength at 0.2% Offset or at 0.0093 in. in 2 in. Extension Under Load ($E = 10,500,000$), psi	28,000 min
Elongation, % in 4D	4 min

- 6.1.2 Hardness: Forgings and test specimens shall have hardness not lower than Brinell 85 using 500 kg load and 10 mm ball or 1000 kg load and 9/16 in. ball, or not lower than Brinell 90 using 1000 kg load and 10 mm ball.

6.2 Forging Stock:

- 6.2.1 When a sample of stock is forged to a test coupon and heat treated as in 6.1, a tensile test specimen taken from the heat treated coupon shall have properties not lower than those specified in 6.1.1.1 and 6.1.2. If a test specimen taken from the stock after heat treatment as in 6.1 has properties not lower than those specified in 6.1.1.1 and 6.1.2, the test shall be accepted as equivalent to the test of a forged coupon. Neither of these tests is required in routine inspection.

- 6.2.2 Unless otherwise specified, tolerances shall be in accordance with AMS 2201.

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

8. REPORTS:

- 8.1 Unless otherwise specified, the vendor of die forgings shall furnish with each shipment three copies of a report stating that the forgings conform to the chemical composition and technical requirements of this specification. This report shall include the purchase order number, material specification number, size or part number, and quantity.
- 8.2 Unless otherwise specified, the vendor of forging stock shall furnish with each shipment three copies of a 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.
- 8.3 Unless otherwise specified, the vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number, contractor or other direct supplier of material, part number, and quantity. When material for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of material to determine conformance to the requirements of this specification, and shall include in the report a statement that the material conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.