AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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AMS 4140

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ALUMINUM ALLOY FORGINGS
Copper Nickel Magnesium (18S-T)

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

2. FORM: Forgings primarily for pistons, or as ordered.

3. COMPOSITION:

Copper	3.5 - 4.5
Nickel	1.7 - 2.3
Magnesium	0.45 - 0.9
Iron	1.0 max
Silicon	0.9 max
Manganese	0.2 max
Other Impurities, each	0.03 max
Aluminum	remainder

4. CONDITION: (a) Quenched and aged. The quenching rate shall not be faster than that of boiling water.

(b) Tensile test bars may be machined from a portion of the purchased material parallel to the direction of metal flow, or from separately forged coupons from the same lot and heat treated with the forgings which they represent. These test bars shall conform to the following minimum physical properties:

Tensile Strength, lb per sq in.	55,000
Yield Strength (0.2% Set), lb per sq in.	40,000
Equivalent Extension Under Load, inch in 2 in.	0.0118
Elongation, % in 2 in.	10
Brinell Hardness	100

(c) Forgings shall have a hardness of not less that Brinell 100, or the equivalent.

(d) Pistons, after rough machining, shall be capable of being heated at 450°F for 5 hours and retaining a hardness of not less than Brinell 90, using 500 Kg load and the 10 mm ball, or the equivalent, or not less than Brinell 93, using 1000 Kg load and the 10 mm ball.

5. QUALITY: This material shall be of uniform quality, free from blisters, fins, seams, laps, cracks, segregations and other defects which affect its strength, use, or machinability. It is subject to coarse etching, and any other tests necessary to insure high quality. If material defects are revealed while machining the parts, the material is subject to rejection.

6. REPORTS: Unless otherwise specified, the manufacturer shall furnish three copies of a notarized report showing the results of physical tests and stating that the material is within the chemical requirements. This report shall include the purchase order number, material specification number, size or part number, and quantity.