

AERONAUTICAL MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
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STEEL - CARBURIZING Nickel Molybdenum

1. ACKNOWLEDGMENT: A vendor must mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. FORM: Bars, billets, forgings, tubing, or as ordered.
3. COMPOSITION:

Carbon	0.18 - 0.23
Manganese	0.45 - 0.65
Phosphorus	0.040 max
Sulphur	0.050 max
Nickel	1.65 - 2.00
Molybdenum	0.20 - 0.30
4. GRAIN SIZE: 5 or finer, A.S.T.M. E19-39T, method a, unless otherwise ordered. A heat of steel predominately 5 or finer, with grains as large as 3, is permissible.
5. HARDENABILITY: Specimens with sections 1/8 inch and 3/8 inch in thickness, and not greater than 2 square inches in area, cut to represent an area half way between the center and outside of the bar or forging, shall be ground and copper plated, placed in a furnace which is at 1500°F, and allowed to heat to 1500°F, held 25 minutes and quenched in commercial paraffin oil (100 S.U.V. at 100°F) at room temperature. The specimens shall have a hardness within the limits of Rockwell C 32-45.
6. CONDITION: (a) Bar stock must be supplied in a machinable condition with a hardness of not more than Brinell 229, unless otherwise ordered. Forgings are to be supplied as ordered.

(b) Stock ordered for forgings must be supplied in the condition and finish ordered by the forging manufacturer.
7. QUALITY: (a) This material must be aircraft quality. It shall be sound, clean, commercially straight and must not reveal defects during forging, heat treating, or machining.

(b) Unless otherwise stated, finished parts are subject to magnetic inspection.
8. REPORTS: The manufacturer shall furnish three copies of a notarized report of the results of chemical analysis and grain size on each heat and size on each shipment. This report shall include the purchase order number, heat number, material specification number, size, and quantity in each heat. If forgings are supplied, the part number and size of steel used to make the forgings shall also be included.
9. SHIPMENTS: A shipment of material shall not contain more than one heat of steel for each forging part number or each bar size. More than one heat of steel shall not be supplied on a purchase order without permission, unless the order is for more than 5 tons.