

AEROSPACE

MATERIAL SPECIFICATIONS

AMS 6320E

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

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STEEL BARS AND FORGINGS 0.50Cr - 0.55Ni - 0.25Mo (0.33 - 0.38C) (SAE 8735)

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **FORM:** Bars, forgings, and forging stock.
3. **APPLICATION:** Parts with sections 0.75 in. or less in thickness at the time of heat treatment which require a through-hardening steel capable of developing hardness as high as Rockwell C 40 when properly hardened and tempered.

4. **COMPOSITION:**

	min	max
Carbon	0.33	0.38
Manganese	0.75	1.00
Silicon	0.20	0.35
Phosphorus	--	0.040
Sulfur	--	0.040
Chromium	0.40	0.60
Nickel	0.40	0.70
Molybdenum	0.20	0.30

- 4.1 **Check Analysis:** Composition variations shall meet the requirements of the latest issue of AMS 2259, paragraph titled "Low Alloy Steels".

5. **CONDITION:**

- 5.1 **Bars:** In a machinable condition and hot finished having hardness not higher than Brinell 229 or equivalent, except that bars ordered cold finished may have hardness as high as Brinell 241 or equivalent.
- 5.2 **Forgings:** As ordered.
- 5.3 **Forging Stock:** As ordered by the forging manufacturer.

6. **TECHNICAL REQUIREMENTS:** When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no commitment to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and applying technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against infringement of patents."

6.1 Hardenability: The hardenability shall be J45=5 min and J41=6 min when determined on the standard end-quench test specimen in accordance with the SAE Method of Determining Hardenability published in the latest issue of the SAE Handbook, except that the steel shall be normalized at $1700\text{ F} \pm 10$ ($926.7\text{ C} \pm 5.6$) and the test specimen austenitized at $1500\text{ F} \pm 10$ ($815.6\text{ C} \pm 5.6$). The hardenability test is not required on a product which will not yield a suitable specimen but the steel from which the product is made shall conform to the hardenability specified.

6.2 Grain Size: Predominantly 5 or finer with occasional grains as large as 3 permissible, determined in accordance with ASTM E112, Appendix III, Section A1, Treatment (1) (McQuaid-Ehn Test).

6.3 Decarburization:

6.3.1 Bars ordered ground, turned, or polished shall be free from decarburization on the ground, turned, or polished surfaces.

6.3.2 Allowable decarburization of bars or billets ordered for redrawing or forging, or to specified microstructural requirements shall be as agreed upon by purchaser and vendor.

6.3.3 Decarburization of bars to which 6.3.1 or 6.3.2 is not applicable shall be not greater than the following:

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	Up to 0.375, incl	0.010
	Over 0.375 to 0.500, incl	0.012
	Over 0.500 to 0.625, incl	0.014
	Over 0.625 to 1.000, incl	0.017
	Over 1.000 to 1.500, incl	0.020
	Over 1.500 to 2.000, incl	0.025
	Over 2.000 to 2.500, incl	0.030
	Over 2.500 to 3.000, incl	0.035
	Over 3.000 to 4.000, incl	0.045

6.3.4 Unless otherwise agreed upon by purchaser and vendor, decarburization shall be measured by the microscopic method, or by Rockwell Superficial 30-N scale hardness method, or equivalent hardness testing method, on hardened but untempered specimens protected during heat treatment to prevent changes in surface carbon content. Depth of decarburization, when measured by a hardness method, is defined as the perpendicular distance from the surface to the non-decarburized depth under that surface below which there is no further increase in hardness. Measurements shall be far enough away from any adjacent surface to be uninfluenced by any decarburization or lack of decarburization thereon.