

300M Ultra-High-Strength Alloy Steel — Material Data Sheet

AMS 6257 · AMS 6419 · AMS 6417 (vacuum-arc remelted) · UNS K44220 · AISI 4340 modified (silicon, vanadium)
Silicon-modified 4340, 280 ksi class

4340 with about 1.6 percent silicon and vanadium for 280 ksi and above — one of the highest-strength low-alloy steels, and the standard landing-gear alloy.

TENSILE, AMS 6417 MIN	270 ksi	SILICON	1.45–1.80 %
TENSILE, TYPICAL (575 °F TEMPER)	about 285 ksi	CARBON (AMS 6257)	0.40–0.44 %
YIELD, AMS 6417 MIN	220 ksi	MAGNETIC	Yes

Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — 300M (UNS K44220), AMS 6257

Element	Symbol	Min %	Max %
Carbon	C	0.40	0.44
Manganese	Mn	0.65	0.90
Phosphorus	P	—	0.010
Sulfur	S	—	0.008
Silicon	Si	1.45	1.80
Nickel	Ni	1.65	2.00
Chromium	Cr	0.70	0.95
Molybdenum	Mo	0.30	0.50
Vanadium	V	0.05	0.10
Copper	Cu	—	0.35

Limits per AMS 6257, confirmed by titanium.com, Service Steel Aerospace and Gautier Specialty Metals. AMS 6419 allows carbon 0.40–0.45 %; AMS 6417 is lower, about 0.38–0.43 %, and some sources give sulfur 0.010 % max for it.

Physical properties (typical)

DENSITY	0.283 lb/in ³ (7.84 g/cm ³)
THERMAL EXPANSION (0–200 °F)	6.3 µin/in·°F
THERMAL CONDUCTIVITY	37.5 W/m·K
MAGNETIC	Yes

Heat treatment

Normalize at 1700 °F. Harden by austenitizing at about 1600 °F and oil quenching, then double temper (2 + 2 h) at 500 to 600 °F, typically 575 °F. The steel is sensitive to hydrogen embrittlement, so plated parts are baked after plating.

Mechanical properties — 300M

Condition	Tensile strength (ksi)	Yield strength 0.2% offset (ksi)	Elongation (%)	Reduction of area (%)	Hardness
AMS 6417 minimum, quenched and double tempered	270	220	8	30	—
Typical, double tempered at 575 °F	286–288	240–245	8.5–11	31–39	about 53 HRC

AMS 6417 minimums confirmed by Service Steel Aerospace and Aircraft Materials. AMS 6419 and 6257 set their own minimums; confirm the requirement on your order with our estimating team. Typical values are from the Latrobe (Carpenter) Lescalloy 300M VAC-ARC datasheet, transverse, 12 to 28 in. sections.

Applicable standards

AMS 6257	300M bars, forgings and tubing, vacuum remelted, normalized and tempered
AMS 6419	300M bars, forgings and tubing, vacuum remelted
AMS 6417	300M, vacuum remelted (replaces MIL-S-83135)
AMS 2300	Premium aircraft-quality cleanliness, magnetic particle inspection

Forms we supply in 300M

- Machined components from certified bar
- Studs, threaded rod and U-bolts
- Hex bolts and cap screws
- Nuts, washers and spacers
- Pins, shafts and bushings

Typical applications

- Aircraft landing-gear components
- Racing and high-performance driveline parts
- High-pressure and high-load pins, studs and shafts
- Drilling and downhole tools at maximum strength