Inconel X-750 Black Bar (UNS N07750) — Technical Data Sheet

Black Bar supplied to ASTM B637 / ASME SB637 — values are minimum requirements for the delivered condition per the governing specification.

Chemical Composition (ASTM B637)

Element	Content
Nickel plus Cobalt (Ni + Co)	70.00% min.
Chromium (Cr)	14.00-17.00%
Iron (Fe)	5.00-9.00%
Titanium (Ti)	2.25-2.75%
Aluminum (Al)	0.40-1.00%
Niobium plus Tantalum (Nb + Ta)	0.70-1.20%
Manganese (Mn)	1.00% max.
Silicon (Si)	0.50% max.
Copper (Cu)	0.50% max.
Cobalt (Co)	1.00% max.
Carbon (C)	0.08% max.
Tantalum (Ta)	0.05% max.
Sulfur (S)	0.010% max.

Minimum Room-Temperature Mechanical Properties

Product Form	Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation, min.	Hardness
Bar and rod, ASTM B637 Type 2	Solution treated at 982 °C, aged	>=170 ksi (1170 MPa)	>=115 ksi (790 MPa)	18%	302-363 HB
Bar and rod, ASTM B637 Type 3	Solution treated at 1093 °C, aged	>=160 ksi (1103 MPa)	>=100 ksi (689 MPa)	20%	267-363 HB
Bar and rod, ASTM B637 Type 1	Solution treated at 1149 °C, stabilised, aged	>=140 ksi (965 MPa)	>=90 ksi (620 MPa)	8%	262 HB min.

Delivery Conditions / Heat Treatment

Condition	Typical Treatment
Type 2 (single age)	Solution treated at 982 °C, then aged near 704 °C
Type 3 (single age)	Solution treated at 1093 °C, then aged near 704 °C
Type 1 (stabilised)	Solution treated at 1149 °C, stabilised near 843 °C, then aged
Solution treated only	Soft stock for buyers who machine and age afterwards

Physical Properties (Approx.)

Property	Value
Density	Approx. 8.28 g/cm³
Melting range	Approx. 1393-1427 °C
Curie temperature, hot rolled	Approx. –143 °C
Curie temperature, fully heat treated	Approx. –125 °C
Modulus of elasticity at 20 °C	Approx. 214 GPa
Modulus of rigidity at 20 °C	Approx. 76 GPa
Poisson's ratio	0.29
Thermal conductivity at 20 °C	Approx. 12.0 W/m·K
Specific heat at 20 °C	Approx. 431 J/kg·K
Electrical resistivity at 20 °C	Approx. 1.22 µΩ·m
Thermal expansion, 20-100 °C	Approx. 12.6 µm/m·K
Strengthening route	Precipitation hardening only

Standards and Designations

Standard	Product or Application
ASTM B637 / ASME SB637	Bars, forgings, and forging stock for moderate or high temperature service
AMS 5667	Bars, forgings, and rings, equalized and precipitation hardenable
AMS 5668 / AMS 5670 / AMS 5671 / AMS 5747	Bars, forgings, and rings by melting route and solution treatment
AMS 5669	Alloy bars, consumable electrode or vacuum induction melted
NACE MR0175 / ISO 15156-3	Sour service qualification where the order requires it
UNS N07750 - W.Nr. 2.4669 - NiCr15Fe7TiAl	Material designations
GB/T 14992 GH4145 - JIS NCF 750	Chinese and Japanese designations
ASTM B168 / ASTM B163	These documents do not cover UNS N07750

Typical Supply Dimensions — Black Bar

Product Form	Typical Supply Range
Black bar	6-300 mm diameter, as rolled to ASTM B637
Black flat bar	6-100 mm thick, up to 350 mm wide
Black square bar	8-80 mm across flats, as rolled
Black bar, heavy	Sections above 254 mm ship as forged stock

Surface Finishes

Surface Condition	Typical Use
Solution treated and pickled	Standard delivery for high-temperature service
Hot-worked	As-rolled or as-forged surface for parts that will be machined
Cold drawn	Close size control with a brighter surface
Peeled	Uniform diameter with a machined skin for further turning
Centerless ground	Tight diameter and straightness for shafting and pins
Polished	Reduced roughness for product-contact and visible parts
Bright annealed	Scale-free surface for instrument and clean circuits

Values are for reference; the mill test certificate prevails for final acceptance. Dimensions, heat-treatment conditions, and surface finishes are confirmed at quotation.