

DATA SHEET



LATROBE SPECIALTY
STEEL COMPANY

Latrobe, PA 15650-0031 USA

LESCALLOY[®] 6305 VAC-ARC[®] HIGH STRENGTH ALLOY STEEL

Typical Composition	C	Mn	Si	Cr	Mo	V
	0.44	0.55	0.25	0.95	0.50	0.28

GENERAL CHARACTERISTICS

LESCALLOY 6305 VAC-ARC steel is a modified 4140 steel with higher molybdenum and a vanadium addition. The alloy is generally used in the 160-180 ksi (1103-1241 MPa) tensile strength range obtained with an 1100°F (593°C) temper where good toughness is critical, such as jet engine shafting. It is produced by the vacuum consumable electrode melting process to provide optimum cleanliness and preferred ingot structure.

PHYSICAL PROPERTIES

Density: 0.283 lb/in³ (7.84 g/cm³)

Specific Heat: 0.11 Btu/lb./°F (460 J/kg•k)

Thermal Conductivity: 260 Btu/in/hr/ft²/°F (37.5 W/m/K)

Coefficient of Thermal Expansion 0-200°F (-17.8-93°C): 6.3x10⁻⁶ in/in•°F (11.34 mm/mm•°C)

HEAT TREATMENT

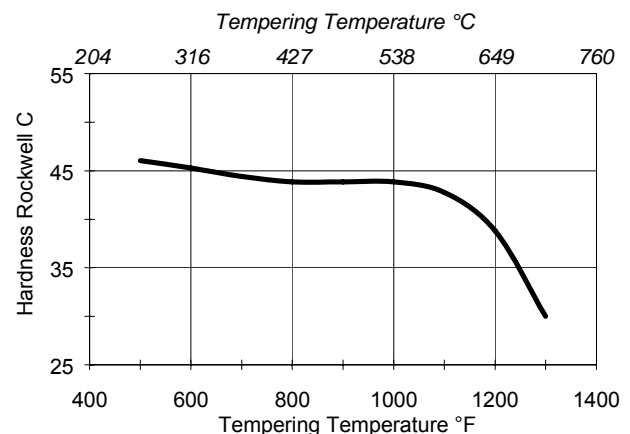
Anneal: Lescalloy 6305 VAC-ARC steel is most commonly used in the quenched and tempered condition. However, an annealed structure may be desired to improve machinability. A typical annealing cycle consists of holding at 1425°F (774°C) for one hour per inch of section thickness, furnace cooling to 1100°F (593°C) and air cooling. A nominal hardness of Brinell 197 can be expected.

Normalize: It is recommended Lescalloy 6305 VAC-ARC steel be normalized within the temperature range of 1700-1750°F (927-954°C). Material should be held at the normalizing temperature for a minimum of one hour.

Quenching: Either an air or oil quench can be used to harden Lescalloy 6305 VAC-ARC steel. Air hardening imparts maximum high temperature creep and stress rupture properties to the alloy for a prescribed high strength level. Oil quenching is used to harden large sections or improve impact resistance.

TEMPERING CURVE

Normalize: 1725°F (941°C), 1 hour, air cool.
Temper: 4 hours at temperature.



LESCALLOY[®] 6305 VAC-ARC[®]

WORKABILITY

Forging: Forge at 1950-2250°F (1066-1232°C) using a minimum forging temperature of approximately 1700°F (927°C). The hot working characteristics of Lescalloy 6305 VAC-ARC steel are similar to AISI 4140.

Machining: Lescalloy 6305 VAC-ARC steel should be in the annealed condition for optimum machinability. Typical annealed hardness is 179-241 HBW.

Weldability: This steel can be readily welded by many of the common established industry practices.

MECHANICAL PROPERTIES

TYPICAL ROOM TEMPERATURE LONGITUDINAL MECHANICAL PROPERTIES

Size Tested*		U.T.S		0.2% Y.S.		Elong.	R.A.
in	mm	ksi	MPa	ksi	MPa	%	%
13x11	330x279	162	1117	137	945	15	55.0
13x11	330x279	160	1104	136	938	15	51.2
3	76.2	169	1166	136	938	18.1	55.9
2 ⁵ / ₈	66.7	164	1131	145	1000	17.9	52.4
2 ⁵ / ₈	66.7	167	1151	140	965	18.7	57.5
2	50.8	164	1131	139	958	16.2	53.3

TYPICAL LONGITUDINAL MECHANICAL PROPERTIES AT 700°F (372°C)

Size Tested*		U.T.S		0.2% Y.S.		Elong.	R.A.
in	mm	ksi	MPa	ksi	MPa	%	%
13x11	330x279	142	979	114	786	30.0	76.6
13x11	330x279	141	972	116	800	30.0	72.6
3	76.2	145	1000	118	813	25.1	77.4
2 ⁵ / ₈	66.7	142	979	116	800	24.0	78.4
2 ⁵ / ₈	66.7	144	993	112	772	23.4	75.9
2	50.8	139	958	111	765	22.3	75.2

* Heat treated as tensile specimen blanks

FORMS AVAILABLE

Billets; hot rolled round, square and flat bars; rough turned or centerless ground bars.

APPLICATIONS

Jet engine shafting and fastener components of Navy nuclear.

SPECIFICATIONS

The following specifications are offered for general reference and should not be considered a complete listing.

AMS 6305

AMS 6304 (Air Melt)

MIL-S-24502

CPW 245 (Pratt & Whitney)

PWA 733 (Pratt & Whitney)

PWA 768 (Pratt & Whitney)

PWA 817 (Pratt & Whitney)



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