

DATA SHEET



LATROBE SPECIALTY
STEEL COMPANY

Latrobe, PA 15650-0031 USA

LESCALLOY[®] 4340 VAC-ARC[®] HIGH STRENGTH ALLOY STEEL

Typical Composition	C	Mn	Si	Cr	Ni	Mo
	0.40	0.75	0.30	0.80	1.80	0.25

GENERAL CHARACTERISTICS

LESCALLOY 4340 VAC-ARC steel is a low alloy, nickel-chromium-molybdenum steel capable of being heat treated to high strength levels. The alloy has a good combination of ductility, toughness and strength along with high hardenability.

LESCALLOY 4340 VAC-ARC steel is produced by the consumable electrode vacuum arc remelting process to provide optimum cleanliness and preferred ingot structure.

PHYSICAL PROPERTIES

Density: 0.283 lb/in³ (7.84 g/cm³)

Thermal Conductivity:

21.67 BTU•ft/h/ft²/°F (37.48 W/m•K)

Coefficient of Thermal Expansion:

Temp Range	in / in / °F	mm / mm / °C	
°F	°C	(x 10 ⁻⁶)	(x 10 ⁻⁶)
0 - 200	-18 - 93	6.3	11.3
0 - 1200	-18 - 649	8.1	14.6

Specific Heat: 0.107 BTU/lb./°F (0.107 cal/g•°C)

HEAT TREATMENT

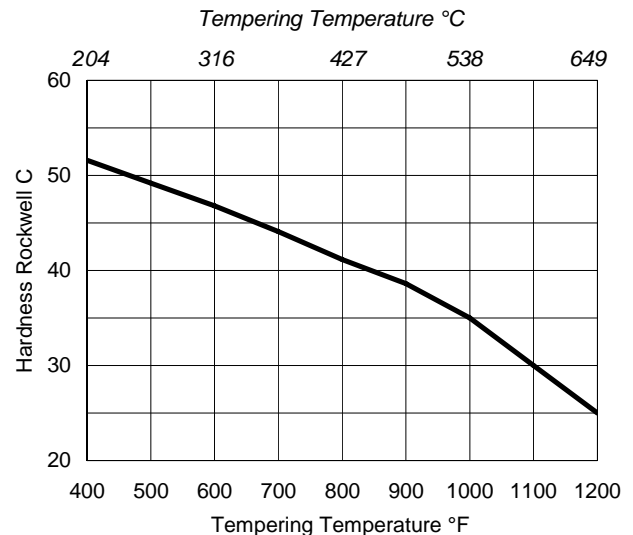
Normalize: 1600-1700°F (871-927°C), air cool.

Austenitize: 1475-1575°F (802-857°C), oil quench.

Temper: 400-1200°F (204-649°C), depending on desired strength. Temper between 400-500°F (204-260°C) to obtain tensile strengths above 260 ksi (1793 MPa).

TEMPERING CURVE

Austenitized 1550°F (843°C) - Oil Quenched
Tempered Twice - 2 + 2 Hours



WORKABILITY

Forging: Forge between 1950 and 2250°F (1066-1232°C). Because of the air hardening capability of the material, preheating and furnace cooling or cooling in ash or lime after forging is recommended.

Machining: Normalize and then temper at approximately 1200°F (629°C) for optimum machinability.

Weldability: This steel can be welded by gas or arc fusion methods. Due to the air hardening characteristics of the steel, the part should be annealed or normalized and tempered after welding.

LESCALLOY[®] 4340 VAC-ARC[®]

MECHANICAL PROPERTIES

TYPICAL TRANSVERSE TENSILE PROPERTIES (Note Different Tempering Temperatures)

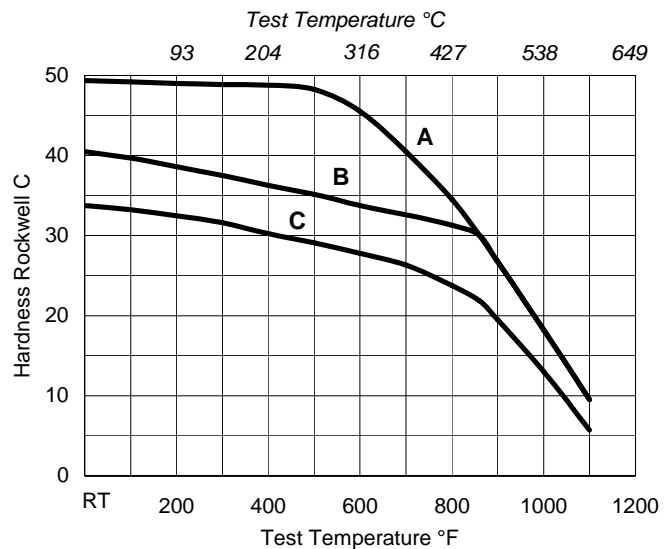
Bar Size		Temper*		U.T.S		0.2% Y.S.		Elong.	R.A.
in	mm	°F	°C	ksi	MPa	ksi	MPa	%	%
3½ rd.	89 rd.	400	204	276	1905	222	1530	11.0	35.0
7½ sq.	191 sq.	500	260	265	1830	222	1530	8.0	25.0
10½ sq.	267 sq.	1100	593	165	1140	150	1035	18.0	60.0

* Prior Treatment: Normalized 1650/1700°F (899/927°C), Austenitized 1500/1525°F (816/829°C), Oil Quenched

TYPICAL HARDENABILITY DATA

Distance from Quenched End		Rockwell C Hardness	
in	mm	Maximum	Minimum
1/16	1.6	60	52
1/8	3.2	60	52
1/4	6.4	60	52
1/2	12.7	60	52
3/4	19.1	59	51
1	25	58	48
2	51	57	46
1¼	32	57	44
1½	38	56	42
1¾	45	56	40

ELEVATED TEMPERATURE HARDNESS DATA



- A** Normalize 1650°F (899°C) / 1 hr / AC
Austenitize 1500°F (816°C) / ½ hr / OQ
Temper 475°F (246°C) / 2 + 2 hours / AC
- B** Normalize 1650°F (899°C) / 1 hr / AC
Austenitize 1500°F (816°C) / ½ hr / OQ
Temper 900°F (482°C) / 2 + 2 hours / AC
- C** Normalize 1650°F (899°C) / 1 hr / AC
Austenitize 1475°F (802°C) / ½ hr / OQ
Temper 1100°F (593°C) / 2 hours / AC

CLEANLINESS STANDARDS

Lescalloy 4340 VAC-ARC steel conforms to AMS 2300 for magnetic particle cleanliness. The microcleanliness of Lescalloy 4340 VAC-ARC steel is typified by the following worst field specifications, in accordance with ASTM E45.

Worst Fields	A	B	C	D
Thin	2.0	1.5	1.5	2.0
Heavy	1.0	1.0	1.0	1.5

SPECIFICATIONS

The following list of popular industry specifications is offered for general familiarization and cross-reference purposes. This should not be considered a complete listing.

AMS 6414 299-947-055 (Bell Helicopter)
AMS 6415 (Air Melt) SS 9702 (Sikorsky)
AMS-S-5000 (Air Melt)



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