

# DATA SHEET



**LATROBE SPECIALTY  
STEEL COMPANY**

Latrobe, PA 15650-0031 USA

## LESCALLOY<sup>®</sup> 52100 VAC-ARC<sup>®</sup> HIGH PERFORMANCE BEARING STEEL

Typical Composition	<b>C</b>	<b>Mn</b>	<b>Si</b>	<b>Cr</b>
	<b>1.05</b>	<b>0.35</b>	<b>0.30</b>	<b>1.50</b>

### GENERAL CHARACTERISTICS

LESCALLOY 52100 VAC-ARC steel is a deep hardening alloy steel used for aircraft bearings and other high stressed parts where good rolling contact fatigue strength is required at operating temperatures below 400°F (204°C). This grade is produced by the vacuum-arc remelting process and offers greatly improved cleanliness and internal soundness over conventionally air melted bearing quality SAE 52100 steel.

This alloy can also be made available as a vacuum induction melted plus vacuum arc remelted (VIM-VAR) product.

### PHYSICAL PROPERTIES

Specific Gravity: 7.8

Density: 0.28 lb./in<sup>3</sup> (7.75 g/cm<sup>3</sup>)

Modulus of Elasticity: 29x10<sup>6</sup> psi (200 GPa)

Modulus of Rigidity: 12x10<sup>6</sup> psi (82.7 GPa)

#### COEFFICIENT OF THERMAL EXPANSION

Temp Range °F	Temp Range °C	in / in / °F (x 10 <sup>-6</sup> )	mm / mm / °C (x 10 <sup>-6</sup> )
100 - 500	38 - 260	6.45	11.6
100 - 800	38 - 427	7.35	13.2
100 - 1000	38 - 538	7.78	14.0
100 - 1200	38 - 649	7.96	14.3

### HEAT TREATMENT

**Normalizing:** Air cool from 1650-1700°F (898-926°C).

**Spheroidize Anneal:** An isothermal anneal of the following cycle is recommended:

1500°F (815°C) 3 hours

1350°F (734°C) 4 hours

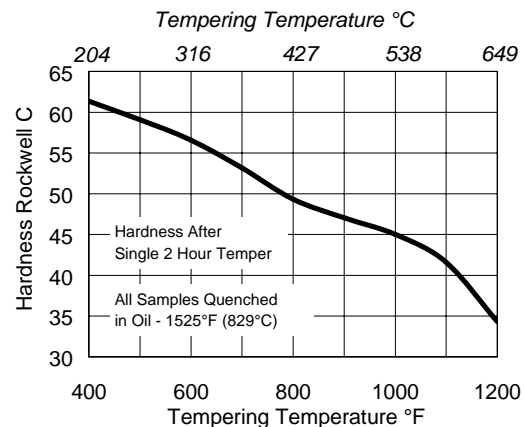
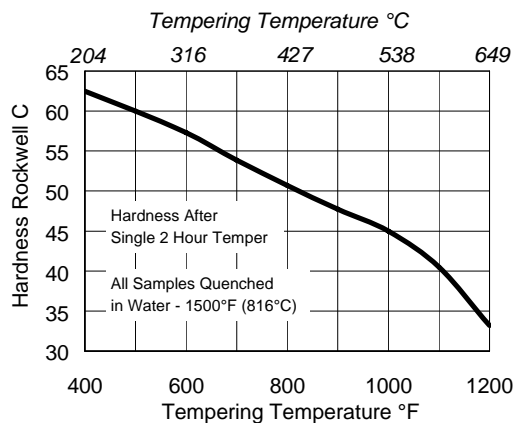
1250°F (675°C) 3 hours

Slow cool to 1000°F (538°C) and then air cool.

Maximum annealed hardness: 207 HBW

**Hardening:** Quench in water from 1475-1525°F (802-829°C) or quench in oil from 1500-1550°F (816-842°C).

**Tempering:** Temper to desired hardness as indicated by tempering curves after water or oil quench.



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## TYPICAL END QUENCH HARDENABILITY DATA

	Distance from Quenched End (1/16 inch)							
	1	2	3	4	5	6	7	8
Rockwell C	67	66.5	66	64	55	46	45	45

## MICROCLEANLINESS STANDARDS

Typical Microscopic Cleanliness Requirements (J/K ASTM E45)				
	A	B	C	D
Worst field, thin	1.5	1.0	1.0	1.5
Worst field, heavy	1.0	1.0	1.0	1.0

Frequency for A, B and C thin type inclusions combined, there shall not be more than three 1.5 (A type) fields and not more than five 1.0 fields. For type D thin, there shall not be more than three 1.5 fields and not more than two 1.0 fields. There shall not be more than one field each of 1.0 heavy type A, B, C or D. Note: Fields of less than 1.0 are not ratable.

## FORGING

Forge at 1950-2100°F (1065-1149°C). Do not forge below 1700°F (926°C). After forging equalize at 1375°F (746°C) and hold for 4-6 hours, then air cool.

## MACHINABILITY RATING

In the annealed condition the machinability rating of Lescalloy 52100 VAC-ARC steel is 45% of B-1112 steel. Cold drawn bars exhibit a 37% rating.

## FORMS AVAILABLE

Billets; hot rolled rounds, square and flat bars; rough turned and centerless ground bars; forgings.

## SPECIFICATIONS

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

AMS 6444	MS 30 (MRC)
CFR 5202 (SNFA) (VAR)	MS 194 (MRC) (VIM-VAR)
CFR 5201 (SNFA) (VIM-VAR)	MS 112 (Winstead)
EMS 166 (Timken Aerospace)	MSP-10-27-02 (McGill)
EMS 26 (Timken Aerospace)	PES 1.104 (NHBB)
EMS 26.1 (Timken Aerospace) (VIM-VAR)	PES 1.106 (NHBB)
FL-LA 2211.8 (VAR) (FAG)	CPW 52 (Pratt & Whitney)
FL-LA 2211.9 (VAR) (FAG)	PWA 723 (Pratt & Whitney)
FL-LA 2211.5 (VIM-VAR) (FAG)	SM6 (NMB)
KMB-600 (Kaydon)	SA1253 (Barden) (VAR)
MP-48 (RBC)	SA5589 (Barden) (VIM-VAR)



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