

QuesTek® Innovations Ferrium® C64™ Case-hardened Gear Steel with Ultrahigh-strength Core

Category : Metal , Ferrous Metal , Alloy Steel

Material Notes:

Description: Ferrium® C64™ is a member of a new class of martensitic secondary-hardening gear and bearing steels that utilize an efficient M2C precipitate strengthening dispersion. Because of the efficiency of this strengthening dispersion, Ferrium® C64™ achieves carburized surface hardness superior to current gear steels with the added benefit of increased core properties. C64™ should be considered for use in applications that require high case hardness, high strength, high toughness, and thermal resistance. C64™ has very high hardenability and only requires mild quenching. **Typical Applications:** Power transmission shafts, gears and other demanding applications in aerospace, energy, and racing/off-road/mission-critical vehicles and other industries where weight savings, compactness, high temperature resistance and high surface fatigue resistance are valued. **Workability:** Forging: Forge at 1800-2100°F (982-1149°C) **Heat Treatment:** Normalizing: Heat uniformly to 1875°F(1024°C) and air cool.. Annealing: Heat uniformly to 1250°F(677°C), hold for 2 to 8 hours and air cool.. **Hardness** should be less than 327 HBW. **Carburizing and Hardening:** Vacuum carburize at 1830°F (1000°C), followed by quenching in gas (1.5 Bar Nitrogen or higher) or oil medium. **Refrigerate:** To obtain optimum case hardness, a refrigeration treatment at -100°F (-73°C) or lower for 1 hour is recommended. This should be performed with minimal delay after completion of the quench. **Temper:** At 925°F (496°C) **Product Forms:** Ferrium® C64™ is manufactured in typical ingot, bar and billet forms. Ferrium is designed by Questek Innovations, LLC. and is manufactured by Latrobe Specialty Steel under license.

Order this product through the following link:

http://www.lookpolymers.com/polymer_QuesTek-Innovations-Ferrium-C64-Case-hardened-Gear-Steel-with-Ultrahigh-strength-Core.php

Physical Properties	Metric	English	Comments
Density	7.98 g/cc	0.288 lb/in ³	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	42.5	42.5	Distance from Quenched End 1 3/4 [in]
	42.5	42.5	Distance from Quenched End 2 [in]
	43	43	Distance from Quenched End 1/4 [in]
	43	43	Distance from Quenched End 1/2 [in]
	43	43	Distance from Quenched End 3/4 [in]
	43	43	Distance from Quenched End 1 [in]
	43	43	Distance from Quenched End 1 1/4 [in]
	43	43	Distance from Quenched End 1 1/2 [in]
	48 - 50	48 - 50	Typical Core Hardness

Mechanical Properties	62 - 64 Metric	62 - 64 English	Typical Case Hardness Comments
Tensile Strength, Ultimate	1580 MPa	229000 psi	
Tensile Strength, Yield	1370 MPa @Strain 0.200 %	199000 psi @Strain 0.200 %	
Elongation at Break	18 %	18 %	
Reduction of Area	75 %	75 %	
Flexural Strength	1520 MPa @# of Cycles 330000	220000 psi @# of Cycles 330000	
	1520 MPa @# of Cycles 550000	220000 psi @# of Cycles 550000	
	1520 MPa @# of Cycles 1.20e+6	220000 psi @# of Cycles 1.20e+6	
	1590 MPa @# of Cycles 130000	230000 psi @# of Cycles 130000	
	1590 MPa @# of Cycles 250000	230000 psi @# of Cycles 250000	
	1590 MPa @# of Cycles 2.50e+6	230000 psi @# of Cycles 2.50e+6	
	1650 MPa @# of Cycles 53000	240000 psi @# of Cycles 53000	
	1650 MPa @# of Cycles 110000	240000 psi @# of Cycles 110000	
	1650 MPa @# of Cycles 190000	240000 psi @# of Cycles 190000	
	1690 MPa @# of Cycles 70000	245000 psi @# of Cycles 70000	
	1690 MPa @# of Cycles 110000	245000 psi @# of Cycles 110000	
	1690 MPa @# of Cycles 210000	245000 psi @# of Cycles 210000	
	1780 MPa	258000 psi	

Mechanical Properties	Metric	English	Comments
	@# of Cycles 100000	@# of Cycles 100000	
	1780 MPa	258000 psi	
	@# of Cycles 190000	@# of Cycles 190000	
	1830 MPa	265000 psi	
	@# of Cycles 49000	@# of Cycles 49000	
	1830 MPa	265000 psi	
	@# of Cycles 80000	@# of Cycles 80000	
	1830 MPa	265000 psi	
	@# of Cycles 100000	@# of Cycles 100000	
Fracture Toughness	93.4 MPa-m ^{1/2}	85.0 ksi-in ^{1/2}	

Thermal Properties	Metric	English	Comments
CTE, linear	9.32 µm/m-°C	5.18 µin/in-°F	
	@Temperature 24.0 - 204 °C	@Temperature 75.2 - 399 °F	
	9.53 µm/m-°C	5.29 µin/in-°F	
	@Temperature 24.0 - 93.0 °C	@Temperature 75.2 - 199 °F	
	9.57 µm/m-°C	5.32 µin/in-°F	
	@Temperature 24.0 - 316 °C	@Temperature 75.2 - 601 °F	
	9.95 µm/m-°C	5.53 µin/in-°F	
	@Temperature 24.0 - 427 °C	@Temperature 75.2 - 801 °F	
	10.25 µm/m-°C	5.694 µin/in-°F	
	@Temperature 24.0 - 538 °C	@Temperature 75.2 - 1000 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.11 %	0.11 %	
Chromium, Cr	3.5 %	3.5 %	
Cobalt, Co	16.3 %	16.3 %	
Iron, Fe	70.62 %	70.62 %	
Molybdenum, Mo			

Component Elements Properties	Metric	English	Comments
Nickel, Ni	7.5 %	7.5 %	
Tungsten, W	0.20 %	0.20 %	
Vanadium, V	0.020 %	0.020 %	

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