Ferrium® C64™

Product Data Sheet

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For high-performance gears

Case-Hardened gear steel with an ultra-high-strength core

Increased engine power transmission demands high-performance gears.

The design objective was to develop a secondary hardening gear and bearing steel with superior core and surface properties to current gear steels. 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 (62-64 HRC) superior to current gear steels with the added benefit of increased core properties.

Advantages

Surface-wear properties and fatigue properties are superior to those found in current commercial alloys.

Fatigue

There is a demonstrated increase in rolling sliding fatigue over conventional gear steels. Single tooth bending fatigue data is not currently available.

Ferrium® C64™ Chemical Composition (nominal wt. %)							
Fe	C	Co	Cr	Ni	Mo	W	V
Bal	0.11	16.3	3.5	7.5	1.75	0.2	0.02

Overview of Ferrium® C64 Properties (typical)					
YS (ksi)	UTS (ksi)	El (%)	RA (%)	Core Hardness (HRC)	K_{IC} (ksi $\sqrt{in}$)
199	229	18	75	48 -50	85

Processing

Ferrium® C64 is a high-temperature carburizing product. Solution heat treatment and carburizing treatment are combined. The alloy is quenched directly from the carburizing temperature. After quenching to room temperature, it is subjected to cryogenic treatment to assure a complete martensitic transformation. Tempered at 925°F (496°C) the product displays excellent thermal resistance approaching this temperature. Case carburizing produces a gradient in the volume fraction of the M2C carbides and results in an increase in hardness and surface residual compressive stress. The efficiency of the M2C strengthening response allows the steel to achieve very high surface hardness with low carbon content. It can achieve very high surface hardness without the formation of detrimental primary carbides. For superior fatigue performance, we recommend final shot peening.

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