Ferrium® C64™

Smiths High Performance

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For high-performance gears

Ferrium® C64 is 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 utilise an efficient M2C precipitate-strengthening dispersion.

Because of the efficiency of this strengthening dispersion, Ferrium® C64 achieves carburised surface hardness (62-64 HRC) superior to current gear steels with the added benefit of increased core properties.

Advantages:

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

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Fatigue:

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

Chemical Composition (nominal wt. %)

Fe	C	Co	Cr	Ni	Mo	W	V
Bal	0.11	16.3	3.50	7.50	1.75	0.20	0.02

Mechanical Properties (typical)

YS	UTS	El	RA	Core Hardness	K_{IC}
(ksi) 199	(ksi) 229	(%) 18	(%) 75	(HRC) 48 - 50	(ksi √ in) 85

Processing:

Ferrium® C64 is a high-temperature carburising product. Solution heat treatment and carburising treatment are combined.

The alloy is quenched directly from the carburising temperature. After quenching to room temperature, it is subjected to cryogenic treatment to ensure a complete martensitic transformation. The product is tempered at 925°F (496°C) and displays excellent thermal resistance approaching this temperature.

Case carburising produces a gradient in the volume fraction of the M2C carbides and increases 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 forming detrimental primary carbides. For superior fatigue performance, we recommend final shot peening.

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