LayrrSteel C64 - Ferrium C64

Type analysis

Single figures are nominal except where noted.

Iron	Balance
Chromium	3.50 %
Carbon	0.11 %

Cobalt	16.30 %
Molybdenum	1.75 %
Vanadium	0.02 %

Nickel	7.50 %
Tungsten	0.20 %

Description

LayrrSteel C64 - Ferrium C64 is high-strength, high-hardness vacuum induction melted/vacuum arc remelted (VIM/VAR) steel designed to enable "lightweighting" in high-performance transmissions. It is specifically engineered to replace traditional gear steels like AISI 9310 by offering superior surface hardness and higher core strength. This allows for the downsizing of gears and shafts, reducing gearbox volume and weight without sacrificing load-bearing capacity.

Material Behavior & Microstructure

- Nanoscale Reinforcement: Utilizing efficient M_2C carbide strengthening, C64 features a fine dispersion of carbides within a martensitic matrix, avoiding the large carbides that act as stress risers in traditional steels.
- Exceptional Surface Hardness: Capable of achieving 62–64 HRC via carburizing, providing world-class resistance to surface contact fatigue (pitting).
- Thermal Margin: Retains mechanical properties up to ~482°C (900°F), offering a critical safety buffer for "oil-out" or dry-running scenarios.
- Core Integrity: Combines extreme surface hardness with high fracture toughness in the core to prevent tooth breakage under sudden shock loads.

Powder Properties

Part number	LayrrSteel64 - Ferrium C64
Application	MIM[1]
Maximum particle size	Max 10 wt% > 22 µm[3]
Minimum particle size	Max 10 vol% < 5 µm[3]
LSD percentile	D10, D50, D90[3], reported
Atomisation	Vacuum Induction Melted, Nitrogen Gas Atomised
Apparent density (lb/in^3)	0.2880
Carney flow	Measured according to ASTM B964[4] and reported

[1] ASTM/ISO 52900: Laser - Powder Bed Fusion (L-PBF), Electron-Beam Powder Bed Fusion (EB-PBF), Directed Energy Deposition (DED), Metal Injection Moulding
[2] ASTM B214 Standard Test Method for Sieve Analysis for Metal Powders
[3] ASTM B822 Standard Test Method for Particle Size Distribution of Metal Powders and Related Compounds by Light Scattering
[4] ASTM B212 Standard Test Method for Apparent Density of Free-Flowing Metal Powders Using the Hall Flowmeter Funnel Testing of powder will fulfill certification requirements to Nadcap Materials Testing and ISO/IEC 17025 Chemical, per relevant ASTM procedures