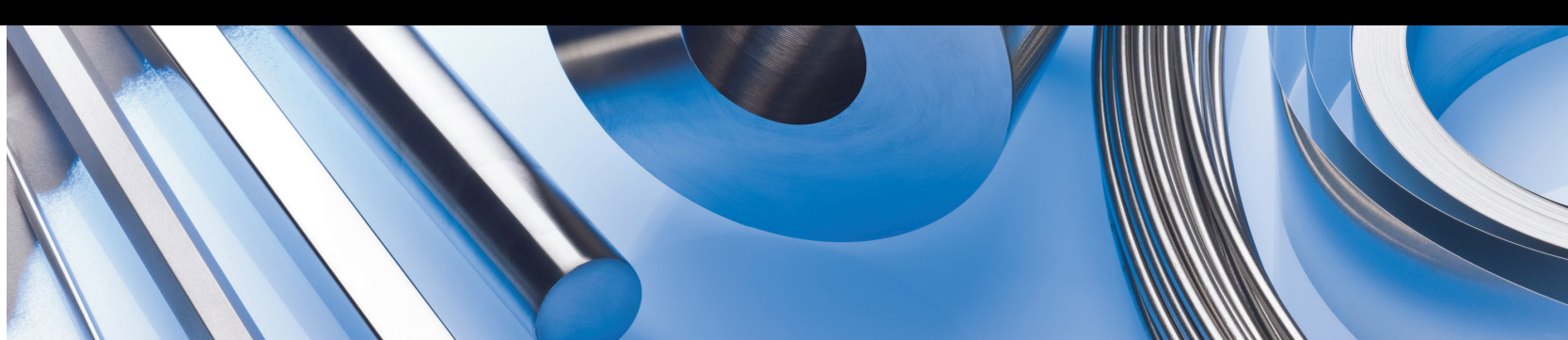


CarTech™ Ferrium® S53®

TYPICAL COMPOSITION

C	Cr	Ni	Co	Mo	W	V
0.21	10.0	5.5	14.0	2.0	1.0	0.30

CarTech Ferrium S53 is an ultra high-strength steel for structural aerospace and other applications where 300M, 4340 are typically used. CarTech Ferrium S53 has mechanical properties on par with these conventional alloys, but with the added benefit of atmospheric corrosion resistance. This can eliminate the need for cadmium coating and the subsequent accompanying processing. In addition, CarTech Ferrium S53 has greatly improved resistance to stress-corrosion cracking (SCC) compared to 300M and 4340.

CarTech Ferrium S53 utilizes an efficient M_2C strengthening dispersion precipitated through tempering while avoiding other carbides. This maximizes strength, wear resistance, and toughness, resulting in a unique combination of mechanical properties for a corrosion resistant steel. CarTech Ferrium S53 uses a stable passive oxide film to provide corrosion resistance similar to 440C stainless steel. It also has high hardenability, permitting less severe quench conditions for a given section size and resulting in less distortion during heat treatment.

APPLICATIONS

Typical applications include aircraft landing gears, flap tracks, actuators, fasteners and other structural applications.

MECHANICAL PROPERTY DATA

Orientation	Long.	Trans.
YS (ksi/MPa)	225/1551	225/1551
UTS (ksi/MPa)	288/1986	288/1986
% El (in 4D)	15	15
% RA	57	55
Impact Energy (ft-lbs/J)	18/24	18/24
Fracture Toughness (ksi√in/ MPa√m)	65/71	65/71
HRC	54	54

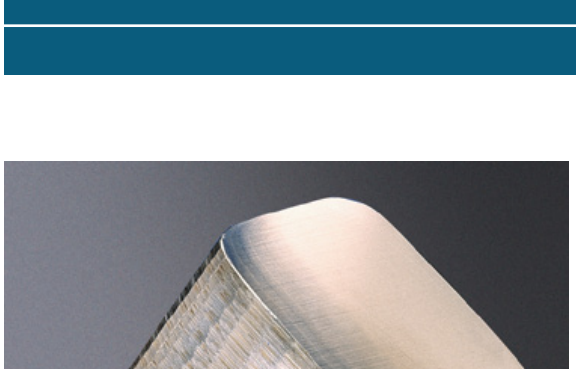
BENEFITS

- Ultra High-Strength
- Fatigue Resistance
- Corrosion Resistance
- High Hardenability

SPECIFICATIONS

AMS 5922
MMPDS-05
UNS S10500

US Patent Number 7,235,212
US Patent Number 7,160,399
US Patent Number 7,967,927



PHYSICAL PROPERTIES

Density: 0.288 lb/in^3 (7.98 g/cm^3)
Modulus of Elasticity: 29.6 x 10^6
Critical Temperatures: A_{C1} 1364°F (740°C)
A_{C3} 1436°F (780°C)
Ms 212°F (100°C)

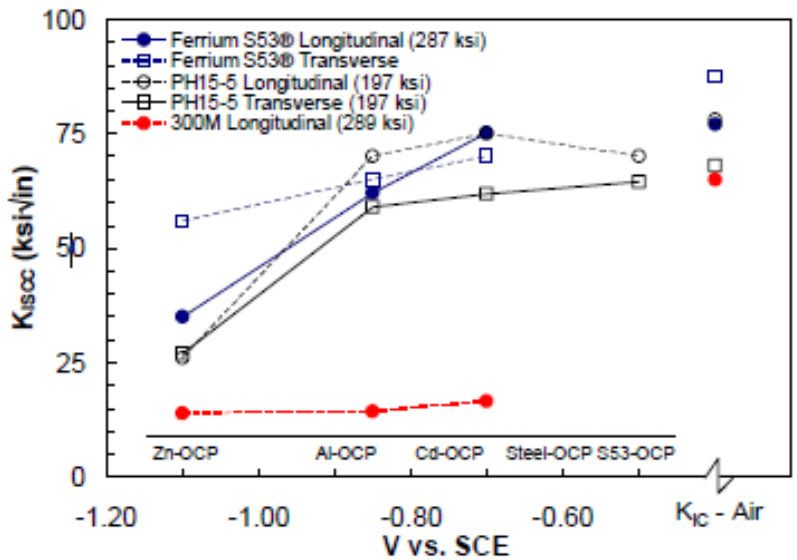
Mean Coefficient of Thermal Expansion

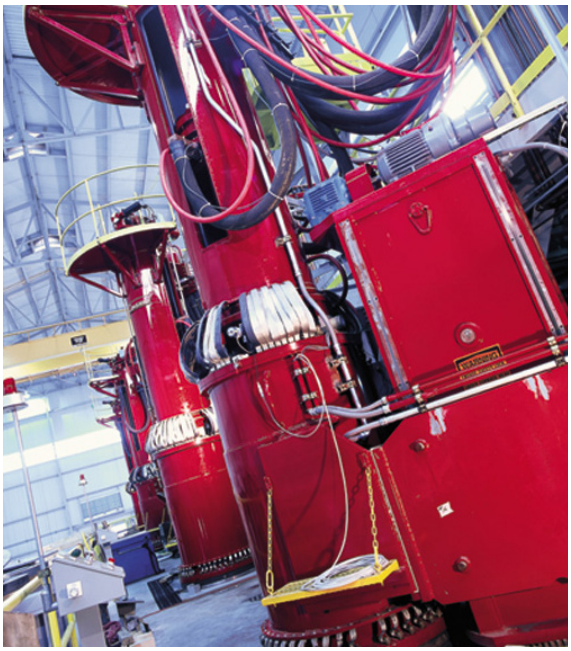
Temp Range		in/in/°F (x 10^{-6})	mm/mm/°C (x 10^{-6})
°F	°C		
75-220	24-104	5.86	10.53
75-400	24-204	5.89	10.59
75-600	24-316	6.00	10.79
75-800	24-427	6.13	11.02
75-1000	24-538	6.22	11.18
75-1100	24-593	6.19	11.13

CORROSION RESISTANCE

The general corrosion resistance of CarTech Ferrium S53 is similar to 440C stainless steel. Linear polarization testing measured an average corrosion rate of 0.40 mils per year versus a saturated Ag/AgCl reference elctrode in 3.5% sodium chloride (NaCl) solution at ambient temperature. CarTech Ferrium S53 is rust resistant in 3.5% NaCl solution.

Stress Corrosion Cracking
(per ASTM F1624 in 3.5% NaCl Solution)





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