

Ferro-Tic[®] Grade CS-40

GRADE DESCRIPTION

Ferro-Tic Grade CS-40 is an advanced metal matrix composite comprised of ultra-hard titanium carbide grains homogeneously dispersed in a high chrome, martensitic stainless steel matrix. In the annealed state, it can be readily machined into any desired shape using conventional tooling. CS-40 exhibits excellent corrosion resistance to atmosphere, fresh water, mild organic acids and body acids. The high chromium content in the matrix provides increased hardenability, abrasive wear resistance and oxidation resistance over conventional stainless steels.

APPLICATIONS

Ferro-Tic Grade CS-40 is ideally suited for applications such as mechanical seal rings or tooling and equipment in the food processing and chemical industries. Because of its unique combination of wear resistance and corrosion resistance, Grade CS-40 has also found wide acceptance in the textile/fiber industry.

CHEMICAL COMPOSITION GUIDE (weight %)

Carbide Phase	Binder Phase			
	Cr	Mo	C	Fe
Titanium Carbide	Cr	Mo	C	Fe
35.0	20.0	0.5	0.8	Bal

PROPERTIES

Density, g/cc.....	6.45
Hardness, Rc	
Annealed.....	47-52
Hardened and Tempered.....	67-70
Transverse Rupture Strength.....	149
(psi x 10 ³)	
Compressive Strength.....	453
(psi x 10 ³)	
Impact Strength (charpy unnotched).....	148
(in-lbs/in ²)	
Tensile Strength.....	145
(psi x 10 ³)	
Modulus of Elasticity, Mpsi	45
Coefficient of Thermal Expansion x 10 ⁻⁶ /in/in/°F	
70°F-200°F.....	0.00
70°F-700°F.....	2.45
Linear Size Change	
Thru Heat Treatment, %.....	+0.016



ANNEALING

Use a slightly carburizing atmosphere or stainless steel envelope for protection.
Heat to 1650°F, hold for 3 hours
Cool to 1450°F, hold for 8 hours
Furnace cool to below 1200°F, air cool
Hardness 47 – 52 HRC
(material is supplied in the annealed condition)

HARDENING

Austenitizing Temperature: 1875°F
Holding Time: 1 Hour per inch of thickness
(minimum 30 minutes)

Austenitizing Methods:

Protective Foil Envelope

Type 321 Stainless Steel Foil
.003 minimum thickness
Edges double crimped to prevent leakage

Air Quench:

Parts in protective envelope – start air flow (fan) over a heat sink plate, remove pieces from envelope immediately after removing envelope from furnace, place pieces on heat sink

OR Vacuum Furnace

Vacuum of 10 to 50 microns
Vacuum Quench: Positive pressure quench (2 bar minimum) to below 125°F

Tempering:

Should be done as soon as quenched parts reach room temperature.

Temper at 400°F, hold for 1 hour, cool to room temperature
Hardness 67 – 70 HRC