

Ferro-Tic[®] Grade C

GRADE DESCRIPTION

Ferro-Tic Grade C is an advanced metal matrix composite comprised of ultra-hard titanium carbide grains homogeneously dispersed in a heat-treatable tool steel matrix. In the annealed state, it can be readily machined into any desired shape using conventional tooling. Grade C is used where ambient or working temperatures do not exceed 375°F.



APPLICATIONS

Ferro-Tic Grade C has been used effectively for all types of punching, stamping and piercing operations. Due to its ease of fabrication, high hardness and dimensional stability, Grade C is an excellent material for gage components. It has also been successfully used in cryogenic environments.

CHEMICAL COMPOSITION GUIDE (weight %)

Carbide Phase	Binder Phase			
	Cr	Mo	C	Fe
Titanium Carbide				
33.0	3.0	3.0	0.62	Bal

PROPERTIES

Density, g/cc.....	6.60
Hardness, Rc	
Annealed.....	44-52
Hardened and Tempered	68-71
Transverse Rupture Strength.....	216
(psi x 10 ³)	
Compressive Strength.....	520
(psi x 10 ³)	
Impact Strength (charpy unnotched)....	323
(in-lbs/in ²)	
Tensile Strength.....	190
(psi x 10 ³)	
Modulus of Elasticity, Mpsi	42
Coefficient of Thermal Expansion x 10 ⁻⁶ /in/in/°F	
70°F-375°F.....	1.96
Linear Size Change	
Thru Heat Treatment, %.....	+0.048

ANNEALING

Use a slightly carburizing atmosphere or stainless steel envelope for protection.
Heat to 1550°F, hold for 3 hours
Cool to 1350°F, hold for 8 hours
Furnace cool to below 1200°F, air cool
Hardness 44 - 52 HRC
(Material is supplied in the annealed condition.)

HARDENING

Austenitizing Temperature: 1750°F
Holding Time: 1 Hour per inch
of thickness (minimum 30 minutes)

Austenitizing Method:
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

Tempering:
Should be done as soon as quenched parts reach 125°F
Hold parts for 1 hour at 375°F, Air cool
Hardness 68 -71 HRC