

PRODUCT DATA SHEET		CEMENTED CARBIDE PRODCUTS	
LATEST REVISION		Date: 01-07-2025	
Product Name	CEMENTED CARBIDE PRODUCTS		
Description	Commonly referred to as tungsten carbide or hard metal encompasses a vast range of composite grades, we classify products by their chemical composition, physical/mechanical properties, and safety parameters. This general datasheet compiles industry-standard specifications for cemented carbide products (typically consisting of Tungsten Carbide (WC) with a Cobalt (Co) binder).		
Application	<p>Cemented carbide grades are generally cross-referenced using the ISO 513 classification system for machining:</p> <ul style="list-style-type: none"> • P-Series (Blue): For steel, long-chip materials. Contains higher TiC/TaC to resist crater wear. • M-Series (Yellow): For stainless steel, cast steel. Versatile, offering a balance of wear and toughness. • K-Series (Red): For cast iron, non-ferrous metals (aluminum, brass), and non-metals (plastics, wood). Straight WC-Co grades with high wear resistance. • H/S/N Series: Special classifications for hardened steel (H), superalloys/titanium (S), and non-ferrous materials (N). 		
Chemical Analysis	<p>Cemented carbide is a metal matrix composite where ceramic carbide particles are "cemented" by a metallic binder.</p> <ul style="list-style-type: none"> • Tungsten Carbide (WC): 70% – 95% (Provides hardness and wear resistance) • Cobalt Binder (Co): 3% – 30% (Provides toughness and shock resistance) • Additives/Grain Refiners: 0% – 15% (e.g., Tantalum Carbide (TaC), Titanium Carbide (TiC), Niobium Carbide NbC), or Chromium Carbide (C3rC2) to prevent grain growth and improve hot hardness). 		
Physical Properties			
Property	Typical Value Range	Notes / Significance	

Density (Specific Gravity)	13.0 - 15.5g/cm ³	Roughly twice the density of steel 7.8g/cm ³
Hardness (Vickers / Rockwell)	800 - 2000HV 85 - 94 HRA	Retains hardness at highly elevated temperatures.
Transverse Rupture Strength (TRS)	1500 - 4000MPa	Measures bending strength; increases with cobalt content.
Compressive Strength	4000 - 7000 MPa	Exceptionally high; much higher than most steels.
Young's Modulus (Elasticity)	500 - 650 GPa	Roughly 3x stiffer than steel; highly resistant to deflection.
Thermal Conductivity	60 - 110 W/(m.K)	Efficiently dissipates heat away from cutting edges.
Coeff. of Thermal Expansion	(4.5 - 6.0)* 10 ⁻⁶ /k	About half that of steel; highly dimensionally stable.

LUOYANG ROBUST METAL TECH CO., LTD.

RM.1606, Bldg. 2, 863 Creative Park, No. 32, Changxiamen Street,
Eco-Tech Development Zone, Luoyang, Henan, China 471000

TEL/FAX: 0086 379 63189168

service@robustmetek.com

www.robustmetek.com