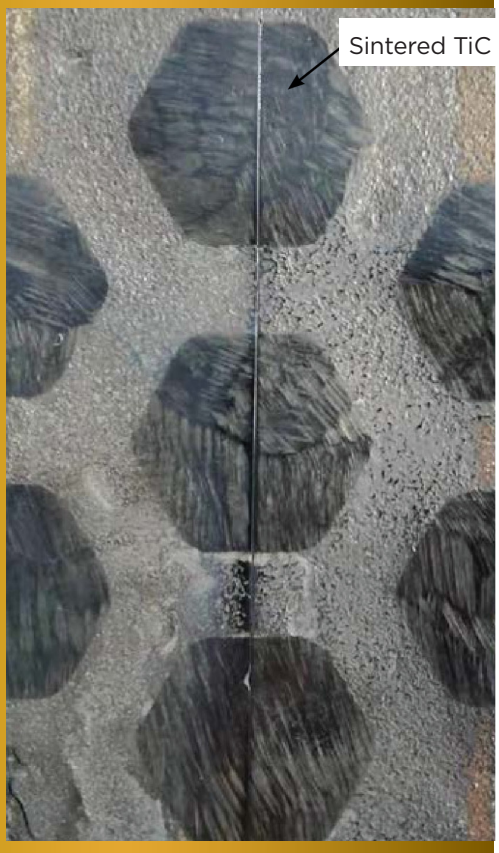
Canadian Innovative Materials Inc.

SINTERED TITANIUM CARBIDE (TIC)

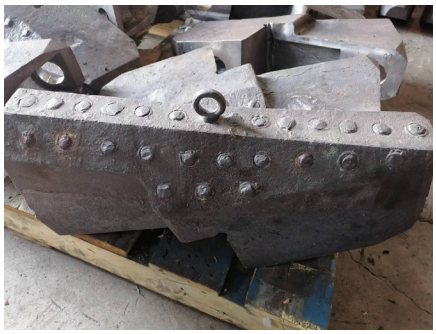
CIMTiC™ is a sintered titanium carbide (TiC) material engineered for cast-in applications. It features excellent wettability with steel, enabling strong metallurgical bonding during the casting process. Compared to sintered tungsten carbide (WC), TiC offers comparable hardness and wear resistance at approximately one-third the density, making it a cost-effective alternative to high-cost WC-based materials.

Unlike brazed inserts, the cast-in process used with CIMTiC™ forms a direct metallurgical bond with the base metal, minimizing residual stress and improving durability. CIMTiC™ is widely used in high-wear components such as crusher teeth, beam caps, drill bits, hammer tips, and more.

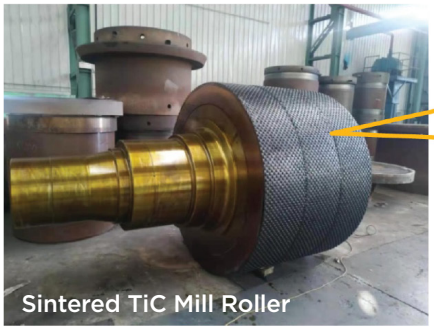
Sintered TiC
Hexagonal Prism



Beam Cap



Crusher Tooth


Sintered TiC Mill Roller

PERFORMANCE SUMMARY

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Based on test results, CIMTiC™ demonstrates excellent wear resistance and robust fracture toughness, comparable to traditional cemented tungsten carbide (WC) but at approximately one-third the density. This unique combination of cost efficiency, superior mechanical properties, and a uniform microstructure makes CIMTiC™ an ideal material for high-wear, cast-in applications that demand both durability and lightweight design.

Fracture Toughness Comparison – CIMTiC™ and WC

Grade	HV100	Pressure (Kg)	L1	L2	L3	L4	Fracture Toughness ($N/mm^{3/2}$)	Fracture Toughness (Average)
Fine-grained cemented tungsten carbide (WC-20Co)	979	100	0.0188	0.0166	0.0266	0.0286	28.52	33.01
	968	100	0.0146	0.0242	0.0339	0	31.66	
	960	100	0.0343	0.0136	0	0	38.85	
Medium-coarse grained cememted tungsten carbide (WC-15Co)	1010	100	0.0275	0.0594	0.0275	0.0367	22.43	21.85
	1030	100	0.0423	0.0454	0.0528	0.0296	21.35	
	1030	100	0.0465	0.0369	0.0275	0.0529	21.76	
CIMTiC™	936	100	0.0197	0.0114	0.0177	0.019	32.24	29.56
	922	100	0.0421	0.021	0.0163	0.0199	26.44	
	930	100	0.022	0.0236	0.0099	0.0223	30.00	

ASTM G65 Wear Resistance Comparison - CIMTiC™ and WC

Materials	Density (g/cm^3)	Pressure (N)	Revolutions (r)	Initial Mass (g)	Final Mass (g)	Mass Loss (g)	Volume Loss (mm^3)	Sand Flow Rate (kg)	Average Volume Loss (mm^3)
Fine-grained cemented tungsten carbide (WC-20Co)	13.55	150	2000	134.8873	134.6908	0.1965	14.502	3.6	10.2380
	13.55	150	2000	134.6908	134.5913	0.0995	7.343	1.8	
	13.55	150	2000	134.5913	134.4704	0.1209	8.923	2.2	
	13.55	150	2000	134.4704	134.3324	0.1380	10.185	3.1	
CIMTiC™	6.24	150	2000	70.9463	70.888	0.0583	9.349	2.8	10.2900
	6.24	150	2000	71.0067	70.9375	0.0692	11.097	2.3	
	6.24	150	2000	70.887	70.8108	0.0762	12.219	3.7	
	6.27	150	2000	71.4161	71.3612	0.0549	8.754	2.4	
	6.27	150	2000	71.482	71.4191	0.0629	10.029	2.3	

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