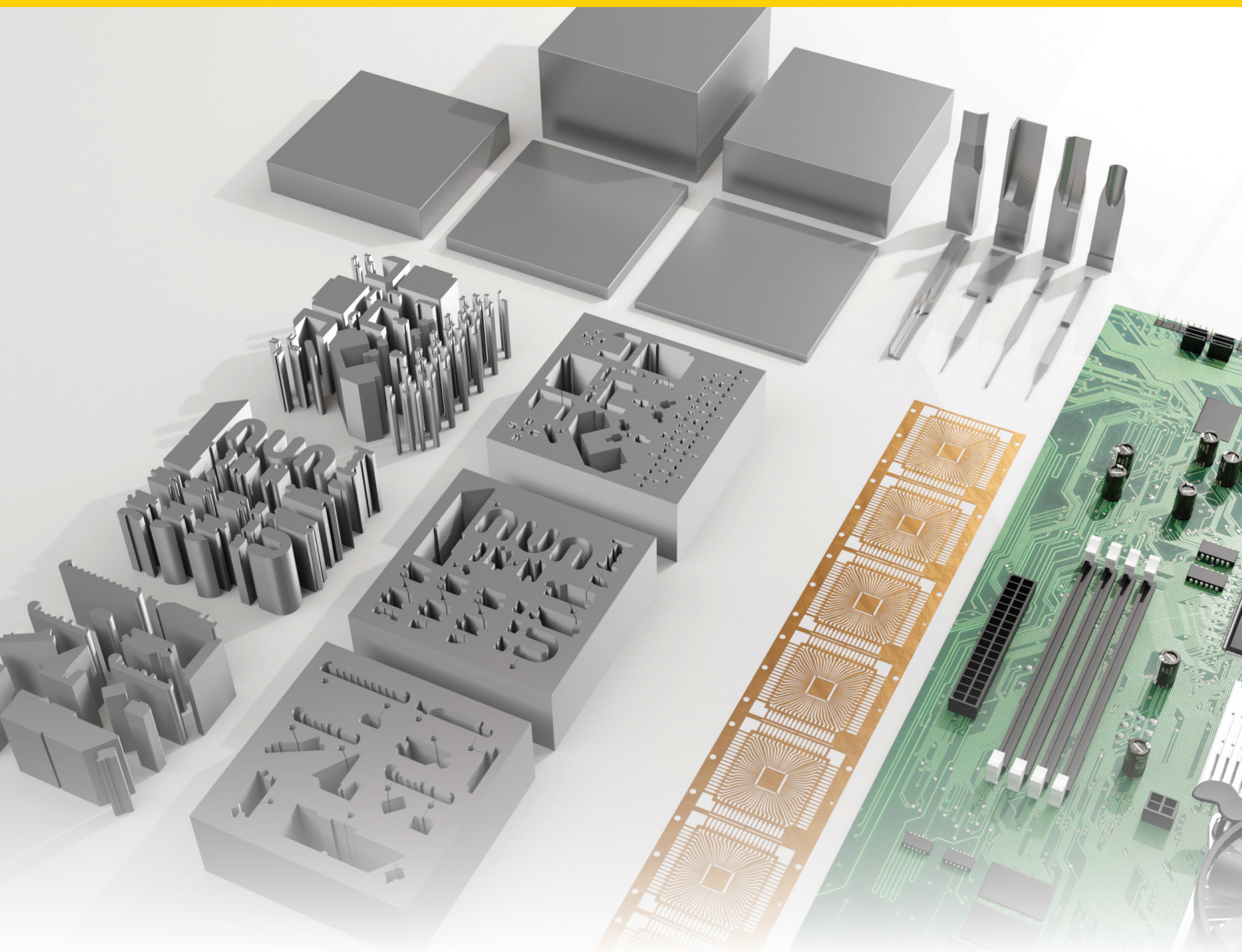


METALFORMING

EDM Blocks



kennametal.com

 **KENNAMETAL®**

Kennametal EDM Blocks

Kennametal is a global supplier of solutions for wear, heat, and corrosion problems, a world-class manufacturer of components, and a service provider to a wide range of industries.

By matching our advanced material solutions and technologies to your applications, we can help you solve your biggest wear problems, avoid costly downtime and catastrophic failures, and achieve significant savings.

EDM Blocks Portfolio:

- All grades are proven in their application.
- Products stocked globally for quick delivery.
- Standard and corrosion-resistant grades.
- 200 standard sizes with custom sizes available upon request.
- Application, metallurgical, and process optimization services.

Expertise in Cemented Tungsten Carbide Metallurgy

Our globally renowned portfolio of grades for metalforming and stamping is based on over 80 years of research and development of tungsten carbide-based materials.

Withstand Extensive EDM

Our latest grades were developed with a proprietary binder system and maintain the hardness and mechanical properties of our conventional grades. They resist the corrosion, pitting, and cracking commonly experienced during electrical discharge machining, especially in thick punches and large die segments.

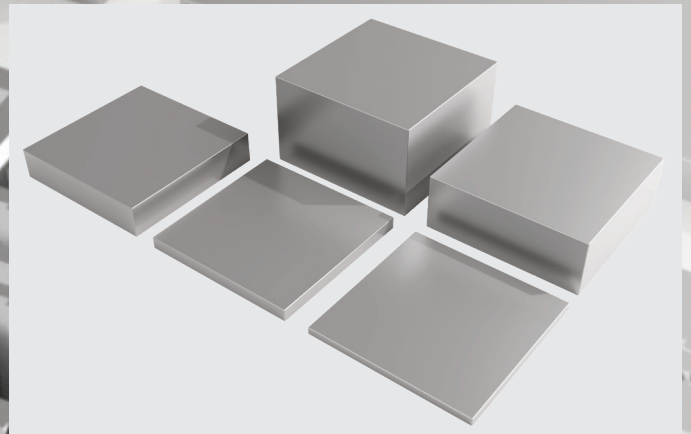
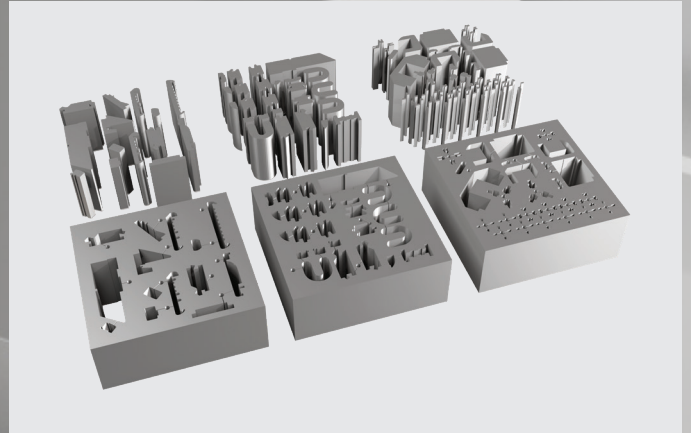
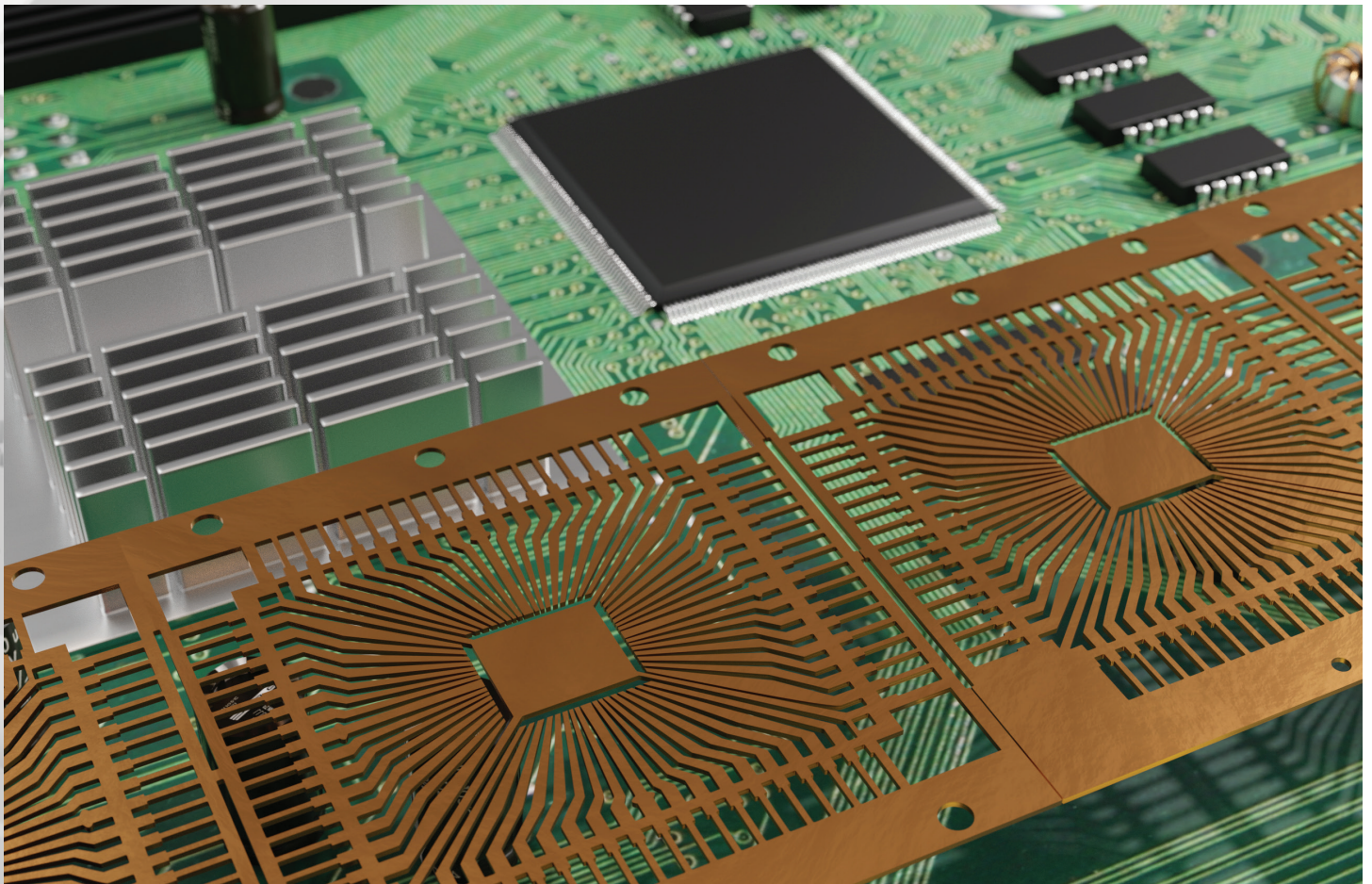
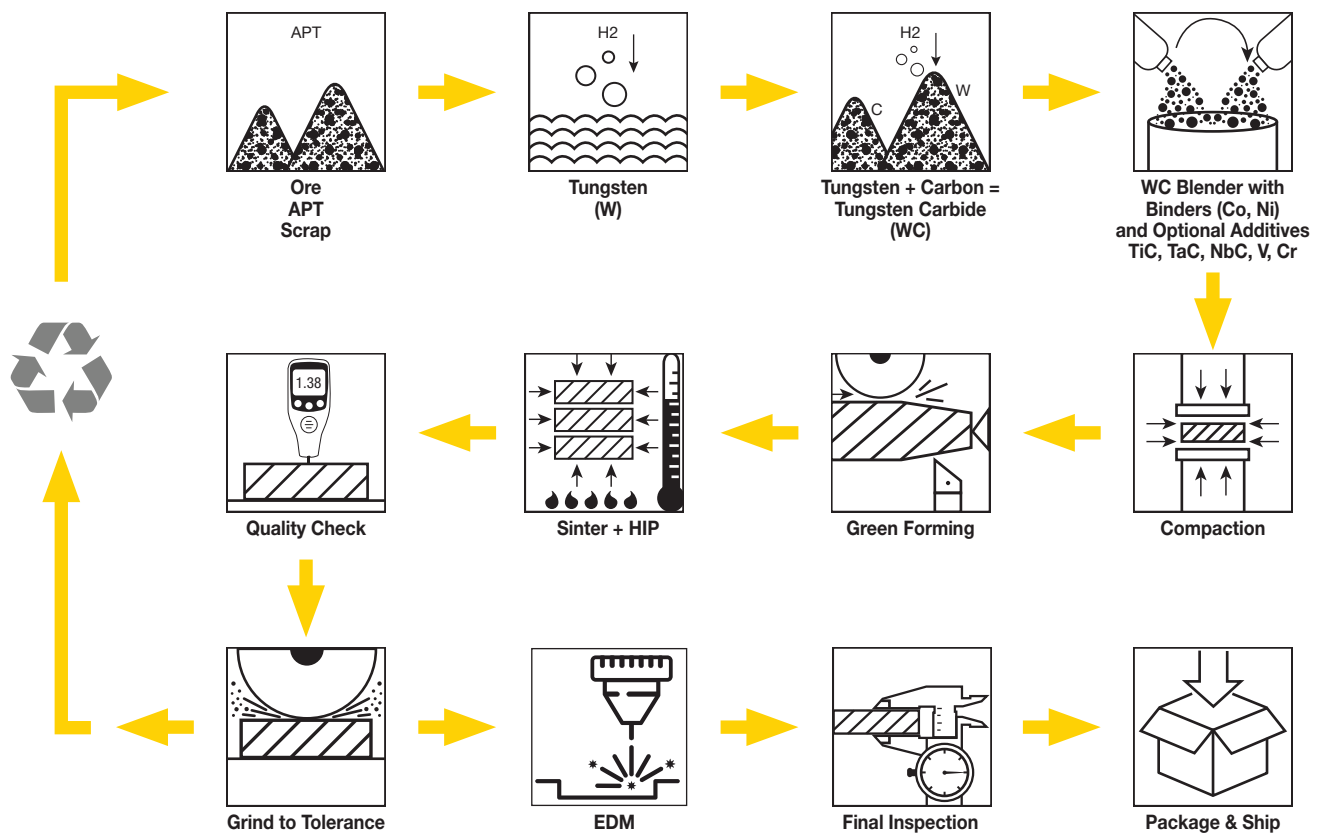


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EDM Block Production Process and Cemented Tungsten Grades



Cemented Tungsten Carbide Grades

We offer a wide variety of carbide grades, including submicron, fine, medium, and coarse-grained tungsten carbides with a mixture of binders and additives to create the right balance of hardness, toughness, abrasion, and corrosion resistance for the application.

Hardness

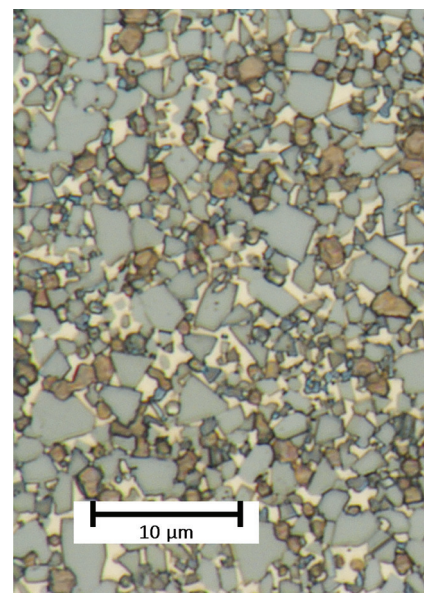
Hardness is determined by the percentage of binder and the grain size of the tungsten carbide particles. Generally, the more binder, the lower the hardness, and the larger the grains, the lower the hardness.

Wear Resistance

Generally, grades with more binder or coarser grains (lower hardness) will have less wear or abrasion resistance. However, there will be an increase in strength. It is always necessary to balance high hardness/high wear resistance with lower hardness/high strength. To test the abrasion or wear resistance of our carbide grades, we typically conduct a dry sand (G65) or slurry tests (B611).

Strength

The amount of binder and the variation in grain size will also affect the impact strength (a shock load) and the fracture toughness (a measure of crack initiation and crack propagation). More binder and/or coarser grains will generally increase the impact strength and the fracture toughness. With submicron grained grades, impact strength and the fracture toughness decrease when compared to coarser grained grades of equal cobalt content; however hardness increases.



Example of Cemented Carbide with Medium-Coarse Grains

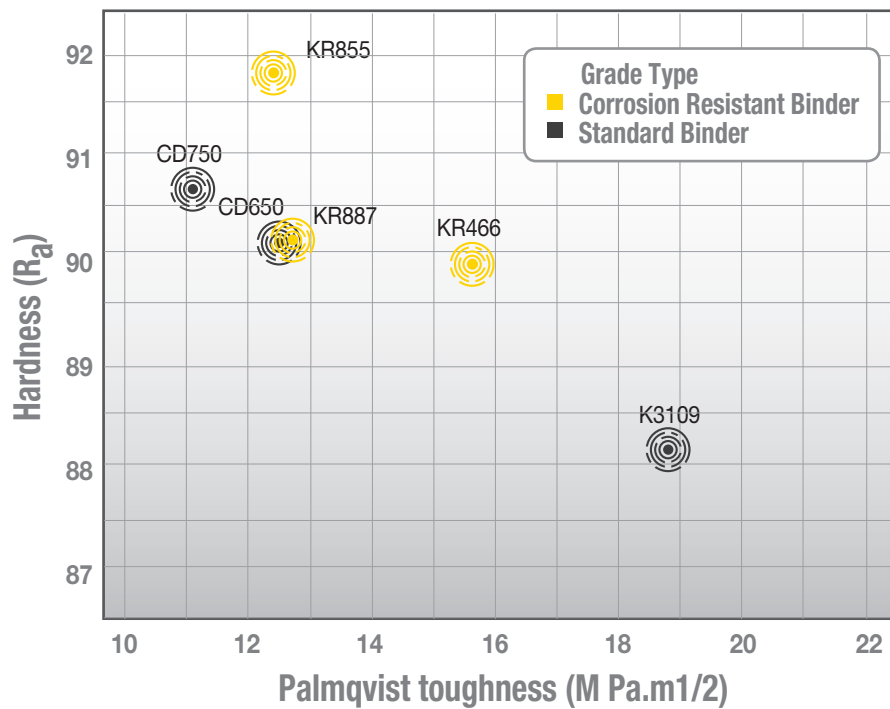
EDM Blocks Grade Properties



Kennametal Grade	Binder (%)	Grain Family	Hardness		Transverse Rupture Strength		Fracture Toughness [Palqvist K1c] Mpa*m ^{1/2}
			HRA	HV30	PSI	MPa	
KR855	10	submicron	91.8	1580	420500	2900	12.4
KR466	12	medium/fine	90.0	1360	480000	3310	15.6
KR887	15	submicron	90.2	1380	435000	3000	12.7
CD650	15	submicron	90.2	1380	550000	3790	12.5
CD750	15.5	submicron	90.7	1440	625000	4310	11.1
K3109	12.1	coarse	88.2	1160	420000	2895	18.8

NOTE: Made-to-order blocks and pre-forms are available in a variety of grades for specialty applications.

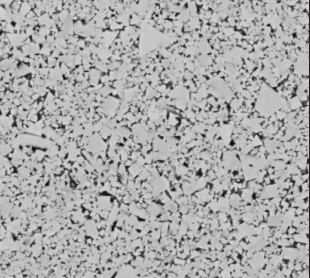
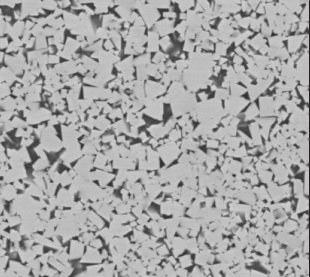
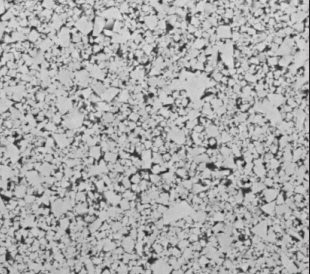
Hardness vs Fracture Toughness



EDM Blocks Grade Descriptions

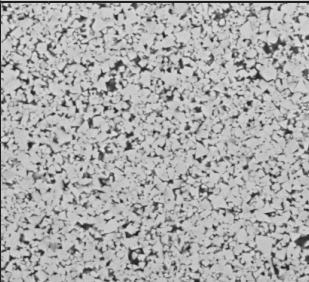
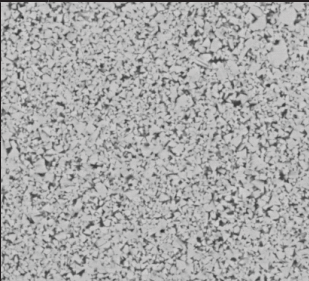

Unlike other carbide manufacturers, we produce our powders from the raw materials. This guarantees the highest quality tungsten carbide throughout the process and maximizes performance for the end user.



Corrosion Resistant Binder grades optimized for the Wire EDM process	
Grade	Description
KR855	
	<p>Composition: 10% corrosion-resistant binder with submicron grain structure. Very good wear resistance with high edge sharpness but less shock resistance than higher binder grades. Excellent for EDM operations and good in non-ferrous applications.</p> <p>Application: An upgrade to standard 10% submicron grades, KR855 presents ideal wear resistance in high-speed stamping, medium, thin sheets — coining brass (~.010" / 0.25mm thick), can die ironing rings, non-gummy steels, compacting dies, stamping dies for razor blades, lead frames (thin copper ~.030"/0.76mm), annealed copper, and draw dies (300 series stainless steel).</p>
KR466	
	<p>Composition: 12% corrosion-resistant binder with medium/fine-grain structure. Very high strength for medium impact with low wear properties.</p> <p>Application: Light blanking dies - Silicon Steel up to ~.020" / 0.5mm, Medium Blanking - Mild Steel to ~.030" / 0.8mm Lamination dies - silicon steel, Scroll dies, burnishing rolls, backward and forward extrusion dies (light impact).</p>
KR887	
	<p>Composition: 15% corrosion-resistant mixed binder with submicron grain structure for lead frame and connector stamping. Very high strength and excellent wear resistance for medium-impact applications.</p> <p>Application: Stamping dies for razor blades, electronic stamping, lead frame dies, laminations, spring steel stampings, and coining dies (hard metal). Not recommended for stamping thick stainless steel. Use in place of CD650 for difficult to EDM parts, or if corrosive die lubricants are used.</p>

NOTE: Grades shown at 1500x magnification.

EDM Blocks Grade Descriptions

Cobalt binder grades optimized for the Wire EDM process		
Grade	Description	
CD650		
	Composition:	Conventional 15% cobalt binder with submicron grain structure for lead frame and connector stamping. Very high strength and excellent wear resistance for medium-impact applications. Our most popular grade for general purpose stamping.
	Application:	Stamping dies for razor blades, electronic stamping, lead frame dies, laminations, spring steel stampings, coining dies (hard metal). Not recommended for stamping thick stainless steel.
CD750		
	Composition:	15.5% cobalt binder with ultrafine submicron grain structure for lead frame and connector stamping. Very high strength and excellent wear resistance for low-impact applications.
	Application:	Extremely thin punches or tools with very fine features will benefit from the ultrafine submicron grain structure, which helps to prevent premature corner washout and maintain edge strength. Also, may be used as an upgrade to CD650, due to increased hardness.
K3109		
	Composition:	This 12% Cobalt grade is well suited for high impact stamping and bending applications due to its coarse grain structure and high fracture toughness.
	Application:	Impacting punches, Coining dies, Forming dies, Can die punches, Swaging dies, Cold forming, Back extrusion punches & dies, high-impact extrusion dies, Nail grip dies, Very severe draw dies for .075" thick cold rolled steel, Piercing punches-305 stainless, Works well on gummy steel.

NOTE: Grades shown at 1500x magnification.

EDM Blocks Grade Applications

Tensile Strength (N/mm ²)	Sheet Metal Thickness (mm)							
	<0.2	0.2-0.4	0.4-0.8	0.8-1.2	1.2-1.5	1.5-2.0	2.0-3.0	3.0+
< 500	KFS33	KFS33	KFF24	KR855	KR466	KR466	KR466	*
	KFF24	KFF24	KR855	KR466	KR887	KR887	KFM67	*
	KR855	KR855	KR887	KR887				*
500 - 1000	KFS33	KFS33	KR855	KR466	KR466	KFM67		*
	KFF24	KFF24	KR466	KR887	KFM67	K3109	K3109	*
	KR855	KR855	KR887		K3109			*
1000 - 1500	KFF24	KFF24	KR855	KR466	KR466	KFM67	KFM67	*
	KR855	KR855	KR466	KFM67	KFM67	K3109	K3109	*
1500 - 2000	KR855	KR466	KFM28	KFM28	KFM28	KHC68	KHC68	*
	KR887	K3109	K3109	K3109	K3109	K3520	K3520	*
> 2000	KR466	KFM67	K3109	K3520	*	*	*	*
	KFM67	K3109	K3520	K3520	*	*	*	*



NOTE: All Kennametal KMSB Standard EDM blocks are individually laser-etched, packaged, and labeled for protection and traceability.

Ready to Meet Your Specific Needs

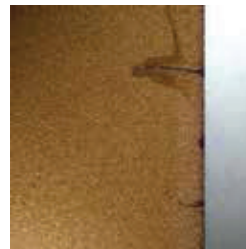
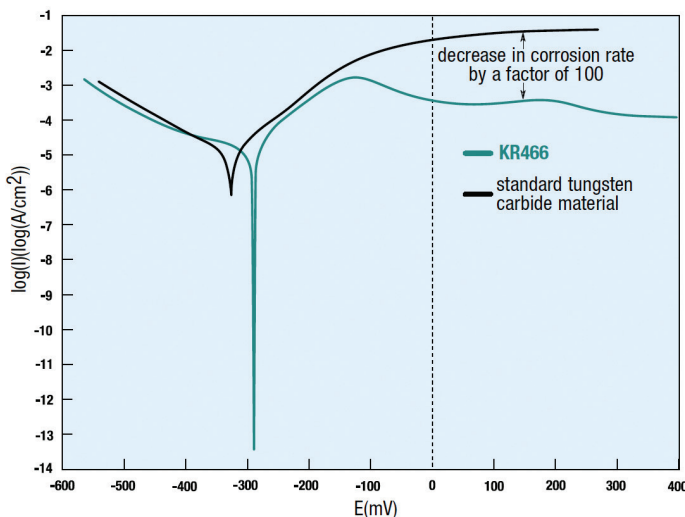
We have a large selection of conventional and low-corrosion rectangular blanks in stock. Each is sinter-HIP processed and stress-relieved for optimum performance in EDM machining. Blocks are available in standard sizes, which are individually packaged for easy delivery and handling.

Your Best Choice for a World of Extremes

For more than 80 years, we've proven our unparalleled performance and durability levels to a worldwide customer base. We have application specialists always on-hand to ensure you receive the right grade for the job. Our customer service and delivery are second to none. To learn more about how we can substantially boost your productivity — and lower your operating costs — contact your local Kennametal Representative.

Comprehensive Field Testing Demonstrates the Superiority of Kennametal Low-Corrosion EDM Blocks.

Potentiodynamic Corrosion Test

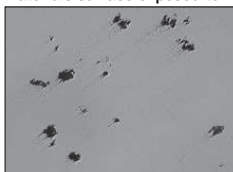


Standard solid carbide with multiple cracks on both rough and trim/finish cuts.



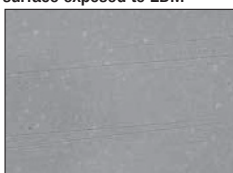
Kennametal low-corrosion grade is free of cracks.

Standard tungsten carbide materials surface exposed to EDM*



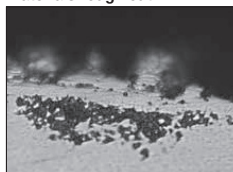
Pitting corrosion on all faces.

Kennametal low-corrosion grade surface exposed to EDM*



No pitting corrosion.

Standard tungsten carbide materials rough cut



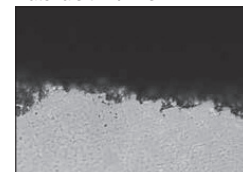
Corrosion.

Kennametal low-corrosion grade rough cut



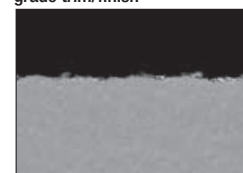
No corrosion.

Standard tungsten carbide materials trim/finish



Corrosion originating from the surface layer.

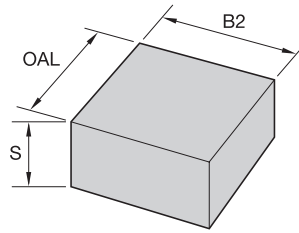
Kennametal low-corrosion grade trim/finish



No corrosion detected.

KMSB • 105 X 105mm

- Nominal dimensions are shown in the chart below.
- All blanks are provided with grinding allowance as shown in the tolerance chart.
- Each block is sinter HIP and stress relieved for EDM machining.



catalog number	S		B2		OAL		Part Number (Material Master)				
	mm	Stock Tolerance	mm	Stock Tolerance	mm	Stock Tolerance	Grade				
							CD650	CD750	KR466	KR887	KR855
KMSB010	1,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205625	5990520	-	-	5704684
KMSB015	1,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205626	6186452	5956612	6306578	5594284
KMSB020	2,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205627	5911311	5969055	-	5704685
KMSB025	2,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205628	6099935	5956613	6306579	5704686
KMSB030	3,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205629	5990601	5969056	6111986	5704687
KMSB035	3,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205720	6099936	6167690	6306580	-
KMSB040	4,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205721	5952842	6225687	-	5949572
KMSB045	4,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205722	6101936	5315125	6306581	-
KMSB050	5,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205723	5952843	6167761	6306582	5949573
KMSB055	5,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205724	6186521	5315126	6306583	-
KMSB060	6,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205725	5952844	6167762	-	-
KMSB065	6,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205726	6186523	5315127	6306584	-
KMSB070	7,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205727	5990602	6306559	-	6060801
KMSB075	7,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205728	6186524	5315128	6306585	-
KMSB080	8,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205729	5952845	6306560	6306586	5565815
KMSB085	8,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205730	6186525	5315129	6306587	5572435
KMSB090	9,0	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205731	5990604	5391771	-	-
KMSB095	9,5	+0.6/+1.25	105	+0.6/+2.5	105	+0.6/+2.5	5205732	6091876	5315170	6306588	-
KMSB100	10,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205733	5564400	6117036	-	6111985
KMSB105	10,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205734	6186526	5315171	-	-
KMSB110	11,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205735	6130102	-	-	-
KMSB115	11,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205736	-	-	-	-
KMSB120	12,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205737	6186527	6306561	6306589	6492292
KMSB125	12,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205738	-	5315172	6306590	6145462
KMSB130	13,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205739	-	-	-	-
KMSB135	13,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205750	-	-	-	-
KMSB140	14,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205753	-	-	-	6093699
KMSB145	14,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205754	-	5315173	-	-
KMSB150	15,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205755	6186528	5969057	5416709	6148465
KMSB155	15,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205756	-	-	-	-
KMSB160	16,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205757	-	5913757	5416710	-
KMSB165	16,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205758	-	-	-	-
KMSB170	17,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205759	-	-	5416711	-
KMSB175	17,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205760	-	-	-	-
KMSB180	18,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205761	5304431	-	5416712	-
KMSB185	18,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205762	-	-	-	-
KMSB190	19,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205763	-	6306562	5416713	-
KMSB195	19,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205764	-	-	-	-
KMSB200	20,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205765	5329043	6225689	5416714	6096163
KMSB205	20,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5315174	-	5623704

KMSB • 105 X 105mm (continued)

catalog number	Part Number (Material Master)										
	S		B2		OAL		Grade				
	mm	Stock Tolerance	mm	Stock Tolerance	mm	Stock Tolerance	CD650	CD750	KR466	KR887	KR855
KMSB210	21,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205766	-	-	5416715	6196560
KMSB220	22,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205767	6187038	-	-	-
KMSB230	23,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205768	5329044	6306563	5416716	-
KMSB240	24,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205769	-	-	-	-
KMSB250	25,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205770	5329045	6084834	5416717	6124337
KMSB255	25,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5315175	6242292	-
KMSB260	26,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205771	6192251	6306564	-	-
KMSB285	28,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306565	6306591	-
KMSB300	30,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205772	-	6360117	6111987	6051610
KMSB320	32,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205773	-	6306566	5416718	-
KMSB350	35,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	5911270	6084833	6306592	-
KMSB380	38,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306567	6306593	-
KMSB390	39,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	-	5416719	-
KMSB400	40,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205774	-	6360118	6306594	-
KMSB415	41,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306568	6306595	-
KMSB445	44,5	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306569	6306596	-
KMSB450	45,0	+0.6/+1.5	105	+0.6/+2.5	105	+0.6/+2.5	5205775	-	-	5416720	-
KMSB500	50,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5954489	6306597	6029869
KMSB510	51,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	5205776	-	6306570	5416721	-
KMSB520	52,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6351035	-	-
KMSB530	53,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	5329046	-	5416722	-
KMSB535	53,5	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5315176	-	-
KMSB550	55,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306571	6306598	6492293
KMSB555	55,5	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5315177	5416723	-
KMSB570	57,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306572	6306599	-
KMSB580	58,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	-	5416724	-
KMSB600	60,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306573	5342190	6339549
KMSB605	60,5	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5315178	5416725	-
KMSB635	63,5	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	5587113	6306600	-
KMSB650	65,0	+0.6/+1.75	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6021416	-	-
KMSB700	70,0	+0.6/+2	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306574	6306601	-
KMSB765	76,5	+0.6/+2	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306575	6306602	-
KMSB855	85,5	+0.6/+2	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306576	6306603	-
KMSB890	89,0	+0.6/+2	105	+0.6/+2.5	105	+0.6/+2.5	-	-	6306577	6306604	-



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