

# Metal Forming

## Grade Specifications and Application Chart



### Cemented Tungsten Carbide Grades for Metal Forming and Wear Components

Kennametal Grade Name	Alternate or Legacy Name	Grain Family	Industry Classification		Cobalt Binder (wt. %)	Hardness (HV30 estimated)		Density (g/cm <sup>3</sup> )	TRS (1000 psi)
			C Code	ISO Code		HRA	HV30		
CD630	KFS06 KF306	Submicron	C4	K05	6.0	93.2	1840	14.90	500
CD30	—	Fine	C2/C9	K10	6.0	92.5	1700	14.90	310
CD35	—	Medium	C10	G10	9.0	90.3	1380	14.60	335
K3135	—	Coarse	—	—	9.0	89.5	1290	14.55	430
CD636	KF310	Submicron	—	K30	10%	92.0	1620	14.50	450
KR855	—	Submicron	—	K30	10% mixed binder	91.8	1580	14.40	420
CD337	—	Coarse	C11	G20	11.0	88.6	1200	14.35	460
KR466	—	Fine	C12	G25	12% mixed binder	90.0	1360	14.15	480
K3109	—	Coarse	—	—	12.1	88.2	1160	14.20	420
CD40	H81	Medium	C11/C12	—	13.0	88.8	1220	14.20	380
CD650	KFS69 KF315	Submicron	C1	K40	15.0	90.2	1380	13.96	530
KR887	—	Submicron	—	—	15% mixed binder	90.2	1380	13.90	435
CD50	—	Medium	C13	G30	15.0	88.0	1140	14.00	420
K3150	—	Coarse	—	—	15.0	86.7	1040	13.95	490
CD750	—	Submicron	—	—	15.5	90.7	1440	13.82	625
CD60	K3520 H20	Extra Coarse	C14	G40	20.0	84.1	840	13.60	426
CD70	H25	Extra Coarse	C17	G50/G55	25.0	82.3	780	13.20	430

CD750 only available as standard EDM block. Grade properties are subject to change or upgrade without notice.

#### CONTACT FOR MORE INFORMATION:

TEL: +1 800 227 2434  
irwin.service@kennametal.com

## Preform Blank Grades

Grades	Description	Applications
CD630	<b>High wear Lower shock</b>	Used in high-abrasion, high-wear applications for: light draw dies, fine blanking dies, stamping dies for mylar, fine wire draw dies, compacting dies.
CD30	<b>High wear Light shock</b>	Draw dies, seal rings, compacting dies, wear pads, burnishing tools, paper slitter rings, plainer knives, drills, reamers, saw tips, spray nozzles, floor tile dies, scrapper blades, router bits, woodworking tools, stamping dies for light blanking: - rubber - abrasive paper - mylar.
CD35	<b>Good wear Light Shock</b>	Valve lifter discs, knurling wheels, bandsaw guides, draw dies, bar and tube dies, powder metal compacting dies (normal), stamping dies, medium size wire bending.
K3135	<b>Good wear Medium Shock</b>	Punch and dies for electrical laminations, draw dies (severe), backward extrusion punches, compressive strength >300,000 psi, or L:D >7:1, lamination dies for silicon steel and stainless.
CD636 KR855	<b>Very good wear Light shock</b>	Coining brass (.010 thick), can die ironing rings, drills (mica), non-gummy steels, rotary drills, crush rolls, compacting dies, stamping dies for razor blades, lead frames (thin copper .030"), annealed copper, draw dies (300 series stainless).
CD337 K3109	<b>Very high strength Heavy impact Low wear</b>	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 for 305 stainless, works well on gummy steel.
KR466	<b>High abrasion resistance</b>	Light blanking dies for silicon steel up to .020", medium blanking for mild steel up to .030", lamination dies for silicon steel, scroll dies, burnishing rolls, backward and forward extrusion dies (light impact).
CD40	<b>Medium impact</b>	Stamping dies, compacting dies (severe), bronze, copper, can die rings, metal forming dies, draw dies (severe), slitter rings, razor blade dies, coining dies, drill bits.
CD50 K3150	<b>Medium impact Good wear</b>	Lamination dies: silicon steel .004-.040", blanking dies for mild steel up to .040", forming dies, scroll dies, mandrels, cut-off knives, compacting dies, boring bars, deep draw dies for oil filters, pulverizing blades, stamping dies for chain saw teeth, light cold heading dies, gripper jaws, swaging dies-aluminum.
CD650 KR887	<b>Low impact Very good wear Very high strength</b>	Stamping dies for razor blades, electronic stamping, lead frame dies, laminations, spring steel stampings, crush rolls, coining dies (hard metal), not good for stamping thick stainless.
CD60	<b>Heavy shock Heavy impact</b>	Heavy metal forming applications, such as: header dies, washer dies, light-heavy blanking up to .062" steel, crushing hammers, rivet sets, backward or forward extrusion dies, heavy piercing punches.
CD70	<b>Heavy shock Heavy impact</b>	Used in hot and cold metal forming applications where very severe shock loads are applied, such as: hot-forming dies, swaging dies, hex dies, trapped extrusion dies, very heavy blanking dies, and very heavy piercing punches, cold heading dies, nail heading dies, swaging dies, coiling dies, shears, and cutoff dies.

## EDM Block Grades

### Corrosion-resistant binder grades optimized for the wire EDM process

Grades	Description
KR855	<p><b>Composition:</b> 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 great for non-ferrous applications.</p> <p><b>Application:</b> ISO K-30 grade with ideal wear resistance in high-speed stamping, medium, thin sheets — coining brass (.010" thick), can die ironing rings, non-gummy steels, compacting dies, stamping dies for razor blades, lead frames (thin copper .030"), annealed copper, and draw dies (300 series stainless steel).</p>
KR466	<p><b>Composition:</b> 12% corrosion-resistant binder with medium/fine-grain structure. Very high strength for heavy impact with low wear properties.</p> <p><b>Application:</b> Light blanking dies for silicon steel up to .020", medium Blanking for mild steel up to .030", lamination dies: silicon steel, scroll dies, burnishing rolls, backward and forward extrusion dies (light impact).</p>
KR887	<p><b>Composition:</b> 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><b>Application:</b> 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>

### Cobalt binder grades optimized for the wire EDM process

Grades	Description
CD650	<p><b>Composition:</b> 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.</p> <p><b>Application:</b> 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.</p>
CD750	<p><b>Composition:</b> Conventional 15.5% cobalt binder with ultra-fine submicron grain structure for lead frame and connector stamping. Very high strength and excellent wear resistance for low-impact applications.</p> <p><b>Application:</b> Extremely thin punches or tools with very fine features will benefit from the ultra-fine 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.</p>

This is a reference guide only. Please consult with a Kennametal applications specialist prior to choosing a grade.