

# Grade & Application Guide

## Conventional Cemented Tungsten Carbide Metalforming Grades

KENNAMETAL GRADE	BINDER %	GRAIN FAMILY	HARDNESS (HRA)	DENSITY (g/cm <sup>3</sup> )
CD630 KF306	6.0	Submicron	93.3	14.90
CD636 KF310	10.0	Submicron	92.2	14.50
CD750	15.0	Submicron	91.0	13.95
CD650 KF315	15.0	Submicron	90.2	13.95
K313	6.0	Fine	93.0	14.90
K96	5.5	Fine	92.1	15.00
CD30	6.0	Fine	92.5	14.90
CD18	12.0	Fine	90.1	14.35
K94	11.5	Fine	89.8	14.30
K92	15.7	Fine	88.4	13.80
K91	19.7	Fine	86.8	13.30
K90	24.8	Fine	84.8	12.90
CD35	10.0	Medium	90.3	14.50
K3833	11.0	Medium	89.8	14.40
CD40	13.0	Medium	89.0	14.20
CD50	15.0	Medium	88.0	14.00
K3135	9.0	Coarse	89.5	14.55
CD337	11.0	Coarse	88.5	14.35
K3109	12.1	Coarse	88.0	14.20
K3150	15.0	Coarse	87.0	13.95
CD60 K3520	20.0	Extra Coarse	84.2	13.45
CD70	25.0	Extra Coarse	82.2	13.20

## Mixed Binder (Corrosion Resistant) Metalforming Grades

KR855	10.9	Submicron	91.8	14.40
KR466	13.2	Coarse	90.0	14.20
KR887	15.6	Submicron	90.4	13.90

## Gall-Resistant (TiC & TaC additives) Metalforming Grades

K84	10.3	Fine	91.0	12.90
K82	12.6	Fine	90.2	11.65



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GRADES	DESCRIPTION	APPLICATIONS
K96, CD30	HIGHLY WEAR RESISTANT LIGHT SHOCK	Draw dies, compacting dies, burnishing tools, drills, reamers, stamping dies for light blanking.
KF306, CD630, K313	HIGH WEAR RESISTANCE LOWER SHOCK	Used in high abrasion, high wear applications for: light draw dies, fine blanking dies, stamping dies for mylar, fine wire draw dies, compacting dies.
CD35	GOOD WEAR RESISTANCE LIGHT SHOCK	Valve lifter discs, knurling wheels, bandsaw guides, draw dies, bar and tube dies, powder metal compacting dies (normal) stamping dies, medium size wire bending.
K3833, K3135	GOOD WEAR RESISTANCE MEDIUM SHOCK	Punch and dies for electrical laminations, draw dies (severe), backward extrusion punches, compressive strength >300,000 psi, or L:D >7:1, lamination dies-silicon steel and stainless.
KF310, CD636	VERY GOOD WEAR RESISTANCE LIGHT SHOCK	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	VERY HIGH STRENGTH HEAVY IMPACT MEDIUM WEAR RESISTANCE	Impacting punches, coining dies, forming dies, can die punches, swaging dies, cold forming, back extrusion punches and 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.
K94, CD18	HIGH ABRASION RESISTANCE	Light blanking dies—silicon steel up to .020", medium blanking—mild steel to .030" lamination dies-silicon steel, scroll dies, burnishing rolls, backward and forward extrusion dies (light impact).
CD40	MEDIUM IMPACT GOOD WEAR	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.
K92, CD50	MEDIUM IMPACT MEDIUM WEAR RESISTANCE	Lamination dies—silicon steel .004"-.040", blanking dies—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-chain saw teeth, light cold heading dies, gripper jaws, swaging dies-aluminum.
KF315, CD650, CD750	LOW IMPACT VERY GOOD WEAR VERY HIGH STRENGTH	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.
K3150, K91, K3520, CD60	HEAVY SHOCK HEAVY IMPACT	Heavy metalforming 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.
K90, CD70	HEAVY SHOCK HEAVY IMPACT	Used in hot and cold metalforming 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.

## Corrosion-Resistant Binder Grades Optimized for the Wire EDM Process

KR855	VERY GOOD WEAR LIGHT SHOCK	10% corrosion-resistant binder with submicron grain structure. Excellent for EDM operations and good in non-ferrous applications. Applications: 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, draw dies (300 series stainless steel).
KR466	GOOD WEAR RESISTANCE MEDIUM SHOCK	12% corrosion-resistant binder with coarse grain structure. Very high strength for heavy impact with low wear properties. Applications: for standard stamping—impacting punches, coining dies, forming dies, can die punches, swaging dies, cold forming, very severe draw dies for .075" thick cold-rolled steel, piercing punches (305 stainless steel), gummy steel.
KR887	LOW IMPACT VERY GOOD WEAR RESISTANCE VERY HIGH STRENGTH	15% corrosion-resistant binder with submicron grain structure for lead frame and connector stamping. Very high strength and excellent wear resistance for low-impact applications. Applications: stamping dies for razor blades, electronic stamping, lead frame dies, laminations, spring steel stampings, crush rolls, coining dies (hard metal). Not recommended for stamping thick stainless steel.

## Gall-Resistant Grades

K84	GOOD WEAR RESISTANCE, LIGHT SHOCK	General purpose, draw dies and tube sizing mandrels.
K82	MEDIUM IMPACT, MEDIUM WEAR RESISTANCE	Large diameter draw dies, tube sizing mandrels, and impact extrusion dies.

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

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