



Grade Application Guide

| Grades | Cobalt % | Description | Applications |
|--------------------------------|----------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CD-700 | 4% | Extreme Wear | Nozzles, Draw dies, Oil field tooling |
| CD-30 | 6 | High wear Light shock | Draw dies, Seal rings, Compacting dies, Wear pads, Burnishing tools, Slitter rings, Plainer knives, Drills, Reamers, Saw tips, Spray nozzles, Floor tile dies, Scrapper blades, Router bits, Wood working tools, Stamping dies for light blanking - rubber - abrasive paper - mylar, Compacting dies for high pressure compacts |
| CD-630 | 6 | High wear Lower shock | Circuit board drills, Stamping dies for mylar, End mill blanks |
| CD-35 CD-K3135 | 9 9 | Good wear Light Shock | Valve lifter discs, Knurling wheels, Bandsaw guides, Draw dies, Bar and tube dies, Compacting dies (normal) Stamping dies (light) Medium size wire bending |
| CD-36 | 10 | Good wear | Stamping dies, Powder metal compacting dies, Draw dies (severe) |
| CD-636 CD-KR855 | 10 10 | Very good wear 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) |
| CD-337 CD-K3109 CD-KR466 | 11 12 12 | Very high strength Heavy impact Low wear | Impacting punches, Coining dies, Forming dies, Can die punches, Swaging dies, mining tools, Percussion bits, Cold forming, Back extruding punches, Very severe draw dies for .075" thick cold rolled steel, Piercing punches-305 stainless, Works well on gummy steel |
| CD-18 | 12 | High abrasion resistance | Stamping dies-silicon steel, Brass, Bronze, Aluminum, Mylar, Lamination dies-silicon steel, Scroll dies |
| CD-40 | 13 | Medium impact | 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 |
| CD-50 CD-K3150 | 15 15 | Medium Impact Good wear | Stamping dies, 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 |
| CD-650 CD-KR887 | 15 15 | 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 |
| CD-60 | 20 | Heavy shock Heavy impact | Header dies, Crushing hammers, Rivet sets |
| CD-70 | 25 | Heavy shock Heavy impact | Heavy blanking punches, Cold heading dies, Nail gripper dies, Swaging dies |

This is a reference guide only. All specific applications should reviewed with a Kennametal applications engineer before a decision is made.



Nominal Grade Properties

| CARBIDE GRADE | BINDER % | GRAIN SIZE | ROCKWELL A SCALE | DENSITY G/CM ³ | TRANSVERSE RUPTURE (psi) | COMPRESSIVE STRENGTH (psi) | WEAR (1-18) | IMPACT (1-18) |
|---------------------|----------|------------|------------------|---------------------------|--------------------------|----------------------------|-------------|---------------|
| CD-700 | 4% | SUBMICRON | 94.0 - 95.0 | 15.15 | 200,000 | 700,000 | 18 | 1 |
| CD-630 | 6% | SUBMICRON | 92.0 - 93.5 | 14.90 | 370,000 | 880,000 | 17 | 2 |
| CD-30 | 6% | FINE | 90.5 - 92.0 | 14.90 | 310,000 | 690,000 | 15 | 4 |
| CD-35 | 9% | MEDIUM | 89.8 - 90.8 | 14.60 | 335,000 | 682,000 | 14 | 6 |
| CD-636 CD-EDM636 | 10% | SUBMICRON | 90.5 - 92.0 | 14.50 | 460,000 | 775,000 | 16 | 3 |
| CD-36 | 10% | MEDIUM | 89.5 - 90.5 | 14.50 | 310,000 | 675,000 | 12 | 7 |
| CD-337 CD-EDM337 | 11% | COARSE | 88.0 - 89.0 | 14.40 | 460,000 | 650,000 | 7 | 13 |
| CD-18 | 12% | FINE | 89.0 - 90.0 | 14.35 | 380,000 | 660,000 | 9 | 10 |
| CD-640 CD-EDM640 | 13% | SUBMICRON | 90.0 - 91.0 | 14.10 | 480,000 | 685,000 | 11 | 8 |
| CD-40 | 13% | MEDIUM | 88.5 - 89.5 | 14.20 | 380,000 | 639,000 | 6 | 11 |
| CD-750 CD-EDM750 | 15% | SUBMICRON | 90.5 - 91.5 | 14.00 | 625,000 | 725,000 | 13 | 5 |
| CD-650 CD-EDM650 | 15% | SUBMICRON | 89.0 - 90.5 | 14.00 | 550,000 | 650,000 | 10 | 9 |
| CD-50 | 15% | MEDIUM | 87.5 - 88.5 | 14.00 | 420,000 | 554,000 | 4 | 14 |
| CD-60 | 20% | COARSE | 83.0 - 84.5 | 13.50 | 440,000 | 483,000 | 2 | 17 |
| CD-70 | 25% | COARSE | 81.5 - 83.0 | 13.30 | 430,000 | 454,000 | 1 | 18 |

Specialty Grades

| | | | | | | | | |
|-------------------------|-----|--------|-------------|-------|---------|---------|---|----|
| CD-K3135 CD-EDMK3135 | 9% | COARSE | 89.0 - 90.0 | 14.60 | 430,000 | 670,000 | 8 | 12 |
| CD-K3109 CD-EDMK3109 | 12% | COARSE | 88.0 - 89.0 | 14.37 | 470,000 | 635,000 | 5 | 15 |
| CD-K3150 CD-EDMK3150 | 15% | COARSE | 86.5 - 88.0 | 14.00 | 490,000 | 550,000 | 3 | 16 |

Corrosion Resistant Grades

| | | | | | | | | |
|-------------------------|-----|-----------|-------------|-------|---------|---------|----|----|
| CD-KR855 CD-EDMKR855 | 10% | SUBMICRON | 91.3 - 92.3 | 14.40 | 420,500 | 800,000 | 16 | 3 |
| CD-KR466 CD-EDMKR466 | 12% | COARSE | 89.6 - 90.4 | 14.20 | 480,000 | 650,000 | 7 | 13 |
| CD-KR887 CD-EDMKR887 | 15% | SUBMICRON | 89.7 - 90.7 | 14.00 | 435,000 | 700,000 | 10 | 9 |

Sinter HIP processing available on all grades.
NOTE: On wear and impact scales 18 equals highest level of performance.

Kennametal Engineered Products
 1576 Arona Road, Irwin, PA 15642-4565
 Phone: 1-800-227-2434 Fax: 724-864-2443
www.kennametal.com
Irwin.Service@kennametal.com