Polycrystalline diamond (PCD)
Grade: CTB004

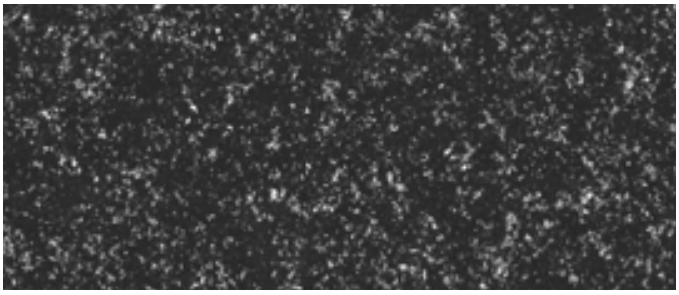
element six
DE BEERS GROUP

Key material characteristics

- 4 µm diamond grain size
- 10 % cobalt ratio (wt %)
- High wear resistance

Ideal for cutting aluminium alloys where high surface finish is required, alongside higher wear resistance. 4 µm average grain size. CTB004's finer grain structure offers optimum balance between tool performance and resistance to abrasion and chipping.

Typical microstructure



BEC 20 kV X500 Magnification 50 µm

Grade Grain size	Behaviour in application		Processing characteristics	
	Chip resistance	Abrasion resistance	Electro-discharge machinability	Grindability
CMX850 0.85 µm				
CTX002 2 µm				
CTB004 4 µm				
CTB010 10 µm				
CTH025 25 µm				
CTM302 2 - 30 µm				

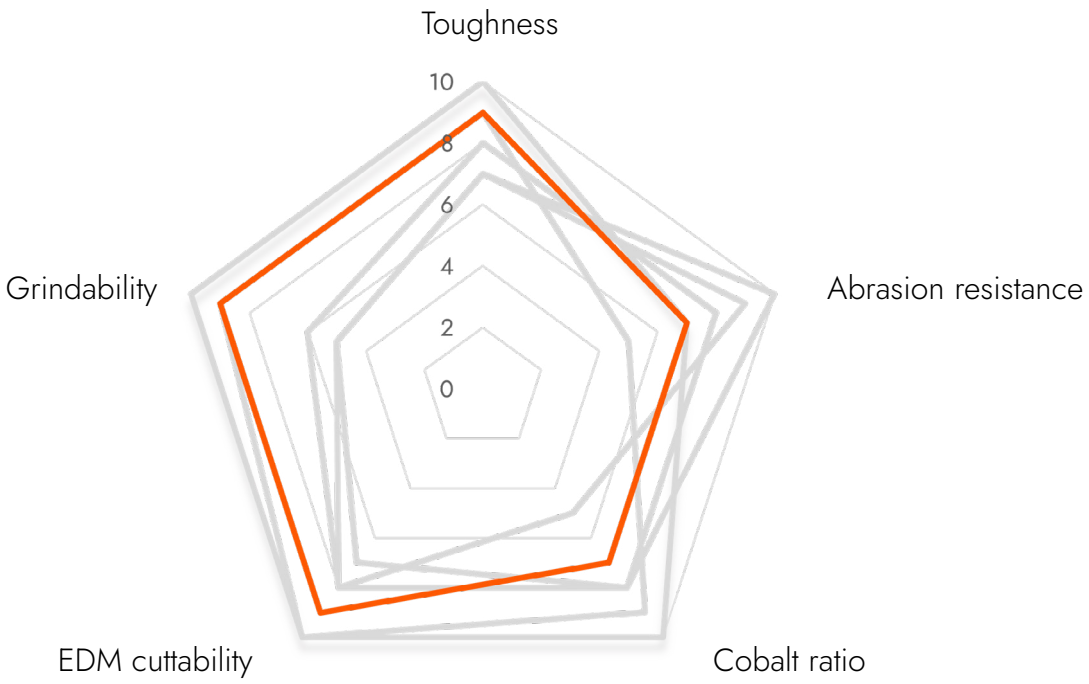
Size and format available

Maximum disc diameter: 76 mm

Maximum PCD certified area: 70 mm

	Overall height							
PCD layer thickness	**0.8**	**1.0**	**1.2**	**1.4**	**1.6**	**2.0**	**3.18**	**8.0**
0.5					✓			

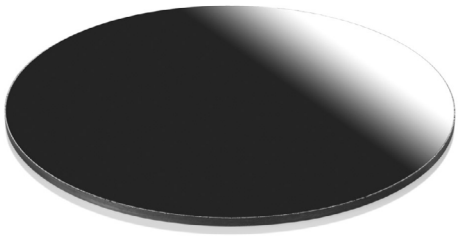
Material characteristics



Physical and metallurgical properties		
Property	**Measurement**	**Applicable standard**
Transverse rupture strenght characteristic strengh (MPa)	1921	ASTM C1239
Weibull modulus	6.35	
Fracture toughness mean (MPa.m^{½})	9.15	Shetty et al. (1995)
Elastic modulus (GPa)	950	ASTM E494
Poisson's ratio	0.1	
Density (g/cm^3)	4.19	Archimedes principle
Thermal conductivity (W/m/K) at 500 °C	248.1	Calculated from thermal diffusivity, specific heat capacity and density
Knoop hardness (Indentation)(GPa)	47	ASTM C1326-03

	Superior	Advanced	Assured
Polish quality	**P+**	**P1**	**P2**
Overall height tolerance + mm	**H+** 0.025	**H1** 0.05	**H2** 0.1
PCD layer tolerance + mm	**L+** 0.1	**L1** 0.15	**L2** 0.2

Range	PCD layer (mm)	Certified area (mm)	Overall height (mm)	Nomenclature	Item number
Superior	0.5	70	1.6	CTB004 R70-160-05 P1H+L+	184-200-0051-01
Advanced	0.5	70	1.4	CTB004 R70-140-05 P1H+L1	184-200-0058-01
Superior	0.5	70	1.5	CTB004 R70-150-05 P1H+L+	184-200-0057-01
Advanced	0.5	70	0.6	CTB004 R70-160-05 P1H1L1	184-200-0049-01
Advanced	0.5	70	2.0	CTB004 R70-200-05 P1H1L1	184-200-0055-01
Advanced	0.5	68	1.6	CTB004 R68-160-05 P1H1L1	184-200-0054-01
Assured	0.5	68	1.6	CTB004 R68-160-05 P2H2L2	184-200-0053-01
Assured	0.5	68	2.0	CTB004 R68-200-05 P2H2L1	184-200-0056-01
Assured	0.5	68	1.6	CTB004 R68-160-05 P2H2L1	184-200-0050-01
Advanced	0.5	60	1.6	CTB004 R60-160-05 P1H1L1	184-200-0052-01



Element Six PCD disc and segments

Element Six is a global leader in the development and production of synthetic diamond and tungsten carbide solutions. For over 70 years, our innovation expertise has enabled a wide range of industries, from aerospace and mining, to semiconductors and sensing. Part of the De Beers Group, our primary manufacturing sites are located in the US, UK, Ireland, Germany and South Africa. Our sites in Ireland and Germany are ISO 50001 certified.

Through the De Beers Group, Element Six is a member of the UN Global Compact (UNGC). The UNGC drives business awareness and action towards the UN Sustainable Development Goals (SDGs), focussing on 10 principles around human rights, labour, environment and anti-corruption. Element Six works within the De Beers Group Building Forever commitment and Science Based Target Initiative (STBi), which is also based on the UNGC principles.

We incorporate and take responsibility for these principles through the Element Six Code of Conduct, Our Values, Responsibilities and Policies.

At Element Six, we have active communities working towards sustainability from a variety of angles, such as environmental impact, inclusion, diversity and community outreach, both internally and externally.

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