



D ENDMILL SERIES

KORLOY Diamond Coated Endmill Series



KORLOY
DIAMOND COATED
ENDMILL SERIES

KORLOY Diamond Coated Endmill Series



Cutting tools made for graphite tend to have poor tool life during machining.

Friction between graphite molecules and the relief surface of end-mill cause early tool wear, and its high hardness is also responsible for the possible flaking of the diamond coating.

It is therefore important to develop a diamond coating that has high hardness and good adherence to the substrate. In return, this will reduce the occurrences of tool wear and flaking, resulting in an increased tool life.

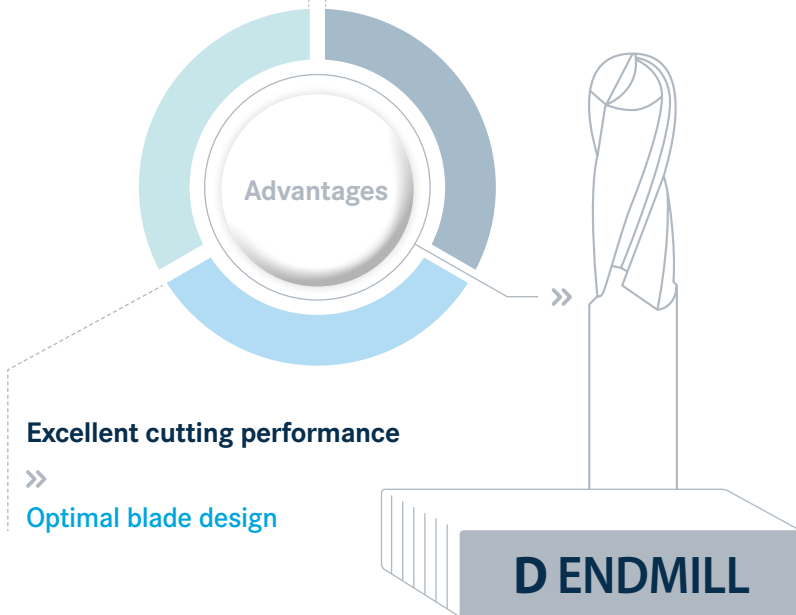
The ND3000 is a new diamond coated grade with high hardness and high purity sp^3 structure that improves wear resistance. It also offers higher resistance to flaking since it holds the coating and the substrate tightly together.

Excellent surface finish

»
Tangential cutting edge geometries

Increased tool life

«
High hardness diamond coating applied



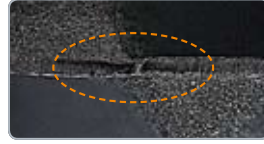
The D Endmill provides precise and sharp cutting performance thanks to optimized tangential cutting edge design. This versatile tool excels in graphite machining under complex conditions.

ND3000(Diamond Coated Grade)

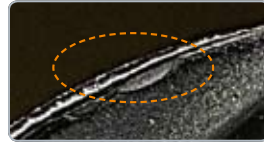
Common Problems when Machining Graphite

- Massive flank wear on relief surface due to continuous friction
- Coating flaking by repeated impacts between high hardness graphite workpiece and the cutting edges

Massive flank wear



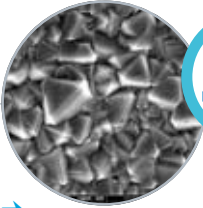
Flaking



Massive relief surface wear caused by the friction between graphite molecules and the tool

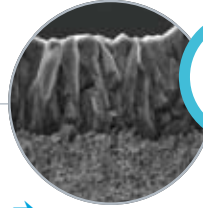
Development of ND3000 (Diamond Coated Grade)

- High hardness diamond coating for machining graphite and ceramics
- Good adhesion strength for high speed and heavy duty machining



Excellent wear resistance

→ **Surface of ND3000** Excellent wear resistance due to high hardness (Hv 10,000) diamond coating

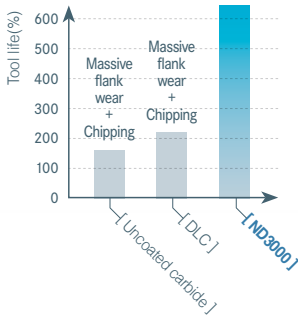


Less flaking

→ **Cross section of ND3000 coating** Excellent adhesion strength due to suitable substrate for diamond coating

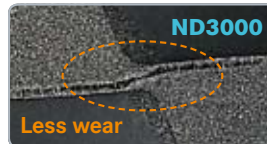
[Cutting performance]

In graphite and special carbon machining



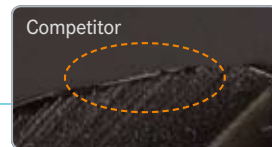
Development Effects

Less flank wear



→ **Reduced creation of massive flank wear** on the relief surface due to excellent wear resistance

Less edge flaking



→ **Reduced coating delamination** due to excellent adhesion between coating and substrate

Diamond Coated Endmill

- » Diamond coated endmill for graphite and ceramics
- » Excellent wear resistance due to high hardness and high purity diamond coating
- » Exceptional coating grip ideal for high speed and heavy duty machining
- » Advanced surface finish and cutting performance thanks to sharp edges and tangential tool geometries

Features

Tangential cutting edge geometries

- One-Pass grinding system
- Prevents stepped cone on the machined surface
- 2-flutes and 4-flutes tooling with a ball nose

[DBE4000]

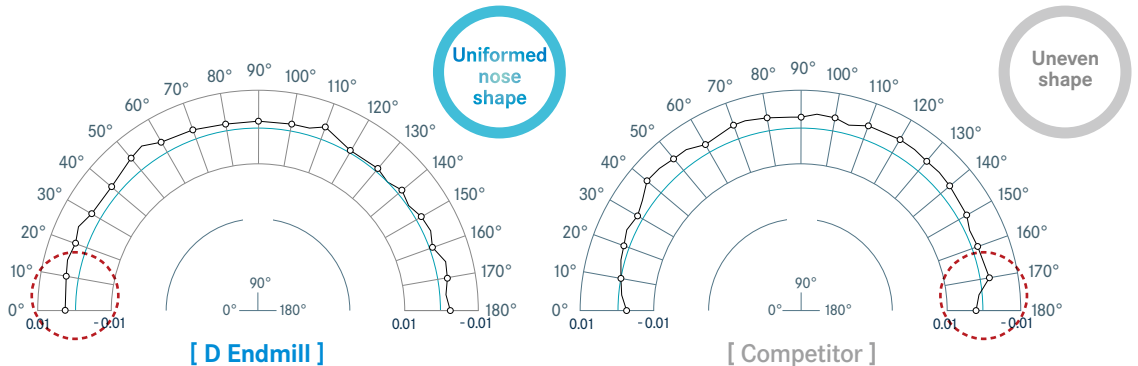
Center-matched ball shape (4-flutes)

- Ball point shape for high feed machining
- Improved rigidity and excellent surface finish

Uniformed nose shape

Prevents stepped cone on the machined surface for excellent surface finish

Measurement of Nose Radius



→ Tangential cutting edge geometries for uniformed nose radius shape ranging from 0° to 180°



APPLICATION EXAMPLES



Graphite mold

Cutting conditions $vc(m/min) = 100$, $fz(mm/t) = 0.11$, $ap(mm) = 0.26$, dry
Tools DBE4060-110-N250S06

D Endmill 8 hours

Competitor 6.5 hours



>> 20% longer cutting time than competitor's



Graphite mold

Cutting conditions $vc(m/min) = 180$, $fz(mm/t) = 0.1$, $ap(mm) = 0.2$, dry
Tools DBE2060-110-N250S06

D Endmill 10 hours

Competitor 8 hours



>> 25% longer cutting time than competitor's



Graphite mold

Cutting conditions $vc(m/min) = 300$, $fz(mm/t) = 0.1$, $ap(mm) = 0.15$, dry
Tools DBE2060-080-N250S06

D Endmill 6 hours

Competitor 5 hours



>> 25% longer cutting time than competitor's

For Machining
Graphite and Ceramics

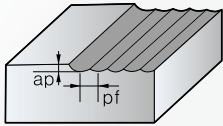


D ENDMILL Specification

Ball type

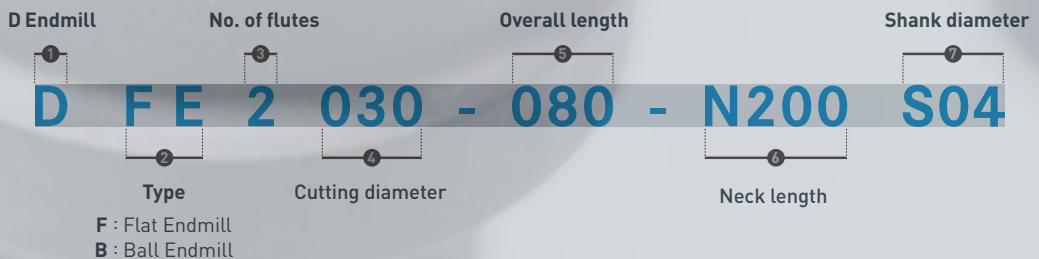
Tool	DFE2000 (Slotting)		DFE4000 (Shouldering)	
Workpiece	Graphite			
	RPM n(min ⁻¹)	Feed vf(mm/min)	RPM n(min ⁻¹)	Feed vf(mm/min)
1	16,000	400	-	-
2	16,000	800	16,000	1,200
3	16,000	1,450	16,000	2,000
4	16,000	2,100	16,000	3,100
5	15,500	2,550	15,000	3,800
6	15,000	2,950	15,000	4,400
8	13,000	3,000	13,000	4,500
10	11,500	3,000	12,000	4,600
12	10,700	3,200	10,000	4,700

Depth of cut(ap)



- $ap = 0.2D$, $pf = 0.2D$
- Workpiece should be clamped rigidly.
In case of vibrations, reduce RPM and feed rate by the same ratio.

D ENDMILL Mill Code System



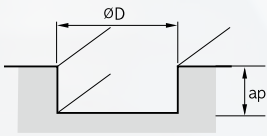
※ Radius and other form of endmills are made to order

Recommended Cutting Conditions

Flat type

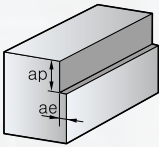
Tool	DFE2000 (Slotting)	DFE2000 (Shouldering)	DFE4000 (Shouldering)			
Workpiece	Graphite					
	RPM n(min ⁻¹)	Feed vf(mm/min)	RPM n(min ⁻¹)	Feed vf(mm/min)	RPM n(min ⁻¹)	Feed vf(mm/min)
1	40,000	500	40,000	700	-	-
2	25,000	570	25,000	800	25,000	1,600
3	20,000	570	20,000	800	20,000	1,600
4	18,000	680	18,000	950	18,000	1,900
5	14,000	960	14,000	1,200	14,000	2,400
6	11,000	1,000	11,000	1,400	11,000	2,800
8	8,000	930	8,000	1,300	8,000	2,600
10	6,500	860	6,500	1,200	6,500	2,400
12	5,500	860	5,500	1,200	5,500	2,400

Slotting depth(ap)



- $D \leq 2.5$, $ap = 0.3D$
- $D > 2.5$, $ap = 0.5D$
- Workpiece should be clamped rigidly.
In case of vibrations, reduce RPM and feed rate by the same ratio.

Shouldering depth(ap)



- $D \leq 2.5$, $ap = 1.5D$, $ae = 0.05D$
- $D > 2.5$, $ap = 1.5D$, $ae = 0.1D$
- Workpiece should be clamped rigidly.
In case of vibrations, reduce RPM and feed rate by the same ratio.

Notice

- Cutting conditions are up to the machine's condition and the shape of cutting.
- Workpiece should be clamped rigidly. In case of vibrations, reduce RPM and feed rate by the same ratio.
- When the overhang is longer than 3D, reduce RPM and feed rate

KORLOY DIAMOND COATED ENDMILL SERIES

www.korloy.com



KORLOY

Holystar B/D, 1350, Nambusunhwan-ro, Geumcheon-gu, Seoul, 08536, Korea

Tel : +82-2-522-3181 Fax : +82-2-522-3184, +82-2-3474-4744 Web : www.korloy.com E-mail : export@korloy.com



KORLOY AMERICA

620 Maple Avenue, Torrance, CA 90503, USA

Tel : +1-310-782-3800 Toll Free : +1-888-711-0001 Fax : +1-310-782-3885
www.korloyamerica.com E-mail : sales@korloy.us



KORLOY EUROPE

Gablonzler Str. 25-27, 61440 Oberursel, Germany

Tel : +49-6171-277-83-0 Fax : +49-6171-277-83-59
www.korloyeurope.com E-mail : sales@korloyeurope.com



KORLOY INDIA

Plot NO.415, Sector 8, IMT Manesar, Gurgaon 122051, Haryana, INDIA

Tel : +91-124-4391790 Fax : +91-124-4050032
www.korloyindia.com E-mail : sales.kip@korloy.com



KORLOY BRASIL

Av. Aruana 280, conj.12, WLC, Alphaville, Barueri,

CEP06460-010, SP, Brasil
Tel : +55-11-4193-3810 E-mail : vendas@korloy.com

BR06-EM-01 / 20170830