

다이아몬드 코팅(HF-CVD)의 선두주자 GCT MicroSpeed Multi-Layer Diamond Coating



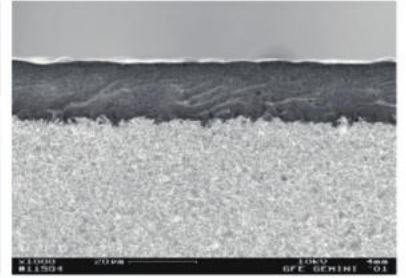
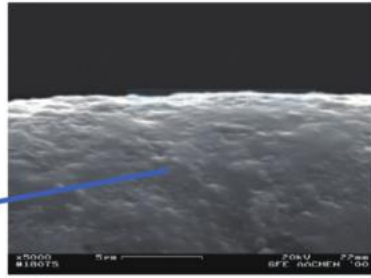
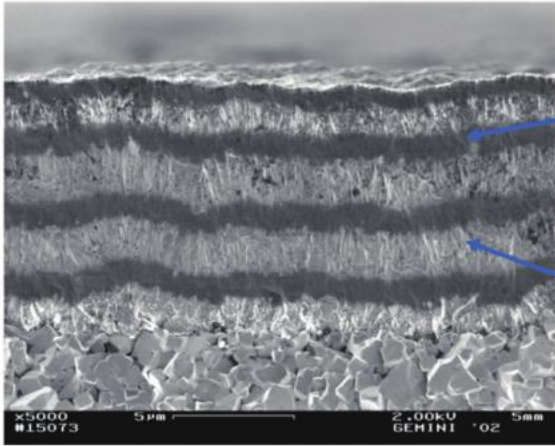
적용분야

- ◆ 반도체 장비용 각종 Ceramic류(Al_2O_3 , AlN, SiC, Quartz..)
- ◆ 치과용 지르코니아(ZrO_2)
- ◆ High Tg / Halogen-free PCB
- ◆ LED조명용 Metal PCB
- ◆ 비철금속(Aluminum/Copper)
- ◆ CFRP, GFRP and GRP(Durostone® and Roedurtherm)
- ◆ 그래파이트(Graphite)

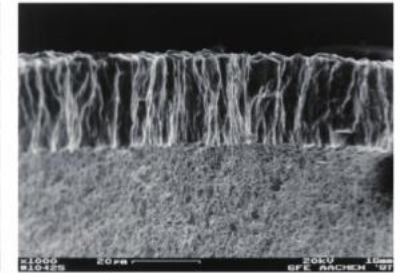
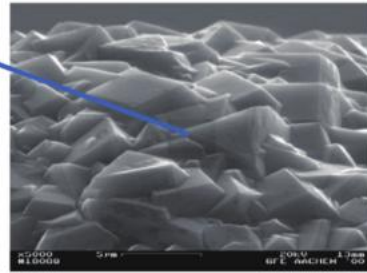
Multi-layer Diamond Coating Structure(독일 GCT 특허)

GCT Multi-layer Coating기술의 핵심은 Nano-crystalline coating과 Crystalline coating을 반복하여 Natural Diamond와 아주 비슷한 강도를 구현한 것입니다. 아무도 흉내낼 수 없는 Multi-layer Technology로 다이아몬드 코팅의 새 지평을 열었고 지금까지 독보적인 우위를 유지하고 있습니다.

MicroSpeed multi-layer coating



nano-crystalline coating

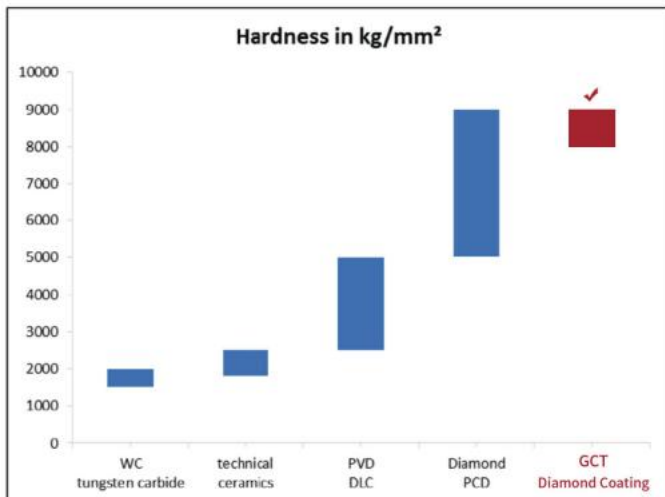


crystalline coating

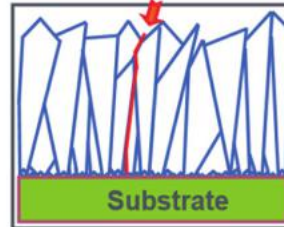
GCT MicroSpeed Diamond Coating 강도비교

Nano-crystalline coating과 crystalline coating을 반복하여 외부충격을 완벽히 흡수

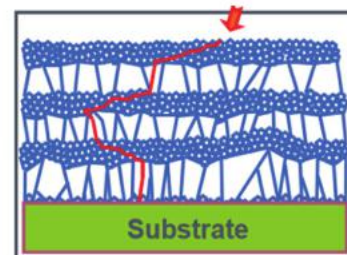
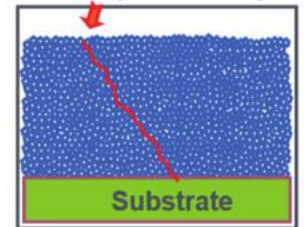
GCT MicroSpeed 강도비교



crystalline layer



nano-crystalline layer



multilayer

Job Coating Service

치과/세라믹/CFRP/그래파이트용 공구에 독일 GCT Diamond Coating Service를 시행합니다.(0.1 φ ~ 8 φ)

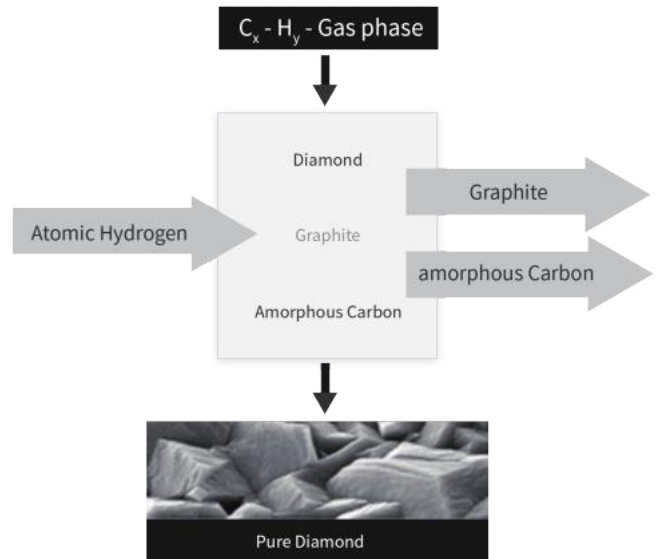
Job Coating 가능한 Size(예시)



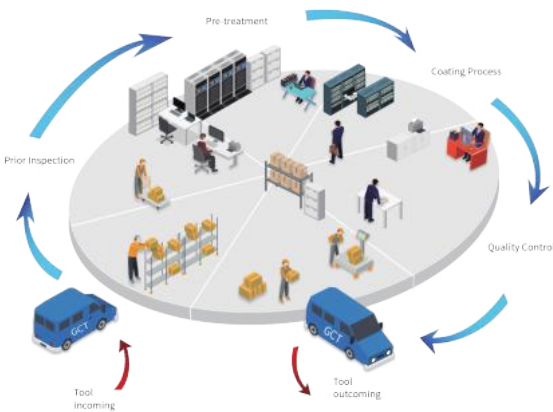
최대 shank 8φ

드릴, 엔드밀(치과용 및 일반 범용공구)

Diamond Coating's Basic process diagram



Job Coating Service Process



Single flute end mill and GCT MicroSpeed diamond coating

Applications / Advantages:

- Routing of inner and outer contours of IMS made copper, hybrid setup with RO3003, Glass-Teflon laminates as e.g. Taconic TLC-32
- Very good edge and surface quality
- Very high dimensional accuracy and process capability
- Feed rate increases by factor 3-4, tool life increases up to 12 times

Type 1312



Type 1318



MicroSpeed diamond coating - Made by GCT in Germany

Ø (mm)	Type 1312 Flute length (mm)	Type 1318 Flute length (mm)
1.6	4.0	-
1.8	4.0	-
2.0	4.0	6.0
2.4	-	6.0
3.0	-	6.0

Further diameters and flute lengths on request.

Type 1312:

- right hand cutting, right twisted (up cut)
- flat end cut
- shank Ø 3.175mm
- overall length 38.10mm
- tolerances according to GCT router specification
- made of solid carbide

Type 1318:

- right hand cutting, right twisted (up cut)
- shank Ø 6.0mm
- overall length 40.0mm
- tolerances according to GCT router specification
- made of solid carbide

■ 기타 모델은 홈페이지 참조

Type 1590/1596 : countersink(5날)

End mill with two flutes and GCT MicroSpeed diamond coating

Applications / Advantages:

- Routing of inner and outer contours as well as for depaneling of IMS made of aluminium and copper
- Ideally suited for depth routing of IMS, aluminium and copper, laminate with ceramic fillers
- Very high dimensional accuracy and process capability
- Feed rate increases by factor 3-4, tool life increases up to 12 times
- no pre-drilling required with **Type 1328**



MicroSpeed diamond coating - Made by GCT in Germany

Ø (mm)	Flute length (mm)	
0.3	-	2.0
0.4	-	2.0
0.5	-	2.0
0.6	-	2.0*
0.8	-	2.0*
0.9	-	2.0*
1.0	-	3.0*
1.2	-	3.0*
1.3	-	3.0
1.4	-	3.0*
1.5	3.0*	5.0*
1.6	-	5.0*
1.8	-	5.0*
1.9	-	5.0*
2.0	4.0*	6.0*
2.1	-	6.0
2.4	4.0	6.0*
2.5	-	6.0*
3.0	4.0*	6.0*

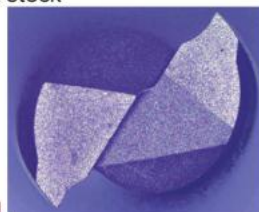
Further diameters and flute lengths on request.

Type 1322:

- right hand cutting, right twisted (up cut)
- flat end cut
- shank Ø 3.175mm
- overall length 38.10mm
- tolerances according to GCT router specification
- made of solid carbide

Type 1328:

- * available ex stock



- centre cutting

Type 1368:

- right hand cutting, left twisted (down cut)
- further data as per type 1328
- not available in all Ø

Drill in undercut design and GCT MicroSpeed diamond coating

Applications / Advantages:

- Ideally suitable for drilling glass, quartz, technical ceramics such as Al₂O₃, AlN, ZrO₂, SiC und silicon
- Very high process capability due to application-specific design and **thicker diamond coating**



MicroSpeed diamond coating - Made by GCT in Germany

(mm)	Flute length (mm)	
0.10	1.8	-
0.15	2.0	-
0.18	2.5	-
0.20	1.5	3.0
0.25	3.0	-
0.30	5.5	-
0.35	5.5	-
0.40	5.5	-
0.45	7.0	11.5
0.48	5.5	-
0.50	7.0	12.5
0.52	7.0	-
0.55	7.0	-
0.60	7.0	-
0.65	7.0	-
0.70	7.0	-
0.80	7.0	12.0
0.90	7.0	12.0
1.00	7.0	12.0
1.10	7.0	12.0
1.20	7.0	12.0
1.30	7.0	12.0
1.40	7.0	12.0
1.50	7.0	12.0

Further diameters and flute lengths on request.

Type 1625:

- **thicker diamond coating and application-specific design**
- for extremely high wear requirements
- right hand cutting, right twisted
- shank Ø 3.175mm
- overall length 38.10mm
- tolerances according to GCT drill specification
- made of solid carbide

▣ 기타 모델은 홈페이지 참조

- Type 1638/1640 : undercut drill
- Type 190X/1940 : thread mill
- Type 1835 : straight type drill
- Type 1534 : inverse type drill

Router with square chip breaker and GCT MicroSpeed diamond coating

Applications / Advantages:

- Routing of inner and outer contours in halogen free and high Tg material $\geq 150^\circ\text{C}$ and for depaneling, also with copper on outer layers
- Optimized chip removal and higher bending strength
- Very high dimensional accuracy and process capability due to polished radius at the shank conus



MicroSpeed diamond coating - Made by GCT in Germany

Ø (mm)	Flute length (mm)	
0.8	5.2	-
0.9	5.2	-
1.0	5.2	6.5 7.5
1.1	6.5	-
1.2	7.0	-
1.4	7.0	-
1.5	7.5	8.5
1.6	7.5	8.5
1.8	9.0	-
2.0	9.0	-
2.4	9.0	-
2.5	9.0	-
3.0	-	10.0

Further diameters and flute lengths on request.

Type 1704:

- right hand cutting, right twisted (up cut)
- drill point cut
- shank Ø 3.175mm
- overall length 38.10mm
- polished radius at shank conus
- square chip breaker
- tolerances according to GCT router specification
- made of solid carbide

▣ 기타 모델은 홈페이지 참조

- Type 1700/1760 : extra fine spiral cut(chip-braker)
- Type 1750/1250 : CFRP, GRP用 thicker diamond coating
- Type 1200 : diamond cut
- Type 138x : chamfering cutter

Application recommendations for GCT Diamond Coated Drills

Tools and applications (XXX ⇒ most suitable)						
Router type	Description	FR4	Halogen-free materials laminates with fillers and Tg ≤ 185°C	Laminates with ceramic fillers and Tg ≥ 200°C	IMS and nonferrous metals	Technical ceramics
1640	Drill in undercut design with optimized point geometry <i>DIAMOND COATED</i>	X	XX	XXX	XX	X
1638	Drill in undercut design with high helix angle <i>DIAMOND COATED</i>	X	XX	XXX	XXX	XX
1835	Straight type drill with high helix angle <i>DIAMOND COATED</i>	X	XX	XXX	XXX	XX
1534	Inverse diameter drill with tapered diameter and thinned web <i>DIAMOND COATED</i>	X	XX	XXX	XXX	XX
1625	Drill in undercut and application-specific design <i>THICKER DIAMOND COATING</i>	-	-	-	-	XXX

General recommendations:
 ⇒ Follow the "GCT check list" for machining PCB's and the "GCT parameter recommendations"
 ⇒ Consider "Specification GCT drills"
 ⇒ Use diamond coated drills without contact drilling function

Application recommendations for GCT Diamond Coated Routers

Tools and applications (XXX ⇒ most suitable)							
Router type	Description	FR4	Halogen-free materials	Laminates with fillers and Tg ≤ 185°C	Laminates with ceramic fillers and Tg ≥ 200°C	IMS and nonferrous metals	Depaneling
1700 1704 1760	extra fine spiral cut <i>DIAMOND COATED</i>	XX	XXX	XXX	XX	-	XXX
1750	extra fine spiral cut <i>THICKER DIAMOND COATING</i>	-	X	XX	XXX	-	X
1200 1204	diamond cut <i>DIAMOND COATED</i>	X	XX	XX	XX	-	XX
1250	diamond cut <i>THICKER DIAMOND COATING</i>	-	-	XX	XX	-	-
1322 1328	2 flute end mill <i>DIAMOND COATED</i>	X	X	XX	XX	XXX (for aluminium)	XXX (on IMS)
1312 1318	single flute end mill <i>DIAMOND COATED</i>	X	X	XX	XX	XXX (for copper)	XXX (on IMS)
1940	thread mill <i>DIAMOND COATED</i>	-	-	X	X	XXX	-
138x	Chamfering cutter <i>DIAMOND COATED</i>	XX	XX	XXX	XXX	XXX	-
5422	2 flute end mill <i>CC ALUSPEED@COATED</i>	-	-	-	-	X	X (on IMS)

General recommendations:
 ⇒ Reduce chip load to 60% if routing inner contours, radii and depth routing
 ⇒ Reduce chip load to 80% for metals
 ⇒ Use type 5422 for depth routing with electrical contact; reduce chip load to 30%



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