

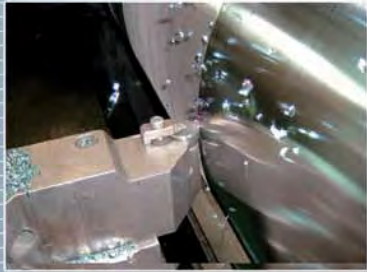
2007-2008



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CUTTING TOOLS



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2007
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CUTTING TOOLS

Diamond-Coated UC1, UC2

Best Performance for

Al alloy (High Si Al alloy), MMC(FRM)
Ceramics, Reinforced ceramics, Carbon

Feature

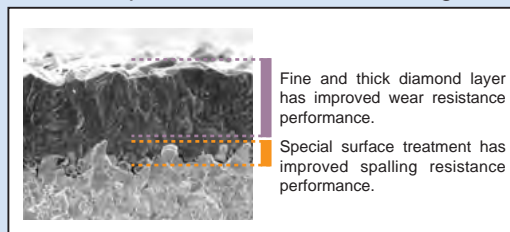
Improvement in Wear Resistance

Superior wear resistance especially for hard-to cut aluminum material I.e. High Si Al alloy and MMC material.

Physical Performance

	UC1·UC2	Natural diamond	DLC	PCD
Crystal structure	Diamond	Diamond	Amorphous	Diamond
Bonded phase	None	None	None	Co, Ni, etc
Density(g/cm3)	3.5	3.5	1.7~2.2	4.1
Young's modulus(GPa)	1000	280~300	280~300	800
Hardness(GPa)	100	90~120	10~50	10~50

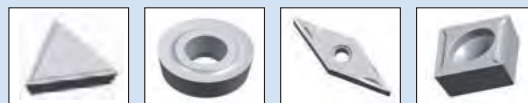
Composition of Diamond Coating



Variety in Shape

- Moulded chipbreaker ensures better chip control.
- Deeper cutting edge is obtained with coating on all the surface (edge) of insert.

Types of shapes

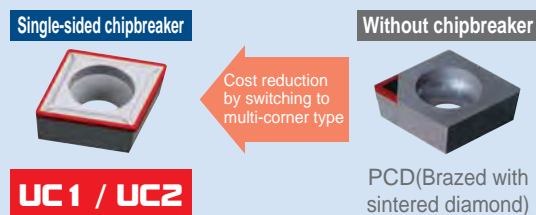


Lower Cost

Multi-corner availability and less re-grinding cost.

Effective cutting-edge area

Note: The red line indicates an effective cutting-edge area.



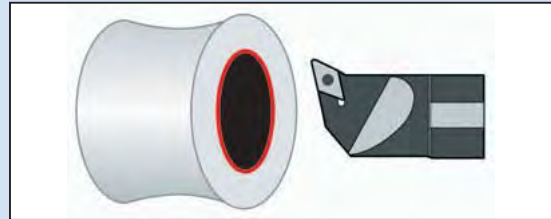
Characteristics of Material

- UC1 has better wear resistance with thick coating layer.
- UC2 has well-balanced durability against spalling and abrasion.

Boring of Al Alloy

Material	Competitor's PCD (Sintered diamond)	UC2
Part number	Brazed cutter	SPMW090312 (4-corner type)
Cutting speed	600m/min	←
Feed rate	0.4mm/rev	←
Cutting depth	4.0 mm (Total)	←
Coolant	WET	←
Tool life	3,000 pcs/corner	6,000 pcs/corner

Part name	Hub of Motor-bike
Material	Aluminum alloy



- **UC2** with a molded chipbreaker raises chip-processing performance and improves brief machine stoppage due to chip-processing defects during competitor's PCD usage.



Chips by PCD

Scale: 10 mm



Chips by UC2

Scale: 10 mm

Outer Roughing of Al Alloys

Material	Competitor's PCD (Sintered diamond)	UC2
Part number	Brazed cutter	SPMW090312 (4-corner type)
Cutting speed	600m/min	←
Feed rate	0.4mm/rev	←
Cutting depth	4.0 mm (Total)	←
Coolant	WET	←
Tool life	3,000 pcs/corner	6,000 pcs/corner

Part name	Piston
Material	Aluminum alloy (Al+13vol%Si)



- **UC1** can have its life extended to twice that of the competitor's PCD and allows productivity to be correspondingly improved.
- Although the competitor's PCD tool needs re-grinding eight times, **UC1** allows cost reduction by extending the life of the tool and adopting a four-corner piece.

Rough Boring of Al Alloys

Material	Competitor's PCD (Sintered diamond)	UC2
Part number	TPGW110304 (1 cutting edge)	Special shape (2 cutting edges)
Cutting speed	8000m/min ⁻¹	←
Feed rate	0.15mm/rev	←
Cutting depth	3.0mm	←
Coolant	WET	←
Tool life	1 pc/corner	8,000 pcs/corner

Part name	Piston
Material	Aluminum alloy (Al+13vol%Si)



- Because of chatter and peeling-off of a brazed section, competitor's PCD tool cannot machine even a single piece.
- The long effective cutting-edge area of the **UC2** can conduct deeper cutting, and its twin cutting-edge structure suppresses chatter.

C/C Composite Outer Surface

Material	Competitor's PCD (Sintered diamond)	UC1
Part number	TNMA160408 (1-corner, w/out chipbreaker)	TNMM160408-ZP (3-corner, w/molded chipbreaker)
Cutting speed	280m/min	←
Feed rate	0.10mm/rev	←
Cutting depth	2.0mm	4.0mm
Coolant	DRY	←
Tool life	50 pcs/corner	100 pcs/corner

Part name	Sintering-furnace parts
Material	Carbon fiber



- The life of **UC1** can be extended to twice that of a competitor's PCD tool.
- Compared with the competitor's PCD tool, **UC1** can achieve deeper cutting and thus reduce a cycle time.
- Because of its extended life and cycle time reduction, **UC1** allows the improvement of productivity.

Ceramics Outer Diameter Finishing

Material	Competitor's PCD (Sintered diamond)	UC2
Part number	Brazed cutter (w/out chipbreaker)	VNMM160404-ZP (2-corner, w/molded chipbreaker)
Cutting speed	150m/min	←
Feed rate	0.2mm/rev	←
Cutting depth	8.0mm	←
Coolant	DRY	←
Tool life	300 pcs/corner	400 pcs/corner

Part name	Vacuum switch parts
Material	Ceramic calcined body



- The life of **UC2** can be extended to 1.3 times that of a competitor's PCD tool, thus allowing productivity to be correspondingly improved.
- Since it can cut work materials to greater depths, **UC2** allows indexing difficult in conventional PCD tools, and hence, the improvement of insert-changing frequency.

Aluminum Alloy Plunge Cutting

Material	Competitor's PCD (Sintered diamond)	UC2
Part number	Special shape	BSMN3207Z24 (Formed insert)
Cutting speed	148m/min	←
Feed rate	0.06mm/rev	←
Cutting depth	3.0mm	←
Coolant	WET	←
Tool life	5,000 pcs/corner	50,000 pcs/corner



















Part name	Two-wheel cylinder, mouth-chamfered
Material	Aluminum alloy(Al+12vol%Si)



- The formed PCD insert is high in cost, and because of machined-surface deterioration due to fusion, the cemented carbide type is found to be short in life.
- The life of **UC2** excellent in fusion resistance and in the diversity of shapes can be extended to 10 times the life of the cemented carbide tool.

Diamond Coated

Standard Stock

Shape	Item-No. IC, T, R	UC1	UC2	Screw	Wrench
 Single-sided chipbreaker	CNMM 120404 ZP		○	—	—
 Single-sided chipbreaker	TNMM 160404 ZP		○	—	—
 Single-sided chipbreaker	VNMM 160404 ZP		○	—	—
NEW  Single-sided chipbreaker	CCMT 060204 AM3		○	LRIS - 2.5×7	RLR - 15S
	CCMT 09T304 AM3		○	LRIS - 4×6	LLR - 25S
NEW  Single-sided chipbreaker	CCMT 090308 AF1		○		
 Single-sided chipbreaker	DCMT 11T304 AM3		○	LRIS - 4×8	
 Without chipbreaker	SPMN 120304		○	—	—
NEW  Single-sided chipbreaker	SPMR 120304 AF1		○	—	—
NEW  Single-sided chipbreaker for left-handed use	TCMT 110204L AP		○	LRIS - 2.5×7	RLR - 15S
	TCMT 110208L AP		○		
NEW  Wiper Single-sided chipbreaker for left-handed use	TCMT 110204 WL AP		○		
NEW  Single-sided chipbreaker for left-handed use	TPMT 110304 L AP		○		
	TPMT 110308L AP		○		
NEW  Single-sided chipbreaker for left-handed use	TPMR 110304L AP		○		
 Single-sided chipbreaker for left-handed use	TPMR 160304 AF1		○	—	—
NEW  Single-sided chipbreaker for left-handed use	TPMH 080204L AP		○	LR - S - 2×4.4 LR - S - 2×5.5	RLR-13S
	TPMT 080204L AP		○	—	
	TPMH 090204L AP		○	LR - S - 2.5×4.8 LR - S - 2.5×6	RLR - 15S
	TPMH 110304L AP		○	LR - S - 3×6.2 LR - S - 3×7.8	RLR - 20S
	TPMH 160304LAP		○	LR - S - 4×5.8 LR - S - 4×9	RLR - 20S
NEW  Wiper Single-sided chipbreaker for left-handed use	TPMT 080204WL AP		○	—	—
 Single-sided chipbreaker	RPMX 1203 MO GB		○	—	—
 Single-sided chipbreaker	VCMT 110304 AM3		○	LRIS - 2.5×7	RLR - 15S
 W/out chipbreaker	VCMW 110308		○	LRIS - 2.5×7	RLR - 15S