

SUMICRYSTAL

M

M43 to M46

M

SUMICRYSTAL

SUMIDIA

SUMIDIA
Binderless

SUMI
CRYSTAL

SUMICRYSTAL

SUMICRYSTAL	M43
SUMICRYSTAL UP	M45
SUMICRYSTAL PD / PDX	M46

SUMICRYSTAL

General Features

In the past, the use of natural diamond was severely restricted due to its limited supply and unpredictable nature.

Now with SUMICRYSTAL, consistency in quality, stability and supply can be assured.

Production Method

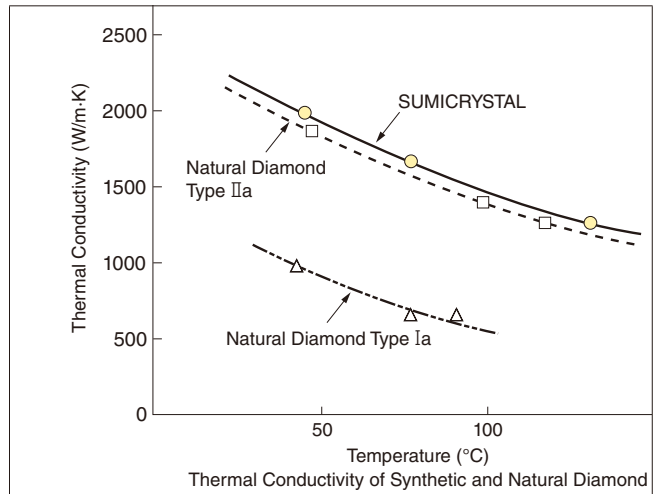
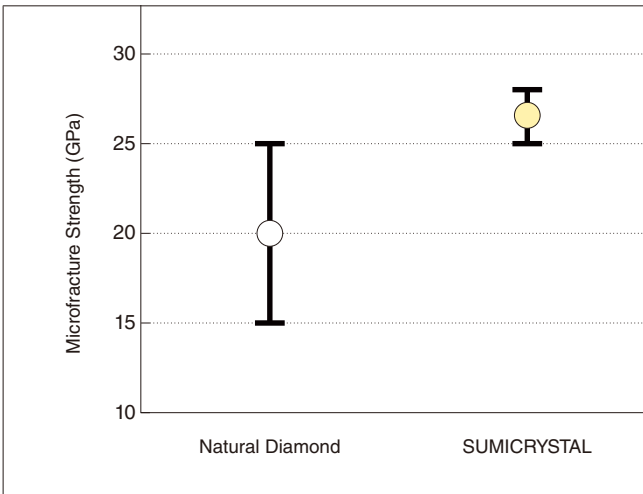
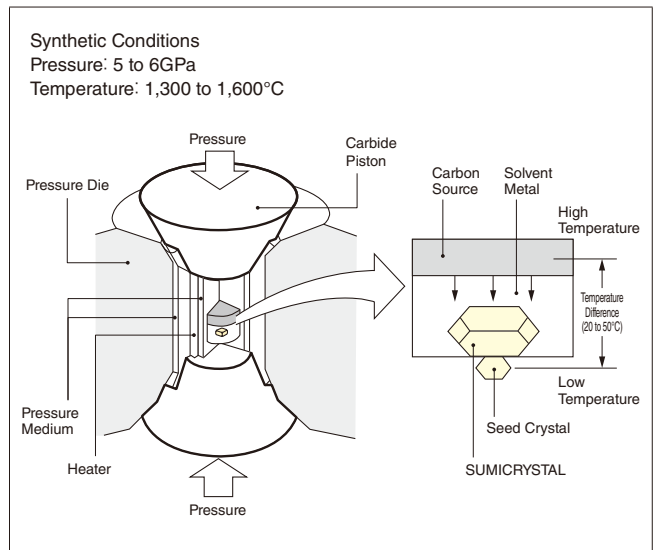
SUMICRYSTAL is synthesized under ultra-high pressures from 5 to 6GPa and high temperatures from 1,300 to 1,600°C. A temperature gradient is created and used to melt the carbon source into molten solvent metal which allows the diamond to grow on a seed crystal. Through this stringent control of pressures and temperatures, a more stable structure with minimal impurities can be obtained.

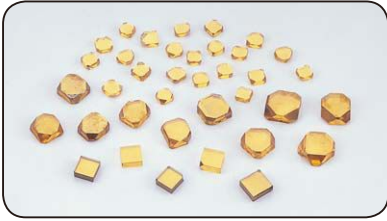
Properties

SUMICRYSTAL has 4 main advantages against natural diamond.

- 1) Structural advantage: Natural diamond is rounded and the direction of lattice is difficult to determine with the naked eye. However, SUMICRYSTAL has a distinct crystal face which makes the identification much easier.
- 2) Uniform quality: Due to the strict controlled conditions in which the crystals are grown, uniform quality can be obtained consistently.
- 3) Availability: Unlike the limited supply of natural diamonds, SUMICRYSTAL can be mass produced.
- 4) Better Characteristics: SUMICRYSTAL type Ib, which is used for cutting tools, have the best thermal conductivity as compared to any other materials; This characteristic is very similar to the rare natural diamond type IIa (refer to bottom right graph) despite SUMICRYSTAL having minute amounts of nitrogen.

The bottom left graph shows that SUMICRYSTAL has similar or even better microfracture strength as compared to the natural diamond.





General Features

Today's sophisticated cutting-edge technologies, such as ultra-precision machining processes, as well as those used for magnetic discs and polygonal mirrors in particular are seeing rapid development.

SUMICRYSTAL UP blanks have the high performance and reliability that make them optimally suited to these applications.

Characteristics

- (1) High quality with very low variance. Stable wear resistance with excellent resistance to edge chipping.
- (2) Uniform shape ensures minimal stock removal during cutting edge formation for easy cutting edge formation.

Standard Type

Rectangular parallelepiped type with 6 (100) faces.

Standard Items

STANDARD TYPE						Units : mm
Shape	Cat. No.	L	W	C ₁ , C ₂	T	
<p>The arrows indicate the direction for easy polishing. (Facing orientations are all (100) except the corners.)</p>	UP 282512	2.8 to 3.5	2.5 to 3.5	Up to 0.8	1.2±0.1	
	UP 282515	2.8 to 3.5	2.5 to 3.5	Up to 0.8	1.5±0.1	
	UP 303015	3.0 to 3.5	3.0 to 3.5	Up to 0.3	1.5±0.1	
	UP 301415	3.0 to 3.5	1.4 to 1.7	Up to 0.3	1.5±0.1	
	UP 333014	3.3 to 4.0	3.0 to 4.0	Up to 0.9	1.4±0.1	
	UP 333017	3.3 to 4.0	3.0 to 4.0	Up to 0.9	1.7±0.1	
	UP 353514	3.5 to 4.0	3.5 to 4.0	Up to 0.4	1.4±0.1	
	UP 353517	3.5 to 4.0	3.5 to 4.0	Up to 0.4	1.7±0.1	
	UP 351717	3.5 to 4.0	1.7 to 2.0	Up to 0.4	1.7±0.1	

*Sizes other than those indicated above can be ordered.

Economy Type

Peripheral and upper growth faces are not cut. Features include having large sizes and low cost.

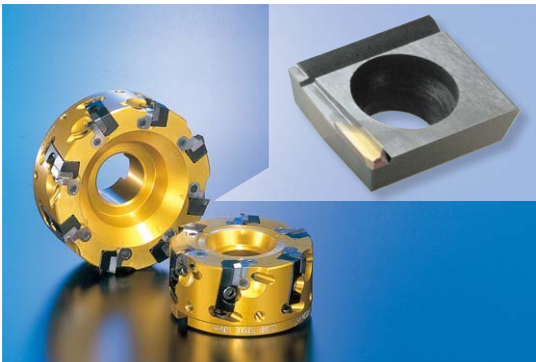
Economy Items

Economy Type (Units : mm) Min. guaranteed dimensions			
Shape	Cat. No.	D	T
	UP 2010	2.0	1.0
	UP 2012		1.2
	UP 2510	2.5	1.0
	UP 2512		1.2
	UP 2515	3.0	1.5
	UP 3010		1.0
	UP 3012	3.0	1.2
	UP 3015		1.5
	UP 3510	3.5	1.0
	UP 3512		1.2
	UP 3515	4.0	1.5
	UP 4010		1.0
	UP 4012	4.0	1.2
	UP 4015		1.5
	UP 4020	4.5	2.0
	UP 4510		1.0
	UP 4512	4.5	1.2
	UP 4515		1.5
	UP 4520	5.0	2.0
	UP 5010		1.0
UP 5012	5.0	1.2	
UP 5015		1.5	
UP 5020	2.0		

*Sizes other than those indicated above can be ordered.

Cutting Tool Using SUMICRYSTAL UP

Wiper Insert for Aluminium Body Cutter RF Type → M31



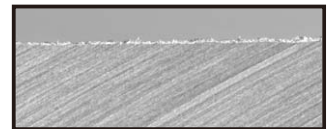
* This product was jointly developed with A.L.M.T. Corp.

SumiCrystal SC10 Wiper Insert

- Utilising Sumitomo Electric Hardmetal's SumiCrystal as a cutting edge. SumiCrystal is a single-crystal diamond, which is produced using an unique superhigh pressure technology.
- SumiCrystal can maintain its edge sharpness better than sintered diamonds, this greatly reduces burr formation.



Machined Surface Using SUMICRYSTAL (Single Crystal Diamond)



Machined Surface Using SUMIDIA (PCD)

SUMICRYSTAL PD / PDX



SUMICRYSTAL PD and PDX are synthetic diamonds processed into thin prism shapes for use as dressers. These dressers can be used in automated, high precision dressing providing reliable performance and longer tool life, as compared to natural diamonds.

SUMICRYSTAL PD

Characteristics

● Revolutionary Elongated Shape

- (1) Improved clamp strength prevents diamond pull out.
- (2) Consistent cross-section prevents deterioration.
- (3) Uniform face orientation promotes stable tool life.

Standard Items

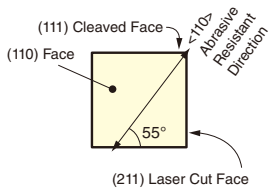
Units (mm)

	Cat. No.	Stock	T	W	L
<p>· 'L' is the distance between the centre points of both ends. · Both upper and lower (111) faces are cleaved.</p>	PD 0220	●	0.2±0.05	0.2±0.05	2.0 to 2.5
	PD 0420	●	0.4±0.05	0.4±0.05	2.0 to 2.5
	PD 0630K	●			3.0 to 4.0
	PD 0640K	●	0.6±0.1	0.6±0.1	4.0 to 5.0
	PD 0650K	●			From 5.0
	PD 0830K	●			3.0 to 4.0
	PD 0840K	●	0.8±0.1	0.8±0.1	4.0 to 5.0
	PD 0850K	●			From 5.0
	PD 1130K	●	1.1±0.1	1.1±0.1	3.0 to 4.0
	PD 1140K	●			4.0 to 5.0
<p>Single cleaved side face with pre-determined abrasive resistant direction.</p>	PD 0630TK	●	0.6±0.1	0.6±0.1	3.0 to 4.0
	PD 0640TK	●			4.0 to 5.0
	PD 0830TK	●	0.8±0.1	0.8±0.1	3.0 to 4.0
	PD 0840TK	●			4.0 to 5.0
	PD 1130TK	●	1.1±0.1	1.1±0.1	3.0 to 4.0
PD 1140TK	●			4.0 to 5.0	

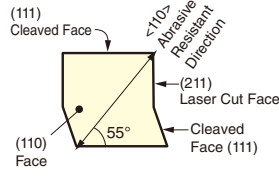
*Sizes other than those indicated above can be ordered.

Orientation PD

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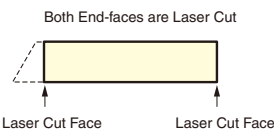


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KK Type

Apart from the standard items listed above, PD is also available in "KK Type" with both end-faces laser cut.



- When ordering, please include "KK" behind the standard catalogue no. (ex. PD ○○○○ KK, PD ○○○○ TKK)

PD0220, 0420 are not available in "KK Type".

SUMICRYSTAL PDX

Characteristics

● New Product With Modified Face Orientation

- (1) Face orientation (211) provides better tool life than conventional PD blanks.
- (2) Parallel abrasive resistant faces (111) facilitate blank setting during manufacturing of dressers.

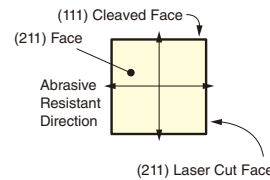
Standard Items

Units (mm)

	Cat. No.	Stock	T	W	L
<p>· 'L' is the distance between the centre points of both ends. · Both upper and lower (111) faces are cleaved.</p>	PDX 0220	●	0.2±0.05	0.2±0.05	2.0±0.1
	PDX 0320	●	0.3±0.05	0.3±0.05	
	PDX 0420	●	0.4±0.05	0.4±0.05	
	PDX 0630	●			3.0±0.5
	PDX 0640	●	0.6±0.1	0.6±0.1	4.0±0.5
	PDX 0830	●			3.0±0.5
	PDX 0840	●	0.8±0.1	0.8±0.1	4.0±0.5
	PDX 1130	●	1.1±0.1	1.1±0.1	3.0±0.5
	PDX 1140	●			4.0±0.5

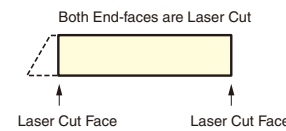
*Sizes other than those indicated above can be ordered.

Orientation PDX



K Type

Apart from the standard items listed above, PDX is also available in "K Type" with both end-faces laser cut.



- When ordering, please include "K" behind the standard catalogue no. (ex. PDX ○○○○ K)

PDX0220, 0320 and 0420 are not available in "K Type".