

 **SUMITOMO**

CARBIDE - CBN - DIAMOND

Global Support, Global Solutions.

TOOLING SOLUTIONS E-01



Tooling Solutions for

AEROSPACE

P M K N S H

**SUMITOMO
ELECTRIC
GROUP**

Past, present and future.
Aerospace component machining solutions
continue to keep the world flying.



Tools For **JET ENGINE**

for Engine Case

P4 ~



for Fan Hub, Disc

P8 ~



for Blade

P6 ~



for Engine Shaft

P10 ~





Tools For AIRFRAME AND PARTS

for Titanium Alloy



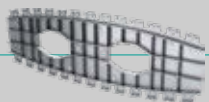
P12

for Landing Gear Parts



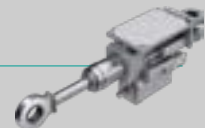
P16

for Aluminum Alloy



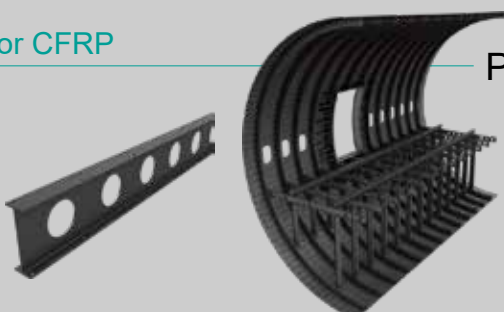
P13

for Actuator Parts



P17

for CFRP



P14 ~

for Fastener



P18

for Gear, Bearing



P19

Jet engine case

Titanium Alloy



Turning

■ Coated Carbide Grades for Exotic Alloys
AC5000S Series

AC5005S
AC5015S
AC5025S



■ CBN Series for Exotic Alloys

Titanium Alloy Machining NCB100
Heat-Resistant Alloy Machining IT105



■ Grooving Tools
GND Series Insert



■ Grooving Tools
GND Series

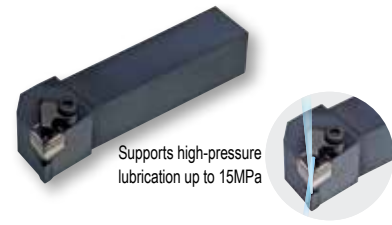


■ Polygonal Taper Shanks
SumiPolygon Internal Coolant Supply



Supports high-pressure lubrication up to 15MPa

■ External Holders
Internal Coolant Holders



Supports high-pressure lubrication up to 15MPa

Drilling

■ MINI-MULTIDRILL
MDSS Series

Diameter:
ø 0,2–1,0 mm



■ MULTIDRILL
SDM Series / MDM Series

Diameter:
ø3,0–16,0 mm
L/D: 3, 5



■ SumiReamer
SSR Series

Diameter:
ø2,97–12,0 mm



Combustor case

Heat-Resistant Alloy INCONEL718 / WASPALLOY / HASTELLOY



Milling

■ SumiDrill
WDX Series

Diameter:
ø13,0–68,0 mm



■ MULTIDRILL SMD Series
Indexable Head MSL Type

Diameter:
ø12,0–30,8 mm
L/D: 1.5, 3, 5, 8, 12



■ Flat MULTIDRILL
MDF Series

Diameter:
ø0,3–20,0 mm



■ Wave Radius Mill
RSE Series / RSX Series



■ WaveMill
WFXH Series



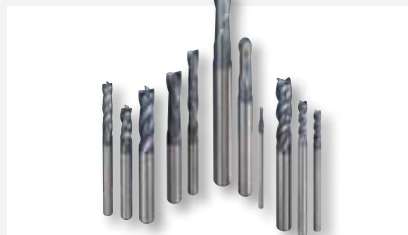
■ WaveMill
WSE Series



■ WaveMill
WEZ Series



■ GSX MILL Series
GSX MILL



■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series



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Blisk (blade integrated disk)

Titanium Alloy

Heat-Resistant Alloy INCONEL718 / WASPALLOY / HASTELLOY



Turning

■ Coated Carbide Grades for Exotic Alloys
AC5000S Series

AC5005S
AC5015S
AC5025S



■ CBN Series for Exotic Alloys

Titanium Alloy Machining NCB100
Heat-Resistant Alloy Machining IT105



■ Grooving Tools
GND Series Insert



■ Grooving Tools
GND Series

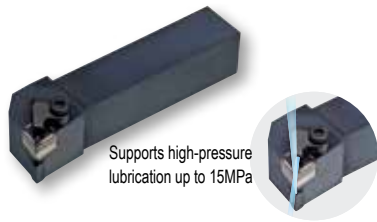


■ Polygonal Taper Shank
SumiPolygon Internal Coolant Supply



Supports high-pressure lubrication up to 15MPa

■ External Holders
Internal Coolant Holders



Supports high-pressure lubrication up to 15MPa

Drilling

■ Plunge Mill
PCT Type

Diameter:
ø16,0–40,0 mm
L/D: 3, 5



■ Plunge Drill
PDL Type

Diameter:
ø16,0–40,0 mm
L/D: 2, 3



■ MULTIDRILL
SDM Series / MDM Series

Diameter:
ø3,0–16,0 mm
L/D: 3, 5



■ Solid Carbide Endmills
Endmills for Chamfering



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Blade

Titanium Alloy
Heat-Resistant Alloy

INCONEL718 / WASPALOY / HASTELLOY

Impeller

Titanium Alloy
Heat-Resistant Alloy

INCONEL718 / WASPALOY / HASTELLOY



Milling

■ Wave Radius Mill
RSE Series / RSX Series



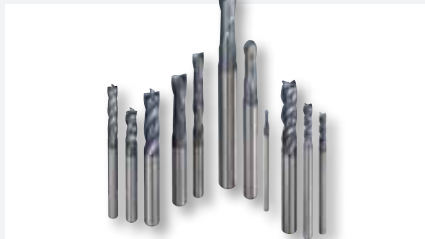
■ WaveMill
WEZ Series



■ Solid Carbide Endmills
Endmills for Blade Machining



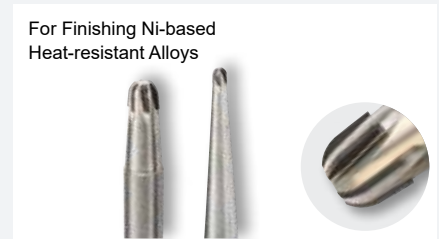
■ GSX MILL Series
GSX MILL



■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series



■ SUMIBORON BINDERLESS
Ballnose Endmills / Radius Endmills



For Finishing Ni-based
Heat-resistant Alloys

■ WaveMill
WFXH Series



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Fan hub (with mount)

Titanium Alloy

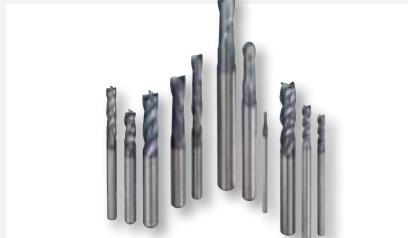


Milling

■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series



■ GSX MILL Series
GSX MILL



■ Plunge Mill
PCT Type

Diameter:
ø16,0–40,0 mm
L/D: 3, 5



■ Plunge Drill
PDL Type

Diameter:
ø16,0–40,0 mm
L/D: 2, 3



PDL Type Pocketing



Turning

■ Coated Carbide Grades for Exotic Alloys
AC5000S Series

AC5005S
AC5015S
AC5025S



■ CBN Series for Exotic Alloys
Titanium Alloy Machining NCB100
Heat-Resistant Alloy Machining IT105



Disc

Titanium Alloy

Heat-Resistant Alloy INCONEL718 / WASPALOY / HASTELLOY



Drilling

MULTIDRILL

SDM Series / MDM Series

Diameter:
ø3,0–16,0 mm
L/D: 3, 5



Drills for Heat-Resistant Alloys

SGS Series

Diameter:
ø3,0–12,0 mm
L/D: 3



Solid Carbide Endmills

Endmills for Chamfering



Grooving Tools

GND Series Insert



Grooving Tools

GND Series



Polygonal Taper Shank

SumiPolygon Internal Coolant Supply



External Holders

Internal Coolant Holders



Engine shaft

Titanium Alloy

Heat-Resistant Alloy INCONEL718 / WASPALOY / HASTELLOY

Ultra-hard Alloy Steel Maraging Steel (Grade 300)



Drilling

■ MULTIDRILL
SDM Series / MDM Series

Diameter:
ø3,0–16,0 mm
L/D: 3, 5



■ MULTIDRILL SMD Series
Indexable Head MSL Type

Diameter:
ø12,0–30,8 mm
L/D: 1.5, 3, 5, 8, 12

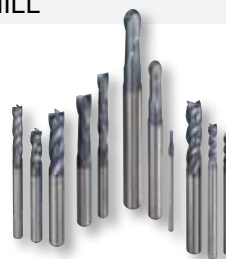


Milling

■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series



■ GSX MILL Series
GSX MILL



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Turning

■ Coated Carbide Grades for Exotic Alloys

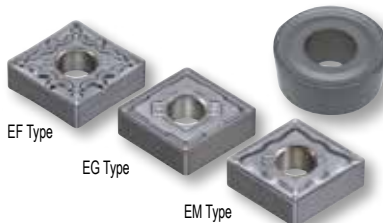
AC5000S Series

AC5005S
AC5015S
AC5025S



■ Inserts for Exotic Alloys

EF Type / EG Type / EM Type / Round Inserts



EF Type

EG Type

EM Type

■ Threading Tools

SSTE Type / SSTI Type

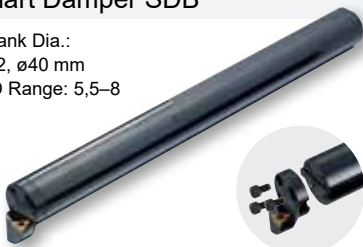
For Aerospace Equipment
UNJ Standards



■ Anti-vibration Arbors

Smart Damper SDB

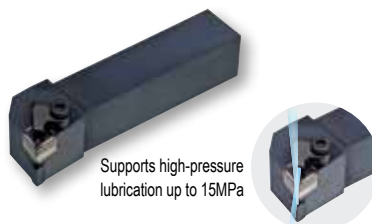
Shank Dia.:
ø32, ø40 mm
L/D Range: 5,5–8



■ External Holders

Internal Coolant Holders

Supports high-pressure
lubrication up to 15MPa



■ CBN Series for Exotic Alloys

Titanium Alloy Machining NCB100

Heat-Resistant Alloy Machining IT105



Titanium Alloy

Titanium Alloy



Milling

■ Wave Radius Mill
RSE Series / RSX Series



■ WaveMill
WFXH Series



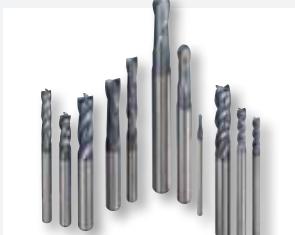
■ WaveMill
WEZ Series / WEZR Series



■ WaveMill
WSE Series



■ GSX MILL Series
GSX MILL



■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series



Drilling

■ Indexable SumiReamer
SR Series



■ MULTIDRILL
SDM Series / MDM Series



■ SumiDrill
WDX Series



■ MULTIDRILL SMD Series
Indexable Head MSL Type



■ Plunge Mill
PCT Type



■ Plunge Drill
PDL Type

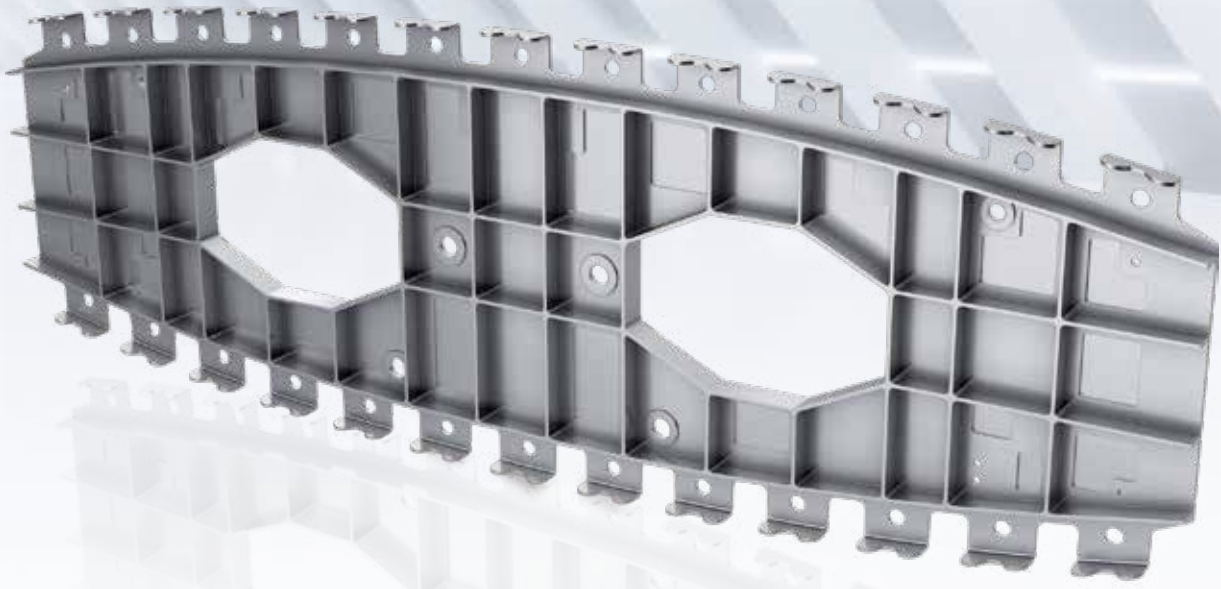


PDL Type Pocketing



Aluminum Alloy

Aluminum Alloy



Milling

■ WaveMill
WEZ Series



■ WaveMill
WAX Series



■ PCD Cutters for High-speed/High-efficiency Machining
ALNEX ANX Series



■ AURORA Coat Endmills
ASM Series



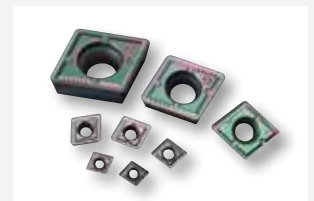
Drilling

■ SumiDrill
WDX Series

Diameter:
ø13,0–68,0 mm



■ Insert for SumiDrill WDX Series
Grade for Aluminum Alloy
Machining DL1500



■ Super MULTIDRILL
NHGS Series

Diameter:
ø3,0–16,0 mm
L/D: 3, 5, 10



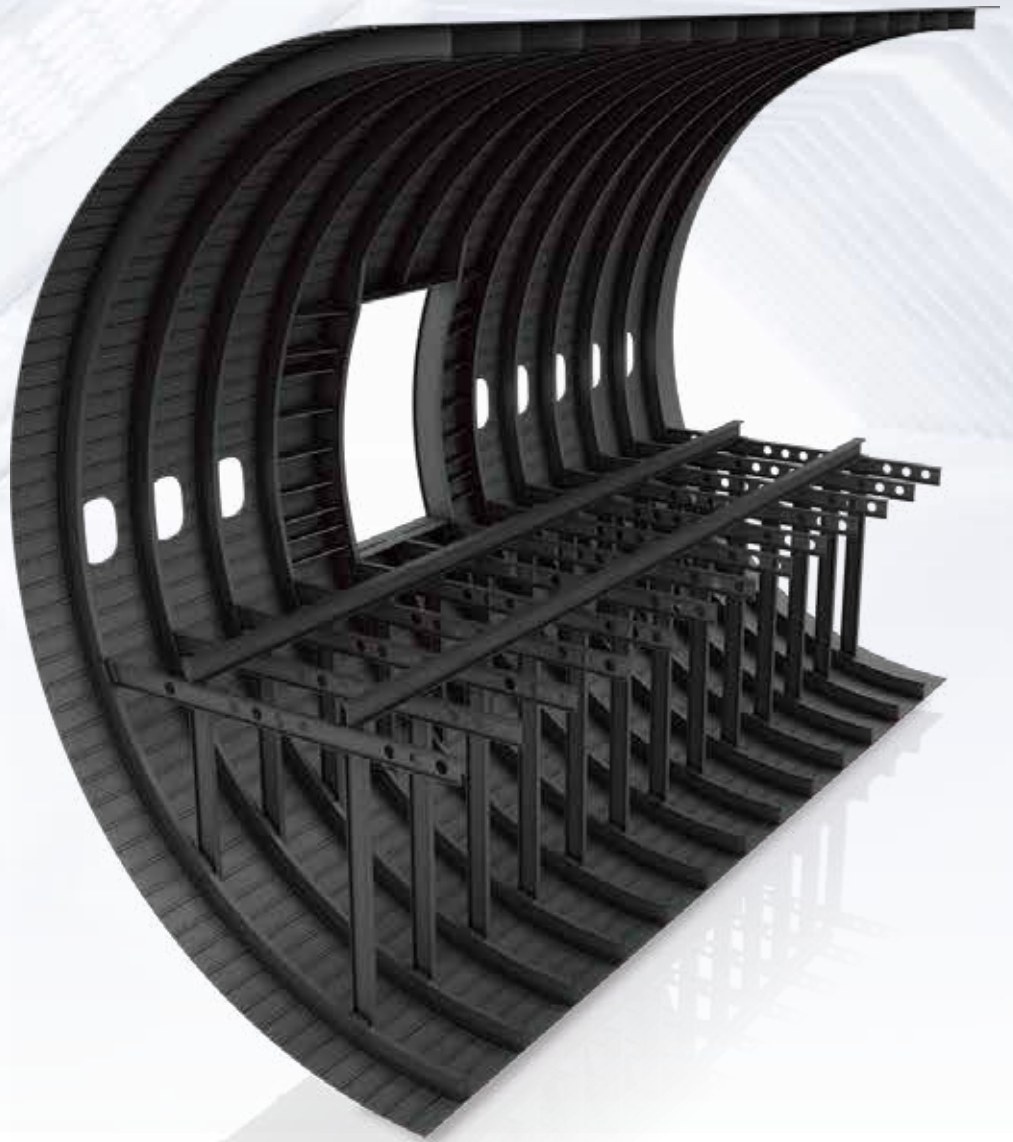
■ MULTIDRILL
MDA Series

Diameter:
ø1,0–3,0 mm, L/D 3, 5, 10, 15, 20
ø3,1–12,0 mm, L/D 3, 5, 10,



Frame

- CFRP
- CFRP / Titanium Alloy
- CFRP / Aluminum Alloy



Drilling

SUMIDIA Coat Drills

SDC-SE Type



General-purpose
1st Recommendation

SDC Type



Focus on Hole
Quality

SDC-WE Type



For CFRP/Al
Focus on Al Machining Quality

Features

- Smooth Diamond Coating with Sharp Cutting Edges
- High Coating Adhesion due to Dedicated Substrate and Special Treatment
- CFRP Dedicated Cutting Edge Design

Hole diameter accuracy, delamination, uncut fibers, chip evacuation, and other issues addressed.

Also applicable to CFRP + multi-layered aluminum alloy.

Bore SUMIDIA Coat

Dimensions Diameter: $\varnothing 2,0-20,0$ mm

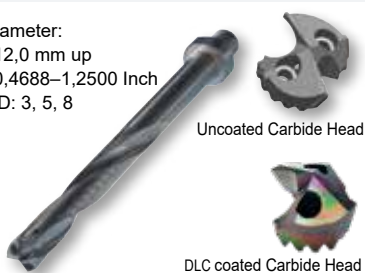
Overall Length: up to 200 mm; Hole Depth (L/D): up to 8D

Recommended Cutting Conditions: v_c : 80–150 m/min f : 0,05–0,1 mm/rev

MULTIDRILL for CFRP

SMD Series

Diameter:
 $\varnothing 12,0$ mm up
 $\varnothing 0,4688-1,2500$ Inch
L/D: 3, 5, 8



Uncoated Carbide Head

DLC coated Carbide Head

Indexable SumiReamer

SR Series

Diameter:
 $\varnothing 7,6-200,2$ mm up





Frame

CFRP

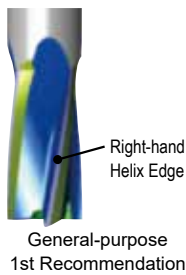
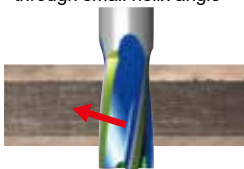
Milling

SUMIDIA Coated Endmills

SSDC Type

Features

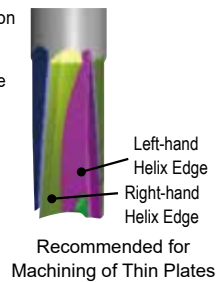
- Optimised Rake and Relief Angles
- Balance of cutting edge sharpness and tool life through small helix angle



SSDCRL Type

Features

- Right/left-hand helix prevents delamination on top and bottom surfaces
- With a left-hand helix edge on the top and a right-hand helix edge on the bottom, fibers are held down during cutting, creating excellent surface quality



PCD Cutters for High-speed/High-efficiency Machining

ALNEX ANX Series



Landing gear

Titanium Alloy

Ultra-hard Alloy Steel Maraging Steel (Grade 300)



Milling

■ WaveMill
WEZ Series / WEZR Series



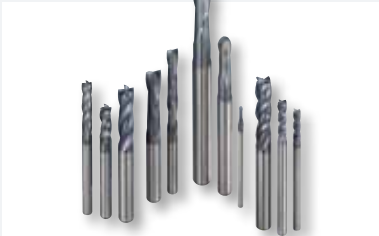
■ Wave Radius Mill
RSE Series / RSX Series



■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series

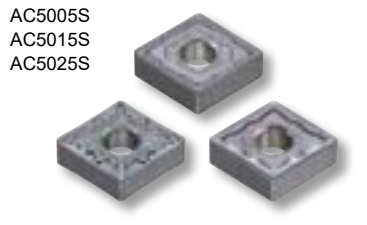


■ GSX MILL Series
GSX MILL



Turning

■ Coated Carbide Grades for Exotic Alloys
AC5000S Series



■ Anti-vibration Arbors
Smart Damper SDB



■ Inserts for Exotic Alloys
Round Inserts



Drilling

■ MULTIDRILL SMD Series
Indexable Head MSL Type



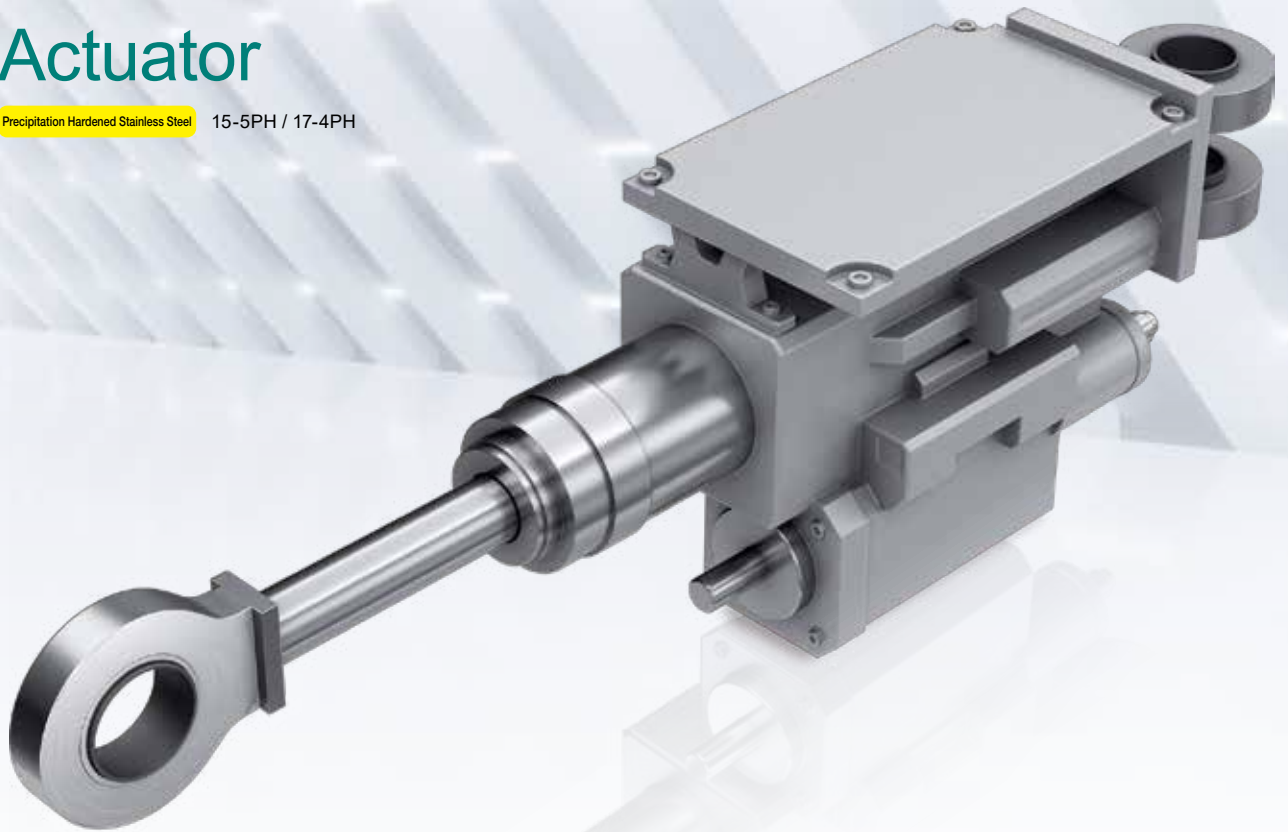
■ SumiDrill
WDX Series



*SMART DAMPER™ is a registered trademark of BIG DAISHOWA Co., Ltd.

Actuator

Precipitation Hardened Stainless Steel 15-5PH / 17-4PH



Indexable SumiReamer SR Series

Diameter:
ø7,6–200,2 mm up



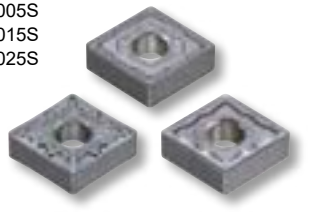
Insert for SumiDrill WDX Series M Type Chipbreaker for Stainless Steel Machining



Turning

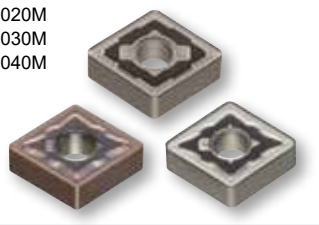
Coated Carbide Grades for Exotic Alloys AC5000S Series

AC5005S
AC5015S
AC5025S



Coated Carbide Grades For Stainless Steel AC6000M Series

AC6020M
AC6030M
AC6040M



Milling

WaveMill WGX Series



WaveMill WEZ Series



Fastener

- Titanium Alloy**
- Heat-Resistant Alloy** INCONEL718 / WASPALLOY / HASTELLOY
- Precipitation Hardened Stainless Steel** 15-5PH / 17-4PH



Gear

Special Steel



Turning

■ Coated Carbide Grades for Exotic Alloys
AC5000S Series

AC5005S
AC5015S
AC5025S



■ CBN Series for Exotic Alloys
Titanium Alloy Machining NCB100
Heat-Resistant Alloy Machining IT105



■ Threading Tools
SSTE Type / SSTI Type

For Aerospace
Equipment
UNJ Standards



Milling

■ WaveMill
WEZ Series for Multi-tasking Machines



■ Grooving Tools GND Series
CF Type Chipbreaker for Cut-off

Handed



■ Polygonal Taper Shank
SumiPolygon Internal Coolant Supply



Supports high-pressure
lubrication up to 15MPa

■ External Holders
Internal Coolant Holders

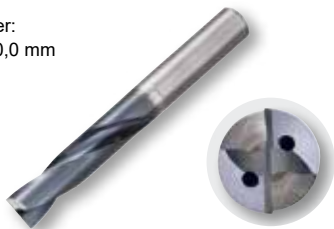


Supports high-pressure
lubrication up to 15MPa

Drilling

■ Flat MULTIDRILL
MDF Series

Diameter:
ø0,3–20,0 mm



■ MULTIDRILL
SDM Series / MDM Series

Diameter:
ø3,0–16,0 mm
L/D: 3, 5



■ Micro Long Drill
MLDH Series

Diameter: ø0,80–2,00mm
L/D: 2, 5, 12, 20, 30
(2D is for guide holes)



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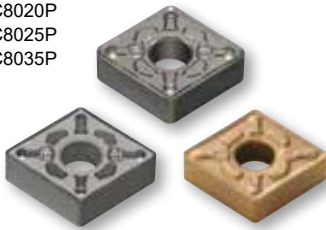
Bearing

Special Steel

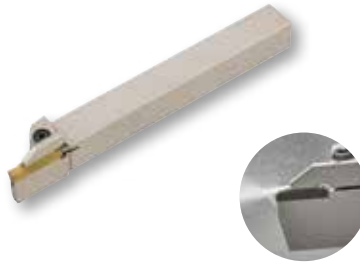
Turning

■ Coated Carbide Grades for Steel
AC8000P Series

AC8015P
AC8020P
AC8025P
AC8035P



■ Grooving Tools
GND Series



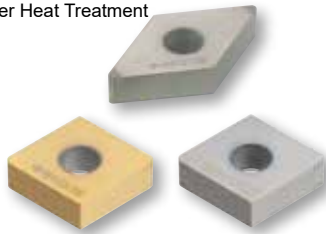
■ Threading Tools
SSTE Type / SSTI Type

For Aerospace Equipment
UNJ Standards



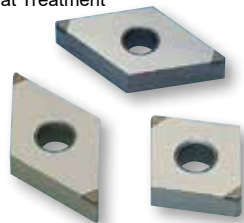
■ Coated SUMIBORON
BNC2115/BNC2125

Continuous Machining
after Heat Treatment



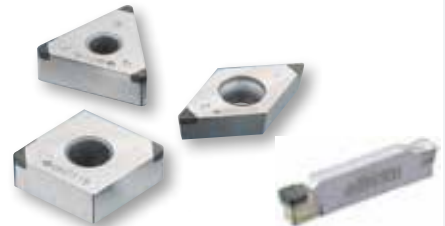
■ SUMIBORON
BN350

Interrupted Machining
after Heat Treatment



■ SUMIBORON
BN7115

For Special Steel
Machining



Drilling

■ MULTIDRILL
NeXEO MDE Series / SDPSeries

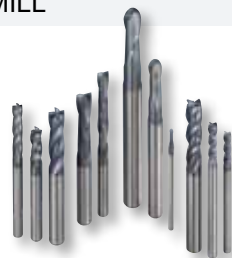
Diameter:
ø1,0–20,0 mm
L/D: 2, 3, 4, 5, 8



Diameter:
ø3,0–16,0 mm
L/D: 3, 5, 7

Milling

■ GSX MILL Series
GSX MILL



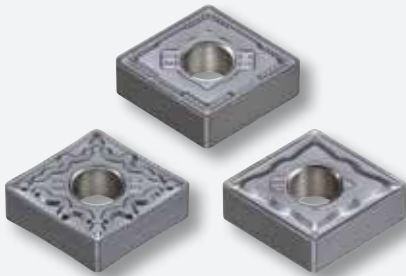
■ Radius Endmills for Exotic Alloys
EPMS Series / SSEH Series



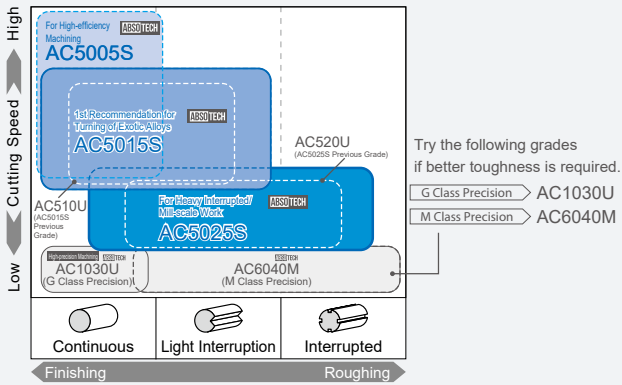
Coated Carbide Grades

Turning

AC5005S/AC5015S/AC5025S



Application Range



Also suitable for work materials other than exotic alloys

Applicable Work Material **P M K S H**

New grade series for exotic alloys

Features of AC5000S Series

ABSOTECH

PVD



PVD Coating Technology **ABSOTECH™**

Highly heat-resistant super multi-layered thin-film AlTiSiN structure realises excellent crater wear resistance and flank wear resistance.

Newly Developed Tough Carbide Substrate

Introduction of a revolutionary new sintering process enables hardness to be maintained while greatly improving toughness, achieving excellent notch wear and chipping resistance.



Newly Developed Heat-Resistant Carbide Substrate **AC5005S**

Newly developed dedicated substrate with excellent high-temperature hardness and strength, provides excellent wear resistance and plastic deformation resistance during high-efficiency machining.



Deformation at high temperatures
50% Down
 from Conventional Grade
 (High-temperature deformation evaluation 800°C)

ACS2500/ACS3000

Milling

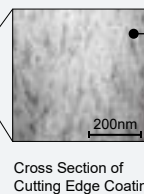


New PVD Coating Features

ABSOTECH

PVD

Coating Layer
 Carbide Substrate



Ultra-fine Grained B Additive
 · New AlTiBN coating, with an ultra-fine coating structure, achieves high strength and toughness
 · Outstanding chipping resistance and wear resistance

High Adhesion Strength
 Significantly improved coating adhesion
 More than twice the chipping resistance as conventional coatings

Grade Application Range

Newly developed ACS2500/ACS3000 grades, ideal for machining titanium alloys, heat-resistant alloys and stainless steel, are now available!

Work Material	Finishing to Light Cutting	Medium Cutting	Rough to Heavy Cutting
S M Coated Carbide	ACS2500		
S M Coated Carbide		ACS3000	

The letter "P" at the end of each grade indicates the coating type. ▲: PVD

Grade Features

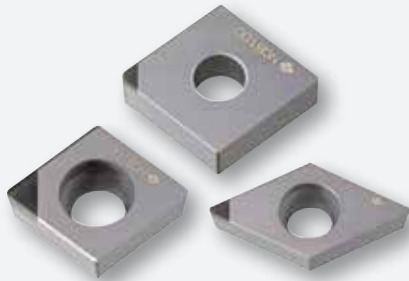
Work Material	Grade	Coating Thickness (µm)	Features
S	ACS2500	3	Carbide substrate with excellent wear and adhesion resistance, coupled with a highly chipping-resistant coating, provides outstanding performance in machining heat-resistant alloys, stainless steel, and particularly titanium alloys
M	ACS3000	3	High toughness carbide substrate and a coating with excellent chipping resistance provide outstanding stability when machining titanium alloys, heat-resistant alloys or stainless steel

CBN

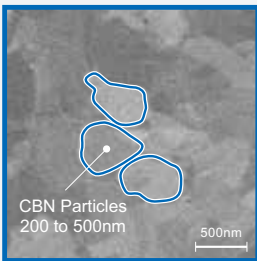
Turning

NCB100 For high-speed machining of Ti alloys

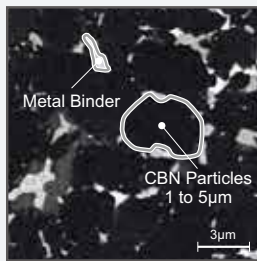
Nano-polycrystalline CBN



Sintered Body Structure



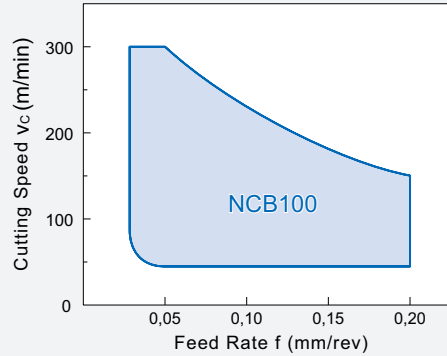
SUMIBORON BINDERLESS
NCB100



Conventional CBN

NCB100 can also be used for milling of heat-resistant alloys.

Application Range



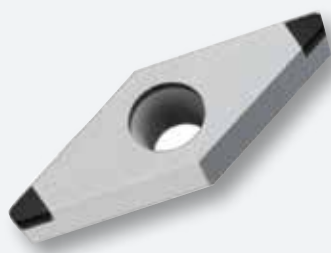
Physical Properties

	SUMIBORON BINDERLESS NCB100	Conventional CBN
CBN Content (vol%)	100	90-95
Binder	—	WC-Co
Hardness HV (GPa)	51-54	41-44
Thermal Conductivity (W/m·K)	180-200	100-120

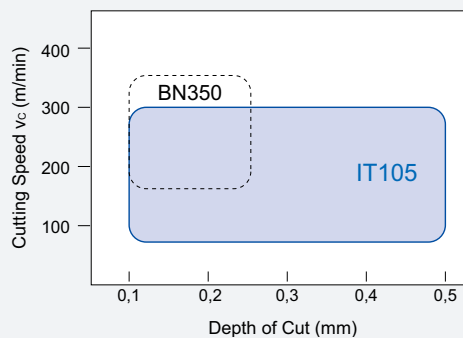
Turning

IT105 For high-speed machining and finishing of heat-resistant alloys

INCONEL718 / WASPALOY / HASTELLOY



Application Range



Physical Properties

	IT105	BN350
CBN Grain Size (µm)	1	1
CBN Content (vol%)	75-80	60-65
Binder	Co Compound	TiN
Hardness HV (GPa)	35-38	33-35
TRS (GPa)	2,3-2,4	1,5-1,6

*Inconel is a trademark or registered trademark of Huntington Alloys Corporation in the US. * HASTELLOY is a trademark or registered trademark of Haynes International, Inc. in the US.

TOOL ENGINEERING SERVICE

Sumitomo Electric Group provides superior products and services through understanding the needs of our customers. Our **Tool Engineering Centers** strongly support manufacturing by offering a variety of services tailored to the customer's needs.

Seminar

Regular Seminar and Individual Workshops

9 courses catering to different machining experience levels are available.

We offer hands-on practicals using machine tools.



Technical Support

Tooling Support

We can propose optimal tools and cutting conditions based on product drawings and machining equipment.

Technical Consultation

Our technical specialists provide support to resolve customer's machining problems.



Cutting Test

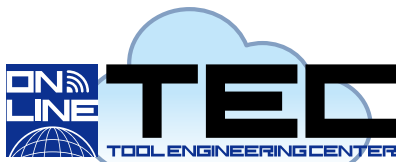
Proposing Optimal Tools and Cutting Conditions / Troubleshooting / Performance Evaluation

We have a variety of machine tools, tooling and measurement equipment to conduct a wide range of cutting tests in support of various customers' requirements.

Using the latest evaluation tools to propose improvements.

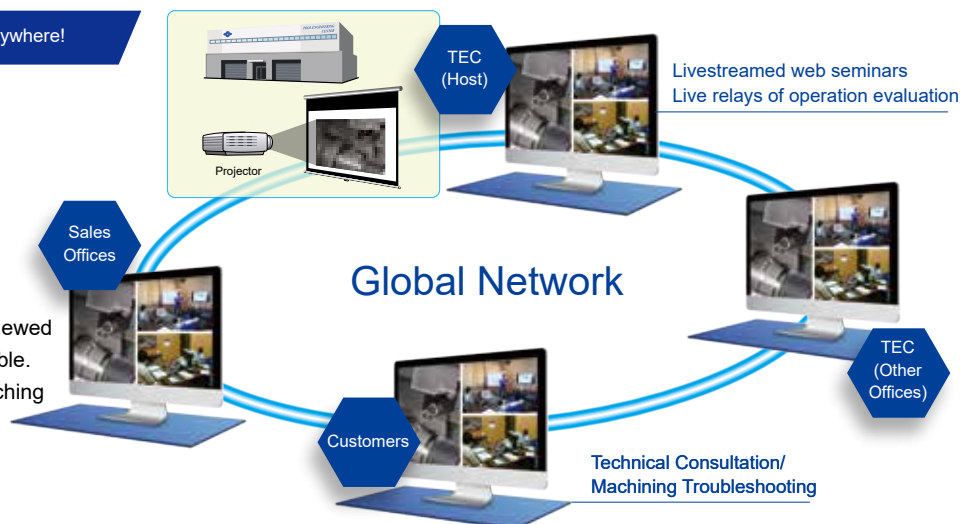


Access online from anywhere!



Online TEC

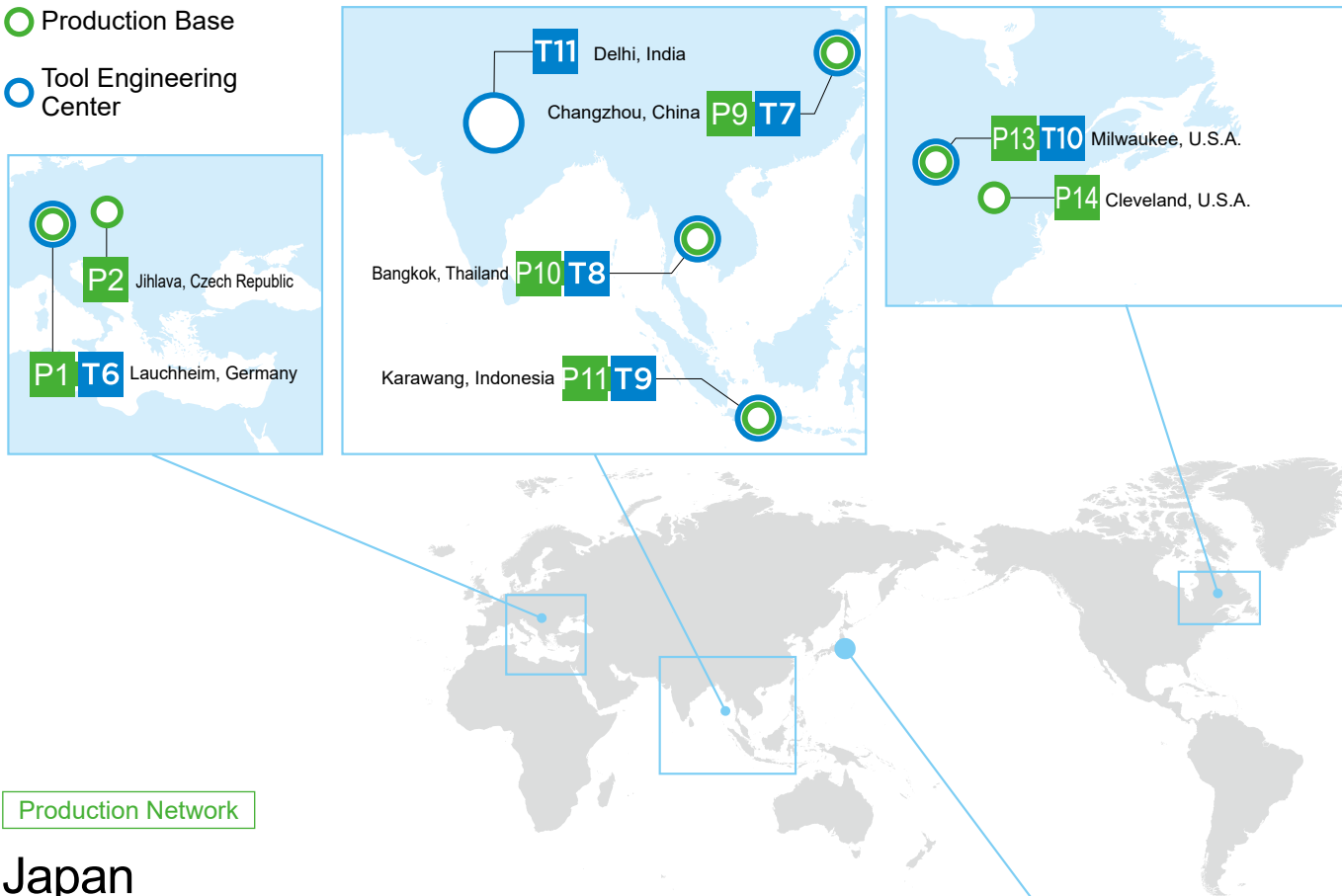
Live relays in which cutting videos can be viewed from remote locations in real time are possible. Evaluation as needed is possible while watching actual operation remotely as well.



CUTTING TOOLS WORLDWIDE LOCATIONS

Strengthening our global presence and expansion of overseas markets through establishment of local production and technical support network.

- Production Base
- Tool Engineering Center



Production Network

Japan

- P3 Hokkaido Sumiden Precision Co., Ltd.
- P5 Tohoku Sumiden Precision Co., Ltd.
- P6 Tokai Sumiden Precision Co., Ltd.
- P7 Kyushu Sumiden Seimitsu Ltd.

Europa

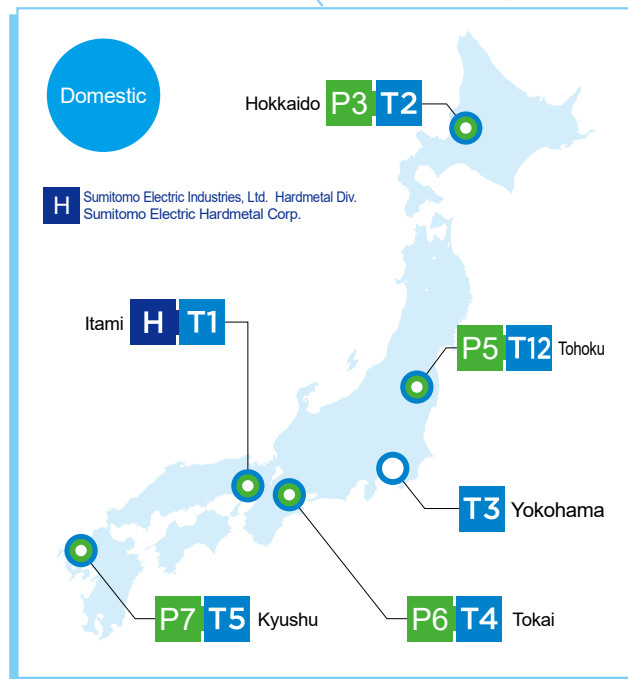
- P1 Sumitomo Electric Hartmetallfabrik GmbH
- P2 Sumitomo Electric Hartmetallfabrik GmbH, organizační složka.

America

- P13 Sumitomo Electric Carbide Manufacturing, Inc. (Wisconsin)
- P14 Sumitomo Electric Carbide Manufacturing, Inc. (Ohio)

Asia

- P9 Sumitomo Electric Hardmetal Manufacturing (Changzhou) Co., Ltd.
- P10 Sumitomo Electric Hardmetal Manufacturing (Thailand) , Ltd.
- P11 PT.Sumiden Hardmetal Manufacturing Indonesia



TEC

TOOL ENGINEERING CENTER

- | | | | |
|--|---|---|---|
| T1 Itami | T2 Hokkaido | T3 Yokohama | T4 Tokai |
| T5 Kyushu | T6 Germany | T7 China | T8 Thailand |
| T9 Indonesia | T10 America | T11 India | T12 Tohoku |

Sumitomo Electric Cutting Tools Official Apps for iOS/Android



Cutting calculation App

SumiTool Calculator



Grade & chipbreaker comparison App

SumiTool Converter



CARBIDE - CBN - DIAMOND

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