



TurnLine



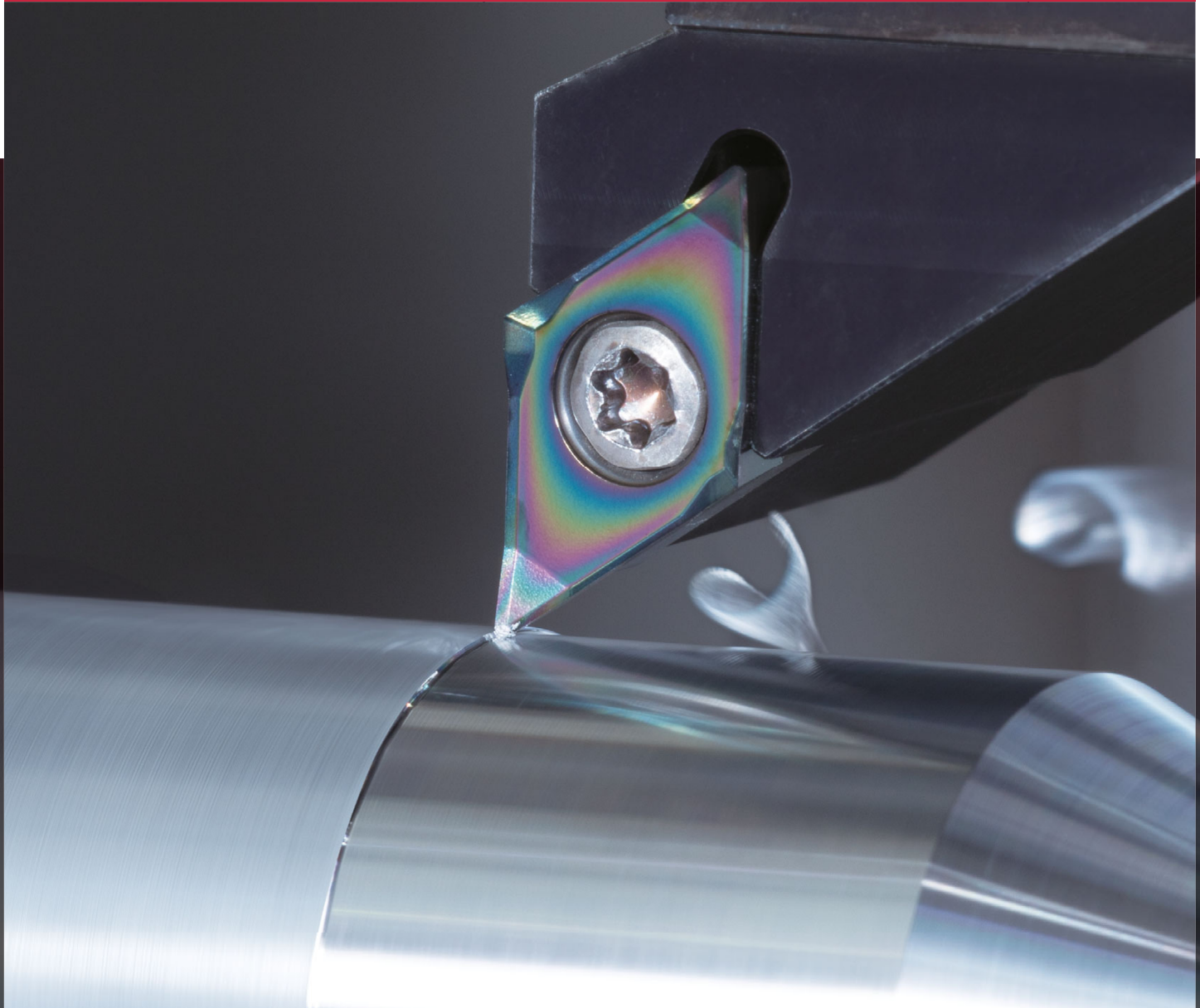
For more information

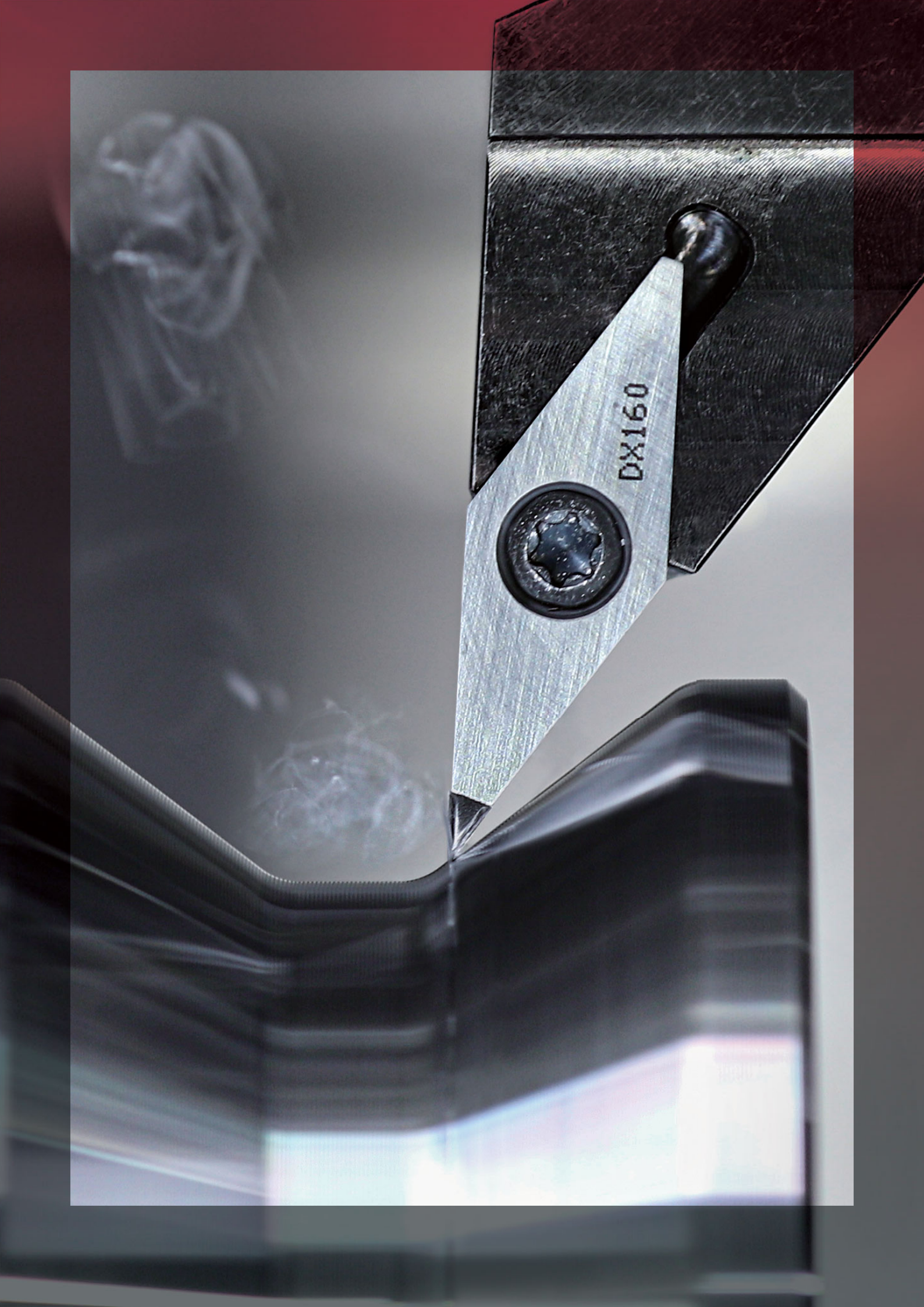
Turning tool

Non-Ferrous Application Series

Tungaloy Report No. 555-G

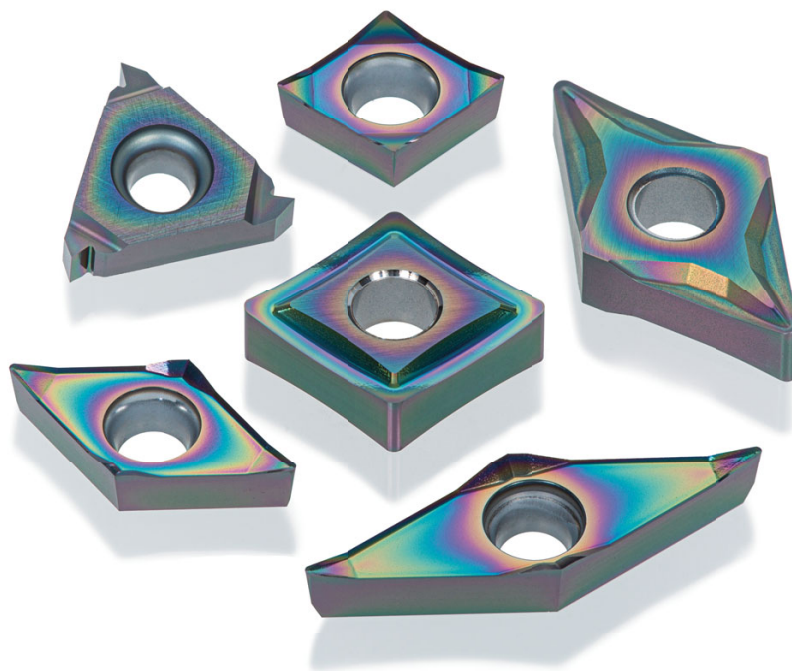
Complete turning solutions for non-ferrous materials







Non-Ferrous Application Series



New DLC coating grade complement
the non-ferrous application series.

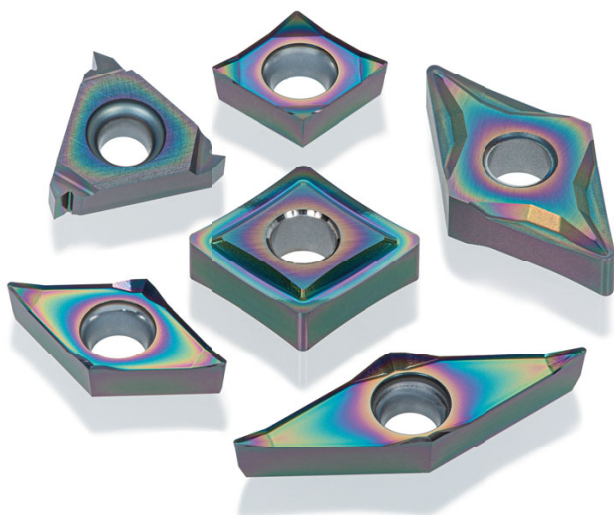
Non-Ferrous Application Series

Excellent built-up edge resistance and high surface quality

DLC coated inserts **DS2000 SERIES**

Tungaloy original DLC coating grade for non-ferrous alloys

- Excellent built-up edge resistance achieves high quality glossy machined surface.
- The coating with high hardness and excellent heat resistance reduce wear.
- Outstanding coating adhesion technology provides stable and reliable machining.



New

DS2005

- Excellent wear resistance ensures stable long life in high-speed machining of non-ferrous metals.

New

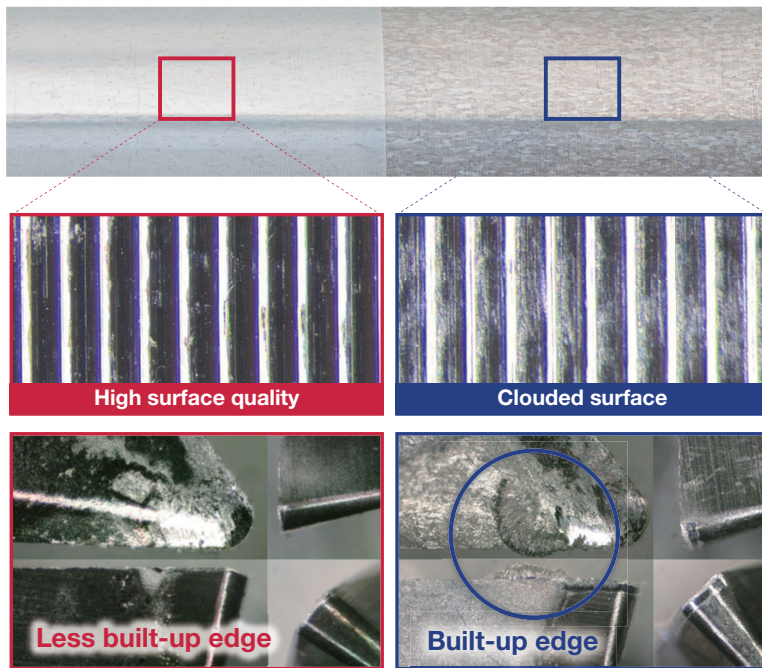
DS2015

- Well balanced wear and chipping resistance perform stable and reliable machining in a wide range of machining applications.

■ Application areas



■ Excellent built-up edge resistance and high surface quality

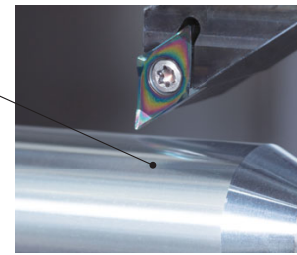


DS2000 SERIES

Non-coated carbide grade

- Excellent built-up edge resistance achieves high quality glossy machined surface.

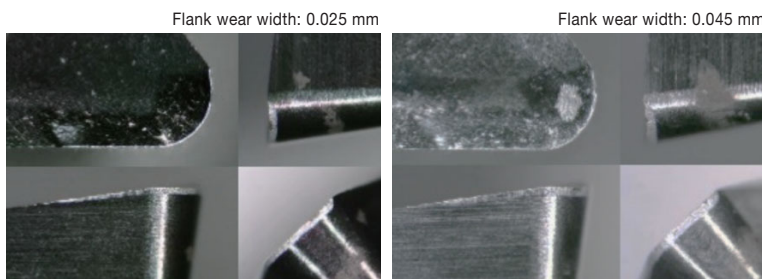
External turning



N A6061 / AlMg1SiCu

Insert : DCGT11T302
Cutting speed : $V_c = 500$ m/min
Feed : $f = 0.1$ mm/rev
Depth of cut : $a_p = 0.5$ mm
Coolant : Dry
Machining time : 17 min

■ Excellent wear resistance



DS2000 SERIES

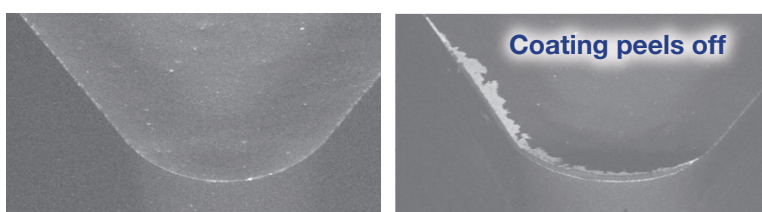
Non-coated carbide grade

- The coating with high hardness and excellent heat resistance reduce wear progress.

N AC4C-T6 / AlSi7Mg

Insert : DCGT11T302
Cutting speed : $V_c = 400$ m/min
Feed : $f = 0.2$ mm/rev
Depth of cut : $a_p = 1$ mm
Coolant : Wet
Cutting length : 560 m (1.4 min)

■ Stable and reliable machining



DS2000 SERIES

Competitor DLC coating grade

N AC4C-T6 / AlSi7Mg

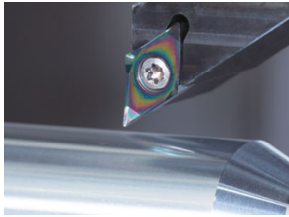
Insert : DCGT11T302
Cutting speed : $V_c = 400$ m/min
Feed : $f = 0.2$ mm/rev
Depth of cut : $a_p = 1$ mm
Coolant : Wet
Cutting length : 40 m (0.1 min)

- Outstanding coating adhesion technology provides stable and reliable machining.

Non-Ferrous Application Series

CUTTING PERFORMANCE

External turning



N A6061 / AlMg1SiCu

Insert : DCGT11T302
Cutting speed : $V_c = 500$ m/min
Feed : $f = 0.1$ mm/rev
Depth of cut : $a_p = 0.5$ mm
Coolant : Dry

■ Surface quality

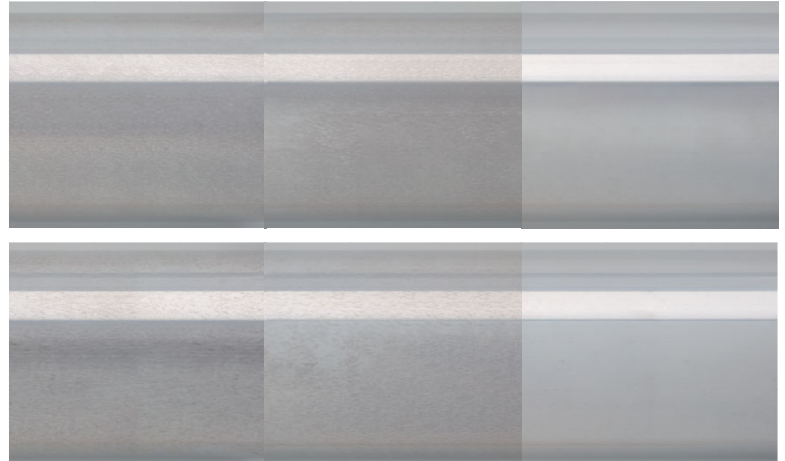
After 17 min

After 48 min

Non coated
Carbide grade

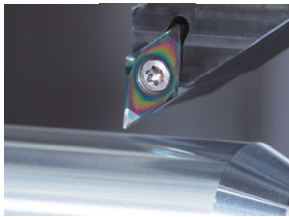
Competitor
DLC coating grade

New
DS2005



- **DS2005 delivers excellent surface quality not only compared with uncoated carbide grade, but also competitor DLC coated grade!**

External turning



N ADC12 / AlSi9Cu3

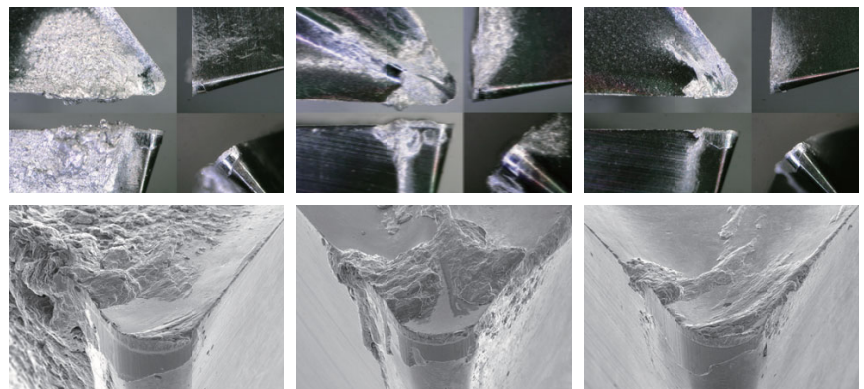
Insert : DCGT11T302
Cutting speed : $V_c = 300$ m/min
Feed : $f = 0.1$ mm/rev
Depth of cut : $a_p = 0.5$ mm
Coolant : Dry
Machining time : 69 min

■ Built-up edge resistance

Non coated
Carbide grade

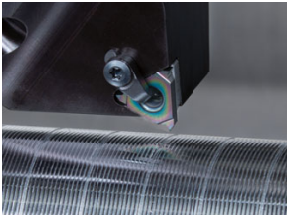
Competitor
DLC coating grade

New
DS2005



- **DS2005 delivers superior built-up edge resistance not only compared with uncoated carbide grade, but also competitor DLC coated grade!**

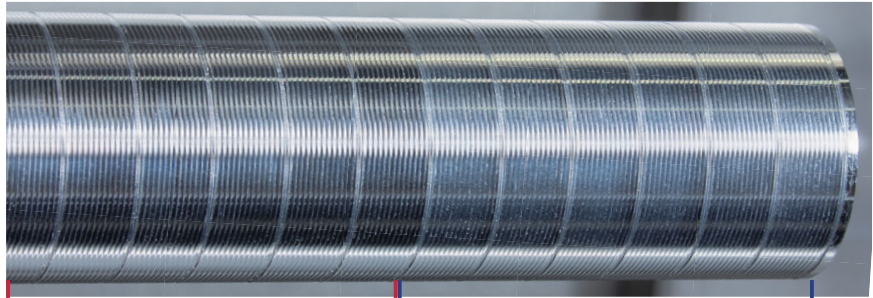
External threading



N A6061 / AlMg1SiCu

Insert : 16ERA60
Cutting speed : $V_c = 300$ m/min
Pitch : 1 mm
Number of pass: 8
Coolant : Dry

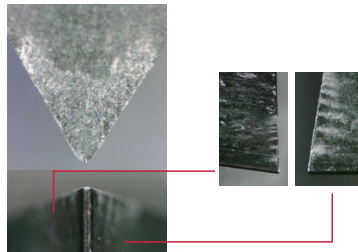
■ Surface quality



New DS2015

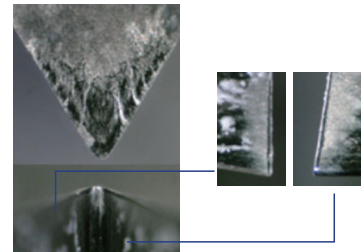
Non-coated carbide grade

■ Wear and built-up edge resistance



Frank wear width : 0.015 mm

New DS2015



Frank wear width : 0.03 mm

Non-coated carbide grade

- **DS2015 delivers excellent surface quality in threading operation!**
- **Significantly suppresses built-up edge on the rake and flank faces, reducing wear progress.**

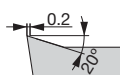
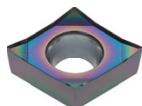
Non-Ferrous Application Series

Chipbreakers for non-ferrous alloy machining

AL/28

No more chip nesting in non-ferrous alloy machining

For positive insert

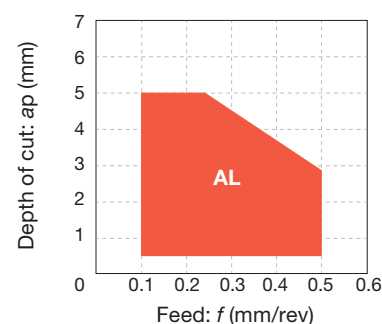


First choice geometry for non-ferrous applications

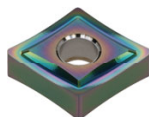
AL

- Provides excellent chip control and resistance to wear and built-up edge
- Low cutting forces generated by a large rake angle and sharp cutting edge
- Superb chip control enabled by large inclination angle of the cutting edge

■ Chip control range



For negative insert

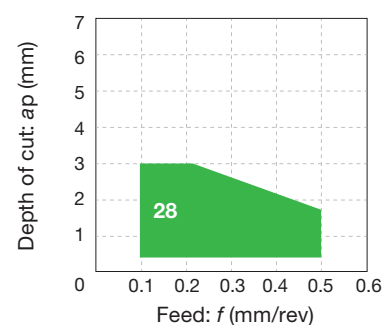


Press-in chipbreaker ideal for medium to finish operations

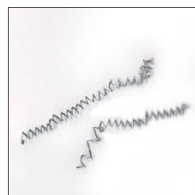
28

- Versatile geometry with a large inclination angle of the cutting edge. Ideal for medium to finish operations
- Provides superior surface finish and chip control

■ Chip control range



■ Chip control



N

Insert : CNGG120404-28
Workpiece material: A6061
Cutting speed : $V_c = 500$ m/min
Feed : $f = 0.2$ mm/rev
Depth of cut : $a_p = 1$ mm
Application : External turning, continuous cut
Coolant : Wet



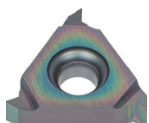
N

Insert : CNGG120404-28
Workpiece material: A6061
Cutting speed : $V_c = 500$ m/min
Feed : $f = 0.3$ mm/rev
Depth of cut : $a_p = 2$ mm
Application : External turning, continuous cut
Coolant : Wet

28 chipbreaker provides excellent chip control in wide range of applications.

TUNGTHREAD

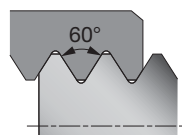
For threading insert



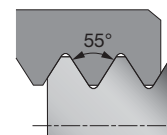
60° and 55° partial profile insert for external and internal threading

- High-precision threading with a grinding type insert
- Provides a high-quality thread surface

■ Applicable thread



ISO metric (M)
Unified (UN)

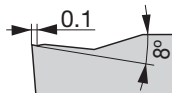
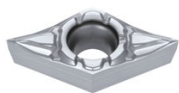


Whitworth (W)
Parallel pipe thread (G)

Pressed 3D chipbreaker inserts for small parts machining

JP/JS

Full lineup of chipbreakers for unrivaled chip control and super surface finishing

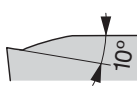
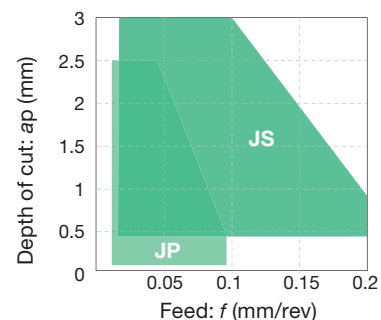


First choice chipbreaker for high precision finishing

JP

- A unique chipbreaker protrusion provides excellent chip control in the finish to super-finish cutting.
- Versatile geometry designed for a broad application range.
- Eliminates burr generation and controls vibration during large depth of cut.

■ Chip control range

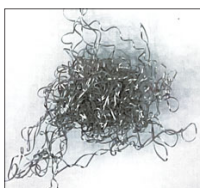
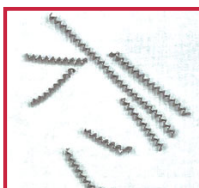
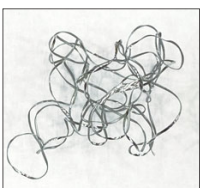


First choice chipbreaker for finish cutting

JS

- A steep cutting edge inclination angle for better chip control and reduced cutting force
- A unique protrusion that extends towards the radius effectively controls chip flow from small to large depth of cut

■ Chip control

JP		Competitor	JP		Competitor	JS		Competitor
								
N	Insert	: DCGT11T0302MF-JP KS05F	N	Insert	: DCGT11T302MF-JP KS05F	N	Insert	: DCGT11T0304MF-JS KS05F
	Workpiece material:	A6061 / AlMg1SiCu		Workpiece material:	A5052 / AlMg 2.5		Workpiece material:	A6061 / AlMg1SiCu
	Cutting speed	: $V_c = 300$ m/min		Cutting speed	: $V_c = 300$ m/min		Cutting speed	: $V_c = 300$ m/min
	Feed	: $f = 0.025$ mm/rev		Feed	: $f = 0.05$ mm/rev		Feed	: $f = 0.15$ mm/rev
	Depth of cut	: $a_p = 0.1$ mm		Depth of cut	: $a_p = 0.25$ mm		Depth of cut	: $a_p = 1$ mm
	Coolant	: Wet		Coolant	: Wet		Coolant	: Wet

JS and JP chipbreaker provides excellent chip control from precision finishing to large depth of cut machining.

Non-Ferrous Application Series

PCD inserts for high speed machining of non-ferrous alloys

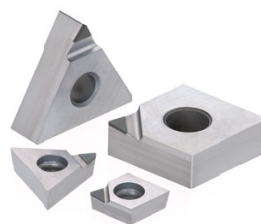
Introducing wear-resistant DX160 grade inserts with NS chipbreaker

PCD inserts
with 3D chipbreaker



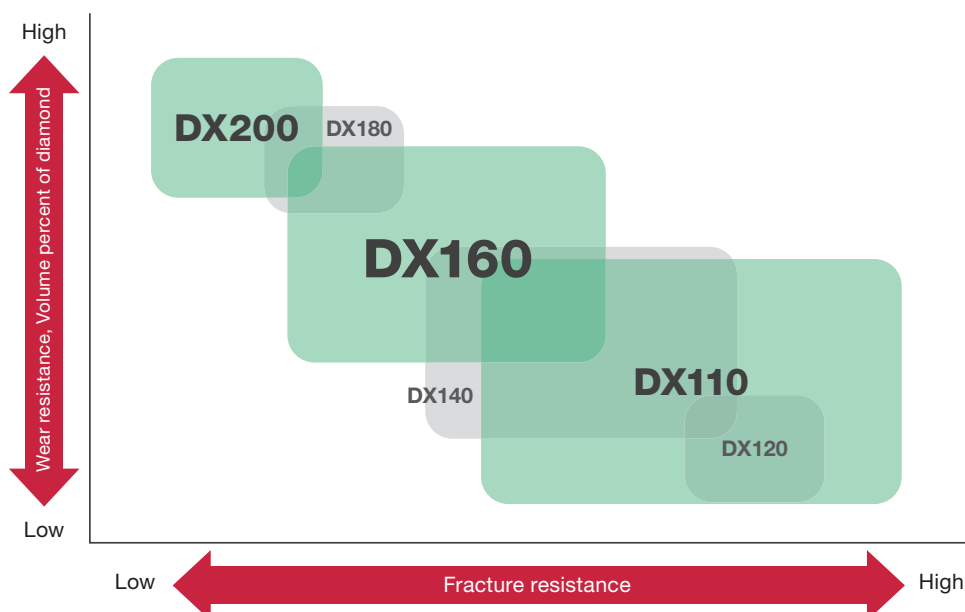
DX110, DX160

PCD (polycrystalline
diamond) tipped inserts



DX110, DX120, DX140
DX160, DX200

■ PCD grades and applications

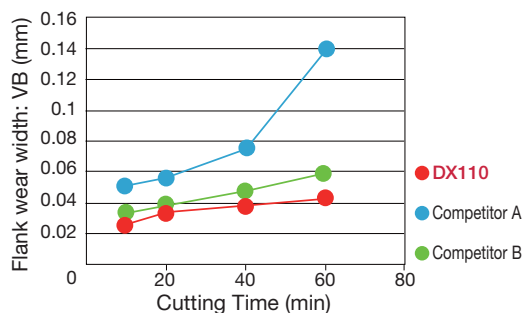


PCD-tipped inserts **DX110**

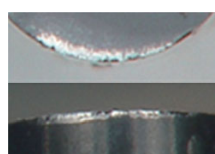
Definitive insert series for high speed machining of aluminum alloys

- Ultra-fine grained PCD grade for edge sharpness
- An extremely wear-resistant grade, featuring strongly-bonded diamond grains that prevents the grains from breaking off during machining
- Thanks to ultra-fine diamond grains, **DX110** provides superior surface finish

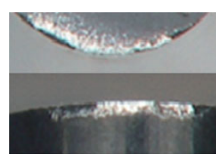
■ Wear resistance



After 60 min



DX110

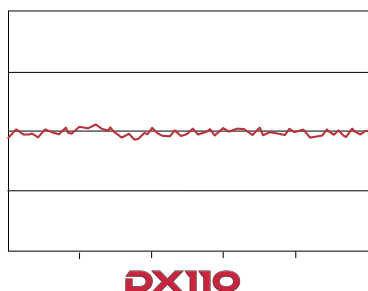


Competitor A

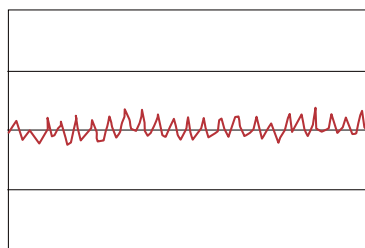
Insert : 1QP-CNMM120404 **DX110**
 Workpiece material : Aluminum alloy (Si: 17%)
 Holder : ACLNL2525M12-A
 Cutting speed : $V_c = 500$ m/min
 Feed : $f = 0.1$ mm/rev
 Depth of cut : $a_p = 0.5$ mm
 Coolant : Dry

DX110 exhibited excellent wear resistance in machining extremely abrasive Si-Al alloy.

■ Surface finish



DX110



Competitor

Insert : 1QP-CNMM120404 **DX110**
 Workpiece material : Aluminum alloy (Si:10%)
 Cutting speed : $V_c = 500$ m/min
 Feed : $f = 0.05$ mm/rev
 Depth of cut : $a_p = 0.3$ mm
 Coolant : Wet

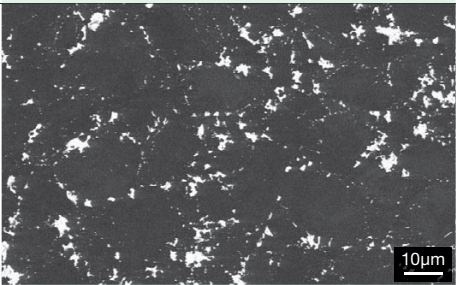
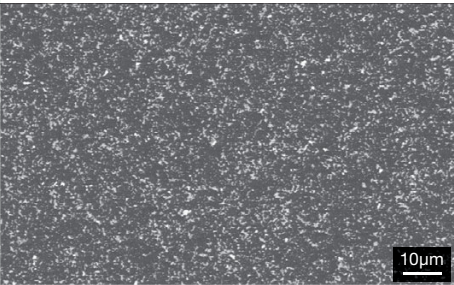
Submicron grain PCD grade DX110 insert with optimized rake angle provides excellent surface finish.

Non-Ferrous Application Series

PCD-tipped inserts **DX160**

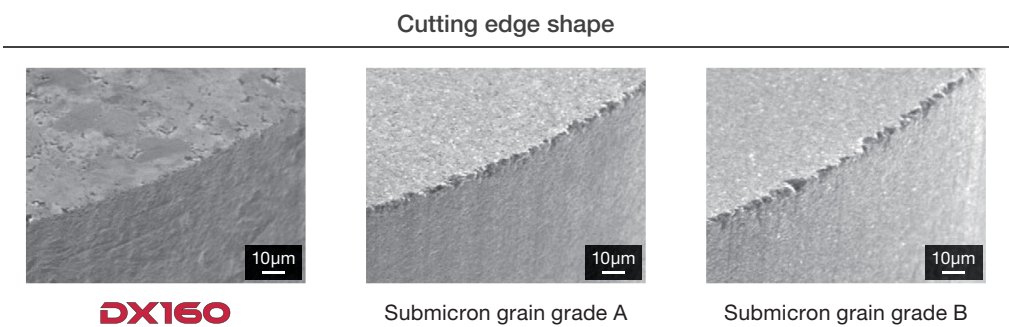
High diamond-content PCD grade for superior wear resistance

- A coarse diamond grain grade, **DX160** contains a high volume percent of diamond, which exceeds the fine-grained DX110, for superior wear resistance.
- Suited for various non-ferrous applications including a wide range of Aluminium and Copper alloys, as well as hard, brittle materials such as Tungsten.

Grade	DX160	DX110
Microstructure		
Grain size (µm)	28	< 1
Hardness (Hv)	11,000	8,500
Application	High wear resistance	High fracture resistance

Superior cutting edge sharpness and integrity

DX160 grade inserts, with its high hardness, boast a sharp cutting edge that retains its sharpness longer than competitors' submicron-grain PCD grades. This contributes to the creation of unparalleled part surface quality and process security in all non-ferrous applications.



PCD-tipped inserts **DX200**

Sharp cutting edge

DX200 has a sharp cutting edge that provides excellent surface finish.

Cutting edge shape



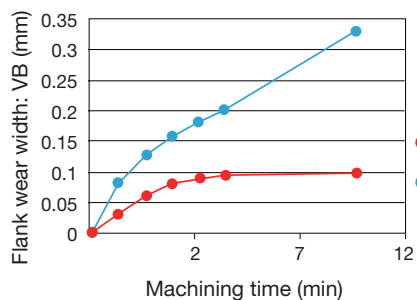
DX200



Conventional PCD grade

Cutting performance

Wear resistance



After 10 min



DX200



Competitor's PCD



Insert : 1QP-DCGW11T304F
DX200
Workpiece material : Tungsten carbide
(85HRA)
Toolholder : SDJCL2525M11
Cutting speed : $V_c = 20$ m/min
Feed : $f = 0.1$ mm/rev
Depth of cut : $a_p = 0.1$ mm
Coolant : Wet

DX200 provides better wear resistance than competitor's PCD grade.

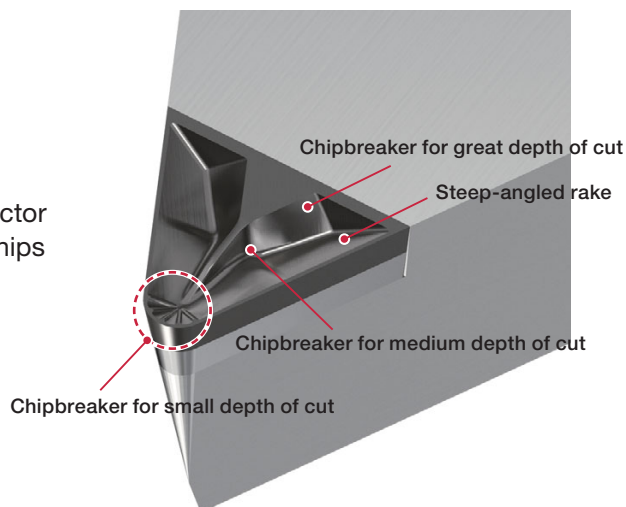
Non-Ferrous Application Series

PCD inserts with 3D chipbreaker

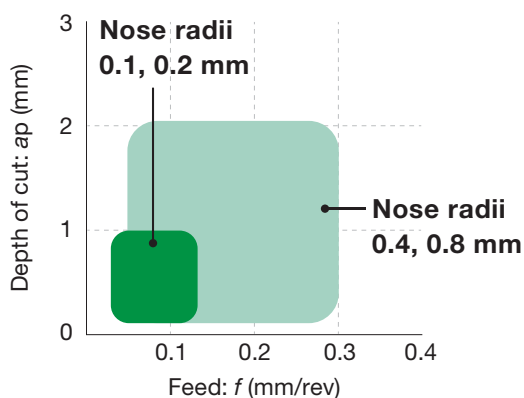
No more chip nesting in aluminum alloy machining

Unique 3D chipbreaker

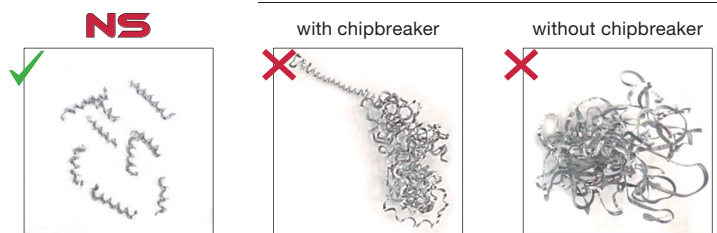
- Versatile geometry allows excellent chip control
- One insert handles from rough to finish operations
- Optimal rake angle design effectively directs chips to the redirector
- Optimized geometry for small nose radii to effectively control chips
- Excellent chipbreaking in varying depths of cut



Recommended application ranges for NS chipbreaker

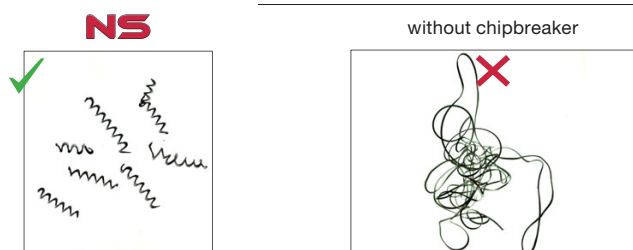


Chip control (R0.4)



N	Insert	: 1QP-DCGT11T304-NS
	Holder	: SDJCL2525M11
	Workpiece material	: A5056
	Cutting speed	: $V_c = 1,000$ m/min
	Feed	: $f = 0.1$ mm/rev
	Depth of cut	: $a_p = 0.5$ mm
	Application	: External turning, continuous cut
	Coolant	: Wet

Chip control (R0.2)



N	Insert	: 1QP-VCGT160402-NS
	Toolholder	: SVJCR2525M16
	Workpiece material	: A6061 / AlMg1SiCu
	Cutting speed	: $V_c = 500$ m/min
	Feed	: $f = 0.08$ mm/rev
	Depth of cut	: $a_p = 0.5$ mm
	Application	: External turning, continuous cut
	Coolant	: Wet

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Chipbreaker	Grade	Cutting speed V _c (m/min)	Feed f (mm/rev)	Depth of cut a _p (mm)
N	Aluminum alloys (Si ≤ 12%)	NS	DX110, DX160	300 - 2500	0.03 - 0.3	0.1 - 2
		Without	DX110, DX120, DX140, DX160	300 - 2500	0.05 - 0.2	0.05 - 2
		AL	KS05F	100 - 1200	0.1 - 0.5	0.5 - 5
			DS2005	100 - 1200	0.1 - 0.5	0.5 - 5
		28	KS05F	100 - 1200	0.1 - 0.5	0.5 - 3
			DS2005	100 - 1200	0.1 - 0.5	0.5 - 3
		P	TH10	100 - 1000	0.2 - 0.5	0.5 - 4
		JP	KS05F	100 - 1200	0.02 - 0.1	0.05 - 2.5
		JS	KS05F	100 - 1200	0.02 - 0.2	0.5 - 3
	Aluminum alloys (Si ≥ 12%)	NS	DX110, DX160	300 - 800	0.03 - 0.2	0.1 - 2
		Without	DX110, DX120, DX140, DX160	300 - 800	0.05 - 0.2	0.05 - 2
		Without	DX120	400 - 800	0.05 - 0.2	0.05 - 2
		Without	DX140	400 - 800	0.05 - 0.2	0.05 - 2
		Without	DX160	400 - 800	0.05 - 0.2	0.05 - 2
		AL	KS05F	100 - 300	0.1 - 0.5	0.5 - 5
			DS2005	100 - 300	0.1 - 0.5	0.5 - 5
		28	KS05F	100 - 300	0.1 - 0.5	0.5 - 3
			DS2005	100 - 300	0.1 - 0.5	0.5 - 3
		P	TH10	100 - 300	0.2 - 0.5	0.5 - 4
		JP	KS05F	100 - 1200	0.02 - 0.1	0.05 - 2.5
		JS	KS05F	100 - 300	0.02 - 0.2	0.5 - 3
	Copper and copper alloys	NS	DX110, DX160	300 - 1500	0.03 - 0.3	0.1 - 2
		Without	DX110, DX120, DX140, DX160	300 - 1500	0.05 - 0.2	0.05 - 2
		AL	KS05F	100 - 300	0.1 - 0.5	0.5 - 5
			DS2005	100 - 300	0.1 - 0.5	0.5 - 5
		28	KS05F	100 - 300	0.1 - 0.5	0.5 - 3
			DS2005	100 - 300	0.1 - 0.5	0.5 - 3
		P	TH10	100 - 300	0.2 - 0.5	0.5 - 4
		JP	KS05F	100 - 300	0.02 - 0.1	0.05 - 2.5
		JS	KS05F	100 - 300	0.02 - 0.2	0.5 - 3
	Magnesium alloys	Without	DX110, DX120, DX140, DX160	400 - 1200	0.05 - 0.2	0.05 - 1
	FRP	Without	DX160, DX200	500 - 1000	0.05 - 0.3	0.1 - 1
	CFRP	Without	DX160, DX200	100 - 700	0.05 - 0.3	0.1 - 1
	Carbon	Without	DX160, DX200	300 - 500	0.05 - 0.3	0.1 - 1
	Green ceramics	Without	DX160, DX200	100 - 200	0.02 - 0.1	0.1 - 1
	Tungsten carbide (HRA80 - 95)	Without	DX160, DX200	5 - 30	0.02 - 0.1	0.02 - 0.2
	Sputtering targets for semiconductor	Without	DX200	10 - 100	0.02 - 0.1	0.02 - 0.2

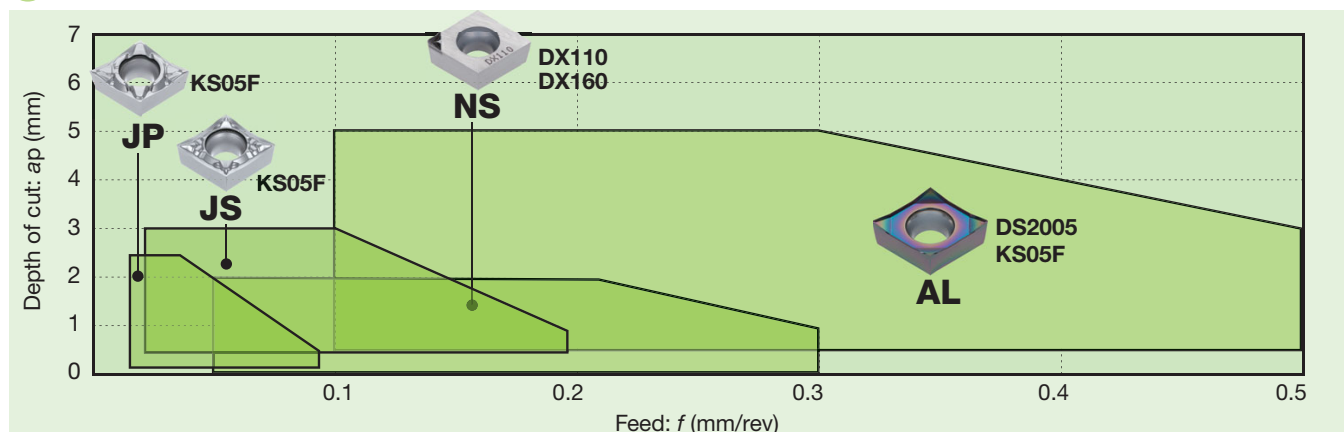
TUNGTHREAD

ISO	Workpiece materials	Grade	Cutting speed V _c (m/min)
N	Non-ferrous metal	TH10	100 - 500
		DS2015	100 - 500

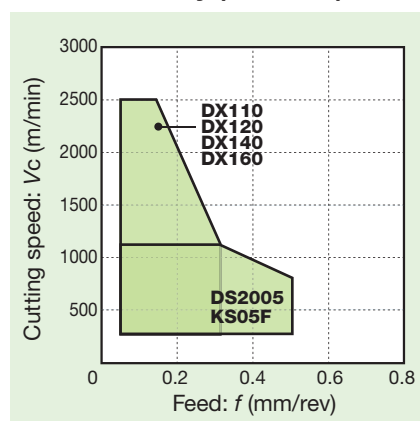
Non-Ferrous Application Series

SELECTION SYSTEM

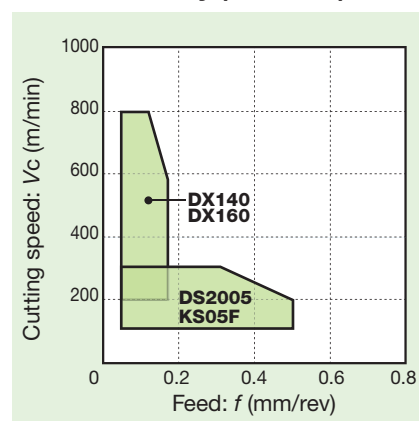
Chipbreaker System for Turning (Positive Type)



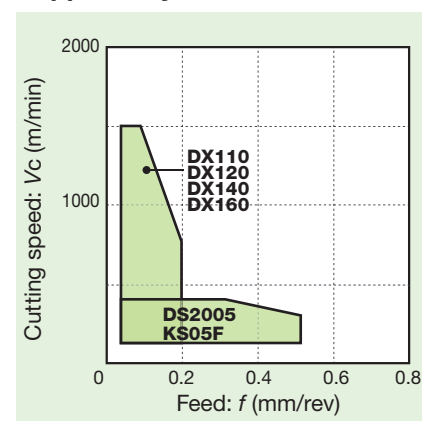
Aluminium alloy (Si < 12%)



Aluminium alloy (Si ≥ 12%)



Copper alloy



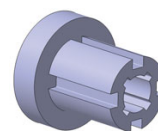
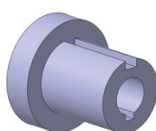
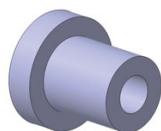
Chipbreaker	Shape	Feature
-		Excellent performance in high-speed finishing of non-ferrous metal with diamond sintered body on the cutting edge.
AL		Large rake angle and sharp cutting edge reduce cutting force. Lapped rake face prevents adhesion. Large inclination on the cutting edge (wavy cutting edge) for more stable chip control.
JP		A unique chipbreaker protrusion provides excellent chip control in the finish to super-finish cutting. Versatile geometry designed for a broad application range. Eliminates burr generation and controls vibration during large depth of cut.

Chipbreaker	Shape	Feature
NS		A unique three-dimensional chipbreaker. Covers a wide range of condition from roughing to finishing.
JS		A steep cutting edge inclination angle for better chip control and reduced cutting force. A unique protrusion that extends towards the radius effectively controls chip flow from small to large depth of cut.

SELECTION SYSTEM

POSITIVE TYPE

N



Continuous

Light interrupted

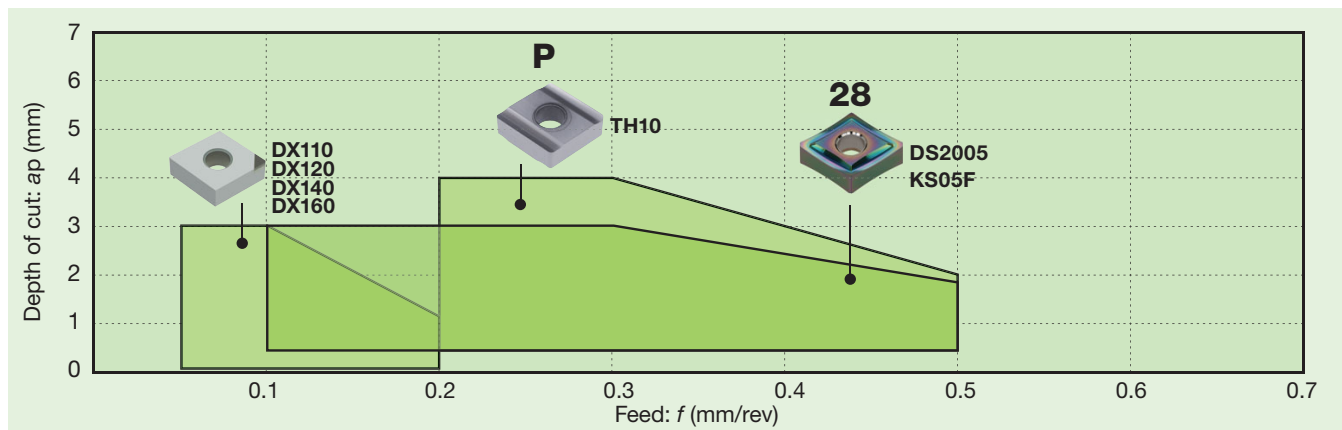
Heavy interrupted

Precision finishing [$a_p \approx 0.5 \text{ mm}$]	Carbide Basic AL KS05F Chip control → JP KS05F	Carbide Basic AL KS05F	
	DLC Basic AL DS2005	DLC Basic AL DS2005	
	PCD Basic NS DX160 Surface quality → NS DX110	PCD Basic DX160 With chipbreaker Surface quality → DX110 Fracture → DX160	
Finishing [$a_p \approx 0.5 \sim 2 \text{ mm}$]	Carbide Basic AL KS05F Chip control → JP KS05F Chip control → JS KS05F	Carbide Basic AL KS05F	Carbide Basic AL KS05F
	DLC Basic AL DS2005	DLC Basic AL DS2005	DLC Basic AL DS2005
	PCD Basic NS DX160 Surface quality → NS DX110	PCD Basic DX160	
Medium cutting [$a_p \approx 1 \sim 5 \text{ mm}$]	Carbide Basic AL KS05F	Carbide Basic AL KS05F	Carbide Basic AL KS05F
	DLC Basic AL DS2005	DLC Basic AL DS2005	DLC Basic AL DS2005
	PCD Basic DX160 With chipbreaker	PCD Basic DX160	

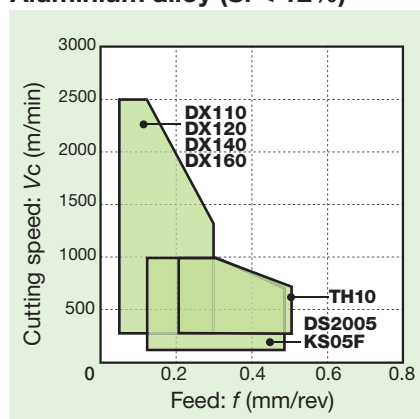
Non-Ferrous Application Series

SELECTION SYSTEM

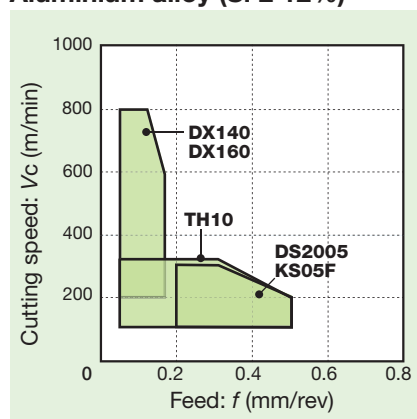
Chipbreaker System for Turning (Negative type)



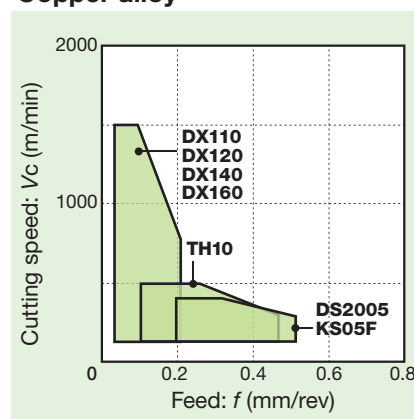
Aluminium alloy (Si < 12%)

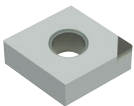
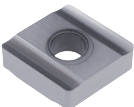


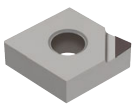
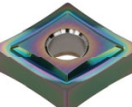
Aluminium alloy (Si ≥ 12%)



Copper alloy



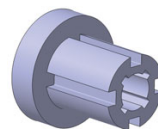
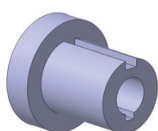
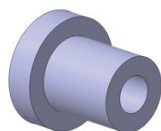
Chipbreaker	Shape	Feature
-		Excellent performance in high-speed finishing of non-ferrous metal, such as aluminium and copper alloy, with diamond sintered body on the cutting edge.
P		Excellent sharpness for non-ferrous metal, such as aluminium and copper alloy.

Chipbreaker	Shape	Feature
With chip-breaker		Wide chipbreaker for excellent chip control.
28		Low cutting geometry with large inclination for finishing to medium cutting range.

SELECTION SYSTEM

NEGATIVE TYPE

N



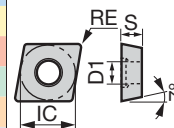
Continuous

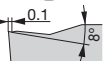
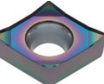
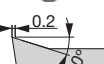
Light interrupted

Heavy interrupted

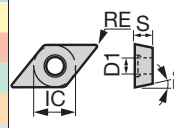
Precision finishing [$a_p \approx 0.5 \text{ mm}$]	Carbide  28 KS05F	Carbide  28 KS05F	
	DLC  28 DS2005	DLC  28 DS2005	
	PCD  With chipbreaker DX160 Surface quality → With chipbreaker DX110	PCD  DX160 Surface quality → With chipbreaker DX110	
Finishing [$a_p \approx 0.5 \sim 2 \text{ mm}$]	Carbide  28 KS05F	Carbide  28 KS05F	Carbide  28 KS05F Fracture → P TH10
	DLC  28 DS2005	DLC  28 DS2005	DLC  28 DS2005
	PCD  With chipbreaker DX160 Surface quality → With chipbreaker DX110	PCD  DX160	
Medium cutting [$a_p \approx 1 \sim 5 \text{ mm}$]	Carbide  28 KS05F	Carbide  28 KS05F	Carbide  28 KS05F Fracture → P TH10
	DLC  28 DS2005	DLC  28 DS2005	DLC  28 DS2005
	PCD  DX160	PCD  DX160	

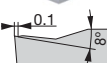
**Rhombic, 80°
with hole
Positive 7°**

[illegible]

Application	Chipbreaker	Designation	Material		Coated	Uncoated											Dimension (mm)			
			DS2005		KS05F												RE	IC	S	D1
Precision finishing (sharp edge)	JP	CCGT09T300MF-JP			●												<0.05	9.525	3.97	4.4
		CCGT09T301MF-JP			●												<0.1	9.525	3.97	4.4
		CCGT09T302MF-JP			●												<0.2	9.525	3.97	4.4
																				
Finishing (sharp edge)	JS	CCGT09T300MF-JS			●												<0.05	9.525	3.97	4.4
		CCGT09T301MF-JS			●												<0.1	9.525	3.97	4.4
		CCGT09T302MF-JS			●												<0.2	9.525	3.97	4.4
		CCGT09T304MF-JS			●												<0.4	9.525	3.97	4.4
Finishing to medium cutting	AL	CCGT060202-AL			●												0.2	6.35	2.38	2.8
		CCGT060204-AL			●												0.4	6.35	2.38	2.8
		CCGT09T302-AL	●		●												0.2	9.525	3.97	4.4
		CCGT09T304-AL	●		●												0.4	9.525	3.97	4.4
		CCGT09T308-AL	●		●												0.8	9.525	3.97	4.4
		CCGT120402-AL			●												0.2	12.7	4.76	5.5
		CCGT120404-AL			●												0.4	12.7	4.76	5.5
	CCGT120408-AL			●												0.8	12.7	4.76	5.5	

**Rhombic, 55°
with hole
Positive 7°**

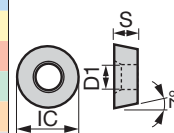
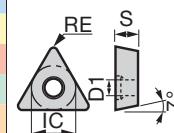
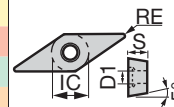
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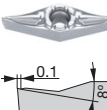
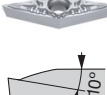
Application	Chipbreaker	Designation	Material												Dimension (mm)					
			Coated	Uncoated																
Precision finishing (sharp edge)		JP	DCGT11T300MF-JP	DS2005	KS05F											RE	IC	S	D1	
			DCGT11T301MF-JP														<0.05	9.525	3.97	4.4
			DCGT11T302MF-JP														<0.1	9.525	3.97	4.4
																	<0.2	9.525	3.97	4.4
Finishing (sharp edge)		JS	DCGT11T300MF-JS													<0.05	9.525	3.97	4.4	
			DCGT11T301MF-JS													<0.1	9.525	3.97	4.4	
			DCGT11T302MF-JS													<0.2	9.525	3.97	4.4	
			DCGT11T304MF-JS													<0.4	9.525	3.97	4.4	
Finishing to medium cutting		AL	DCGT070202-AL													0.2	6.35	2.38	2.8	
			DCGT070204-AL													0.4	6.35	2.38	2.8	
			DCGT11T302-AL	●												0.2	9.525	3.97	4.4	
			DCGT11T304-AL	●												0.4	9.525	3.97	4.4	
			DCGT11T308-AL	●												0.8	9.525	3.97	4.4	

● : New product
● : Line up



- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

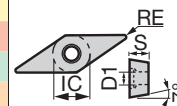
[illegible][illegible][illegible][illegible][illegible]

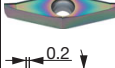
Application	Material		Uncoated																	Dimension (mm)				
	Chipbreaker	Designation		KS05F																		RE	IC	S
Precision finishing (sharp edge)	JP	VBGT110300MF-JP	●																		<0.05	6.35	3.18	2.8
		VBGT110301MF-JP	●																		<0.1	6.35	3.18	2.8
		VBGT110302MF-JP	●																		<0.2	6.35	3.18	2.8
Finishing (sharp edge)	JS	VBGT110300MF-JS	●																		<0.05	6.35	3.18	2.8
		VBGT110301MF-JS	●																		<0.1	6.35	3.18	2.8
		VBGT110302MF-JS	●																		<0.2	6.35	3.18	2.8
		VBGT110304MF-JS	●																		<0.4	6.35	3.18	2.8

● : Line up

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

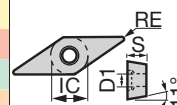
**Rhombic, 35°
with hole
Positive 7°**

[illegible]

Application	Chipbreaker	Designation	material		Coated		Uncoated												Dimension (mm)			
			DS2005		KS05F												RE	IC	S	D1		
Finishing to medium cutting	AL	VCGT160404-AL	●		●												0.4	9.525	4.76	4.4		
		VCGT160408-AL	●		●												0.8	9.525	4.76	4.4		
		VCGT160412-AL	●		●												1.2	9.525	4.76	4.4		
		VCGT220520-AL			●												2	12.7	5.56	5.5		
		VCGT220530-AL			●												3	12.7	5.56	5.5		

● : New product
● : Line up

35° Rhombic
with hole
Positive 11°

[illegible][illegible]

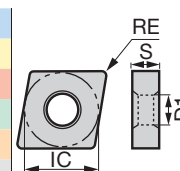
Corner radius (RE) with a sign of inequality (<) means minus tolerance.

● : Line up

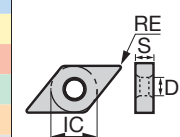
Tolerance



- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible][illegible]

● : New product
● : Line up

[illegible][illegible]

● : New product
● : Line up

Insert NEGATIVE TYPE

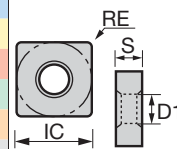
● : Continuous cutting
● : Light interrupted cutting
✱ : Heavy interrupted cutting

SN



Square, 90°
with hole

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



Application	Chipbreaker	Designation	Uncoated		Dimension (mm)			
			TH10		RE	IC	S	D1
Medium cutting		P SNGG090304R-P	●		0.4	9.525	3.18	3.81
		SNGG090304L-P	●		0.4	9.525	3.18	3.81
		SNGG090308R-P	●		0.8	9.525	3.18	3.81
		SNGG090308L-P	●		0.8	9.525	3.18	3.81
		SNGG120404R-P	●		0.4	12.7	4.76	5.16
		SNGG120404L-P	●		0.4	12.7	4.76	5.16
		SNGG120408R-P	●		0.8	12.7	4.76	5.16
		SNGG120408L-P	●		0.8	12.7	4.76	5.16

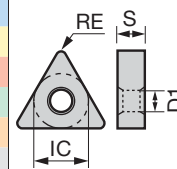
● : Line up

TN



Triangular, 60°
with hole

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



Application	Chipbreaker	Designation	Uncoated		Dimension (mm)			
			KS05F TH10		RE	IC	S	D1
Finishing to medium cutting		28 TNMG160404-28	●		0.4	9.525	4.76	3.81
		TNMG160408-28	●		0.8	9.525	4.76	3.81
Medium cutting		P TNGG160402R-P	●		0.2	9.525	4.76	3.81
		TNGG160402L-P	●		0.2	9.525	4.76	3.81
		TNGG160404R-P	●		0.4	9.525	4.76	3.81
		TNGG160404L-P	●		0.4	9.525	4.76	3.81
		TNGG160408R-P	●		0.8	9.525	4.76	3.81
		TNGG160408L-P	●		0.8	9.525	4.76	3.81

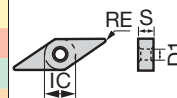
● : Line up

VN



Rhombic, 35°
with hole

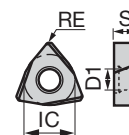
P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material



Application	Chipbreaker	Designation	Coated	Uncoated	Dimension (mm)			
			DS2005	KS05F	RE	IC	S	D1
Finishing to medium cutting		28 VNMG160404-28	●	●	0.4	9.525	4.76	3.81
		VNMG160408-28	●	●	0.8	9.525	4.76	3.81

● : New product
● : Line up

**Trigon, 80°
with hole**

[illegible][illegible]

● : Line up

Related Items



**Rhombic, 55°
with hole**

[illegible][illegible]

● : Line up

Related Items



TUNGTHREAD

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

A technical drawing of a V-thread profile. It shows a cross-section of a thread with a 60-degree angle between the two flanks. The angle is labeled "60°" with arrows pointing to the flanks. The thread is shown as a series of peaks and valleys. A dashed horizontal line is drawn below the thread profile.

- : New product
- : Line up

TUNGTHREAD

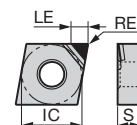
- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

A diagram showing a single-tooth gear profile. The tooth is shaded gray. The addendum angle is labeled as 55° between the tangent to the addendum circle and the radial line. A dashed horizontal line represents the pitch circle.

A technical drawing of a triangular part. The part is shaded blue and has a central circular hole. Four dimensions are indicated: PDX (horizontal distance from the left edge to the center of the hole), RE (radius of the central hole), PDY (vertical distance from the top edge to the center of the hole), and IC (horizontal distance from the center of the hole to the right edge).

● : New product
● : Line up

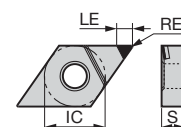


CN**80° Rhombic
with hole**

IC : 12.7 mm
 D1 : 5.16 mm
 S : 4.76 mm

		80°Rhombic with hole		N Non-ferrous		●c	●c	●c	●c																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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● : Line up

DN**55° Rhombic
with hole**

IC : 12.7 mm
 D1 : 5.16 mm
 S : 4.76 mm



55° Rhombic

with hole

N

Non-ferrous

●c

●c

●c

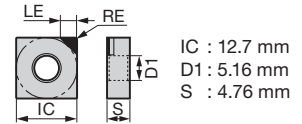
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX120	DX140	DX160																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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● : Line up

SN



Square with hole



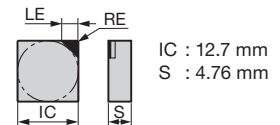
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	N Non-ferrous ●●															
		RE	LE			DX140 ●●															
Finishing	SNGA120404-DIA	0.4	3.6	1		●															
	SNGA120408-DIA	0.8	3.6	1		●															

● : Line up

SN



Square without hole



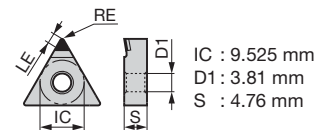
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	N Non-ferrous ●●															
		RE	LE			DX140 ●●															
Finishing	SNGN120408-DIA	0.8	3.6	1		●															

● : Line up

TN



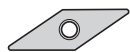
Triangular with hole



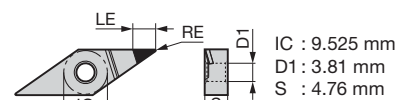
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	N Non-ferrous ●● ●● ●● ●●															
		RE	LE			DX110 DX120 DX140 DX160															
Finishing	1QP-TNMM160402	0.2	2.7	1	○	●															
	1QP-TNMM160402F		2.6	1	○																
	TNMM160402-DIA		3.3	1	○		●														
	1QP-TNMM160404	0.4	2.6	1	○	●															
	1QP-TNMM160404F		2.4	1	○																
	TNMM160404-DIA		3.2	1	○		●														
	TNGA160404-DIA		3.2	1				●	●												
	1QP-TNMM160408F	0.8	2.1	1	○																
	TNGA160408-DIA		2.9	1				●	●												

● : Line up

VN



**35° Rhombic
with hole**



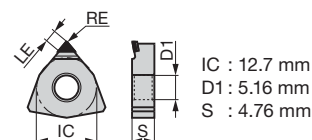
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX120	DX160														
Finishing	1QP-VNMM160402F	0.2	2.5	1	○	●	●														
	VNMM160402-DIA		4.8	1	○	●	●														
	1QP-VNMM160404F	0.4	2.3	1	○	●	●														
	VNMM160404-DIA		4.4	1	○	●	●														
	1QP-VNMM160408F	0.8	2.1	1	○	●	●														
	VNMM160408-DIA		3.6	1	○	●	●														
	1QP-VNMM160412F	1.2	2.1	1	○	●	●														

● : Line up

WN



**80° Trigon
with hole**



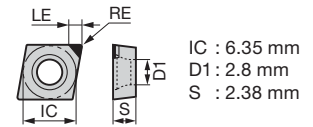
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX160															
Finishing	1QP-WNMM080402F	0.2	2.6	1	○	●															
	1QP-WNMM080404F	0.4	2.6	1	○	●															

● : Line up

CC



**80°Rhombic
Positive 7°
with hole**



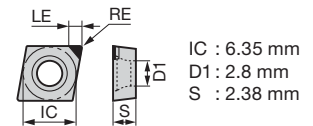
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-CCGW04T102F	0.2	1.7	1	DX200	●	●														
	CCGW04T104F	0.4	1.6	1		●															

● : Line up

CC



**80°Rhombic
Positive 7°
with hole**

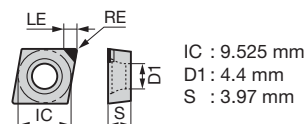


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110	DX120	DX140	DX160	DX200											
Finishing	CCGW060200-DIA	0.05	2.4	1				●													
	1QP-CCGT060201-NS	0.1	3.1	1	○	●															
	1QP-CCMT060202F	0.2	2	1	○				●												
	CCMT060202-DIA		2.4	1	○		●														
	1QP-CCGT060202-NS		3.1	1	○	●			●												
	1QP-CCGW060202F		3.5	1						●											
	CCGW060202-DIA	0.4	2.4	1				●													
	1QP-CCGT060204-NS		3.1	1	○	●			●												
	1QP-CCMT060204		2.4	1	○	●															
	1QP-CCMT060204F		2.1	1	○				●												
	CCMT060204-DIA		2.4	1	○		●														
	1QP-CCGW060204F		3	1						●											
	CCGW060204-DIA		2.4	1				●													

● : Line up

CC

**80° Rhombic
Positive 7°
with hole**

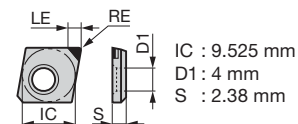


		80°Rhombic Positive 7° with hole		N Non-ferrous		●c		●c		●c		●c		●c																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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● : Line up

CP

**80° Rhombic
Positive 11°
with hole**



		80° Rhombic Positive 11° with hole		N Non-ferrous																							
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140																					
		RE	LE																								
Finishing	CPGA090202-DIA	0.2	2.4	1																							
	CPGA090204-DIA	0.4	2.4	1																							

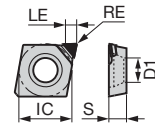
Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

CP



**80° Rhombic
Positive 11°
with hole**

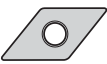


IC : 9.525 mm
D1 : 4.4 mm
S : 3.18 mm

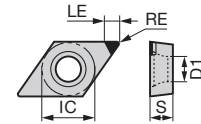
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX160															
Finishing	1QP-CPMT090302F	0.2	2	1	○	●															
	1QP-CPMT090304F	0.4	2	1	○	●															
	1QP-CPMT090308F	0.8	1.9	1	○	●															

● : Line up

DC



**55° Rhombic
Positive 7°
with hole**



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm

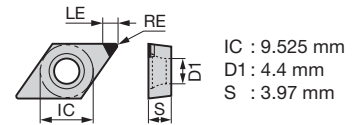
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110	DX120	DX140	DX160	DX200											
Finishing	DCGW070200-DIA	0.05	2.4	1																	
	1QP-DCGT070201-NS	0.1	3.3	1	○	●															
	1QP-DCGT070202-NS		3.2	1	○	●			●												
	1QP-DCMT070202F		2.5	1	○				●												
	DCMT070202-DIA	0.2	2.3	1	○		●														
	1QP-DCGW070202F		3	1						●											
	DCGW070202-DIA		2.3	1			●	●													
	1QP-DCGT070204-NS		3	1	○	●			●												
	1QP-DCMT070204F		2.5	1	○				●												
	DCMT070204-DIA	0.4	2.1	1	○		●														
	1QP-DCGW070204F		3	1						●											
	DCGW070204-DIA		2.1	1				●													

● : Line up

DC



**55° Rhombic
Positive 7°
with hole**



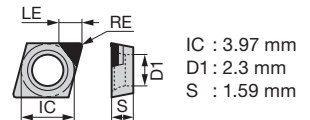
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	Material									
		RE	LE			N Non-ferrous									
Finishing	1QP-DCGT11T301-NS	0.1	3.3	1	○	●	●	●	●	●					
	1QP-DCGT11T302-NS		3.2	1	○	●				●					
	1QP-DCMT11T302F		2.6	1	○					●					
	DCMT11T302-DIA	0.2	3.2	1	○		●								
	1QP-DCGW11T302F		3	1							●				
	DCGW11T302-DIA		3.2	1				●							
	1QP-DCGT11T304-NS		3	1	○	●				●					
	1QP-DCMT11T304F		2.4	1	○					●					
	DCMT11T304-DIA	0.4	3	1	○		●								
	1QP-DCGW11T304F		3	1							●				
	DCGW11T304-DIA		3	1				●							
	1QP-DCGW11T308F		4	1							●				
	1QP-DCMT11T308F		2.4	1	○					●					
	1QP-DCGT11T308-NS	0.8	3	1	○	●				●					
	DCGW11T308-DIA		2.7	1				●							

● : Line up

EP



**75° Rhombic
Positive 11°
with hole**

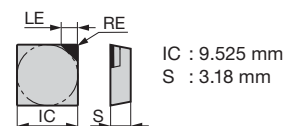


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	Material									
		RE	LE			N Non-ferrous									
Finishing	EPGW040102-DIA	0.2	2	1		●									
	EPGW040104-DIA	0.4	1.9	1		●									

● : Line up

SP

**Square
Positive 11°
without hole**

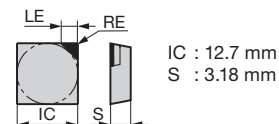


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	SPGN090308-DIA	0.8	3.6	1	DX140	●	●														

● : Line up

SP

**Square
Positive 11°
without hole**

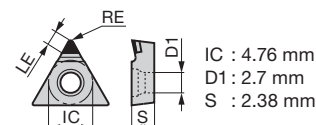


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	SPGN120302-DIA	0.2	3.6	1	DX140	●	●														
	SPGN120304-DIA	0.4	3.6	1	DX160	●															
	SPGN120308-DIA	0.8	3.6	1		●	●														

● : Line up

TC

**Triangular
Positive 7°
with hole**



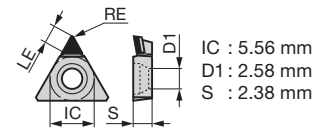
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TCMT080202-DIA	0.2	2.2	1	DX120	○	●														
	TCMT080204-DIA	0.4	2	1		○	●														

● : Line up

TC



**Triangular
Positive 7°
with hole**



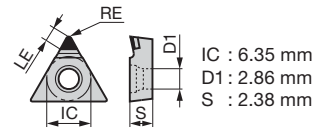
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	Material Compatibility															
		RE	LE			Non-ferrous		●●		●●											
Finishing	1QP-TCGT090202-NS	0.2	3.1	1	○	●	DX110	●	DX160	●											
	1QP-TCMT090202F	0.2	2.3	1	○	●		●													
	1QP-TCGT090204-NS	0.4	3	1	○	●		●													
	1QP-TCMT090204F	0.4	2.2	1	○	●		●													

● : Line up

TC



**Triangular
Positive 7°
with hole**



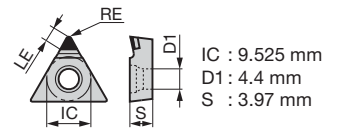
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	Material Compatibility															
		RE	LE			Non-ferrous		●●													
Finishing	1QP-TCGT110202-NS	0.2	3.1	1	○	●	DX160	●													
	1QP-TCGT110204-NS	0.4	3	1	○	●															

● : Line up

TC



**Triangular
Positive 7°
with hole**

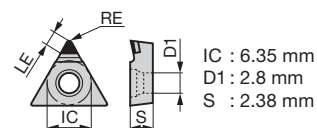


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	Material Compatibility															
		RE	LE			Non-ferrous		●●													
Finishing	1QP-TCGT16T304-NS	0.4	3	1	○	●	DX160	●													
	1QP-TCGT16T308-NS	0.8	3.1	1	○	●															

● : Line up

TC

**Triangular
Positive 7°
with hole**

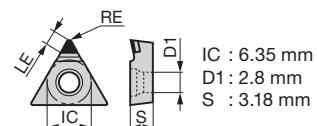


 Triangular Positive 7° with hole		N Non-ferrous		●●●●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX120	DX160																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</

● : Line up

TC

**Triangular
Positive 7°
with hole**



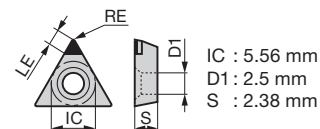
 Triangular Positive 7° with hole			N Non-ferrous		●c ●c																		
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX110	DX120																
		RE	LE																				
Finishing	TCMT110302-DIA	0.2	2.4	1	○	●																	
	1QP-TCMT110304	0.4	2.2	1	○	●																	
	TCMT110304-DIA		2.2	1	○	●																	

● : Line up

TP



**Triangular
Positive 11°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140										
		RE	LE													
Finishing	TPGA090202-DIA	0.2	2.4	1		●										
	TPGA090204-DIA	0.4	2.2	1		●										

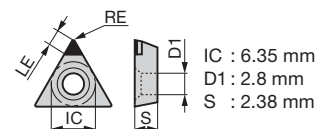
Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

TP



**Triangular
Positive 11°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140										
		RE	LE													
Finishing	TPGA110202-DIA	0.2	2.4	1		●										
	TPGA110204-DIA	0.4	2.2	1		●										

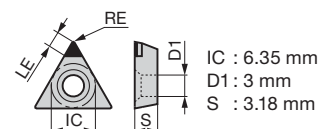
Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

TP



**Triangular
Positive 11°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140										
		RE	LE													
Finishing	TPGA110302-DIA	0.2	2.4	1		●										
	TPGA110304-DIA	0.4	2.2	1		●										
	TPGA110308-DIA	0.8	2.9	1		●										

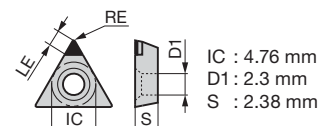
Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

TP



**Triangular
Positive 11°
with hole**



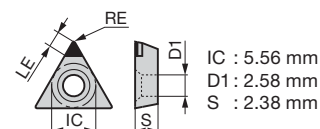
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPGT080202-NS	0.2	2.7	1	○	●															
	1QP-TPGT080204-NS	0.4	2.6	1	○	●															

● : Line up

TP



**Triangular
Positive 11°
with hole**



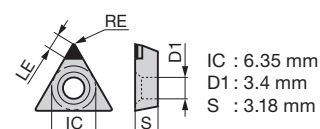
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPGT090202-NS	0.2	3.1	1	○	●															
	1QP-TPGT090204-NS	0.4	3	1	○	●															

● : Line up

TP



**Triangular
Positive 11°
with hole**

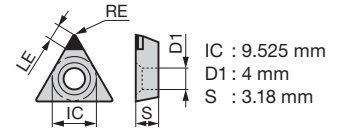


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPGT110302-NS	0.2	3.1	1	○	●															
	1QP-TPGT110304-NS	0.4	3	1	○	●															

● : Line up

TP

**Triangular
Positive 11°
with hole**



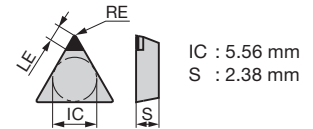
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	N Non-ferrous ●●															
		RE	LE			DX140															
Finishing	TPGA160302-DIA	0.2	3.3	1		●															
	TPGA160304-DIA	0.4	3.2	1		●															
	TPGA160308-DIA	0.8	2.9	1		●															

Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

TP

**Triangular
Positive 11°
without hole**

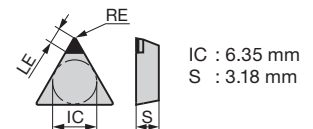


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	N Non-ferrous ●●															
		RE	LE			DX140															
Finishing	TPGN090204-DIA	0.4	2.2	1		●															

● : Line up

TP

**Triangular
Positive 11°
without hole**

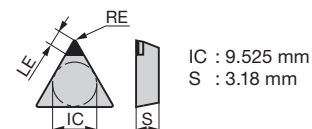


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	N Non-ferrous ●● ●●															
		RE	LE			DX120 DX140															
Finishing	TPGN110304-DIA	0.4	3.2	1		●	●														
	TPGN110308-DIA	0.8	2.9	1			●														

● : Line up

TP

**Triangular
Positive 11°
without hole**

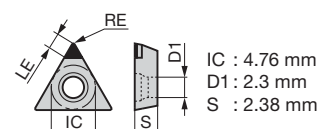


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX120	DX140														
Finishing	TPGN160302-DIA	0.2	3.3	1		●	●														
	TPGN160304-DIA	0.4	3.2	1		●	●														
	TPGN160308-DIA	0.8	2.9	1			●														

● : Line up

TP

**Triangular
Positive 11°
with hole**

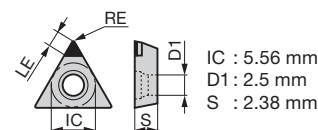


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX140															
Finishing	TPGW080202-DIA	0.2	2.4	1		●															
	TPGW080204-DIA	0.4	2.3	1		●															

● : Line up

TP

**Triangular
Positive 11°
with hole**

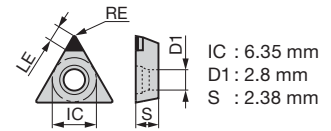


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX120	DX140														
Finishing	TPGW090202-DIA	0.2	2.4	1		●	●														
	TPGW090204-DIA	0.4	2.2	1			●														

● : Line up

TP

**Triangular
Positive 11°
with hole**

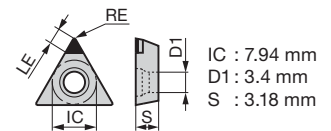


Triangular Positive 11° with hole					N Non-ferrous		●●	●●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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● : Line up

TP

**Triangular
Positive 11°
with hole**

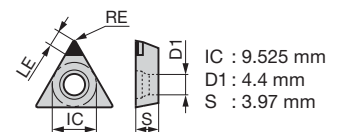


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX120	DX140														
Finishing	TPGW130302-DIA	0.2	3.3	1		●	●														
	TPGW130304-DIA	0.4	3.2	1			●														

● : Line up

TP

**Triangular
Positive 11°
with hole**



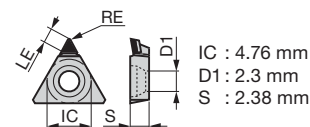
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX140															
Finishing	TPGW16T302-DIA	0.2	3.3	1		●															
	TPGW16T304-DIA	0.4	3.2	1		●															
	TPGW16T308-DIA	0.8	2.9	1		●															

● : Line up

TP



**Triangular
Positive 11°
with hole**



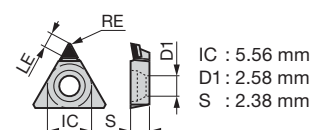
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPMT080202F	0.2	1.8	1	○	●●															
	1QP-TPMT080204F	0.4	1.7	1	○	●●															

● : Line up

TP



**Triangular
Positive 11°
with hole**



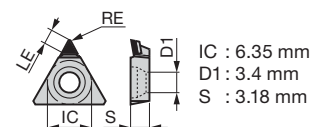
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPMT090202F	0.2	1.8	1	○	●●															
	1QP-TPMT090204F	0.4	1.7	1	○	●●															

● : Line up

TP



**Triangular
Positive 11°
with hole**



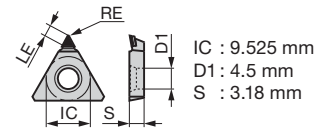
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPMT110302F	0.2	2.3	1	○	●●															
	1QP-TPMT110304F	0.4	2.2	1	○	●●															

● : Line up

TP



**Triangular
Positive 11°
with hole**



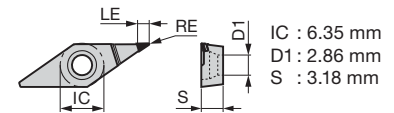
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TPMH160302F	0.2	2.4	1		●															
	1QP-TPMH160304F	0.4	2.3	1		●															

● : Line up

VB



**35° Rhombic
Positive 5°
with hole**



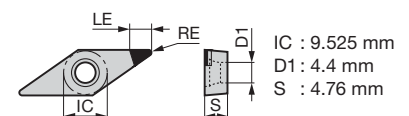
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-VBMT110302F	0.2	2.5	1	○	●															
	1QP-VBMT110304F	0.4	2.3	1	○	●															
	1QP-VBMT110308F	0.8	2.1	1	○	●															

● : Line up

VB



**35° Rhombic
Positive 5°
with hole**

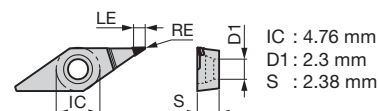


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-VBGT160401-NS	0.1	2.8	1	○	●	●														
	1QP-VBMT160402F	0.2	2.5	1	○		●														
	1QP-VBGT160402-NS		3.4	1	○	●	●														
	1QP-VBGT160404-NS	0.4	3	1	○	●	●														
	1QP-VBMT160404F		2.3	1	○		●														
	1QP-VBGT160408-NS	0.8	3	1	○	●	●														
	1QP-VBMT160408F		2.1	1	○		●														

● : Line up

VC

**35° Rhombic
Positive 7°
with hole**

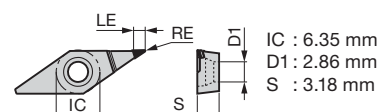


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110		DX160													
Finishing	1QP-VCMT080202-NS	0.2	3.4	1	○	●	●														
	1QP-VCMT080202F	0.2	2.5	1	○		●														
	1QP-VCMT080204F	0.4	2.3	1	○		●														
	1QP-VCMT080208F	0.8	2.1	1	○		●														

● : Line up

VC

**35° Rhombic
Positive 7°
with hole**

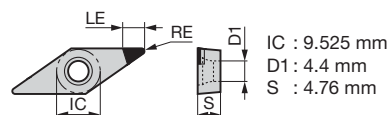


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110		DX160		DX200											
Finishing	1QP-VCMT110302-NS		3.4	1	○	●	●														
	1QP-VCMT110302F	0.2	2.5	1	○		●														
	1QP-VCMT110302F		3.4	1	○			●													
	1QP-VCMT110304-NS	0.4	3	1	○		●														
	1QP-VCMT110304F		2.3	1	○		●														

● : Line up

VC

**35° Rhombic
Positive 7°
with hole**



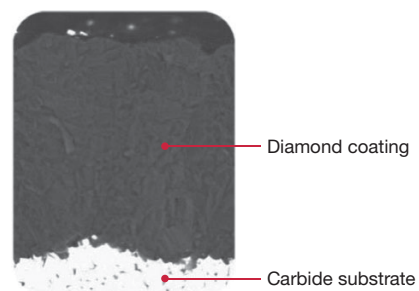
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110		DX120		DX140		DX160									
Finishing	1QP-VCMT160401-NS	0.1	2.8	1	○	●															
	1QP-VCMT160402-NS		3.4	1	○	●						●									
	1QP-VCMT160402F	0.2	2.5	1	○							●									
	VCMT160402-DIA		4.8	1	○		●														
	VCGW160402-DIA		4.8	1						●											
	1QP-VCMT160404-NS		3	1	○	●						●									
	1QP-VCMT160404F	0.4	2.3	1	○							●									
	VCMT160404-DIA		4.4	1	○		●														
	VCGW160404-DIA		4.4	1						●											
	1QP-VCMT160408-NS		3	1	○	●						●									
	1QP-VCMT160408F	0.8	2.1	1	○							●									
	1QP-VCMT160412F	1.2	2.1	1	○							●									

● : Line up

Diamond-coated grade for non-ferrous applications

MFSMA

- Diamond coating with extremely high hardness and wear resistance.
- Can be coated on all shapes and sizes of carbide tools.
Available upon request



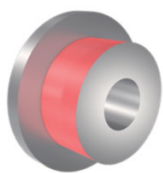
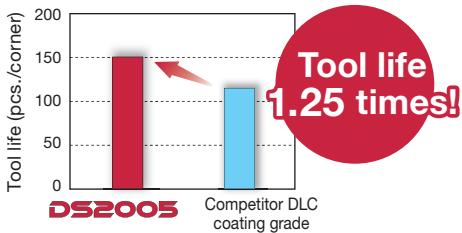
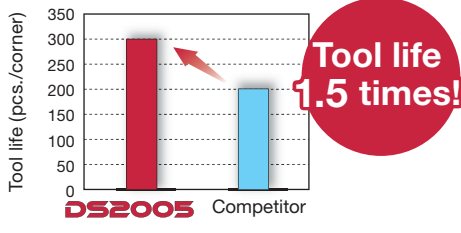
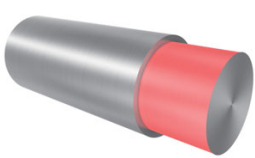
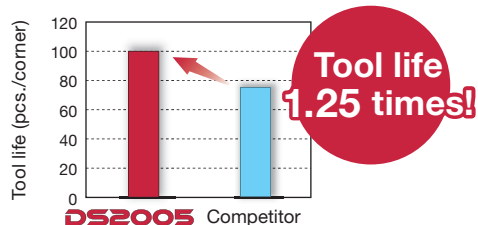
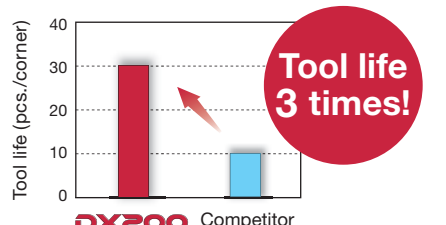
■ Grade properties

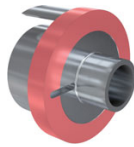
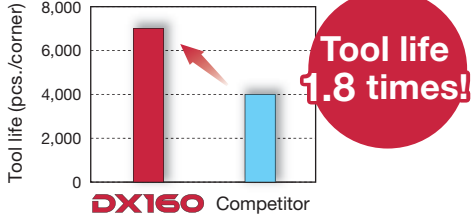
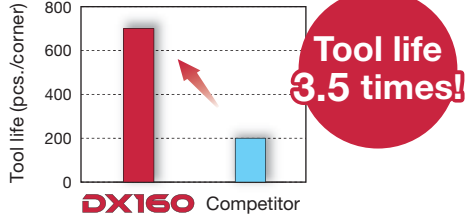
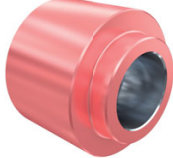
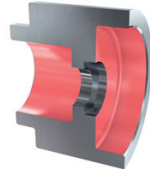
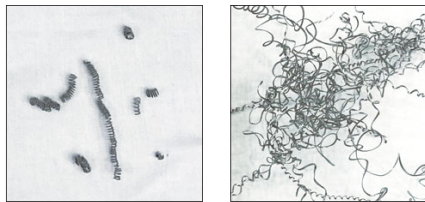
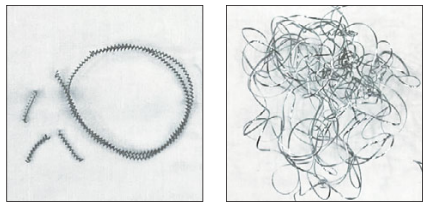
Application	Grade	Coating layer		
		Main composition	Thickness (μm)	Hardness (Hv)
N	MFSMA	Diamond	9	< 10,000

Customized inserts are available tailored to your specific application needs.

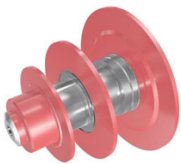
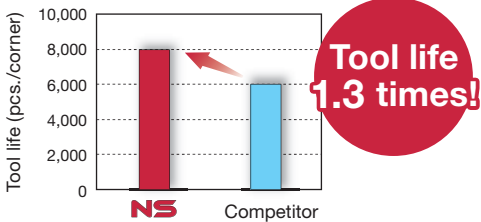
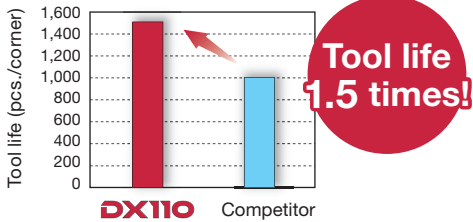
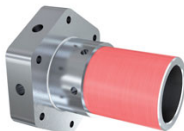
Non-Ferrous Application Series

PRACTICAL EXAMPLES

Workpiece type		Vacuum pump part	Machine part
Insert		CNGG120404-28	CNGG120408-28
Grade		New DS2005	New DS2005
Workpiece material		A6061 / AlMg1SiCu	C1011 / Copper
		 N	 N
Cutting conditions	Cutting speed : V_c (m/min)	330	270
	Feed : f (mm/rev)	0.35	0.15
	Depth of cut : a_p (mm)	2	1
	Coolant	Wet	Wet
Results		 DS2005 suppresses built-up edge, delivers a high quality machined surface, and achieves 1.25 times longer tool life against competitor DLC coating grade.	 DS2005 achieves 1.5 times longer tool life against competitors while maintaining high machined surface quality.
Workpiece type		Shaft	Tungsten carbide rod
Insert		16IRA60	1QP-DCGW11T304F
Grade		New DS2015	DX200
Workpiece material		A5052 / AlMg2.5	Tungsten carbide
		 N	 N
Cutting conditions	Cutting speed : V_c (m/min)	150	6
	Feed : f (mm/rev)	-	0.04
	Depth of cut : a_p (mm)	-	0.1
	Pitch	1	-
	Coolant	Wet	Wet
Results		 Non-coated inserts, built-up edge cause poor surface finish. The excellent built-up edge resistance of DS2015 achieved 1.25 times longer tool life.	 Extremely hard, DX200 provided reduced wear during machining of tungsten carbide rods, allowing 3 times tool life increase over the competitor.

Workpiece type		Stator	Scroll compressor component
Insert		1QP-VCMT110304F	1QP-DNMM150408F
Grade		DX160	DX160
Workpiece material		AlSi11Cu3(Fe)	Aluminium alloy
		 N	 N
Cutting conditions	Cutting speed : V_c (m/min)	200	560
	Feed : f (mm/rev)	0.06	0.03
	Depth of cut : a_p (mm)	0.25	0.15
	Coolant	Wet	Wet
Results		 Tool life 1.8 times! A coarse diamond grain grade, DX160 provided better wear resistance over competitors' submicron PCD grades, achieving 1.8x tool life increase.	 Tool life 3.5 times! Boasting a sharp and strong cutting edge that excelled competitors' submicron PCD grades, DX160 grade inserts provided 3.5x tool life increase during interrupted cuts without losing edge integrity.
Workpiece type		Valve parts for the Brake system	Valve parts for the Brake system
Insert		CCGT09T302MF-JS	VBGT110302MF-JP
Grade		KS05F	KS05F
Workpiece material		A6061 / AlMg1SiCu	A6061 / AlMg1SiCu
		 N	 N
Cutting conditions	Cutting speed : V_c (m/min)	196	296
	Feed : f (mm/rev)	0.1	0.06
	Depth of cut : a_p (mm)	0.5	0.25
	Coolant	Wet	Wet
Results		 JS Competitor JS chipbreaker eliminated the formation of long chips and part surface damage caused by poor chip control.	 JP Competitor JP chipbreaker improved productivity by eliminating machine downtime that was caused by the bird nesting of chips.

Non-Ferrous Application Series

Workpiece type		Transmission parts	Con-rods
Insert		1QP-VCGT160404-NS	1QP-CCMT09T304
Grade		DX110	DX110
Workpiece material		A2011 / AlCu6BiPb	Copper-based sintered alloy
		 N	 N
Cutting conditions	Cutting speed : V_c (m/min)	1,400	300
	Feed : f (mm/rev)	0.08	0.05
	Depth of cut : ap (mm)	0.1	0.1
	Coolant	Wet	Wet
Results		 DX110 with NS chipbreaker provided 1.3x tool life over the competitor with superior chip control.	 With its optimized rake angle and sharp cutting edge, the DX110 not only eliminated burr formation on the machined surface but also extended tool life by 1.5x compared to the competitor's
Workpiece type		Pipe	Semi-conductor component
Insert		1QP-DCGT11T304-NS	1QP-VBGT160402-NS
Grade		DX110	DX110
Workpiece material		A5052S / AlMg2.5	A5056 / AlMg5
		 N	 N
Cutting conditions	Cutting speed : V_c (m/min)	400	300
	Feed : f (mm/rev)	0.1	0.07
	Depth of cut : ap (mm)	1	0.2
	Coolant	Wet	Wet
Results		 NS Competitor DX110 with NS chipbreaker eliminated chip entanglement, which was the case with the competitor's PCD insert with no chipbreaker.	 NS Competitor While competitors PCD inserts suffered from chip re-cutting due to the absence of a built-in chipbreaker, DX110 with NS chipbreaker delivered excellent surface finishes, eliminating chip re-cutting.

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