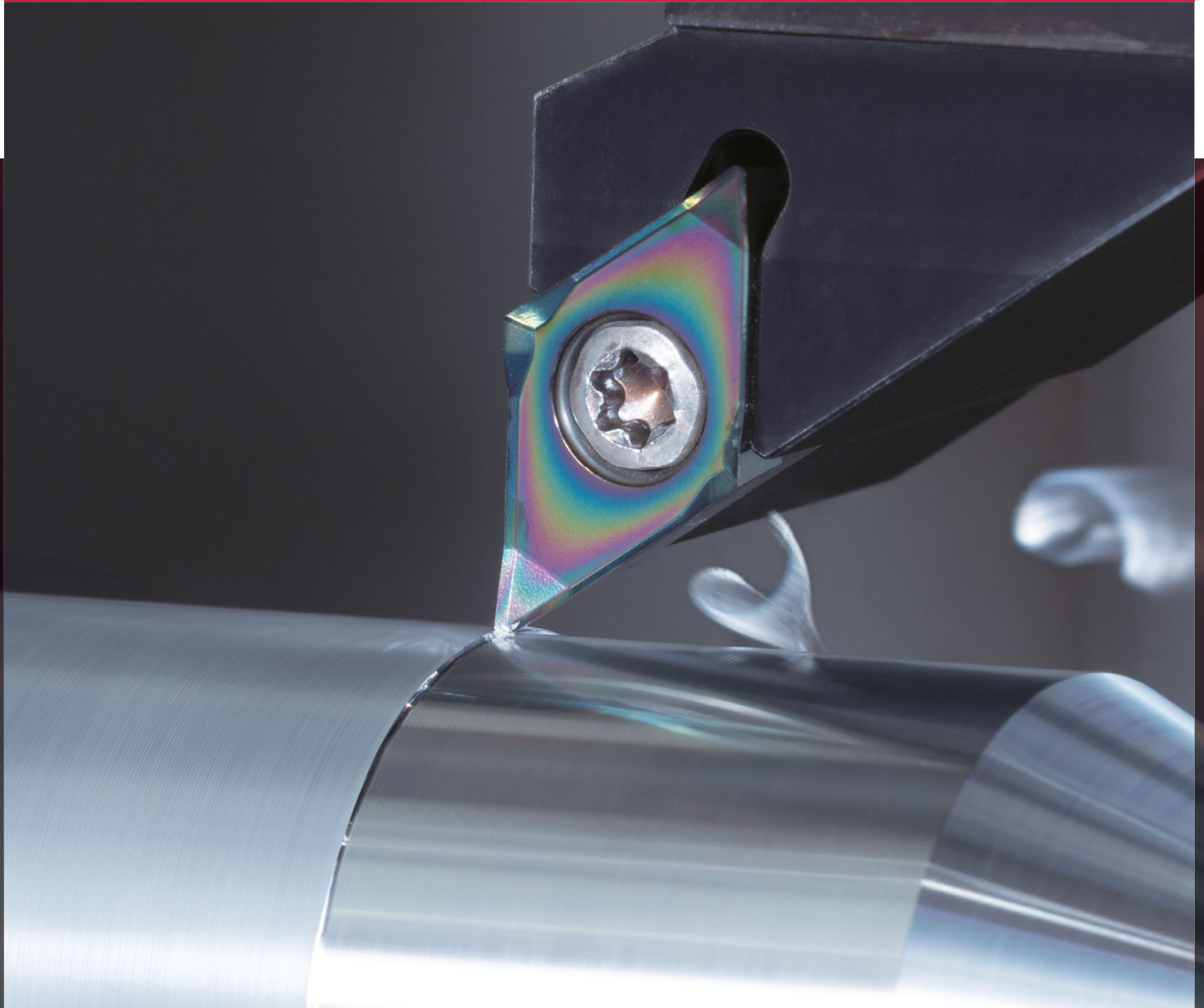


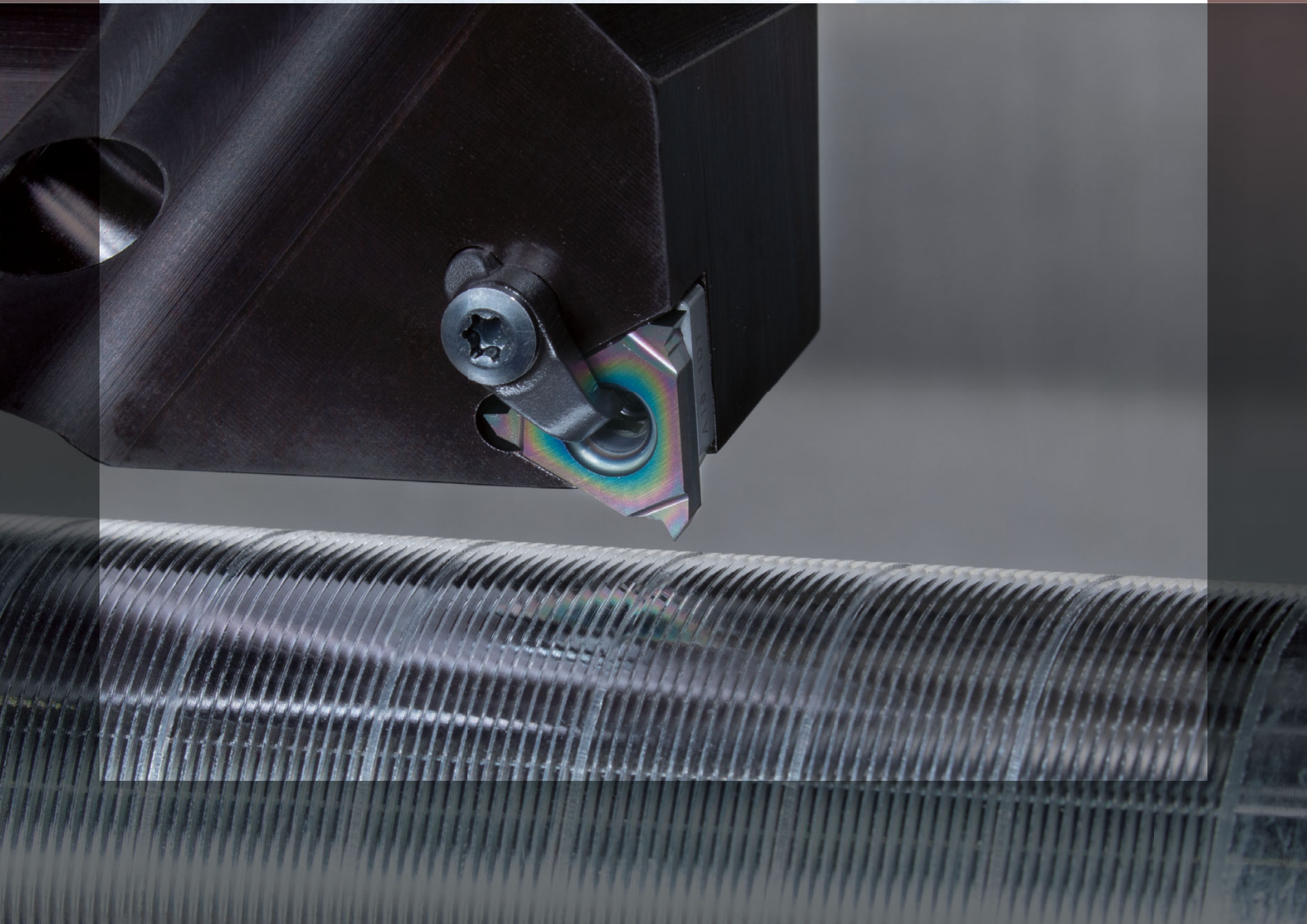
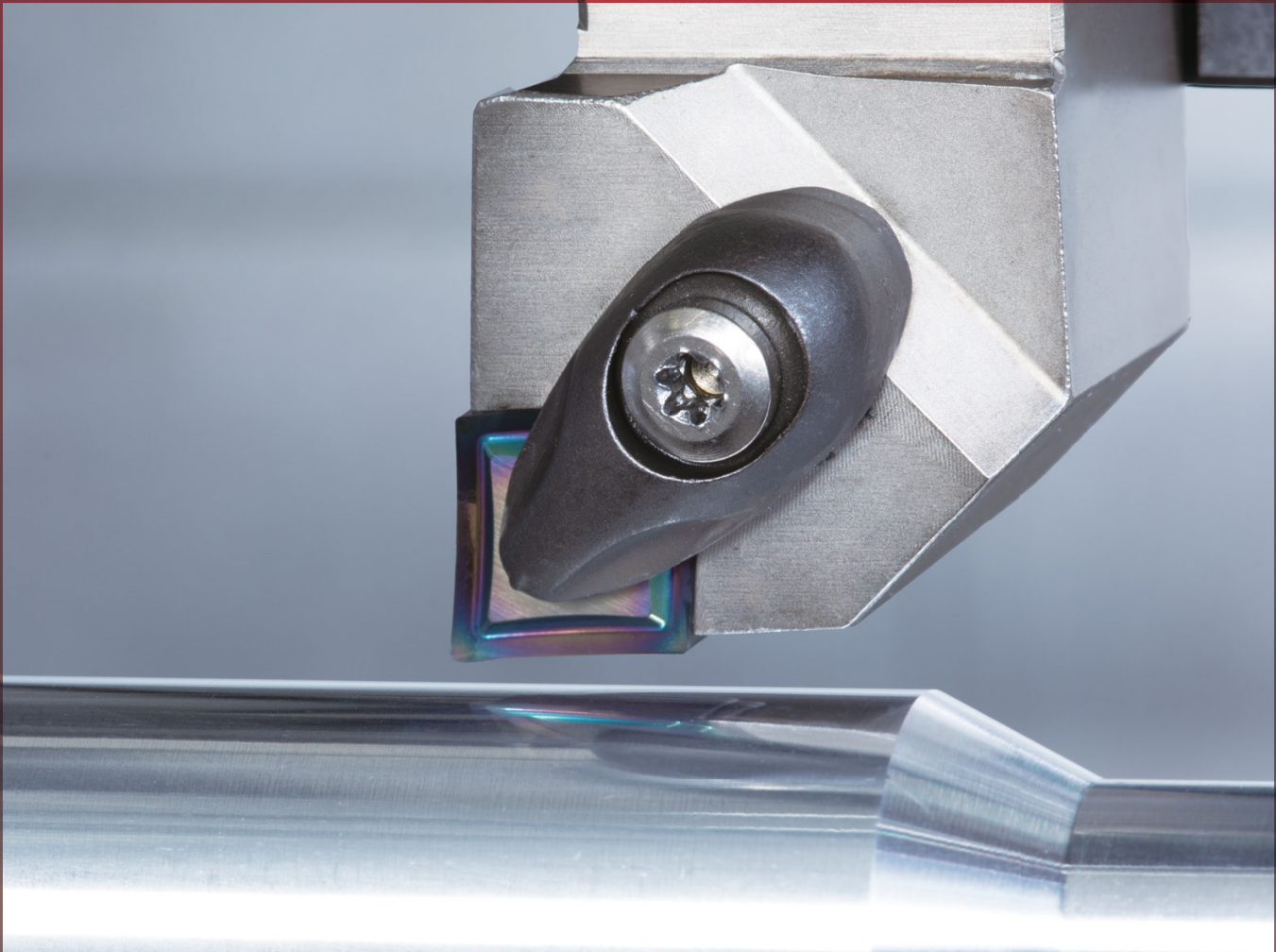


DS2000 SERIES

Tungaloy Report No. 572-G

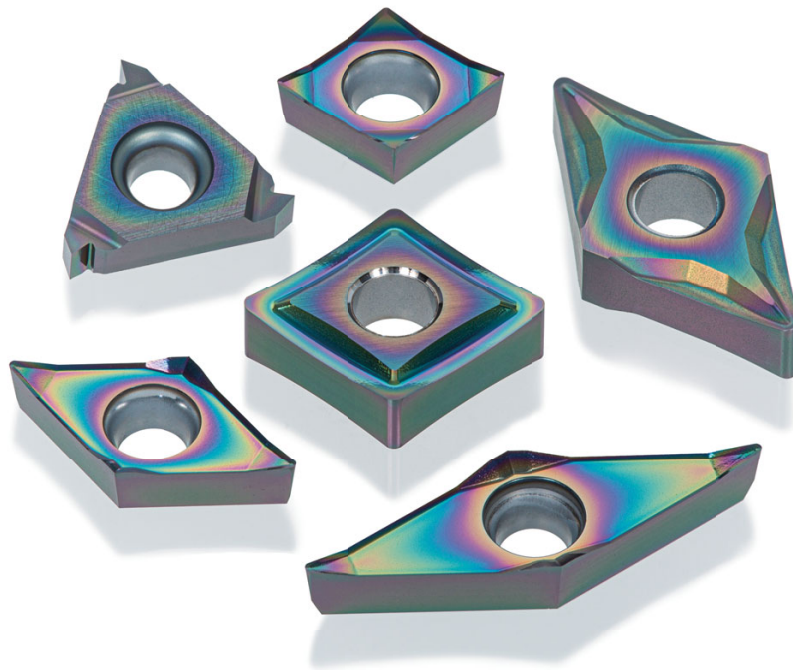
New DLC coating grade for Turning & Threading







DS2000 SERIES



Tungaloy original DLC coated grade for non-ferrous alloys,
Now available for Turning and Threading applications.

DS2000 SERIES

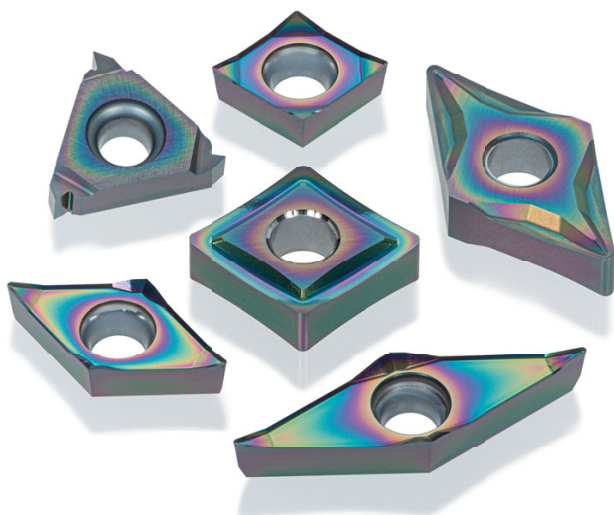
Excellent built-up edge resistance and high surface quality

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

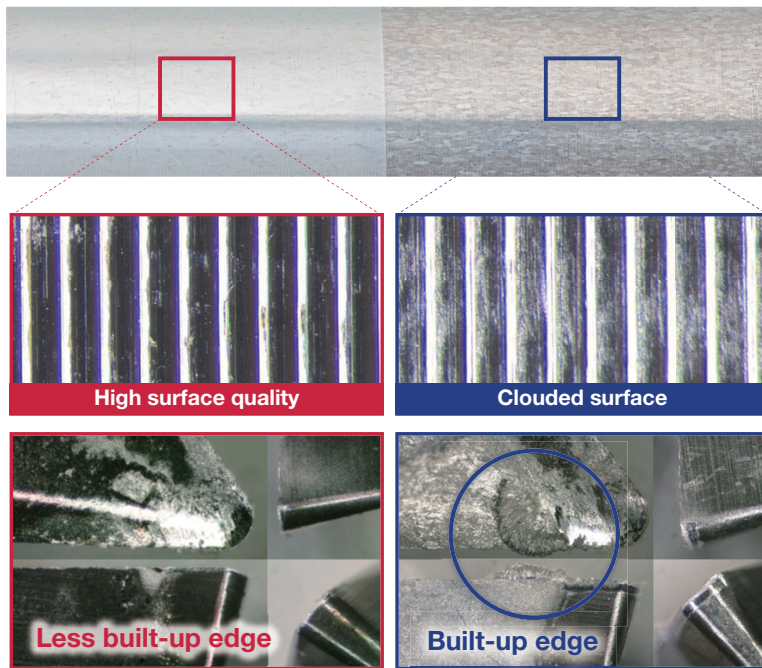
DS2015

- 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

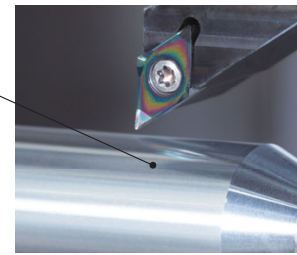


DS2000 SERIES

Non-coated carbide grade

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

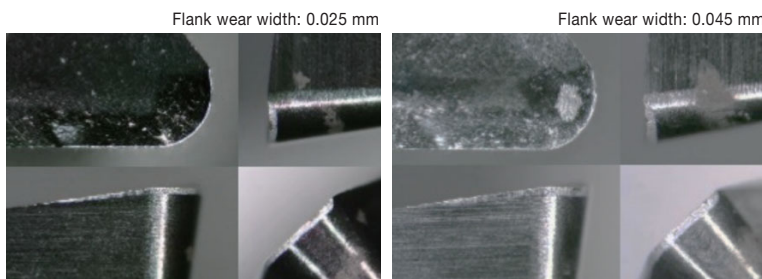
External turning



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

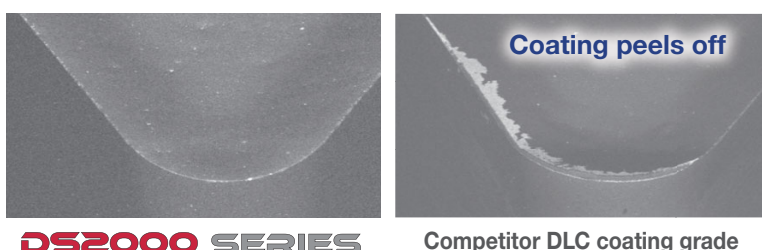
Non-coated carbide grade

- 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

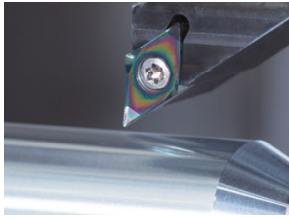
Insert : DCGT11T302
Cutting speed : $V_c = 400$ m/min
Feed : $f = 0.2$ mm/rev
Depth of cut : $a_p = 1$ mm
Coolant : Wet
Cutting length : 40 m (0.1 min)

- Outstanding coating adhesion technology provides stable and reliable machining.

DS2000 SERIES

CUTTING PERFORMANCE

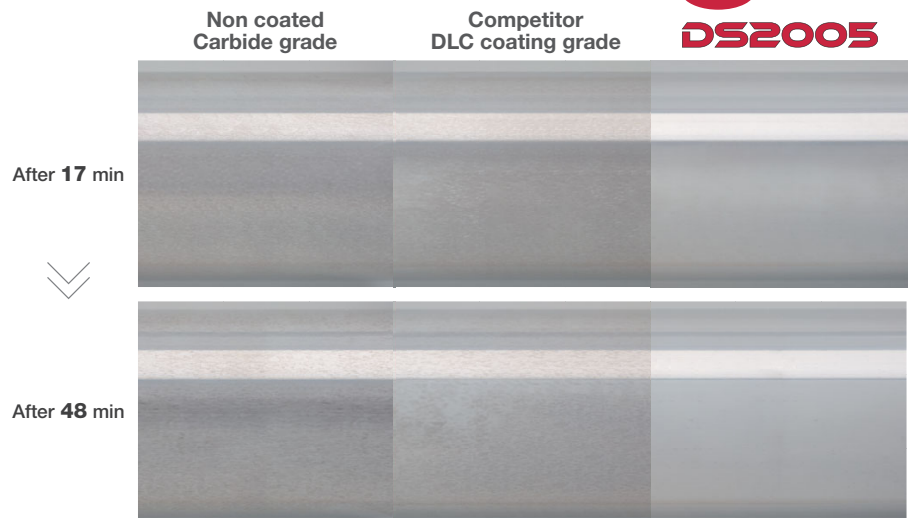
External turning



N A6061 / AlMg1SiCu

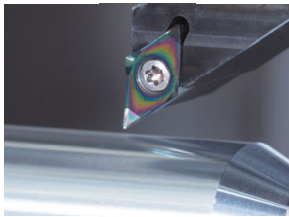
Insert : DCGT11T302
Cutting speed : $V_c = 500$ m/min
Feed : $f = 0.1$ mm/rev
Depth of cut : $a_p = 0.5$ mm
Coolant : Dry

■ Surface quality



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

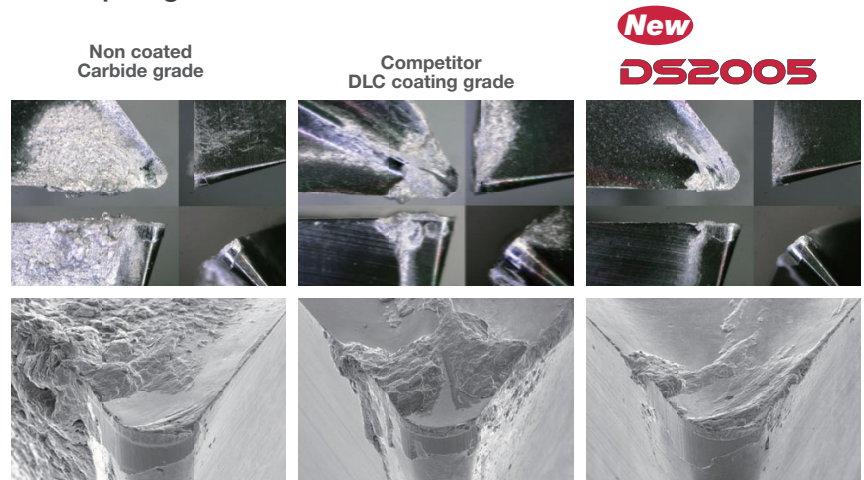
External turning



N ADC12 / AlSi9Cu3

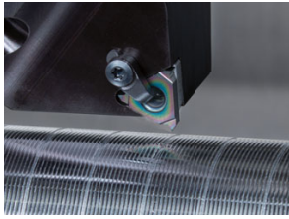
Insert : DCGT11T302
Cutting speed : $V_c = 300$ m/min
Feed : $f = 0.1$ mm/rev
Depth of cut : $a_p = 0.5$ mm
Coolant : Dry
Machining time : 69 min

■ Built-up edge resistance



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

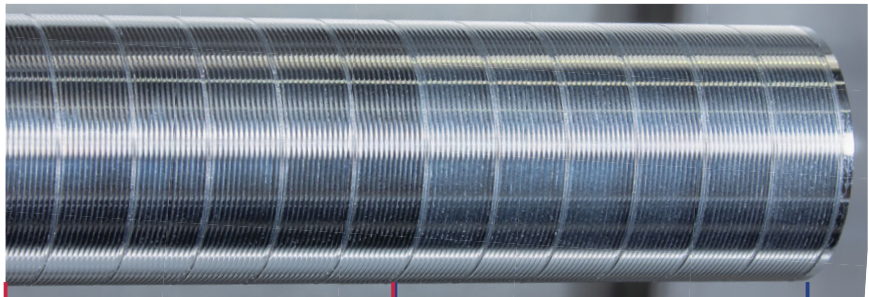
External threading



N A6061 / AlMg1SiCu

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

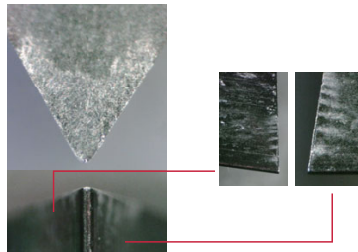
■ Surface quality



New DS2015

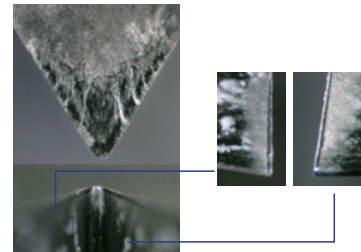
Non-coated carbide grade

■ Wear and built-up edge resistance



Frank wear width : 0.015 mm

New DS2015



Frank wear width : 0.03 mm

Non-coated carbide grade

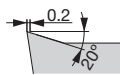
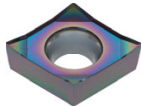
- **DS2015 delivers excellent surface quality in threading operation!**
- **Significantly suppresses built-up edge on the rake and flank faces, reducing wear progress.**

DS2000 SERIES

Chipbreakers for non-ferrous alloy machining AL/28

No more chip nesting in non-ferrous alloy machining

For positive insert

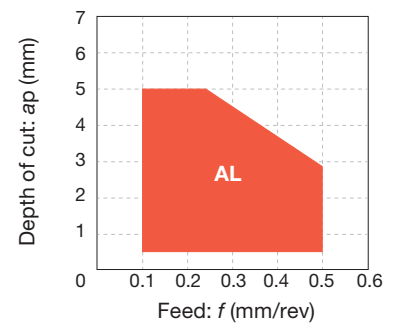


First choice geometry for non-ferrous applications

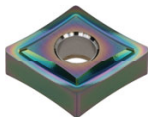
AL

- 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

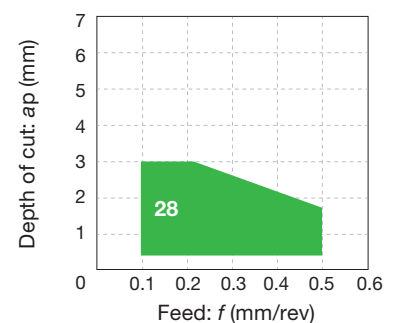


Press-in chipbreaker ideal for medium to finish operations

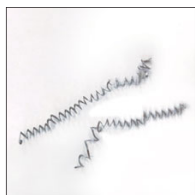
28

- 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

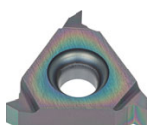


N Insert : CNGG120404-28
 Workpiece material: A6061
 Cutting speed : $V_c = 500$ m/min
 Feed : $f = 0.3$ mm/rev
 Depth of cut : $a_p = 2$ mm
 Application : External turning, continuous cut
 Coolant : Wet

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

I TUNGTHREAD

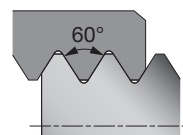
For threading insert



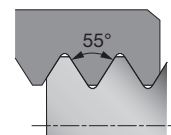
60° and 55° partial profile insert for external and internal threading

- 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)

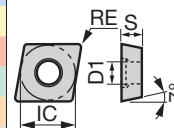
STANDARD CUTTING CONDITIONS

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 $\leq$ 12%)	AL	DS2005	100 - 1200	0.1 - 0.5	0.5 - 5
		28	DS2005	100 - 1200	0.1 - 0.5	0.5 - 3
	Aluminum alloys (Si $\geq$ 12%)	AL	DS2005	100 - 300	0.1 - 0.5	0.5 - 5
		28	DS2005	100 - 300	0.1 - 0.5	0.5 - 3
	Copper and copper alloys	AL	DS2005	100 - 300	0.1 - 0.5	0.5 - 5
		28	DS2005	100 - 300	0.1 - 0.5	0.5 - 3

TUNGTHREAD

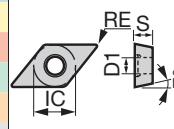
ISO	Workpiece materials	Grade	Cutting speed V_c (m/min)
N	Non-ferrous metal	DS2015	100 - 500

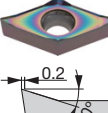
**Rhombic, 80°
with hole
Positive 7°**

[illegible][illegible]

● : New product

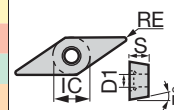
Rhombic, 55°
with hole
Positive 7°

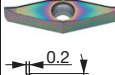
[illegible]

Application	material		Coated												Dimension (mm)					
	Chipbreaker	Designation	DS2005														RE	IC	S	D
Finishing to medium cutting		AL	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

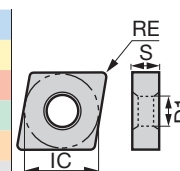
**Rhombic, 35°
with hole
Positive 7°**

[illegible]

Application	material		Coated												Dimension (mm)				
	Chipbreaker	Designation	DS2005													RE	IC	S	D
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

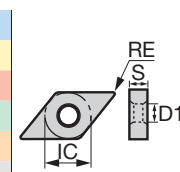
● : New product

**Rhombic, 80°
with hole**

[illegible][illegible]

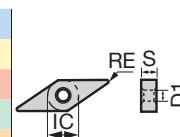
● : New product

• **Rhombic, 55° with hole**

[illegible]

● : New product

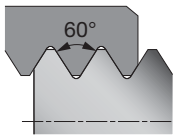
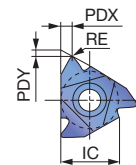
**Rhombic, 35°
with hole**

[illegible]

● : New product

TUNGTHREAD

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

[illegible]

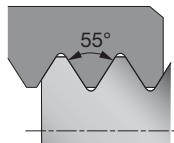
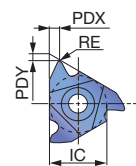
Right hand (R) for external
threading.

[illegible]

● : New product

TUNGTHREAD

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

[illegible]

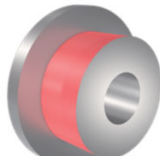
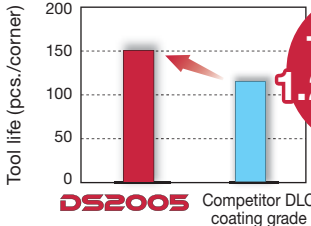
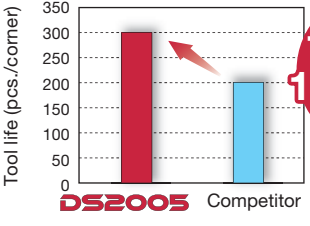
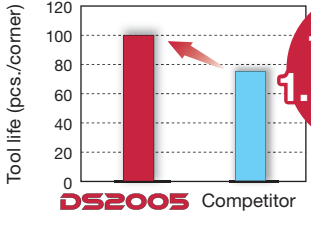
Right hand (R) for external
threading.

[illegible]

● : New product



PRACTICAL EXAMPLES

Workpiece type		Vacuum pump part	Machine part
Insert		CNGG120404-28	CNGG120408-28
Grade		DS2005	DS2005
Workpiece material		A6061 / AlMg1SiCu	C1011 / Copper
		 N	 N
Cutting conditions	Cutting speed : Vc (m/min)	330	270
	Feed : f (mm/rev)	0.35	0.15
	Depth of cut : ap (mm)	2	1
	Coolant	Wet	Wet
Results		 Tool life 1.25 times! DS2005 suppresses built-up edge, delivers a high quality machined surface, and achieves 1.25 times longer tool life against competitor DLC coating grade.	 Tool life 1.5 times! DS2005 achieves 1.5 times longer tool life against competitors while maintaining high machined surface quality.
Workpiece type		Shaft	
Insert		16IRA60	
Grade		DS2015	
Workpiece material		A5052 / AlMg2.5	
		 N	
Cutting conditions	Cutting speed : Vc (m/min)	150	
	Pitch	1	
	Coolant	Wet	
Results		 Tool life 1.25 times! 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.	

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