

***CERTainly*** [but not only] ***CERamics***

Outstanding solutions for demanding applications

***CERtainly*** [ but not only ] ***CERamics***

Outstanding solutions for demanding applications



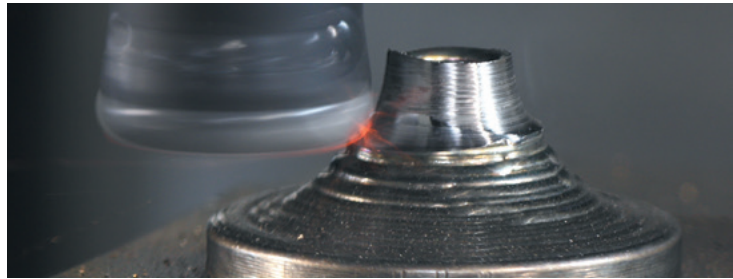
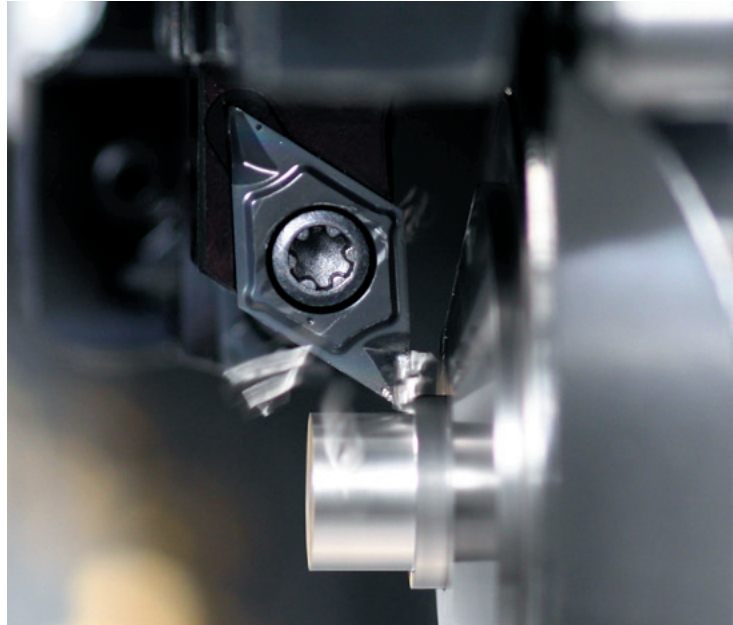
In April 2023, IMC and NGK formed a Joint Venture in Japan – NTK Japan.

NTK's premium Ceramics and Miniature advanced products have become a significant addition to IMC's unique value proposition.

We are proud to be a part of IMC Group and will continue delivering higher standards of productivity and efficiency to our customers worldwide.

**NTK CUTTING TOOLS Co., Ltd.**

# W D E X





## CERAMICS for Aerospace components

06

Turning - Innovative grades for heat-resistant alloy  
Turning – Roughing with scale  
Milling - Roughing

## CERAMICS for Cast Iron / Hardened material

12

Cast Iron, Ductile cast iron - Roughing  
Cast Iron, Ductile cast iron - Finishing  
Hardened material - Finishing  
Mill Rolls Hardened material - Finishing

## Miniature Tool Line

20

Medical & Dental  
Grades  
The Front Max  
Chipbreakers  
Splash Series – Coolant through tool holder series  
Y-axis tool holder series  
Center height adjustable DS tool holders

## Tools for next generation applications

46

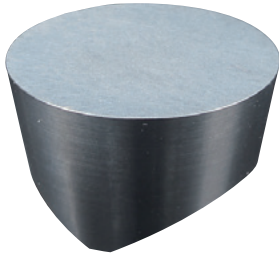
Additive Manufacturing  
FSW – Friction Stir Welding



**BIDEMICS LINE  
NEW ERA OF TURNING  
FOR HEAT RESISTANT  
ALLOYS WITH ULTRA-HIGH  
PRODUCTIVITY**

BIDEMICS

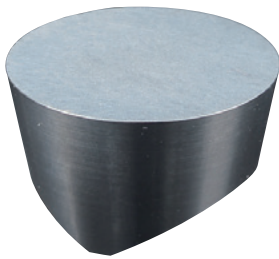
**JX3**



**S**

BIDEMICS Our 1st recommendation  
Excellent stability of toughness

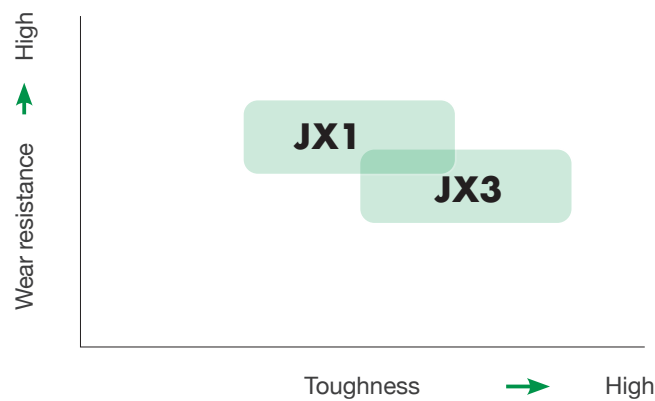
**JX1**



**S**


BIDEMICS grade with  
exceptional wear resistance

APPLICATION AREA **S** WET



For more information

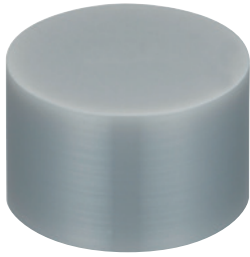




**CERAMIC LINE FOR  
HEAT RESISTANT ALLOY  
HIGH SPEED ROUGH  
TURNING WITH SCALE TO  
SEMI FINISHING**

SiAlON

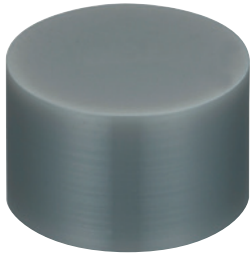
**SX3**



Our No.1 recommendation  
Well balanced grade with wear  
resistance and toughness



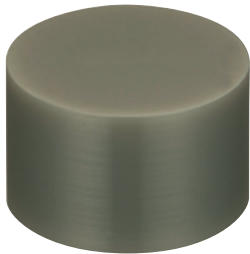
**SX9**



Grade with reinforced toughness



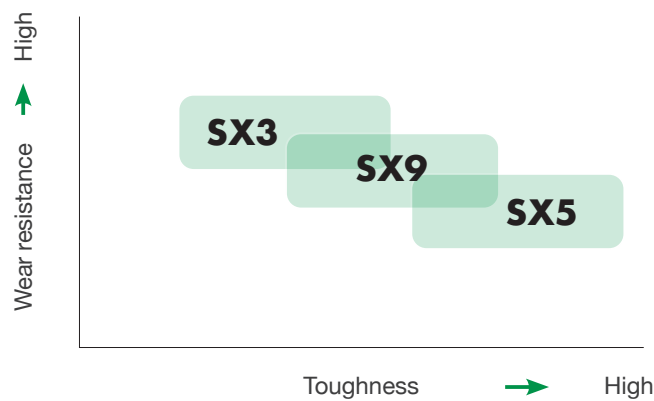
**SX5**



Grade used for descaling



APPLICATION AREA  WET



For more information

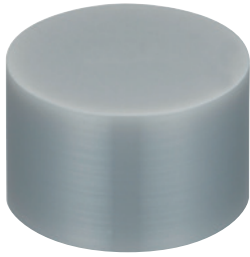


# CERAMIC LINE FOR MILLING HEAT RESISTANT ALLOYS PREMIUM PERFORMANCE WITH SUPERIOR PRODUCTIVITY



SiAlON

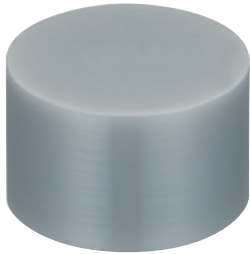
## SX3



Our No.1 recommendation  
Well balanced grade with wear  
resistance and toughness



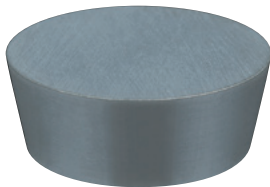
## SX7



Grade with reinforced wear  
resistance



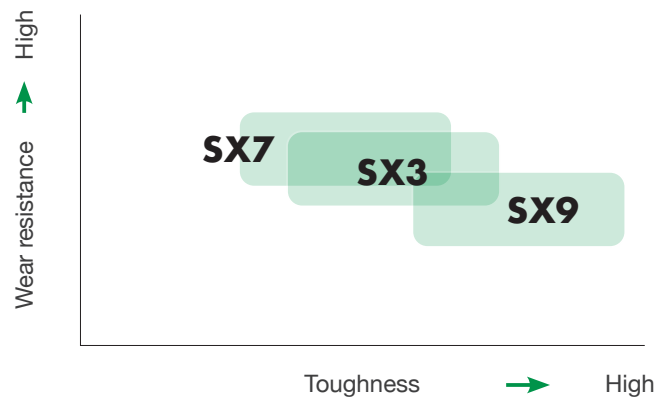
## SX9



Grade with reinforced toughness



APPLICATION AREA  DRY



For more information

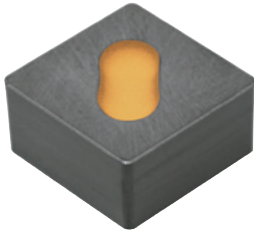


# CERAMIC LINE FOR ROUGHING SUPERIOR GRADES FOR TURNING & MILLING



Silicon nitride ceramics

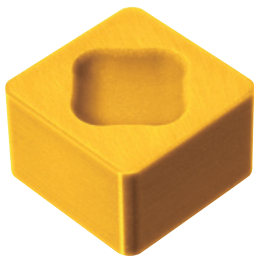
**SX6**



WET & DRY **K**

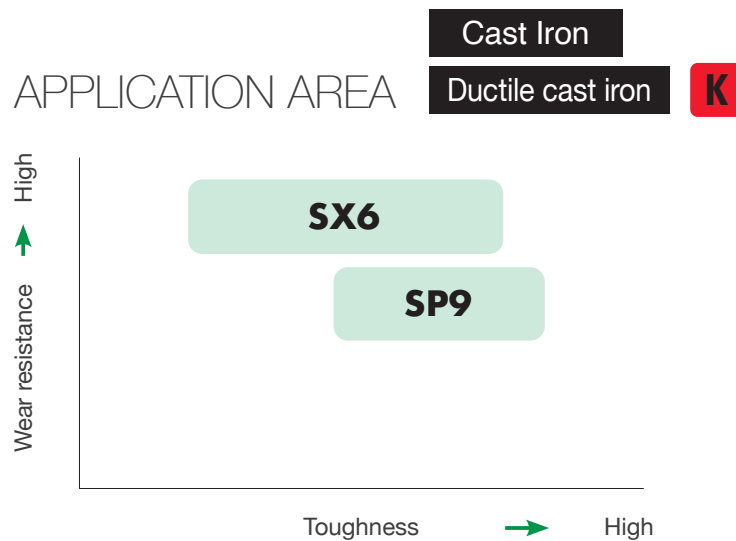
The best grade for rough Turning and Milling

**SP9**



DRY **K**

Excellent performance for Ductile cast iron



For more information





# CERAMIC LINE FOR FINISHING

## OPTIMAL GRADES FOR CAST IRON TURNING



Alumina base White Ceramics

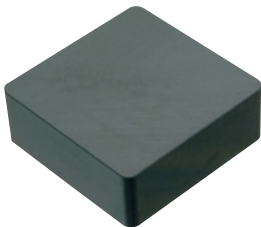
## HC1/HW2 -Al<sub>2</sub>O<sub>3</sub>-



Our No.1 recommendation for finishing gray cast iron

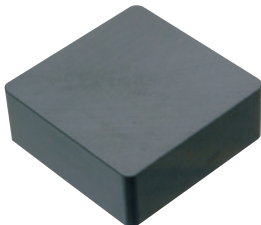
Alumina TiC base Black Ceramics

## HC2 -TiC+Al<sub>2</sub>O<sub>3</sub>-



Multi-purpose grade capable of machining gray cast iron and ductile cast iron

## HC6 -TiC+Al<sub>2</sub>O<sub>3</sub>-

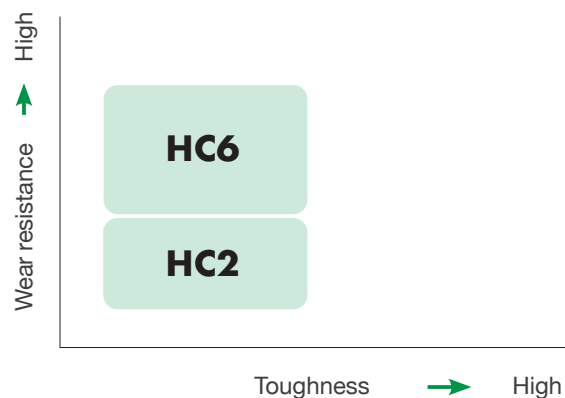
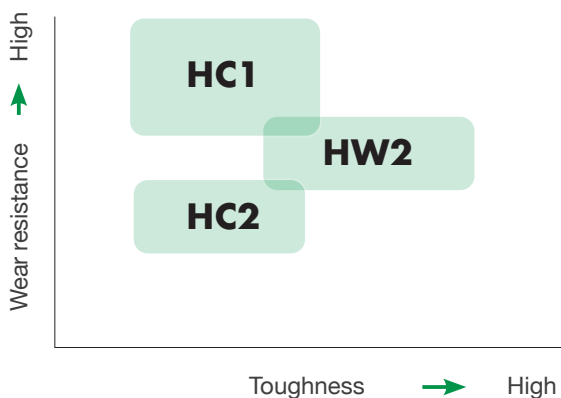


Our No.1 recommendation for finishing ductile cast iron

### APPLICATION AREA

Cast Iron DRY

Ductile cast iron WET

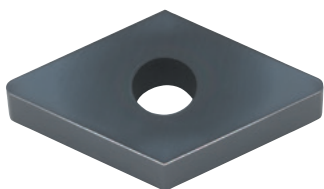


For more information

# CERAMIC LINE FOR HARDENED MATERIALS

NTK CeramiX

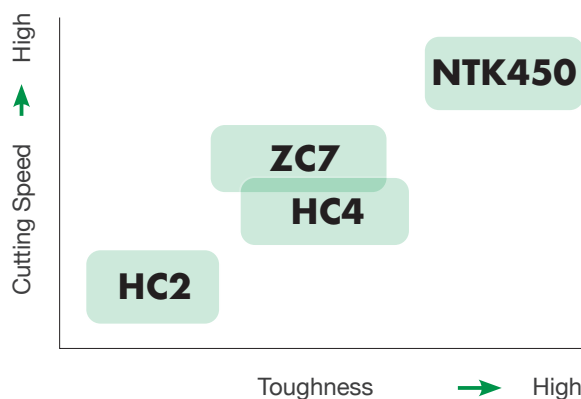
## NTK450



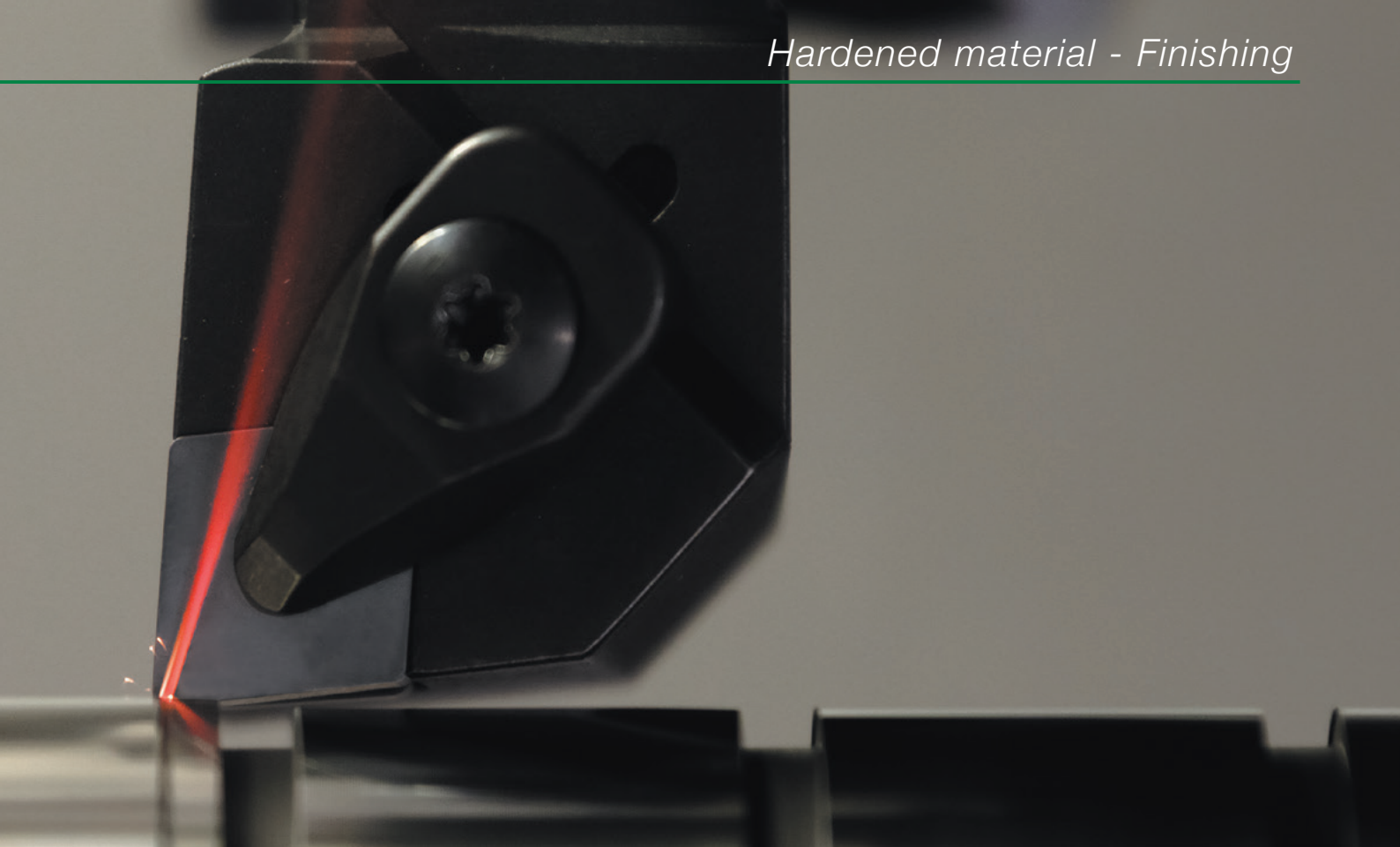
The ultimate ceramic grade  
for finishing

H

### APPLICATION AREA **H**



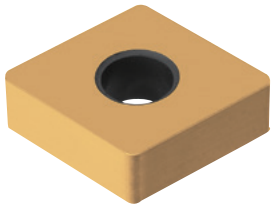
For more information



Alumina TiC base Black Ceramics

**HC4 / ZC7** -Al<sub>2</sub>O<sub>3</sub>+TiC / TiN coated

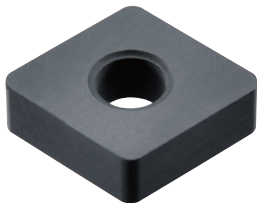
H



Machines a wide range of hardened materials

**HC2**

H

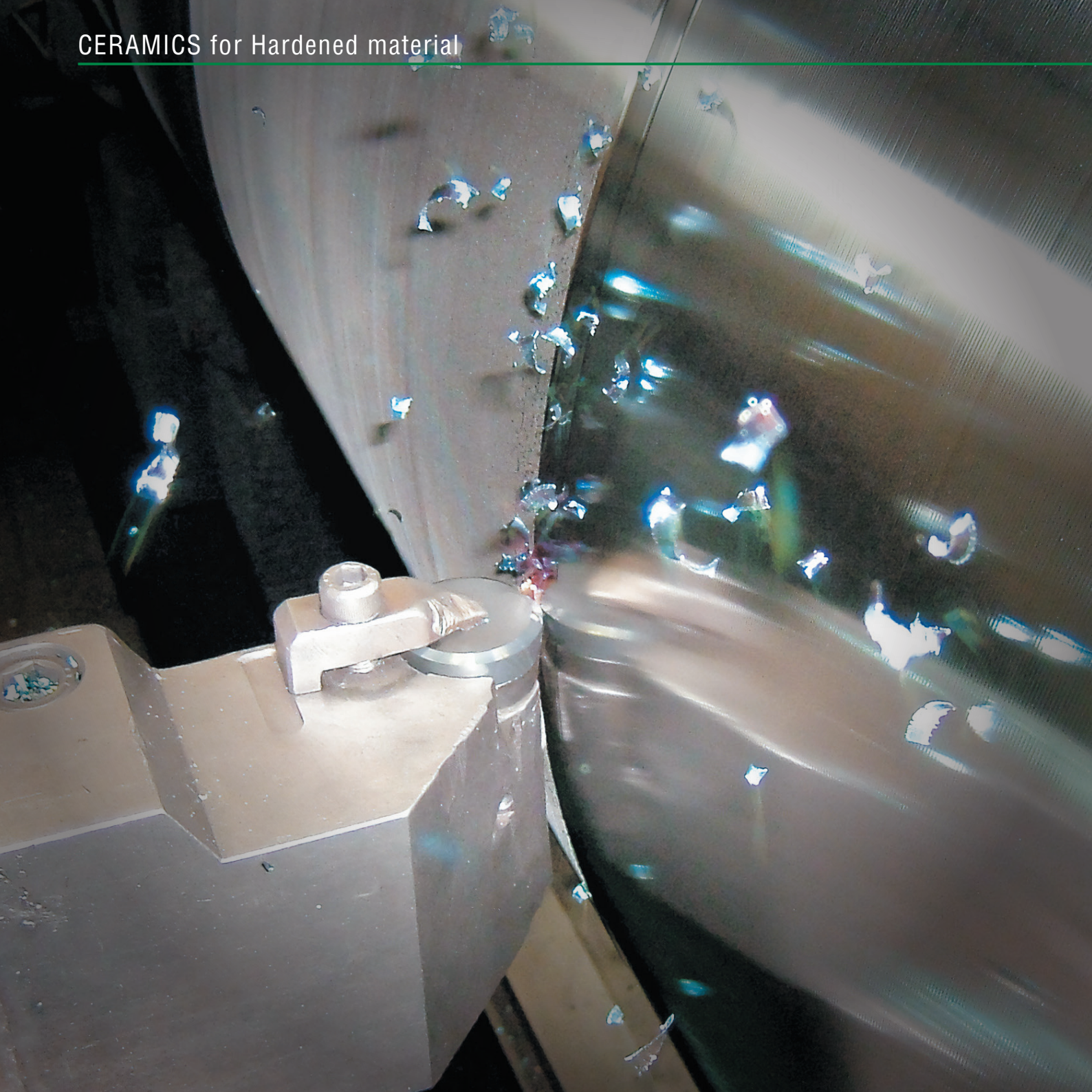


Excellent cost performance compared to CBN



For more information





# CERAMIC LINE FOR MILL ROLLS



## HC7



For hardened material from 30 - 62 HRC



## HC5



Developed for use in hard turning applications for mill rolls



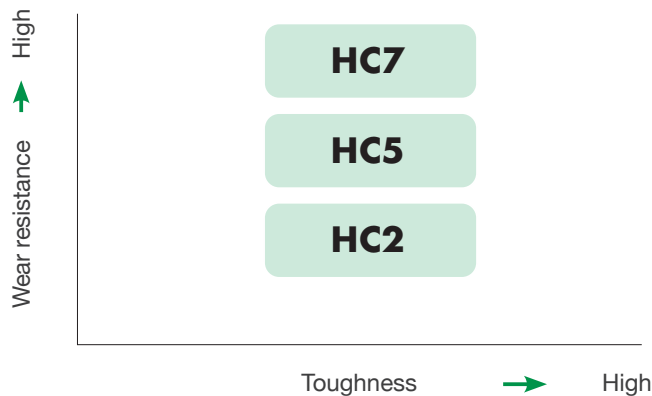
## HC2



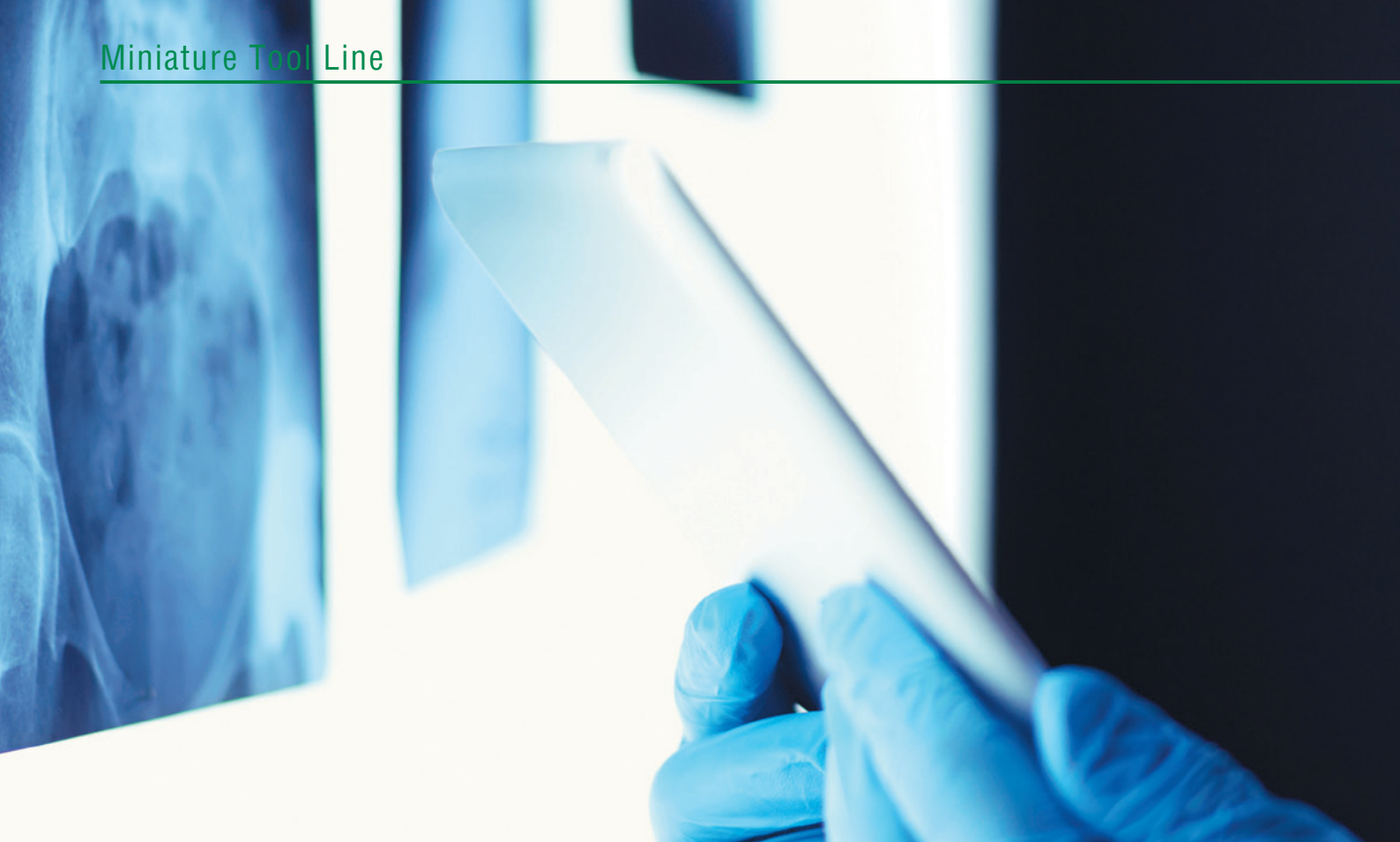
Excellent cost performance compared to CBN



### APPLICATION AREA



For more information



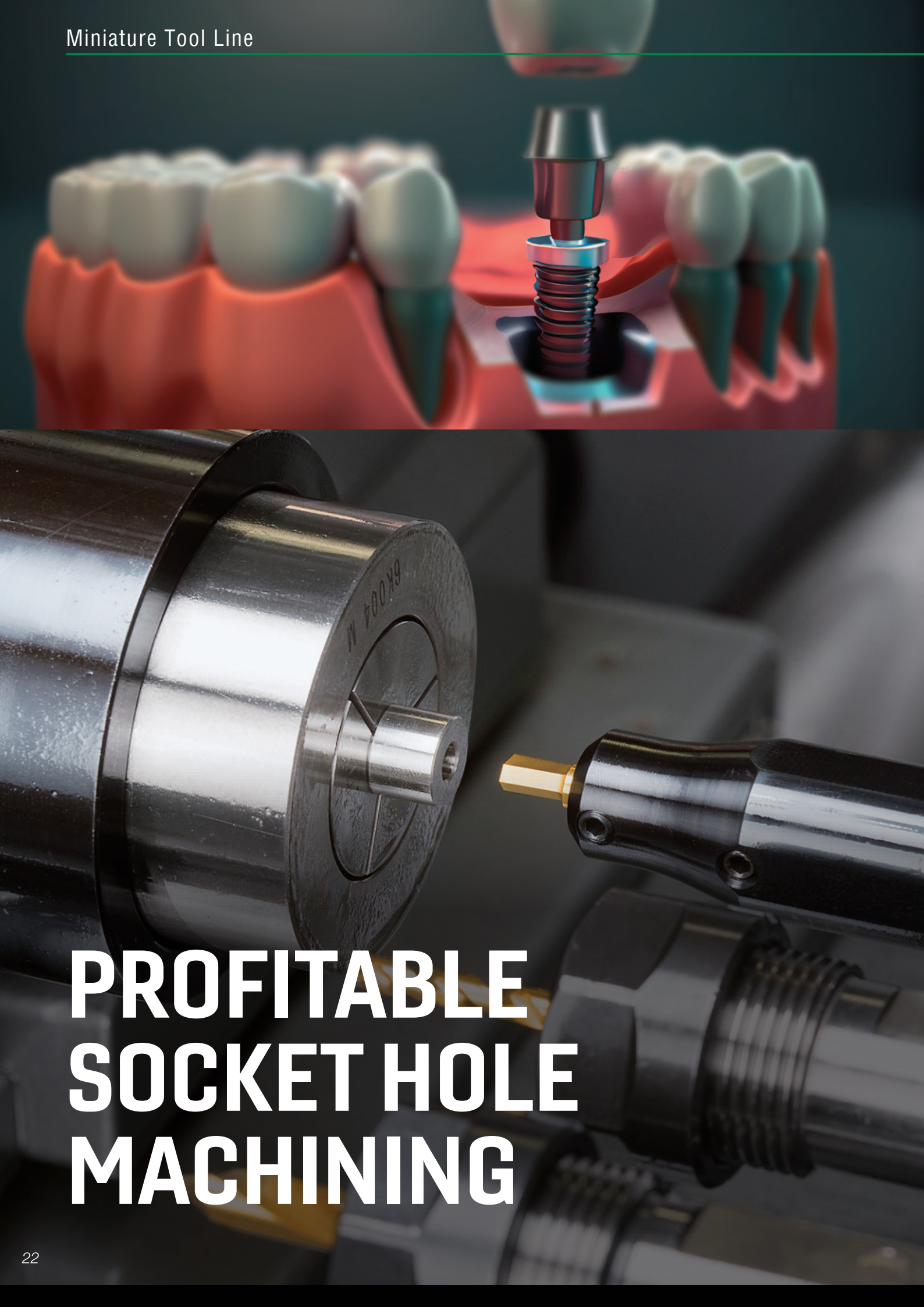
# MINIATURE



# TOOL LINE







# PROFITABLE SOCKET HOLE MACHINING

# SHAPER DUO

Hexalobular (6-lobe)



T6-T30

Hexagon



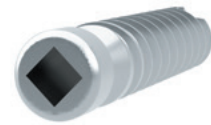
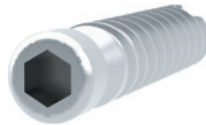
HEX 1.0 - 8.0

Square



AF 2.0 - 8.0

Ideal for a variety of applications



Hexagon & Square socket process comparison

	Tool pressure	Cycle time	Flexibility	Tool cost	
<b>Shaper Duo</b>					Less tool pressure, especially good for small diameter parts. One insert can machine a range of socket sizes
Broach	-		-	-	You need a tool for each socket size

Hexalobular (6-lobe) socket process comparison

	Tool pressure	Cycle time	Tool Cost	High speed spindle	Program	
<b>Shaper Duo</b>				Not necessary	Simple	No need for a high speed spindle
Milling			-	Necessary	Complicated	Requires high speed spindle

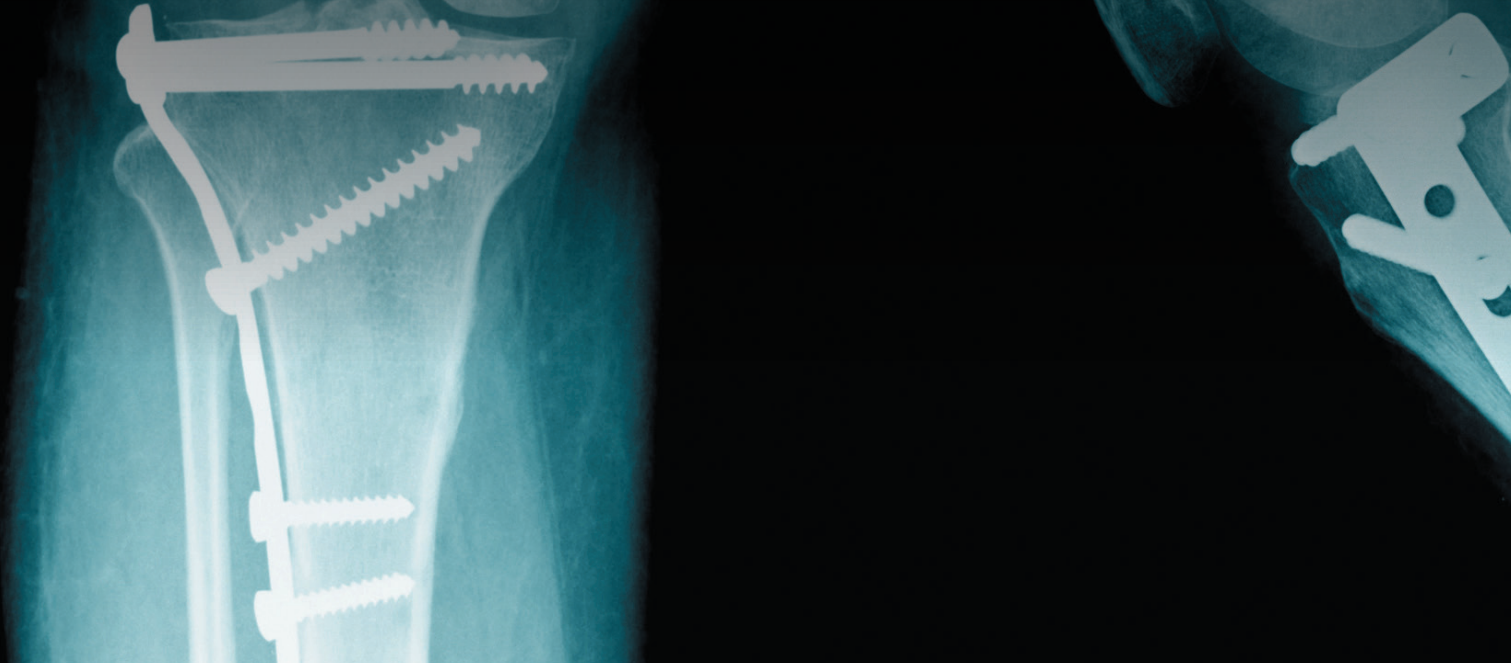
**New** Hexagon socket : **AF 1.0mm - 1.4mm**  
For Abutment screws



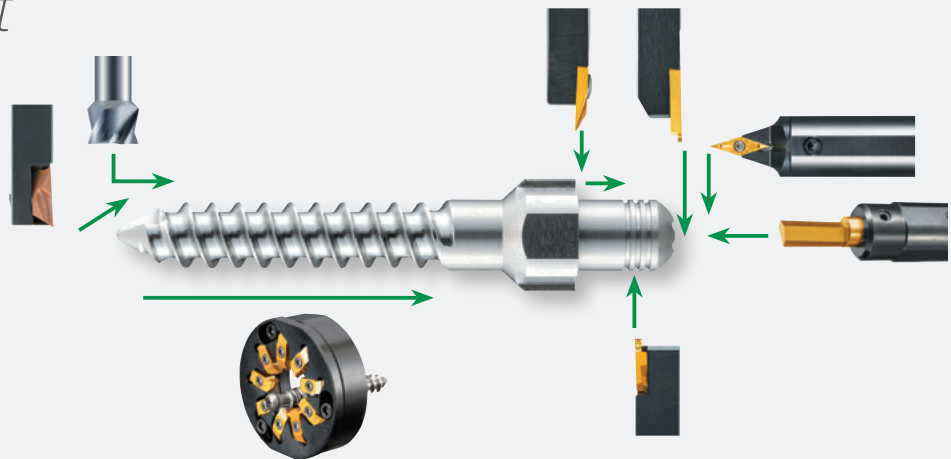
For more information



# HIGH PRODUCTIVITY SINGLE PASS MACHINING OF MULTI-LEAD THREADS



*Tooling layout*



*Machining on the front spindle side*

*Machining on the back spindle side*

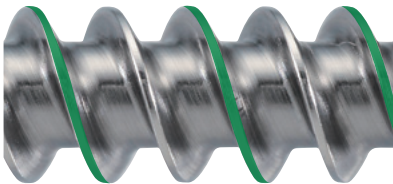
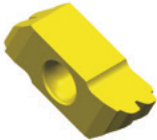
# Thread Whirling

High productivity for precision screw manufacturing, like dental implant screws and bone screws

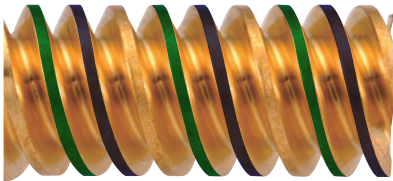
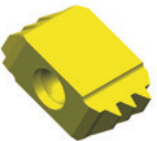


Ideal for medical screw thread forms that are becoming more complex  
Single pass thread forming reduces cycle time

*Double lead thread*



*Triple lead thread*



For more information



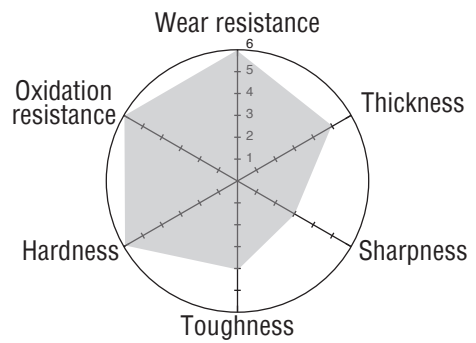
# UNPARALLELED PERFORMANCE DUE TO SUPER TOUGH COAT ST4 FOR ALL STAINLESS STEEL TURNING

# ST4



# ST4

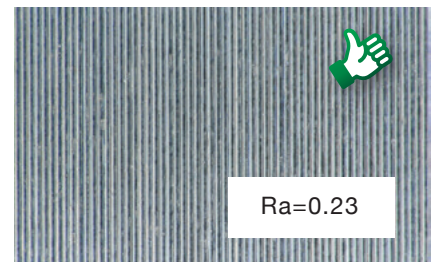
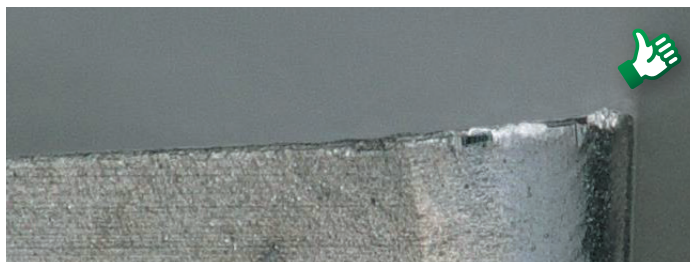
No.1 grade for stainless steel



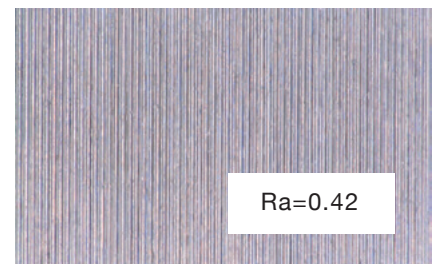
Higher hardness and oxidation resistance

Unique coating technology creates a high-aluminum coated composition. Extends tool life and allows high-speed machining of stainless steel.

**ST4**



Competitor



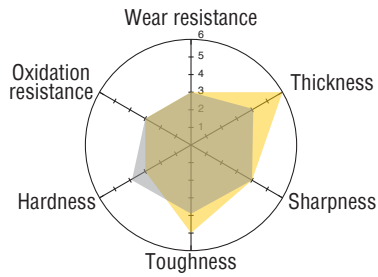
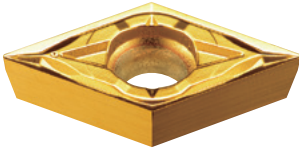
SUS304 vc=70m/min f=0.03mm/rev ap=0.05mm WET



For more information

# ZM3 / TM4

Best grade for general purpose

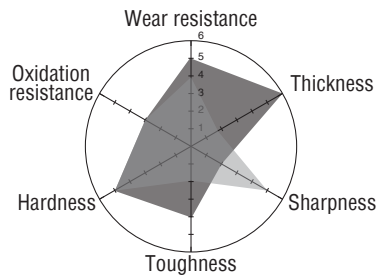
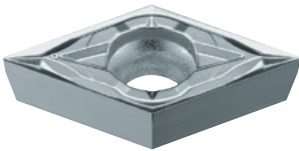


ZM3  
TM4

- P**
- M**
- N**

# QM3 / VM1

Best grade for alloy/ carbon steel / hardened steel

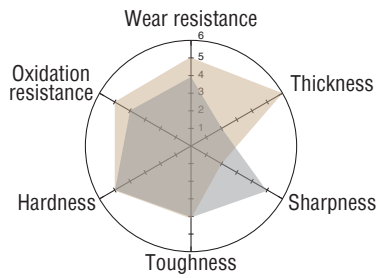


QM3  
VM1

- P**

# DM4 / DT4

Best grade for difficult-to-cut materials / titanium alloys

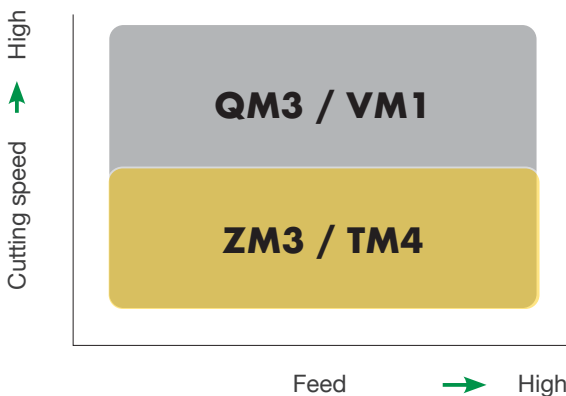


DM4  
DT4

- M**
- S**

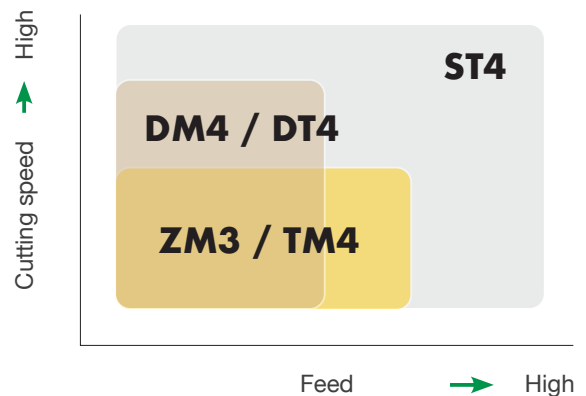
APPLICATION AREA

**P**



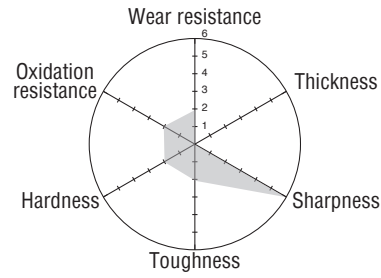
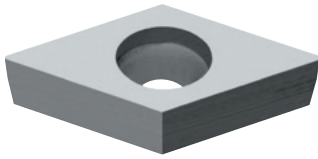
APPLICATION AREA

**M**



# KM1

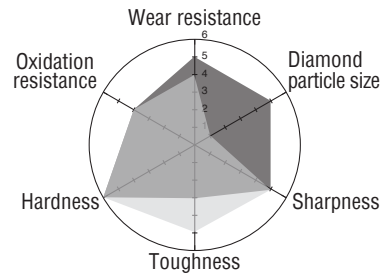
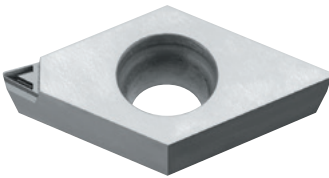
Un-coated carbide grade for non-ferrous materials



N

# PD1 / PD2

PCD grade for non-ferrous materials

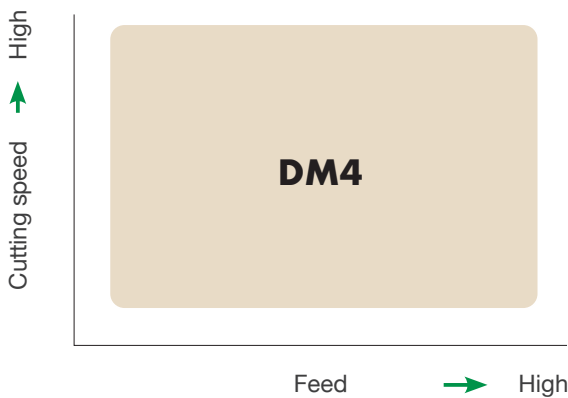


PD1  
PD2

N

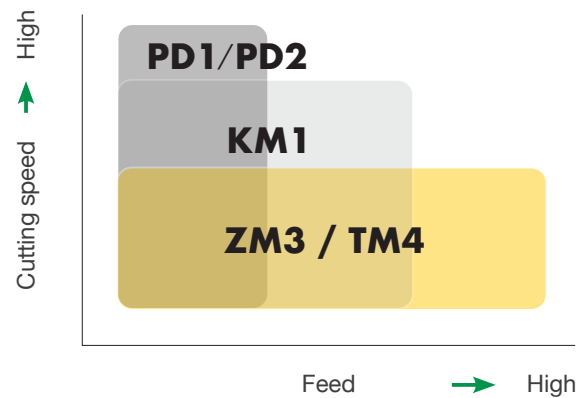
## APPLICATION AREA

S



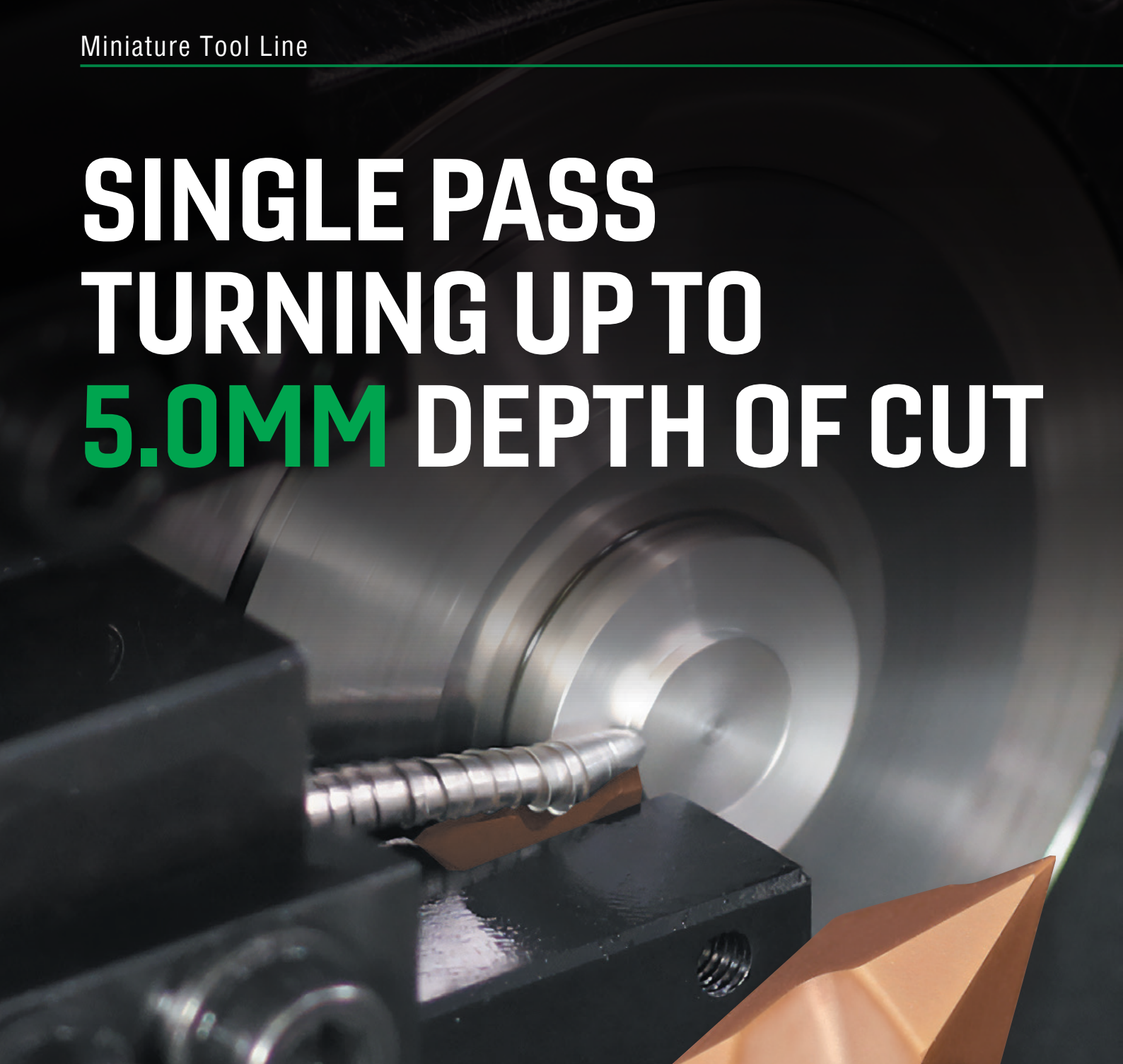
## APPLICATION AREA

N

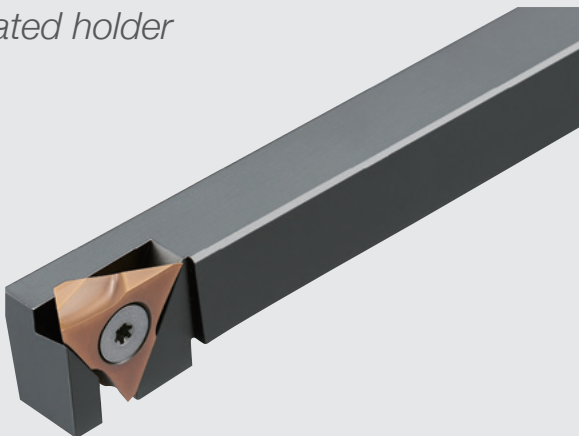




# SINGLE PASS TURNING UP TO **5.0MM** DEPTH OF CUT



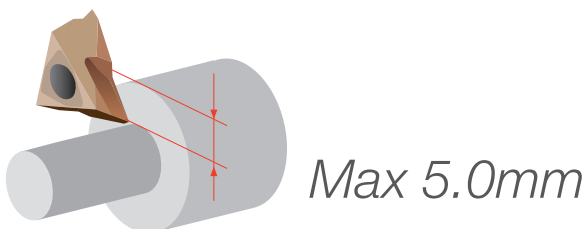
*Dedicated holder*



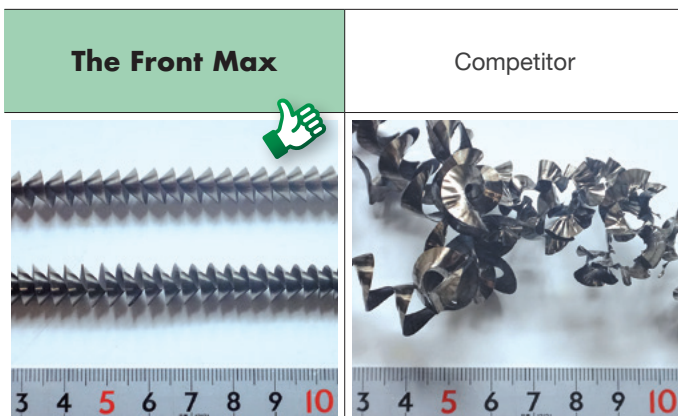
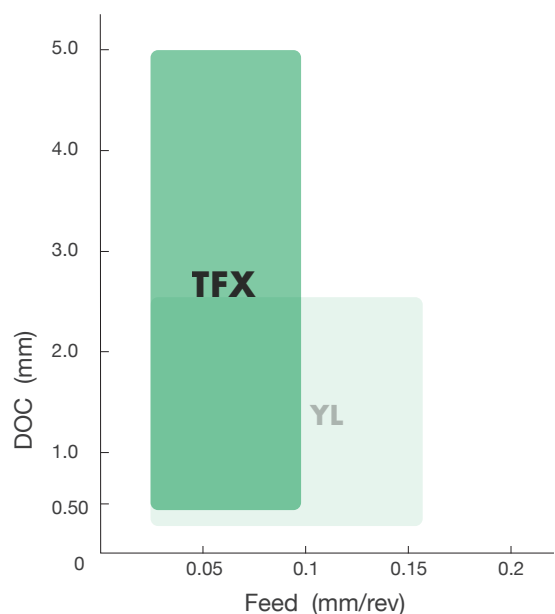
# The Front Max

Maximum depth of cut 5.0 mm  
 Single pass machining reduces cycle time.  
 Fewer machining passes reduce insert wear.  
 Tool life can be extended.

Uniquely Designed Chipbreaker  
 Achieves Excellent Chip Control  
 And Machined Surfaces.



FUNCTIONING RANGE



material: AISI304  
 ap5.0mm vc=80m/min f=0.03mm/rev WET



For more information



Specialized for



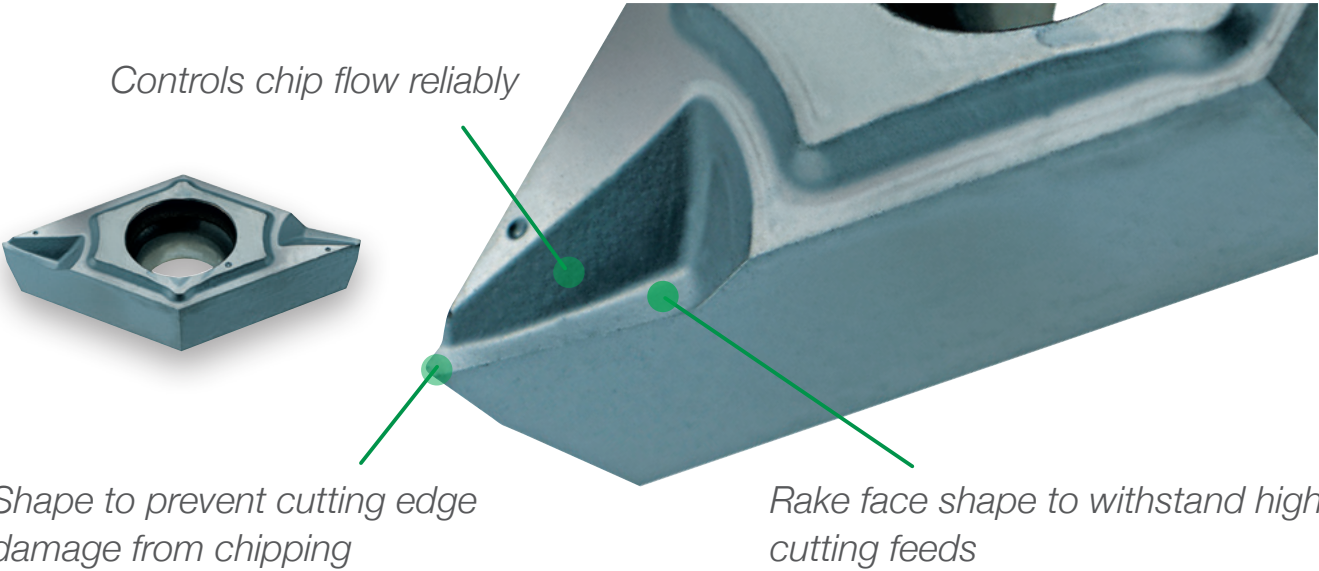
\* LFV is a registered trademark of Citizen Watch Co., Ltd.

# **N°1 CHIPBREAKER FOR VIBRATION MACHINING**



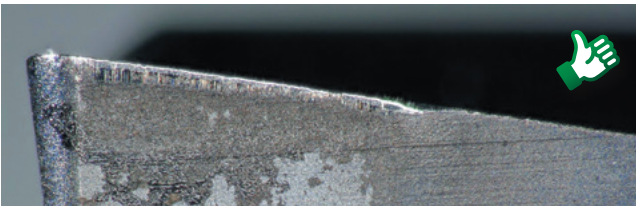
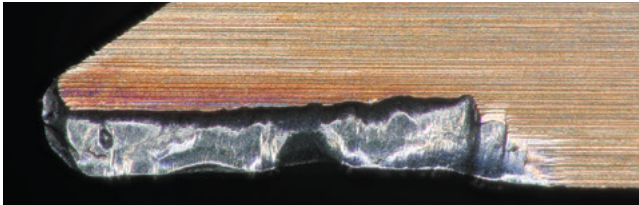
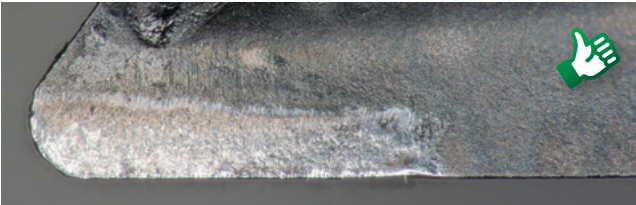
# TMV Chipbreaker

*What is the unique point?*



**TMV Chipbreaker**

conventional



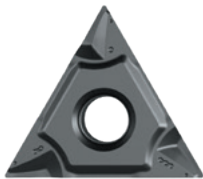
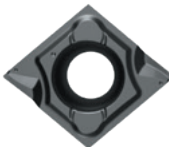
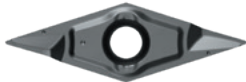
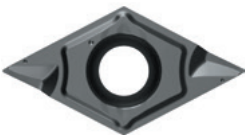
**New** *New shape debut!*

**DCGT**

**VCGT**

**CCGT**

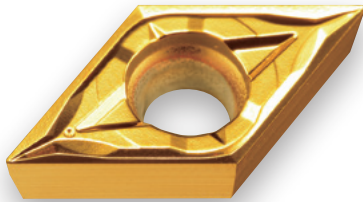
**TNGG**



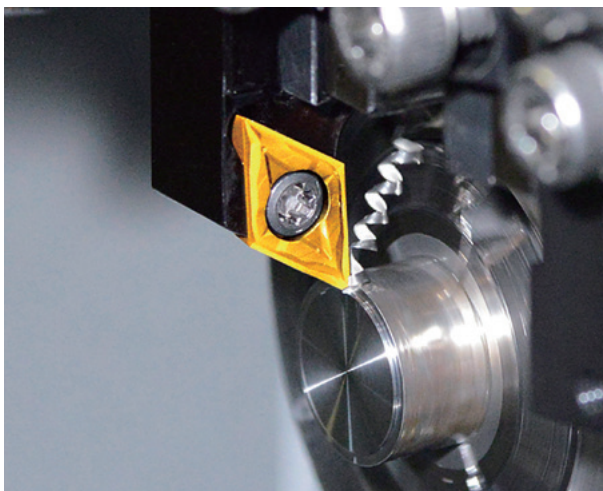
For more information

Front turning

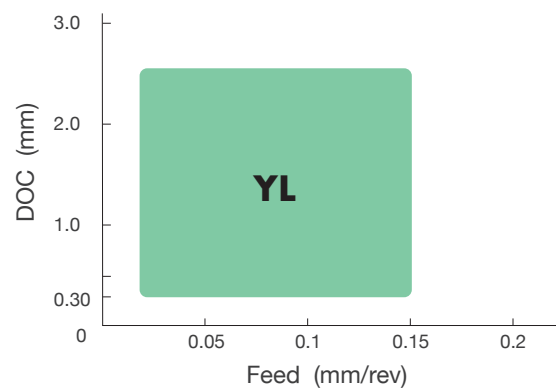
# YL Chipbreaker



The first choice from NTK  
Combination of sharpness, toughness, and good chip control in wide range of cutting conditions



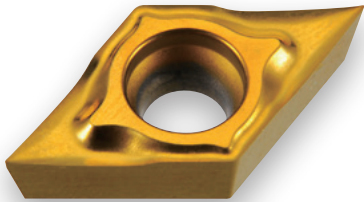
## FUNCTIONING RANGE



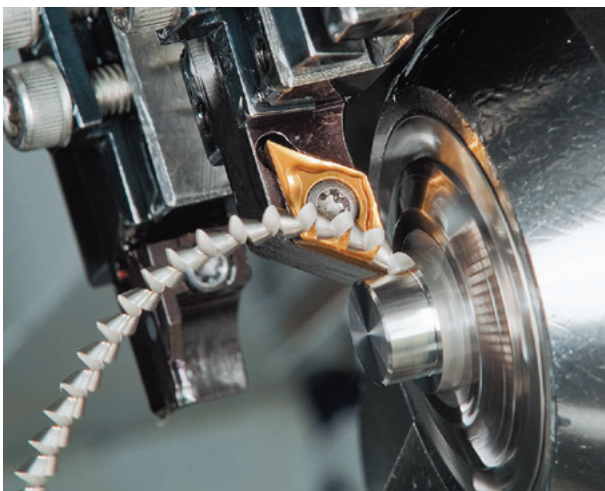
For more information

SUPERIOR CHIPBREAKERS FOR MINIATURE TOOLS

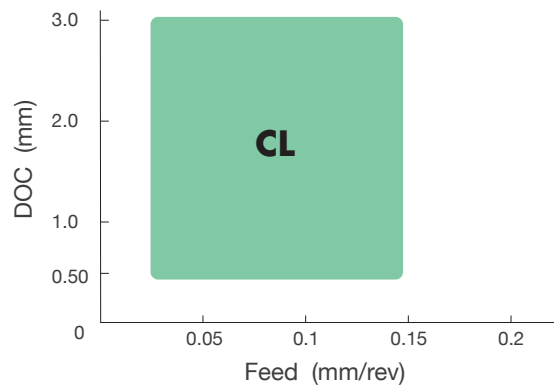
# CL Chipbreaker



Low cutting force in high depth of cut up to 3.0mm



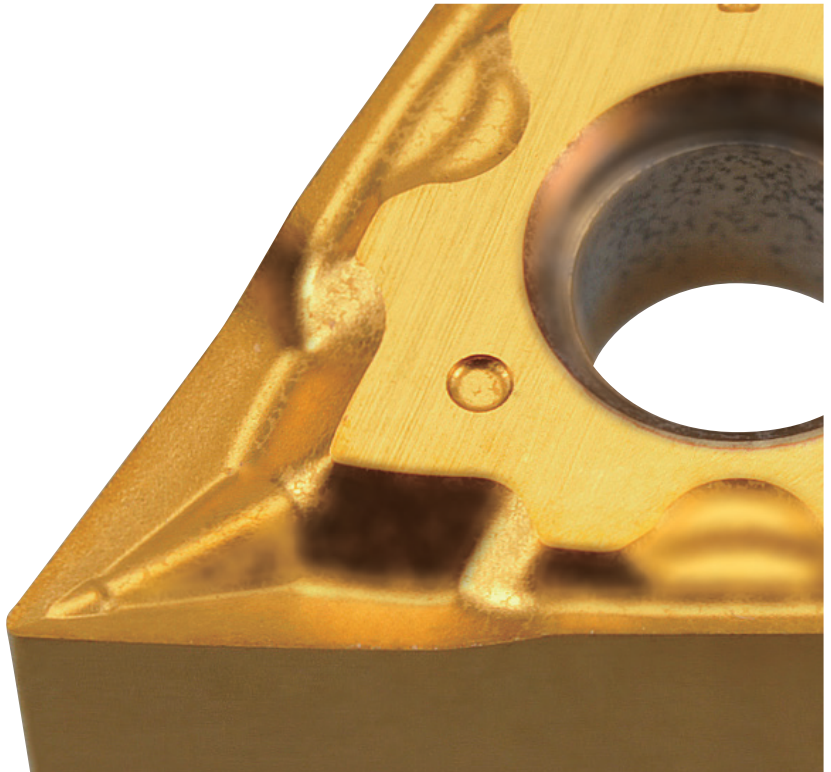
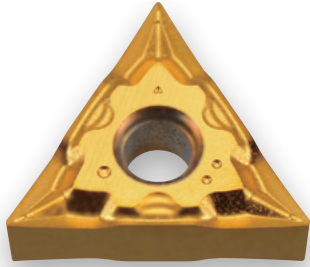
FUNCTIONING RANGE



For more information

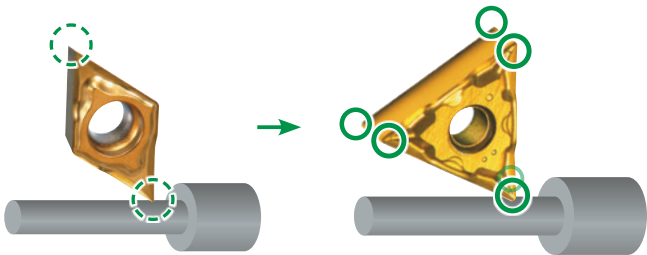


# UL Chipbreaker



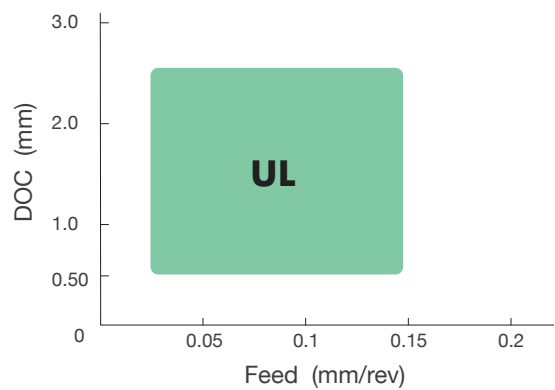
Multi corner negative inserts & Up-sharp-edge like positive inserts

## Cost reductions for Swiss machining



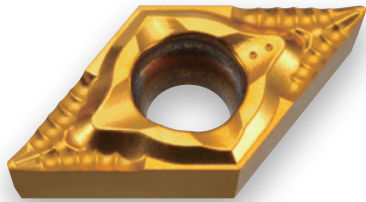
*UL chipbreaker has excellent sharp edge like positive insert for small diameter machining!*

## FUNCTIONING RANGE



For more information

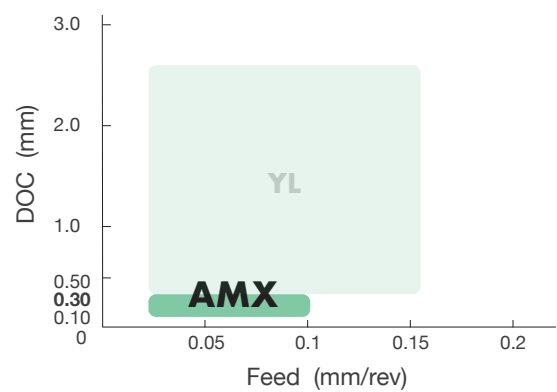
# AMX Chipbreaker



Reliable chip control from DOC 0.05 up to 0.3mm  
Super finish chipbreaker



## FUNCTIONING RANGE

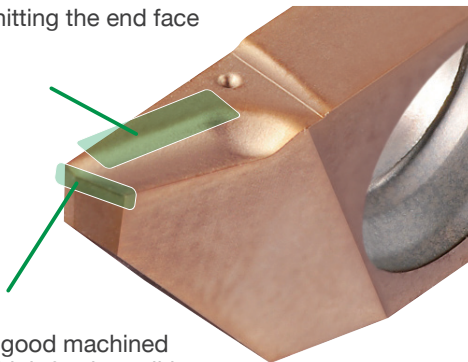


For more information

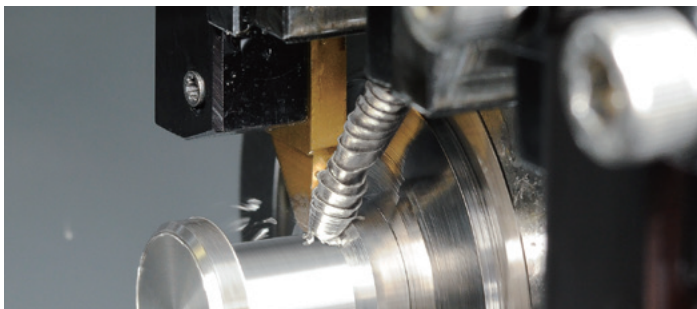
# TBP/TBPA-BM Chipbreaker

Single pass back turning with  
Good chip control, good machined surface, higher productivity

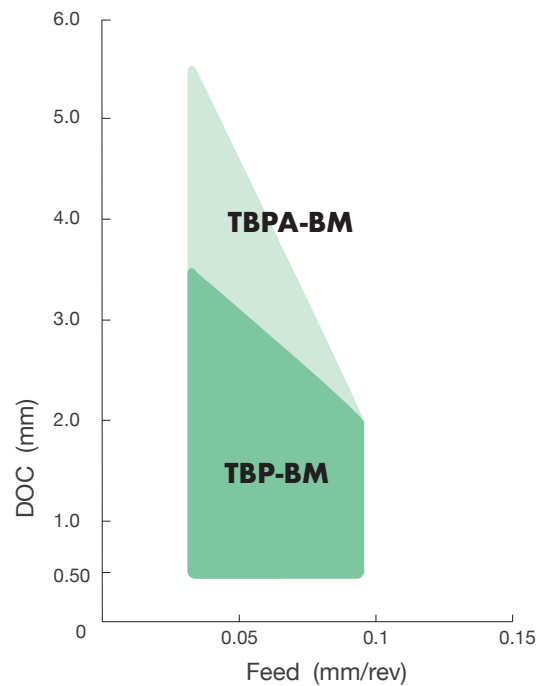
Prevents chips from hitting the end face during back turning



Wiper edge provides good machined surfaces even under high feed conditions



## FUNCTIONING RANGE



## SUPERIOR SURFACE

1 Pass	TBP/TBPA-BM		Competitor	
	End face	OD	End face	OD
	<p><b>Excellent surface</b></p>	<p>Ra 0.72µm Rz 4.46µm</p>	<p>Rough surface</p>	<p>Ra 1.65µm Rz 6.01µm</p>



For more information

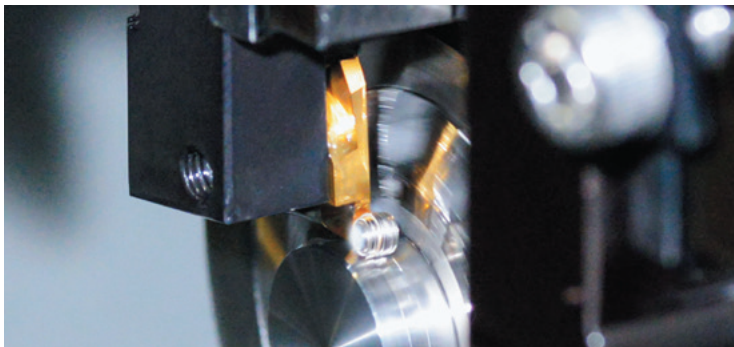


# GTMH-GX Chipbreaker

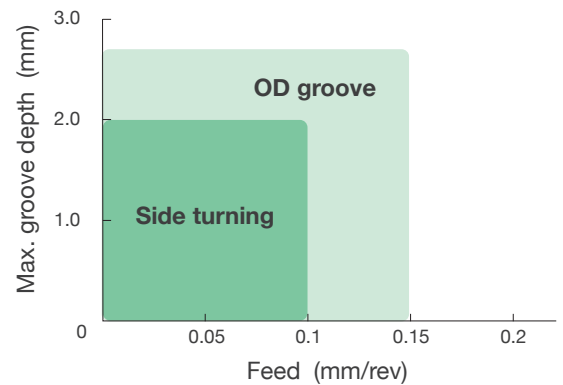
Groove widths from: 0.33mm - 3.0mm  
Grooving & side turning with excellent chip control

Groove width 1.5mm

Groove width 1.0mm



## FUNCTIONING RANGE



## EXCELLENT CHIP CONTROL

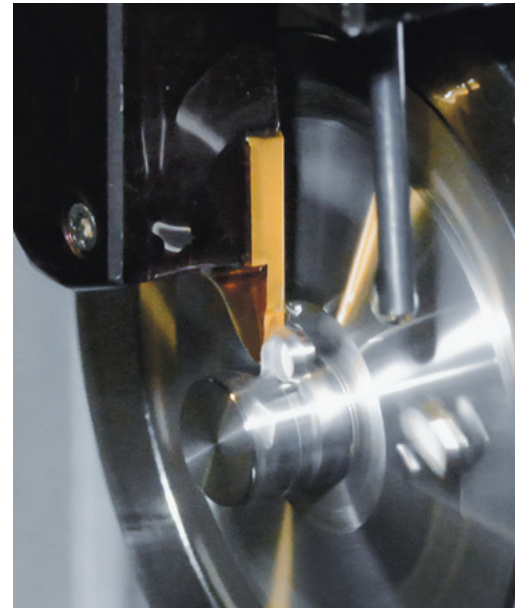
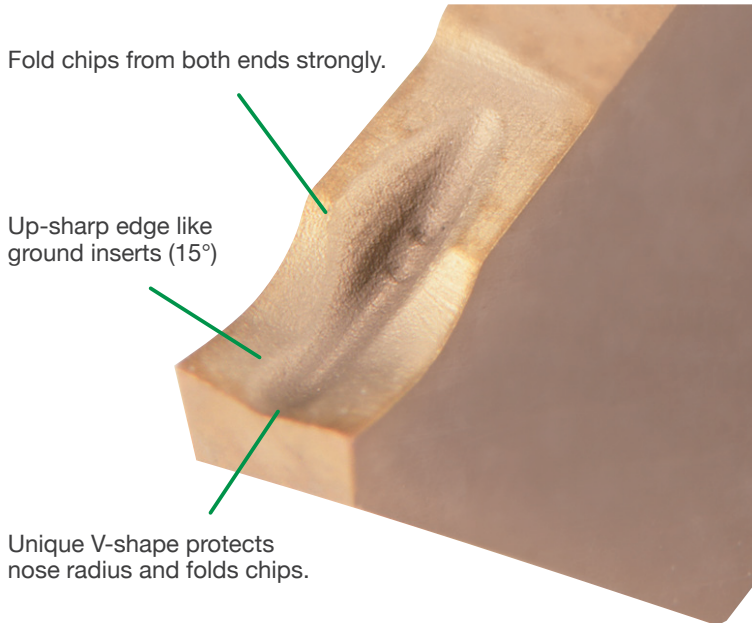
	<p><b>GX Chipbreaker</b></p>	
<p><b>Cutting conditions</b> Material: AISI 316L vc=80m/min f=0.02mm/rev ap=2.5mm WET</p>	<p>Competitor</p>	



For more information

# CTP/CTPA-CX Chipbreaker

Curls and controls chips. Achieves good surface finish.



## CUTTING PERFORMANCE

Feed (mm/rev)	CX Chipbreaker		Conventional (ground chipbreaker)		Competitor (3D chipbreaker)	
	Chip	Surface finish	Chip	Surface finish	Chip	Surface finish
0.02						
0.05						
	Excellent machined surface finish		Rough surface finish		Vibration occurred due to rigidity issue	

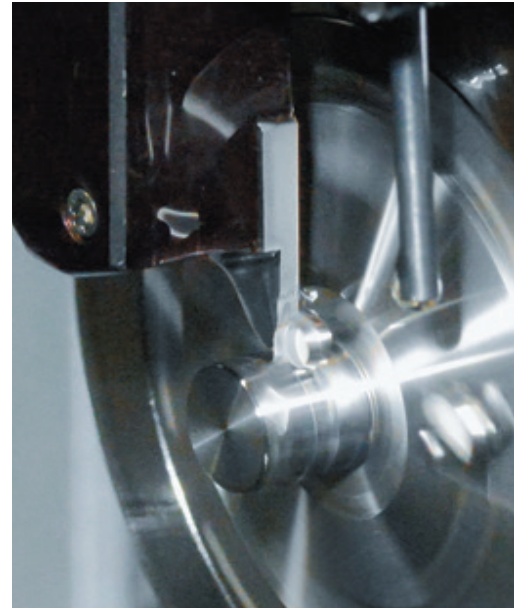
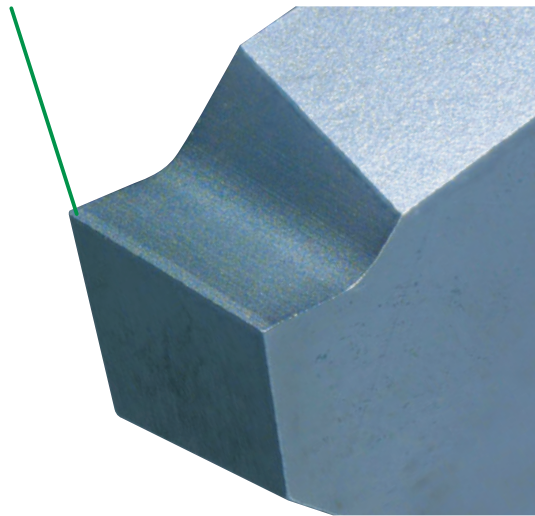


For more information

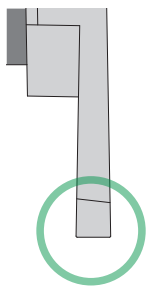
# CTP/CTPA-TH Chipbreaker

Strong edge reduces occurrence of chipping

Small land on the cutting edge prevents chipping.



## EXCELLENT TOOL LIFE



**Cutting conditions**  
 Material: : AISI304  $\phi$ 11  
 $V_c=80\text{m/min}$   
 $f=0.03\text{mm/rev}$   
 Tools:  
 Insert: CTP-TH Series 2.0mm width  
 Holder: CTPR12

CTP-TH Chipbreaker	Competitor
<p><b>Machined 200 parts</b></p>	<p>Machined 100 parts</p>



For more information



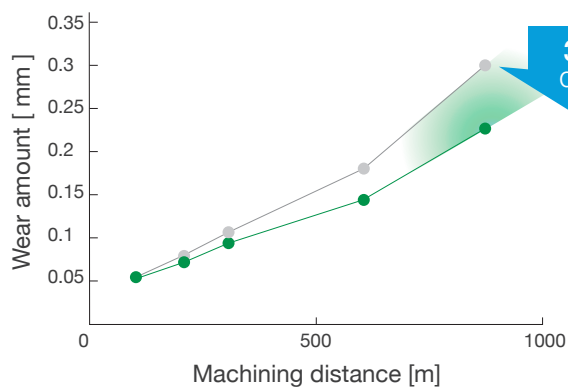


**DIRECT COOLANT  
SUPPLY TO THE  
CUTTING EDGE FOR  
EXTENDED TOOL LIFE  
AND IMPROVED CHIP  
CONTROL**

# SPLASH Series

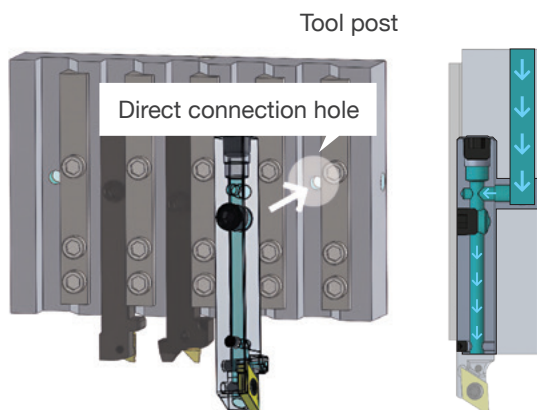
## Full Tooling application

Front turning | Back turning | Grooving | Threading | Parting off | ID boring

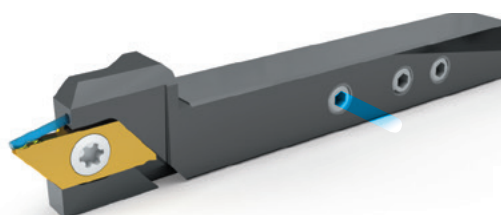


Wear amount is reduced achieving stable dimensional accuracy

- External coolant
- Internal coolant



**New** Direct gang coolant connection "OH2 and OH3"



For more information

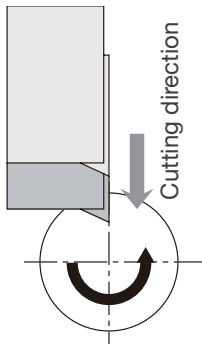


# Y-axis tool holder series

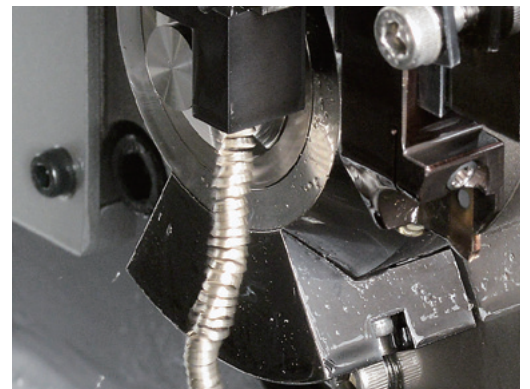
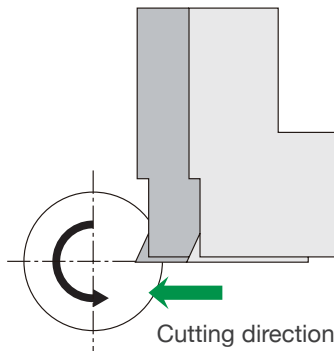


Efficient Y-axis miniature machining  
for improved chip flow and productivity

Conventional



Y-axis



*Chips automatically drop down*

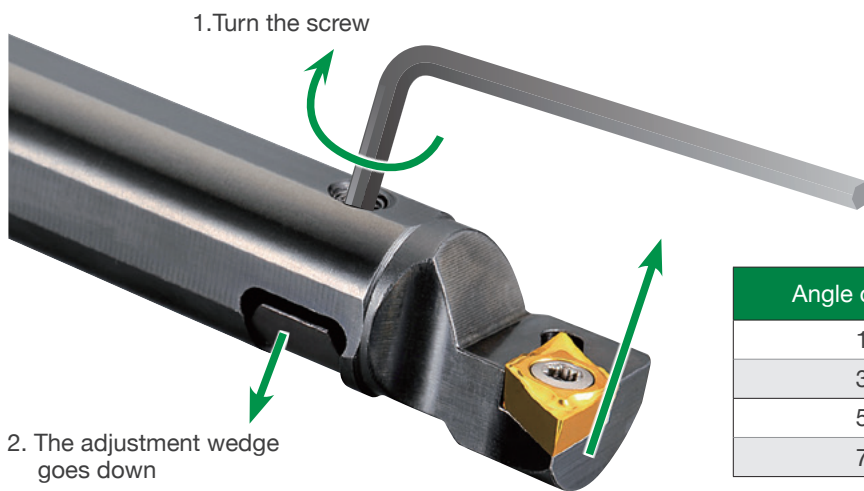


For more information



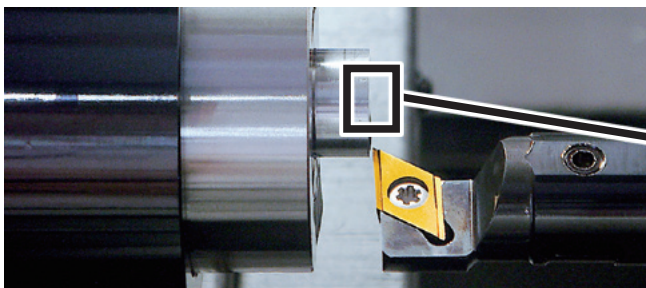
# Adjustable centerline height DS tool holders

Instantly adjust cutting edge height, reducing time and elevating quality

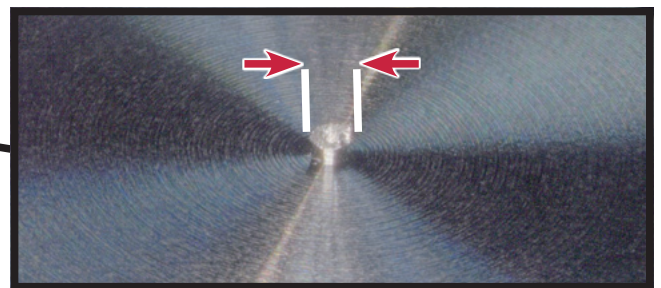


Angle of rotation	Increase cutting edge height
180°	0.05
360°	0.10
540°	0.20
720°	0.30

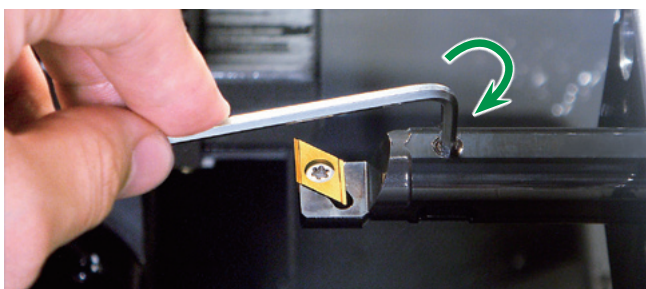
\* The amount of cutting edge height increase differs depending on the model number.



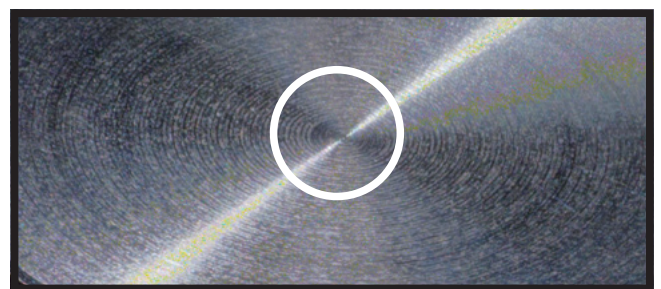
1. Take a facing test cut slightly below centerline



2. Measure the dia. of center boss



3. Raise the center height by one half of the dia. of the boss.



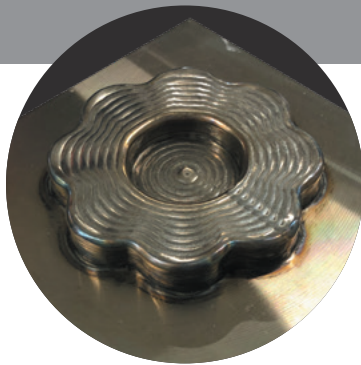
4. Re-machine the end face



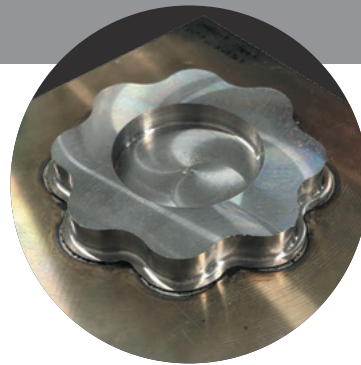
For more information

# SUPERIOR PRODUCTIVITY OF ROUGH MILLING FOR NICKEL-BASED ALLOYS

## METAL ADDITIVE MANUFACTURING

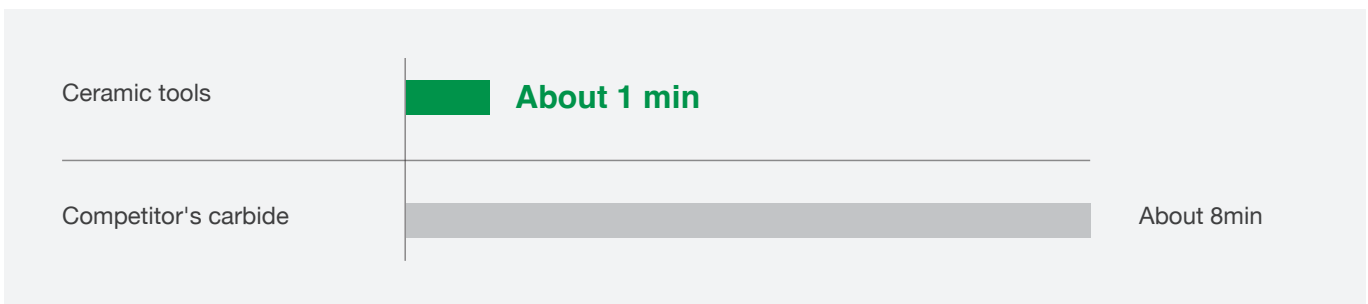


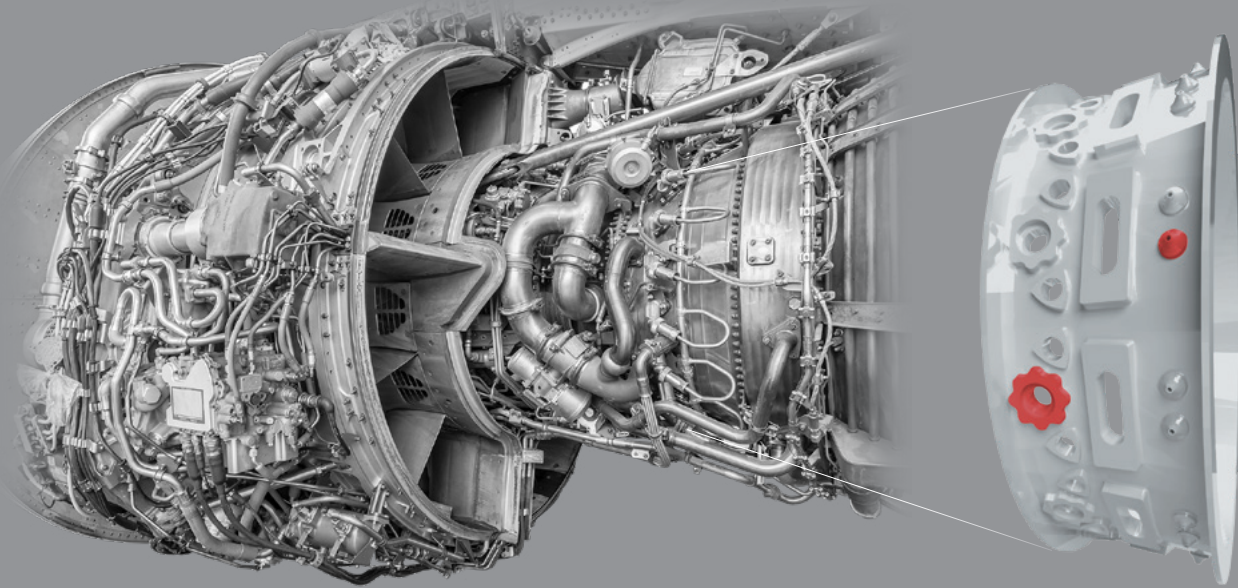
Before processing



After processing

### MACHINING TIME





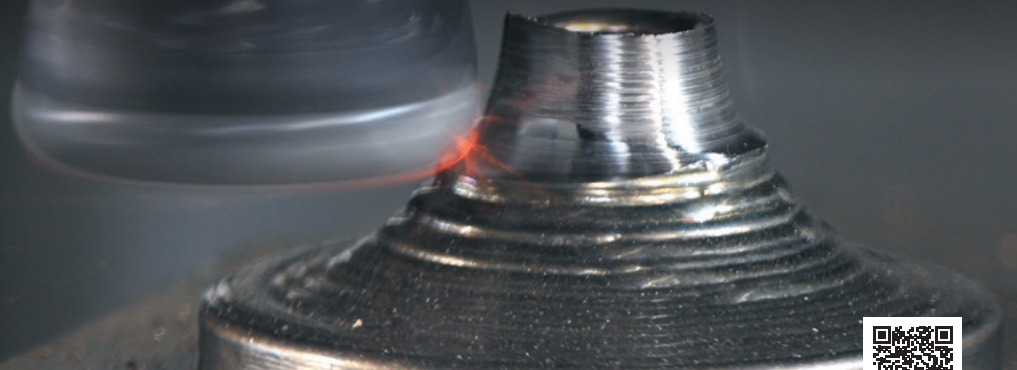
Turbine case

## Ceramic solid endmill CERAMATIC



Machining built parts with ceramic endmill  
Cutting speed  $V_c = 600\text{m/min}$

## Indexable milling cutter for HRSA



For more information



## FSW TOOL

# CERAMIC TOOLS FOR FRICTION STIR WELDING



*Advanced ceramic technology in the cutting tool industry has evolved.  
Now we aim to provide a new value in the field of FSW.*

## Expected Application Fields

---

*Steel industry : Friction stir welding of thick steel plates*

*Automotive : Less vehicle weight by replacing bolting with our FSW*

*Joining of dissimilar materials such as aluminum alloys  
and other light metals with ferrous metals*



For more information



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