



Small Part Machining Solutions



Increase Productivity with LFV® and Coolant-Through Tooling Technology

Citizen Machinery Latest Machines



L12



L20



M32



BNJ42/51

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

Solution

- Lineup Expansion of Direct Coolant Compatible Machines
- Reduces Down-Time and Extends Tool Life by Improving Chip Control

New Product

JCTM Series

Direct Coolant Holders for Small Parts Machining

Compatible with Different Supply Styles

Supports Internal Coolant with or without Piping Systems

Lineup of Turning, Grooving (KGBF), and Cut-off (KGD/KTKF) Holders

1 Using Internal Coolant to Enhance Tool Performance



CG Image

Advantages of Internal Coolant

- Fewer piping components for compact machining
- Reduced installation time and interference checks
- Prevents chips winding around piping
- Reduced pressure loss

The JCTM series is compatible with internal coolant in a wide range of machines

Direct coolant machines made by Citizen Machinery



Cincom L20



Cincom D25



Cincom M32



Switching to internal coolant toolholder reduces chip entanglement issues

Internal Coolant (2.5 MPa)



External Coolant



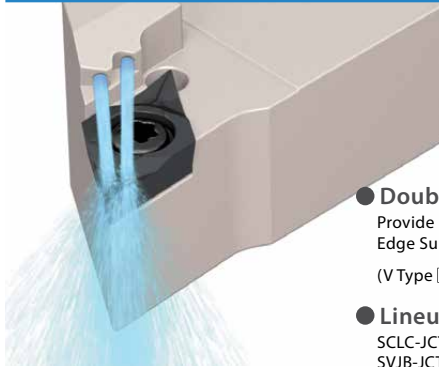
Pin Alloy Tool Steel

Vc = 590 sfm, D.O.C. = 0.055"
f = 0.005 ipr, Wet
SDJC Holder / DCMT3251 Insert

(User Evaluation)

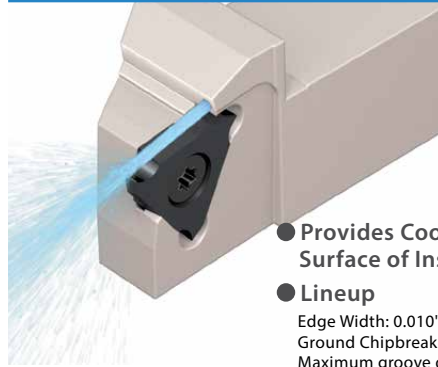
2 Lineup of Turning, Grooving, and Cut-off Holders Available

Turning Screw Clamp - JCTM



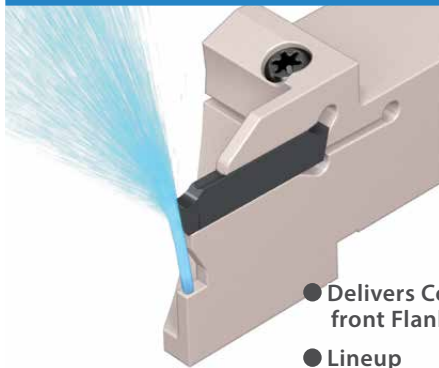
- **Double Coolant Holes**
Provide Coolant toward the Cutting Edge Surface of the Insert
(V Type □12mm: Single hole)
- **Lineup**
SCLC-JCTM / SDJC-JCTM
SVJB-JCTM / SVJP-JCTM

External Grooving KGBF-JCTM



- **Provides Coolant toward the Rake Surface of Insert**
- **Lineup**
Edge Width: 0.010" - 0.118" (0.25mm - 3mm)
Ground Chipbreaker / Molded GL Chipbreaker
Maximum groove depth: 0.118" (3mm)

Cut-off KGD-JCTM



- **Delivers Coolant Directly to front Flank Face**
- **Lineup**
Maximum Cut-Off Dia.:
~0.945, ~1.260" (~24mm, ~32mm)

Cut-off KTKF-JCTM



- **Discharges Coolant in Three Directions toward Rake Surface of Insert**
(Two holes toward the rake face and one hole toward the flank face of the insert)
- **Lineup**
TKF 12 Type (Maximum Cut-Off: Ø0.197" - Ø0.472" / Ø5mm - Ø12mm)
TKF 16 Type (Maximum Cut-Off: Ø0.630" / Ø16mm)

3 Compatible with Different Supply Styles Supports Internal Coolant with/without Piping System

Internal Coolant without Piping

NEW

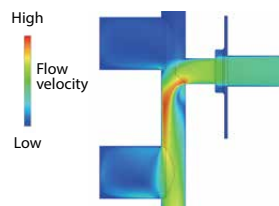
*When the tool turret supports direct coolant

Coolant is supplied directly from the tool turret into the holder without the need to install piping

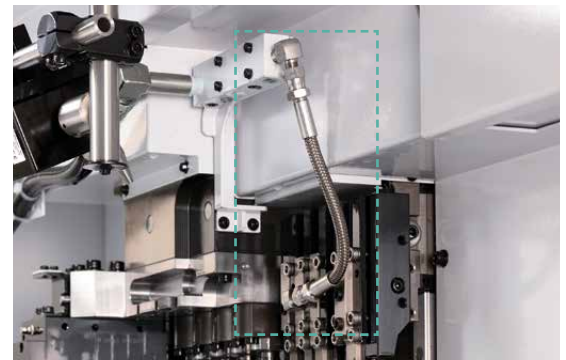


Optimized Coolant Supply

Supply hole designed to reduce energy loss based on extensive flow analysis
Analysis Image (Internal Evaluation)



Internal Coolant with Piping



Compatible with internal coolant on any machine with standard piping parts

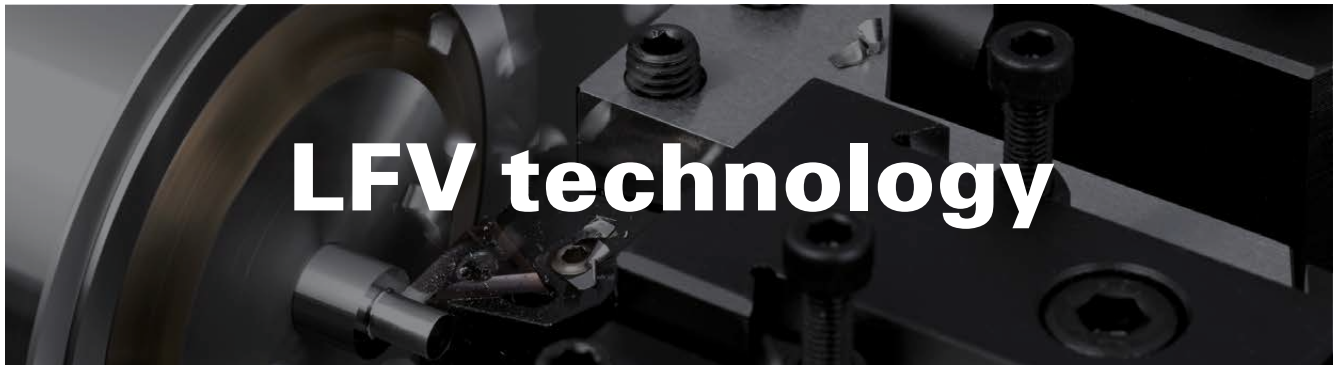
Even under normal pressure, it is effective in improving chip control. Commercially available nylon hose can be substituted for normal pressure.

**For more information about JCTM,
view product brochure.**



Take your productivity to the next level

With Next-generation Processing Technology

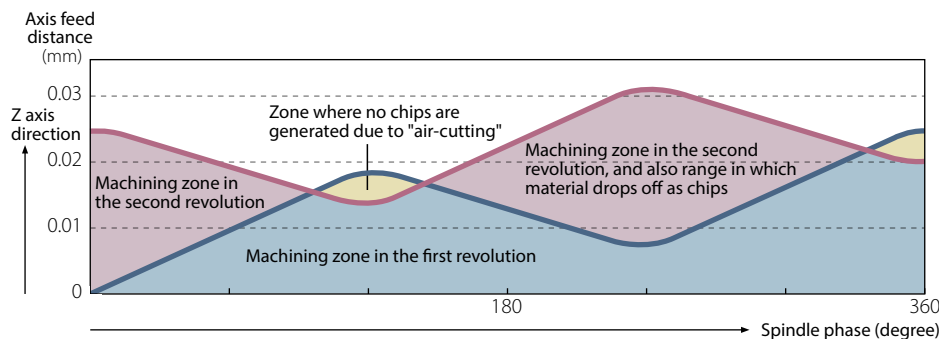


What is Low Frequency Vibration Cutting?

The servo axes are vibrated in the axial direction and cutting is performed while synchronizing this vibration with the rotation of the spindle. Because “air-cutting” times are provided during cutting, it is characterized by intermittent expulsion of chips. This widely applicable cutting technology – able to handle a broad range of machining shapes and materials – is ideal for cutting difficult-to-cut materials like Inconel, stainless steel and copper. It is state-of-the-art and suppresses various risks associated with these materials, such as entanglement of chips and built-up edges.

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

■ Z axis feed distance per spindle revolution and the low frequency vibration waveform



■ Representation of the cutting



Chip Shapes

Depending on the material being cut, a variety of problems can be caused by chips getting entangled with each other, including increased cutting resistance, scarring, changes in the texture of the machined surface, tool nose damage, and built-up edges due to cutting heat. In low frequency vibration cutting, “air cutting” time provided during cutting serves to break chips up finely and expel them. This “air cutting” time also prevents the machining temperature rising, which both prolongs tool lives and gives relief from various problems caused by chips.

■ Shape differences of chips of the same weight (304)



Chips generated by low frequency vibration cutting

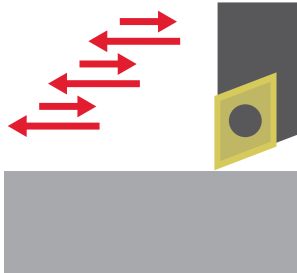


Chips generated by conventional cutting

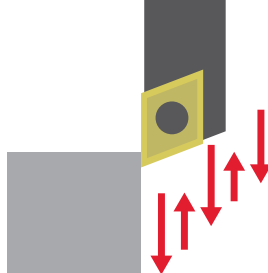
Variety of Machinable Geometries

Vibration cutting can handle a variety of types of machining in addition to linear machining on faces, including tapers, arcs, and drilling. Vibration cutting can be turned ON and OFF just by inserting G codes into a program, giving relief from chip entanglement and problems with the tool nose, depending on the material being machined.

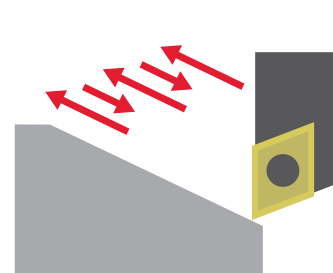
■ Horizontal face



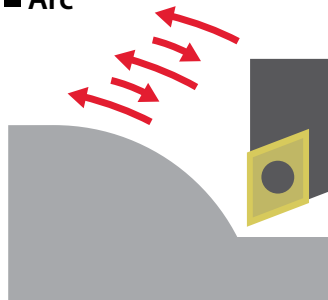
■ Vertical face



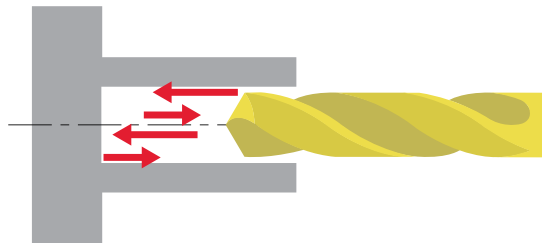
■ Taper



■ Arc



■ Drilling



Three vibration modes

The optimum vibration mode can be selected depending on the purpose of machining.



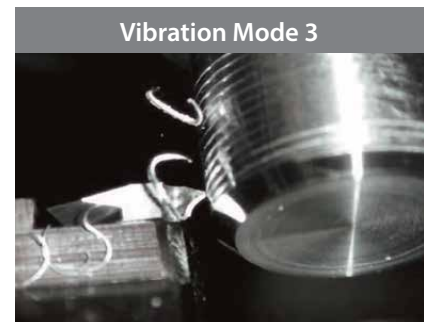
Breaking up chips

Designate the number of vibrations per workpiece rotation when fine swarf fragments are required



Drilling, or turning where high peripheral speed is required

Designate the amount of workpiece rotation per vibration when high peripheral speed is required for fine machining or deep, small-diameter holes



Breaking up chips in thread cutting

Processing method which alters the vibration timing within the threading pass when breaking up chips during threading processing is desired

For more information, please visit the Citizen Machinery LFV website.

<https://cmj.citizen.co.jp/english/product/lfv/>



What tools are suitable for LFV?

- It is desirable to use a sharp edge chipbreaker to improve chip control.
- Reduction of cutting force is required due to frequent biting of workpieces.

Recommendation

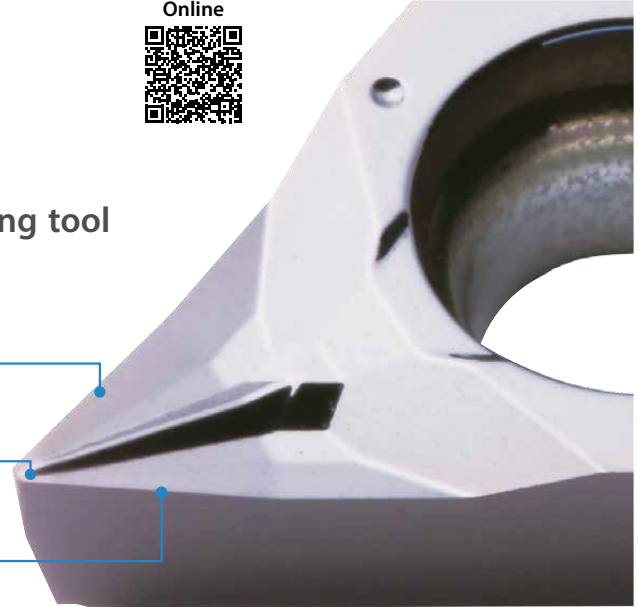
SK Chipbreaker

Molded Sharp Edge Chipbreaker

Unique sharp edge chipbreaker maintains long tool life and stable machining in LFV

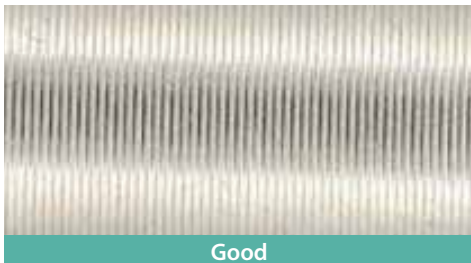


- Stable chip evacuation in large D.O.C. due to large rake angle.
- Chip control is improved in small depths of cut due to chipbreaker projecting out to the corner tip
- Cutting force is reduced as the cutting edge is lowered towards the center of the workpiece



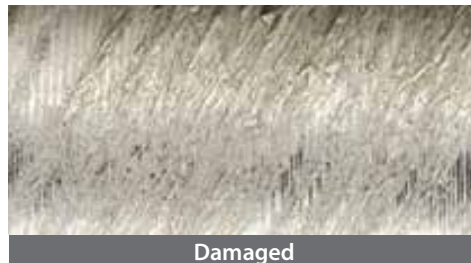
Surface Finish Comparison

SK Chipbreaker



Good

Conventional Chipbreaker



Damaged

Cutting Conditions : $V_c = 160$ sfm, D.O.C. = $0.110''$ $f = 0.002$ ipr
LFV conditions : Q2.0 (Amplitude ratio), D1.5 (The number of vibration) Insert : DCGT32505 type (SK, Standard)
Workpiece : S17400

Wear Comparison

Challenges

- Unstable machining can cause biting of the workpiece to occur frequently

Solution

- SK Chipbreaker reduces cutting force when biting and the sloped cutting edge prevents insert fracture

<Flank Wear Condition> 10 min Machining

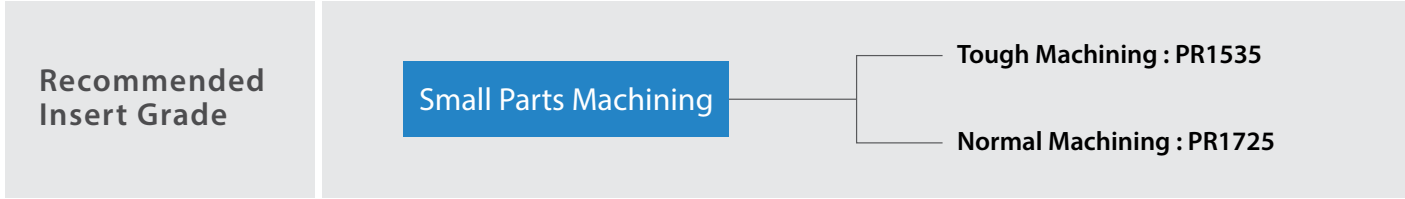
SK Chipbreaker



Conventional Chipbreaker



Insert Grade for LFV



Recommendation

PR1535

MEGACOAT NANO

View Online



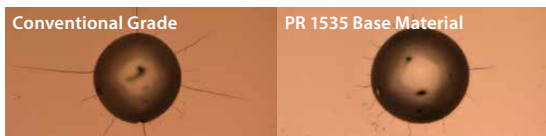
Fracture resistant with a tough substrate and high heat-resistant coating.
Stable machining of general steel, mold steel, and difficult-to-cut materials

MEGACOAT NANO®

- 1 Toughening by a new cobalt mixing ratio *Internal evaluation
- 2 Improved stability by optimization and homogenization of grains in the base material
- 3 MEGACOAT NANO coating technology for long tool life and stable machining

↑ 23%
Fracture toughness *

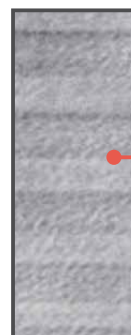
Cracking Comparison by Diamond Indenter (Internal Evaluation)



Long Cracks

Short Cracks

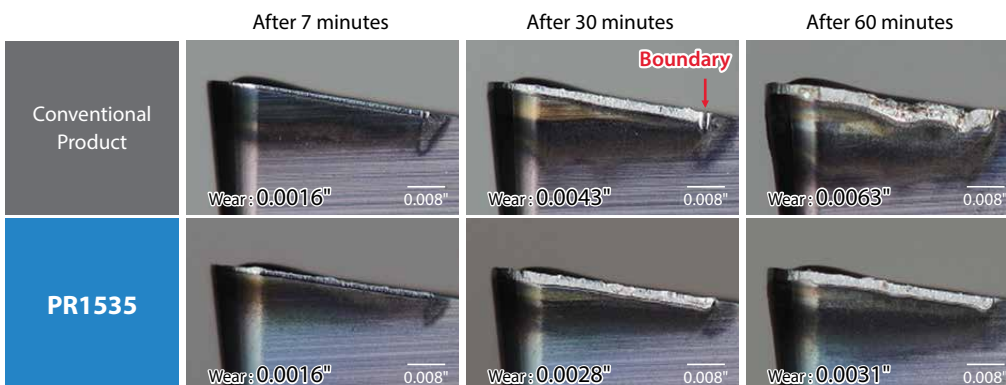
↑
Shock Resistance



MEGACOAT Base layer structure

PR1535 shows superior performance in steel machining under unstable conditions

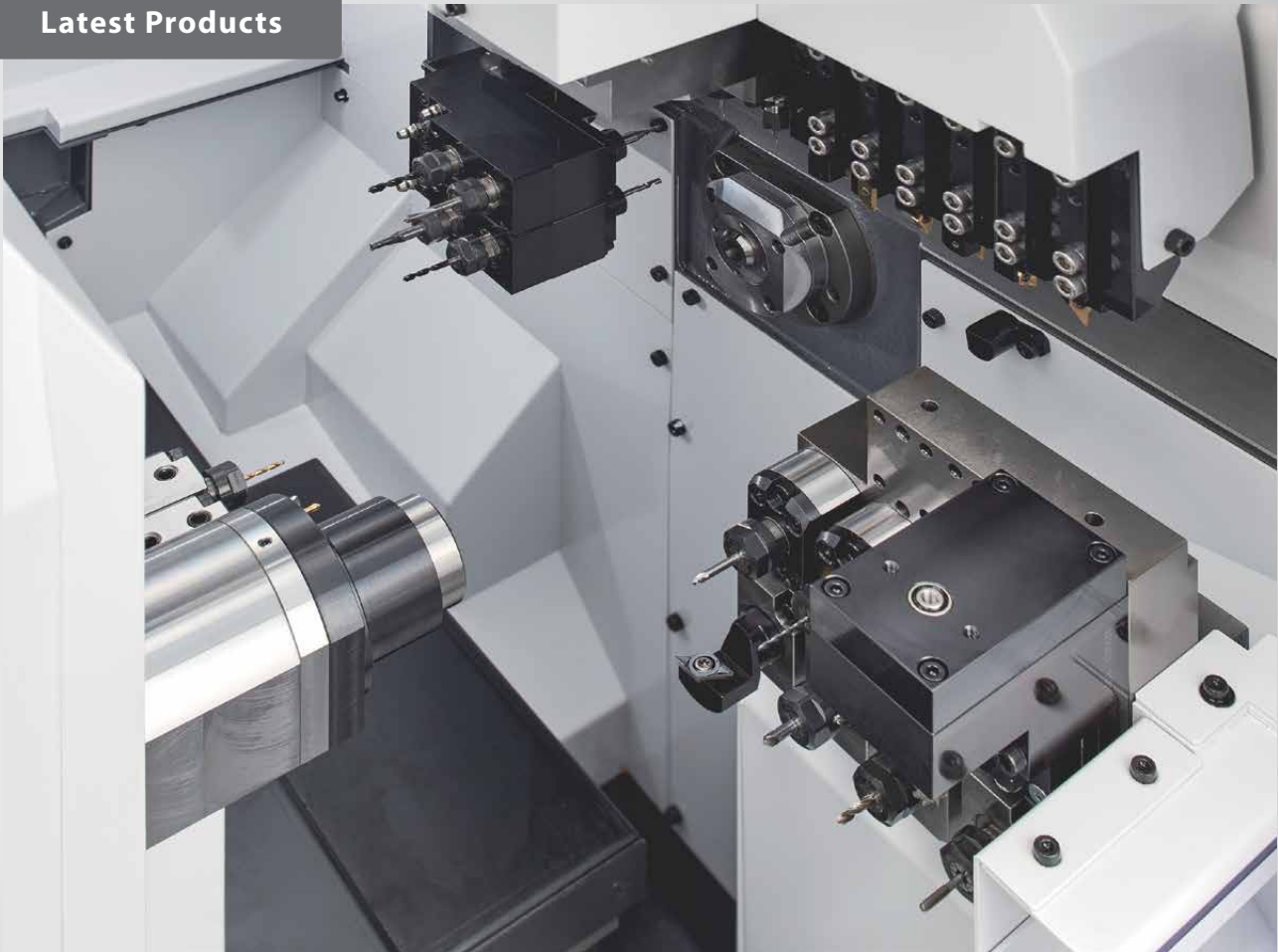
Wear Comparison (Internal Evaluation)



Cutting Conditions: LFV Q 1.5, D 0.5, Vc = 120 m/min, D.O.C. = 0.059", f = 0.0012 ipr (Instant Feed 0.004 ipr) Workpiece: W1-9

PR1535 of high toughness base material was effective for stable LFV machining.

CITIZEN MACHINERY
Latest Products



Cincom
L12



L12 premium model with modular tooling and Y2 axis

L12 for small-diameter machining with 5-axis control equipped with a high-speed spindle adapted a modular tooling system with Y2 axis on back spindle for even higher functionality. The built-in motor is used for the back spindle to support high-speed back machining. With the popular LFV function, it has evolved into a machine with high speed, high function and high productivity.

Learn more about
L12 Machines

*Link to Citizen Machinery website



Featured Product



Molded PCD Chipbreaker

APD Chipbreaker, AGT Chipbreaker

Newly designed molded chipbreaker controls chips
Provides improved productivity

- Molded chipbreaker with complex shape developed by Kyocera's advanced technology
- Good chip control improves productivity
- Improves down-time due to winding chips, smearing of the finished surface, and suppresses quality degradation and yield deterioration

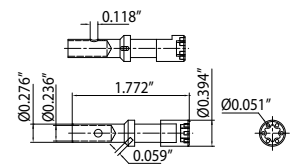
View
Brochure



L12 Tooling Proposal 5052

- "Adjustable angle end-face spindle" that allows for slanted hole drilling, enable you to perform various kinds of machining.
- Equipping of a Y2 axis to the back spindle enables drilling circumference of the hole and complex shape machining by end mill.

Workpiece Dimensions



Front

Opposite tool post

① T22 Drilling

131N 3XD ø6mm
EDP: 67630

Milling

③ T8 Drilling (Cross hole)

2ZDK030HP-1.5D

④ T11 Drilling (Diagonal hole)

2ZDK016HP-1.5D

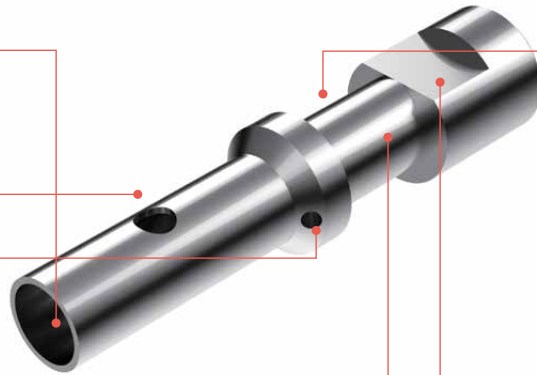
2ZDK-HP

New generation flat bottom drill. Stable machining in a wide range of applications including counterboring and drilling in cylinder surfaces



⑥ T10 End Mill Machining

3AFK060-090



Gang Tool Post

② T5 Front Turning

FEATURED

DCMT32505APD (KPD001)
SDJCR6-3JXFF



APD Chipbreaker

The uniquely designed molded chipbreaker controls chips and achieves excellent surface finish quality.

⑦ T1 Cut-off Machining

TKF12R100-S(PDL025)
KTKFR6-12JX

⑤ T3 Back Turning

FEATURED

TKF12R200-AGT (KPD001)
KTKFR6-12JX

Excellent cutting edge profile and good finished surface due to ultrafine particles (Average particle size of 0.5 μm)

Back Spindle

Back tool post

④ T35 Front Turning

FEATURED

DCGT32505MFP-SK (PDL010)
S19G-SDUCL11

PDL010

Hardness close to that of diamond with aluminum welding resistance. Delivers a high-gloss surface finish



① T33 Drilling

2ZDK045HP-1.5D

② T32 Drilling

2ZDK013HP-1.5D

2ZDK-HP

New generation flat drill. Chisel edge with S-curve provides high precision and stable machining results

View Online



③ T31 End Mill Machining

2FESS010-015-04

Featured Product



PDL010

DLC Coating

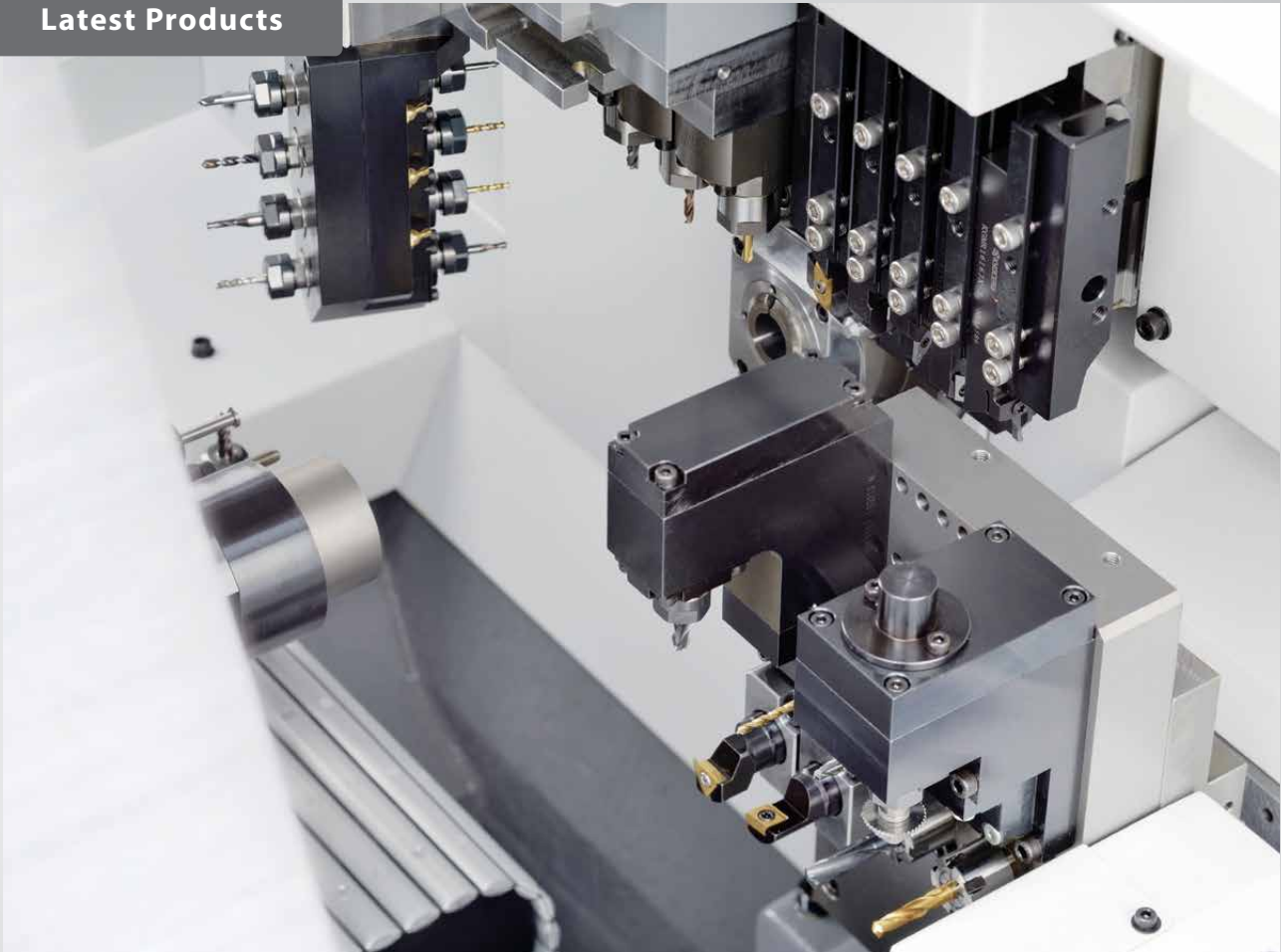
High Quality and Long Tool Life for Machining Aluminum

- Achieves long tool life with hardness close to that of diamond
- Excellent surface finish with aluminum welding resistance
- Large lineup for turning, cut-off, and milling

View Brochure



CITIZEN MACHINERY
Latest Products



Cincom
L20



CITIZEN's best-seller L20 has been designed for the new age in modular design

Ranging from a 5-axis machine with excellent cost performance to a high-end machine equipped with B axis and a back spindle Y axis, you can select the applicable machine from 4 models. Individual optimized specifications for flexibility from simple machining to complex machining.

Learn More about L20 Machines

*Link to Citizen Machinery website



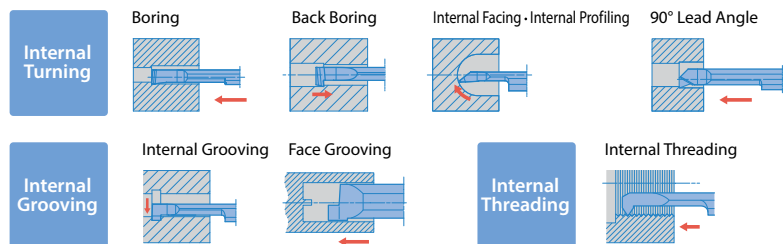
Featured Product



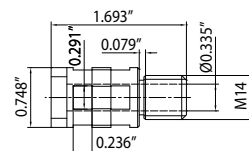
EZ Bar

For Micro Boring

Easy Adjustment and High Precision for a Wide Range of Machining Applications



Workpiece Dimensions



- Standard models for a wide range of products and machining
- Supports various drilling and end mill machining with B-axis and C-axis control

Front

Opposite tool post

② T23 Drilling
KDA0800X05S080C **FEATURED**

① T21 Drilling
KDA1000X05S100C **FEATURED**

KDA
New general purpose solid carbide drill KDA. The perfect balance between performance and cost. Curved cutting-edge design and special flute shape provides stable machining.



Gang Tool Post

⑤ T5 Front Turning
DCGT32505MFP-SKS (PR1725)
SDJCR5.72-3FFJCTM

PR1725
Newly developed PVD coating MEGACOAT NANO PLUS provides excellent surface finish and long tool life

View Online



⑦ T1 Cut-off Machining
GDM2020N-020PM (PR1535)
KGDR8.5-2JCTM

Milling

③ T11 End Mill Machining (Internal)
Z-Carb Z1M ø3.0mm
EDP: 46357



④ T13 End Mill Machining (External)
4TFK080-120

4TFK
High feed machining for difficult-to-cut materials such as stainless steel. Unequal flute spacing and variable lead design provide greater chatter resistance

⑥ T8 End Mill Machining (Cross)
4TFK060-090



Back Spindle

Back tool post

① T34 Front Turning
DCGT32505MFP-SK (PR1725)
S19G-SDUCL11

Molded sharp edge Chipbreaker SK Chipbreaker

Unique Chipbreaker enables improved chip control and reduced cutting force



② T33 Grooving
GBF32R150-010(PR1535)
S19G-KGBFL16

③ T32 Threading
TTX32R6001(PR1115)
S19G-KTTXL16



④ T31 Boring **FEATURED**
EZBR080080HP-015F (PR1225)
EZH08019HP-120

EZBar
Adjustable overhang length (EZ adjust structure)



Featured Product



KDA

High Efficiency Coated Solid Carbide Drill

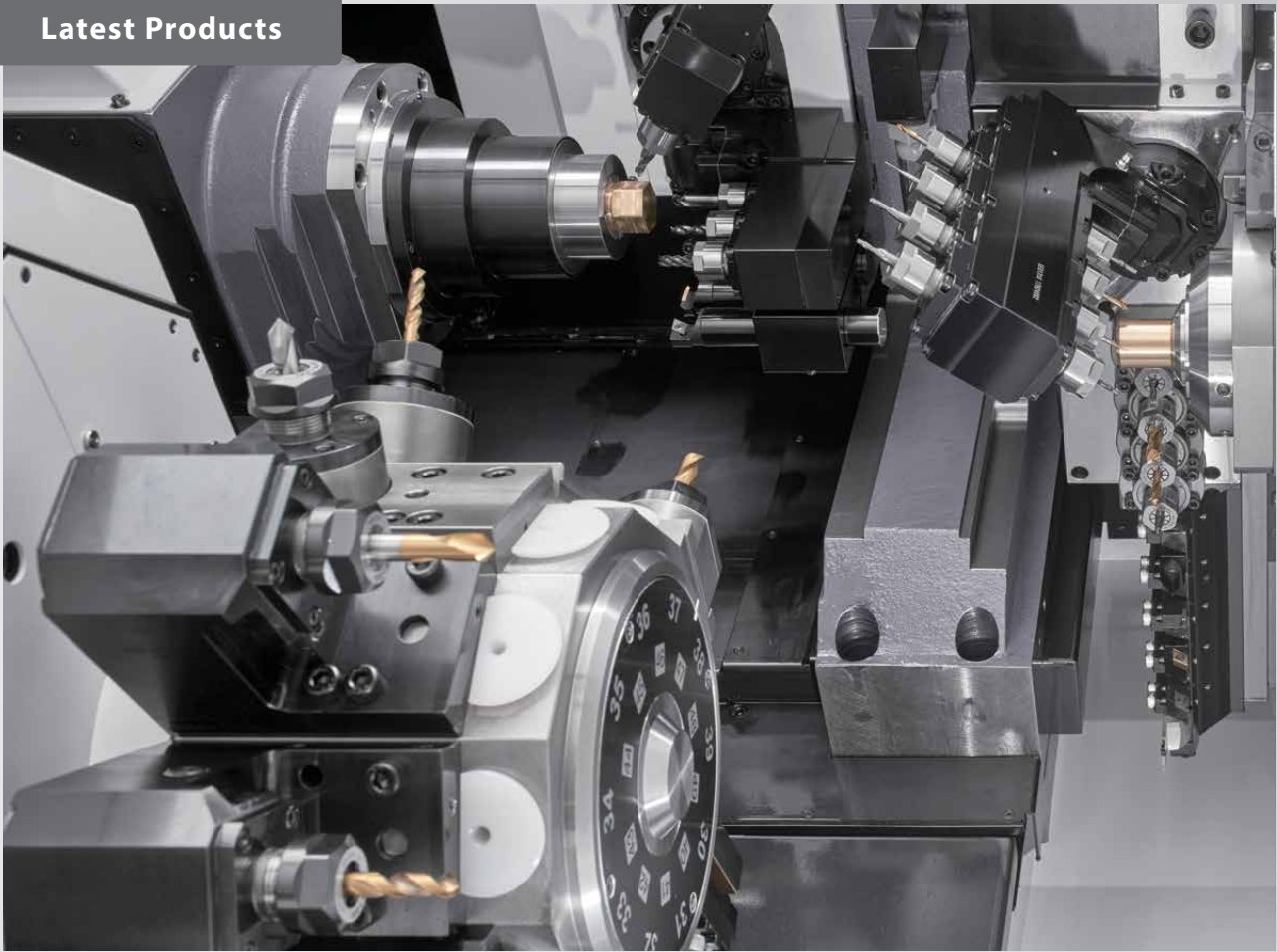
New K-Series is Now Available for Excellent All-Around Drilling Performance

New general purpose solid carbide drill is now available!
The perfect balance between performance and cost
Large lineup accommodates a wide variety of applications

View Online



CITIZEN MACHINERY
Latest Products



Cincom
M32



Ultimate gang tool + turret configuration machine Revamped M32

The new M 32, which is a synonym for the high-performance cincom, has been fully remodeled. In addition to the improved operability and workability of the new design, the newly redesigned turret tooling adopts "single drive" which is driven only by the selected rotary tool. The M32 leads improved machining capabilities, improved tooling life, low vibration and low heat generation.

Learn More about M32 Machines

*Link to Citizen Machinery website



Featured Product



GBF

Grooving Tools for Small Parts Machining

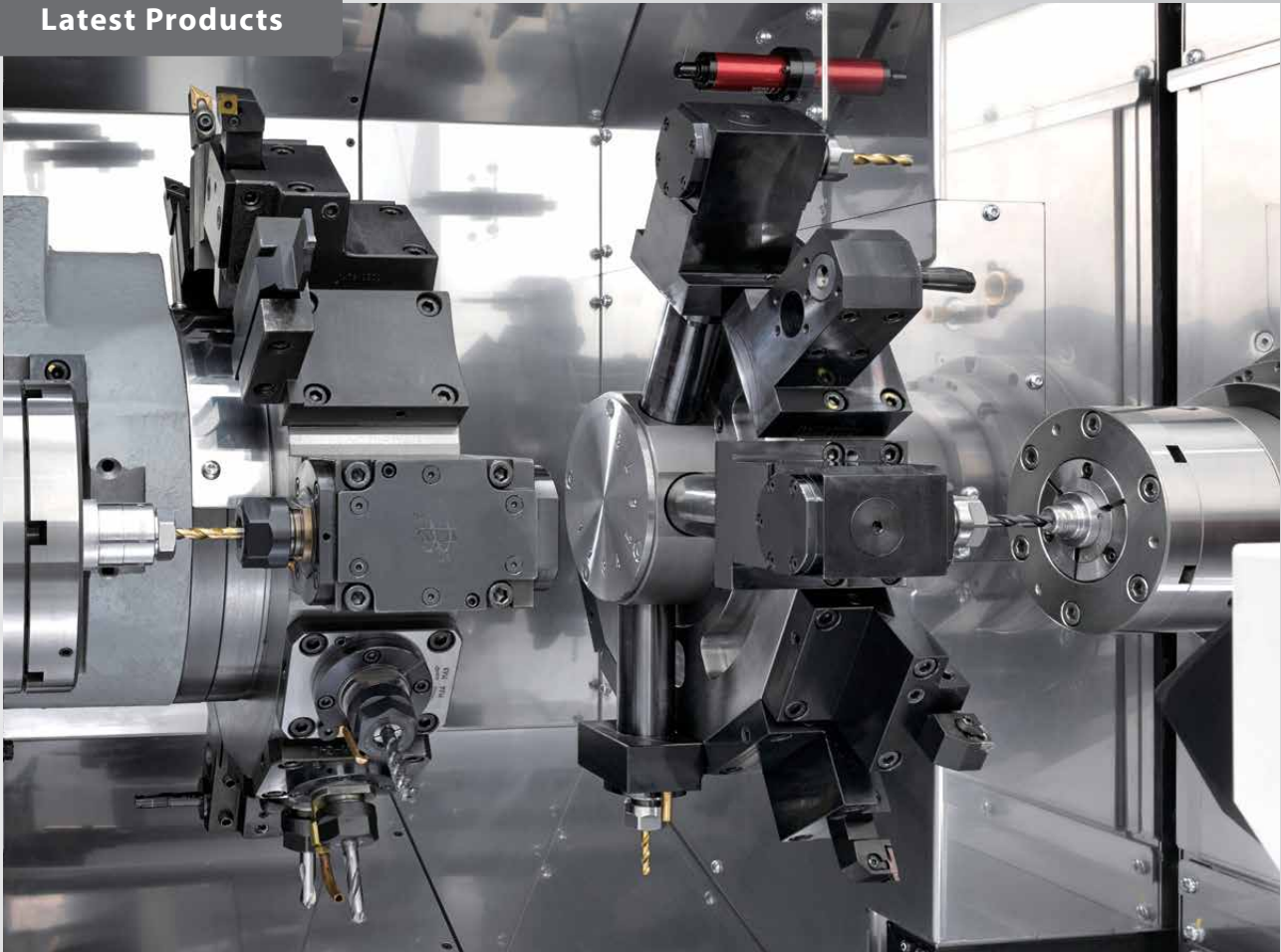
**Stable Chip Control and Excellent Surface Finish
High Precision, the Edge Width Tolerance : $\pm 0.02\text{mm}$**

- Groove widths from 0.25 mm to 3.00 mm and maximum groove depths up to 3 mm
- Long tool life and high efficiency machining achieved by MEGACOAT technology
- Cermet is available. Provides excellent surface finish

View Brochure



CITIZEN MACHINERY
Latest Products



Miyano
BNJ42/51



Proprietary back working turret dramatically reduces idle time

In addition to the high efficiency machining by simultaneous machining at right and left, the superimposition machining drastically shortened machining time. Superimposition control, where the move commands of turret No. 2 that can move in the X and Z directions are overlapped on the movement of turret No.1, can achieve substantial reductions in machining time. In addition, the Y-axis function of the main turret allows easy side milling, enabling large-diameter threading and machining with uneven parts that were previously impossible.

**Learn More about
BNJ42/51 Machines**

*Link to Citizen Machinery website



Featured Product



KPK Series

High-Performance Cut-Off Solutions

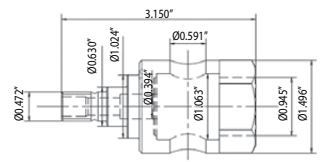
**Unique Design for Superior Performance in
Various Cut-Off Operations**

- Easy insert replacement reduces downtime
- Features new insert, blade, and tool block
- Unique chipbreaker for long tool life and stable machining

View
Online



Workpiece Dimensions



- High efficiency machining by simultaneous machining at right and left with 2 spindles and 2 turrets
- Main turret provides easy side milling and polygon machining

Front

⑦ T11 Boring

TPGT18151MFP-PF (PR1725)
E08L-STLPR09-10AN
SHA0825.0-135

⑥ T24 Drilling

DA0900M-HQP (PR1535)
SS0375-DRA090M-8

DRA-HQP

Improved centripetal forces with special two-step bottom
Excellent cylindricity, roundness and surface finish in steel machining



⑧ T12 Cut-off Machining

PKM30N-025PM (PR1625)
KPKB26-3JCT (Blade)
KPKTB20-26JCT (Block)



KPK Series

Reduce down time with fast insert replacement
JCT type compatible with internal coolant

FEATURED

① T1 External, Face Finishing

CNMG432PP (CA025P)
DCLNR16-4DJCT

Double-Clamp JCT

The unique coolant structure improves tool life and chip control. Tool life is improved even under normal pressure.



② T2 Polygon Machining

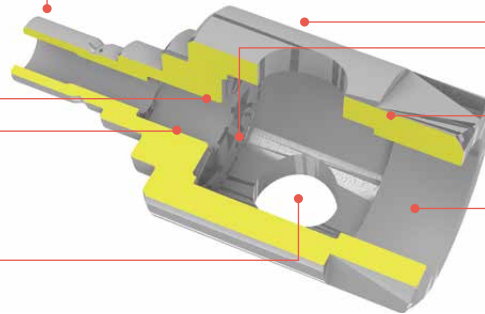
Custom Polygon Cutter

③ T3 Drilling

DA2400M-FTP (PR1535)
SF1000-DRA240M-3

④ T6 Internal Grooving

KGDIR10B-3
GDM3015N-040GMI(PR1225)



⑤ T9 Cross Hole Machining

ZZDK150HP-1.5D

Back Spindle

① T1 External Roughing

TNMG331R-LD (PR1725)
DTGMR2020K-16JCT

② T2 External Finishing

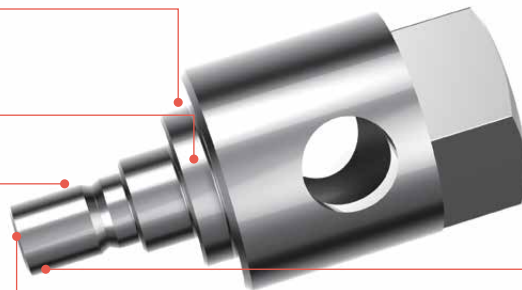
DNMG431PP (PV730)
DDJNR12-4BJCT

View Online



③ T7 Threading

16ER125ISO-TQ (PR1515)
KTNR12-16JCT



④ T4 Drilling

KDA0700X05S080C



⑤ T5 Boring

EZBR070070HP-015F(PR1725)
EZH07025.OCT-135

EZ Bar

Easy adjustment and high precision for a wide range of machining applications. Newly developed PVD coating PR1725 added to the lineup. Provides long tool life and excellent surface finish.

View Brochure



Featured Product



DRA Magic Drill

High Efficiency Replaceable Tip Drills

High Precision Insert for Steel Machining HQP

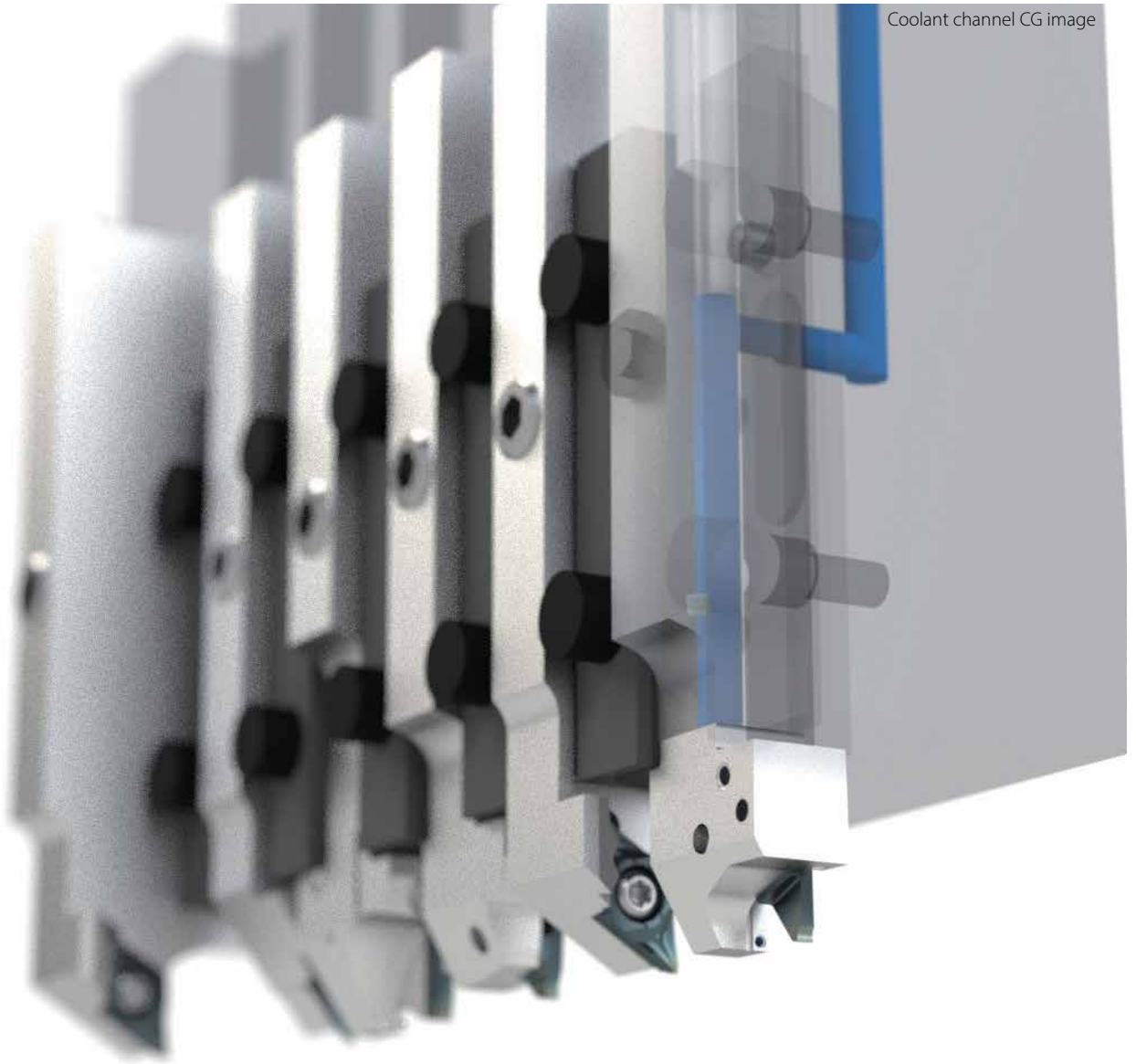
Newly Developed Insert Provides High-precision Drilling Capabilities

- Special two-step bottom, large rake angle and double margin design reduce initial shock for higher-precision machining
- Excellent surface finish with unique flute shape. Controlled chips reduce scratches on the hole wall.

View Online



Coolant channel CG image



USING **COOLANT-THROUGH TECHNOLOGY** CAN DRASTICALLY IMPROVE MACHINING PERFORMANCE



KYOCERA Precision Tools

102 Industrial Park Road
Hendersonville, NC 28792
Customer Service | 800.823.7284 - Option 1
Technical Support | 800.823.7284 - Option 2



Official Website | www.kyoceraprecisiontools.com
Distributor Website | mykpti.kyocera.com
Email | cuttingtools@kyocerapti.com

©KYOCERA Precision Tools
09/2021, 2K Printed in U.S.A.