

MST's SHRINK-FIT HOLDER SLIMLINE is

a system to hold tools (carbide) firmly and accurately by heating and cooling the holder (steel).

It is different from the existing mechanism of chucking, and is a revolutionary holder that uses the science of material expansion and shrinkage. SLIMLINE is made of MST's exclusive material which is developed to shrink-fit (insert/remove tool) easily at low temperatures (300°C on average).

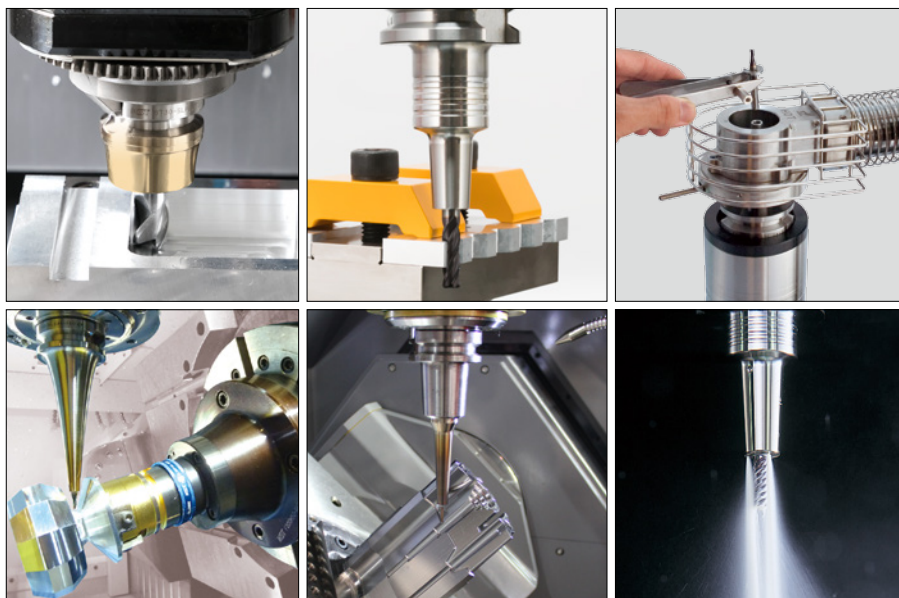
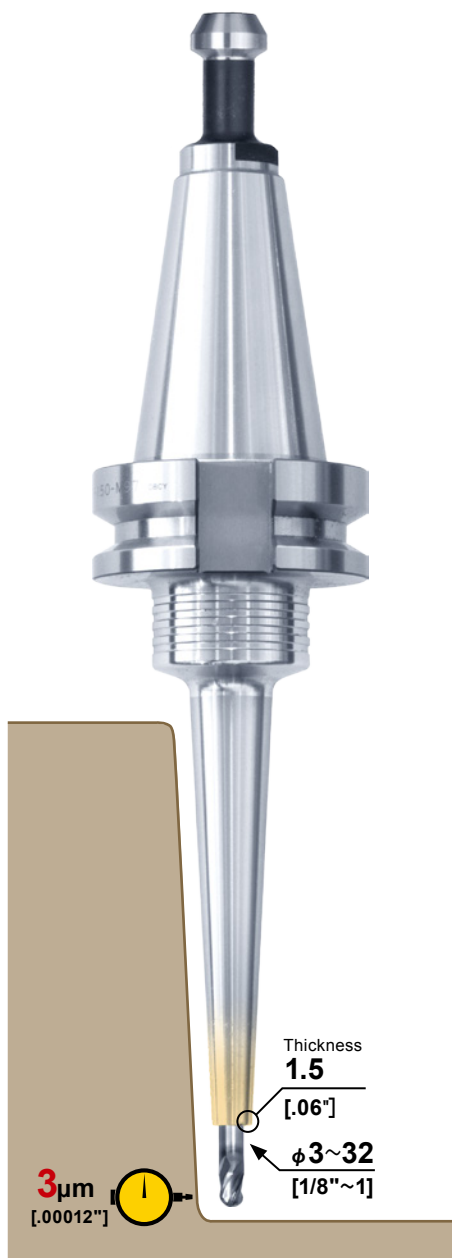
It also has a coefficient of thermal expansion that is 1.6 times higher than that of regular steel. Unlike conventional holders, SLIMLINE does not require any parts such as collets and nuts to hold tools. The simple mechanism can make the nose very thin, even to a thickness

of 1.5mm, and achieve the slimmest holder on the market. It creates less work-piece interference and minimizes cutter projection in order to achieve stable and high-rigidity machining.

Our line-up contains 4,000 kinds to offer the most suitable holder design for a large variety of work-piece shapes. These are benefits that only SLIMLINE can offer.

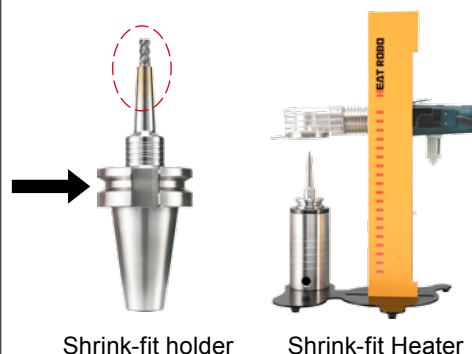
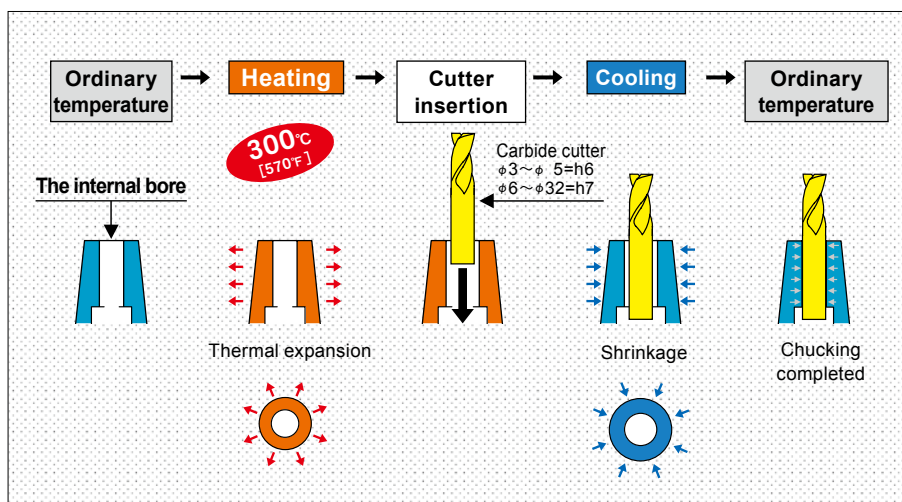
We promise that SLIMLINE will demonstrate its outstanding capabilities in 5-axis, micro-precision, heavy-duty, and many kinds of machining in order to improve accuracy, extend tool life and reduce production cost.

PAT.



Principle of shrinking technology

- A shrink-fit holder is a chucking system that utilizes the difference between the coefficients of thermal expansion of the holder material (steel) and the cutter (carbide).



Special material for shrink-fitting

Thermal expansion coefficient is 1.6 times higher.

- Special material is applied to MST's shrink-fit holders. This material has a higher coefficient of thermal expansion than that of competitor's shrink-fit holders, and you can shrink-fit at lower temperatures than that of competitors. Also, due to its superior heat resistance temperature, the holder doesn't receive any damage by overheating.

Shrink-fitting temperature and heatproof temperature

MST's SLIMLINE

Heatproof temperature

- You can heat it up to 720°C [1310°F] without any issue.

Shrink-fitting temperature

- Since the heating temperature is lower than 430°C [810°F], there is no adverse impact on holder life.

Coefficient of thermal expansion

- Between the holder(special material) and cutter(carbide).
... 10.5×10^{-6} mm/°C

1.6 times
(Compared to
competitors'
holders)

The tip of the shrink-fit holder doesn't get burned due to the low heating temperature.



Long service life

Heatproof temperature
720°C
[1310°F]

Safety ratio

Maximum heating temperature
430°C
[810°F]

Shrink-fitting temperature

Competitors' shrink-fit holder

Heatproof temperature

- Heat resistant temperature 580°C [1080°F], which is 20% lower than that of MST's proprietary material."

Shrink-fitting temperature

- They need 690°C [1270°F] for shrinking operation, and it means over heating. Thus, through repeated heating and cooling cycle, the internal bore of the shrink-fit holder deforms, and then the cutter doesn't go into the internal bore.

Coefficient of thermal expansion

- Between the holder(die steel) and cutter(carbide)... 6.5×10^{-6} mm/°C

Short life

Maximum heating temperature
690°C
[1270°F]

Over Heating

Heatproof temperature
580°C
[1080°F]

- Oxidation
- Contraction of a bore dia.
- Reducing hardness

The shrink-fit holder burns due to the high heating temperature.

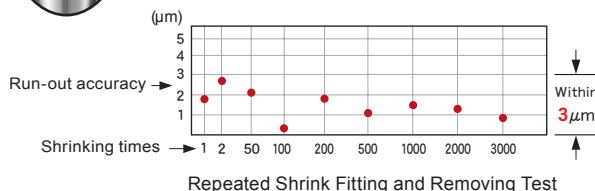
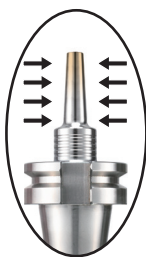


The difference between the maximum heating temperatures of MST's shrink-fit holders and our competitors' (3mm dia. shank cutter).

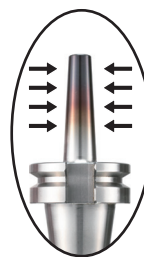
The lifetime of shrink-fit holder

MST's SLIMLINE

A shrink-fit temperature of a SLIMLINE holder is as low as 430°C maximum. It never exceeds a heatproof temperature of 720°C. Repetitious shrinkage fitting does not cause the deterioration of a holder.



Competitors' shrink-fit holder



Heating several times at 700°C

The internal bore
Contraction of a bore dia.

The cutter is difficult to insert.
Run-out accuracy deteriorations.

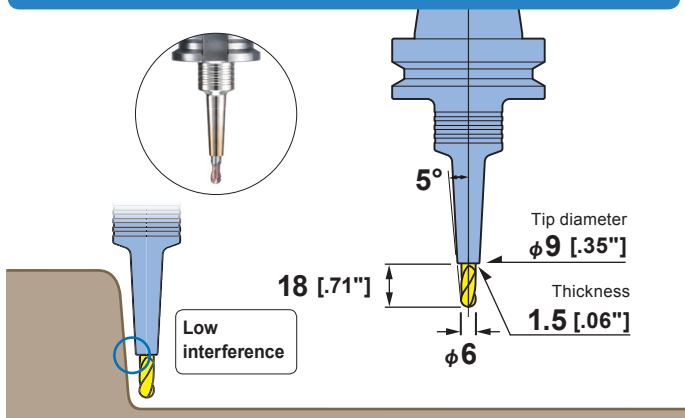
Repeated over-heating causes change in properties of the materials, the holder will be reduced performance.

Super-slim design

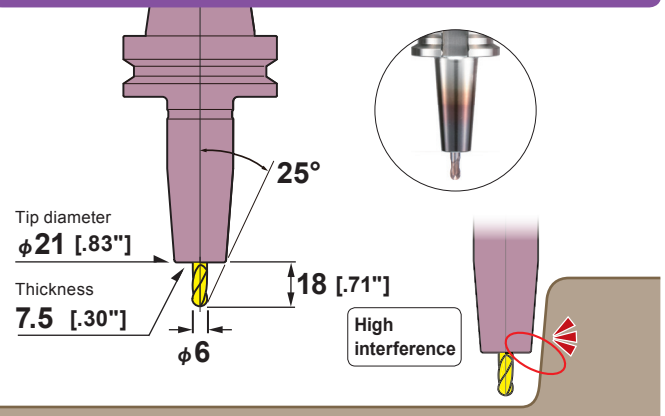
Displaying the highest performance at deep machining

- The holder tip thickness with 1.5mm minimizes interference against the workpiece and jig fixtures.

MST's SLIMLINE



Competitors' shrink-fit holder

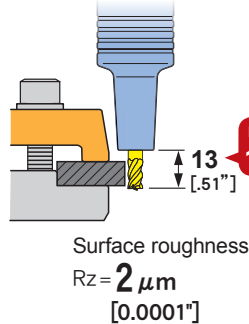


High rigidity

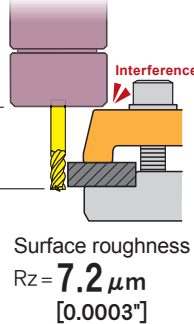
Shortest cutter projection

- The cutting tool life is extended and the finishing surface quality is improved tremendously thanks to reduced deflection.

SLIMLINE



Collet chuck



Deflection amount is proportional to projection length³.

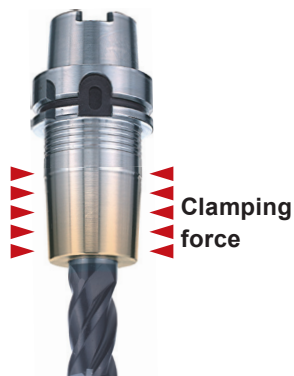
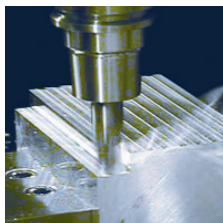
Length becomes 2 times → Deflection amount becomes 8 times

$$S = \frac{6.8 \times F \times L^3}{E \times D^4}$$

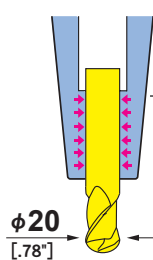
S : Deflection amount
L : Tool projection
E : Young's modulus
D : Shaft diameter
F : Load

High clamping force

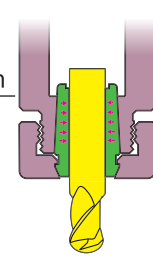
3 times greater clamping force (compare with a collet chuck)



SLIMLINE



Collet chuck

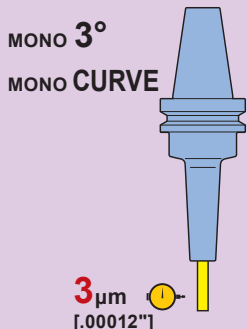


Clamping force
3 times

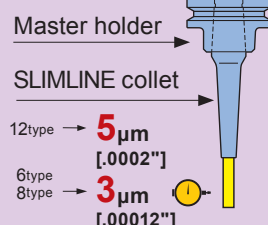
High run-out accuracy

Stable high run-out accuracy can be achieved at all times.

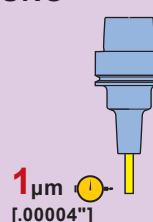
- There are no tightening parts (such as nuts and collets) to hold cutters. The simple design maintains high-accuracy chucking.



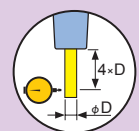
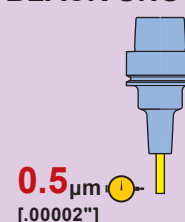
2 PIECE type



UNO

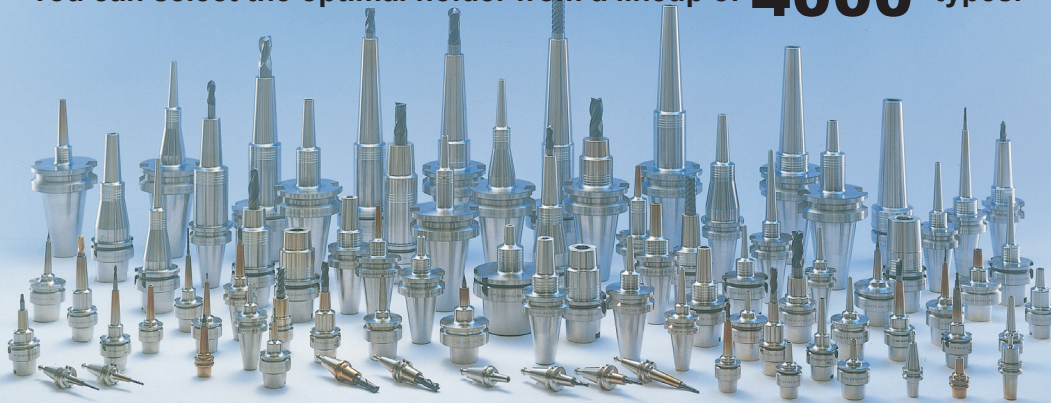


BLACK UNO



A broad line-up

MST's shrink-fit holder, SLIMLINE has an amazing line-up for all kinds of applications!
You can select the optimal holder from a lineup of **4000** types.

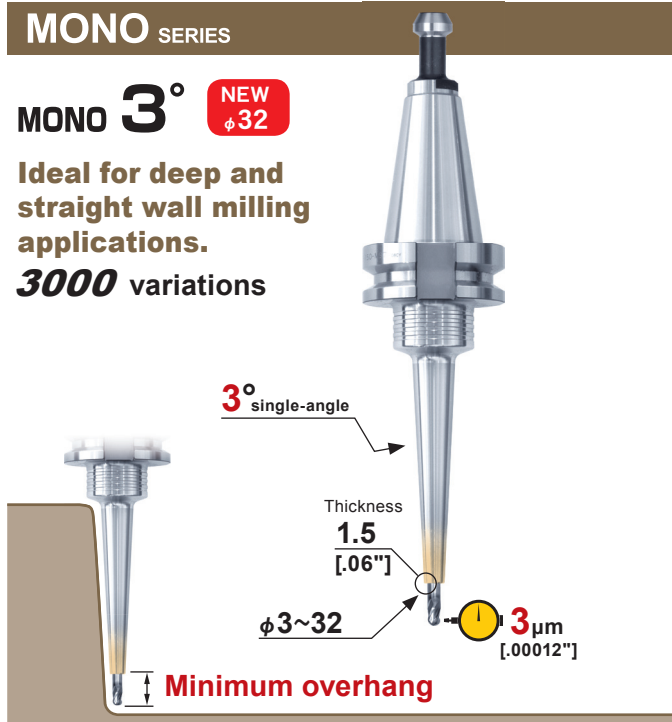


MONO SERIES

→ P. 16

MONO 3° **NEW** φ32

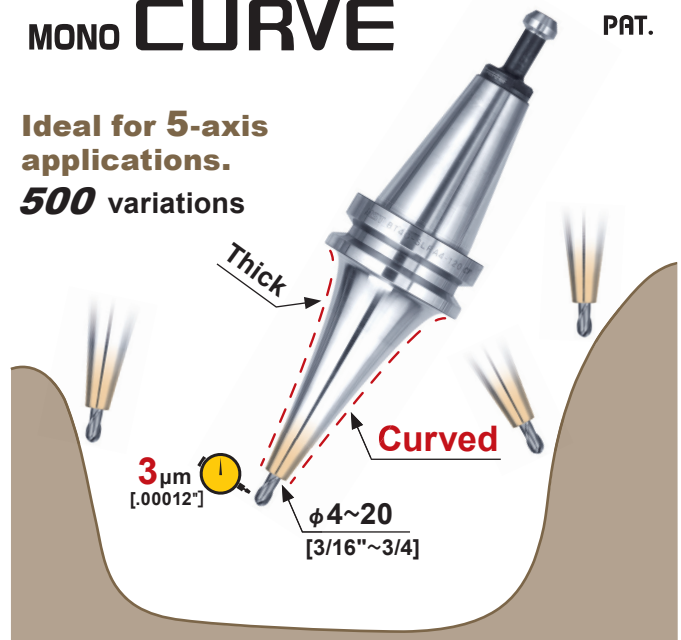
Ideal for deep and straight wall milling applications.
3000 variations



MONO CURVE

PAT.

Ideal for 5-axis applications.
500 variations

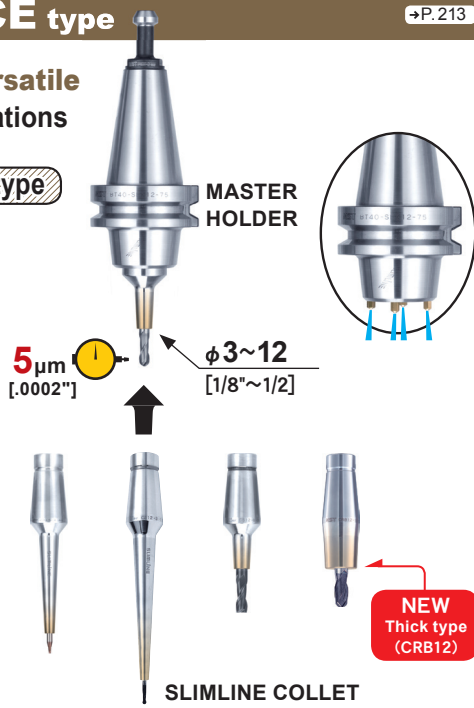


2 PIECE type

→ P. 213

Highly versatile
250 variations

Modular type



UNO

→ P. 221

Superior accuracy

NEW

BLACK UNO

UNO

PAT.

0.5μm
[0.00002"]

1μm
[0.00004"]

HYPER VERSION

→ P. 223

Heavy-duty endmill holder with high clamping force

Shortest L dimension

φ12~25



Z

→ P. 227

Anti-pulling out and anti-slippage mechanism

PAT.

φ8~25
[5/16"~1"]



SHRINK-FIT HEATER

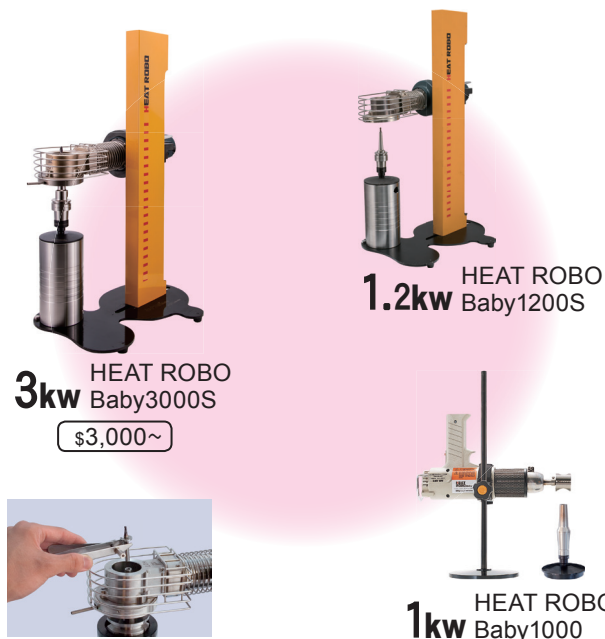
HEAT ROBO

Shrink-fitting at low heating temperature

- Shrink-fitting temperature is comparatively low, about 300°C, which is safer for the materials.
Tools can be changed by the inexpensive and compact shrink-fit unit.

Hot-air Heater

- The heater will not over-heat the holder.



1.2kw HEAT ROBO Baby1200S

3kw HEAT ROBO Baby3000S
\$3,000~

1kw HEAT ROBO Baby1000

Induction Heater

- Clean and safe Induction Heater. Desktop type.



1.2kw HEAT ROBO DENJI 1200S
\$9,200~

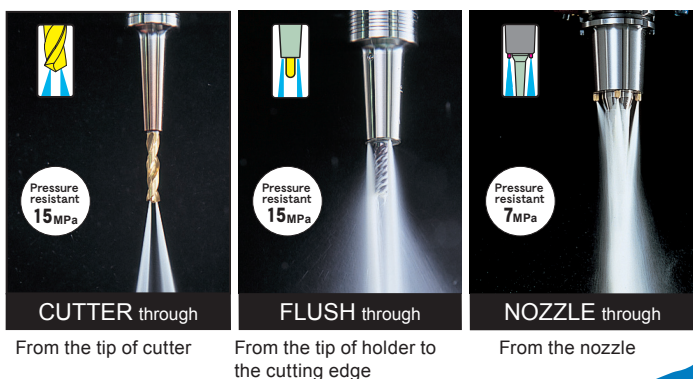
5kw HEAT ROBO DENJI 5000S

For COOLANT through

Withstanding pressure 15MPa

7MPa (NOZZLE through)

- The shrink-fit holder has a very simple configuration without a collet or a tightening nut. It is easily and completely compatible with through spindle coolant.



CUTTER through
From the tip of cutter
Pressure resistant 15MPa

FLUSH through
From the tip of holder to the cutting edge
Pressure resistant 15MPa

NOZZLE through
From the nozzle
Pressure resistant 7MPa

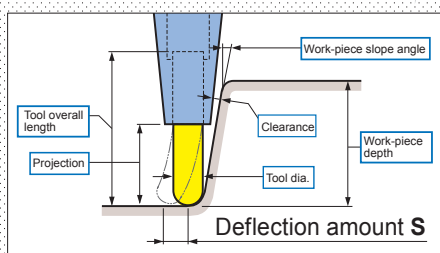
**Ideal for carbide
coolant-thru drills!**

3.175 3 4 5 6 7 8 9 10 11 12 16 20 25
Applicable for all drill shanks.

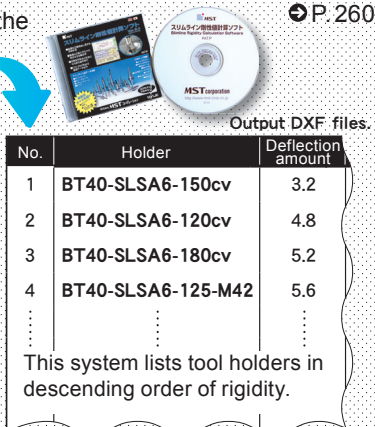
Rigidity calculation software

Holder automatic selection

- Automatically select optimum holders in the order of smaller deflection value S by inputting tool and work-piece information.



Enter your tool holder, cutting tool, and work-piece information.



Output DXF files.

No.	Holder	Deflection amount
1	BT40-SLSA6-150cv	3.2
2	BT40-SLSA6-120cv	4.8
3	BT40-SLSA6-180cv	5.2
4	BT40-SLSA6-125-M42	5.6

This system lists tool holders in descending order of rigidity.

USER Customization

Modifying outer-dimension

- When you have interference using a standard holder, you can customize it yourself.



➔ P. 257

- MST can customize upon your request.
- There is a dimensional limitation for customizing.

Production improvement examples

Examples 1 Improved tool design

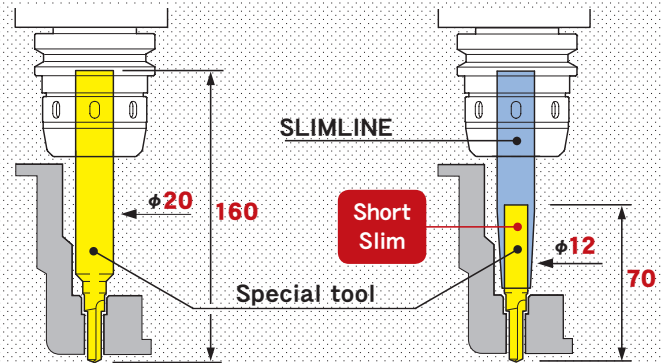
- Reducing the overall length and diameter of the special cutting tool.



Clutch Housing



Special tool cost
50% down
¥60,000 → ¥30,000



Examples 2 Integration of a cutting tool and a holder

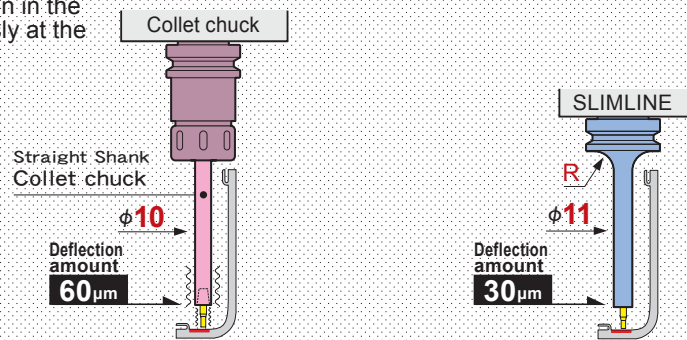
- SLIMLINE Solid type with the thinnest body design in the world allows the rigidity improvement tremendously at the straight wall application.



Smart phone



Tool life
3 times longer



Examples 3 Interference avoidance.

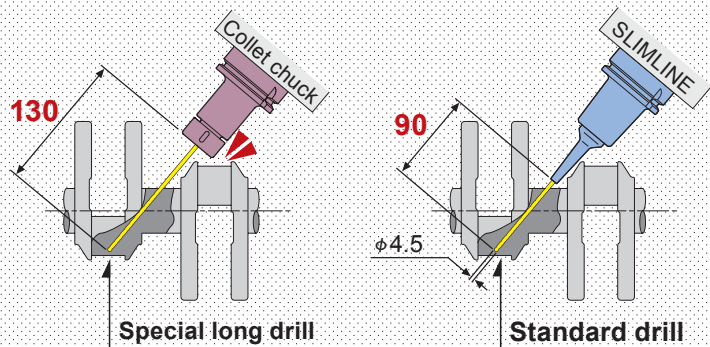
- Replacing the special long drill to the standard drill.



Crankshaft



Tool cost
reduction
¥23,000 → ¥12,500
Shortens
machining time
1min. → 30sec.



Examples 4 Small-size drilling

- SLIMLINE UNO allows dia. 0.07mm drilling.



Printer head parts



From impossible to
possible

