# HY-DUAL CHUCK PAT.

**TOOL HOLDER FOR DIFFICULT TO MACHINE MATERIALS**

POINT 1

## Dual-clamping method

Dual chucking by Hydraulic & Mechanical
Only high rigidity & high clamping power can prevent the end mill from being pull-out and can prevent chattering.
SHOWA has solved the so-called "wooden pestel phenomenon" which causes the pulling out of end mill,
by clamping the cutting tool's shank nose & shank end.
"Vibration" caused by chattering is removed by the attenuation mechanism of hydraulic and spring.

POINT 2

## Structure

Simple chuking by a single to be made by SHOWA（Japanese and American, patent acquistion finished） SHOWA present one action, easy chuking（Patent acquired in Japan and USA）.

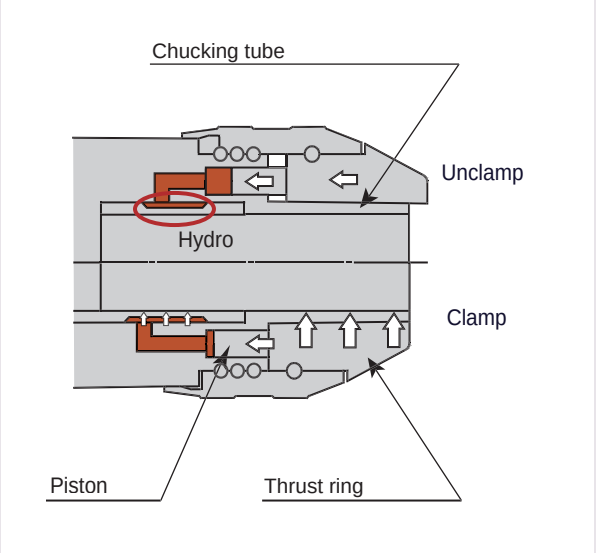
① Thrust rilg is plled down.

② At the same time, the piston is being pressed down.

③ Chucking tube shrink.

④ At the same time, the hydraulic clamping is activated.

⑤ Clamping is complete.



POINT 3

# "Wooden pestel phenomenon"

A tool, while being deformed by a bending moment in the milling process, twists in the tool holder, the deformation occurs repeatedly by high pressure in a short stroke.(Bending moment: Bending resistance R (N) x tool protruding amount L (m)). The mouths of both the collet and the holder will expand and wear flare by this movement. These mouths are easily deformed by the principle of leverage, as the ratio below is increased. L (tool protruding amount) /H (tool gripping length) The material such as steel having a lower Young's modulus is more likely to deform than the carbide of the tool. A circumference difference [e=π(D1-D)] occurs between the tool shank and the holder mouth because of abrasion expansion.
The tool turns more than the holder and at the same time it starts pulling out little by little. In addition, debr is generated in the worn area creates a rust ring and is adhered mainly to the shank. It is considered that, as measures, to reduce the bending moment is mainly common.

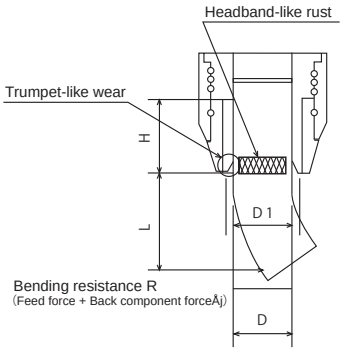



図1 direct chucking

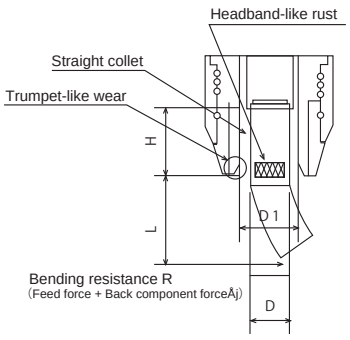



図1 Chucking throgh collet

POINT 4

# Machining Performance

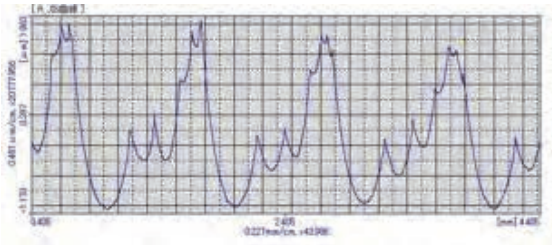
Test cut with Hy-Dual chuck and conventional milling chuck in the same program

## Comparison of surface roughness

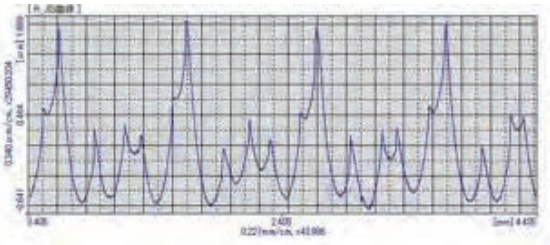
- Holder in use : BT50-HDU20-100(HY-DUAL CHUCK)
  BT50-HPC20-105(MICRON CHUCK)
- Cutting tool : Six flutes Cemented carbide endmill
- Work materials : SKD61
- Cutting condition

| Ap | Ae | Rotational speed | Feeding rate | Tool projection |
|---|---|---|---|---|
| 30mm | 1mm | 1900min$^{-1}$ | 1920mm/min | 55(L/D=2.75)mm |

- Result: improvement of surface roughness was observed



HPC Ra=0.64μ



HDU Ra=0.360μ

DIMENSIONS BT▸P.61,62 | HSK▸P.130