

Micro-hole Drilling Technology for Making Minute Flow Passage

1. Micro-hole for analysis equipment

The nozzles or valves used in an analysis equipment, for example, are required to have minute flow passages in which a liquid or gas flows through. FUTA-Q's micro-hole drilling technology can make minute holes on various kinds of materials to solve the clients' problems with minute flow passages.

2. Micro-hole drilling example

FUTA-Q can produce parts in high accuracy with micro holes using our various kinds of facilities such as a machining center with thinner drills than hair and a laser processing machine.

- Material: Including hard-to-process materials such as Hastelloy, Inconel, ceramics, magnesium, carbide, stainless steel, and noble metals.
- Processed sample: The cut sample on Fig. 1 shows a nozzle whose six flow passages join at the center of the circle with the PCD of 2.5 mm. The vibration of the drill bits is well suppressed so that the apertures of the holes have no burrs.

Material: SUS306

Work thickness: 15 mm

Nozzle dia.: 0.2 mm

Nozzle angle: 35°

The holes are evenly arranged on the circle with the PCD (Pitch circle diameter) of 2.5 mm. (Fig.2)

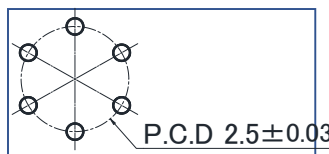
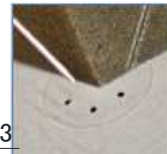
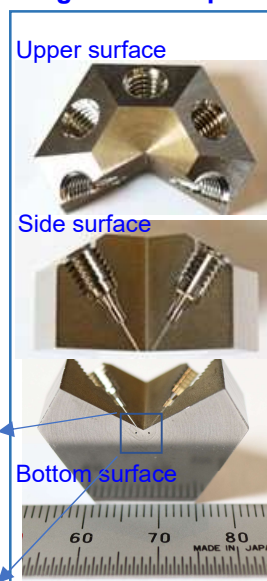


Fig. 2



Enlarged view of holes

Fig.1 Cut sample

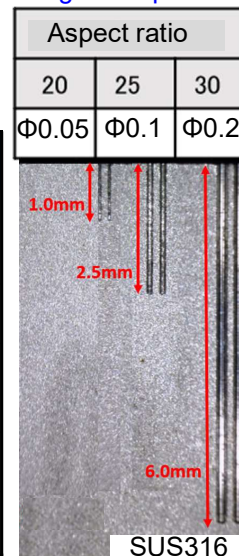


3. Deep hole drilling with small diameter

Fig. 3 shows the cross-sectional image indicating the aspect ratios for deep holes with small diameter. Aspect ratio, parallel accuracy, and surface roughness are adjustable according to a client's requirement.

Machines	Minimum drilling diameter	Spindle speed (rpm)	Characteristics
High-precision & high-speed micromachining machine	0.05 mm	40,000	High precision micromachining with small-diameter drills
Small CNC automatic lathe	0.07 mm	12,000	Machining with small-diameter drills
Swiss type automatic lathe	0.10 mm	24,000	Continuous cutting for a long side rod with small-diameter drills
Fiber laser machine	0.05 mm	—	High speed drilling for a thin sheet or pipe
Femtosecond laser machine	0.01 mm	—	Drilling micro-holes for any thin materials

Fig.3 Deep holes



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