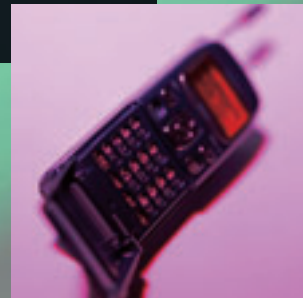
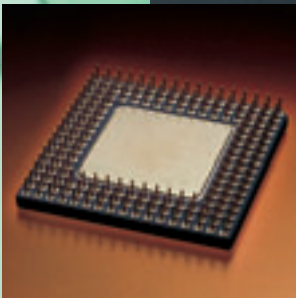
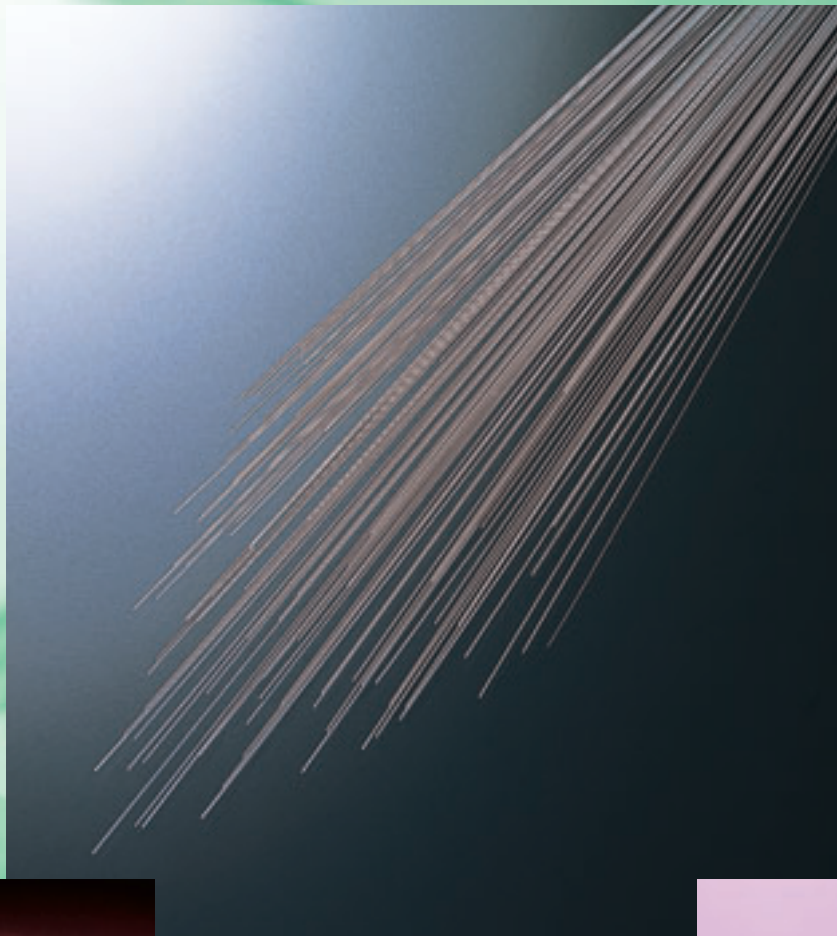


Ultra-fine Wire Series of Hard Materials

Micron Hard



Ultra-fine Wire Series of Hard Materials “Micron Hard”

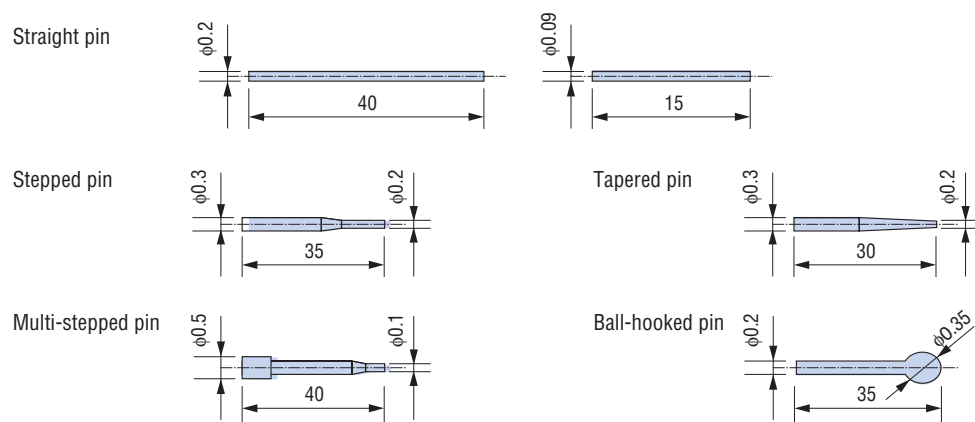
- Extremely fine wires with high hardness, “HSS Micron Hrad”, which are already heat-treated. Dia.0.04 mm is available.
- As sinterd fine wires, “Carbide Micron Hrad”, which have excellent straightness. Dia.0.3 mm is available.



General Specifications and Characteristics

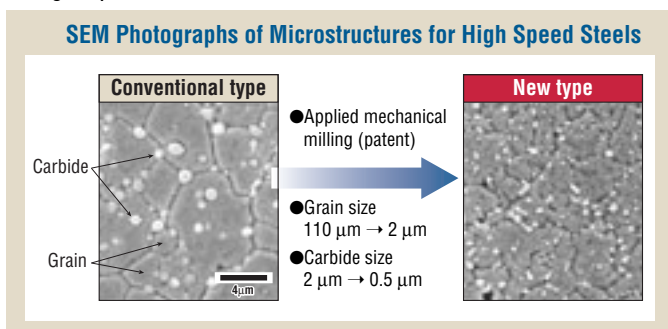
Materials	Type of material	Hardness (HV)	Bending strength (GPa)	Dimension (mm)
HSS Micron Hard	P/M High Speed Steel (FAX40D, 40SS)	900~950	4.5~5.0	Dia.: φ0.04~0.4 Length: 10~600
Carbide Micron Hard	Cemented Carbide (HF13T, 14T, 15T, KF10D)	1250~1850	2.5~4.8	Dia.: φ0.05~0.8 Length: 10~400 (As sintered: φ0.3~1.0)

Shapes of Typical Products

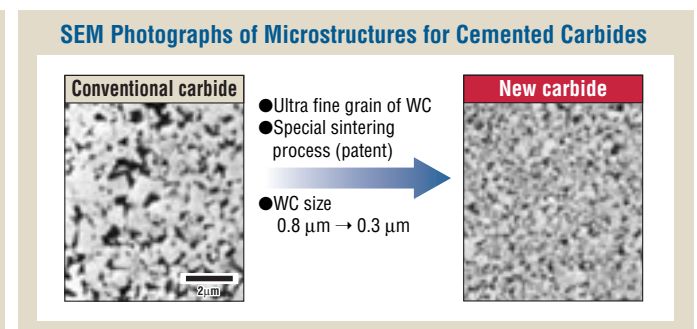


Essential Points of the Development

High Speed Steel Micron Hard

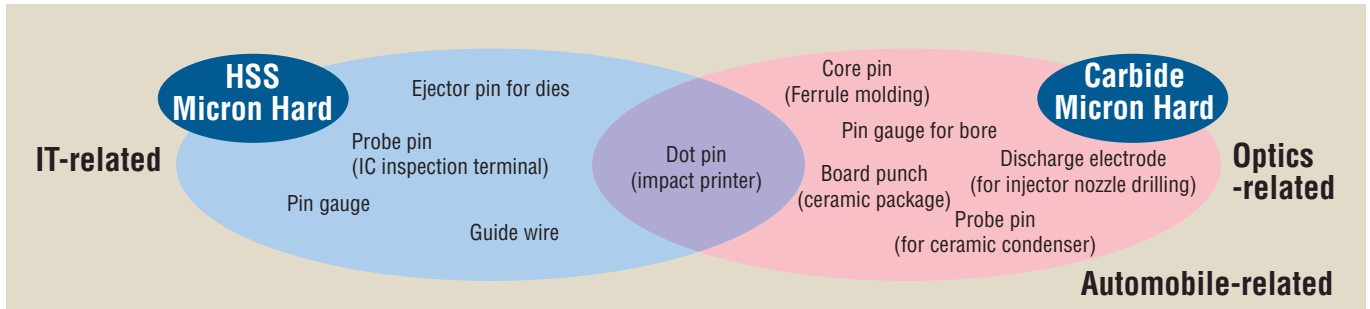


Cemented Carbide Micron Hard



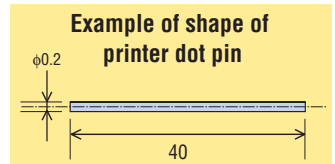
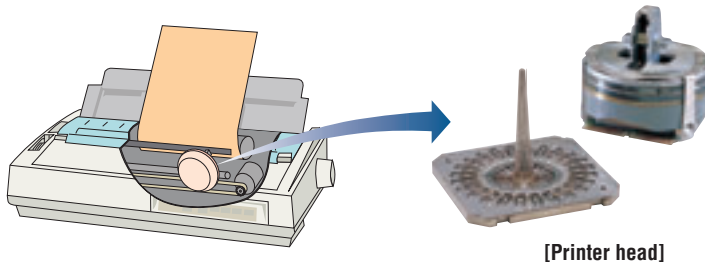
Typical Application Examples

Classification of Typical Uses



Typical Examples of Applications

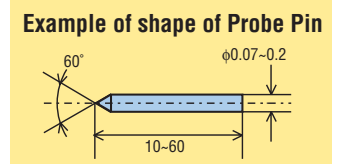
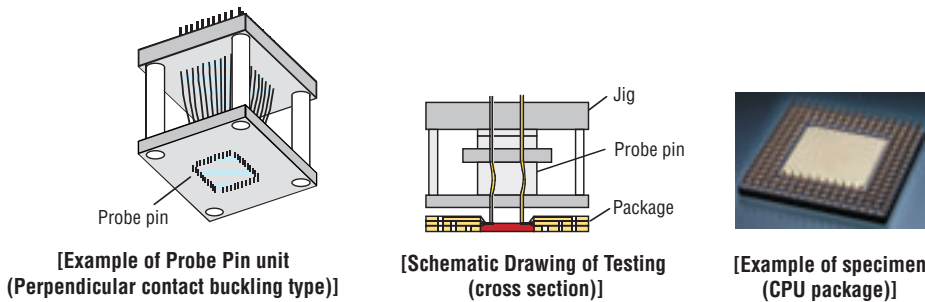
● **Dot Matrix Printer (Printer Head)** Type of material: P/M High Speed Steel



Mobile and Digital field

Micron Hard for printer head

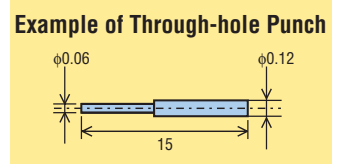
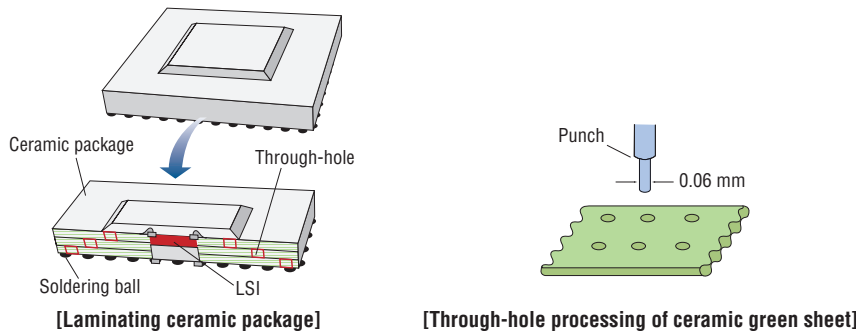
● **Probe Pin (IC Inspection Terminal)** Type of material: P/M High Speed Steel



High strength, High elasticity, High Wear Resistance HSS

Suitable for thinner probe pin below $\phi 0.1$ mm

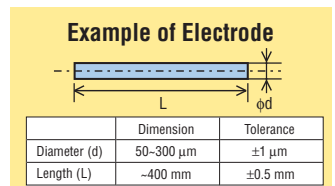
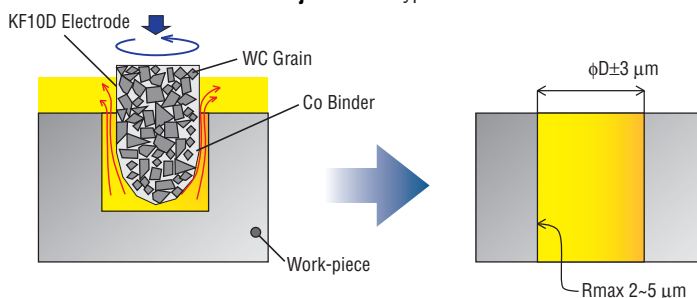
● **Punch for Through-Hole of Semiconductor Package** Type of material: Cemented Carbide



Punch made by high toughness cemented carbide with fine grain

Suitable for punching of thinner hole (below $\phi 0.1$ mm)

● **Electrode to Make Nozzle Hole of Fuel Injector** Type of material: Cemented Carbide



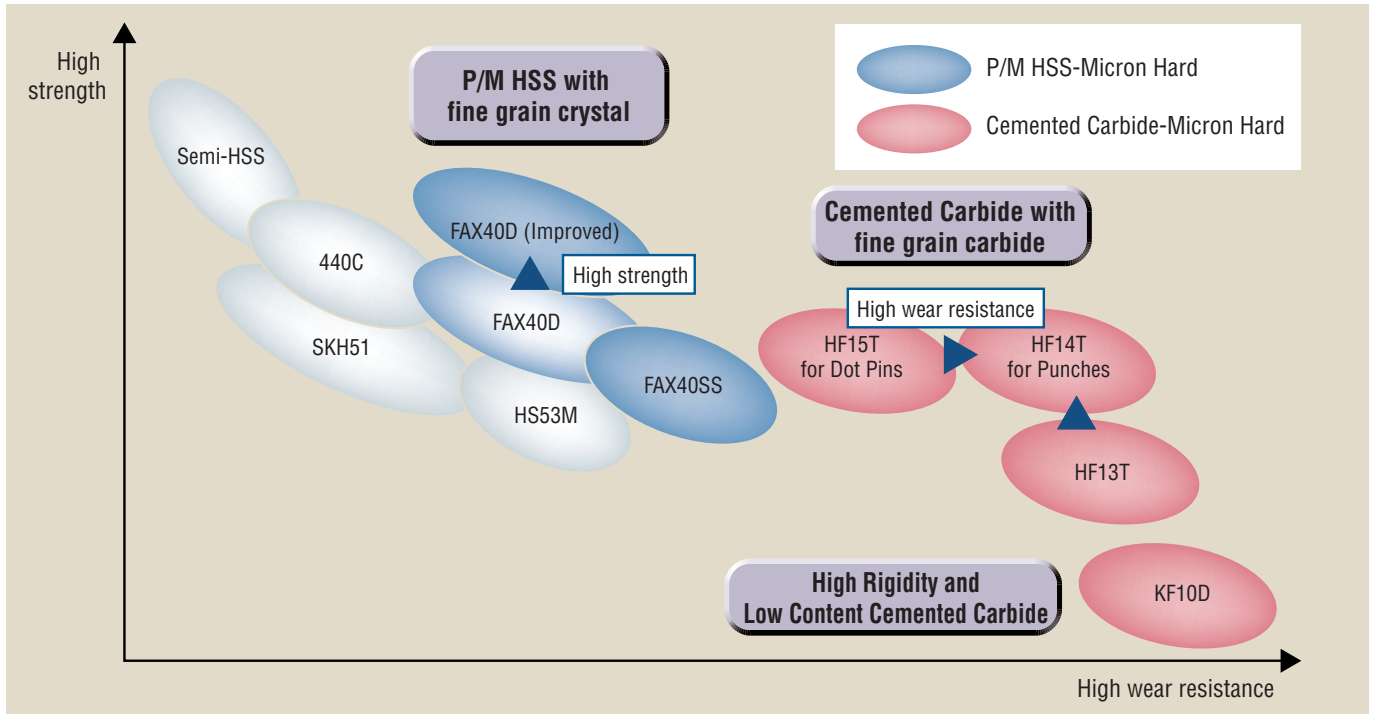
Electrode of High Rigidity Carbide
Small Shaking under Sparking condition

Suitable for small dia. drilling
High performance
High precision machining

Material Grades

Types of "Micron Hard" are currently offered in two grades of P/M High Speed Steel and four grades of Cemented Carbide

Characteristic Position of the Materials



Materials and Features

Materials	Types	Features
P/M HSS	FAX40D	Standard P/M high speed steel for dot pins and probe pins requiring high elasticity
	FAX40SS	High wear resistance P/M high speed steel with high vanadium content
Cemented Carbide	HF13T	High strength hard metal fitting for fine pin and punch of precise mold requiring high wear resistance
	HF14T	High wear resistance and high toughness hard metal fitting for fine punch
	HF15T	High toughness hard metal fitting for fine parts as dot pins requiring more durability than HSS
	KF10D	Higher rigidity hard metal fitting for discharge electrode for small diameter drilling

Mechanical Properties

Materials	Types	Young's modulus (GPa)	Hardness (HV)	Bending strength (GPa)	Electric resistibility ($\mu\Omega\text{cm}$)
P/M HSS	FAX40D	230	900 *	5.0	54
	FAX40SS	230	950	4.5	52
Cemented Carbide	HF13T	520	1850	4.0	38
	HF14T	510	1600	4.6	36
	HF15T	470	1250	4.8	34
	KF10D	630	1800	2.5	20

*Lower hardness is available upon request.

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