

## Cutting tool classification V- Cutting principles of working difficult materials

The materials of high strength with poor workability or high hardness metal, Makes the cutting tool life is shortened, Or the volume crumbs, chip breaker difficulties, Or machining surface quality is poor, Or a combination of several above phenomena, Therefore such materials are called difficult cutting metal materials. The common difficult materials we often meet includes stainless steel, Ti alloy, high temperature alloys, High-strength steel, High manganese steel, etc.

### Main factors of difficult cutting materials-

- Material containing high hardness ingredients
- High hardness or high-temperature hardness, work hardening
- Poor thermal conductivity, high cutting temperatures
- The strength of the material is high, especially in high temperature strength
- Easy bonding with the cutter
- Vivid chemical activity

## Cutting principles of working difficult materials

### 1. Use reasonable tool material

Cutting tools need to be small chemical affinity with difficult material, Good thermal conductivity, High strength, stable, Good hot hardness, Wear resistance and good heat dissipation ... Common suitable tools includes the PCD material tool (polycrystalline diamond tool), Coated carbide cutting tools, PCBN tool ...

### 2. Improving cutting conditions

Machine -clamping-the rigidity of the fixture should be excellent, tool system is better. Part of the gap of the machine to be adjusted, Spindle runout is smaller. The fixture work piece clamping should be strong, Have sufficient rigidity.

To maintain a sharp blade to ensure that the chip removal smooth, To avoid sticky crumbs chipping.

### 3. Select a reasonable cutting parameters

Select a reasonable cutting parameters. Because the temperature of the cutting speed of cutting edge of the cutting speed the higher the cutting edge temperature excursions, Cutting edge temperature directly affect the life of the tool, So you want to choose the right cutting speed.

### 4. The appropriate heat treatment of the work

Through heat treatment to change the performance of the hard cutting material and crystal phase organization to achieve the purpose of improving the machining of materials.

It is recommended that the spindle revolutions should be maintained at an acceptable number of revolutions appropriate (if the spindle revolutions excessive, will cause the machine processing sound too large, You should adjust the spindle speed), If the cutting speed is fast, The depth eating should be shallow; Conversely, If the cutting speed is slow down, The depth can be deeper. Getting cutting characteristics of work piece, Then controlling good cutting speed and processing depth, The tool life can be maintained under normal wear and tear.