

1-1.

- ① Hot hardness ② Toughness & Impact strength ③ Thermal shock resistance
- ④ Wear resistance ⑤ Chemical stability & Inertness

1-2.

To maintain low ^① friction & ^② wear.

① Breaking the microweld will cause friction. If the tool material is inert, the microweld are less likely to occur

② If there is bond chemically between workpiece and cutting tool, it will cause diffusion and adhesive wear.

1-3. Cubic Boron Nitride. Because it is chemically inert to iron and nickel when Temperature rise.

2-1.

① Friction is the force that dissipates energy and generate heat when two surfaces have relative motion.

② Wear is the damaging, gradual removal or deformation of material at solid surface. It changes the shapes of tools and dies, affects the tool life, dimensions and quality of the parts produced.

2-2.

Because nickel-based superalloy is more likely to form adhesive wear, we can reduce it by using:

it by using:

① Hard coatings ② Appropriate Lubricant.

3-1. hard = 有 filler, 母材不熔, $450^{\circ}\text{C} \uparrow$, 提供機械力

soft = 有 filler, 母材不熔, $450^{\circ}\text{C} \downarrow$, 電路連接

fusion = 母材熔 (加 filler 幫助流動), 大面積熔融

solid-state: 母材熔, 部分熔融 (No liquid and molten phase)

3-2.

Flash welding (arc welding)

4-1.

Oxidation \rightarrow CV \rightarrow Lithography \rightarrow lift off \rightarrow Etch \rightarrow 離子佈植 \rightarrow oxidation

1. 2. 3.

4-2.

PR \rightarrow Lithography \rightarrow Etch \rightarrow film decoration

★ Clean room: the cleanliness at critical processing locations is defined by the class.

A room that

class 1000: 每 ft^3 空氣中含 1000 個 $\geq 0.5\mu\text{m}$ 粒徑的粒子

class 10: 10