

## ■ Coating punches — TiCN —

MISUMI's coating punches receive a TiCN coating applied by ion plating, which is one type of PVD (physical vapor deposition). TiCN coating has a number of advantages, including high hardness and low friction coefficient. It improves punch wear resistance, contributing to higher productivity and improved product quality. Because these punches are treated in high vacuum at temperatures of 500°C, coating of base materials tempered at temperatures of 500°C or higher can be achieved with no loss of base material hardness and no thermal deformation. This ensures that the tip remains sharp after coating, which is one of the large advantages of this method.

Because the dimensions and accuracy of MISUMI coating punches after coating are guaranteed, there is no need to control dimensions in consideration of the coating thickness.

Technical data of TiCN coating

Hardness (HV)	3000
Coating thickness (μm)	2~4
Friction coefficient (with steel, when dry)	0.3
Heat resistance (°C)	~400
Color	Blue gray

## ■ Features of TiCN coating punches

### 1. High hardness

TiCN coating has a hardness of 3000HV, which is harder than carbide. This high hardness provides the cutting edges with good protection from wear, extending the life span before regrinding by up to 10 times.

### 2. Small friction coefficient

TiCN coating has a small coefficient of friction with steel, and is chemically inert. This makes it possible to avoid the surface fatigue that leads to cracking. This coating treatment keeps the punch surface away from the workpiece surface, therefore even after the cutting fluid has lost its chemical activity, it still provides lubricating effects. Also TiCN has superior sliding characteristic, allowing pressing with high-speed strokes. Greater benefits can be expected from TiCN coating punches with workpieces that have a strong tendency toward sticking (such as light metals, nonferrous metals, and stainless steel).

### 3. Product quality improvements

TiCN makes it possible to produce products with little burring and with long punch life spans, and to deliver smooth cut surfaces with few streaks.

## ■ Notes concerning the use of TiCN coating punches

Please pay attention to the following when using a TiCN coating punch.

- The effective coating punch range (length) is B dimension (tip length), however an extremely thin and incomplete coating of 0.5 μm or less is also formed for approximately 10 mm beyond this range.
- Slight variation occurs in the thickness of the coating film at the corners of the tip shape.
- When regrinding, avoid strong grinding in order to prevent separation of the coating layer.