

# TOOL MATERIALS

## Tool Materials Introduction

### Tool Material Physical Properties

Density

Color

Electrical Conductivity

Thermal Conductivity

Thermal Expansion

Melting Point

### Tool Material Mechanical Properties

#### Strength

Tensile Strength

Compressive Strength

Yield Strength

Shear Strength

Fatigue Strength

#### Hardness

Brinell Hardness Test

Rockwell Hardness Test

#### Wear Resistance

#### Toughness

#### Brittleness

#### Plasticity

Ductility

Malleability

#### Surface Finish

### Thin-Film Coatings

### Heat Treating

Shock-Resisting Steels

High-Speed Steels

Hot-Work Steels

Plastic Mold Steels

Special-Purpose Steels

Cast Irons

## Nonferrous Tool Materials

Aluminum

Carbide

Carbide Coatings

Cermet

## Nonmetallic Tool Materials

Wood

Composites

Rubber

Silicone Rubber

Ceramics

Alumina-Based

Silicon Nitride-Based

Whisker-Reinforced Ceramics

Diamond

Polycrystalline Diamond

Cubic Boron Nitride

## Ferrous Tool Materials

Carbon Steels

Alloy Steels

Tool Steels

Water-Hardening Steels

Cold-Work Steels

Oil-Hardening

Air-Hardening Medium-Alloy

High-Carbon, High-Chromium