

# DAYE JINGCHENG MOULD CO., LTD

## TOOL STEEL PRODUCT

### 1.2581 HOT WORK TOOL STEEL

#### Identification

Mat. No.	Designation by Standards		
	DIN	JIS	AISI
1.2581	X30WCrV9	SKD5	H21

#### Chemical Composition

C	Si	Mn	Cr	V	W	P&S
0.25	0.15	0.20	2.50	0.30	8.00	0.03
0.35	0.30	0.40	2.80	0.40	9.00	MAX

#### General Information

##### Characteristics

Hot work tool steel for oil or air hardening to develop high hot strength, retention of hardness, and heat checking resistance.

##### Applications

Highly stressed hot work tools, such as mandrels, dies and containers for metal tube and rod extrusion; hot extrusion tools; tools for manufacture of hollows, screws, rivets, nuts and bolts. Die casting tools, forming dies, die inserts, hot shear blades.

#### Heat Treatment

##### Annealing

Heat slowly to 1600-1650 °F, hold until the entire mass is heated through, and cool slowly in the furnace (40°F per hour) to about 1000°F, after which the cooling rate may be increased. Suitable precautions must be taken to prevent excessive carburization or decarburization.

##### Strain Relieving

When desirable to relieve the strains of machining, heat slowly to 1050-1250°F, allow to equalize, and then cool in still air.

##### Preheat for Hardening

Warm slightly before charging into the furnace, which should be operating at 1500-1550°F.

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### **Hardening**

After thorough preheating, transfer to hardening furnace operating at 2050 – 2200°F, depending upon the degree of hardening required for the application, and the size of the tool, a salt bath or controlled atmosphere furnace is desirable. If these are not available, pack hardening in spent pitch coke is suggested. Long soaking times at the hardening temperature are not recommended because of the danger of grain growth.

### **Quenching**

Cool in air, oil or a molten salt bath operating at 1000-1100°F. In the case of oil quenching, it is usually good practice to interrupt the quench by removing the tool after it has reached about 1000°F, and allow the cooling to continue in still air. The tool should be allowed to cool to 150°F, or to where it can be held in the bare hand, and then tempered immediately.

### **Tempering**

Tempering practice may vary with size and application, but is usually performed in the range of maximum secondary hardness or higher. Double tempering is recommended. The following chart may be used as a guide to the hardness that may be expected after tempering.