



**A L Z**

**H13**

**HOT WORK TOOL STEEL**

**Nominal Chemical Analysis %**

C	.40
Si	1.00
Cr	5.25
Mo	1.40
V	1.00

### Corresponding Specifications

<b>AISI</b>	<b>H13</b>
<b>BS EN ISO 4957:2000</b>	<b>X40CrMoV5-1</b>
Supersedes BS4659 BH13	
<b>WKSTOFF</b>	<b>1.2344</b>

**Colour Code:** Yellow

**Delivery Condition**  
Annealed 230 BHN Max

### Characteristics

H13 is a versatile hot work tool steel giving good hot toughness and wear resistance. It has good thermal shock resistance and will tolerate a degree of water cooling in service. H13 may be nitrided but care should be taken not to impart too great a depth of hardness as shock resisting capacity will be reduced. Electroslag Remelted (ESR) H13 is also available; it exhibits greater homogeneity and an exceptionally fine structure. This results in better machinability and polishability together with improved high temperature mechanical strength.

### Applications

H13 is suitable for many hot work applications: pressure diecasting tools, extrusion tools, forging dies, hot shear blades and stamping dies. It may also be used for plastic mould tools. ESR H13 is particularly suitable for aluminium die-casting tools and plastic mould tools requiring a very high surface polish.

### Heat Treatment

#### Annealing

850 / 870°C for 4 hours approx.  
Cool slowly in the furnace at 20°C maximum per hour.

#### Stress Relieving

600 / 650°C for 2 hours approx.  
Cool in still air. Always stress relieve before hardening.

#### Hardening

##### Pre-Heating

- (i) 400°C Holding time at temperature:  
1 min / mm effective section approx.
- (ii) 650°C Holding time at temperature:  
30 sec / mm effective section approx.
- (iii) 850°C Holding time at temperature:  
30 sec / mm effective section approx.

##### Austenitizing

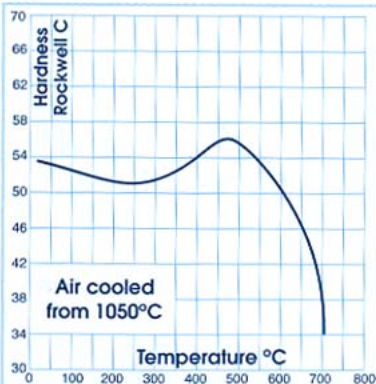
1020/1060°C Holding time at temperature:  
30 sec / mm effective section approx.  
H13 is suitable for Vacuum Hardening.

##### Quenching:-

- (i) Quench in Oil or,
- (ii) Quench in Air or,
- (iii) Quench into Neutral Salts (Martempering) at 500 / 550°C then cool slowly in still air.

Temper immediately after quenching whilst tools are still hand warm.

### Tempering



Consult the tempering diagram and temper according to requirements.

Temper for 1 hour / 25mm effective section for a minimum of 2 hours then cool in still air.

For guidance, temper at:  
550 / 580°C for maximum hardness,  
600 / 620°C for hardness with toughness.

Triple tempering is recommended, cooling to room temperature between tempers.

NB. Lower hardness values will tend to result when hardening larger sections.