

C	Si	Mn	Cr	Mo	W	V
0.95		1.20	0.55		0.55	0.20

### Features and Uses

This material is supplied precision ground, coated in a rust preventative and wrapped in paper to protect the material from damage. It is normally supplied in standard lengths of 500 mm and 1000 mm but non-standard sizes will be specially manufactured upon request with a delivery time of about 10 working days.

This moderately priced oil hardening tool steel gives excellent wear resistance, holds a good cutting edge and is relatively easy to machine. It is excellent general-purpose tool steel often used where the expenses of high carbon high chromium steels would not be justified.

There are thousands of applications for this product and it has the advantage of already being ground to size thereby saving the toolmaker many hours in preparing the material.

It is well known as a paper knife material and also for ejectors and slides in tool making. Cams, Punches, dies and other profiles are wire cut or water jet cut either prior to hardening or afterwards. It is advisable to stress temper items that have been wire cut after heat treatment as the wire cutting process causes secondary hardening which can lead to cracking.

### Working and Heat Treatment

#### Normalising

Normalising is not recommended for this steel.

### Annealing

Pack anneal in a tube or other closed container with clean cast iron borings at 740° / 760°C for at least 2 to 3 hours. Cool very slowly with the furnace until the temperature falls below 500°C. With draw from box or tube and allow to cool to shop temperature. Brinell hardness after annealing will be approximately 229.

### Stress relieving

Where tools are heavily machined, ground or subjected to cold work, the relief of internal strains is essential before hardening. Stress relieving should be done after rough machining. To stress relieve, heat carefully to 670° / 700°C soak well and allow to cool in air.

### Hardening

This material hardens in oil at a low temperature with minimum movement. Quench in oil from 780 / 820°C. Long slender sections should always be suspended in the furnace for heating and quenched by plunging vertically into the oil bath. Resultant hardness will be Rockwell C63/64.

Tempering is always necessary after hardening.

### Martempering

Martempering is an alternative hardening procedure that may be used when suitable salt bath equipment is available.

By this method, internal strain, distortion and risk of quench cracking is reduced to the minimum.

Pre heat at 360°C then reheat to 800°C for sections 3.5 mm or less, or 820°C for sections over 3.5 mm. Soak according to section, then quench into molten salt held at 210°C. Allow sufficient time for the center of the piece to reach bath temperature, withdraw and cool in the air. Tempering will then be necessary. Hardness obtainable in salt or oil is similar but salt bath quenching reduces distortion. Only sections of less than 10 mm can be vacuum hardened.

### Tempering

Temper between 150°C and 350°C according to the requirements of the job. Soak for one hour at the tempering temperature. Where possible, use an air-circulating Furnace.

150°C to obtain Rockwell C62.
200°C to obtain Rockwell C60.
250°C to obtain Rockwell C58
350°C to obtain Rockwell C56.

**Tempering curves and size range are printed on the reverse of this data sheet.**