

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

Features and Uses

This moderately priced oil hardening tool steel hardens in oil from a low temperature, offers pronounced non-deforming characteristics and retains its original dimensions after oil hardening and tempering. It gives excellent wear resistance, holds a good cutting edge and is relatively easy to machine. Due to these properties, Newhall is excellent general-purpose tool steel often used where the expenses of high carbon high chromium steels would not be justified.

Typical applications of Newhall include medium run dies, intricate press tools, drawing punches, broaches, bushings, lathe centers, chuck jaws, master cavity sinking hobs, paper cutting machine knives, plug gauges, thread gauges and precision measuring tools generally, cams, cloth cutting knives, cold taps, reamers, collets, cutting hobs, strip slitting cutters, trimmer dies, tube expander rolls, plastic moulds and wood working knives.

Working and Heat Treatment

Forging

Heat slowly and begin forging at 980° / 1000°C. Do not allow temperature to fall below 800°C reheating if necessary. Slow cool.

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

Heat slowly and if possible pre-heat to 300° / 500 °C before raising to the hardening temperature of 780° / 820°C. Pre heating is especially desirable for complex sections. Soak thoroughly, allowing 30 minutes per inch of ruling section before quenching. Light sections should be quenched in oil from the lower end of the temperature range.

Long slender sections should always be suspended in the furnace for heating and quenched by plunging vertically into the oil bath.

Tempering is always necessary after hardening.

Martempering

Martempering is an alternative hardening procedure, which 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 thick can be vacuum hardened.

Tempering

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

Tempering Curves and stock range are printed on the reverse of this data sheet.