Taylor
Special Steels Ltd

H21

H21 HOT WORK TOOL STEEL

TYPICAL ANALYSIS					BS4659	BH21
C	Cr	V	W		ASTM	H21
0.30	3.00	0.30	9.00		Werkstoff	1.2581

H21 is a hot work tool steel suitable for applications where red hardness, high compressive strength and wear resistance at elevated temperatures are required. These features together with good impact resistance provide a steel with excellent properties for general purposes, hot working conditions. Preheating prior to use in service will considerably improve tool life.

APPLICATIONS

H21 is particularly useful for hot forging and blanking dies and punches for making nuts, bolts and other similar small components. Dies, cores, inserts, pins, etc for the die casting of copper base alloys are also prime applications for this steel. Other uses include forming dies, shear blades, hot extrusion dies, mandrels, punches, die holders, ejector discs and extrusion liners.

ANNEALING

Pack preferably in a suitable sealed container with spent carburising mixture or cast iron chippings to prevent excessive scaling or decarburisation. Heat to 850°C / 880°C, holding at temperature for sufficient time to achieve uniformity. Cool at less than 25°C per hour to 650°C followed by air cooling. Correctly annealed the tools or parts should not exceed 248 HB.

STRESS RELIEVING

Heat to 600°C / 650°C. Hold for 2-4 hours and furnace cool.

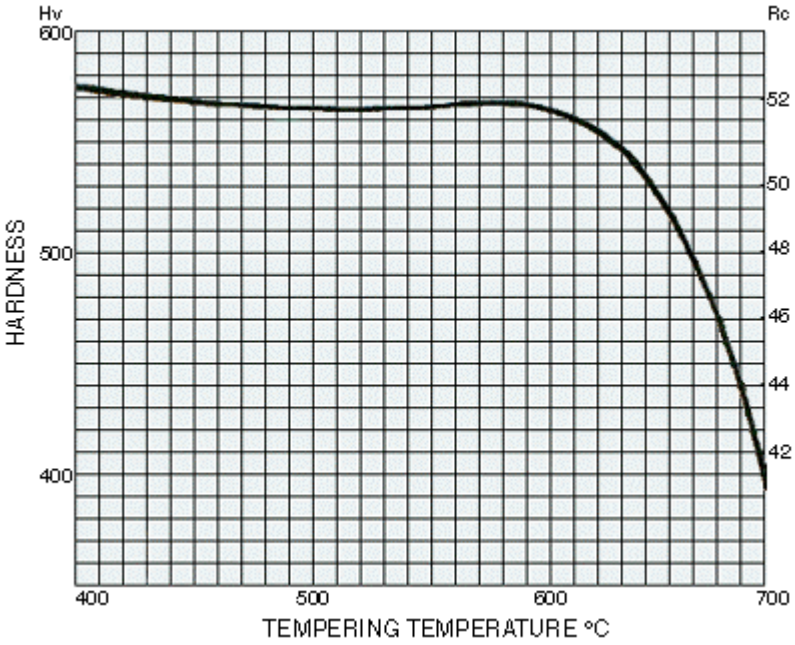
HARDENING

Before heat treatment, sufficient machining should be carried out to remove surface decarburisation. Hardening should be carried out in controlled atmosphere furnaces or neutral salt baths. Preheat slowly to 800°C / 850°C then transfer to a bath or furnace at 1120°C / 1170°C allowing sufficient time for uniform heating. Quench into warm oil or salt bath operating at 520°C / 540°C. In the latter case ensure that the tools are allowed to equalise before completing the quench by cooling in air.

* The hardening temperatures given above are for salt bath treatment. For atmosphere furnace hardening, there temperatures should be increased by 15°C.

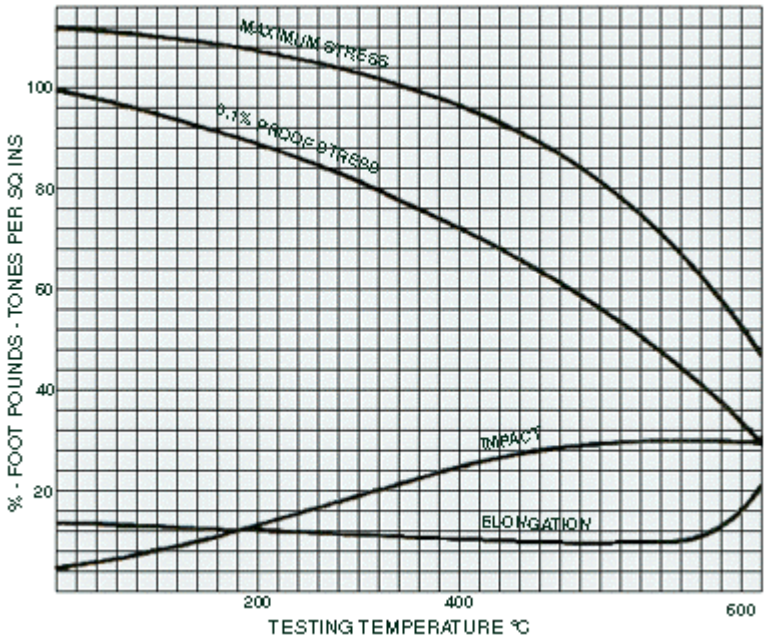
TEMPERING

Tempering should be carried out immediately after proper completion of the quenching operation. Heat to within the 560°C / 675°C range soaking for two to three hours according to section. A second tempering cycle of similar duration is strongly recommended and care should be taken to ensure that the tools are allowed to cool to room temperature al least 50°C higher than that which the tools may be expected to achieve in service. The curve given indicates typical hardness values obtained on oil quenching from 1160°C and double tempering.



ELEVATED TEMPERATURE PROPERTIES

These curves indicate typical values obtained from standard test specimens oil quenched from 1150°C and double tempered at 600°C.



ISOTHERMAL TRANSFORMATION

The diagram illustrates the time required for transformation of austenite to commence and it may be usefully employed in determining the correct temperatures and holding times for interrupted quenching treatments.