



X40CrMoV5-1 Tool Steel

Quality X40CrMoV5-1 tool steel cut and delivered straight to your tool room.

X40CrMoV5-1 tool steel stockholders and suppliers, delivering to the whole of the UK.

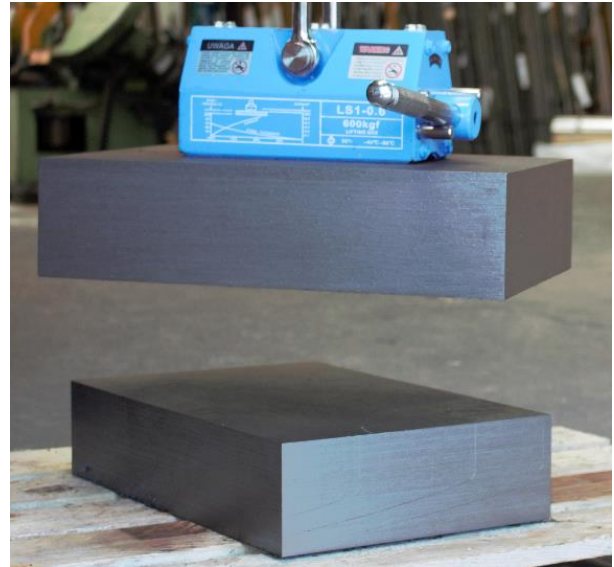
West Yorkshire Steel supply X40CrMoV5-1 tool steel in round bar and plate, cut to your requirements. As a reliable hot work steel it is suitable for a wide variety of applications. It combines very good red-hardness with toughness and tools may be water-cooled in service. X40CrMoV5-1 may be cold-hobbed in the annealed condition.

Form of Supply

West Yorkshire Steel are stockholders and suppliers of X40CrMoV5-1 tool steel round bar and flat sections which can be sawn cut to your required sizes. X40CrMoV5-1 ground steel bar can be supplied, providing a high quality tool steel precision ground tool steel bar to your required tolerances. X40CrMoV5-1 tool steel is also available produced as Ground Flat Stock / Gauge Plate, in standard and non standard sizes. Ground tool steel bar can be supplied, providing a quality precision finish bar to close tolerances.

Applications

Typical applications include die casting dies for aluminium, magnesium and zinc, extrusion dies for aluminium and brass, liners, mandrels, pressure pads, followers, bolsters, die cases, die holders and adaptor rings for copper and brass extrusion. X40CrMoV5-1 is used to produce hot stamping and press forge dies, split hot heading dies, gripper dies, hot punching, piercing and trimming tools. Other applications include plastic moulds, shear blades for hot work and hot swaging dies.



Contact our experienced sales team who will assist you with your enquiry.

- Flat
- Plate
- Diameter

DIN Standard steel grades we supply

[45NiCrMo16](#) | [55NiCrMoV7](#) | [90MnCrV8](#)
[42CrMo4](#) | [X45NiCrMo4](#) | [60WCrV8](#) | [31CrMoV9](#)
[X100CrMoV5](#) | [X153CrMoV12](#) | [X210Cr12](#)
[60WCrV7](#) | [X210CrW12](#) | [X40Cr14](#) | [X40CrMoV5-1](#)
[40CrMnMoS8-6](#) | [HS6-5-2C](#) | [40CrMnMo7](#)
[X155CrMoV12-1](#) | [100MnCrW4](#)

Analysis

Carbon	0.35-0.42%	Chromium	4.80-5.50%
Manganese	0.25-0.50%	Molybdenum	1.20-1.50%
Sulphur	0.02% max	Silicon	0.80-1.20%
Phosphorous	0.03% max	Vanadium	0.85-1.15%

Forging

Preheat slowly to 750°C then increase the temperature more rapidly to 1050-1100 °C. Do not forge below 850°C. It is essential to cool the X40CrMoV5-1 slowly after forging, either in a furnace or in vermiculite.

Annealing

Soak thoroughly at 840-860°C before furnace cooling at a maximum rate of 20°C per hour down to 600°C followed by cooling in air.

Stress Relieving

When tools made from X40CrMoV5-1 tool steel are heavily machined or ground, the relief of internal strains is advisable before hardening to minimise the possibility of distortion. Stress relieving should be done after rough machining. To stress relieve, heat the component carefully to 700°C, allow a good soaking period (two hours per 25mm of ruling section). Cool in the furnace or in air. The tools may then be finish machined before hardening.

Hardening

Preheat to 780-820°C. Soak thoroughly, then increase rapidly to the final hardening temperature of 1000-1030°C. When the X40CrMoV5-1 has attained this temperature, soak for approximately thirty minutes. Cool in air. Large sections may be quenched in oil. To reduce scaling or decarburisation, we recommend isothermal molten salt bath treatment. Preheat in salt at 780-820°C then transfer to salt bath standing at 1000-1030°C. Soak and quench into salt standing at 500-550°C. Allow to equalise, withdraw and cool in air. Alternatively, this tool steel may be vacuum hardened or pack hardened. Tools should be tempered as soon as they become hand warm.

Tempering

Heat uniformly to the required temperature allowing a soaking time of two hours per 25mm of ruling section. Withdraw from the furnace and allow to cool in air. A second tempering is strongly recommended, the X40CrMoV5-1 tool being allowed to cool to room temperature between tempers. The usual tempering range is 530-650°C depending on the hardness requirements and the operating temperature of the tool.

Temperature °C	150	200	250	300	350	400
Hardness HRC	62-61	61-60	60-59	57-56	56-55	56-55

Welding

In general, we do not advise the welding of tool steel but users sometimes prefer to weld in order to avoid the cost of retooling. It should be remembered that this grade is an air hardening steel and that in welding the area of the weld attains a temperature of about 1000°C. Cracking is likely to occur during cooling unless proper precautions are taken. Popular methods of welding are atomic hydrogen and argon arc. We recommend you contact your welding consumables supplier who should provide you full assistance and information on welding tool steels.

Welding Procedure

- 1) It is desirable to anneal the tool prior to welding but with care welding may be done on hardened and tempered tools.
- 2) It is important to preheat the die to 300-500°C and to maintain this temperature during welding.
- 3) After the weld has been completed, maintain at 300-500°C for one hour, then cool the die slowly in a furnace or in insulating material.
- 4) If the tool has been annealed prior to welding, stress relieve at 700°C before re-hardening.
- 5) If the tool has not been annealed prior to welding, re-temper at 550-600°C for a minimum of 2 hours.

Nitriding

X40CrMoV5-1 tool steel can be nitrided to give a hard surface case. The steel is then very resistant to wear and erosion. Nitriding also increases resistance to corrosion. Nitriding in ammoniac gas at a temperature of 525°C will give a surface hardness approximately 1000 to 1250HV. Before nitriding the tool should be hardened and tempered at approximately 50°C above the nitriding temperature. It is important to note that with increase in penetration of the nitriding, there is a reduction in resistance to thermal shock and an increase in embrittlement.

Temperature	Time	Approx. Depth of Case
525°C	10 hours	0.125mm
525°C	20 hours	0.180mm
525°C	40 hours	0.250mm
525°C	60 hours	0.300mm

Heat Treatment

Heat treatment temperatures, including rate of heating, cooling and soaking times will vary due to factors such as the shape and size of each X40CrMoV5-1 tool steel component. Other considerations during the heat treatment process include the type of furnace, quenching medium and work piece transfer facilities. Please consult your heat treatment provider for full guidance on heat treatment of tool steels.

Final Grinding

Select the correct grade of wheel in consultation with the grinding wheel manufacturer. Ensure the grinding wheel is in good condition by means of a suitable dressing tool. Wet grinding is a preferable option using a copious supply of coolant. If dry grinding is resorted to then use a very soft wheel.

Quality Assured Supply

X40CrMoV5-1 tool steel is supplied in accordance with our ISO 9001:2015 registration.



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