

O1 Tool Steel

O1 tool steel stockholders and suppliers, delivering to the whole of the UK. West Yorkshire Steel are stockholders and suppliers of O1 tool steel round bar, flat bar and plate. This grade is an oil hardening tool steel type supplied in the annealed condition. O1 tool steel offers good durability, gives excellent wear resistance and holds a good cutting edge. With these properties it is an excellent general purpose tool steel often used where the expense of a high carbon high chromium tool steel would not be justified.

We welcome export enquiries for tool steel. Please contact our sales office and consult our [shipping policy](#) for further details.

Related Specifications

AISI ASTM A681 DIN 17350 BS EN ISO 4957

Alternative tool steel grades we supply

[D2](#) | [D3](#) | [O2](#) | [D6](#) | [A2](#) | [S1](#) | [H13](#) | [P20](#) | [P20S](#) | [420](#) | [1.2083](#) | [2767](#) | [M2](#) | [M42](#) | [1.1730](#)

Form of Supply

West Yorkshire Steel are stockholders and suppliers of O1 tool steel round bar, flat bar, plate and block. Diameters can be sawn to your required lengths as one offs or multiple cut pieces. Rectangular pieces can be sawn from flat bar or plate to your specific sizes. O1 ground tool steel bar can be supplied, providing a quality precision ground bar to your required tolerances.

Contact our experienced sales team who will assist you with your O1 tool steel enquiry.

- Sheet
 - Plate
 - Flat
 - Diameter
-

Applications

Typical applications for O1 tool steel include medium run dies, intricate press tools, drawing punches, broaches, bushings, lathe centres, chuck jaws, master cavity sinking hobs, paper cutting machine knives, plug gauges, thread gauges and precision measuring tools. Also commonly used in applications such as cams, cloth cutting knives, cold taps, reamers, collets, cutting hobs, strip slitting cutters, trimmer dies, tube expander rolls, plastic moulds and woodworking knives.

O1 Typical Analysis

Carbon	0.95%	Manganese	1.25%
Chromium	0.50%	Tungsten	0.50%
Vanadium	0.20%		

Ground Flat Stock

Precision [ground flat stock / gauge plate](#) can be supplied in O1 tool steel. Stocks are available in a wide range of sizes. Metric sizes are supplied in 500mm and 1000mm lengths. Imperial sizes are supplied in 18" and 36" lengths. Subject to size suitability and availability non standard sizes and lengths can be produced in approximately 2 to 3 weeks.

Forging

Heat slowly and begin forging at 980-1000°C. Do not forge below 800°C. After forging O1 tool steel, cool slowly preferably in a furnace.

Annealing

O1 is supplied in the annealed and machineable condition. Re-annealing will only be necessary if the steel has been forged or hardened by the tool maker. To anneal, heat the O1 tool steel slowly to 740-760°C, soak well and allow to cool in the furnace to 500°C or below, before withdrawing. Annealed hardness will be about 229 Brinell.

Stress Relieving

When parts are heavily machined, ground or otherwise subject to cold work, stress relieving will be beneficial prior to hardening. Heat the O1 steel component carefully to 670-700°C, soak well and allow to cool in air.

Hardening

Heat slowly and if possible pre heat at 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 25mm of ruling section before quenching. Light sections should be quenched in oil from the lower end of the hardening temperature range. 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 are reduced to a minimum. Pre heat at 360°C then increase the heat to 800°C for sections 3mm thick or less, or to 820°C for sections over 3mm thick. Soak according to section then quench into molten salt, held at 210°C. Allow sufficient time for the centre of the piece to reach bath temperature, withdraw and cool in the air. Tempering will then be necessary. Hardening from a neutral salt bath, will reduce the possibility of scaling or decarburisation. Heat to 830-850°C and after equalisation quench in oil.

Tempering

Temper between 100°C and 350°C. Soak well at the selected temperature and soak for at least one hour per 25mm of total thickness.

Temperature [°C]	100	150	200	250	300	350
Hardness [HRc]	64-63	63-62	62-61	60-59	58-57	56-55

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 O1 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 steel grades.

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

O1 tool steel is supplied in accordance with our ISO 9001:2015 registration.