

1.2311 Tool Steel

1.2311 tool steel stockholders and suppliers, delivering to the whole of the UK. West Yorkshire Steel are stockholders and suppliers of round bar, flat bar, plate and block. As an alloy tool steel grade 1.2311 is commonly supplied in the hardened and tempered condition with a supply hardness of approximately 300HB. This steel gives an excellent polished finish and is one of the most widely accepted specifications for machine cut plastic moulds and zinc die casting dies. This grade gives excellent wear resistance but if maximum surface hardness is required for compression moulding plastic dies or similar tools, the steel can be case hardened or nitrided.

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

Form of Supply

West Yorkshire Steel are stockholders and suppliers of 1.2311 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 block to your specific sizes. Ground bar can be supplied, providing a quality precision ground bar to tight tolerances.

Contact our experienced sales team who will assist you with your 1.2311 tool steel enquiry.

- Plate
 - Flat
 - Diameter
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Applications

This tool steel grade is ideally suited for the production of plastic moulds. Typical applications include die holders, zinc die casting dies, backers, bolsters and injection moulds. The versatility of 1.2311 tool steel with its high tensile characteristics enables uses for a variety of other applications such as shafts, rails and wear strips

Analysis

Carbon	0.35-0.45%	Chromium	1.80-2.10%
Manganese	1.30-1.60%	Molybdenum	0.15-0.25%
Sulphur	0.03% max	Silicon	0.20-0.40%
Phosphorous	0.03% max		

Forging

Heat the steel slowly, allowing sufficient time for it to become heated through. Begin forging at 1050°C. Do not forge below 930°C reheating if necessary. After forging, cool very slowly.

Annealing

Heat uniformly to 770-790°C. Soak well, cool slowly in the furnace.

Stress Relieving

When dies are heavily machined, we recommend stress relieving just before finish machining in order to relieve machining strains. Heat to 460-500°C. Soak well and allow to cool in the air.

Hardening

Heat uniformly to 820-840°C until heated through. Quench in oil.

Tempering

Heat uniformly and soak at the tempering temperature for at least one hour per 25mm of section. Allow to cool in still air.

Temperature [°C]	100	200	300	400	500	600
Hardness [HRc]	51	50	48	46	42	36
Tensile [N/mm²]	1730	1670	1570	1480	1330	1140

Nitriding

1.2311 steel may be nitrided to give a wear resistant case of approximately Rockwell C60 surface hardness with a case depth of between 0.35mm to 0.5mm. Nitriding also increases the corrosion resistance. After nitriding at 525°C in ammonia gas the surface hardness will be approximately 650HV.

Temperature	Time	Approx. Depth of Case
525°C	20 hours	0.30mm
525°C	40 hours	0.35mm
525°C	60 hours	0.50mm

Carbursing / Case Hardening

In order to obtain maximum surface hardness, moulds machined from 1.2311 tool steel may be case hardened, which can achieve a surface hardness of 55 to 59 HRc.

Tufftriding

At 570°C tufftriding of 1.2311 tool steel will give a surface hardness of approximately 700HV. Allowing 2 hours treatment the surface hard layer will be approximately 0.01mm.

Hard Chromium Plating

To avoid hydrogen embrittlement 1.2311 should be tempered for 4 hours at 180°C for 4 hours after hard chromium plating.

Flame / Induction Hardening

Flame or induction hardening will achieve a hardness of 50 to 55 HRc. Air cooling is preferable, though smaller components may require forced cooling. Temper immediately after hardening.

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 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 1.2311 tool steel.

Quality Assured Supply

1.2311 plastic mould steel is supplied in accordance with our ISO 9001:2015 registration.