



## 1.2311 Tool Steel

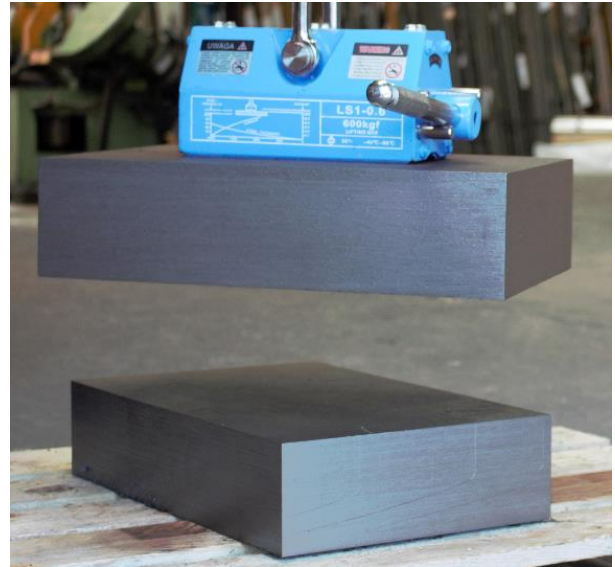
Quality 1.2311 tool steel cut and delivered straight to your tool room, whatever size you need.

### 1.2311 tool steel suppliers, delivering to the whole of the UK.

West Yorkshire Steel are stockholders and suppliers of 1.2311 tool steel round bar, flat bar and plate. 1.2311 is an alloy tool steel which offers good machineability even in the hardened and tempered (approx. 300 Brinell) condition. This steel gives an excellent polished finish and is one of the most widely accepted specifications for machine cut plastic moulds and casting dies. 1.2311 is often supplied in the hardened and tempered condition ready for use. In this condition it 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. For better machinability a higher sulphur version 1.2311S is available. For improved through hardenability in larger sections we also offer 1.2738 1.2311N

### Form of Supply

West Yorkshire Steel are stockholders and suppliers of 1.2311 tool steel round bar, flat bar and plate. Diameters in 1.2311 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. 1.2311 ground tool steel bar can be supplied, providing a quality precision ground bar to tight tolerances. Ground 1.2311 tool steel bar can be supplied, providing a quality precision finish bar to close tolerances.



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

- Sheet
- Flat
- Plate
- Diameter

### **Werkstoff** tool steel grades we supply

[1.2080](#) | [1.2083](#) | [1.2311](#) | [1.2312](#) | [1.2344](#)  
[1.2363](#) | [1.2379](#) | [1.2436](#) | [1.2510](#) | [1.2550](#)  
[1.2767](#) | [1.2842](#) | [1.3343](#)

## Applications

1.2311 tool steel 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 strip.

## 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 slowly, allowing sufficient time for the steel 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 stabilising 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 the steel 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/mm <sup>2</sup>	1730	1670	1570	1480	1330	1140

## Nitriding

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

## Case Hardening / Carburising

Tools produced from 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 two hours treatment the surface hard layer will be approximately 0.1mm.

### Flame / Induction Hardening

Flame or induction hardening of 1.2311 will achieve a hardness of 50 to 55HRC. 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 1.2311 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 tool steel is supplied in accordance with our ISO 9001:2015 registration.



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