

## 1.2344 Tool Steel

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**1.2344 tool steel stockholders and suppliers, delivering to the whole of the UK.** West Yorkshire Steel are suppliers of this tool steel grade in diameters, plate and sawn block, cut to your requirements. As a hot work tool steel 1.2344 is suitable for a wide variety of applications. It combines very good red-hardness with toughness and tools from can be water-cooled in service. It may be cold-hobbed in the annealed condition.

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

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### Form of Supply

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

Contact our experienced sales team who will assist you with your 1.2344 tool steel enquiry.

- Plate
  - Flat
  - Diameter
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### Applications

Typical 1.2344 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. Other applications include plastic moulds, shear blades for hot work and hot swaging dies. Also used to produce hot stamping and press forge dies, split hot heading dies, gripper dies, hot punching, piercing and trimming tools.

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### 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% |

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## Forging

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

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## 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. To avoid scaling, box annealing in cast iron chips is preferred.

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## Stress Relieving

When tools made from 1.2344 tool steel are heavily machined or ground, the relief of internal strains is advisable before hardening to minimise the possibility of distortion. Stress relieving of this grade of steel 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 section). Cool in the furnace or in air. Tools may then be finish machined before hardening.

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## Hardening

Preheat to 780-820°C. Soak thoroughly, then increase rapidly to the hardening temperature of 1000-1030°C. When it has attained this temperature, soak for 20 to 30 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, 1.2344 tool steel may be vacuum hardened or pack hardened. Tools should be tempered as soon as they become hand-warm.

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## 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 advised, the 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.

|                         |     |     |     |     |     |
|-------------------------|-----|-----|-----|-----|-----|
| <b>Temperature [°C]</b> | 400 | 500 | 550 | 600 | 650 |
| <b>Hardness [HRc]</b>   | 54  | 56  | 54  | 49  | 47  |

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## Nitriding

1.2344 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               |

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## 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 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.

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## 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.

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## Quality Assured Supply

1.2344 tool steel is supplied in accordance with our ISO 9001:2015 registration.