Boron Steel

Data Sheet

What is boron steel?

Boron is a very small chemical addition that is added by the steel maker to a medium carbon steel which has the effect of improving the hardenability.

Carbon steel is a medium alloy type grade, usually used for a heat treatment process. Boron is the catalyst that increases the strength of a heat treatable steel grade, during the quenching and tempering process.

Boron steel can be hot worked and directly quenched to achieve a high strength component and is ideally suited to components which are subject to high wear conditions.

What is the chemistry?

The exact chemistry we use is unique to Chapmans and has been refined for over 30 years of processing by ourselves and our customers.

The main chemical constituents are typically :

Carbon (%)	Silicon (%)	Manganese (%)	Chrome (%)	Boron (%)	CEV (%)
0.30	0.30	1.30	0.30	0.003	0.60

Please do not hesitate to contact us if you require further explanation or data.

Call now on 0114 285 6000

The steel making process

All of our suppliers are steel producers with integrated plant with long experience of casting and rolling the boron grade. They must adhere to our defined quality standards both for hot rolled bar and coil. These include limits for de-carburization, inclusions and full chemistry certification.

Steel making for hot rolled bar is from an electric arc re-cycled scrap route to produce billet that is then hot rolled into bar. Coil is produced from an iron ore continuous casting route, producing slab which is then hot rolled into coil and then de-coiled into sheet.

Boron Section sizes

Bar

For bar sections, we stock over 50 different sizes, starting from 40mm wide up to 200mm wide in varying thicknesses. For non-stocked sections, there is a 6 tonne MOQ.

Sheet

For sheet thickness sizes, our stock begins from 4mm and continues up to 25mm thick plate, with over 10 different thickness options.

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Heat Treatment

We are able to heat treat to a customer's own specific requirements but we can also advise as to the optimum hardness range of a component depending on the application and fitment of a part.

Typical hardness is from 48 – 52 HRC in the tempered condition.

Main uses

Probably the most common form of component using the boron grade are agricultural discs, in as little as 3mm thickness for drilling or 6mm thick for traditional tillage.

Virtually all ground engaging parts use boron steel whilst above ground components vary from grass cutting blades, hedge cutting flails and even to augers.

Outside our sector, earth moving machinery uses boron and even the automotive sector uses boron for some of its higher strength components, with a lower carbon content.

Boron is a grade growing in volume which gives huge advantages to users :

- Optimum hardness without embrittlement
- Well proven and trustworthy chemical grade
- No costly high-end alloys included
- Consistent and proven track record
- Up to six times longer wear life than most as-rolled steel grades

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Boron Strengths and Weight Advantages

Many OEMs use low grade steels as they are a low-cost option in machinery assembly.

However, with our boron heat treated grade, customers can choose between :

- Using the same steel thickness in heat treated boron and benefiting from the steel having much higher loads; or
- Reducing the steel thickness and achieving the same load plus a weight and cost saving

To calculate any reduction in thickness, use these guidelines.

Grade	Yield Strength	Thickness			
S355	355 MPa	8mm	10mm	12mm	15mm
CHAPMANS BORON	1200 MPa	4.35mm	5.44mm	6.53mm	8.16mm

15mm components in S355 can be reduced to 8mm thickness in a heat-treated boron part. **It is advisable to carry out practical tests to validate any design changes.**

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