

Steel

# TBL® – very good processing potential and high wear resistance

Hardenable boron steels  
for components exposed  
to extreme wear on  
agricultural machinery  
and special vehicles




thyssenkrupp





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TBL<sup>®</sup>-steels: wear resistance and processability in perfect combination.



TBL® steels are fine-grain boron-alloyed special structural steels with high surface quality and high purity. These properties add up to a better-than-ever combination of excellent wear protection and superior forming and hardening characteristics – not to mention reduced costs. Agricultural machinery and concrete mixing trucks can only be used economically if their components that are subject to wear will last a long time. At the same time, however, you as a manufacturer depend on the steels you use having the best possible workability. With our hardenable TBL® boron steel grades, you have the best of both worlds.


TBL® steels are characterized by a high degree of purity and a good surface quality, ideal prerequisite for consistently high product quality. Thanks to tight analysis tolerances, it is also possible to set almost identical final hardnesses after quenching and tempering – these ensure high wear resistance and thus satisfied end customers.

#### Advantages at a glance

- ➞ High wear resistance for longer service life
- ➞ Flexible forming with adjustable characteristics
- ➞ Consistently high quality of end products
- ➞ Substantial cost savings



# High wear resistance. For consistently high product quality.



In delivery condition, thyssenkrupp TBL® steels already have excellent forming characteristics and good welding properties. Normally, they are hardened after being processed for use in agricultural machinery. And this is where the advantages of alloying with boron stand out: TBL® grades can be hardened in water, oil or polymer dispersion with no problems. This makes TBL® steels ideal for complex structures demanding high wear resistance, for instance in harrows, packers and plows. A wide range of different mechanical properties can be realized depending on the steel grade and heat-treatment conditions.

## Impressive final hardnesses.

The maximum attainable hardness is 660 HBW (62 HRC) for TBL® steels. Ultimately, the hardnesses achieved depend mainly on the chemical composition and the cooling rate in the hardening process. The recommended austenitization temperature is 860–900 °C. The hardness set in the product can be varied again by subsequent tempering. Additional tempering is necessary for the TBL® 40, TBL® 45 and TBL® 50 variants, and this must be taken into account.

## Effective even without hardening.

In the case of rather moderate wear applications, TBL® grades can also be successfully used in delivery condition, such as cement mixers. They owe these good wear properties to the microstructure developed during rolling, which is characterized by the presence of both hard and soft components – pearlite with ferrite.

### Delivery forms and dimensions of TBL® steels

		Thickness [mm] from _ to	Width [mm] from _ to
<b>Steel grade Delivery form</b>			
TBL® 30	Hot-rolled strip/Cut-to-length plate	2.50 – 18.00	1,000 – 2,030
TBL® 35	Hot-rolled strip/Cut-to-length plate	2.50 – 15.00	1,000 – 1,630
TBL® 40	Hot-rolled strip/Cut-to-length plate	2.50 – 12.00	1,000 – 1,630
TBL® 45	Hot-rolled strip/Cut-to-length plate	2.50 – 12.00	1,000 – 1,630
TBL® 50	Hot-rolled strip/Cut-to-length plate	3.00 – 12.00	1,000 – 1,630

Steel grades according to DIN EN ISO 683-2.

Other dimensions and delivery forms as well as different thickness and width combinations available on request.

# Excellent processing. Excellent results.

## Hot forming.

For complex geometries, hot forming between 900 and 1,050°C is recommended, followed by quenching in water, oil or polymer dispersion, each of which is associated with a different cooling rate. Where the geometry permits, air cooling can also be sufficient for achieving the desired final hardness.

## Cold forming is also possible.

TBL® steels are cold-formable in their delivery condition. Cold forming is possible only to a limited extent in the hardened state.

## Thermal cutting? No problem.

All commonly used thermal cutting processes may be used to cut TBL® steels.

## Excellent weldability.

Hardenable TBL® boron steels are characterized by their suitability for welding, and can be welded either automatically or manually using all commonly-used methods. Preheating is effective in preventing cold-cracking.



Primary use in agricultural wearing parts: Harrow and hollow disks, plow-shares, knives and chippers. In non-hardened condition, TBL® is suitable for moderate stresses, e.g. concrete mixer drums.

### Because light should be easy: our service.

Together with you, we not only develop material conceptions but also give you access to the extensive know-how of our research and application technology experts if you have any questions relating to processing.

### Our know-how



Material  
concepts



Process  
optimization



Processing  
support

### Your benefits



Performance



Weight  
optimization

## Steel

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