

**ThyssenKrupp Steel Europe**

<b>Structural steel for agricultural machinery</b>	Steel grade		Material No.	Material Specification
	TKSE-Short name	EN-Short name		
	<b>TBL</b>	-	<b>1.5529</b>	

Heavy plate

**Scope**

This Material Specification applies to heavy plate with thicknesses up to 100 mm, made of the fine-grain structural steel TBL. For plate thicknesses above 100 mm special agreements are necessary.

**Application**

The steel may be used for welded constructions of different types such as harrows and ploughs. If necessary, wear parts can be partly or completely hardened.

The entire processing technique is of fundamental importance for the good performance of the products made of this steel. The processor must assure himself, that his methods of calculation, designing and working conform with the material to be used, meet the latest requirements of technical progress, and are suited to the proposed application. Due consideration must be given to relevant construction specifications.

The selection of the material is left up to the purchaser.

**Chemical composition** (heat analysis, %)

C	Si	Mn	P	S	Cr	B
0.25 - 0.30	≤ 0.40	1.10 - 1.30	≤ 0.040	≤ 0.040	≤ 0.50	0.0008 - 0.0040

The steel has a fine-grained microstructure. Nitrogen is absorbed to form nitrides.

**Delivery condition**

Normalised or normalised rolled

**Properties typical of 15 mm plate thickness** <sup>1)</sup>

Yield strength (MPa) <sup>2)</sup>	: 400
Tensile strength (MPa)	: 580
Elongation at fracture A (%)	: 18

<sup>1)</sup> The values are valid for the delivery condition.

<sup>2)</sup> 1 MPa = 1 N/mm<sup>2</sup>

**Heat treatment**

Normalising	Hardening	
	Quenching in water	Quenching in oil
840 - 890 °C Subsequent to temperature equalisation, cooling in still air	860 - 910 °C	900 - 950 °C

Tempering after hardening usually is not necessary. In order to increase the yield strength tempering between 200 - 250 °C can be carried out if necessary.

**Number of tests**

Test unit is maximum 40 t from each heat. On every test unit one tensile test shall be performed.

**Processing**

The steel is suitable for hot forming as well as for machining. In the delivery condition cold forming is possible only conditionally. If more than a slight cold forming is planned, the steel must be normalised before forming. Considering the carbon content, welding and thermal cutting is possible appropriate to the well known methods.

The instructions outlined in STAHL-EISEN-Werkstoffblatt 088 (weldable fine-grain structural steels, processing directives, especially for welding) apply equally to this steel. Recommendations for welding are also given in EN 1011 part 1 and part 2 - Welding, Recommendation for welding of metallic materials -.

For any information beyond the scope of these instructions, in particular that on the first use, our technical experts are at the disposal of the purchaser.

**General information**

Unless otherwise agreed upon in the order, the delivery will be governed by the conditions outlined in EN 10021.

The admissible tolerances are based on EN 10051 for plates cut from coils and on EN 10029 for four-high mill plates.

The plates will be supplied with a maximum flatness tolerance according to EN 10029, table 4.

For surface quality requirements EN 10163 is applicable.

**Publisher`s addresses**

STAHL-EISEN-Werkstoffblätter  
EN Standards

Verlag Stahleisen GmbH, Postfach 10 51 64, D-40042 Düsseldorf  
Beuth Verlag GmbH, Postfach, D-10772 Berlin