SECURE
Protection Steels

SECURE 600

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ILSENBURGER
GROBBLECH
A Member of the Salzgitter Group

Armour steel		Steel grade	Material No.	Issue
	ILG-Short Name	EN-Short Name		
Heavy Plate	**SECURE 600**	-	-	04/2022

SCOPE OF APPLICATION

This material data sheet applies to the alloyed, liquid quenched and tempered high-strength special steel grade **SECURE 600** for civil applications, by standard produced in thicknesses from 6 to 40 mm. The steel is supplied with defined ballistic properties.

APPLICATION

The steel may be used at the discretion of the purchaser for purposes of ballistic protection mainly for applications such as armoured limousines and transporters of valuables. 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, design and working conform with the material to be used, meet the latest requirements of technical progress, and are suited to the proposed application.

The selection of the material is up to the purchaser.

CHEMICAL COMPOSITION (heat analysis, %)

Thickness	C	Si	Mn	P	S	Cr	Mo	Ni
	≤ 0.40	≤ 0.80	≤ 1.50	≤ 0.025	≤ 0.010	≤ 1.5	≤ 0.50	≤ 1.50

Steel may contain Ti, Nb and B in addition to the elements listed.

CONDITION OF DELIVERY

Hardened or quenched and tempered
(see paragraph "Heat Treatment")

HARDNESS AT ROOM TEMPERATURE ON DELIVERY

570 - 640 HBW
The hardness is determined in accordance with DIN EN ISO 6506-1. The hardness is measured approx. 1 mm below the plate surface.

TYPICAL MECHANICAL PROPERTIES in state of delivery condition at room temperature (transverse test sample according to DIN EN ISO 6892-1/Procedure B). Charpy-V test according to DIN EN ISO 148-1 (transverse sample).

Yield strength R_{eH} *) MPa	Tensile strength R_m MPa	Elongation at fracture A %	Notched bar impact energy Av - 40 °C, J
1,500	2,000	8	15

*) If yielding occurs, the yield is determined as $R_{p0.2}$.

SCOPE OF TESTING

Unless otherwise agreed upon in the order, the tests listed below will be performed during inspection:

Hardness testing will be determined once per 40t of a heat.

In addition, a test of the ballistic properties according to customer specifications is optionally available on request. If not requested at the time of inquiry and order, the products shall be supplied in accordance with the basic specifications as provided in this spec. sheet. All test results are documented in inspection certificates according to DIN EN 10204-3.1.

GENERAL INFORMATION ON PROCESSING

Prior to processing, it is recommended to check the information provided by the steel manufacturer in order to benefit from the processing experience available in processing respective steels. The general information below can only cover a few important points. The recommendations of Stahl-Eisen-Werkstoffblatt 088 [Steel and Iron Specifications 088] (Weldable fine-grained structural steels, processing directions especially for welding) apply equally to these steels. Information on welding is provided in DIN EN 1011 Parts 1 and 2 - Welding, recommendations for welding metallic materials.

COLD FORMING

Cold forming of **SECURE 600** steel is not recommended due to its high hardness.

HEAT TREATMENT

In general, this steel obtains its required properties by austenitizing followed by conventional quenching and, if necessary, tempering. The heat treatment depends on the chemical composition and the plate thickness. To avoid a reduction in hardness, the **SECURE 600** steel grade must not be heated above 200 °C after treatment.

THERMAL CUTTING

Plates with thicknesses up to 15 mm are preferably cut by laser. For thicker sheets up to 40 mm thickness, underwater plasma cutting is recommended. Flame cutting is also possible. Depending on the plate thickness, sufficient preheating and, if necessary, post heating must be ensured.

For detailed recommendations, please refer to our cutting recommendations for **SECURE** steels.

WELDING

If due consideration is given to the general rules for welding, this steel is weldable both manually and automatically. To prevent cold cracking of the welded joints, only use filler metals that result in a low hydrogen content in the welded metal. The use of the austenitic filler metal grade 18 8 Mn is recommended. In this case, plate thicknesses up to 25 mm do not need to be preheated.

Highly stressed seams welded with ferritic filler metals, should generally be preheated for welding as specified in Stahl-Eisen-Werkstoffblatt 088 for the respective thicknesses. The level of preheating temperature during welding depends on the plate thickness and the residual stress in the structure. The inner temperature should not exceed 200 °C. For detailed recommendations, please refer to our welding recommendations.

DIMENSIONS AND TOLERANCES

	Quarto Plate
Thickness	6 - 40 mm
Thickness tolerance	≤ 15.0 mm: -0 / +0.8 mm ≤ 20.0 mm: -0 / +1.0 mm ≤ 40.0 mm: -0 / +1.2 mm
Width	1,250 - 2,500 mm
Length	4,000 - 12,000 mm

NOTES

Unless otherwise agreed upon in the order, the delivery will be subjected to the conditions outlined in DIN EN 10021

Dimensional deviations are based on DIN EN 10029 unless agreed otherwise.

Thickness tolerances are according to the table shown above (paragraph "Dimensions and tolerances").

The plates are supplied with a maximum flatness deviation in accordance with DIN EN 10029, Table 4 H plus 3 mm at 1 m gauge length.

For surface quality requirements DIN EN 10163 is applicable.

As per special agreement, it is possible to supply plates descaled or descaled and primed.

SOURCES OF SUPPLY

DIN EN, DIN EN ISO standards
Beuth Verlag GmbH, 10772 Berlin, Germany

Steel-Iron Material Sheets
Beuth Verlag GmbH, 10772 Berlin, Germany

Recommendations for thermal cutting of SECURE steels
Ilsenburger Grobblech GmbH, Veckenstedter Weg 10,
38871 Ilsenburg, Germany

Recommendations for the welding of SECURE steels
Ilsenburger Grobblech GmbH, Veckenstedter Weg 10,
38871 Ilsenburg, Germany

Publication of Ilsenburger Grobblech GmbH
"SECURE safety steels"
Ilsenburger Grobblech GmbH, Veckenstedter Weg 10,
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