NLMK Europe – Plate

Quard®
ABRASION RESISTANT STEEL

ABRASION RESISTANT STEELS

QUARD 550

1. Steel description and applications

Quard 550 is a martensitic abrasion resistant steels, with an average hardness of 550 HBW. Its very high resistance to abrasive wear makes it ideal where long service life is required. With the combination of superior hardness and strength, Quard 550 is an optimal choice for the recycling, mining and quarry industry.

Quard 550 is mainly recommended for the **following applications**:

- linings
- shrouds
- cutting edges
- hammers
- cutters

2. Technical characteristics

Hardness guarantee

Hardness
HBW = 520 - 580

Brinell hardness test, HBW according to EN ISO 6506-1, is performed 1 - 2 mm below the plate surface once per heat and 40 tonnes.

Other mechanical properties (typical values)

Yield Strength (MPa)	Tensile Strength - Transverse - (MPa)	Elongation A5 (%)
1575	1750	7

Chemical composition The steel is grain refined.

Max ladle analysis , %								
C	Si	Mn	P	S	Cr	Ni	Mo	B
0,35	0,80	1,60	0,025	0,01	1,10	1,00	0,50	0,005

Carbon equivalent, typical values, %		
Plate thickness	CEV(1)	CET(2)
6 - 30 mm	0,68	0,46

(1) CEV = C+Mn/6+ (Ni+Cu)/15+ (Cr+Mo+V)/5, (2) CET = C+(Mn+Mo)/10+Ni/40 +(Cr+Cu)/20

3. Dimensions

Quard 550 at present is supplied in the **following range**:

- thickness: 6 - 30 mm
- width: 1500 - 3100 mm

For more information, please check our website or contact your local NLMK Clabecq representative.

4. Flatness, tolerances & surface properties

Quard 550 is delivered with a unique combination of excellent flatness, tight thickness tolerances and superior surface finish.

Feature	Norm
FLATNESS	- EN 10029: . Class N (standard) & . Class S **PLUS**
THICKNESS tolerance	- meets and exceeds EN 10029 Class A - tighter tolerances upon request **PLUS**
Shape, length, width tolerances	meets EN 10029
SURFACE properties	exceeds the usual market standards, EN 10163-2 Class B3 **PLUS**

5. Delivery conditions

Our Quard plates are supplied as standard in the **shotblasted and primed** condition. In order to maintain a good weldability and laser cutting performance, a low zinc silicate primer is applied. Plates can also be delivered unpainted.

6. Heat treatment

Quard 550 receives its properties by quenching and when applicable by subsequent tempering. The properties of the delivery condition can not be retained after exposure at service or preheating temperatures above 250 °C. Quard 550 is not intended for any further heat treatment.

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7. Ultrasonic testing

Ultrasonic testing (UT), is applied to secure the plate from discontinuities like inclusions, cracks and porosity. In thickness from
8 mm and up, all plates are UT tested and controlled against class S2, E2, according to EN 10160.

8. General processing recommendations

To obtain optimal work shop productivity when processing Quard 550, it is essential to use the recommended procedures and tools given below.

Thermal cutting

Plasma and flame cutting can be performed without the need for preheating in thicknesses up to 20 mm, provided the ambient temperature is above 0 °C.
Subsequent to cutting, let the cut parts slowly cool down to room temperature. A slow cooling rate will reduce the risk of cut edge cracking (never accelerate the cooling of the parts).

Welding

Quard 550 can be welded using any of the conventional welding methods, both as manual or automatic. Welding of Quard 550 is recommended to be performed at ambient temperature not lower than +5°C.

Subsequent to welding, let the welded parts slowly cool down to room temperature (never accelerate the cooling process of the weld).

If welding using a heat input of 1.7 kJ/mm, preheating is not required in single plate thickness up to 10 mm. The interpass temperature used should not exceed 225 °C.

Soft weld consumables, giving low hydrogen weld deposits (<= 5 ml/100g), are recommended. The consumable strength should be as soft as the design and wear mode allows.

In general, the welding recommendation of Quard 550 should be in the accordance to EN-1011.

Machining

Quard 550 offers good machinability with HSS and HSS-Co alloyed drills. The feed rate and cutting speed have to be adjusted to the high hardness of the material.
Face milling, counter boring and countersinking are best performed using tools with replaceable cemented carbide inserts.

For more information regarding welding, cold forming and machining, please consult the respective manuals with technical recommendations on http://qt.nlmk.com

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