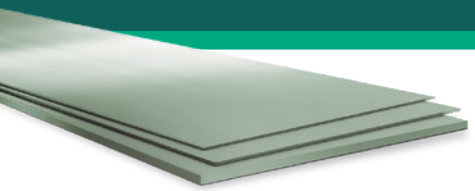
Quard 500

WEAR RESISTANT STEEL



QUARD 500 is a martensitic abrasion resistant steels, with an average hardness of 500 HBW. Its very high resistance to abrasive wear and impact makes it ideal where long service life is required With the combination of superior hardness and strength, **QUARD 500** is an optimal choice for the recycling and mining industry.

1. Applications

QUARD 500 is mainly recommended for the following applications:

- screeners
- crushing and pulverizing equipment
- conveyors belts
- grapples
- scrap presses

2. Technical characteristics

Hardness guarantee

HARDNESS
HBW = 470 - 530

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)

CHARPY-V NOTCH IMPACT TEST	YIELD STRENGTH (MPA)	TENSILE STRENGTH - TRANSVERSE - (MPA)	ELONGATION A5 (%)
30 J (longitudinal at -40°C)	1500	1700	8

Chemical composition

The steel is grain refined.

MAX LADLE ANALYSIS, %									
Thickness	C	Si	Mn	P	S	Cr	Ni	Mo	B
4 - 20 mm	0,28	0,80	1,60	0,025	0,001	1,00	1,00	0,50	0,005
20,01 - 40 mm	0,30	0,80	1,60	0,025	0,001	1,00	1,00	0,50	0,005
40,01 - 64 mm	0,30	0,80	1,60	0,025	0,001	1,20	1,00	0,50	0,005

CARBON EQUIVALENT, TYPICAL VALUES, %		
Plate thickness	CEV(1)	CET(2)
4 - 20 mm	0,56	0,39
20,01 - 40 mm	0,60	0,42
40,01 - 64 mm	0,70	0,45

(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 450 at present is supplied in the following range:

- thickness: 4 - 64 mm
- width: 1500 - 3100 mm

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

4. Flatness, tolerances & surface propertie

QUARD 450 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 500 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 500 is not intended for any further heat treatment.

Plate/QT/Quard/V07 (09.2024)

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 450, 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).

Cold forming

QUARD 500 is very well suited for cold forming operations. The minimum recommended R/t ratio when bending of QUARD 500 is given in the table below:

Thickness (mm)	Transverse to rolling (R/t)	Longitudinal to rolling (R/t)	Trans. Width (W/t)	Long. Width (W/t)
t < 8.0	3.5	4.5	10	10
8 ≤ t < 20	4.5	5.0	12	14
t ≥ 20	6.0	7.0	16	18

R = Recommended punch radius (mm), t = Plate thickness (mm) , W – Die opening width (mm) (bending angle ≤ 90°)

Due to the homogeneous properties and narrow thickness tolerances of QUARD 500, variations in springback is kept at a low level. Grinding of flame cut or a sheared edge in the bending area is recommended to further prevent cracking during bending.

Welding

QUARD 500 has a very good weldability, granted by the optimal carbon equivalent of the steel. It can be welded using any of the conventional welding methods, both as manual or automatic

Welding of QUARD 500 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 12 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 500 should be in the accordance to EN-1011.

Machining

QUARD 500 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.

Plate/QT/Quard/V07 (09.2024)

If you want to calculate the optimal parameters for your operations on Quard and Quend, download our Q Calculator using the QR code. Available on Google Play and Apple Store.

The elements in the data sheet are given for information only and reflect the information known at the time of publishing. This document is intended to give a general guideline for the purchasing and use of the steels only. The transmitter of this document doesn't accept any liability for any error or omission in the content of this document. Values and components quoted must not be considered as being guaranteed unless specifically confirmed separately in writing.

QUARD is a registered trademark of NLMK Clabecq
Rue de Clabecq 101 - B-1460 ITTRE - Belgium
Tel: +32 (0)2 391.91.00 - quard@eu.nlmk.com