NLMK Europe – Plate

Quend®

HIGH YIELD STRENGTH STEEL

EXTRA HIGH STRENGTH STRUCTURAL STEELS

QUEND 1300

1. Steel description and applications

Quend 1300 is extra high strength structural steel produced as quenched and tempered with a minimum yield strength of 1300 MPa.

Quend 1300 is recommended for the applications where high load-bearing capacity is required:

- lifting equipment (mobile cranes, marine cranes, truck cranes)
- stabilising support stabilising structures

2. Technical characteristics

Tensile properties

TRANSVERSE TESTING			
Yield strength Rp 0.2	Tensile Strength Rm	Thickness mm	Elongation A5
1300 MPa min	1400 - 1700 MPa	⩽ 4mm	8% min
		> 12 mm	8% min

Impact toughness

Minimum values at		
0 °C	-20 °C	-40 °C
35 J	30 J	27 J

Transverse testing according to EN 10025 option 30. Thickness < 12 mm subsized charpy V specimen have been used.

Testing according to EN 10025.

Chemical composition

The steel is fine grain treated.

Max ladle analysis , %													
C	Si	Mn	P	S	Nb	Cr	V	Ti	Ni	Al	Mo	N	B
0,25	0,50	1,20	0,02	0,01	0,04	0,70	0,06	0,01	1,50	0,06	0,70	0,005	0,005

Carbon equivalent, typical values, %	
CEV(1)	CET(2)
0,67	0,43

(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

Quend 1300 is currently supplied in the following range:

- thickness: 4 - 12 mm
- width: 1500 - 2700 mm

NLMK Clabecq is continuing the extension of its dimensional program. For more information, please check our website or contact your local representative.

4. Flatness, tolerances & surface properties

Quend 1300 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 PLUS - tighter tolerances upon request
Shape, length, width tolerances	meets EN 10029
SURFACE properties	exceeds the usual market standards, EN 10163-2 Class B3 PLUS

5. Delivery conditions

Quend 1300 is delivered as quenched and tempered. Our Quend plates are supplied as standard in the shotblasted and painted 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

The mechanical properties of Quend 1300 has been obtained by quenching and tempering. For not losing the guaranteed properties of Quend 1300, the plate should not be used in applications requiring hot working and service temperatures above 200 °C.

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7. Ultrasonic testing

Ultra sonic 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 Quend 1300, it is essential to use the recommended procedures and tools given below.

Thermal cutting

Quend 1300 may be cut either by oxygen fuel, plasma and laser cutting without any restrictions.

Subsequent to cutting, let the cut parts slowly cool down to room temperature. Do never accelerate the cooling of the parts. A slow cooling rate will reduce the risk of cut edge cracking.

Cold forming

Quend 1300 is very well suited for cold forming operations.

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	4.0	10	10
8 ⩽ t ⩽ 12	3.5	4.0	10	12

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 Quend 1300, variations in springback are 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

Welding of Quend 1300 can be performed using any of the conventional welding methods available both as manual or automatic.

In the thickness range up to 10 mm, preheating prior to welding is normally not needed, if a heat input of 1,7 kJ/mm is used.

Welding of QUEND 1300 is recommended to be performed at ambient temperature, not lower than 5°C, for thickness < 10 mm. For thickness >= 10 mm, preheating is recommended at 100°C. Subsequent to welding, let the welded parts slowly cool down to room temperature. Do never accelerate the cooling process of the weld.

It is always recommended to use low hydrogen electrodes when welding Quend 1300.

Machining

Quend 1300 provides a very good machinability and can be drilled, counter sinked and milled in the same way as any other 1300MPa Q&T steel.

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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