

Optim™ 700 MC

Extra High Strength Structural Steel

Extra high strength Optim™ 700 MC structural steel offers excellent bendability, weldability and cutting properties. Lightened structures mean increased payloads for machines and equipment, reduced fuel consumption, environmentally sound construction and sustainable development. Surface quality and dimensional and geometrical accuracy are guaranteed.

Optim™ 700 MC is a thermomechanically rolled (M), cold formable (C) structural steel which meets and exceeds the requirements of EN 10149-2.

Applications

Frame structures for mobile vehicles, superstructures of commercial vehicles, frames and booms for forestry vehicles, crane arms and other lifting equipment, load handling equipment and masts.

Tolerances

Tolerances on dimensions and shapes.

The dimension and shape tolerances conform with, and in part exceed, EN 10051 requirements. Flatness of cut lengths is 3mm/m. Optim™ 700 MC cut lengths are delivered with the Dead Flat guarantee.

Properties

Mechanical properties: tensile test. Optim™ 700 MC steels. Tensile test, longitudinal testing.

Plate Thickness mm	Yield Strength R _{eH} or R _{p0,2} MPa Minimum	Tensile Strength R _m MPa	Elongation % Minimum A ₈₀ ¹⁾ A
3 – 10	700 ²⁾	750 – 950	N/A 13

Yield and tensile strength are tested longitudinal to the rolling direction, and guaranteed both in the longitudinal and transverse directions.

¹⁾ Elongation A₈₀ is used for thickness below 3mm.

²⁾ For thickness >8 mm, the minimum yield strength can be 20 MPa lower, according to EN 10149-2.

Mechanical Properties: impact strength test

Optim™ 700 MC steels. Impact strength, longitudinal testing.

Test Temperature, Energy Level	Test Temperature, Energy Level
-20°C 40J minimum	-40°C 27J minimum

The requirement value 40 J means tests carried out with 10 x 10 longitudinal standard test pieces. When testing thicknesses less than 10mm, the width of the test pieces corresponds with the strip thickness and the requirement values decrease in direct relation to the surface area of the test piece. No impact tests are carried out for thicknesses less than 6mm.

Chemical Composition Content % (ladle analysis)

C max.	Si max.	Mn max.	P max.	S max.	Al max.	CEV %
0.10	0.20	2.10	0.020	0.010	0.015	0.37 ave. 0.41 max.

In addition, niobium (Nb), vanadium (V), titanium (Ti), boron (B), molybdenum (Mo), nickel (Ni) or copper (Cu) may be used as alloying elements either singly or in combination.

$$CEV = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$$

Processing Instructions

Welding

The weldability is excellent and all the common welding processes can be used. Preheating is not necessary under normal conditions. A narrow heat affected zone (HAZ) with a somewhat lower strength is formed immediately adjacent to the weld. The softening tendency can be limited by avoiding unnecessarily high heat input during welding. In applications where high strength is required, the welded joints should be placed in the less stressed locations. So, the effect of welds on the structure will be minimised. Matching welding materials are recommended when high strength of the weld is needed. Alternatively, undermatching consumables may be used if the weld is located in a less stressed part of the structure.

Cutting

Optim™ 700 MC steels can be cut easily by using thermal methods such as flame, plasma and laser cutting. Mechanical cutting can also be applied, but attention must be paid to the stiffness of the equipment, blade condition and clearance, and support of the work piece.

Bending

Minimum permissible bending radius, bending angle 90°, in all directions

Minimum permissible inside bending radius mm

Thickness mm $t \leq 3$	$3 < t \leq 6$	$6 < t \leq 10$	$t > 10$
1.2xt	1.4xt	1.8xt	N/A

Heat Treatment

If relieving of residual stresses is required, Optim™ 700 MC steels may be annealed at temperatures of +530°C to +580°C. Heating the steel to temperatures higher than +580°C reduces its strength.

Heat Treatment	Temperature °C	Treatment time & manner of cooling
Stress relieving	+530°C – +580°C (target +560°C)	2 minutes/mm thickness, minimum 30 minutes. Slow cooling in furnace.

Too high temperature and long treatment time may weaken mechanical properties.

Inspection Document

Inspection documents are in accordance with EN 10204-3.1.

Full specification and details are available on request.
The above information is provided for guidance purposes only.
For specific design requirements please contact our technical sales staff.