F550 TMCP toughcore

Cost reduction and increased safety for offshore CO_2 and LPG tank manufacturing

Qualified by DNV and BV, F550 TMCP toughcore offers excellent toughness properties and highest uniform elongation values to increase safety for CO_2 or LPG offshore tank manufacturing.

The outstanding CTOD properties and the remarkable fracture arrest behavior of the base material of F550 TMCP toughcore offers a safety margin which allows even for a fracture mechanic qualification at design temperature and in the heat affected zone.

Even in the unlikely event of full depressurization of your tank, stable toughness values are achieved at temperature of -80 °C or below.

Compared to conventional steel grades, suitable for CO_2 or LPG tank manufacturing, F550 TMCP toughcore offers an cost advantage of approx. 30% by its reduced nickel content.

As a consequence of the sustainable alloying concept, even the CO_2 footprint of your project can be improved.

Convincing advantages

- Reduced nickel content
- Cost reduction
- Reduced CO_2 footprint
- Best weldability
- Excellent toughness in combination with high strength
- Higher safety margin

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Chemical composition

Heat analysis in mass % acc. standard

Steel grade	Plate thickness [mm]	C max.	Si max.	Mn max.	P max.	S max.	Al max.	Cr max.	Mo max.	Ni max.	Nb max.	Ti max.	CE [1] max.	PCM max.
F550 TMCP toughcore	20 ≤ 60	0.08	0.5	1.6	0.01	0.005	0.035	0.2	0.43	0.55	0.03	0.015	0.48	0.22

[1] Max. 0.50 for WT exceeding 50 mm

Mechanical properties: Notch impact energy [2]

Values in as-delivered condition acc. standard

Steel grade	Test temperature [°C]	Test location [mm]	Notch impact energy Testing direction transversal A_v min. [J]	A min. [J]
F550 TMCP toughcore	-80	¼ thickness	50	35
	-60	½ thickness		

[2] Testing will be carried out in transverse direction acc. to DNVGL Rules for Classification – Ships, Part 2 respectively DNVGL OS-B101.
Additional testing in the simulated stress relieved condition can be agreed at a temperature of max. 580 °C.

Mechanical properties: Tensile test [3]

Values in as-delivered condition acc. standard

Steel grade	Yield strength $R_{p0.2}$ [MPa] min.	Tensile strength R_m [MPa]			Fracture elongation A5 $L_0 = 5.65 \sqrt{S_0}$ [%] min.	Uniform elongation [%] min.	Ratio max.
	t = 20 ≤ 60 mm	t = 20 ≤ 42 mm	t > 42 ≤ 50 mm	t > 50 ≤ 60 mm	t = 20 ≤ 60 mm	t = 20 ≤ 60 mm	
F550 TMCP toughcore	550	670 – 830	660 – 830	650 – 830	19	7	0.9

[3] Testing will be carried out in transverse direction acc. to DNVGL Rules for Classification – Ships, Part 2 respectively DNVGL OS-B101.
Additional testing in the simulated stress relieved condition can be agreed at a temperature of max. 580 °C.
Yield strength ratio of max. 0.87 upon request.

Welding Pre-Qualification [4]

Pre-Qualification	Welding process	Test location	Test temperature [°C]
CTOD	SAW 1.5 & 2.5 kJ/mm	FL / FL + 1 mm	min. 0.2 mm / -35
CVN			-60
CTOD	SAW 5.0 kJ/mm		min. 0.2 mm / -10
CVN			-60

[4] Additional testing in the simulated stress relieved condition can be agreed at a temperature of max. 580 °C.

Available dimensions

Steel grade	Plate thickness [mm]	Max. width [mm]	Max. length [mm]	Max. weight [t]	As-delivered condition
F550 TMCP toughcore	20 ≤ 60	3,850	18,000	21.5	TMCP toughcore®

Additional dimensions upon request.

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