A 645 Gr A / A 645 Gr B

Cost reduction and increased safety for ethylene and LNG tank manufacturing

The revision of API Standard 620 – "Design and Construction of Large, Welded, Low-Pressure Storage Tanks" in 2018 diversified the material choice for gas storage land tanks remarkably.

It is now possible to utilize the ASTM grades A 645 Gr A and Gr B for building gas storage tanks for e.g. ethylene, LPG or LNG. With the experience of the first projects, voestalpine Grobblech is again pioneering this field of application.

Ethylene tanks made of A 645 Gr A offer an approx. 15% higher material strength and an additional safety margin due to a lower CVN test temperature of -140 °C instead of -120 °C, compared to the conventional 5% nickel steel. Utilizing the higher strength and safety margin, you are able to safe material costs by reducing the overall wall thickness of your land tanks.

Meeting your existing LNG gas storage requirements with the A 645 Gr B instead of using the conventional 9% nickel steel, the approx. 30% lower nickel content reduces the material investment when building all types of LNG tanks for on-, offshore or fuel tank application.

Convincing advantages of A 645 Gr A compared to a conventional 5% Ni steel grade

- Reduced wall thickness and costs
- Higher material strength
- Lower test temperature and higher safety margin

Convincing advantages of A 645 Gr B compared to a conventional 9% Ni steel grade

- Essential costs reduction
- Similar mechanical properties
- Sustainable use of Ni-resources

greentec steel

PREMIUM QUALITY
WITH REDUCED
CARBON FOOTPRINT

Processing

Same workability like cutting, bending and edge preparation as for traditional material.
Proven weldability with our sister company voestalpine Böhler Welding.

Further information upon request.

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.	N max.
A 645 Gr A	> 5 ≤ 50	0.13	0.40	0.6	0.025	0.025	0.12	-	0.35	5.2	0.02
A 645 Gr B	> 5 ≤ 50	0.13	0.30	1.5	0.020	0.010	0.05	1.0	0.30	6.0	0.01

Mechanical properties: Notch impact energy [1)]

Values in as-delivered condition acc. standard

Steel grade	Test temperature [°C]	Size of specimen [mm]	Notch impact energy Testing direction longitudinal Av [J] min.	Notch impact energy Testing direction longitudinal A [J] min.	Notch impact energy Testing direction transversal Av [J] min.	Notch impact energy Testing direction transversal Av [J] min.
A 645 Gr A	-140	10 x 10	34	27	27	22
		10 x 7.5	26	22	20	16
		10 x 6.67	23	18	18	14
		10 x 5.0	18	14	14	11
A 645 Gr B	-196	10 x 10	34	27	27	22
		10 x 7.5	26	22	20	16
		10 x 6.67	23	18	18	14
		10 x 5.0	18	14	14	11

[1)] Each specimen shall have a lateral expansion opposite the notch of not less than 0.38 mm
Notch impact bending test in accordance with ASTM A 20M

Mechanical properties: Tensile test [2)]

Values in as-delivered condition acc. standard

Steel grade	Yield strength $R_{p0.2}$ [MPa] min.	Tensile strength R_m [MPa]	Fracture elongation A5 $L_0 = 5.65 \sqrt{S_0}$ [%]
A 645 Gr A	450	655 – 795	20
A 645 Gr B	590	690 – 830	20

[2)] Tensile test in accordance with ASTM A 20M

Available dimensions

Steel grade	Plate thickness [mm]	Max. width [mm]	Max. length [mm]	As-delivered condition [3)]
A 645 Gr A	5 – 50	3,800	12,700	Q + I + T
A 645 Gr B	5 – 50	3,800	12,700	Q + I + T

[3)] I ... Intermediate heat treatment

Additional dimensions upon request.

OUR PATH TO A GREENER FUTURE

Premium products in the greentec steel Edition

With greentec steel, voestalpine is pursuing an ambitious step-by-step plan in the long-term decarbonization of steel production. The declared objective is to achieve carbon-neutral production by 2050, and the initial steps have already been taken. Process-optimized production operations already prevent up to 10% of the direct CO_2 emissions at the Linz site. The material and processing properties of the steel are not affected in any way in this production route. Each voestalpine heavy plate product is available in premium quality in the greentec steel Edition with a reduced carbon footprint and unique benefits.

greentec steel

Premium quality with reduced carbon footprint

Heavy plates (excl. heads and clad plates) – greentec steel Edition
Max. carbon footprint 2.21 kg CO_2e per kg of steel [1]

[1] per EN 15804+A2 (EPD methodology) cradle to gate

Please find further information and downloadable files at
www.voestalpine.com/Nickel-plates

voestalpine Grobblech GmbH
voestalpine-Straße 3
4020 Linz, Austria
grobblech@voestalpine.com
www.voestalpine.com/grobblech

voestalpine
ONE STEP AHEAD.