



alform® x-treme

High-strength and ultra-high-strength heavy plates

Successful light-weight design requires the utilization of high-strength and ultra-high-strength steels. The innovative steel grades of voestalpine provide exceptional advantages in reduced weight and processability.

The high-strength steel grades alform plate 620 M, alform plate 700 M and the ultra-high-strength steel grades alform plate 900 M x-treme, alform plate 960 M x-treme, alform plate 1100 M x-treme, alform plate 1100 MH x-treme and alform plate 1300 M x-treme are thermomechanically rolled fine-grained structural steels with excellent weldability and good bending properties.

The alloying concept provides very low carbon contents and low carbon equivalents, which aims in very good weldability. The high strength provide special advantages in areas, where weight savings are of great importance, e.g. for mobile cranes, concrete pump cars, steel construction industry and architecture, penstocks and vehicles.

Convincing advantages

- » Excellent weldability
- » Optimum processability
- » Structural components and vehicles with higher lifting and load capacity and with lower dead weight
- » Improved environmental compatibility, lower fuel consumption



Premium quality
with reduced carbon footprint

alform®
greentec steel

Chemical composition

Heat analysis in mass %

alform®	C max.	Si max.	Mn max.	P max.	S max.	Al _{ges} min.	Cr max.	Mo max.	Ni max.	V ¹⁾ max.	Nb ¹⁾ max.	Ti ¹⁾ max.	B max.
plate 620 M	0.12	0.50	2.00	0.020	0.008	0.020	1.50	0.50	2.00	0.12	0.06	0.05	0.005
plate 700 M	0.12	0.60	2.10	0.020	0.008	0.020	1.50	0.50	2.00	0.12	0.06	0.05	0.005
plate 900 M x-treme	0.12	0.60	1.70	0.020	0.008	0.020	1.50	0.70	2.00	0.12	0.06	0.05	0.005
plate 960 M x-treme	0.12	0.60	1.70	0.020	0.008	0.020	1.50	0.70	2.00	0.12	0.06	0.05	0.005
plate 1100 M x-treme	0.18	0.60	2.10	0.020	0.008	0.020	1.50	0.80	2.00	0.12	0.06	0.05	0.005
plate 1100 MH x-treme	0.18	0.60	2.10	0.020	0.008	0.020	1.50	0.80	2.00	0.12	0.06	0.05	0.005
plate 1300 M x-treme	0.26	0.60	2.10	0.020	0.008	0.020	1.50	0.80	2.00	0.12	0.06	0.05	0.005

¹⁾The total of Nb, V und Ti must not exceed 0.22%.

The chemical composition of alform plate 700 M is according to EN 10149-2 for steel grade S700MC. The chemical composition of alform plate 900 M x-treme is according to EN 10025-6 for steel grade S890QL. The chemical composition of alform plate 960 M x-treme is according to EN 10025-6 for steel grade S960QL.

Carbon equivalent

Standard values for carbon content and carbon equivalent

alform®	Plate thickness [mm]	C [%]	CEV ²⁾ [%]	CET ³⁾ [%]	PCM ⁴⁾ [%]
plate 620 M	15	0.06	0.51	0.30	0.21
	40	0.06	0.52	0.31	0.21
plate 700 M	15	0.04	0.43	0.26	0.18
	40	0.06	0.47	0.26	0.19
plate 900 M x-treme	12	0.08	0.56	0.31	0.24
	20	0.08	0.60	0.33	0.25
plate 960 M x-treme	12	0.09	0.58	0.32	0.26
	20	0.08	0.60	0.33	0.25
plate 1100 M x-treme	12	0.16	0.57	0.37	0.30
plate 1100 MH x-treme	20	0.13	0.70	0.40	0.31
plate 1300 M x-treme	12	0.23	0.64	0.44	0.36

²⁾CEV = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15, according to IIW

³⁾CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40, according to SEW 088

⁴⁾PCM = C + Si/30 + (Mn + Cu + Cr)/20 + Ni/60 + Mo/15 + V/10 + 5*B, according to API 5L

The steel grades are characterized by excellent weldability as a result of their low carbon equivalent. Due to the very low carbon content the steel grades provide a high cold cracking resistance according to Graville.

Mechanical properties: Tensile test

alform®	Plate thickness [mm]	Yield strength R _{p0,2} [MPa] min.	Tensile strength R _m ⁵⁾ [MPa]	Fracture elongation A ₅ ⁵⁾ [%] min.
plate 620 M	8 ≤ 50	620	700 - 890	15
	6 ≤ 15	700	770 - 1,050	10
plate 700 M	> 15 ≤ 50	680	770 - 1,050	12
	> 50 ≤ 60	650	770 - 1,050	12
plate 900 M x-treme	6 ≤ 30	900	940 - 1,100	11
plate 960 M x-treme	6 ≤ 30	960	980 - 1,150	10
	6 ≤ 16	1,100	1,250 - 1,550	8
plate 1100 M x-treme	> 16 ≤ 30	1,100	1,250 - 1,550	8
	8 ≤ 20	1,100	1,160 - 1,550	7
plate 1100 MH x-treme	> 20 ≤ 25	1,080	1,100 - 1,550	7
	6 ≤ 16	1,300	1,400 - 1,700	8
plate 1300 M x-treme	> 16 ≤ 30	1,300	1,400 - 1,700	8

⁵⁾Tensile test in accordance with EN ISO 6892-1 on transverse samples.

Mechanical properties: Notch impact energy/Edging radii

alform®	Plate thickness [mm]	Notch impact energy ⁶⁾ Av [Joule] min.		Edging radii Ri min. at 90° edging (s = plate thickness)
		Testing direction Longitudinal Test temperature -40 °C	Testing direction Transverse Test temperature -40 °C	
plate 620 M	8 ≤ 50	40	30	3 s
	6 ≤ 15	40	30	3 s
plate 700 M	> 15 ≤ 50	40	30	3 s
	> 50 ≤ 60	30	27	3 s
plate 900 M x-treme	6 ≤ 30	30	27	4 s
plate 960 M x-treme	6 ≤ 30	30	27	4 s
plate 1100 M x-treme	6 ≤ 30	27	27	5 s
plate 1100 MH x-treme	8 ≤ 25	27	27	5 s
plate 1300 M x-treme	6 ≤ 30	27	27	5 s

⁶⁾Notch impact bending test in accordance with EN ISO 148-1 on Charpy-V longitudinal samples at -40 °C or -20 °C for alform plate 1300 M x-treme >16 mm. The mean value from 3 individual samples must reach the specified requirements. No individual value may be below 70% of the guaranteed mean value. For thicknesses < 10 mm, subsize-specimen with dimensions of 10 x 7.5 mm or 10 x 5 mm are tested. The guaranteed value is reduced in proportion to the sample cross-section.

The mechanical properties of alform plate 620 M are according to EN 10025-6 for steel grade S620QL. The mechanical properties of alform plate 900 M x-treme are according to EN 10025-6 for steel grade S890QL. The mechanical properties of alform plate 960 M x-treme are according to EN 10025-6 for steel grade S960QL.

Available dimensions

Maximum width per thickness; minimum width 1,500 mm

alform®	Plate thickness [mm]	Max. width [mm]	Max. length [mm]	As-delivered condition ⁸⁾
plate 620 M	8 ≤ 15	3,000	18,700	TM + DIC
	> 15 ≤ 20	3,500	18,700	
	> 20 ≤ 50	3,800 ⁷⁾	18,700	
plate 700 M	6 < 8	2,500	18,700	TM + DIC
	8 ≤ 15	3,000	18,700	
	> 15 ≤ 20	3,500	18,700	
	> 20 ≤ 50	3,800 ⁷⁾	18,700	
plate 900 M x-treme	> 50 ≤ 60	3,800 ⁷⁾	16,000	TM + DIC + T
	6 ≤ 30	2,500	16,000	TM + DIC + T
	6 ≤ 30	2,500	16,000	TM + DIC + T
plate 960 M x-treme	6 ≤ 30	2,500	16,000	TM + DIC + T
plate 1100 M x-treme	6 ≤ 30	2,500	16,000	TM + DIC + T
plate 1100 MH x-treme	8 ≤ 15	2,000	16,000	TM + DIC + T
	> 15 ≤ 25	2,500	16,000	TM + DIC + T
plate 1300 M x-treme	6 ≤ 30	2,500	16,000	TM + DIC + T

⁷⁾ Max. width of 3,750 mm for weight per piece > 15 t

⁸⁾ TM ... thermomechanically rolled; DIC ... direct intensive cooling; T ... tempered

Weight per plate is max. 19.5 t.
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 CO₂ 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.



Premium quality with reduced carbon footprint

alform®
greentec steel

Heavy plates (excl. heads and clad plates) – greentec steel Edition

Max. carbon footprint 2.21 kg CO₂e per kg of steel ¹⁾

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

The information and product properties contained in this printed material are non-binding and serve the sole purpose of technical orientation. They do not replace individual advisory services provided by our sales and customer service teams. The product information and characteristics set forth herein shall not be considered as guaranteed properties unless explicitly stipulated in a separate contractual agreement. For this reason, voestalpine shall not grant any warranty nor be held liable for properties and/or specifications other than those subject to explicit agreement. This also applies to the suitability and applicability of products for certain applications as well as to the further processing of materials into final products. All application risks and suitability risks shall be borne by the customer. The General Terms of Sale for Goods and Services of the voestalpine Steel Division shall apply to all materials supplied by the voestalpine Steel Division and can be accessed using the following link: www.voestalpine.com/stahl/en/The-Steel-Division/General-Terms-of-Sale

Technical changes are reserved. Errors and misprints are excepted. No part of this publication may be reprinted without explicit written permission by voestalpine Stahl GmbH.

Please find further information and
downloadable files at
www.voestalpine.com/alform/en

