



alform® x-treme

Ultra-high-strength sheets made of hot-rolled steel strip

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 alform® x-treme steels are thermomechanically rolled and acceleration-cooled. The microstructure consists of martensite and annealed martensite. Special constructional steels are well suited to cold-forming and demonstrate a high degree of toughness because of their fine-needle crystals in the martensite. The steel is also demonstrates favorable cutting and blanking capacity. The steel can be stress-relief-annealed between 550 and 550 °C (at a maximum annealing time of 30 minutes).

Convincing advantages:

- » Optimum processability, excellent weldability
- » Higher wear resistance
- » Structural components and vehicles with higher lifting and load capacity with lower dead weight
- » Improved environmental compatibility based on lower fuel consumption

Chemical composition

Ladle analysis in weight percent and carbon equivalent

alform®	C	Si	Mn	P	S	Al	Cr	Ni	Mo	Cu	V	Nb	Ti	B	CEV	Reference values	
	max.	max.	max.	max.	max.	min.	max.	max.	max.	max.	max.	max.	max.	max.	max.	CEV	CET
900 x-treme	0.12	0.50	1.70	0.015	0.006	0.020	1.50	2.00	0.70	0.20	0.12	0.06	0.05	0.005	0.67	0.57	0.31
960 x-treme	0.12	0.50	1.70	0.015	0.006	0.020	1.50	2.00	0.70	0.20	0.12	0.06	0.05	0.005	0.77	0.66	0.34
1100 x-treme	0.20	0.50	2.10	0.015	0.006	0.020	1.70	2.00	0.80	0.70	0.20	0.09	0.24	0.005	0.82	0.73	0.43

The analysis limits of the respective steel grades are met according to EN 10149-2 and EN 10025-6.

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

CET = C + (Mn+Mo)/10 + (Cr+Cu)/20 + Ni/40

Mechanical properties: Tensile test

Longitudinal tensile test; minimum values for R_{eH} and R_m also apply in cross direction.

alform 900 x-treme and alform 960 x-treme meet all requirements of EN 10149-2.

Yield strength and tensile strength meet all the requirements according to EN 10025-6.

A yield strength of $R_{p0.2}$ applies for non-distinct arbitrary cases.

alform®	Yield strength R_{eH}	Tensile strength R_m	Elongation [%] min.
	[MPa]	[MPa]	A_5
900 x-treme	≥ 900	940 – 1100	10
960 x-treme	≥ 960	980 – 1150	10
1100 x-treme	≥ 1100	1160 – 1350	8

Mechanical properties: Notch impact energy/Edging radii

alform®	Notch impact energy ¹⁾			Edging radii ²⁾	
	Testing direction Longitudinal Test temperature -20 °C	[Joule]		Ri min. at 90° edging	
		Testing direction Transverse Test temperature -20 °C	Testing direction Longitudinal Test temperature -40 °C	s 3-6 mm	s > 6 mm
900 x-treme	40	30	30 ³⁾	2.5 s	3.0 s
960 x-treme	40	30	30 ³⁾	2.5 s	3.0 s
1100 x-treme	27	27	27	3.5 s	5.0 s

¹⁾ Minimum mean value from three samples (ISO-V) as related to full-size specimen (10 x 10 mm).

²⁾ Smallest permissible inside radius at 90° edging for sheet thickness s, bending axis in longitudinal direction

³⁾ When agreed upon at the time of the inquiry and order, a mean value of ≥ 27 joules will apply.

If requested in the order, the notch impact energy can be calculated from a sheet thickness of 3 mm.

Note: Notch impact energy tests in thicknesses < 6 mm do not conform with applicable Euronorm standards.

Dimensions

Maximum width per thickness; minimum width 900 mm

alform®	Thickness [mm]					
	3.5	4.0	5.0	6.0	7.0	8.0
900 x-treme	1500	1600	1600	1600	1600	1600
960 x-treme	1400	1500	1600	1600	1600	1600
1100 x-treme	-	1300	1500	1500	1600	1430

Available only as cut sheets in unpickled condition with a mill edge.
Additional dimensions upon request.

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 the following link:
www.voestalpine.com/alform

