alform®

THERMOMECHANICALLY ROLLED FINE-GRAINED STEELS

Technical terms of delivery for heavy plates
1 December 2019

voestalpine Grobblech GmbH
www.voestalpine.com/grobblech

voestalpine
ONE STEP AHEAD.

These general terms apply to all deliveries of thermomechanically rolled fine-grained steel – alform® supplied as heavy plate by companies in the voestalpine Steel Division. Please use the following link to find a list of the companies affiliated with the Steel Division:

www.voestalpine.com/stahl/en/Companies

The names of companies in the voestalpine Steel Division are referred to simply as **voestalpine** in this document.

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INTRODUCTION

voestalpine operates one of Europe's most modern steelmaking facilities in Linz. Each of the modern lines required for the production of high-quality heavy plates is located next to related facilities and is highly integrated into the works.

Our goal is to innovate and go beyond standard steels, to continually offer high-quality products. The most modern manufacturing technologies, continuous quality control systems as well as intense research and development guarantee optimum product quality.

These technical terms of delivery provide information on the ordering and processing of **thermo-mechanically rolled fine-grained heavy plates**. Please direct any of your questions to your responsible sales personnel or technical specialist at voestalpine.

Subject to change pursuant to further development.
The current version is available at www.voestalpine.com/alform/en

STEEL GRADES

» alform plate 355 M / alform plate 355 M toughcore
» alform plate 420 M / alform plate 420 M toughcore
» alform plate 460 M / alform plate 460 M toughcore
» alform plate 500 M
» alform plate 550 M

More information you will also find in our technical terms of delivery for high-strength and ultra-high-strength thermomechanically rolled fine-grained steels.

QUALITY MANAGEMENT

voestalpine is a quality leader in a challenging market environment, and it has become the company philosophy to meet the justified expectations and requirements of both the market and the customer with respect to every possible aspect of quality. Comprehensive quality management is a central component of the company strategy. In addition to this comprehensive quality management system, production monitoring using the most modern testing systems is also a necessity. These systems are inspected on a regular basis by external and independent agencies.

COMPREHENSIVE QUALITY MANAGEMENT

The voestalpine companies meet the highest standards of quality management and are certified pursuant to **Lloyd's Register QA Ltd.** in the United Kingdom as well as **ISO 9001** and **IATF 16949**.

This has been confirmed by numerous customer awards presented for best quality performance. Focus has been continually on this pursued path as well as on consistent implementation of all quality standards.

STATE-OF-THE-ART TESTING TECHNIQUES

voestalpine uses the most modern testing techniques and methods, laboratory information and management systems equipped with state-of-the-art technologies. The technical expertise of our testing and inspection laboratories is certified in accordance with international standards, e.g. **ISO/IEC 17025** and **ISO/IEC 17020**, and is accredited by Austrian national standards.

alform®

The steel grades of the alform® series are thermomechanically rolled, weldable and bendable fine-grained structural steels. Plates made of these steels combine the good toughness properties of the thermomechanically rolled fine-grained steels according to EN 10025-4 with the excellent cold forming properties of the cold forming steels according to EN 10149-2. The alform® steel grades, produced with toughcore® additionally show increased, excellent toughness properties, when compared with conventional alform® grades.

The technical terms of delivery apply for plate thicknesses from

» 8 - 140 mm, depending on steel grade

STEEL GRADE OVERVIEW

Steel grade	Designation according to EN 10149-2	Designation according to EN 10025-4
alform plate 355 M	S 355 MC	S 355 ML
alform plate 355 M toughcore		
alform plate 420 M	S 420 MC	S 420 ML
alform plate 420 M toughcore		
alform plate 460 M	S 460 MC	S 460 ML
alform plate 460 M toughcore		
alform plate 500 M	S 500 MC	–
alform plate 550 M	S 550 MC	–

Table 1: Steel grades

PRODUCTION PROCESS

alform® steels are produced via LD-route and are cast as fully killed steel. The alloying concept provides very low carbon contents and low carbon equivalents, which aims in very good weldability. In particular, the high-strength grades (alform plate 500 M and alform plate 550 M) provide special advantages in areas, where weight savings are of great importance. The steel grades of the alform® series are used in steel construction, bridge building and the manufacture of penstocks, vehicles and cranes. The special steel grade toughcore® is manufactured in a completely new and patented process and in accordance to EN 10025-4 that enables unique combinations of properties with respect to thickness, strength, excellent toughness and best weldability. The so produced heavy plates show their remarkable potential particularly in the thickness range from 100 mm to 140 mm.

CHEMICAL COMPOSITION

HEAT ANALYSIS

GUARANTEED VALUES

Table 2: Chemical composition

Steel grade	Mass [%]													
	C max.	Si max.	Mn max.	P[1] max.	S[1] max.	Nb[2] max.	V[2] max.	Ti[2] max.	Cr max.	Ni max.	Cu max.	Mo max.	N max.	B max.
alform plate 355 M	0.10	0.40	1.60	0.012	0.003	0.05	0.08	0.02	0.30	0.30	0.30	0.10	0.010	0.0005
alform plate 355 M toughcore	0.05	0.35	1.60	0.010	0.002	0.04	0.08	0.02	0.25	0.50	0.25	0.20	0.008	0.0005
alform plate 420 M	0.10	0.40	1.70	0.012	0.003	0.05	0.10	0.02	0.30	0.30	0.30	0.20	0.010	0.0005
alform plate 420 M toughcore	0.07	0.35	1.60	0.010	0.002	0.04	0.08	0.02	0.25	0.50	0.25	0.30	0.008	0.0005
alform plate 460 M	0.10	0.40	1.70	0.012	0.003	0.05	0.10	0.02	0.30	0.70	0.30	0.20	0.010	0.0005
alform plate 460 M toughcore	0.07	0.35	1.60	0.010	0.002	0.04	0.08	0.02	0.25	0.50	0.25	0.30	0.008	0.0005
alform plate 500 M	0.10	0.40	2.00	0.012	0.003	0.06	0.12	0.02	0.30	0.80	0.30	0.50	0.010	0.0005
alform plate 550 M	0.10	0.40	2.00	0.012	0.003	0.09	0.12	0.02	0.30	0.80	0.30	0.50	0.010	0.0005

[1] The standard EN 10025-4 would permit significantly higher values: P max. 0.025; S max. 0.020
[2] The total of Nb, V and Ti must not exceed 0.22%.
Different elements are not alloyed.

STANDARD VALUES FOR CARBON EQUIVALENT

Table 3: Carbon equivalent

Steel grade	Mass [%]			
	C max.	CEV[2] max.	CET[3] max.	PCM[4] max.
alform plate 355 M	0.04	0.33	0.20	0.13
alform plate 355 M toughcore	0.05	0.43	0.26	0.18
alform plate 420 M	0.04	0.33	0.20	0.13
alform plate 420 M toughcore	0.07	0.45	0.28	0.20
alform plate 460 M	0.04	0.37	0.22	0.15
alform plate 460 M toughcore	0.07	0.45	0.28	0.20
alform plate 500 M[1]	0.05	0.43	0.26	0.17
alform plate 550 M	0.05	0.45	0.29	0.20

[1] Carbon equivalents for alform plate 500 M in thicknesses > 60 mm have to be agreed individually.
[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

AS-DELIVERED CONDITION

The plates are delivered in a thermomechanically rolled condition with accelerated cooling.

MECHANICAL PROPERTIES alform® plate

The values of yield strength, tensile strength, fracture elongation and notch impact energy are guaranteed for thicknesses from 8 to 100 mm depending on steel grade. The values of bending test are guaranteed for thicknesses from 8 to 20 mm.

TENSILE TEST IN AS-DELIVERED CONDITION

Table 4: Tensile test

Steel grade	Plate thickness[1] mm	Yield Strength R_{eH}[2] MPa, min. Thickness mm				
		8 ≤ 16	> 16 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100
alform plate 355 M	8 - 100	355	345	335	325	325
alform plate 420 M	8 - 100	420	400	390	380	380
alform plate 460 M	8 - 100	460	440	430	410	410
alform plate 500 M	8 - 80	500	480	460	450	–

		8 ≤ 30	> 30 ≤ 50
alform plate 550 M	8 - 50	550	530

Steel grade	Plate thickness[1] mm	Tensile strength R_m[2] MPa Thickness mm			
		8 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100
alform plate 355 M	8 - 100	470 - 630	450 - 610	440 - 600	440 - 600
alform plate 420 M	8 - 100	520 - 680	500 - 660	480 - 650	470 - 630
alform plate 460 M	8 - 100	540 - 720	530 - 710	510 - 690	500 - 680
alform plate 500 M	8 - 80	580 - 760	580 - 760	580 - 760	–

		8 ≤ 30	> 30 ≤ 50
alform plate 550 M	8 - 50	600 - 760	570 - 730

[1] Larger thicknesses on request.
[2] Tensile test in accordance with EN ISO 6892-1 on transverse samples.

NOTCH IMPACT ENERGY AND BENDING IN AS-DELIVERED CONDITION

Table 5: Notch impact energy and bending

Steel grade	Plate thickness[1] mm	Fracture elongation $L_0 = 5.65 \sqrt{S_0}$ min. %	Notch impact energy [1] at –50 °C min. J	Bending test[2] bending angle 180° Mandrel diameter s = plate thickness	Admissible minimum inner radius 90°-edging s = plate thickness
alform plate 355 M	8 - 100	22	27	0.5 s	1.0 s
alform plate 420 M	8 - 100	19	27	0.5 s	1.5 s
alform plate 460 M	8 - 100	17	27	1.0 s	1.5 s
alform plate 500 M	8 - 80	16	27	1.0 s	2.0 s
alform plate 550 M	8 - 50	16	27	1.5 s	2.0 s

[1] Notch impact bending test in accordance with EN ISO 148-1 on Charpy-V longitudinal samples at –50 °C. 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 < 12 mm, subsize-specimen with dimensions of 10 x 7.5 mm are tested. The guaranteed value is reduced in proportion to the sample cross-section.
[2] Tensile test an on transverse samples.

MECHANICAL PROPERTIES alform® plate toughcore

The values of yield strength, tensile strength, fracture elongation and notch impact energy are guaranteed for thicknesses from 40 to 140 mm depending on steel grade.

TENSILE TEST IN AS-DELIVERED CONDITION

Table 6: Tensile test

Steel grade	Plate thickness [mm]	Yield strength $R_{p0.2}$ [1] (¼ t) [MPa] min.	Yield strength $R_{p0.2}$ [1] (½ t) [MPa] min.	Zugfestigkeit R_m [1] (¼ t) [MPa]	Tensile strength R_m [1] (½ t) [MPa]
alform plate 355 M toughcore	> 40 ≤ 100	355	355	470 - 600	470 - 600
	> 100 ≤ 140	345	345	460 - 590	460 - 590
alform plate 420 M toughcore	> 40 ≤ 100	420	380	500 - 630	490 - 630
	> 100 ≤ 140	380	365	480 - 620	470 - 620
alform plate 460 M toughcore	> 40 ≤ 100	460	400	550 - 680	540 - 680
	> 100 ≤ 140	400	385	500 - 660	490 - 660

[1] Tensile test in accordance with EN ISO 6892-1 on transverse samples.

NOTCH IMPACT ENERGY IN AS-DELIVERED CONDITION

Table 7: Notch impact energy

Steel grade	Plate thickness [mm]	Notch impact energy A_v min./A min. [1] [J] (¼ t) Test temperature		Notch impact energy A_v min./A min. [1] [J] (½ t) Prüftemperatur	
		-80 °C	-65 °C	-60 °C	-45 °C
alform plate 355 M toughcore	> 40 ≤ 100	150 / 105	150 / 105	100 / 35	100 / 35
	> 100 ≤ 140	-	150 / 105	-	100 / 35
alform plate 420 M toughcore	> 40 ≤ 100	150 / 105	150 / 105	100 / 35	100 / 35
	> 100 ≤ 140	-	150 / 105	-	100 / 35
alform plate 460 M toughcore	> 40 ≤ 100	150 / 105	150 / 105	100 / 35	100 / 35
	> 100 ≤ 140	-	150 / 105	-	100 / 35

[1] Notch impact bending test in accordance with EN ISO 148-1 on Charpy-V longitudinal samples. Normative requirements acc. to EN 10025 at -50 °C min. 27/19J in ¼ t

UNIFORM ELONGATION IN AS-DELIVERED CONDITION

Table 8: Uniform elongation

Steel grade	Uniform elongation Ag [1] [%]	Fracture elongation $L_0 = 5{,}65\sqrt{S_0}$ A5 [1] [%]	$R_{p0.2}$ / R_m max.
alform plate 355 M toughcore	10	25	0.92
alform plate 420 M toughcore	10	25	0.92
alform plate 460 M toughcore	10	25	0.92

[1] Tensile test in accordance with EN ISO 6892-1 on transverse samples.

QUALITY TEST

TEST UNIT

Unless otherwise agreed upon ordering, 40 t of a heat or a smaller portion is used as test unit for the mechanical properties. The test unit must consist of plates with the same steel grade and the same thickness range for the yield strength according to table 4.

SCOPE OF TESTING

Quality testing includes tensile test and notch impact test. The notch impact test is carried out on longtudinal samples at -50 °C for conventional alform production. For the special steel grades toughcore, the notch impact test is carried out between -45 °C and -80 °C. A different sample position or testing temperature must be agreed upon ordering. Bending test is applied on request. The heat analysis is provided as proof of the chemical composition.

TOLERANCES AND SURFACE FINISH

Unless otherwise agreed, tolerances according to EN 10029 (thickness tolerance according to class A, flatness tolerance according to class N), and surface finish according to EN 10163-A1 are valid.

MARKING

In general, marking consists of the:
» voestalpine symbol
» Steel grade designation
» Heat number
» Plate number

MATERIAL TESTING CERTIFICATE

Type of certificate according to EN 10204 must be agreed upon ordering.

PROCESSING GUIDELINES

COLD FORMING

alform® plate steels provide good cold forming properties. On condition that cut edges have been ground very smooth and that the bending process is done professionally a minimum bending radius without cracks for 90°- bending is guaranteed according to table 5. In general, the resulting bending radius on the plate is smaller than the die-radius. The proper die-radius is to be choosen by the processor; as minimum die-radius we recommend minimum inner radius plus 0.5 x plate thickness.

HOT FORMING

Heavy plates of alform® plate steel grades are in thermomechanically rolled condition and are intended for cold forming. In case of hot forming necessary, reheating for short time up to maximum 580 °C is possible.

WELDING

GENERAL

The thermomechanical manufacturing process for alform® plate grades makes it possible to achieve high yield strengths with significantly lower alloy content and reduced carbon equivalents. In particular, the low carbon content significantly reduces hardening in the heat-affected zone (HAZ). This is why alform® plate (x-treme) grades exhibit such excellent weldability. Compliance with the generally valid and accepted rules for the welding of low-alloy, high-strength, fine-grain structural steels is mandatory pursuant to EN 1011-2 and the STAHL-EISEN material data sheet SEW 088.

WELD SEAM PREPARATION

Weld preparation can be in the form of machining or thermal cutting. Preheating for thermal cutting is not required for workpiece temperatures above +5 °C. The fusion faces must be dry and free of impurities before welding begins.

WELDING TECHNIQUES

All conventional welding processes, both automatic and manual, can be used, particularly manual arc, inert gas and submerged arc welding.

WELDING CONSUMABLES

The welding consumables should be selected so that the properties of the weld metal are matched to the mechanical-technological properties of the base material. The recommended welding consumables are listed in Table 6.

RECOMMENDED WELDING CONSUMABLES FOR alform plate 355 M / 420 M / 460 M / 500 M /550 M alform plate 355 M / 420 M / 460 M toughcore

Table 9: Recommended welding consumables

Base material	Welding process, welding filler metals				
	Manual electric welding (SMAW) -111	WIG (GTAW) -141	MAG (GMAW) -135	MAG cored wire (FCAW) -136 / -138	UP (SAW) -12
alform plate 355 M	BÖHLER FOX EV 50 (AWS A5.1: E7018-1H4R)	BÖHLER EML 5 (AWS A5.18: ER70S-3)	BÖHLER EMK 6 (AWS A5.18: ER70S-6)	BÖHLER Ti 52-FD (AWS A5.36: E71T1-M21A4-CS1-H8)	Union S2 + UV400 (AWS A5.17: F7A4-EM12)
		BÖHLER EMK 6 (AWS A5.18: ER70S-6)			
alform plate 355 M toughcore	Phoenix 120 K (AWS A5.1: E7018-1)	Union I 52 (AWS A5.18: ER70S-6)	Union K 52 (AWS A5.18: ER70S-6)	BÖHLER HL 51 T-MC (AWS A5.36: E70T15-M21A4-CS1-H4)	BÖHLER EMS 2 + BB24 (AWS A5.17: F7A8-EM12K)
alform plate 420 M	BÖHLER FOX EV 50 (AWS A5.1: E7018-1H4R)	BÖHLER EMK 6 (AWS A5.18: ER70S-6)	BÖHLER EMK 6 (AWS A5.18: ER70S-6)	BÖHLER Ti 52 T-FD (AWS A5.36: E71T1-M21A4-CS1-H4)	BÖHLER SUBARC T55 + UV421TT (AWS A5.17: F7A8-EC1)
				BÖHLER Ti 52 -FD (AWS A5.36: E71T1-M21A4-CS1-H8)	
alform plate 420 M toughcore	Phoenix SH Ni 2 K 80 (AWS A5.5: E7018-C2L)	Union I 52 (AWS A5.18: ER70S-6)	Union K 52 (AWS A5.18: ER70S-6)	BÖHLER HL 51 FD (AWS A5.36: E70T15-M21A4-CS1-H4)	Union S 2 NiMo 1 + UV418TT (AWS A5.23: F8A10-ENi1-Ni1)
alform plate 460 M	BÖHLER FOX EV 60 (AWS A5.5: E8018-C3H4R)	BÖHLER Ni 1-IG (AWS A5.28: ER80S-Ni1 (mod)	BÖHLER EMK 8 (AWS A5.18: ER70S-6)	BÖHLER HL 51 T-MC (AWS A5.36: E70T15-M21A4-CS1-H4)	BÖHLER SUBARC T60 + UV421TT (AWS A5.23: F8A8-EC-Ni1)
				BÖHLER Ti 52-FD (AWS A5.36: E71T1-M21A4-CS1-H8)	
alform plate 460 M toughcore	BÖHLER FOX EV 63 (AWS A5.5: E8018-GH4R)		Union K 56 (AWS A5.18: ER70S-6)	BÖHLER Ti 52 T-FD (AWS A5.36: E71T1-M21A4-CS1-H4)	Union S 3 NiMo 1 + UV420TTR (AWS A5.23: F9A8-EF3-F3-N)
alform plate 500 M	BÖHLER FOX EV 65 (AWS A5.5: E8018-GH4R)	BÖHLER NiMo1-IG (AWS A5.28: ER90S)	BÖHLER NiMo1-IG (AWS A5.28: ER90S-G)	BÖHLER Ti 60 T-FD (AWS A5.36: E81T1-M21A8-Ni1-H4)	Union S 3 NiMo 1 + UV420TTR (AWS A5.23: F9A8-EF3-F3-N)
	BÖHLER FOX EV 70 (AWS A5.5: E9018-GH4R)			BÖHLER Ti 60-FD (AWS A5.36: E81T1-M21A8-Ni1-H4)	
	Phoenix SH Ni 2 K 90 (AWS A5.5: E10018-M)		Union MoNi (AWS A5.28: ER90S-G)	BÖHLER HL 53 T-MC (AWS A5.36: E80T15-M21A8-Ni1-H4)	
alform plate 550 M	BÖHLER FOX EV 65 (AWS A5.5: E8018-GH4R)	BÖHLER NiMo1-IG (AWS A5.28: ER90S)	BÖHLER NiMo1-IG (AWS A5.28: ER90S-G)	BÖHLER Kb 65 T-FD (AWS A5.36: E90T5-M21A4-GH4)	Union S 3 NiMo 1 + UV421TT (AWS A5.23: F9A8-EF3-F3)
	BÖHLER FOX EV 70 (AWS A5.5: E9018-GH4R)			BÖHLER Ti 75 T-FD (AWS A5.36: E101T1-M21A4-K2-H4)	
	Phoenix SH Ni 2 K 90 (AWS A5.5: E10018-M)		Union MoNi (AWS A5.28: ER90S-G)	BÖHLER HL 65 T-MC (AWS A5.36: E90T15-M21A8-K1-H4)	

Please find more detailed information at www.voestalpine.com/welding.
Our experienced welding experts will be happy to consult you.

HEAT CONTROL DURING WELDING

Preheating for welding is not necessary with dry fusion faces, component temperatures above +5 °C and hydrogen content HD of less than 5 ml per 100 grams of weld metal. Welding parameters that lead to $t_{8/5}$ times of 5 to 15 seconds result in optimum mechanical properties in the welded joint. Where special strength and toughness is required of the weld metal, an interpass temperature of 150 °C should not be exceeded.

WELDING CALCULATOR APP

With the Welding Calculator App from voestalpine (available for Android and iOS), you can now easily calculate cooling times $t_{8/5}$ and preheating temperatures pursuant to EN 1011-2 and based on your individual specifications. You can also optimize your welding activities with retroactive calculations. Based on climatic conditions, the app also recommends parameters for edge drying and features a module for calculating the required volume of welding consumables.

You will find more detailed information about the Welding Calculator App at
www.voestalpine.com/alform/en/Service/Welding-Calculator

DELIVERABLE DIMENSIONS alform plate 355 M, alform plate 420 M, alform plate 460 M

Thickness mm																										
100		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
95		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
90		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
85		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
80		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
75		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
70		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
65		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
60		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
55		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
50		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
45		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
40		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
35		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
30		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
25		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
20		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
15		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
10		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
8		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Width mm		1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000	3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800	

Maximum length: 18,700 mm
Maximum length: 17,000 mm for thicknesses of 8 < 9 mm and widths ≥ 3,450 - 3,800 mm.
Maximum length: 17,000 mm for thicknesses of 9 < 10 mm and widths > 3,650 - 3,800 mm.

Different dimensions on request.

DELIVERABLE DIMENSIONS alform plate 355 M toughcore, alform plate 420 M toughcore, alform plate 460 M toughcore

Thickness mm																									
140		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
135		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
130		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
125		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
120		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
115		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
110		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
105		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
100		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
95		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
90		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
85		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
80		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
75		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
70		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
65		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
60		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
55		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
50		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
45		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
40		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Width mm		1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000	3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800

Maximum length: 18,700 mm

Detailed dimensions on request.

DELIVERABLE DIMENSIONS alform plate 500 M

Thickness mm																										
80																										
75																										
70																										
65																										
60																										
55																										
50																										
45																										
40																										
35																										
30																										
25																										
20																										
15																										
10																										
8																										
Width mm		1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000	3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800	

Maximum length: 18,700 mm
Maximum length: 17,000 mm for thicknesses of 8 < 9 mm and widths ≥ 3,450 - 3,800 mm.
Maximum length: 17,000 mm for thicknesses of 9 < 10 mm and widths > 3,650 - 3,800 mm.

Different dimensions on request.

DELIVERABLE DIMENSIONS alform plate 550 M

Thickness mm																									
50																									
45																									
40																									
35																									
30																									
25																									
20																									
15																									
10																									
8																									
Width mm		1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000	3,100	3,200	3,300	3,400	3,500	3,600	3,700	3,800

Maximum length: 18,700 mm
Maximum length: 17,000 mm for thicknesses of 8 < 9 mm and widths ≥ 3,450 - 3,800 mm.
Maximum length: 17,000 mm for thicknesses of 9 < 10 mm and widths > 3,650 - 3,800 mm.

Different dimensions on request.

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