alform®

UNLEASH YOUR POTENTIAL WITH alform®

Premium steel for maximum efficiency and freedom of design

greentec steel

Premium quality
with reduced carbon footprint

alform®
greentec steel

voestalpine Steel Division
www.voestalpine.com/alform

voestalpine
ONE STEP AHEAD.

alform®

PREMIUM STEEL FOR MAXIMUM EFFICIENCY AND FREEDOM OF DESIGN

Innovative light-weight design and highest performance

Successful light-weight design requires the utilization of high-strength and ultra-high-strength steels. Our innovative thermomechanically (TM) rolled premium steel grades alform® and alform® x-treme lead to comprehensive weight reduction and provide exceptional advantages in processing.

With their reduced material thicknesses and excellent weldability, alform® steels provide cost savings from procurement to manipulation and processing.

Find out more about alform®
on our website at
www.voestalpine.com/alform

Stella Sustainable keeps you informed of greentec steel products, environmental protection and sustainability in the voestalpine Steel Division:
www.voestalpine.com/stella

SEE FOR YOURSELF WHAT alform® CAN DO FOR YOU

Higher lifting and load capacity based on innovative light-weight design

S355J2C (sheet thickness 15 mm)

-73 % strip thickness
-93 % weld volume

alform 960 x-treme (sheet thickness 4 mm)

Rectangular hollow section 120 mm x 80 mm x thickness, longitudinally welded, V seam, bending moment 50 kNm

Advantages over other steel grades. This graphic shows the potential savings achieved by implementing ultra-high-strength steels, for example in a bending beam under static load.

alform® is now also available as a greentec steel edition in proven quality with a reduced CO_2 footprint.

greentec steel

Premium quality
with reduced carbon footprint

alform®
greentec steel

Here are a few examples of alform® premium steel applications

- Railcars
- Knuckle boom cranes
- Spreaders
- Concrete pumps
- Agricultural and forestry equipment
- Mobile cranes
- Long-wall mining systems
- Trailers
- Push-off trailers
- and much more


Made with the
by voestalpine
voestalpine
ONE STEP AHEAD.

THE 2023/2024 alform® PARTNER

For whatever is being built anywhere in the world: SCHWING-Stetter is on board. For more than 85 years, the company has been passionate about the world's most important building material: Concrete. SCHWING-Stetter offers premium products for the entire range of ready-mix concrete technology from production to transport, placement and environmentally friendly concrete recycling.

Photograph from left to right: Daniel Neumann (Schwing GmbH), Horst Jöbstl (Schwing GmbH), Wolfgang Mitterdorfer (voestalpine Steel Division), Arnold Ackerlauer (voestalpine Steel & Service Center GmbH), Jürgen Lechfellner (voestalpine Steel Division)

A SOLID PARTNERSHIP.

SCHWING-Stetter is found worldwide in more than 75 countries with production and service locations. The site in St. Stefan houses the largest SCHWING production plant for truck-mounted concrete pumps and is the center of competence for hydraulics and machine components. voestalpine supplies high-strength and ultra-high-strength steels for dynamically stressed components.

But the joint venture goes beyond that: In collaboration with technical universities, SCHWING-Stetter and voestalpine have continuously developed welding processes and have become the technology leader in this field.

"THE TREND IS CLEARLY TOWARD EVEN SLIMMER AND LIGHTER COMPONENTS. WE ARE CONTINUALLY OPTIMIZING OUR EXPERTISE IN THE PROCESSING OF HIGH-STRENGTH STEELS. VOESTALPINE IS THE PERFECT PARTNER FOR US IN THIS RESPECT."

Horst Jöbstl
(Managing Director of SCHWING GmbH
in St. Stefan)

„PRODUCT INNOVATION AND ENTHUSIASM FOR TECHNOLOGY AND SUSTAINABILITY DRIVE US FORWARD. THESE VALUES HAVE ALWAYS CONNECTED SCHWING-STETTER AND VOESTALPINE AND ARE THE BASIS FOR OUR SUCCESSFUL PARTNERSHIP."

Arnold Ackerlauer
(voestalpine Steel & Service Center GmbH)

BEST PROCESSING PROPERTIES

Extreme performance at low weights. The alform® grades are thermomechanically rolled, weldable, bendable, fine-grained structural steels. They combine the toughness properties of thermomechanically rolled fine-grained structural steels with the excellent bendability of cold-forming steels.

Weight and volume reduction

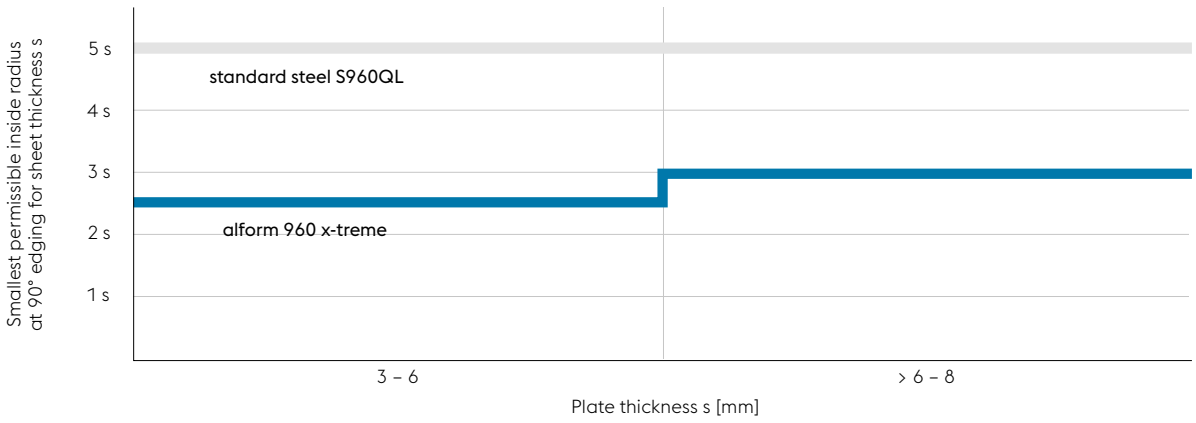
The reduced material thickness leads to light weight and smaller volume, which is a cost-saving advantage in all alform® steel grades.

Best cutability

We have designed the production technologies used in making high-strength and ultra-high-strength alform® steel grades to minimize and avoid residual stresses during thermal cutting. The low carbon content and homogeneous surface make these high-strength and ultra-high-strength alform® premium steel grades suitable for all conventional cutting methods.

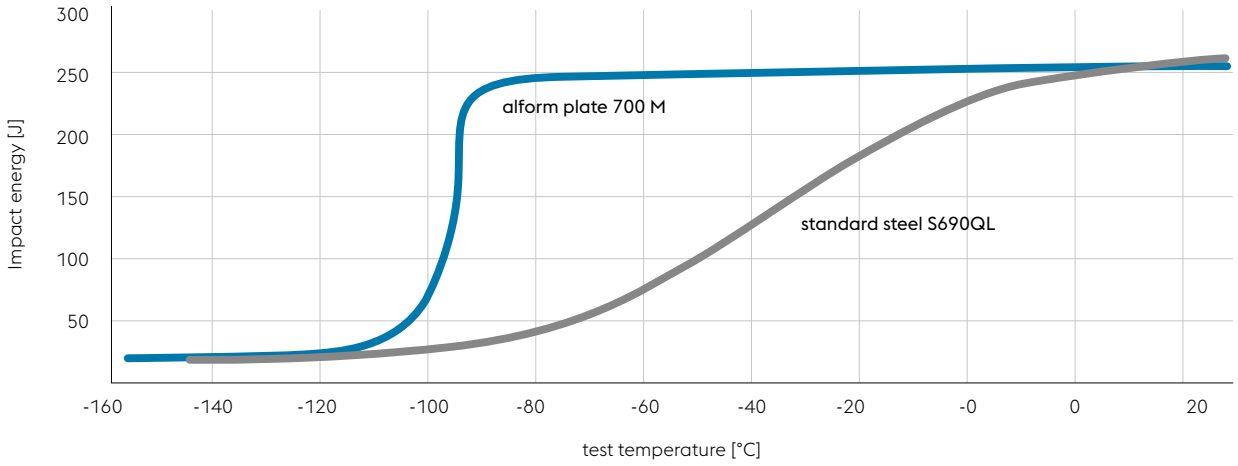
Very good cold formability

The homogeneous and fine-grained microstructure lends our alform® steel grades their decidedly improved forming behavior with more than twice the minimum yield strength than that of conventional structural steels.



Excellent toughness

During the development of our alform® steel grades, special emphasis was placed on the requirements of the crane building industry. Thermomechanical rolling and accelerated cooling lend our alform® steel grades a fine-grained structure and excellent toughness that make it possible for us to enter into agreements that exceed the applicable standards.



Perfect flatness

Excellent flatness is achieved through precisely controlled rolling processes in combination with modern leveling units and production-route-based temper softening. Freedom from inner tension is highly advantageous during cutting and further processing and achieves optimized dimensional accuracy of the manufactured components.

Clean surface

A uniform layer of scale forms on the sheet surface following hot rolling in our process route. The natural protective layer acts against corrosion during transport and can easily be removed through sand blasting.

Outstanding weldability

The combination of thermomechanical rolling and micro-alloying makes it possible to achieve very low carbon content. The excellent weldability of high-strength and ultra-high-strength alform® steels is based on the low carbon content and the tempering-resistant base materials.

These properties lead to the following advantages

» Wide range of welding processing
» Low tendency to hardness increase
» Low temper softening in the heat-affected zone
» Increased resistance to cold cracking

THERMO-MECHANICAL ROLLING

For outstanding mechanical properties

Properties
We are the specialists in thermomechanical rolling with accelerated cooling. This process leads to a fine-grained structure that provides high strength, high toughness levels and good cold formability.

Rolling process
Our heavy plates (produced on a reversing four-high rolling stand) and hot-rolled strips (cut to lengths after rolling) are precision-rolled while ensuring that the temperature and forming processes are perfectly coordinated with each other. Heavy plates and steel strips are accelerated-cooled directly after hot rolling.

Temper softening
The composition and microstructure of the steel grades are finely tuned to achieve the desired material properties, even after final annealing.

Surfaces and thickness tolerances
Our direct processes permit the use of modern alloying strategies with low carbon content and provide good surface characteristics by avoiding furnace scale and narrow thickness tolerances.

greentec steel

Premium quality with reduced carbon footprint

alform®
greentec steel

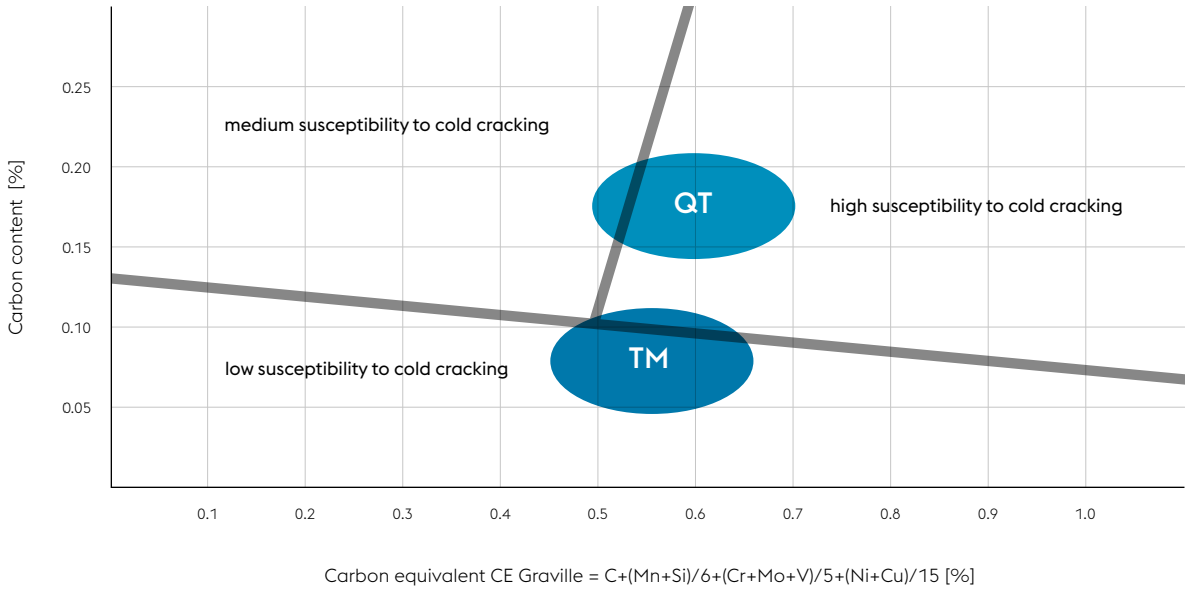
Hot-rolled steel strip – greentec steel Edition
Max. carbon footprint 1.95 kg CO_2e per kg of steel [1]
High-strength plates (excl. heads and clad plates) – greentec steel Edition
Max. carbon footprint 2.21 kg CO_2e per kg of steel [1]

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

All products, dimensions and steel grades listed in each voestalpine supply range are available as greentec steel Edition.

DIFFERENT MATERIAL GRADES
ARE CHARACTERIZED BY
A VARIETY OF WELDING
BEHAVIORS.

Comparison: Thermomechanical rolling (TM) and quenched and tempered (QT)



Three ranges with different levels of susceptibility to cold cracking are differentiated according to Graville in dependence on carbon content and carbon equivalent.

When compared with conventional quenched and tempered steels, thermomechanically rolled alform® steel grades achieve especially low carbon content at minimum yield strengths ranging from 700 to 960 MPa. For this reason, alform® steel grades do not tend as readily to harden in the heat-affected zone (HAZ) and have low susceptibility to cold cracking. The benefits are achieved by means of a modern analysis strategy, thermomechanical rolling and accelerated cooling.

alform®
RANGE OF SUPPLY

	Sheet thickness [mm]	Max. width [mm]	Max. length [mm]
alform 700 M / ME	2.0 < 2.5 2.5 < 3.0 3.0 < 4.0 4.0 ≤ 10.0 > 10.0 ≤ 12.0 > 12.0 ≤ 15.0	1,250 1,375 1,500 1,750 1,620 1,380	14,000
alform plate 700 M	6.0 < 8.0 8.0 ≤ 15.0 > 15.0 ≤ 20.0 > 20.0 ≤ 50.0 > 50.0 ≤ 60.0	2,500 3,000 3,500 3,800 3,800	18,700 18,700 18,700 18,700 16,000
alform 900 x-treme	3.5 < 4.0 4.0 < 8.0	1,550 1,620	14,000
alform plate 900 M x-treme	6.0 ≤ 30.0	2,500	16,000
alform 960 x-treme	3.5 < 4.0 4.0 < 4.5 4.5 < 8.0	1,400 1,500 1,620	14,000
alform plate 960 M x-treme	6.0 ≤ 30.0	2,500	16,000
alform 1100 x-treme	4.0 < 5.0 5.0 ≤ 7.0 > 7.0 ≤ 8.0	1,300 1,500 1,450	14,000
alform plate 1100 M x-treme	8.0 ≤ 15.0 > 15.0 ≤ 25.0	2,000 2,500	16,000

Cut-to-length sheets made of hot-rolled steel strip Heavy plates

Further measurements upon request.

New
alform 1300 x-treme available as a trial sample

Note
The different production routes for cut-to-length sheets made of hot-rolled steel strip and heavy plates result in specific product advantages that are described in greater detail in the respective data sheets. A special feature of our alform plate grades 700 M and alform 700 ME is their excellent toughness.

Conversion table
The following values are Anglo-American yield strength data:

1 ksi	~ 7 MPa
100 ksi	~ 690 MPa
130 ksi	~ 896 MPa
140 ksi	~ 965 MPa
160 ksi	~ 1,103 MPa

Tensile test	Plate thickness [mm]	Yield strength R_{eh} min. [MPa]	Yield strength $R_{p0.2}$ min. [MPa]	Tensile strength R_m [MPa]	Total elongation [%] min. A_{80}	A_5
alform 700 ME	2.0 ≤ 12.0	700 [1]	-	750 – 930	11	14
alform 700 M	2.0 ≤ 15.0	700 [1]	-	750 – 930	11	14
alform plate 700 M	6.0 ≤ 15.0	-	700	770 – 1,050	-	10
	> 15.0 ≤ 50.0	-	680	770 – 1,050	-	12
	> 50.0 ≤ 60.0	-	650	770 – 1,050	-	12
alform 900 x-treme	3.5 ≤ 8.0	900	-	940 – 1,100	-	10
alform plate 900 M x-treme	6.0 ≤ 30.0	-	900	940 – 1,100	-	11
alform 960 x-treme	3.5 ≤ 8.0	960	-	980 – 1,150	-	10
alform plate 960 M x-treme	6.0 ≤ 30.0	-	960	980 – 1,150	-	10
alform 1100 x-treme	4.0 ≤ 8.0	1,100	-	1,160 – 1,350	-	8
alform plate 1100 M x-treme	8.0 ≤ 20.0	-	1,100	1,120 – 1,300	-	8
	> 20.0 ≤ 25.0	-	1,080	1,100 – 1,300	-	8

Notch impact energy Edging radii	Plate thickness [mm]	Notch impact energy Av [Joule] min. Test temperature -20 °C longitudinal	transverse	Test temperature -40 °C longitudinal	transverse	Edging radii Ri min at 90° edging Location of bending edge in direction of rolling (s = sheet thickness) longitudinal	transverse
alform 700 ME	2.0 ≤ 3.0	-	-	-	-	0.8 s	0.8 s
	3.0 ≤ 6.0	40	-	27	-	1.2 s	1.2 s
	> 6.0 ≤ 12.0	40	-	27	-	1.6 s	1.6 s
alform 700 M	2.0 ≤ 3.0	-	-	-	-	0.8 s	0.8 s
	3.0 ≤ 6.0	40	-	-	-	1.2 s	1.2 s
	> 6.0 ≤ 15.0	40	-	-	-	1.6 s	1.6 s
alform plate 700 M	6.0 ≤ 15.0	-	-	40	30	4.0 s	3.0 s
	> 15.0 ≤ 50.0	-	-	40	30	4.0 s	3.0 s
	> 50.0 ≤ 60.0	-	-	30	27	4.0 s	3.0 s
alform 900 x-treme	3.5 ≤ 6.0	40	30	30	27 [2]	2.5 s	2.5 s
	> 6.0 ≤ 8.0	40	30	30	27 [2]	3.0 s	3.0 s
alform plate 900 M x-treme	6.0 ≤ 30.0	-	-	30	27	5.0 s	4.0 s
alform 960 x-treme	3.5 ≤ 6.0	40	30	30	27 [2]	2.5 s	2.5 s
	> 6.0 ≤ 8.0	40	30	30	27 [2]	3.0 s	3.0 s
alform plate 960 M x-treme	6.0 ≤ 30.0	-	-	30	27	5.0 s	4.0 s
alform 1100 x-treme	4.0 ≤ 6.0	27	27	27	27 [2]	3.5 s	-
	> 6.0 ≤ 8.0	27	27	27	27 [2]	5.0 s	-
alform plate 1100 M x-treme	8.0 ≤ 25.0	-	-	30	27	6.0 s	5.0 s

1) The yield strength may be lower by 20 MPa for thicknesses > 8 mm. Longitudinal tensile test; minimum values for ReH und Rm also apply in cross direction
2) Transverse values at –40 °C only guaranteed upon agreement and when ordered as such. Notch impact energy can be measured from a plate thickness of 3 mm upon request. Notch impact energy tests on thicknesses < 6 mm do not comply with respective Euronorm standards.

MORE THAN JUST A QUALITY PRODUCT

When solutions are in demand

With our material and processing expertise, we have been the reliable partner to our customers in the machinery industry for many years and provide innovative product solutions in addition to our full service for best possible support and process performance.

alform®
SERVICE

BENEFIT FROM THE COMPREHENSIVE EXPERTISE OF OUR SPECIALISTS IN MECHANICAL ENGINEERING!

alform® technical support
Our large pool of technical experts will be happy to assist you in all matters of concern, whether it be help with the adjustment of your production facilities, technical consultation in selecting the correct product or any other issues.

alform® inhouse welding competence
We are continuously improving our outstanding expertise in the most modern welding processes in the course of research projects that we carry out with economic and scientific partners. We use the most modern welding machines, robots and a thermal welding simulator to conduct practical welding tests for punctual measurement of microstructures and other properties.

voestalpine Steel & Service Center
We offer you customized solutions in collaboration with our own logistics company. Our well stocked warehouse of sample parts in Linz allows short-term sample deliveries for welding and bending trials. Our state-of-the-art stock logistics make it possible for us to quickly meet your requirements and supply small lots and cut shapes upon request.

MORE THAN JUST SUCCESSFUL LIGHT-WEIGHT DESIGN

Innovations that save costs

Our experience and continued research activities make it possible for us to develop innovative steel grades that help you more effectively meet your challenges in the future. State-of-the-art technologies in manufacturing and processing help reduce your costs and provide a decisive competitive advantage for your operations.

alform®
EFFICIENCY

BENEFIT FROM SHORT PROCESSING TIMES, MINIMAL POST-PROCESSING AND COST-EFFECTIVE TRANSPORT AND LOGISTICS!

Short processing times
The excellent flatness and surface of our alform® premium steel grades ensure higher productivity through significantly increased cutting speeds and reduced downtimes as a result of optimized work processes.

Reduction of revision work
The homogeneous properties of our materials lead to reproducible processing results, thus guaranteeing optimized dimensional accuracy, and revision work is eliminated almost entirely.

Reduction of transport and logistics costs
Our alform® steel grades make lower material thicknesses possible. This leads to a reduction in transport weights and procurement volumes. Means of transport and hoisting devices can be smaller, and additional fuel costs can be saved.

MORE THAN JUST PERFECT WELD JOINTS

System solution in a new dimension

The alform® welding system is the world's first custom-matched system of steels and consumables for high-strength and ultra-high-strength welded structures. This opens up an entirely new dimension of our alform® steels with respect to material expertise.

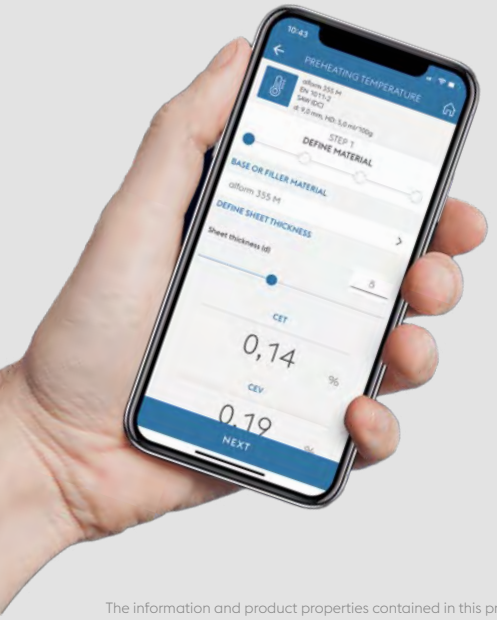
alform®
WELDING SYSTEM

BENEFIT FROM
STATE-OF-THE-ART
WELDING EXPERTISE!

Exceptional strength
Our optimized system of tempering-resistant steel grades and adapted filler metals guarantees strength values in the welded joint across a wide range of parameters. These values meet the demands of the respective base materials.

Operational reliability
The steel grades and welding consumables in our system allow weld seams (heat-affected zone and filler metals) with excellent toughness. The excellent values guarantee high operating safety at low temperatures under complex loading conditions.

Best product quality
The alform® welding system stands for consistently high product quality in the base material and welding consumables. The proven system solution guarantees optimized component property profiles. The extended welding range achieves reduced costs and increased production reliability. Our highly professional consultation services for your applications and comprehensive processing expertise perfectly round off the package.



voestalpine WELDING CALCULATOR

The voestalpine Welding Calculator supports the planning and optimization of welding tasks such as the calculation of cooling times, preheating temperatures or the required quantities of welding consumables.

Please find more information on the voestalpine Welding Calculator:
www.voestalpine.com/alform/Welding-Calculator

12/2023

voestalpine Steel Division
voestalpine-Straße 3
4020 Linz, Austria
daniel.saric@voestalpine.com
www.voestalpine.com/alform

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ONE STEP AHEAD.