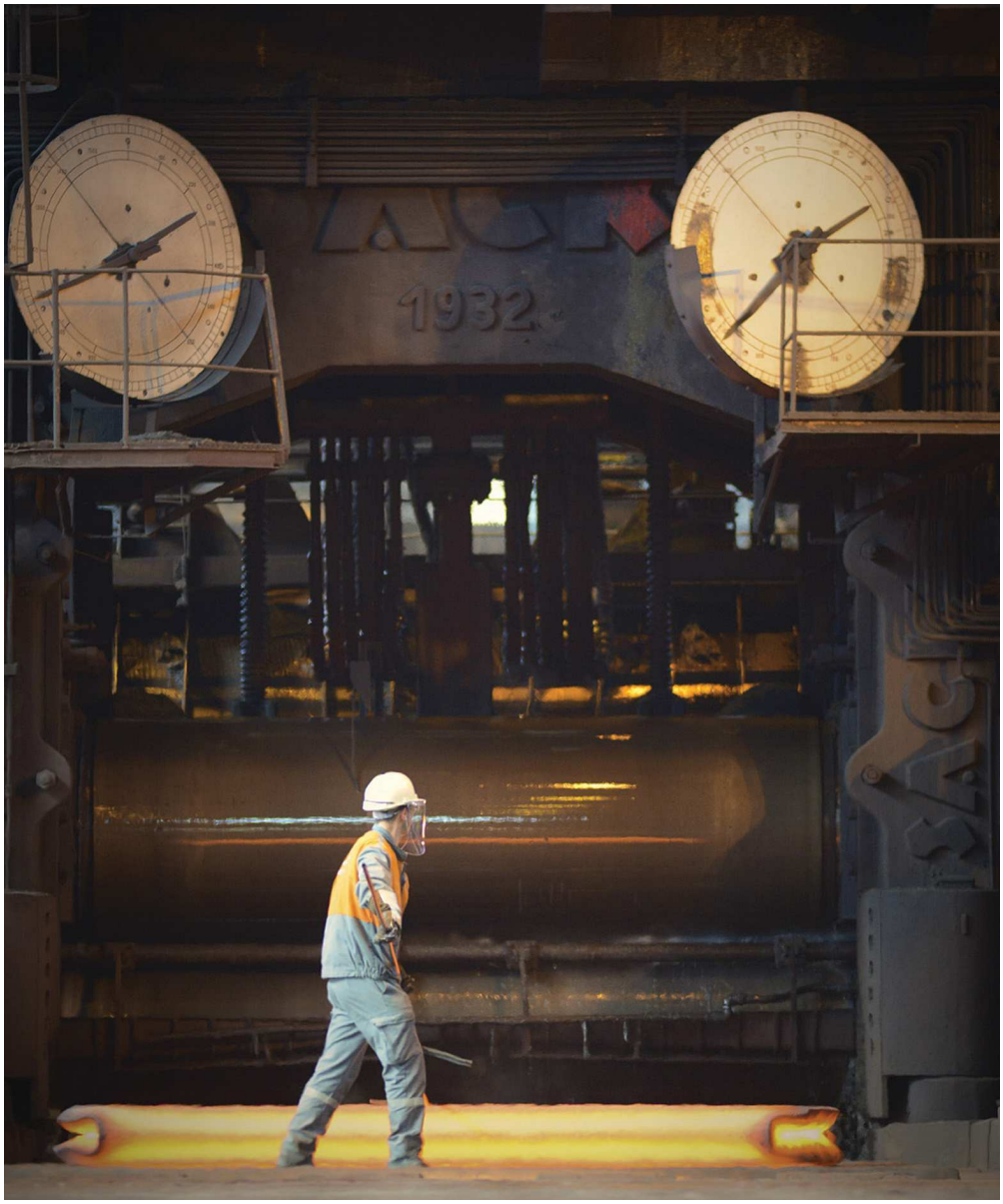
Industeel

ArcelorMittal

Steel Solutions for high strength applications

Industeel
Special steel plates producer

Rolling mill Industeel France (Chateauneuf)



Electric arc furnace

Rolling mill Industeel Belgium

Industeel is a subsidiary of ArcelorMittal producing special steel hot rolled plates, ingots and formed pieces in the world's widest dimensional range.

Specialized in carbon, low alloys, and stainless steels, Industeel offers a complete range of high quality steel grades designed to meet the most stringent specifications.

Thanks to its 3 integrated mills located in Belgium and France, Industeel meets all customer requirements providing the widest dimensional range.

Tailor-made solutions adapted to your projects thanks to a rich metallurgical know-how.

Our expertise

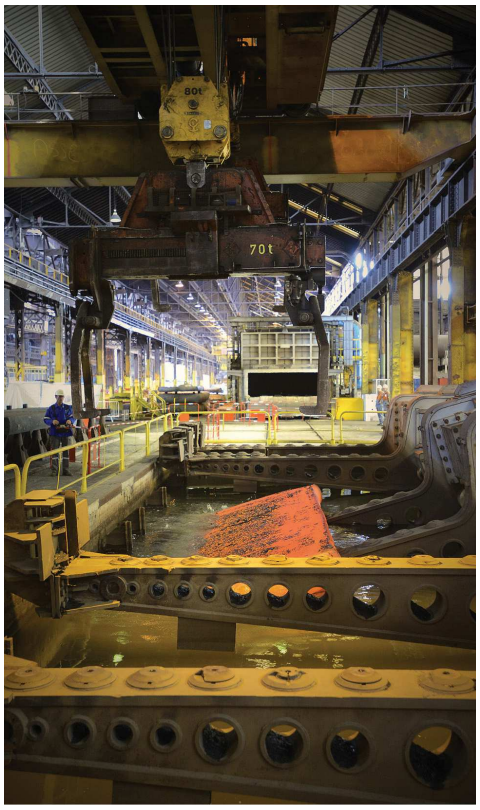
First-class producer of High Strength Steel plates for structural applications

Careful selection of raw materials to produce high purity steel melting electric arc furnace. All scraps used by Industeel are issued from recycling, which is environmental friendly.

Fine tuned secondary metallurgy, vacuum and special degassing processes for high cleanliness steels (VD).

Quenching and tempering provides the steel with high strength and ductility.

Heat treatment operation



Finishing Industeel Belgium

Quenching and tempering provides the steel with high strength and ductility

Flatness

THICKNESS	FLATNESS TOLERANCE IN mm PER 2000 mm			
	Amstrong® Ultra 690	Amstrong® Ultra 890	Amstrong® Ultra 960	Amstrong® Ultra 1100
6 mm	8	12	12	12
> 6 mm	6	6	6	6

Amstrong® Ultra
Our high strength steel grades

Due to their higher minimum yield strengths of **690 - 890 - 960 - 1100 MPa** compared to classical structural steels, Amstrong® Ultra grades enable to:

- Reduce thickness of welded structures and make weight saving (so to limit preheating conditions, decrease quantity of welding consumable, welding time and production costs)
- Support higher stresses and realize more resistant and innovative structures
- Increase payload of mobile cranes
- Reduce fuel consumption

Industeel produces all High Strengh Steel grades according to international standards.

INDUSTEEL TRADEMARK	STANDARD
Amstrong® Ultra 690	S690 Q - S690 QL - S690 QL1 according to EN 10025-6 ASTM A 514 Grades B, E, F, H, Q / ASTM A 517 Grade Q
Amstrong® Ultra 890	S890 Q – S890 QL – S890 QL1 according to EN 10025-6
Amstrong® Ultra 960	S960 Q - S960 QL according to EN 10025-6
Amstrong® Ultra 1100	Grade produced as per Industeel technical datasheet

Industeel plates are produced in accordance with international standards and are certified by recognized bodies such as ABS, Lloyd's Register, DNV and Bureau Veritas

	INDUSTEEL BELGIUM		INDUSTEEL LE CREUSOT		INDUSTEEL LOIRE	
ABS	AQ70 Z35/Z25 (0°C) DQ70 Z35/Z25 (-20°C) EQ70 Z35/Z25 (-40°C) FQ70 Z35/Z25 (-60°C)	90 mm max	AQ70 Z35/Z25 (0°C) DQ70 Z35/Z25 (-20°C) EQ70 Z35/Z25 (-40°C) FQ70 Z35/Z25 (-60°C)	186 mm max	AQ70 Z35/Z25 (0°C) DQ70 Z35/Z25 (-20°C) EQ70 Z35/Z25 (-40°C) FQ70 Z35/Z25 (-60°C)	210 mm max
DNV	*NVE500 (-40°C) *NVF550 (-60°C) NVF690 (-60°C)	100 mm max	NVF690 (-60°C)	130 mm max	NVF690 (-60°C)	215 mm max
Lloyd's Register	*DH42, DH46, DH50, DH55, DH62 * EH42, EH46, EH50, EH55, EH62 DH69 (-20°C) EH69 (-40°C) FH69 (-60°C)	100 mm max	-	-	-	-
Bureau Veritas	Project by project based on specific approval	Project by project based on specific approval	-	-	-	-

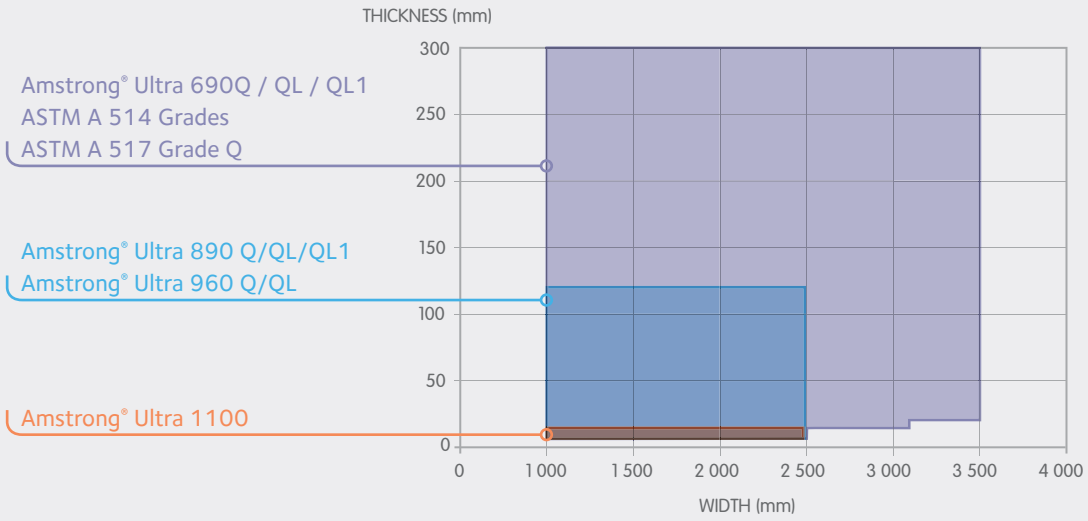
Dimensions

Industeel can manufacture the largest range of thicknesses and unit weights available on the market in Quenched and Tempered (Q+T) steel grades.

Ingot rolling

High Strength Steel typical dimensional ranges

Thickness : 5 to 300 mm
Length : up to 17 meters
Weight : up to 80 T



Our services
More than a simple plates producer

Need a special grade?

Industeel can produce plates from standard grades up to the most severe specifications.

- Our experts are available to help you in designing a grade matching your most demanding requirements.
- Our steel making process associated with heat treatment allows to reach excellent mechanical properties throughout the entire thickness and reach Charpy values up to 120 J at -60°C of a thickness up to 210 mm.

From the minimum guarantees of the European standards up to special values for offshore applications

Toughness in transverse direction :
- from 27 J at – 20°C
- up to 120 J at – 60°C

Possibility to deliver plates according to the best flatness requirement of European norm Class S (3 mm/m)

R&D center

Our added value

A world - class research center for innovative High Strength Steels

Our R&D center named CRMC is a world - class facility with 50 researchers dedicated to our customers:

- Providing on-field technical assistance to help our customers to use our steel solutions.
- With an integrated welding workshop with expertise in welding metallurgy and welding processes.
- And cooperation with research institutes and organizations on processing operations.

Technical Assistance

Our team can give you technical assistance to help you to gain full advantage of Industeel grades.

Mechanical testing

Metallographic studies

Amstrong® Ultra 690

ADVANTAGES

Amstrong® Ultra 690 is a high strength quenched and tempered steel dedicated for structure.

Weight saving
Thanks to its minimum yield strength of 690 MPa, it enables to save weight in the final stucture.

Easy forming and weldability
Thanks to its exceptional purity rate (very low sulphur and phosphorus contents), and its adapted chemical analysis, Amstrong® Ultra 690 is easy to shape and weld, even for heavy and thick plates. The reduced carbon and alloying elements content of Amstrong® Ultra 690 allows welding in very good conditions with excellent characteristics.

Welding operation on samples

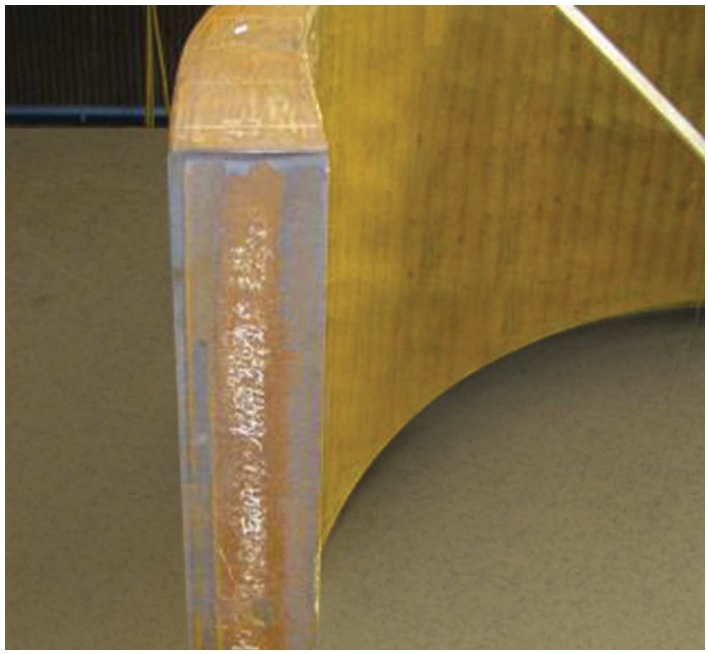
Mechanical properties of Amstrong® Ultra 690

THIC-KNESS mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELON-GATION MIN %	S690QL* J (-40°C)	S690QL1* J (-60°C)
5-50	690	770 - 940	14	40 / 30	30 / 27
51-100	650	760 - 930	14	40 / 30	30 / 27
101-250	630	710 -900	14	40 / 30	30 / 27

*Min impact energy (J) Longitudinal and Transverse

WELDING CONDITIONS	
Preheating	100 °C - 150 °C (Not necessary < 15 mm)
Postheating	200 °C / 2 h
Max Interpass Temperature	< 200 °C
Post Welding Heat Treatment	Not necessary

Formed plate in 130 mm



690 MPa for high strength applications

Applications

Public Work (demolition)

Jaw crushers

Lift heavy loads

Amstrong® Ultra 690 th = 60 – 80 mm

EXAMPLES OF APPLICATIONS

Dumpers, Chassis – Canopy Amstrong® Ultra 690 : th = 8 - 50 mm

The vehicle weight is reduced,
the fuel consumption is reduced

Thanks to its typical mechanical properties and easy weldability, Amstrong® Ultra 690 is often used in different applications such as:

- Penstocks
- Machine frames
- Offshore cranes
- LPG vessel
- Bucket parts
- Offshore equipments
- Heavy mechanical
- Outriggers
- etc ...

SuperElso® 690CR

ADVANTAGES

SuperElso® 690CR is a 690 MPa (100 ksi) yield strength quenched and tempered steel adapted for legs of offshore jack-up platforms.

Specially designed grades
This grade has been specially designed for offshore applications requiring the use of heavy thick plates (up to 210 mm/8.3") with demanding mechanical properties requirements.

Adapted chemical composition
The chemical composition of SuperElso® 690 CR has been carefully adapted and allows the achievement of high impact values (> 50 J at - 60 °C) across the thickness while respecting the tensile properties required.

Cost efficiency of manufacturing
The very low carbon content of this material allows cutting and welding under classical conditions, increasing in this way the cost efficiency of manufacturing.

Mechanical properties of SuperElso® 690CR

THICKNESS mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELONGATION MIN %	S690 CR* J (-60°C)
≤ 210	690	790 - 940	16	32 / 32

*Min impact energy (J) Longitudinal and Transverse at ¼ thickness

WELDING CONDITIONS	
Preheating	120 °C
Postheating	250 °C / 2 h
Max Interpass Temperature	< 170 °C
Post Welding Heat Treatment	Not recommended

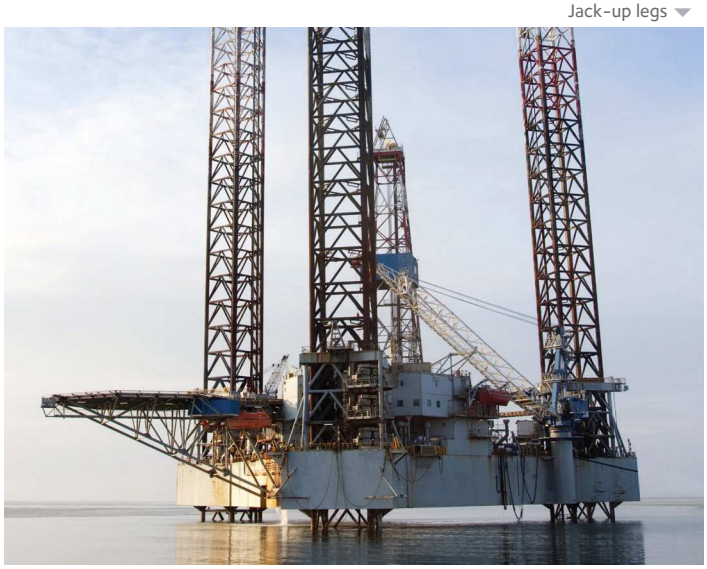
Jack-up racks after cutting

690CR

Applications

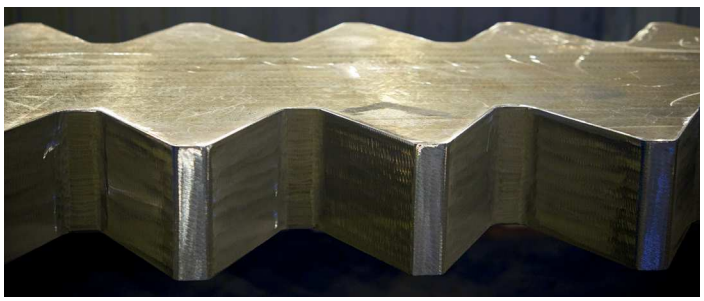
The main application of SuperElso® 690CR being the manufacturing of racks and chords, particular attention has been paid on forming, oxycutting and welding properties. Industeel produces welded elements for jack-up legs manufacture. These elements are assembled from cut racks and hot pressed chords welded on both sides of each racks.

Jack-up legs

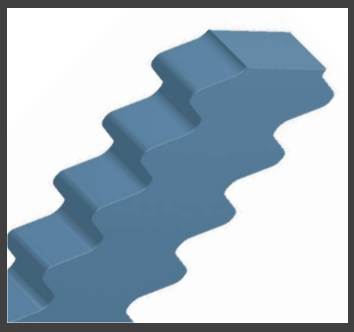


Jack-up for windfarm installation

Racks

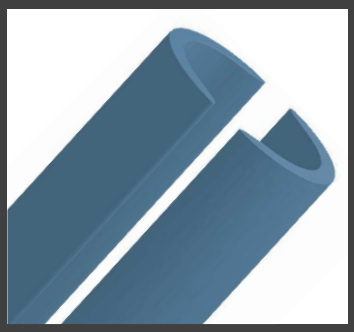


EXAMPLES OF APPLICATIONS



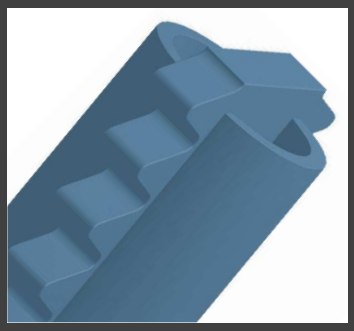
Racks

- Length: up to 15.5 m
- Thickness: up to 210 mm
- Width: 600 to 1100 mm



Chords

- Length: up to 10 m
- Thickness: up to 120 mm



Welded elements

- Length: up to 24.5 m
- Weight: up to 70 tons

Amstrong® Ultra 890

ADVANTAGES

Amstrong® Ultra 890 is a quenched and tempered steel for structure with higher strength.

Weight saving
Thanks to its minimum yield strength of 890 MPa, Amstrong® Ultra 890 enables large weight savings or support higher stresses and thus carry higher payloads.

Ease in fabrication
With a special steel making process, and an adapted chemical analysis (low alloying content), Amstrong® Ultra 890 is easy to machine, bend and weld which simplifies production and maintenance.

Cost efficiency
By using Amstrong® Ultra 890 and thus thinner plates in welded structures, you limit preheating conditions, you decrease quantities of consumables, welding time and thus production costs.

Mechanical properties of Amstrong® Ultra 890

THIC-KNESS mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELON-GATION MIN %	S890QL* J (-40°C)	S890QL1* J (-60°C)
5-50	890	940 - 1100	11	40 / 30	30 / 27
51-100	830	880 - 1100	11	40 / 30	30 / 27
101-120	830	880 - 1100	11	40 / 30	30 / 27

*Min impact energy (J) Longitudinal and Transverse

WELDING CONDITIONS	
Preheating	130 °C -150 °C (Not necessary < 15 mm)
Postheating	250 °C / 2 h
Max Interpass Temperature	< 200 °C
Post Welding Heat Treatment	Not necessary

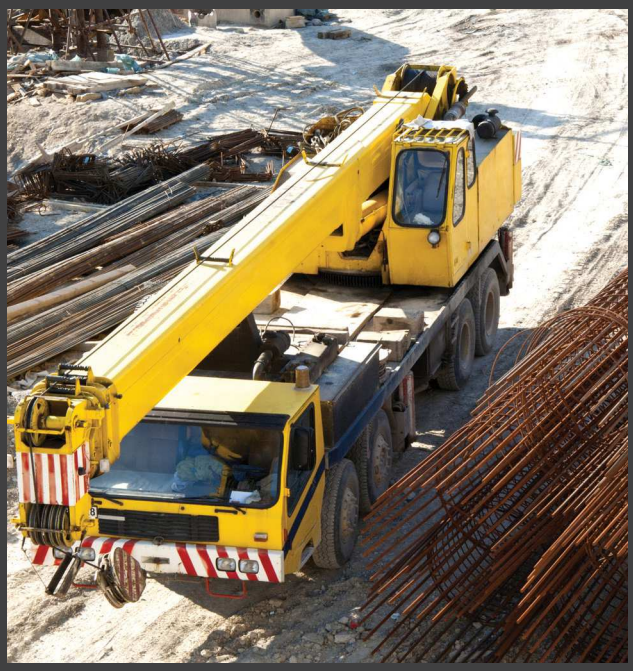
Cold bending operation

890 MPa for very high strength applications

Applications

Excavator mounted with hydraulic breaker

EXAMPLES OF APPLICATIONS



Mobile crane

Amstrong® Ultra 890 is well appreciated when used for high strength applications such as:

- Heavy handling cranes
- Mobile cranes
- Truck chassis
- Work tools for demolition

Amstrong® Ultra 960

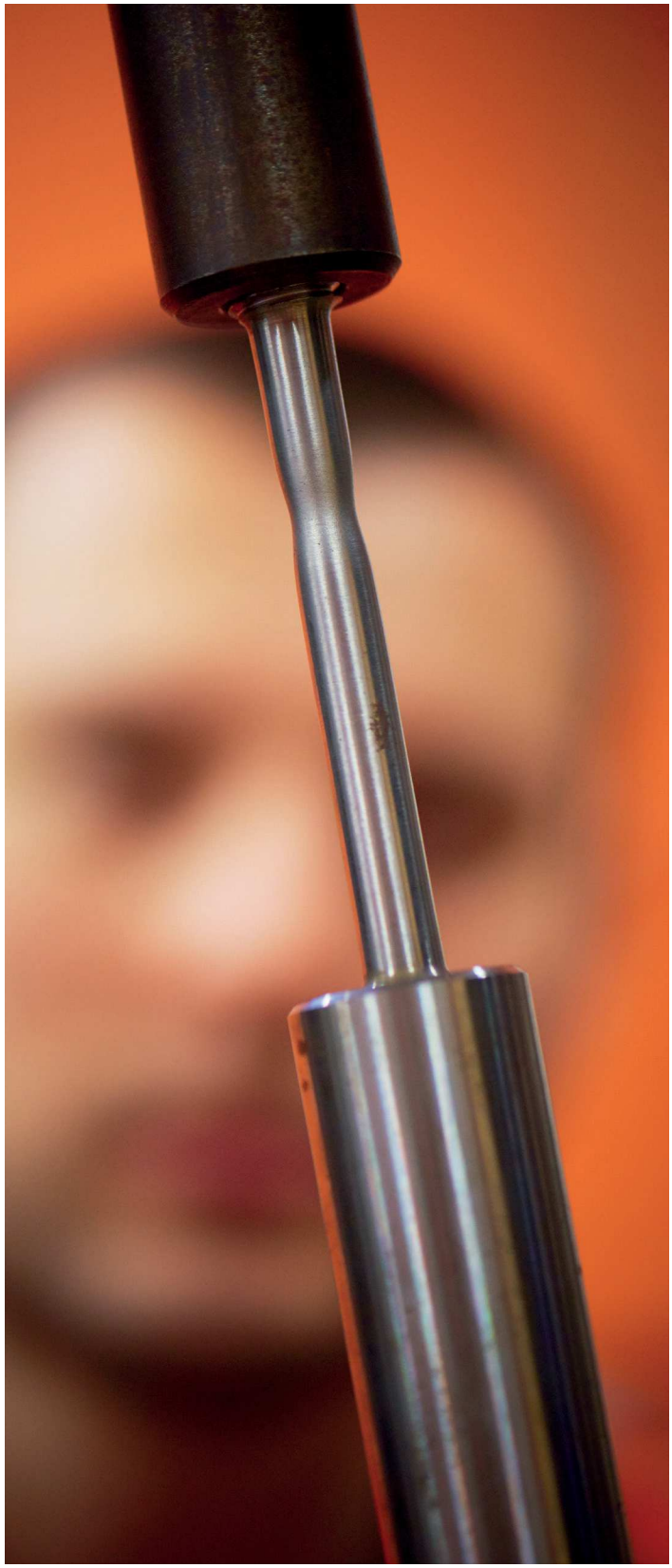
ADVANTAGES

Amstrong® Ultra 960 is a quenched and tempered steel for structure with very high strength.

Weight saving
Thanks to its minimum yield strength of 960 MPa, Amstrong® Ultra 960 enables large weight savings or support higher stresses and thus carry higher payloads.

Cost efficiency
By using Amstrong® Ultra 960 and thus thinner plates in welded structures, you limit preheating conditions, you decrease quantities of consumables, welding time and thus production costs.

Yield strength testing



Mechanical properties of Amstrong® Ultra 960

THICKNESS mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELON-GATION MIN %	S960QL* J (-40°C)
5-50	960	980 - 1150	10	30 / 27
51-105	900	940 - 1100	10	30 / 27

*Min impact energy (J) Longitudinal and Transverse

WELDING CONDITIONS	
Preheating	Not necessary < 15 mm 130 °C - 150 °C
Postheating	250 °C /2h
Max Interpass Temperature	< 200 °C
Post Welding Heat Treatment	Not necessary

960 MPa for ultra high strength applications

Applications

Mobile crane

Mobile crane

EXAMPLES OF APPLICATIONS

Crawler crane

Amstrong® Ultra 960 is well appreciated when used in ultra high strength applications such as:

- Heavy handling cranes
- Mobiles cranes
- Truck chassis
- Mobile concrete pumps

Amstrong® Ultra 1100

ADVANTAGES

Thanks to its minimum yield strength of 1100 MPa, Amstrong® Ultra 1100 enables large weight savings or support higher stresses and thus carry higher payloads.

Easy machinability
Amstrong® Ultra 1100 is easy to machine, bend and weld which simplifies production and maintenance.

Excellent weldability
The reduced carbon and alloying elements content of Amstrong® Ultra 1100 allow welding in very good conditions with excellent characteristics.

Mechanical properties of Amstrong® Ultra 1100

THICKNESS mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELONGATION MIN %	S1100QL* J (-40°C)
5-15	1100	1250 - 1450	10	30 / 27

*Min impact energy (J) Longitudinal and Transverse

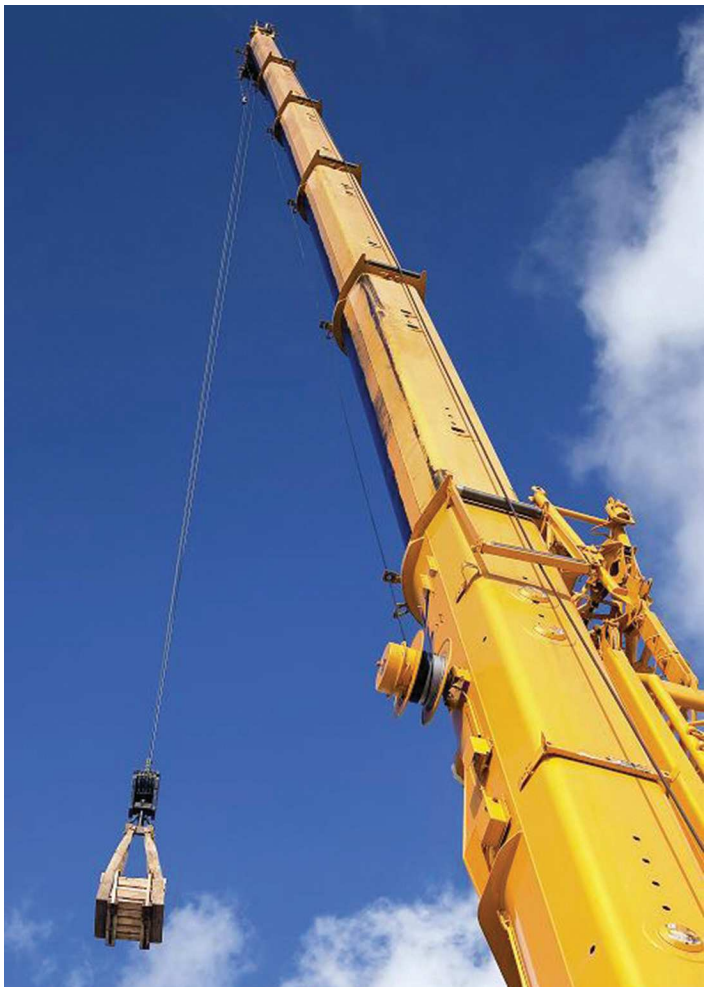
WELDING CONDITIONS	
Preheating	130 °C - 150 °C (Not necessary < 15 mm)
Postheating	250 °C / 2 h
Max Interpass Temperature	< 175 °C
Post Welding Heat Treatment	Not necessary

Bended samples

1100 MPa for extreme high strength applications

Applications

Booms of mobile crane



EXAMPLES OF APPLICATIONS

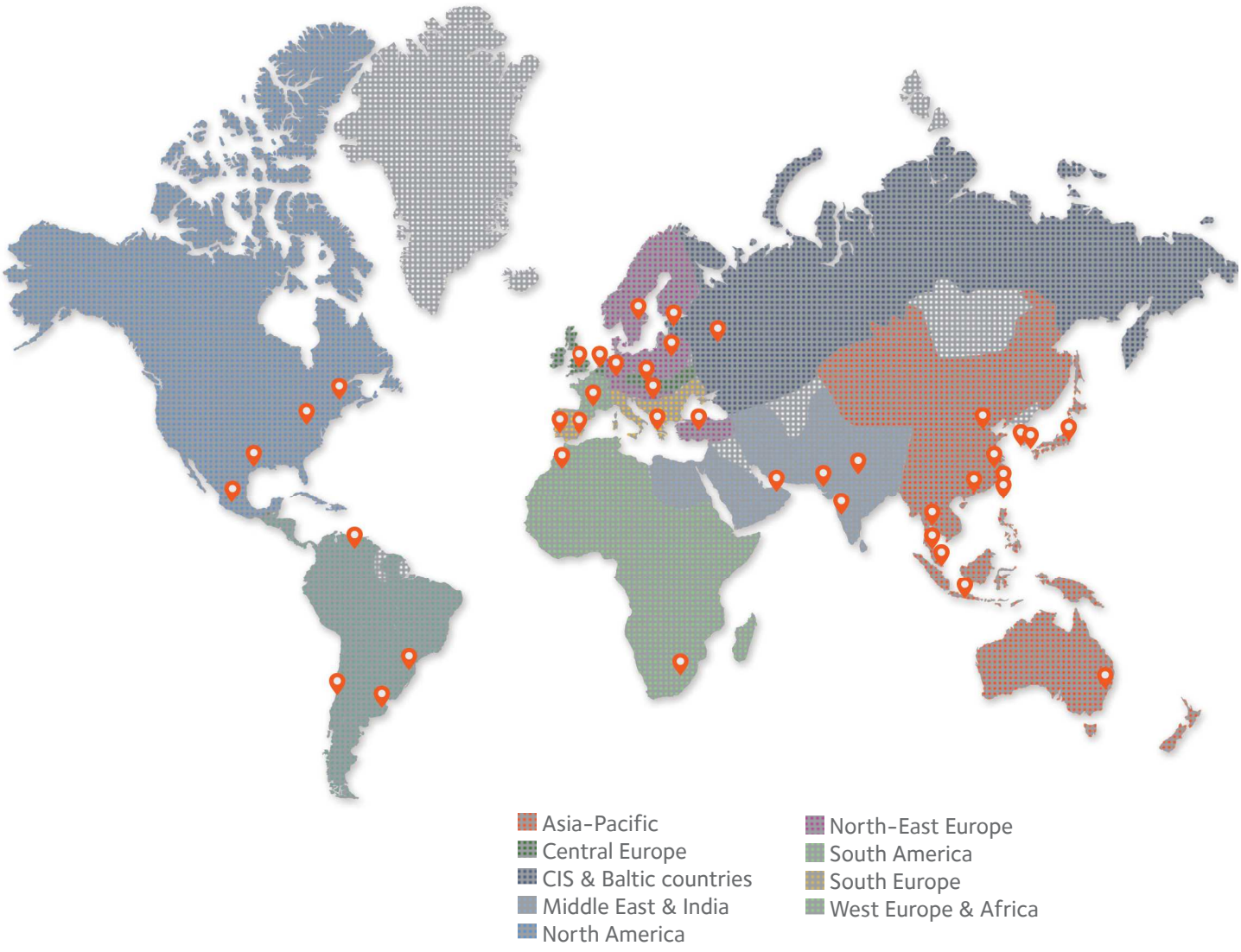
Crawler crane

Amstrong® Ultra1100 is well appreciated when used in extreme applications such as:

- Cranes booms
- Crawler cranes


At your service
for your projects

Where to find our steels



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tomorrow