Industeel

Amstrong® Ultra

ArcelorMittal

Amstrong® Ultra 690 – 890 – 960

Smarter steels for people and planet

With XCarb® Recycled and Renewably Produced certification, **Amstrong® Ultra** guarantees a reduction by 60% of CO_2 emission compared to traditional steelmaking

XCarb®
Recycled and renewably produced

Made from recycled steel scrap and using renewable wind energy in our electric arc furnace

Project Vestas Offshore Wind Esbjerg

Amstrong® Ultra 690

Amstrong® Ultra 690 is a high strength quenched and tempered fine grained steel dedicated for structure and enables weight savings by thickness reduction thanks to a minimum yield strength of 690 MPa.
Thanks to its exceptional purity rate (very low sulphur and phosphorous contents), and its adapted chemical analysis,
Amstrong Ultra® 690 steel is easy to shape and to weld. Combination of distinctive metallurgical features that extend the lifetime of wear parts in critical applications.

Standards

Amstrong® Ultra 690Q-QL-QL1 fulfills the requirements of S690Q-QL-QL1 according to EN 10025-6 standard, last edition.

Chemical Analysis (weight %-Max. values).

C	Mn	Si	Cr	Mo	P	S	V	Ni	Cu	Al
0.20	1.60	0.50	1.50	0.60	0.02	0.01	0.08	2.0	0.5	0.018 to 0.050

Carbon equivalent

	Thickness range (mm)	Amstrong® Ultra 690Q-QL		Amstrong® Ultra 690QL1	
		CET Max.	CEV Max.	CET Max.	CEV Max.
$CET = C + \frac{Mn+Mo}{10} + \frac{Cr+Cu}{20} + \frac{Ni}{40}$ $CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$	4 - 50	≤ 0.33	≤ 0.56	≤ 0.37	≤ 0.57
	50.01 - 99.9	≤ 0.37	≤ 0.57	≤ 0.38	≤ 0.60
	100 - 120	≤ 0.38	≤ 0.59	≤ 0.38	≤ 0.60
	120.01 - 150	≤ 0.39	≤ 0.63	≤ 0.39	≤ 0.63

Mechanical properties (Min. values)

Tensile properties

Thickness range mm	Yield Strength ReH (MPa)	Tensile Strength Rm (MPa)	Min Elongation Lo = 5.65√So (%)
4 - 50	690	770 - 940	14
50.01 - 100	650	760 - 930	14
100.01 - 150	630	710 - 900	14

Impact tests

Minimum value (average from 3 tests) according to **EN10025-6.**

Amstrong® Ultra	Temperature	Longitudinal direction impact toughness	Transversal direction impact toughness
690Q	- 20°C (-4°F)	30 J (22 ft.lbs)	27 J (20 ft.lbs)
690QL	- 40°C (-40°F)		
690QL1	- 60°C (- 76°F)		

For thicknesses below 10 mm, subsize specimen will be used and requirement adapted accordingly.
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 specification.

Amstrong® Ultra 890-960

Amstrong® Ultra 890 - 960 are quenched and tempered steels for structure with higher strength.
Thanks to a higher yield strength), **Amstrong® Ultra 890 - 960** enables to make weight savings or support higher stresses and thus carry higher payload.

With a good quality of steel making process, an adapted chemical analysis (low alloying content) and an excellent precision in our fabrication process (thickness tolerance, uniform mechanical characteristics), **Amstrong® Ultra 960QL** is easy to machine, to bend and to weld which simplify production and maintenance.

Using **Amstrong® Ultra 960QL** and thus thinner plate in welded structures, limits preheating conditions, decrease quantity of consumables, reduce welding time and so production costs.

Standards

Amstrong® Ultra 890-960 fulfills the requirements of S890QL-S960QL according to EN 10025-6 standard, last edition.

Chemical Analysis (weight %-Max. values).

Amstrong® Ultra	C	Mn	Si	Cr	Mo	P	S	V	Ni	Cu	Al
890	0.18	1.50	0.50	0.70	0.70	0.02	0.01	0.10	1.6	0.30	0.018 to 0.060
960	0.20	1.50	0.50	0.70	0.70	0.02	0.01	0.10	1.6	0.30	0.018 to 0.060

Carbon equivalent

	Amstrong® Ultra	Thickness range (mm)	CET	CEV
$CET = C + \frac{Mn+Mo}{10} + \frac{Cr+Cu}{20} + \frac{Ni}{40}$ $CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$	890	6 - 50	≤ 0.41	≤ 0.59
		50.1 - 125	≤ 0.44	≤ 0.70
	960	6 - 50	≤ 0.41	≤ 0.59
		50.1 - 105	≤ 0.44	≤ 0.70

Mechanical properties (Min. values)

Amstrong® Ultra	Thickness range (mm)	Yield Strength ReH (MPa)	Tensile Strength Rm (MPa)	Min elongation Lo = 5.65√So (%)
890	6 - 50	890	940 - 1100	11
	50.1 - 125	830	880 - 1100	11
960	6 - 50	960	980 - 1150	10
	50.1 - 105	900	940 - 1100	10

The smartest choice

Industeel Amstrong® Ultra high-strength steels combine excellent formability with toughness at low temperature and fatigue resistance. These ultra-high strength steel grades have minimum yield strengths ranging from 630 up to 960 MPa.

The Amstrong® Ultra series are available as quenched and tempered sheets and quarto plates.

Delivery program

thickness range	Product	Min. width (mm)	Length (mm)	Max. width (mm) per thickness (mm)																	
				2	3	4	5	6	7	8	9	10	11	12	13	15	25	50	100	120	150	250
Amstrong® Ultra 690	Plate	1 200	4 000 to 13 000			2 000		2 500			3 100			3 500			3 800				3 500	
Amstrong® Ultra 890	Plate	1 200	4 000 to 10 000							2 500			3 000									
Amstrong® Ultra 960	Plate	1 200	4 000 to 10 000							2 500			3 000									

Other dimensions on request, Thickness up to 300 mm, plates up toup to 70 tons, width up to 4350 mm, length up to 19 m.

Applications

Amstrong® Ultra to increase payload

Amstrong® Ultra to absorb significant efforts

Amstrong® Ultra to reduce non-functional weight and fuel consumption

Industeel

ArcelorMittal

Industeel is producing quarto plates in our three mills in Belgium and France and our dimensional program is the largest in the world.

Our steel is melted via the electric arc furnace route, using scrap, allowing a substantial reduction of the CO_2 footprint per ton of steel.

For more information

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F - 42803 RIVE-DE-GIER Cedex
FRANCE

Industeel France
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