ArcelorMittal

Amstrong®

Advanced high strength steels

Like any organisation, ArcelorMittal constantly seeks to optimally meet – if not surpass – market expectations. In common with high-performing athletes, our ambition is to reach ever-higher targets. So it is vital for us to keep up with what really matters to our clients. The latest addition to our product range provides the answer: **Amstrong® high strength and advanced high strength steel** – like the pole of a pole vault athlete, it's the strong, high-performance material that enables our clients to reach higher targets thanks to innovative steel solutions, developed together with ArcelorMittal.

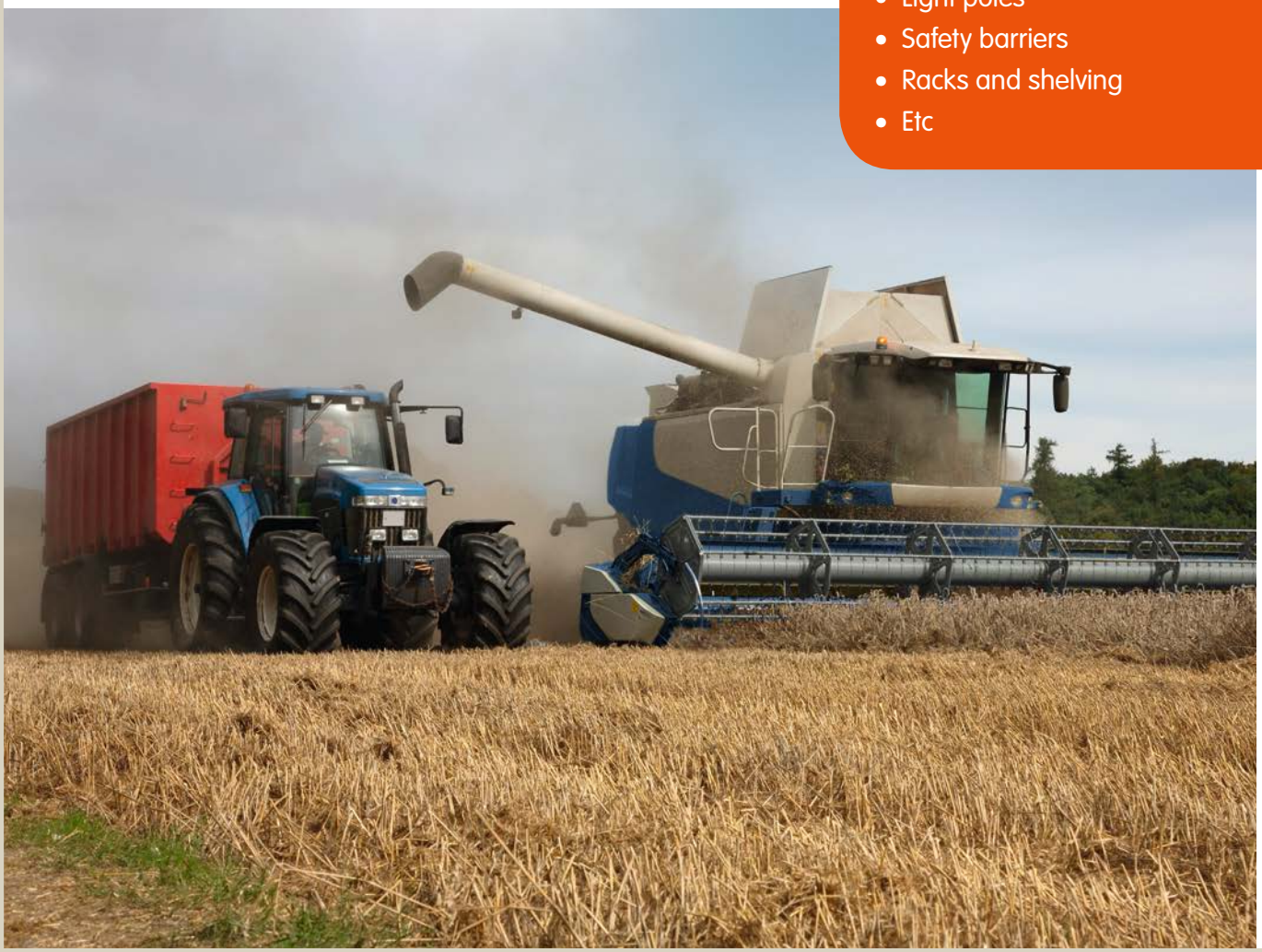
Amstrong®

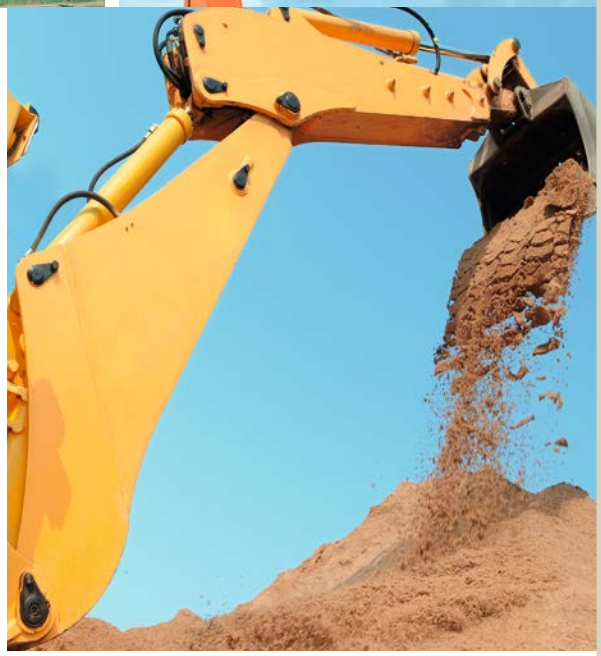
Amstrong® high strength steels are available as thermomechanically hot rolled, cold formable grades. Their main properties include high yield strength and tensile strength, combined with excellent formability, toughness at low temperatures and fatigue resistance.

These grades are therefore an excellent choice for reducing structural thickness and weight whilst improving load-bearing capacity, thereby generating cost savings and securing market advantage.

Amstrong® high strength steels can be used with considerable advantage in a wide range of applications, including:

- Construction of truck trailers and tippers
- Container construction
- Truck-mounted cranes and construction cranes
- Excavators and construction vehicles
- Agricultural vehicles and machinery
- Concrete mixers and pumps
- Freight and passenger rail cars
- Light poles
- Safety barriers
- Racks and shelving
- Etc





Amstrong®

Chemistry and mechanical properties

The Amstrong® product range is manufactured according to a very strict production process, which makes it possible to provide a better range of properties.
These grades also have better ductility and bendability than standard high strength low alloy (HSLA) grades. They are therefore perfect for demanding processes, allowing trouble-free operations and ensuring constant properties from one batch of material to the next. This results in a better yield on the production line and helps to achieve the most severe tolerances on the finished steel parts.

With low P and Si content, the chemical composition of these grades makes them suitable for galvanising.

All Amstrong® products come with a toughness guarantee of 40 J minimum at -20°C[1] . A 'Tough' version, with a guarantee of 27 J minimum at -40°C[1], is available starting at Amstrong® 650MC grade and can also be provided for other grades on request.

[1] *For standard 10 x 10 mm Charpy samples; for low thicknesses, subsize test samples are used and required values are decreased proportionally.*

Chemical composition

	C (%)	Mn (%)	P (%)	S (%)	Si (%)	Al (%)	Nb (%)	V (%)	Ti (%)	B (%)	Mo (%)	C_{eq} (CEV)	Galvanisability
Amstrong® 240MC	≤ 0.100	≤ 0.80	≤ 0.020	≤ 0.020	≤ 0.03	≥ 0.015	≤ 0.025	≤ 0.200	≤ 0.150			≤ 0.18	Cat. A/Class 1
Amstrong® 280MC	≤ 0.080											≤ 0.23	Cat. A/Class 1
Amstrong® 315MC	≤ 0.100	≤ 0.70		≤ 0.015			≤ 0.045					≤ 0.25	Cat. A/Class 1
Amstrong® 355MC		≤ 1.40										≤ 0.32	Cat. A/Class 1
Amstrong® 390MC		≤ 1.50		≤ 0.012			≤ 0.065					≤ 0.36	Cat. A/Class 1
Amstrong® 420MC	≤ 0.110											≤ 0.38	Cat. A/Class 1
Amstrong® 460MC	≤ 0.120						≤ 0.080					≤ 0.40	Cat. A/Class 1
Amstrong® 500MC		≤ 1.70										≤ 0.42	Cat. A/Class 1
Amstrong® 550MC	≤ 0.100											≤ 0.44	Cat. A/Class 1
Amstrong® 600MC	≤ 0.120	≤ 1.90		≤ 0.015			≤ 0.090		≤ 0.220				Cat. A/Class 1
Amstrong® 650MC	≤ 0.100	≤ 2.00	≤ 0.025	≤ 0.005	≤ 0.25				≤ 0.150	≤ 0.005	≤ 0.5		Cat. B/Class 3*
Amstrong® 700MC		≤ 2.10											Cat. B/Class 3*

Galvanisability according to EN ISO 14713-2 and NFA 35-503
V + Nb + Ti ≤ 0.22%
* *Category A available for thicknesses ≤ 8 mm*

Mechanical properties

Thickness (mm)	Direction	R_e (MPa) ≤ 8	R_e (MPa) > 8	R_m (MPa)	A_{80} (%) < 2	A_{80} (%) 2-3	A 5.65$\sqrt{S_o}$ (%) ≥ 3	Bending ratio (th)* < 6	Bending ratio (th)* 6-13	Bending ratio (th)* ≥ 13	KV -20°C (J) ≥ 6	KV -40°C (J) ≥ 6
Amstrong® 240MC	L	240 - 320		340 - 450	≥ 27		≥ 32				≥ 40	
	T	260 - 340		340 - 450	≥ 26		≥ 31		0			
Amstrong® 280MC	L	280 - 350		370 - 450	≥ 26		≥ 30				≥ 40	
	T	300 - 380		370 - 450	≥ 25		≥ 29		0			
Amstrong® 315MC	L	315 - 395		415 - 495	≥ 24		≥ 28				≥ 40	
	T	340 - 420		420 - 500	≥ 23		≥ 27		0			
Amstrong® 355MC	L	355 - 435		430 - 520	≥ 22		≥ 25				≥ 40	
	T	380 - 460		440 - 530	≥ 21		≥ 24		0			
Amstrong® 390MC	L	390 - 480		460 - 560	≥ 20		≥ 24				≥ 40	
	T	420 - 500		470 - 570	≥ 19		≥ 23		0			
Amstrong® 420MC	L	420 - 520		490 - 600	≥ 18		≥ 22				≥ 40	
	T	450 - 550		500 - 600	≥ 17		≥ 21	≥ 0.2		≥ 0.5		
Amstrong® 460MC	L	460 - 560		520 - 640	≥ 15		≥ 18				≥ 40	
	T	490 - 590		530 - 640	≥ 14		≥ 17	≥ 0.6	≥ 1			
Amstrong® 500MC	L	500 - 600		560 - 700	≥ 15	≥ 16	≥ 19				≥ 40	
	T	530 - 630		570 - 700	≥ 14	≥ 15	≥ 18	≥ 0.6	≥ 1			
Amstrong® 550MC	L	550 - 650		620 - 750	≥ 12		≥ 14				≥ 40	
	T	580 - 680		630 - 750	≥ 11		≥ 13	≥ 0.8	≥ 1.5			
Amstrong® 600MC	L	≥ 600		650 - 820	≥ 11		≥ 13				≥ 40	
	T	≥ 620		660 - 820	≥ 10		≥ 12	≥ 1.5				
Amstrong® 650MC	L	≥ 650	≥ 630	700 - 850	≥ 10		≥ 14				≥ 40	≥ 27**
	T	≥ 670	≥ 650	710 - 880	≥ 10		≥ 12	≥ 1.8				
Amstrong® 700MC	L	≥ 700	≥ 680	750 - 930	≥ 10		≥ 14				≥ 40	≥ 27**
	T	≥ 720	≥ 700	760 - 950	≥ 10		≥ 12	≥ 1.8				

* *Minimum mandrel diameter for 180° bend*
** *Toughness guarantee at -40°C on 'Tough' version: Amstrong® 650MCT and Amstrong® 700MCT*

Dimensional feasibility

One of the most outstanding features of the Amstrong® range is its dimensional feasibility.
All steel grades are available in widths exceeding 2000 mm, which can help our clients to reduce costs:

- Stock optimisation for maximum flexibility
- Improved productivity of the cutting line
- Manufacture of large parts simplified by reducing the number of welds

Amstrong® steel grades are available as mill finish coils or pickled and oiled.

Feasibility mill finish coils, mill edge

	Max width (mm)											
Thickness (mm)	1.5	1.8	2	3	4	5	6	8	10	12	15	16
Amstrong® 240MC	1540	1630	1830	2040	2130		2040	1790		1570	1370	
Amstrong® 280MC	1350	1450	1600	2030	2130			2030	1880	1710	1370	
Amstrong® 315MC	1300	1430	1600	2000	2130							2050
Amstrong® 355MC	1180	1300	1450	1790	2040	2150						
Amstrong® 390MC		1200	1350	1600	2040	2150						1370
Amstrong® 420MC		1020	1350	1650	2040	2150						2050
Amstrong® 460MC		1200	1350	1650	2020	2150					2050	
Amstrong® 500MC		1050	1280	1570	2020	2150				2130		
Amstrong® 550MC			1230	1530	2020	2150			2050	1380		
Amstrong® 600MC			1100	1340	1540	1630	2135		1930			
Amstrong® 650MC				1520	1620	1720	1770	1920	2020	2060	2120	
Amstrong® 700MC			1250	1520	1620	1720	1770	1920	2020	2060		

ArcelorMittal is developing its top-of-the-range advanced high strength steels. In order to be able to offer you a complete range of high strength and advanced high strength steels, our R&D experts are currently developing additional steel grades.

available

Feasibility pickled and oiled – up to 15 mm on request

	Max width (mm)										
Thickness (mm)	1.5	1.8	2	3	4	5	6	8	10	12	13
Amstrong® 240MC	1540	1630	1830	2030	2130		1520				
Amstrong® 280MC	1320	1450	1600	1880	1840			1525			
Amstrong® 315MC	1140	1320	1540	1880	2130			1550	1525		
Amstrong® 355MC	1090	1300	1450	1730	2040	2130		1550	1525		
Amstrong® 390MC		1100	1350	1580	2040	2130		1525			
Amstrong® 420MC		1020	1350	1580	2040	2130		1525			
Amstrong® 460MC			1350	1580	2020	2070		1525			
Amstrong® 500MC		1050	1280	1570	2020	2070		1600			
Amstrong® 550MC			1230	1530	2020	2070		1525			
Amstrong® 600MC			1100	1340	1440	1340	1525				

Processing

Amstrong® products have a low carbon equivalent value and can therefore be easily welded using various welding techniques. When required as sheets, they are supplied with tight flatness tolerance thanks to the use of selected cut-to-length lines. They are therefore perfectly suited for oxy-fuel, plasma or laser cutting. Laser-cutting ability is also improved thanks to the low carbon and silicon content.

Availability

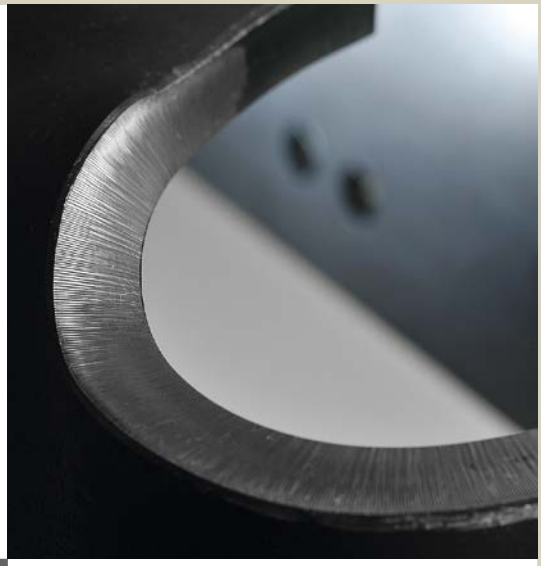
Amstrong® products are manufactured in several European ArcelorMittal steel mills, which means that you will always have easy access to them wherever you are located. They can also be found in stock at various Steel Service Centres.

Since ArcelorMittal operates a policy of continuous development, our product range is naturally constantly changing.
For dimensional feasibility, we therefore advise you to regularly check the dedicated leaflet and product data sheets A20 and A22 in our online product catalogue at www.arcelormittal.com/industry (Amstrong® replaces the AM FCE grades in our catalogue), or contact your account manager – remember that stock sizes vary over time.

ArcelorMittal's aim is to offer support to markets and clients seeking new solutions, to help them meet the challenges of tomorrow.

We therefore combine production, extensive R&D resources and a worldwide network of agencies & distribution centres.

Below you will find a few examples of successful applications.



Trailer part made of 12 mm Amstrong® 700MC, laser cut and bent

Develop your product with us.

Trailer chassis

Trailer chassis in Amstrong® 700MC and Amstrong® 420MC, **40% weight reduction** compared with chassis in structural steel.

Full support from design through to welding and avoidance of fatigue problems.

Tipper

Entire body composed of Amstrong® 700MC and Amstrong® 420MC structural components, **25% weight reduction** compared with structural steel. T-bone hook replaced with Amstrong® 500MC, **35% weight reduction** and **25% cost saving.**

Corn harvester

Increase in threshing capacity with Amstrong® 700MC and Amstrong® 420MC due to **35% weight reduction**, which makes it possible to increase the width of the corn head from 8 to 12 rows.

Find out more

For more information on our Amstrong® high strength and advanced high strength steel product range please consult our online product catalogue (data sheets A20 and A22) or our product document centre on www.arcelormittal.com/industry

Contact us at fce.technical.assistance@arcelormittal.com

Or contact your local account manager or technical representatives.

Credits

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