



ArcelorMittal

# High strength steels for structural profiles

New grades go beyond the standard



ArcelorMittal  
has developed lighter,  
thinner, stronger, and more  
durable steels, enabling  
the design of efficient  
and cost-effective  
structures.



### Lighter

Thickness and weight reduction combined with higher stiffness allows new design opportunities.

### Stronger

Increased load-bearing capacity.

### Longer spans

Reduced number of portal frames and increased open space.

### Cost-effective

Reduced manufacturing costs.

### Durable

Magnelis® or zinc coatings improve corrosion resistance for long-lasting structures. Coated steels are fully recyclable at end of life.



## High performing cold-formed profiles with high strength steels

Cold-formed steel profiles are important components in many steel buildings. Commonly used as secondary structures, these profiles are utilised between primary portal frames to support roofing and cladding elements.

Secondary structural profiles distribute wind or snow loads from the building envelope to the main frame and foundations.

Cold-formed profiles include purlins, rails, sleeves, rafters, cleats, bracings, and other related accessories.



# Two ranges of high strength steels for specific needs

ArcelorMittal offers two different ranges of metallic-coated high strength steels: construction grades and high strength low alloy (HSLA) grades. The selection of the appropriate range depends on the required processing or in-use properties.

- According to the EN10346 standard, steels for construction are supplied with minimum guaranteed values for the yield and tensile strength (properties measured in rolling direction).
- High strength low alloy (HSLA) grades offer a controlled range of mechanical properties and better formability (properties measured in transverse direction).

	Construction grades	HSLA grades
Forming	No maximum value for YS and TS. Lower guaranteed elongation. Suitable for bending and profiling.	Better and stable formability for bending and drawing operations due to limited YS range, smaller grain size, lower sulfur content, and lower inclusion rate.
Welding	Suitable for all types of welding.	Improved arc-welding due to lower carbon content.
Piercing & punching	Care must be taken when punching or using self-piercing screws in case TS is too high. (no guaranteed maximum value for TS).	Upper limit on TS value is better for piercing and screwing, especially with self-tapping screws.
Toughness at low temperature		Better behaviour due to lower grain size and better metallurgical cleanliness.
Fatigue		Better behaviour due to lower grain size.

ArcelorMittal's new **HyPer®** grades (High Performance) and new HX550, HX600, and HX700LAD grades exceed the mechanical requirements of the standard

Structural steels						HSLA grades				
Mechanical properties in rolling direction						Mechanical properties in transverse direction				
	Norm	YS (MPa)	TS (MPa)	A <sub>80</sub> % mini	TS/YS		Norm	YS (MPa)	TS (MPa)	A <sub>80</sub> % mini
S350GD	EN 10346	> 350	> 420	> 16	-	HX340LAD	EN 10346	340 - 420	410 - 510	> 21
S390GD	EN 10346	> 390	> 460	> 16	-	HX380LAD	EN 10346	380 - 480	440 - 560	> 19
S420GD	EN 10346	> 420	> 480	> 15	-	HX420LAD	EN 10346	420 - 520	470 - 590	> 17
<b>S420GD-HyPer®</b>	<b>ArcelorMittal</b>	<b>&gt; 420</b>	<b>480 - 620**</b>	<b>&gt; 15*</b>	<b>&gt; 1.1*</b>					
S450GD	EN10346	> 450	> 510	> 14	-	HX460LAD	EN 10346	460 - 560	500 - 640	> 15
<b>S450GD-HyPer®</b>	<b>ArcelorMittal</b>	<b>&gt; 450</b>	<b>510 - 650**</b>	<b>&gt; 15*</b>	<b>&gt; 1.1*</b>					
S550GD	EN10346	> 550	> 560	-	-	HX500LAD	EN 10346	500 - 620	530 - 690	> 13
<b>S550GD-HyPer®</b>	<b>ArcelorMittal</b>	<b>&gt; 550</b>	<b>600 - 760**</b>	<b>&gt; 13*</b>	<b>&gt; 1.05*</b>	<b>HX550LAD*</b>	<b>ArcelorMittal</b>	<b>550 - 670</b>	<b>580 - 740</b>	<b>&gt; 12</b>
						<b>HX600LAD*</b>	<b>ArcelorMittal</b>	<b>600 - 730</b>	<b>630 - 790</b>	<b>&gt; 10</b>
						<b>HX700LAD**</b>	<b>ArcelorMittal</b>	<b>700 - 840</b>	<b>750 - 950</b>	<b>&gt; 10</b>

\* Steel grade fulfils the requirements of Eurocode 3/EN 1993 for structural parts:

Grade conforms with EN 10346 and is certified accordingly

\*\* Upper limit of tensile strength for easier piercing and punching

\* On request

\*\* Available for thicknesses above 2 mm – on request for thicknesses below 2mm

Available dimensions	Thickness: 0.70 to 6 mm (Lower thickness on request)	Width: up to 1680 mm
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Contact us for detailed feasibility by range.



# In-use properties

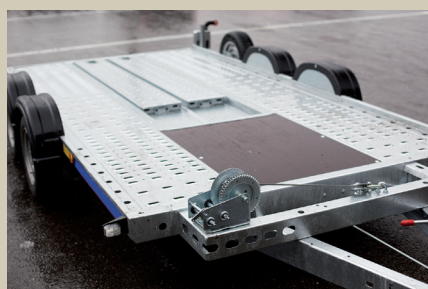
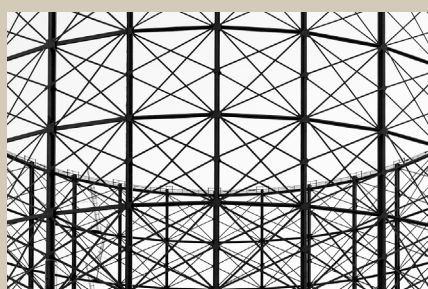
## Cold forming

High strength metallic-coated steels show excellent cold forming ability.

They are specifically designed for bending, profiling, punching, and light drawing operations.

Higher material springback can be expected with higher YS, but can usually be compensated by tooling adjustments.

Metallic coated steels can be deformed easily, low bending radii should be avoided.



## Examples of applications

- > Framing, structural profiles (purlins, rails, sleeves, rafters, cleats, bracing, and all related accessories)
- > Long span decking
- > Composite floors
- > Under structure rails for facades
- > Roofing and cladding
- > Cable trays
- > Silos
- > Solar racks & poles
- > Trailers
- > Chassis
- > Wagons
- > Storage racks
- > Tubes

## Assembling

High strength metallic-coated steels are compatible with many commonly used metal joining techniques such as screwing and bolting.

## Welding

High strength metallic-coated steels can be welded using all conventional methods. Specific flux-cored wires are available for metallic coating.



# Coating and surface treatments

Metallic and pre-painted coating (coating weight)	Hot dip galvanised: from Z100 to Z725 (g/m <sup>2</sup> )
	Magnelis®: from ZM90 to ZM430 (g/m <sup>2</sup> )
	Granite® (pre-painted steel): up to 3 mm
Surface treatments	O: Oiled
	C: E-passivation®
	SE: Easyfilm®
Surface finishes	A or B

Contact us for detailed feasibility by range.

## Credits

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