Flat Carbon Europe

ArcelorMittal

update

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Contents

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In each edition of Update, an ArcelorMittal opinion leader speaks out. In this issue we hear from Jean-Martin Van der Hoeven, Chief Marketing Officer for Flat Carbon Europe.

Steel, the fabric of modern life

At ArcelorMittal we often talk about how we wouldn't be able to live our lives as we do, without steel. This is particularly true when it comes to cars. Steel can't take the credit for the in-car entertainment or leather seats that can help make your journey a comfortable one. But from the safety barriers that line your route to the doors that protect you, to the lightweight steel solutions that aid fuel efficiency and cuts carbon emissions, steel is the material of choice.

ArcelorMittal is working hard to stay on the cutting edge of innovations in the automotive industry. A lot of this work is done in collaboration with our customers, the most recent example of which was with Japanese car manufacturer Honda.

Honda has produced the world's first single-piece, hot-stamped door ring made entirely of our steel: Usibor® Alusi®. This development would have been impossible without the contribution from ArcelorMittal's Global R&D centres and ArcelorMittal Tailored Blanks. The door ring is a breakthrough way of reducing the weight of a body-in-white, using tailored blanks manufactured by ArcelorMittal using laser welding technology. Honda is using the door ring in its new SUV, the Acura MDX that was launched in the USA in May this year. Furthermore, in September this year ArcelorMittal inaugurated the new annealing line in St. Chely d'Apcher, France that will produce new high value-added electrical steels to be used in electric motors for cars and other appliances.

These developments build on three decades of innovation within ArcelorMittal. For example, the first use of high strength steel to improve the safety of cars on an industrial scale dates back to 1982. From this milestone, to the 2010 launch of S-in motion which demonstrated the potential of advanced high strength steels, to the next generation of advanced high strength steels under development in our labs: in essence we always have future needs in mind.

As one of our key franchises, developing new automotive steels is at the heart of ArcelorMittal's business. In fact, half of our research is spent on automotive. But many of our automotive innovations find their way into solutions for other industries. In this edition of *Update* you can read about how our ultra-thin high strength steel is being used by global canmaker Ardagh. In this industry too, lightweight solutions are crucial.

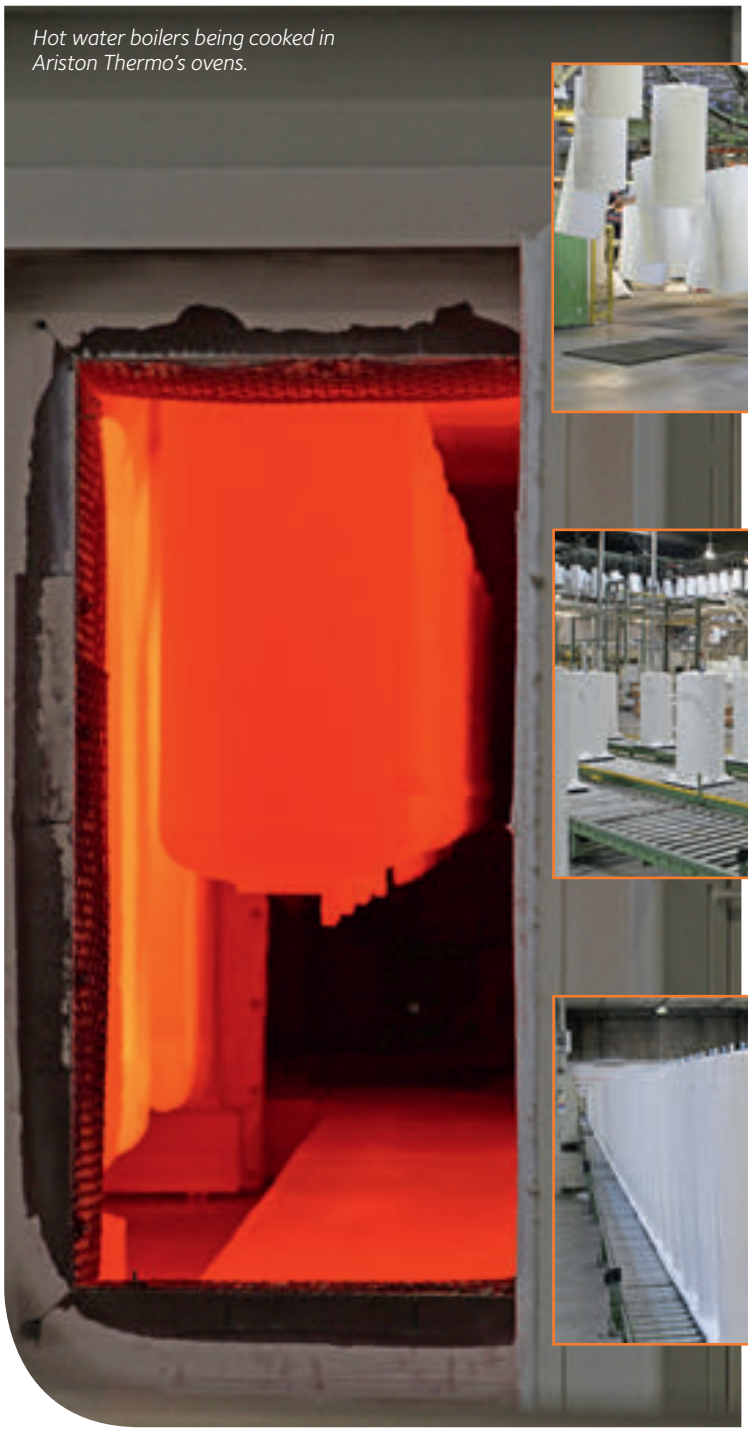
The other articles in this magazine also illustrate the wide variety of markets in which we are investing research, skills and time: from innovative coatings for solar structures, thin high pressure vessels to transport liquefied natural gas, to lightweight boilers and new organic coated steel finishes for building façades. Because steel is not just the fabric of the modern car, it is the fabric of modern life.

Jean-Martin Van der Hoeven

On the boil!

Co-engineering with Ariston Thermo brings new enamelling steel to market quickly.

When heating and hot water producer Ariston Thermo and ArcelorMittal were thinking about a new enamelling steel for the inner of Ariston Thermo's hot water boilers, they could have hardly imagined the product would be on shop shelves in just over a year. Yet thanks to a close co-engineering partnership with ArcelorMittal, Ariston Thermo was able to quickly adapt its production methods to utilise the new steel – HC300EK. In the process they provided ArcelorMittal with valuable feedback on industrialising a brand new product.



Hot water boilers being cooked in Ariston Thermo's ovens.

Finished hot water boilers ready for shipping.

Pictures © Ariston Thermo Group

Industrial development of HC300EK started in early 2012. Designed for applications which require one-sided enamelling, HC300EK was chosen by Ariston Thermo to form the inner shell of their boilers where the hot water is actually heated. Enamelling protects the steel from corrosion while resisting the high temperatures inside the boiler.

Win-win project

"From the outset, the project represented a win-win scenario for both Ariston Thermo and ArcelorMittal," explains Frank Racanelli, Quality Manager at the company's Malonne factory in Belgium where the boilers are produced. "Any experience Ariston Thermo could provide guided industrial development of the new steel and we benefited from the expertise of ArcelorMittal in that process."

Ariston Thermo previously utilised a hot rolled commodity steel grade in this application. By substituting it with HC300EK, the manufacturer was able to reduce the thickness of the inside wall of the boiler by 10%. At the same time, strength and production reliability were increased without compromising safety. As it utilises less steel every boiler is lighter, making installation easier. Ariston Thermo was also able to switch from a wet to a powder enamelling process to improve product quality.

Reducing working capital

Compared to hot rolled steel, the HC300EK enamelling steel has a much broader dimension range as cold rolled steel can be thinner and wider. This allowed Ariston Thermo to dramatically reduce its stock levels and simplify its supply chain.

However, one of the biggest advantages for Ariston Thermo was ArcelorMittal's assistance during the trials of HC300EK in an industrial setting. "Our timetable for implementing the new steel was quite short," says Frank Racanelli. "ArcelorMittal personnel were exemplary in their reactivity when problems arose. The

About Ariston Thermo Group

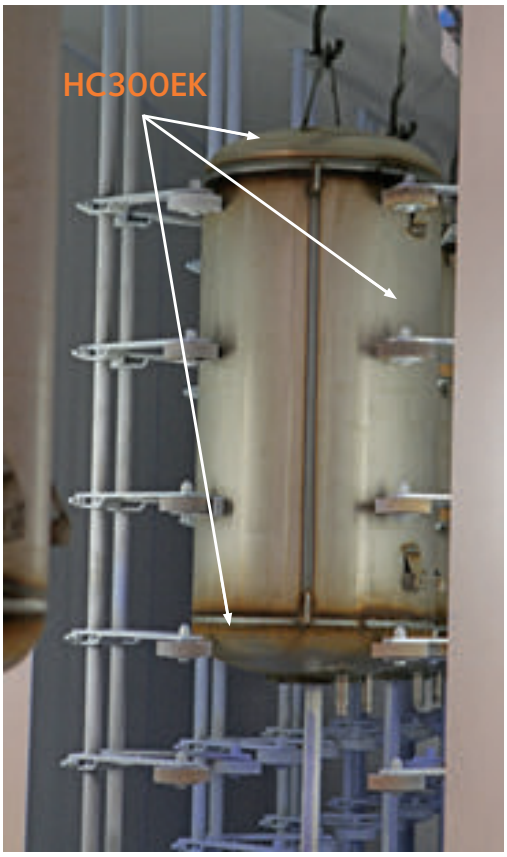
As one of the world's leading producers of heating and hot water products, Ariston Thermo Group employs almost 6,700 people and distributes its products in over 150 countries. Major markets include Asia, and Western and Eastern Europe.

Ariston Thermo prides itself on providing people with the maximum degree of comfort using the minimum amount of energy. To help achieve this goal, Ariston Thermo is constantly researching and developing new products at its 15 competency centres around the globe.

More flexibility and less stock thanks to the new solution

Typically there are two standard radii used to make boilers so they can fit into existing spaces. However, the height of the space can vary. The capacity of the boiler is therefore defined by its height. As hot rolled steels cannot be wide and thin, the width of the commodity grade coil had previously defined the maximum height of the boiler.

As HC300EK can be rolled more thinly, the width of the coil now defines the radius of the boiler. In theory the boiler could be any height up to the length of coil. Practically, the new steel can be cut into sheets of any length to enable Ariston Thermo to create boilers with a large capacity. The change limits wastage and reduces the amount of stock required.



Interior of the Ariston Thermo boiler showing parts made from HC300EK.

Boiler inners undergo a visual check before the outer casing is added.

synergies between Ariston Thermo and ArcelorMittal have been fundamental to the success of the project."

Frank Racanelli believes that the co-engineering approach used in this project is an example for the future: "In the current economic environment, sharing resources and knowledge is highly desirable." His response is echoed by Paolo Rossini, Global Raw Materials Purchaser for Ariston Thermo: "We have a more collaborative approach now – we are partners. I will certainly recommend this type of cooperation in the future."

"Working on interesting new steel solutions like these, brings us closer to our customers," notes Nicolas Dujardin, ArcelorMittal's Account Manager for Ariston Thermo in Belgium. "That's what partnership is all about: creating added value for both customer and supplier." ■

HC300EK for enamelling applications

ArcelorMittal's Global R&D division for Industry in Ghent has specifically developed HC300EK in response to customer requests for thinner steels for enamelling applications. Until the development of HC300EK, the lowest feasible thickness limit was 1.55 mm. In the case of the Ariston Thermo boiler, thickness has been reduced below this limit.

HC300EK is usually supplied in coils, ready for processing at our customers' premises. Depending on the enamelling process used, HC300EK can be shot blasted or pickled. In some cases, only degreasing is required before enamelling. Uncoated steel can be supplied for applications which require painting such as the outer casings of hot water boilers.

More information?

For more information about the properties and dimensions of HC300EK, please visit www.arcelormittal.com/industry

© Honda

The world's first serial-produced car with a hot-stamped door ring

ArcelorMittal collaborates with Honda on innovative single-piece, hot-stamped, laser-welded side-opening door ring panel technology.

The new Honda 2014M Acura MDX rolled off the assembly plant in Lincoln, Alabama (USA), just a few months ago, but decisions regarding the design and development began years earlier. One component of the latest model is the industry's first single-piece, hot-stamped, side-opening panel reinforcement – the so-called door ring – produced entirely from Usibor®. This development required close collaboration between Honda R&D of Americas, ArcelorMittal's Montataire (France) and East Chicago Global R&D centres, and ArcelorMittal Tailored Blanks in Europe and North America.

The Honda MDX team had a goal to reduce vehicle weight and further improve safety performance. In order to satisfy those requirements, Honda decided to equip the new Acura MDX with a laser-welded, hot-stamped, door ring made of Usibor® Alusi®, ArcelorMittal's patented aluminium-silicon coated, hot-stamping steel grade. During the development there were challenges to overcome when mastering the laser welding of Usibor® and the hot stamping of such a large component by Magna/Cosma International. The lighter, stronger and safer structure turned out to be a key component of the MDX's improved refinement and performance.

Global collaboration

"At ArcelorMittal, a global team bringing together researchers from Global R&D and laser welding experts from our Tailored Blanks divisions in North America and Europe was quickly formed to respond to

Honda's many questions regarding Usibor® 1500 and our patented laser welding technology," explained Jayanth Chintamani, ArcelorMittal Global Technology Coordinator for Honda.

Wolfram Ehling, Senior Manager Operations, Tailored Blanks in Europe noted: "Cumulative know-how of the innovative Usibor® laser welding system developed with support from Global R&D Montataire (France) and industrialised at Tailored Blanks Gent (Belgium) since 2007, was invaluable in responding to Honda's in-depth inquiry of the technology and also for the timely supply of door rings for the MDX prototype builds. This enabled the full validation of the laser-welded, hot-stamped door ring solution."

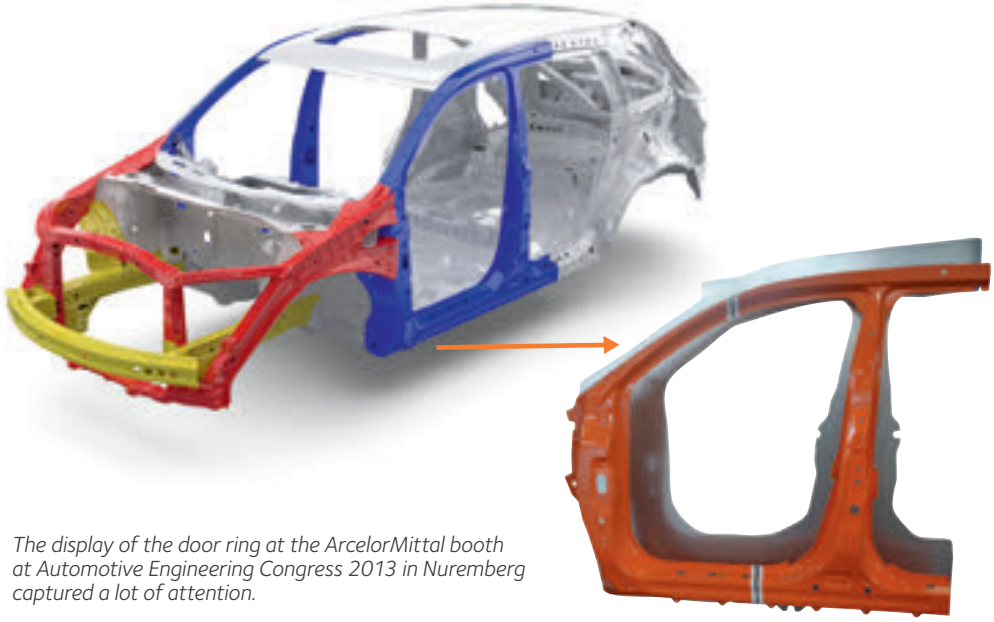
Gagan Tandon, Director of Product Development for Tailored Blanks Americas, added: "The mission of our global team was to build Honda's confidence in the robustness of the Usibor® laser welding process and to lead them to adopt this technology for the 2014 Acura MDX door ring."

With Honda accepting our solution, global activity began to design and install new Usibor® laser welding systems. "The Tailored Blanks Pioneer team in Ohio (USA) embraced the challenge of integrating new technology based on the first production system at our Tailored Blanks Gent facility in Belgium and the new capability became operational in August 2012 in time for the Acura MDX launch in May 2013" said Gary Black, Director of Manufacturing Technology, Tailored Blanks Americas.

Industry recognition

The Usibor® 1500 MPa door ring solution is quickly receiving industry recognition. In August, the component was named runner-up in the 2013 Inaugural Altair Enlighten Award for Innovation in Automotive Vehicle Light-Weighting. Honda is also presenting the innovation globally on the technical conference circuit. Their first stop was Great Designs in Steel in Livonia, Michigan (USA). In June 2013, they presented the MDX door ring at the Automotive Engineering Congress (AEC) conference in Nuremberg, Germany, where the display received much attention. In October 2013 it was presented at the International Auto Body Congress in Troy, Michigan (USA).

Peter Leblanc, Director, ArcelorMittal Automotive Sales NAFTA, summarised the importance of global cooperation: "Our unique steel product capability, along with the added value from our Tailored Blanks division, coupled with our global technology support provided for this industry-first application, has created mutual value for both ArcelorMittal and Honda."



The display of the door ring at the ArcelorMittal booth at Automotive Engineering Congress 2013 in Nuremberg captured a lot of attention.

© Honda R&D Americas, AEC 2013, Nuremberg

The first application of a one-piece hot-stamped door ring will help the Acura MDX achieve what Honda predicts will be a five-star safety score.

© Honda

Other OEMs to follow

The industry-first, laser-welded, hot-stamped door ring can be adapted to other vehicle architectures to increase safety, improve fuel economy and reduce vehicle weight. Replacing a conventional multi-piece, spot weld design allows for improved energy management through uninterrupted joints, resulting in smoother load transfer which ultimately better protects passengers.

The 2014 Honda Acura MDX is expected to receive the US Insurance Institute for Highway Safety's (IIHS) Top Safety Pick Plus (TSP+) Rating and the US National Highway Traffic Safety Administration's (NHTSA) 5 Star Rating. Additionally, the 2014 Acura MDX has improved fuel economy compared to the previous model.

"Now that Honda has taken the leap in introducing this innovative design in the MDX body structure, I fully expect other OEMs to adopt it in their race to meet the fuel economy targets of 54 mpg (miles per gallon) by 2025 in the USA and 95 g/km CO_2 in Europe by 2020 and meet the latest safety regulations," said Blake Zuidema, Director, Automotive Product Applications, ArcelorMittal.

Everyone in the solar system wants Magnelis®

Revolutionary coating keeps ground-mounted solar structures corrosion free for decades.

Steel is already the material of choice for the support structures of more than 90% of the world's ground-mounted photovoltaic energy generation systems. But with the European Union and other regions seeking to increase the share of renewable energy, the development of photovoltaic systems is set to grow dramatically. ArcelorMittal's Magnelis® coating is ensuring that those installations will continue to generate clean, renewable energy for up to 25 years.

Using photovoltaic systems to convert sunlight into energy is one of the most environmentally friendly ways to generate electricity. Using steel to build the support structures makes it even more sustainable as steel is a durable and 100% recyclable material. Steel also has the strength to resist the loads placed on ground-based solar structures by wind, snow and ice.

Long-term viability

To ensure adequate return on their investment, developers of photovoltaic installations need the supporting structure to remain viable for as long as possible. A solar installation is regarded as a success if it can still generate 80% of its initial capacity after 20 years of use. For ground-based systems this can be a challenge as the structure must be anchored in the ground or in concrete. Both can promote corrosion in the photovoltaic installation supports, leading to failure.

The unique composition of ArcelorMittal's Magnelis® coating guarantees the integrity of steel solar structures, even on the ground. Thanks to the presence of 3% magnesium, the coating protects the steel for up to 25 years in normal locations (see box). The application of Magnelis® ensures the preservation of natural resources as it uses less zinc than pure zinc coatings. Less zinc is washed from the surface of steels coated in Magnelis® by falling rain – reducing zinc runoff to soils considerably.

Self-healing property

One of the most remarkable properties of Magnelis® is its ability to self-heal on cut edges. This is typically where corrosion begins. A zinc-based protective film containing magnesium forms on the cut edge to protect it from the environment.

Magnelis® also demonstrates superior performance in industry-standard salt spray tests. Steels coated with Magnelis® showed no signs of corrosion weeks after other samples were completely corroded. Magnelis® performs more than three times better than galvanised steels.

For ground-based solar installations, Magnelis® ZM310 is recommended. The 25 µm coating is two to four times thinner than the coating on conventional galvanised steel. Magnelis® is applied to both sides of the steel on a standard hot-dip galvanisation line. It offers the best protection for the profiles which support the solar panels and the posts which are placed in the ground or mounted on concrete.

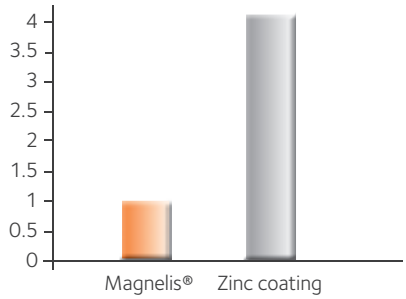
"We started using Magnelis® in 2010 to solve the problems we faced with corrosion and durability of our systems. Magnelis® gave us the guarantees against corrosion that the market was asking us for."

Mirco Briosi, General Manager of MetalSistem

Pictures © MetalSistem 2013

> Using photovoltaic systems to convert sunlight into energy is one of the most environmentally friendly ways to generate electricity. Using steel to build the support structures makes it even more sustainable.

Zinc runoff rate (g/m²/year)



Brest, France – maritime category C3 (average) – Institut Français de la Corrosion



MetalSistem is using Magnelis® on its modular steel structures for photovoltaic installations.

Steel grades for terrestrial systems

In ground-based solar installations, Magnelis® is usually applied to structural steels including grades:

- DX51D to DX57D
- HX180BD to HX300BD
- HX180YD to HX300YD
- HX260LAD to HX420LAD
- S220GD to S390GD

These steels can be supplied in thickness from 0.45 to 5.0 mm. Thicknesses above 5 mm are available on request. Maximum width is 1,680 mm.

Not just for ground-based solar installations

Magnelis® is suitable for use with most steels which are used to support photovoltaic systems whether they are mounted on buildings or roofs, or used as cladding. It can also be applied to the parts which are used to connect the photovoltaic system to the underlying structure.

Magnelis® is also suitable for use in non-solar applications and can be applied to:

- Cold forming grades
- Deep drawing steels
- High strength low alloy steels (HSLA)
- Structural grades

Cost effective mass production

ArcelorMittal customers such as MetalSistem are using Magnelis® on their modular steel structures for photovoltaic installations. The support systems are based on a patented, modular, adjustable upright section that is used in other applications such as industrial storage systems which also benefit from the corrosion protection offered by Magnelis®. The sections are mass produced in the MetalSistem factory which offers excellent cost efficiency.

"We started using Magnelis® in 2010 to solve the problems we faced with corrosion and durability of our systems," explains Mirco Briosi, General Manager of MetalSistem. "Magnelis® gave us the guarantees against corrosion that the market was asking us for."

ArcelorMittal's R&D team is available to help you select the right steel grade for your application and can help to optimise the design. We also offer advice on the use of Magnelis® in conjunction with mechanical assembly, welding, or adhesive bonding.

Magnelis® guaranteed up to 25 years

Magnelis®: Guaranteed durability for ground-based solar supports and posts

- Excellent corrosion resistance – the 3% magnesium in the coating ensures a stable and durable barrier against corrosion over the whole surface.
- Self-healing effect protects cut edges, welds and scratches.
- Provides excellent workability during welding and forming.
- Environmentally safe – uses less zinc than pure zinc coatings and reduces run-off to soil.
- Suitable for use with a wide range of steels and tubes, and in thicknesses from 7 to 25 µm.
- Cost-effective!

For more information about Magnelis®, please visit www.arcelormittal.com/industry/magnelis

Sustainable steels for packaging

Eco-design creates lighter, resource efficient steel packaging solutions.

With a recycling rate of over 74% in Europe, steel is already the most recycled packaging material on the market. But thanks to our close partnerships with our customers, dedicated Packaging R&D centre, and range of high strength steels, ArcelorMittal Flat Carbon Europe (FCE) is helping the packaging industry reduce its environmental impact even further. Using an approach known as eco-design, ArcelorMittal and our canmaking partners are taking a lifecycle view of steel packaging to define how and where sustainability can be improved.

Picture © Ball Europe

As a major player in the European packaging market, ArcelorMittal FCE has followed the principles of eco-design for more than three decades. Those principles include improving the ecological quality of our products and reducing their environmental impact from cradle-to-cradle. The goal of this approach is to reduce consumption of resources including materials and energy, and minimise waste.

In the packaging sector, steel already has some distinct environmental advantages. The steel in cans is 100% recyclable, regardless of the number of recycling cycles it goes through. This reduces resource use accordingly. Steel cans are easily separated from waste streams with an electromagnet, ensuring almost all are collected.

Impenetrable barrier reduces wastage

If you also count the environmental cost of food wastage, steel packaging also comes

ArcelorMittal at MetPack

ArcelorMittal Flat Carbon Europe will attend MetPack 2014 from 6 to 10 May 2014. in Essen, Germany. MetPack will offer ArcelorMittal the opportunity to demonstrate our support for the packaging industry and our range of cutting-edge and sustainable steel solutions.

Steel packaging in figures

In 2012, about 3.6 million tonnes of steel for packaging were consumed in Europe. More than half (55%) was used to package food. The remainder was used in various other steel packaging solutions.

Food	55%
Beverages	10%
Aerosols	7.5%
Closures	7.5%
Specialty packaging	20%

out ahead. Steel forms an impenetrable barrier which protects the contents from light, water and air – ensuring the contents are as nutritious as the day they were packed. The hard case also reduces wastage caused by bumps en route. As well as reducing resource usage, thinner walls lighten the weight of the can. This in turn leads to environmental savings during handling and transport of the final product.

Over the last decade, ArcelorMittal's packaging customers have been able to downgauge the average thickness of food can walls by 5% despite the high-level maturity of three-piece can design. The introduction of ArcelorMittal's Maleïs® range of hard and ductile steels for packaging in 2002 led to an acceleration in the downgauging of easy open ends, typically by 10 to 20%. For two-piece beverage cans, ArcelorMittal's packaging R&D team has contributed to a 42% drop in the average weight of a 330 ml can (from 36.4 to just 21.0 grams) since 1973. To enable canmakers to produce even lighter and more environment friendly cans, ArcelorMittal is continuing to develop new steels for packaging.

ArcelorMittal FCE is also working with customers to redesign existing packaging to use less resources. One recent project saw ArcelorMittal support the R&D work of global canmaker Ardagh Group to create a revolutionary two-piece DWI can for the food sector without affecting performance or quality (see box on Ardagh Group). With a full range of steels for packaging, our global presence and leading R&D teams, ArcelorMittal FCE is well-equipped to help our packaging customers achieve their eco-design goals.

Ardagh Group's state-of-the-art Nemo production site in Deventer (the Netherlands)

Picture © Ardagh Group

Ardagh Group perfects two-piece DWI food can

Food cans are normally produced using three-piece can technology or two-piece drawn wall ironed (DWI) technology. DWI technology allows cans be manufactured at high speed and is very cost effective.

The full potential of DWI to reduce can weight is demonstrated in the beverage segment. The high internal pressure, naturally present in carbonated drinks, keeps the very thin can wall robust when it is filled. When DWI beverage technology is applied to food cans, a 15% weight reduction is achievable. However, it is more difficult to obtain the levels of pressure required in food cans.

Global canmaker Ardagh Group decided to research how the pressurisation technology used in drinks cans could be adapted to food cans. The goal was to reduce the amount of steel they use while maintaining the convenience of easy open ends. Led by Philippe Gimenez, Head of R&D, the company began to experiment using an industry standard DWI 73 x 110 mm food can. "We required steel of very high quality and ArcelorMittal is one of the very few suppliers in the world who can deliver this quality," says Tim Clarke, Commercial Director Food for Ardagh Group.

Working closely with ArcelorMittal, Ardagh Group perfected and patented the breakthrough technology in 2010. The result is the Nemo two-piece DWI food can which is thinner and lighter but maintains wall rigidity thanks to internal pressure. "ArcelorMittal played a big part in the development of Nemo," says Clarke. "We have a very good, long-standing technical partnership."

Bonduelle was the first brand to adopt the Nemo steel can. To date consumers haven't noticed a change, notes Clarke: "It has the same functionality, the same security – consumers don't notice."

Bonduelle became the first European filler to utilise the Nemo can.

Picture © Bonduelle

Quality and experience

ArcelorMittal's Industeel business unit leads the world in hot rolled specialty plates.

With three mills in Belgium and France and a capacity for 400,000 tonnes per year, Industeel offers an extensive range of specialty steel plates which are in high demand around the world. More than two-thirds of Industeel's output goes directly to major infrastructure projects such as oil and gas refineries, offshore platforms, liquid natural gas storage tanks, and desalination facilities.

Unlike their competitors who usually manufacture just one or two product families, Industeel offers over 400 grades of specialty plate. They include extremely clean carbon steel, alloyed plates, stainless steels and nickel alloys. Industeel offers customised solutions for large industrial projects, and a wide range of proprietary branded products which are distributed through specialised steel service centres.

The strategy of investing in a wide range of products has seen the company weather the economic crisis and maintain momentum in difficult market conditions. "If you have a broad product range and service many different end markets as Industeel does, you have an advantage – not all of the down cycles come at the same time," explains Alex Nick, CEO of Industeel.

Diverse and strong

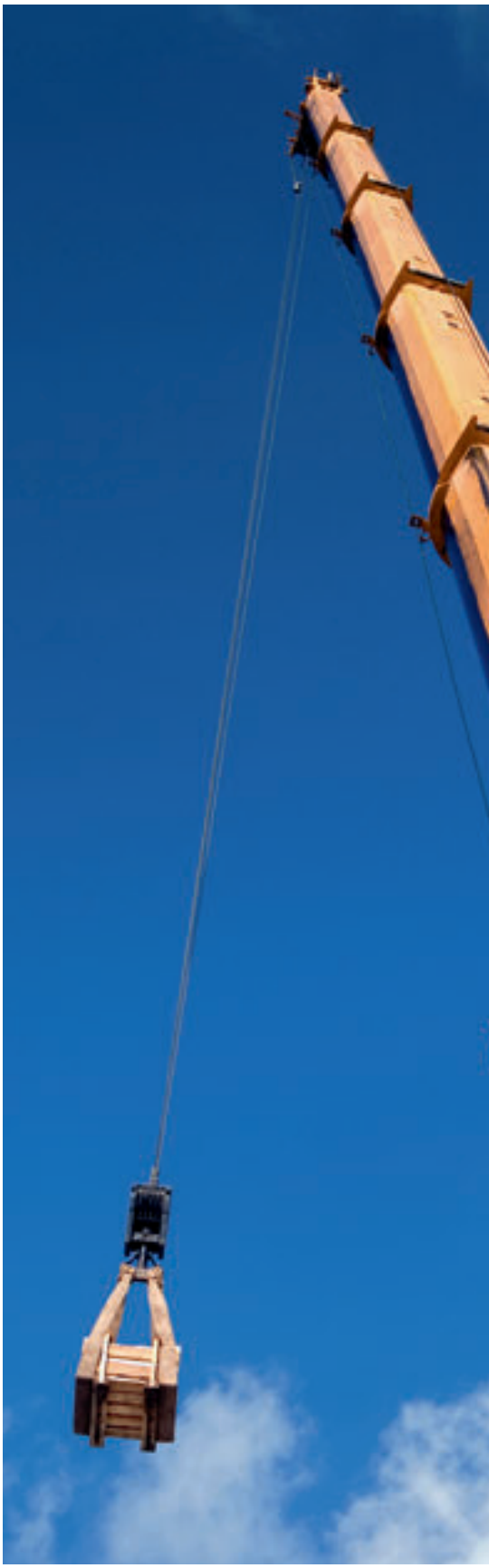
Industeel's unique business model allows customers to choose the most suitable grade and treatment for their particular application. Many of the products are rare and used in highly specialised applications. One example is clad plate which is only produced by five companies in the world. This type of plate is used to make products such as subsea pipelines, coke drums, manifolds, and separators for oil and gas production.

Industeel also guarantees better quality plates compared to the standard market offer. "Our wear resistant plates are a good example," says Alex Nick. "Industeel's extensive and unique product range enables us to offer tailor-made solutions for every application, and achieve better properties than our competitors can deliver. That means our wear resistant plates last longer, resulting in a much better total cost of ownership for our clients."

Industeel innovations have included the development of the Mecasteel concept – a branded range of pre-hardened steel grades. Mecasteel grades are utilised in the shale gas industry for fracking operations and mud pumps, and in selected mining applications such as the tracks of earthmoving equipment. This is largely due to their guaranteed mechanical properties which result in a longer life.

Industeel specialises in small orders and offers a level of flexibility that other companies cannot match. "We accept orders for very small lots and allow changes in the orders," notes Alex Nick. "It's ideal for engineering companies."

Customers who operate within driving distance of an Industeel mill can order the company's RELIA®wear and RELIA®force plates from a dedicated website: www.reliaplates.com. The site shows available mill stock which can be ordered for immediate



"Industeel's extensive and unique product range enables us to offer tailor-made solutions for every application, and achieve better properties than our competitors can deliver."

Alex Nick, CEO Industeel

Industeel specialty plates are used in highly technical applications.

Pictures © Industeel

Industeel at a glance

Employees:	Over 2,300 serving more than 5,000 customers worldwide
Mills:	Charleroi (Belgium), Châteauneuf and Le Creusot (France)
Capacity:	400,000 tonnes per year
Sales:	50% to Europe, 30% to Asia and Middle East, 20% to the Americas

For a complete overview of the Industeel offer, please visit www.industeel.info

delivery. To qualify for free delivery, the customer only needs to order 18 tonnes of product.

To help customers improve the efficiency of their projects, Industeel is able to offer semi-finished products. In special forming shops equipped with dedicated tools, Industeel can manufacture one-part or multi-piece heads for gas vessels, formed pieces such as half-shells, or pre-formed bevelled plates for tanks.

Investing in our customers

Web-based services are increasingly important to Industeel's relationship with its worldwide customer base. In February 2013 the company launched e-Services, a dedicated platform where customers can access all of the documentation related to their order.

The new platform provides greater transparency as customers are able to directly see the status of their orders. However, the direct relationship with clients is still maintained explains Alex Nick: "Our sales and marketing team have extensive technical knowledge and it's not unusual for them to interact with ten or more people on multiple continents for large projects."

R&D improves processes and products

Industeel dedicates around 1% of turnover to research and development (R&D). The R&D Centre in Le Creusot (France) includes 60 people who develop new products and techniques for welding, machining and corrosion protection. On average, Industeel launches around six new products or applications each year.

"Our R&D team focuses on developing new products for existing applications, and qualifying existing steels for new applications," notes Alex Nick. "Innovation not only contributes to cost reductions through improved processes, it also results in increased customer satisfaction." With the 2014 sales book rapidly filling and orders already in for 2015, it seems Industeel's strategy of satisfying their customers with a diverse range of products is paying dividends.

Continuous investments

Industeel continuously invests in maintaining its quality leadership in special plates. Recent investments have included a state-of-the-art leveller in the Charleroi mill and a new flattening press for Châteauneuf. They enable Industeel to meet the strictest flatness standards in the industry. Industeel has also recently installed a new quencher in Le Creusot, enabling the company to produce plates with mechanical properties that meet the strictest tolerances.



Pictures © Isısan

Quality under pressure

ArcelorMittal Galati supplies Turkey's largest producer of high pressure vessels.

When it comes to transporting volatile fuels like liquid petroleum gas (LPG) or liquid natural gas (LNG), there can be no room for error, either in the quality steels used or in the design and manufacture of the tank. That is exactly why Isisan, Turkey's leading maker of pressure storage and transport vessels chooses ArcelorMittal's heavy plate grades for their products.

Isisan, whose vessels help to deliver fuel to gas stations and LNG terminals around the world, has chosen heavy plate grades from ArcelorMittal Galati, Romania, for their quality. The steels, typically grades P355NL2 and P460NL1, exhibit excellent resistance to pressure at all temperatures. That's particularly important for tanks used to store liquids which can turn into gas with explosive consequences. The vessels used to transport LPG and LNG are largely made from steel and must match the most stringent specifications.

"Steel quality is very significant," explains Murat Arslan, Administrative and Financial Manager at Isisan. "If any defective plate is used in the production of our pressure vessels it could have disastrous results."

Thinner steels reduce costs

The high strength of the plates means the walls of the tanks can be surprisingly thin considering the pressure the contents are under. Walls of between 6 and 14 mm are common. However, Isisan also use thicknesses up to 70 mm for vessels which contain gases that are at extremely high pressure. "Thinner (and therefore lighter) pressure vessels are more economical because they require less resources and labour to produce," notes Murat Arslan. "Costs are also reduced during the use

phase of the tank's life as lighter tanks enable our customers to transport more gas in one trip."

Isisan exports more than half of the storage and transport tanks it produces each year to Africa, Baltic and CIS states, Europe and the Middle East. The company recently delivered a number of 200 and 300 cubic metre (m^3) capacity tanks to Europe, and is currently completing a Middle East order for 80 transportation tanks, each with a capacity of 50 m^3.

> "Steel quality is very significant, if any defective plate is used in the production of our pressure vessels it could have disastrous results."
>
> Murat Arslan, Isisan

Quick response cuts delays

While quality is an important consideration, it is not the main reason Isisan has been an ArcelorMittal customer for over ten years. "Our customers demand their tanks with shorter lead times than ever before," says Murat Arslan. "ArcelorMittal is able to quickly respond to our enquiries and technical demands. When they are able to supply plates in shorter timeframes, it improves our production capacity accordingly."

Steels for pressure vessels and boilers

ArcelorMittal offers a full range of steels for pressure vessel applications including the P355NL2 and P460NL1 grades used by Isisan. The fundamental property of these steels is their ability to withstand high pressure at low, ambient and high temperatures.

Steels for pressure vessels are mainly used to manufacture boilers, drums, pressure or steam piping, industrial thermal vessels and heat exchangers. They have good weldability, excellent toughness and are suitable for normalisation annealing and stress-relief annealing.

About Isisan

Isisan began producing pressure vessels in 1980s and now employs approximately 250 people at its 55,000 square metre site in central Anatolia. The company's products are used to store or transport liquid petroleum gas (LPG), liquid natural gas (LNG), carbon dioxide, ammonia and industrial gases such as liquid nitrogen, oxygen and argon. For more information, please visit www.isisan.com.tr

The vessels used to transport LPG and LNG are largely made from steel and must match the most stringent specifications.

Strengthening every link in the steel supply chain

ArcelorMittal Flat Carbon Europe extends service offer to add value for customers.

ArcelorMittal Flat Carbon Europe (FCE) has been actively working to improve our performance in the steel supply chain. Based on customer feedback, ArcelorMittal FCE has introduced initiatives to reduce and stabilise lead times, and make it possible for customers to order smaller lots. The changes have enabled our customers to reduce working capital and warehouse requirements while improving their competitive position.

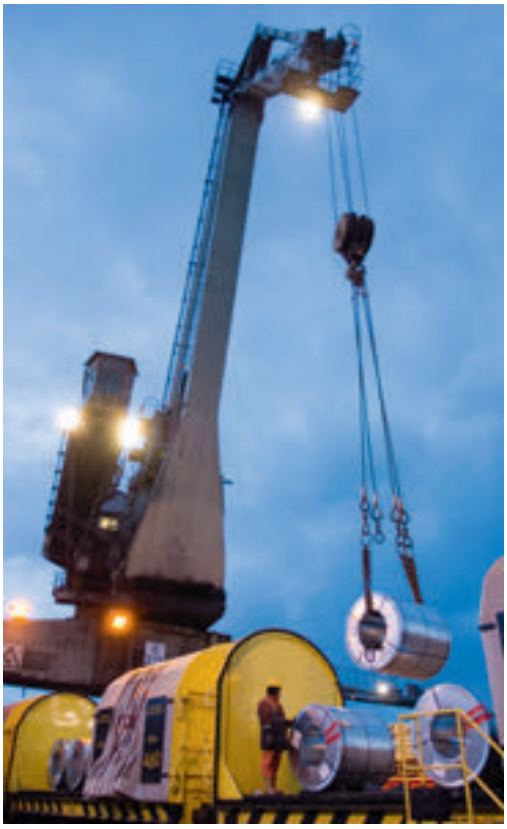
In response to customer demand, every order step was studied in detail to reduce delays and improve processes. Short lead times were tested with selected large volume customers and further improvements made.

Today many of our customers can also take advantage of these short lead times. ArcelorMittal FCE is committed to expanding this service offer capability to all mills in Europe. For example, a secured lead time programme has been developed at ArcelorMittal Eisenhüttenstadt which enables customers to specify colours late in the order process (see *ArcelorMittal's service offer*). Our mills in Poland are currently rolling out this programme with the goal of making it available to all customers during 2014.

Small lots possible

Recognising that customers do not always need a large volume of steel for a specific project, some ArcelorMittal FCE mills also allow customers to order small lots. Depending on the mill and product required, the volume can be as low as three to five tonnes of steel.

Construction customers who are supplied from ArcelorMittal Montataire can specify a small lot as part of a larger order. The small lot (at least five tonnes) can be accepted as part of a total order of at least 40 tonnes.



Pictures © ArcelorMittal Gent, Jeroen Op de Beeck

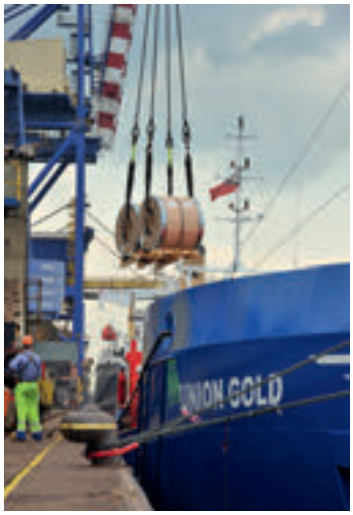
Better processes, shorter lead times

ArcelorMittal Lesaka has introduced two new short lead time services: FAST 14 and FAST 21. As the names suggest, lead time is below 14 or 21 days. The offer is valid on six formats including panel and corrugated applications. Minimum order quantity is 10 tonnes for both offers.

At ArcelorMittal Gent lead times have been cut by more than half for some roofing and cladding products. In the case of pickled and oiled steels, lead time has been cut from eight to two weeks.

While other ArcelorMittal mills may not be able to achieve these targets depending on their production layout, most have implemented programmes to reduce lead times significantly. "Each mill offers their customers the best service while maintaining the strengths of the individual mill," notes Bart Beernaert, Customer Service Manager at ArcelorMittal Gent.

Short lead times have proved extremely popular with ArcelorMittal customers in the Baltic and Nordic countries thanks to regular weekly shipments from Gent to our warehouse in Tallinn (Estonia). Some other ArcelorMittal mills now ship steels for these customers via Gent so everything can be grouped onto one vessel, reducing shipping costs and improving delivery reliability for some of our most remote European customers.



Short lead times have proved extremely popular with ArcelorMittal customers in the Baltic and Nordic countries thanks to regular weekly shipments from Gent to our warehouse in Tallinn (Estonia).

Pictures © ArcelorMittal Gent, Jeroen Op de Beeck

In Italy, customers can order between 3 and 20 tonnes of steel for roofing and cladding in one lot. In combination with the XpressO service, the steel is delivered 14 days after order entry. More than 50 colours can be specified and a range of substrates and dimensions are available.

© Italpannelli

"We avoid increasing our stock, but can use XpressO to win specific projects for which short lead time is a key success factor."

Andrea Baldassarri, Director of Production and Purchasing for Italian customer Italpannelli

"We use small lots and XpressO," explains Andrea Baldassarri, Director of Production and Purchasing for Italian customer Italpannelli. "We avoid increasing our stock, but can use XpressO to win specific projects for which short lead time is a key success factor."

Many advantages for customers

For ArcelorMittal customers the changes provide a distinct advantage. It allows them to offer shorter lead times to their own clients, better manage their working capital and reduce the amount of warehouse space. They can also bid on profitable project work without the need to have the steel in stock.

To ensure the level of service we aim to achieve, ArcelorMittal FCE requires support from our customers. Typically this includes providing us with reliable forecasts of demand. ArcelorMittal FCE understands practicalities of business and we work with each customer individually to identify the best service offer for them.

If you would like to know more about any of our supply chain services, please contact your local ArcelorMittal agency.

ArcelorMittal's service offer

ArcelorMittal FCE's supply chain improvements include a number of initiatives such as short and secured lead times and small lots. Other options include:

- On Time in Full (OTIF): Our superior delivery service aims to deliver 85% of all order items to the customer in the week specified.
- Committed Volume and Lead Time (CV&LT): A quarterly volume of steel is distributed in regular weekly lots to an agreed and competitive lead time.
- Committed Volume and Short Lead Time (CV&SLT): An additional service is available for customers who need shorter lead times.
- Late Colour Specification (LCS): Mainly used for ArcelorMittal FCE's organic coated products. The colour can be specified late, but the substrate is booked in advance.
- Committed Volume and Schedule Agreement (CV&SA): Ideal for customers who order the same article (including specifications) at fixed intervals. This offer requires more significant quantities and a good customer forecast of their needs.

Designed for safety

New standard unlocks potential of high strength steels to improve the safety of road restraint systems and lighting poles.

Until 2011, the characteristics of road restraint systems in Europe were mainly defined through national regulations and standards. Many of these standards specified the design and materials that were to be used. Since the introduction of a new standard for road safety barriers (EN 1317) in January 2011, manufacturers are able to utilise new materials – including high strength steels – in their designs.

Like the EN 12767 standard for road infrastructure such as lighting poles (introduced in 2007), the EN 1317 standard is entirely performance based. This means designers are free to choose the materials – as long as these pass the tests defined in the relevant standards. For steel, minimum yield stress is usually set at 235 MPa.

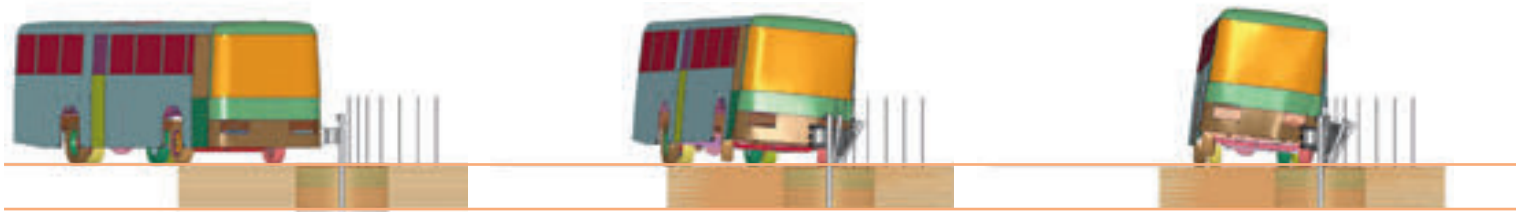
25% reduction in weight per metre

Manufacturers of steel road safety systems have welcomed the innovative aspects of the standards. The rules enable them to replace structural steels such as S235JR with high strength steels (HSS) which are lighter per metre and better able to absorb crash energy. "Mieres Tubos prides itself on producing high-quality products. For that reason we have embraced the use of micro-alloyed HSS as a technical solution for our family of safe, competitive and sustainable safety barriers," says Cristina Rodríguez, R&D Manager at Mieres Tubos – a major safety barrier manufacturer based in Spain.

The significant reduction in the overall weight of the pole or barrier per metre (up to 25% compared to those made with structural grades) reduces greenhouse gas emissions as less steel is required and more finished products can be transported to the installation site in one trip. Compared to other materials such as concrete, steel offers the best compromise between energy absorption and vehicle containment in road safety applications.

HSS properties easier to control

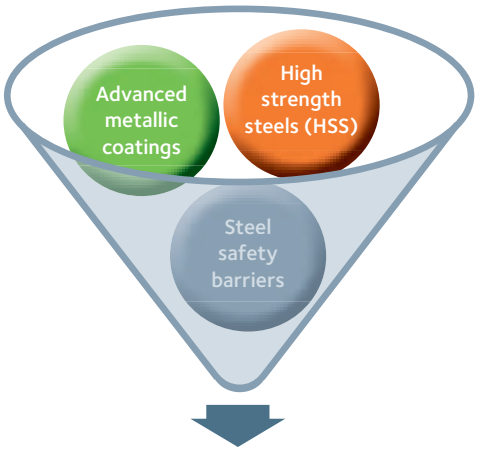
The mechanical properties of HSS grades are easier to control than those of structural grades such as S235JR. Quality is usually higher as most HSS grades are produced in Europe where controls are tighter. "Through several studies we have verified that the more controlled mechanical properties of these steels provide an optimal solution in terms of safety," explains Cristina Rodríguez. "As a result, our barriers exhibit the same behaviour in an accident as they do in a crash test."



"We have embraced the use of micro-alloyed HSS as a technical solution for our family of safe, competitive and sustainable safety barriers."

Cristina Rodríguez, R&D Manager at Mieres Tubos

© Mieres Tubos



Lighter, safer and more sustainable safety barriers

One study of 200 coils carried out by Mieres Tubos found that the yield limit of S235JR can vary by up to 190 MPa. This means that an S235JR steel complying with the requirements of the EN 10025 standard for hot rolled structural steels may have up to 415 MPa of yield stress. This is 75% higher than the 235 MPa minimum specified in EN 1317.

For HSS, the variation was around 80 MPa – a significant improvement if the goal is to produce a safety barrier or lighting pole with consistent performances between test and production.

Cost-effective and long lasting

High performance coatings such as ArcelorMittal's Magnelis® are also being utilised in conjunction with HSS. Composed of zinc with 3.5% aluminium and 3% magnesium, the Magnelis® coating lasts much longer than traditional hot dip galvanisation –the standard corrosion-protection mechanism for safety barriers and lighting poles. For more information on Magnelis® see the story on page 8 in this issue of *Update*.

When it comes to price, HSS safety barriers and lighting poles are more cost-effective than other materials. Their simple profile limits manufacturing operations, minimising production costs. Used in lower thicknesses, HSS guardrails require much less steel than structural steels thanks to their higher resistance.

The simplicity of HSS safety barriers means the same HSS post and beam can be used to create road restraint systems with different containment capacities (from level N2 to H2 for example). This enables manufacturers to maintain good price competitively. Barriers designed with HSS also require fewer components than those made with structural steels, further increasing the economic sustainability of HSS solutions.

However, the economic and environmental benefits of HSS safety barriers and lighting poles are far outweighed by their effectiveness at saving lives. Properly designed HSS barriers and poles absorb the crash energy of a vehicle and wrap around it to reduce momentum. There is less chance the vehicle will return to the road, injuring other motorists or the vehicle's occupants. When combined with approved motorcyclist protection systems, even the most vulnerable road users are protected.

ArcelorMittal can perform co-engineering studies with safety barrier manufacturers to optimise barrier design and limit the number of expensive crash tests required. With properly designed HSS barriers, there is less chance the vehicle will return to the road, injuring other motorists or the vehicle's occupants.

Going the extra mile

ArcelorMittal's long experience in the automotive sector brings benefits for truck makers.

As the leading steel supplier to the global car industry, ArcelorMittal is uniquely positioned to offer truck makers a range of steel solutions which lighten both the truck and trailer, increase safety and driver comfort, and help to reduce the total cost of ownership. Increasingly truck makers are using ArcelorMittal's high strength and advanced high strength steels to achieve these goals. Technologies such as laser welded blanks and hot stamping, both vital in car industry efforts to create lighter vehicles, are also appearing in state-of-the-art trucks.

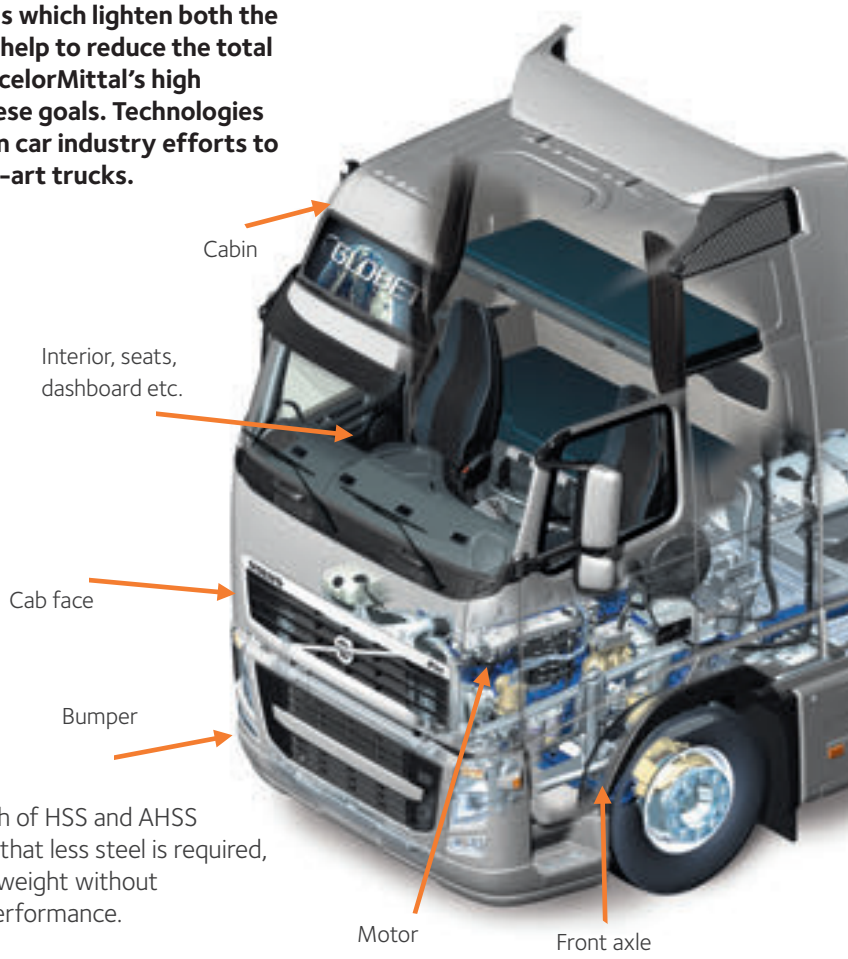
Trucks have a service life of between 15 and 20 years and may cover a million kilometres or more in their lifetime. To ensure maximum cost effectiveness, trucks must be reliable partners for drivers and owners. Any repairs or maintenance time means lost productivity and should be minimised.

Technology transfer in progress

Before including new materials and technologies in their designs, truck OEMs want to be sure that they will work and be available over the lifespan of their vehicles in case repairs are needed. For this reason, truck cab structure designs evolve more slowly than those for cars, though almost all innovations in the automotive sector are making their way into truck cab design.

High strength steels (HSS) and advanced high strength steels (AHSS) – including dual phase and boron steels – have already demonstrated their potential to reduce vehicle weight significantly through ArcelorMittal's S-in motion study (see box).

The right steel in the right place



The high strength of HSS and AHSS products means that less steel is required, reducing overall weight without compromising performance.

Early involvement brings benefits

New coatings such as ArcelorMittal's Zagnelis® are also helping to extend the life of trucks. Containing 3% magnesium and 3% aluminium, Zagnelis® ensures that vulnerable parts will resist corrosion for significantly longer than coatings such as hot dip galvanisation.

ArcelorMittal also works closely with individual truck OEMs to review the body-in white of their cabs.

S-in motion provides ideas for advanced steel use in trucks

ArcelorMittal's S-in motion study continues to demonstrate how existing HSS and AHSS, coupled with advanced solutions such as laser welded blanks (LWBs) and hot stamping can reduce the weight of a typical C-segment body-in-white (BIW). Using the lightest solutions, the weight of the BIW can be reduced by 19% at little to no additional cost.

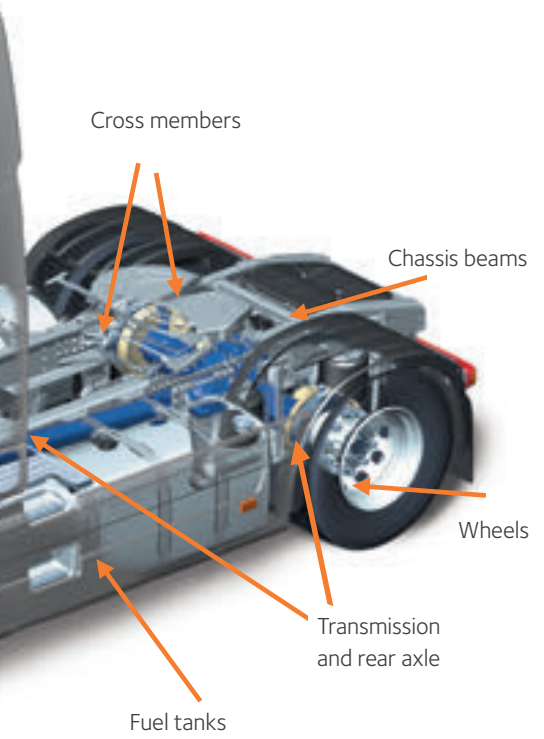
ArcelorMittal is also undertaking projects which are specifically designed to develop solutions for the truck sector. The CLIC project (City Lightweight and Innovative Cab) is a collaborative study which aims to identify weight reductions for the BIW of cabs for light and medium duty trucks. CLIC involves seven partner organisations and laboratories. The goal is to develop a breakthrough cab with ArcelorMittal HSS and AHSS which will be 20% lighter and pass standard industry crash tests.

ArcelorMittal also works closely with individual truck OEMs to review the BIW of their cabs. We can propose steel solutions

ArcelorMittal well placed to assist truck manufacturers

For many steelmakers, supplying the full range of steels required to build trucks can be a challenge. ArcelorMittal's long experience with both car and truck makers means we are able to supply all grades required and in thicknesses from ultra thin coated steel for cabs (0.55 mm) to very thick hot rolled steel for the chassis (up to 12 mm). ArcelorMittal also delivers long products and tubes. Our electrical steels are already contributing to the development of hybrid and electric powertrains for the trucks of the future. ArcelorMittal Total Offer Processing is also a partner in the development of truck sub-assemblies with its Solustil approach.

ArcelorMittal's global footprint means that we have facilities close to almost all major truck OEMs. This ensures our R&D teams can provide expertise and advice when truck makers are designing and developing new models and processes, and during ongoing production.



Picture © Volvo Trucks

By involving ArcelorMittal's engineers in the design of new trucks at a very early stage, OEMs can benefit from our expertise.

Our specialised truck customer team, supported by researchers from Global R&D Automotive, can advise which steels and process improvements will achieve the biggest weight savings without compromising reliability, safety, comfort or affordability. ■

which meet the OEM's goals to create new cab designs which are lighter, stronger and safer.

Our generic lightweight solution for trailer chassis applications – Trailtech has already shown that high strength low alloy grades such as S700MC can reduce fuel use and environmental emissions (see *Update* May 2011).

HSS are being used to reduce the weight of truck wheels by between 10 and 15%. Standard 22.5 x 9.00-inch truck wheels weigh around 43 kg, but by using HSS this can be reduced to around 36 kg. With seven to fifteen wheels on a truck and trailer, the weight of the wheels can be cut by up to 105 kg.

For more information visit www.arcelormittal.com/automotive

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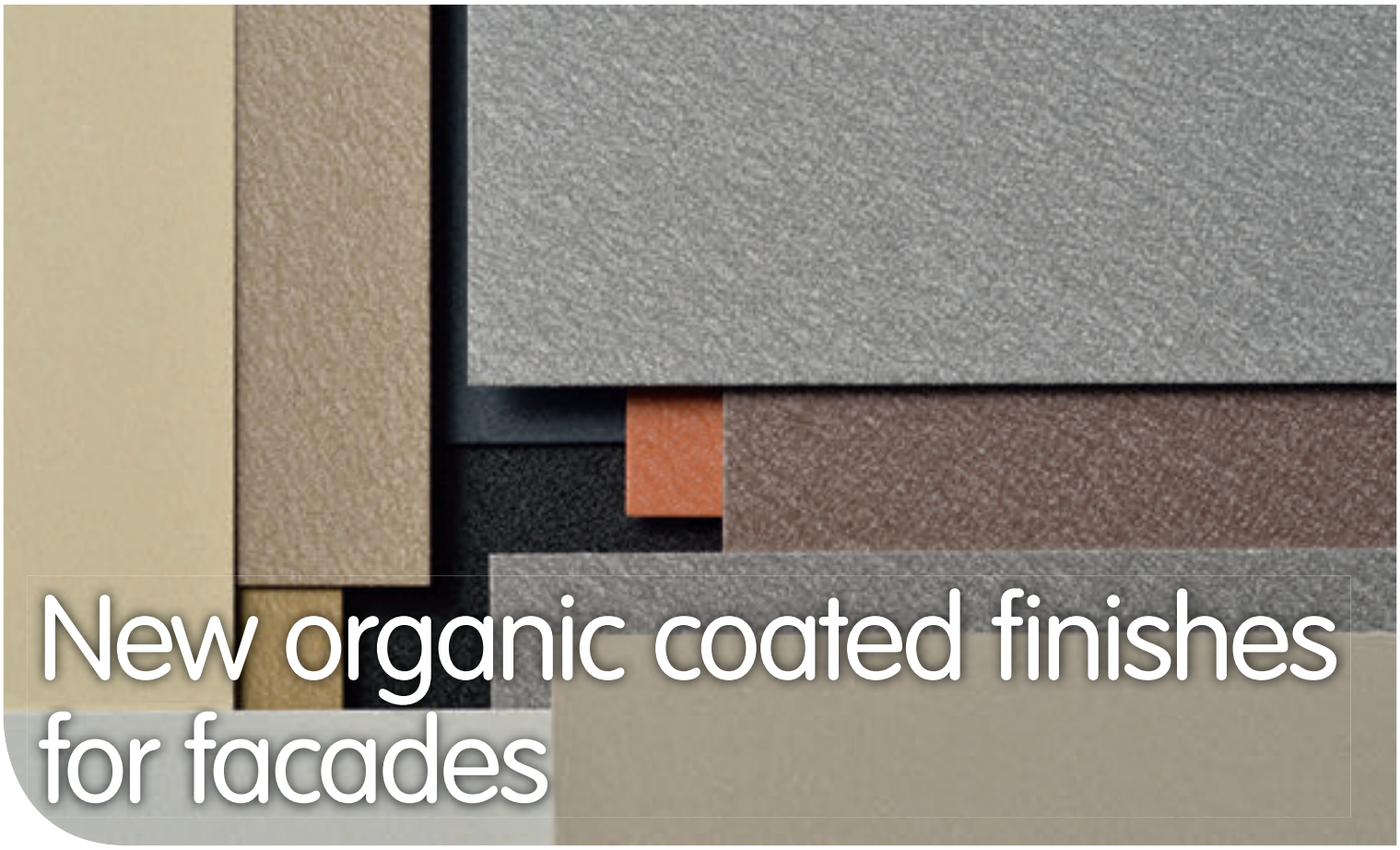


New organic coated finishes for facades

Pictures © ArcelorMittal Gent, Jeroen Op de Beeck

Granite® Silky Mat and Granite® Impression will be added to our offer for building applications.

ArcelorMittal's Granite® range includes a number of organic coated products for outdoor building applications. Two new options will be added to the offer from January 2014: Granite® Silky Mat and Granite® Impression. Designed for use in prestigious architectural facades, the new finishes offer unique patterns and textures which will add drama, character and excitement to any exterior.

"These products are designed by architects for architects and Global R&D has developed them accordingly. The new aesthetics allow architects to reinforce the personality of their designs, whatever the type of building," says André Lavaud, Product Lead, Coated Products for ArcelorMittal Flat Carbon Europe. The visual aesthetics of Granite® Silky Mat* and Granite® Impression* are so unique that we have protected the designs with the Office for Harmonization in the Internal Market (OHIM).

Like all of our Granite® products, Granite® Silky Mat and Granite® Impression are part of the ArcelorMittal Nature range. All of our Nature organic coated steels are free from heavy metals and chromates (see box). "Both products have been inspired by nature, as new constructions must be more sustainable and integrated into the landscape," notes André Lavaud.

Sparkling mat finish adds glamour

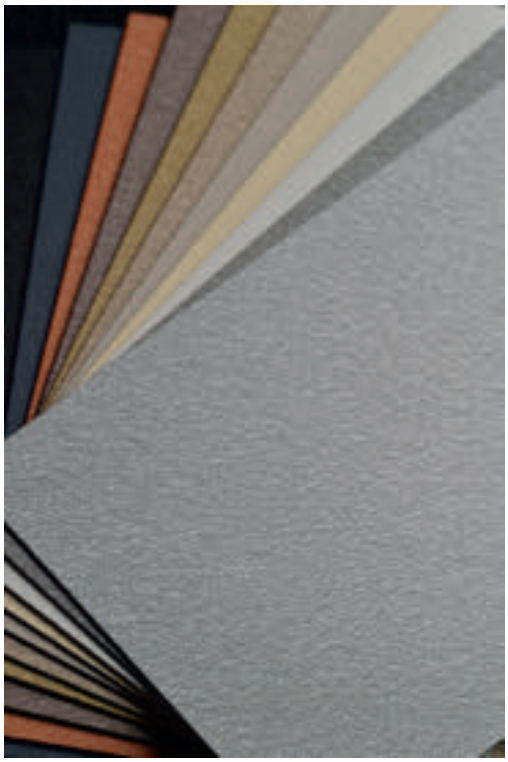
Granite® Silky Mat is a highly durable finish in two different wrinkled textures: smooth or rough. The smooth option is extremely fine, giving a completely flat mat finish which will last for years. The coarser texture of the rough finish has a slight sparkle which adds glamour to any construction.

The rough finish of Granite® Silky Mat is available in six natural colours, while the smooth option is available in five colours. A rigorous quality assurance system is in place at all our mills to ensure that colours produced on any line conform to the ArcelorMittal standard.

New textures leave an impression

Granite® Impression is available in four options: snake, elephant and blue and brown

Both Granite® Impression and Granite® Silky Mat are part of ArcelorMittal's Nature range.



Picture © Lattonedil

"We have used our Isopar panels which were made with ArcelorMittal's Granite® Silky Mat for our stand at the MadeExpo in Milan this year. The Granite® Silky Mat was appreciated by the visitors to our stand. We have received good feedback on the aesthetics, and also on the tactile feel of this special surface finish."

Fabrizio Bettio, Purchasing Manager, Lattonedil

Technical specifications for Granite® Impression and Granite® Silky Mat

	Granite® Impression	Granite® Silky Mat
Thickness:	0.4 to 1.8 mm	0.5 to 2.0 mm
Width:	600 to 1,500 mm	610 to 1,500 mm
Coating:	35 µm organic coating, applied on a zinc-coated flat carbon steel substrate	
Corrosion resistance:	RC3	
Fire resistance:	A1 in accordance with EN 13501-1	
Reverse:	To ensure quality and uniformity, ArcelorMittal offers two standard colours for the reverse side of the strip.	
UV resistance:	RUV4	
VOC emission level:	Very low	

agate. The texture of snake offers irregular scales of various hues and longitudinal forms. By contrast, the elephant finish is very tough and wrinkled in appearance.

Granite® Impression agate finish is available in natural blue or brown. Both colours add a classic polished stone effect to a project.

Robust and flexible solutions

Granite® Impression and Granite® Silky Mat feature a robust but flexible paint system which is scratch resistant, durable and formable. They are ideal for cladding applications such as sandwich panels, profiled sheets and cassettes.

Protective films can be applied to Granite® Impression and Granite® Silky Mat coils on request. Customers can also apply these films to finished products such as cassettes.

To answer the needs of specific construction projects, both products are available in small quantities. "As ArcelorMittal FCE's 'small lots' service applies to the whole Granite® range, our customers can fully benefit from this new offer," explains André Lavaud. Please contact your nearest agency for more details about this service.

Granite® Impression and Granite® Silky Mat have been subjected to a battery of tests in the laboratory and at outdoor exposure sites to ensure the best possible product performance.

Granite® Impression and Granite® Silky Mat are available from ArcelorMittal's network of building system manufacturers and steel service centres. ■

* Community Design pending: No. 002272401 in the name of ArcelorMittal Flat Carbon Europe, S.A.

free of chromates
Nspired by Nature
and heavy metals

Designed for environmentally responsible building

At ArcelorMittal, we truly believe in the principles of sustainable development and are fully committed to making sure that our steel contributes to the future growth of environmentally responsible construction. That's why we have introduced our Nature collection of organic coated steels. The products in the range are:

- Free of hexavalent chromium compounds (SVHC)
- Free of lead and other heavy metals
- Fully tested by our R&D experts to extreme corrosion and weathering conditions, both in the laboratory and outdoors
- Innovative and aesthetic for more harmonious integration in the environment.

Many have reflective coatings which provide more comfortable living conditions, reducing indoor temperatures by a few degrees in hot and sunny environments.

For more information, please visit www.arcelormittal.com/industry/facades

VAMA to start production in China by mid-2014

Pictures © VAMA

ArcelorMittal and Valin Steel joint venture to lead automotive steel development in China

Valin ArcelorMittal Automotive Steel Co., Ltd. (VAMA) has officially launched its brand in Loudi (China) ahead of production start-up, scheduled for mid-2014. Formed in June 2008, the joint venture between ArcelorMittal Flat Carbon Europe (FCE) and Valin Steel entered an accelerated construction phase in June 2012. When complete in mid-2014, the new facility will produce state-of-the-art steels with superior surface quality and coating technology for safe and cost-efficient lightweight automotive design. VAMA's output will be China-focused, supplying world-class steel solutions to serve the growing local automotive market.

ArcelorMittal FCE is supporting the project with its advanced technology and providing production know-how to both Valin Steel and VAMA to ensure seamless production along the entire supply chain. "VAMA represents the introduction of ArcelorMittal automotive technology in China and is the result of a strong partnership with Valin Steel," says Brian Aranha, CMO of ArcelorMittal Global Auto Steel. "Both partners are committed to ensuring the success of VAMA with competitive technology, global R&D support, management know-how, branding and customer focus."

Knowledge sharing partnership

There has already been extensive knowledge sharing between FCE's European sites and Valin's upstream production site. "We are proud to have an experienced and effective international team from many different countries working closely with our local team," says Wang Jun, Chairman of VAMA. "This will enable VAMA to be more inclusive of different cultures and maintain a unique international perspective of the market."

VAMA's product portfolio will include technologically advanced products developed by ArcelorMittal. "ArcelorMittal is the leading supplier of flat carbon steels to the global automotive market. This includes advanced and ultra high strength steels - trademarked and patented products such as Extragal® and Usibor®," explains Brian Aranha.

VAMA

Valin ArcelorMittal Automotive Steel

VAMA's production lines will be world class. They will include a continuous pickling and cold rolling mill with an annual production capacity of 1.5 million tonnes, a continuous mixed annealing line with a capacity of 1 million tonnes, and a continuous hot dip galvanising line with a capacity of 0.5 million tonnes. VAMA will produce Galvannealed, Dual Phase, Extragal® and Usibor® steel grades under license from ArcelorMittal.

"VAMA is committed to leading the development of China's automotive steel industry in close partnership with automotive manufacturers, while providing safer and more eco-friendly advanced automotive steels," says Wang Jun. "This also meets the sustainable development requirement of China's automotive industry."

For more information about VAMA, please visit: www.vamachina.com

UPDATE NOV/2013-EN