



## Eurostructures Beam Finishing Centre

### Bridges



### Buildings



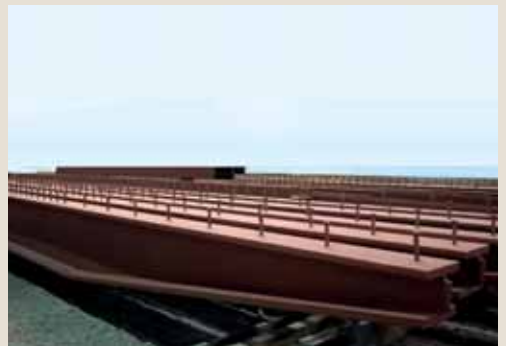
### Logistics



### Foundations







Dear Customer,

Eurostructures Beam Finishing Centre, an operational unit within ArcelorMittal Luxembourg, is upgrading its service offer in the frame of a continuous strategic engagement. These services may include simple finishing, complex beam fabrication and surface treatment. The beam finishing workshops are connected to ArcelorMittal mills by internal roads and railways allowing environmental footprint and cost reduction.

We deliver construction solutions used in a wide range of applications: bridges, buildings, industrial and foundation infrastructures. Depending on your project, we may operate as a supplier to steel distributors, steel contractors and in some cases to general construction contractors. ArcelorMittal is present on the five continents and offers you extensive experience and flexibility.

We believe that Safety and Quality are key values for sustainable business. ArcelorMittal employees are the beating heart of our activity. With shared vigilance principle, everyone cares about her/his own safety as well as the one of the others.

Eurostructures Beam Finishing Centre is more than a service centre, it is the passion of our workforce to make and deliver the services and products you need and it is the commitment of our technical teams to develop tailor-made solutions for your benefit. Continuous improvement is the cornerstone of our work approach. With our performance excellence goal, we strive to be your partner of choice.

Kind regards,

A handwritten signature in grey ink, appearing to read 'Tapas Rajderkar', with a stylized flourish at the end.

Tapas Rajderkar

ArcelorMittal Europe - Long Products  
CEO Sections and Merchant Bars

## Sections & Merchant Bars facilities

### Eurostructures Beam Finishing Centre



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# 1. Introduction

ArcelorMittal is the world's **leading steel and mining company**. ArcelorMittal is present in 60 countries and has an industrial footprint in 18 countries. Guided by a philosophy to produce safe, sustainable steel, we are the leading supplier of quality steel in all major global steel markets including construction, automotive, household appliances and packaging, with world-class research and development and outstanding distribution networks.

In 2017, ArcelorMittal had revenues of US \$68.7 billion and crude steel production of 93.1 – million tonnes. For the **construction industry**, ArcelorMittal offers engineers and fabricators innovative, competitive and sustainable solutions.

## ArcelorMittal Europe – Long Products

ArcelorMittal Europe – Long Products is one of the major strategic unit within the group. Our principal markets are in the fields of construction, industry and automotive applications.



**ArcelorMittal office building (AOB), Esch-sur-Alzette, Luxembourg**

Throughout the world we offer an extensive range of products meeting the strictest technical, quality and environmental requirements. Customer satisfaction, performance and innovation are our first objectives.



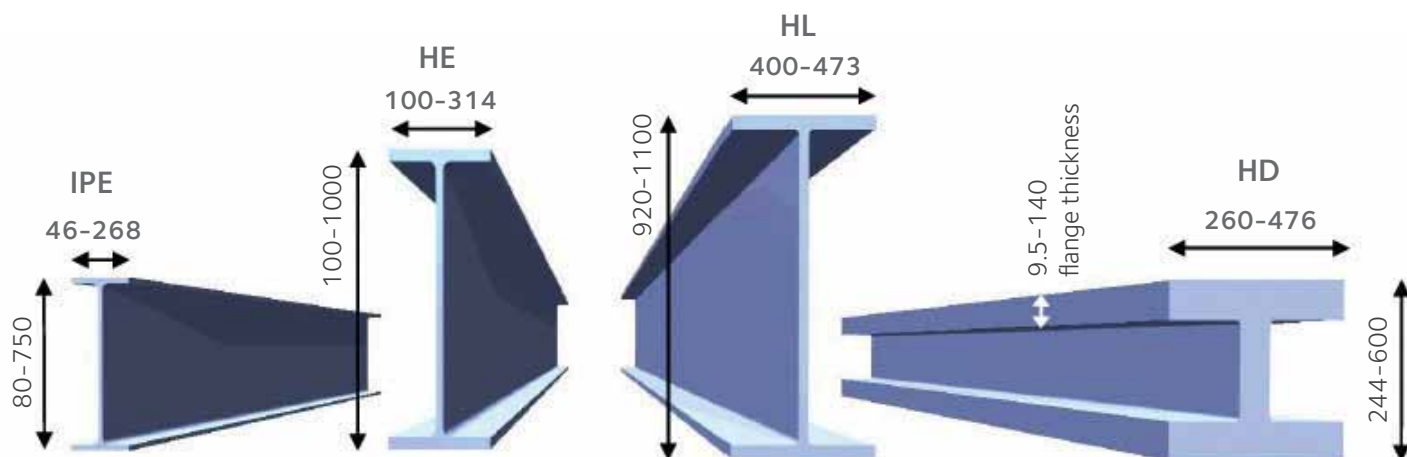
**Electric arc furnace**

ArcelorMittal Europe – Long Products is a top producer of long products like beams and steel sheet piles that provide innovative solutions to the construction industry.

## ArcelorMittal Commercial Sections

ArcelorMittal Commercial Sections is the operational unit of ArcelorMittal Europe – Long Products responsible for sales, marketing and development of sections and merchant bars.

ArcelorMittal provides free technical advice to assist designers in using its unique products and materials to their full potential. The technical advisory team is available to answer questions about structural shapes, merchant bars, design of structural elements, construction details, surface protection, fire safety and welding.



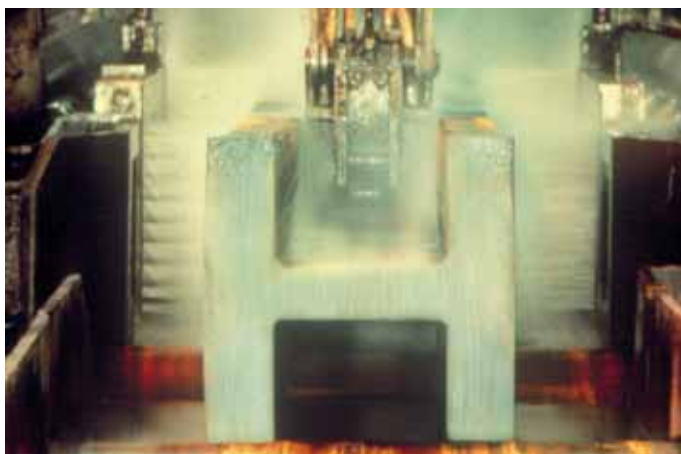
**ArcelorMittal offers the widest range of H beams – also available with fabrication**

### H structural shapes

The development of the modern rolled shapes is strictly linked to the history of the ArcelorMittal group, which is nowadays the uncontested leader in this segment concerning product range, requirements and volumes.

Our experience in the production of structural shapes is best represented by the history of our Grey mill at **ArcelorMittal Differdange**. Located in Luxembourg, this mill is home to several world firsts in the steel industry. In 1902, we rolled the first parallel wide flange shape and shortly after, in 1911, we produced the first steel section measuring 40 inches (one meter) in depth. This mill also introduced Tailor-Made beams (WTM) in 1979 – profiles that were praised by both structural engineers and fabricators as a cost effective alternative to built-up sections and concrete.

**Heavy Jumbo sections** and high performance steel grades from ArcelorMittal in Differdange have a worldwide reputation for use in high rise buildings and save up to 40% of material weight (and accordingly CO<sub>2</sub>).



**Rolling of a Jumbo section at Differdange mill, Luxembourg**



**Office Tower D2 in Paris, France,  
Outstanding example of steel framed high-rise building**

## Eurostructures Beam Finishing Centre: our mission

Our mission is summarized by these keywords: **excellence in customer service and partner development.**

Our facilities are conceived to offer complementary capabilities to yours. Our offer is linked to the products from our own plants in order to facilitate their use on the construction market. To be your partner of choice, we develop our finishing facilities in such a way to differentiate from the typical fabrication capabilities on the market. The service we offer in terms of technical advice, specialty products, tailor-made fabrication is the key to sustain long-term relationships with you.

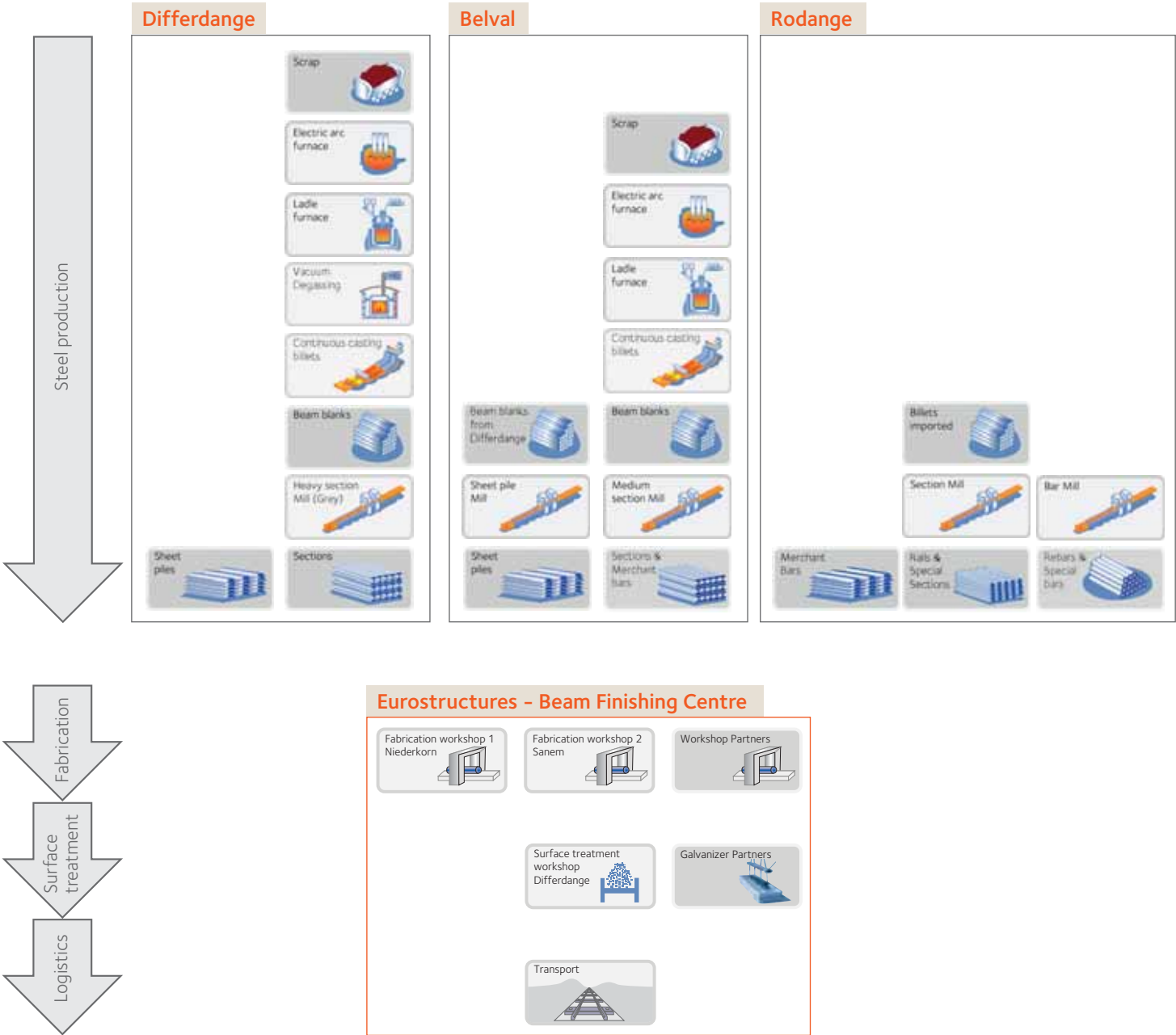
Eurostructures Beam Finishing Centre is engaged in developing the steel market sector and the implementation of new technical solutions. We are steel producers key partners through a strong alliance with the supply chain so as to create value for public and private investors.



Delivery of a 41.7 m fully finished heavy section of a bridge on the B6N express way in Bernburg, Germany



# Long Products production flow in Luxembourg



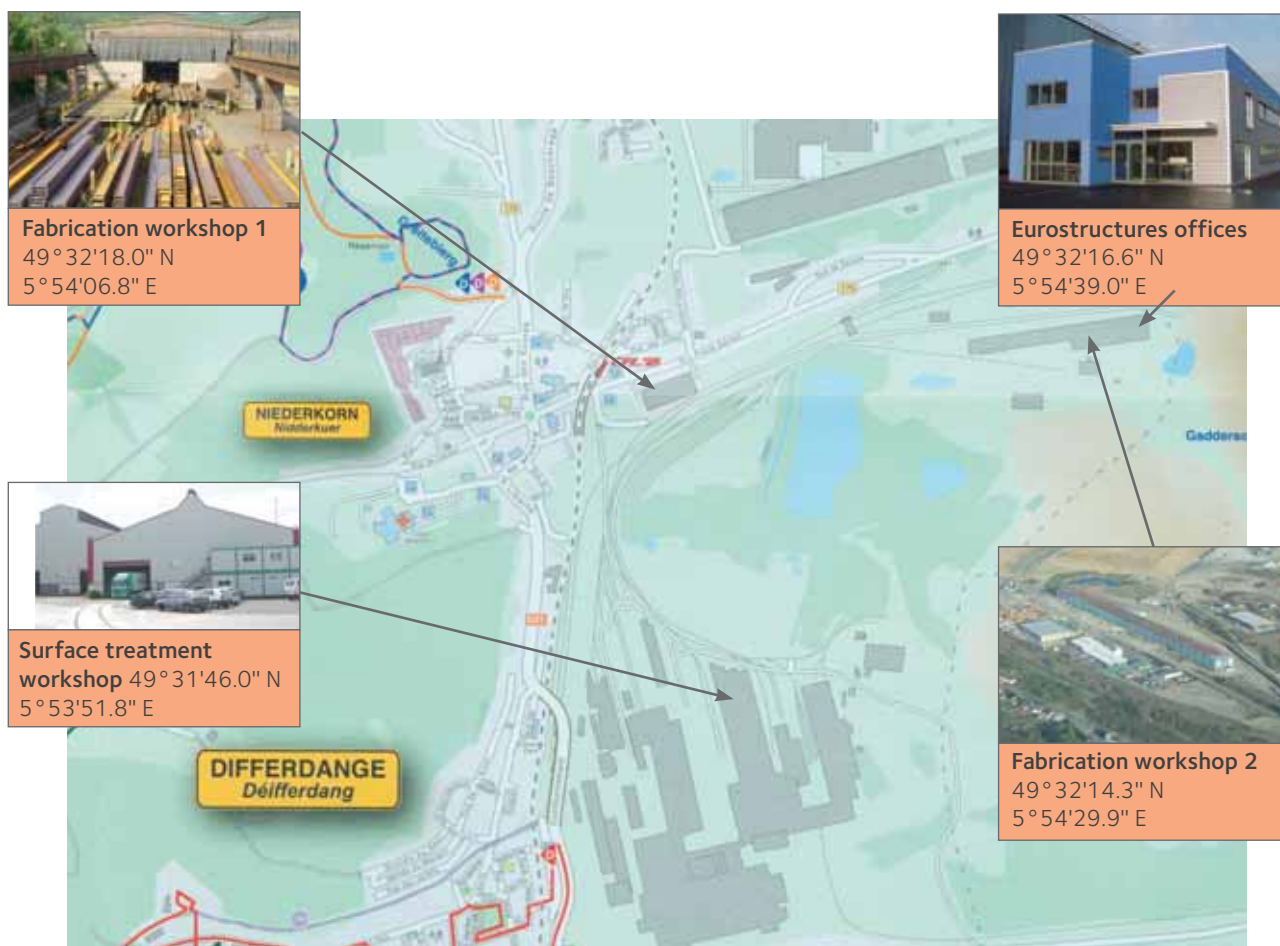
## 2. Our capacities

### Location

The facilities are located in Differdange with a dedicated access to the rolling mill, as well as to the ones of Belval and Rodange, located just 10 km away. Mills and workshops are connected by internal railways allowing cost optimisation and time reduction.

Some of the largest sections and merchant bars stocks in Europe are available in a few kilometres perimeter, providing additional possibilities in terms of reactivity. The location of our facilities is a strategic asset to meet your specific needs for construction projects.

The finishing capacities are about 4000 to 5000 tonnes/month depending on the type of fabrication.



## Our facilities



### Eurostructures Offices, Sanem

Office of management, technical sales agents and customer service



### Fabrication workshop 1, Niederkorn

dedicated to the finishing of bridges and special heavy structures;  
Internal surface: 4600 sqm; External surface: 7000 sqm



### Fabrication workshop 2, Sanem

dedicated to building applications and medium to heavy structures; Internal surface: 14000 sqm  
External surface: 5000 sqm



### Surface treatment workshop, Differdange

dedicated to painting of fabricated beams compliant with fabrication workshop capacity  
Internal surface: 24000 sqm

## Our partners

Beside our own workshops, we rely on a consolidated network of internal and external partners to meet your requirements on specific projects. We can work in cooperation with complementary facilities within the ArcelorMittal group or with independent partners in order to provide:

- fabrication workshop completing our capacity in terms of welding and assembling
- mechanical workshops for special pieces machining
- galvanization of structural steelwork



## Basic finishing

### Sawing

Cold sawing by circular blade with a diameter up to 1510 mm, adapted to the whole section range. Straight and bias cutting possible about both axis with reduced tolerances concerning length and angle.



### Bending

Bending belongs to the specialty of our workmanship. Whether it's for architectural or mechanical reasons, we are able to establish cambering according to circular, parabolic or curves determined by points and along both strong and weak axis.

With the availability of three own hydraulic press we have the possibility to cover the whole section range. The bending is done by cold forming, with a special attention to the mechanical requirements of the steel material.

The hydraulic press are also used to perform double straightening of the sections to ensure reduced tolerances than the ones provided through the rolling process, in order to meet stricter requirements for specific projects. We can bend all types of H sections with a maximum length of 40 m.

### Drilling

Automatic and manual drilling robots for thickness up to 140 mm and diameter up to 120 mm. Reduced tolerances concerning hole dimensions and positioning.



## Flame cutting

In our workshops we have various oxygen cutting as well as plasma cutting facilities, used in function of the type of required shapes and thickness.

Whereas oxygen cutting is used for thicknesses between 8 and 140 mm, plasma cutting is used between 5 and 25 mm.



### Flame cutting robot

Our flame cutting robot (oxygen + acetylene) able to operate around 6 axes, allows complex bevels for the joining of the beams. It is also used to fabricate T sections (flame cut into two beams along its axis, in symmetrical or asymmetrical shape) or to operate holes with large diameters. The robot can accommodate beams with a maximum length of 40 meters.



### Oxygen & Plasma cutting table

Four heads cutting machine (2 for oxygen cutting, 2 for plasma cutting) dedicated to perform cutting in the lying beams web. Typically used for castellated beams or other types of special web fabrication. It can accommodate beams with a maximum length of 32 meters.



# Welding



## Automatic Welding

An automatic submerged arc welding machine is available with 2x1000A generators. The machine can perform welding with speeds up to 60 cm / min and a deposit rate up to 12 kg / hour. Automatic seam tracking allows the adaptation to any kind of shapes. Weldable width is up to 2000 mm, the optimal horizontal run is up to 18000 mm, whereas extension may be studied case by case. It is dedicated to the fabrication of Slim floor beams, box girders or cross columns.



## Assembling and welding

Manual welding is used for the different elements associated with the finishing of the girders, such as stiffeners, additional flange plates, support plates, lifting hooks, header plates, support plates, T-plates...



## Stud Welding

Studs are elements to ensure the connection between the concrete slab and the steel girders to ensure the composite action between the two materials.



## Automatic fabrication line



### Fully automatic drilling-cutting-coping line

To increase our capacities, improve the quality and our flexibility to the customers' requests, we have installed an automatic line with following capacities:

- Profile length from 6 to 30m
- Profile weight up to 600 kg/m, max. 15 tonnes
- Profile depth from 150 to 1300 mm
- Cutting up to 45° depending on profile
- Drilling up to diameter 40 mm



### Milling and drilling

Max. length: 20m, 3 heads for drilling/milling  
 Drilling up to 40mm, diameters above via milling  
 Milling of beam ends, in-plane tolerances up to 0.3mm



### Plasma robot

Up to 30mm thickness, cutting, drilling and coping  
 of beam web and flanges

## Surface treatment

In order to protect the steel structures from aggressive environmental conditions, we are able to offer corrosion protection treatment of the steel surface. Coating systems for steel structures have developed over the years to comply with industrial environmental legislation and in response to demands from bridge and building owners for improved durability performance.

Beside corrosion protection, we can also offer the application of fire protection coating according to the latest technical standards. We are specialized in the application of complete painting systems according to ISO EN 12944, Acqpa certification, DB-TL, ZTV-Kor or eventually other specifications on request.



Automatic shot blasting to grades Sa 2.5 or Sa 3.0 and application of shopprimer



Automatic shopprimer application



Manual application of an organic layer



Manual metal spray zinc layer



Final coating



Hot dip galvanizing (offered in collaboration with long-term partners across Europe)



## Handling and special pre-assembly

### Fabrication workshop 1: Niederkorn

- max. tonnage: 25 t single crane capacity; 45 t combined
- max. length: 42 m (up to 60 m on special requirements)
- Internal surface: 4600 sqm
- External surface: 7000 sqm



### Fabrication workshop 2: Sanem

- max. tonnage: 30 t single crane capacity; 50 t combined
- max. length: 32 m (up to 42 m on special requirements)
- Internal surface: 14000 sqm
- External surface: 5000 sqm

### Special pre-assembly

For specific projects, we can study the pre-assembling of fabricated structure inside the workshop. This pre-assembling may be requested to verify the perfect match of the fabricated parts before the final assembly on the construction site. We have experience in this kind of pre-assemblies for bridges as well as for components of building structures.

### Surface treatment workshop: Differdange

- max. tonnage: 27 t
- max. length: 42 m
- Internal surface: 29000 sqm





## Shipping with external partners



© Claudio Piscitelli

### By truck

- up to 4 trucks per day from each single workshop; conventional and exceptional trucks
- up to 42 m length on special requirement
- up to 5.0 m width on special requirement



### By train

- daily train departures from Differdange mills to major destinations
- length per element: up to 40 m (max. 60m on special requirement)
- width per element: up to 2.4 m

### 3. Bridge applications

Eurostructures Beam Finishing Centre has developed since its beginnings an outstanding expertise in the finishing of bridge girders. Structural shapes are a traditional competitive technology used since over a century in the railway infrastructure for small and medium span bridges.

The development of high strength steel has enhanced the competitiveness of steel-concrete composite decks also for road-bridges, which are nowadays a widespread technology all over the world. We are also involved in the realization of small footbridges as overpasses for roads or rail infrastructures.



Multi-girders composite deck out of rolled sections, Soleuvre, Luxembourg

## Filler beam bridge decks

The filler beam bridge is a widespread technology, used in several countries (application: about 90% railway bridges, 10% road bridges). It consists of a concrete slab with longitudinal reinforcement made of rolled beams, with usual spans between 10 and 25 m. The filler beam bridges are in competition with pre-stressed concrete bridges, but they offer many advantages against concrete solutions, as:

- The simple method of construction, which opens the tender to a large number of companies.
- The thickness of the deck is the most thin amongst all deck typologies. Generally HEA, HEB or HEM sections are used on this purpose.

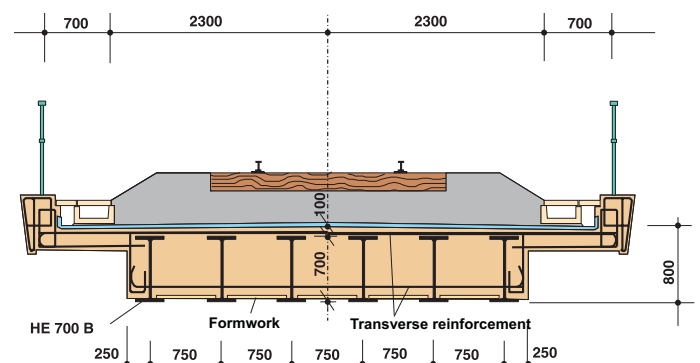
The filler beams deck is composed of closely spaced longitudinal beams. Welding on the site construction is usually not needed; the corrosion protection is not necessary except for the bottom flange. The erection at the construction site is quick and without any major difficulties.

The finishing work capacities for filler beams include the bending along both the strong and weak axis, the drilling of the beam web to allow the transversal reinforcement to pass through, and the corrosion protection of bottom flanges.

In addition to this, the accessory parts (support plates, stabilizing devices, etc...) are delivered to complete the offer for the constructional steelwork.



Filler beam deck for A4 access in Esch-sur-Alzette, Luxembourg



Typical cross section of a railway bridge



Eiweiler Viadukt, Saarland, Germany



## Downstand double-T sections composite bridge decks

The composite bridge is a concrete slab based on steel structure where the girders may be realized out of rolled sections. In the Eurostructures Beam Finishing Centre, we perform the rolled sections finishing works for the bridge girder, with high performance and efficiency, providing the shortest delivery time.

This type of deck is mainly used for road bridges, in which the span length is between 15 and 45 m. It offers many advantages versus concrete solutions:

- their supports are smaller, so less intrusive in the landscape
- deck steelwork can be pull back or cut up into “easily” moved sections and its steel can be recycled
- their deck slabs are not thick and therefore lightweight



**Choisy bridge, Villeneuve-Saint-Georges, France**

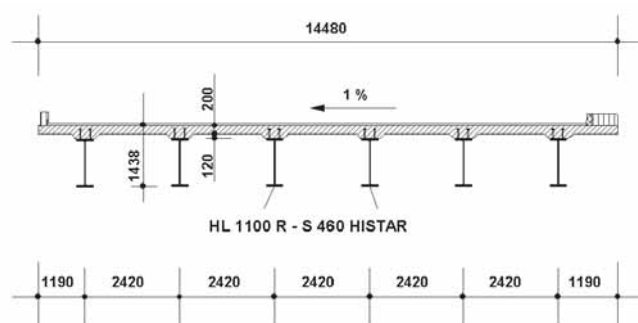
Depending on the span bridge width ratio, twin girder or multi-girder decks may be chosen. To ensure structures stability, we may provide associated elements such as cross beams or bracing for the construction in the final phase.



**WD7 and WD8 viaducts, Gdansk, Poland**

Those elements need accurate work to be assembled together, and this may under given circumstances require a pre-assembling study before erection.

Shear studs connectors are used to connect the steel structure to the concrete slab. They are welded in the workshop to the main girders.



**Typical cross-section of a road bridge**

## Half-through bridge decks



Overpass on A3 in Bettembourg, Luxembourg

Half-through decks are composed by two lateral main girders, with closely spaced cross girders connecting the lower chords. Cross beams are supporting the deck, which may be used for railway, roadway or footpath. Usually the concrete deck is designed to work compositely with the steelwork. For footbridges the deck can be with precast concrete plates or with wooden boards fixed on the steel structure.

Eurostructures Beam Finishing Centre offers the fabrication of main girders as well as of cross girders out of rolled sections.

Main and cross girders assembling are done on the construction site by an external contractor.

In case of major bridges (e.g. span >25m), side main girders are done out of plated girders. In this case, Eurostructures delivers cross beams to a major steel contractor, offering cambering, painting and end preparation with delivery to the construction site.



Half-through bridge deck in Dudelange, Luxembourg



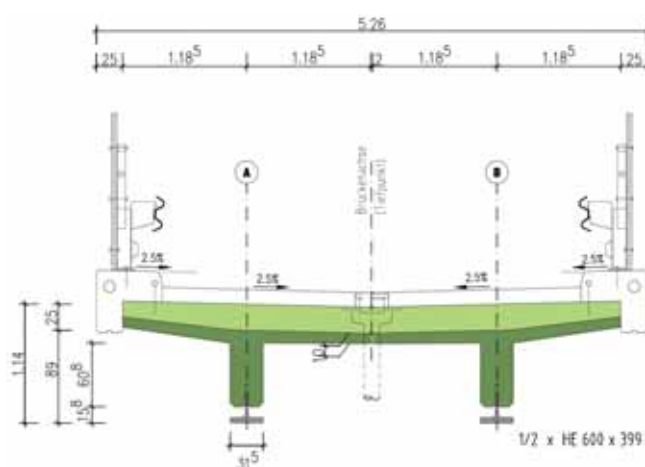
Footbridge in Steinheim, Luxembourg

## Precobeam girder bridge decks

Precobeam – Prefabricated Composite Beam – is an innovative concept developed in various research projects over the past decade, entering now in the European construction practice.

A high-strength rolled H sections is cut into two T-sections. The T-sections are used as external reinforcement in prefabricated concrete girders. The cutting is performed in a special engineered way to ensure the steel concrete connection thanks to its special shape.

Precobeam is a technical innovation for short-span bridges making steel-reinforced concrete a very economical solution.



Typical cross section of a road bridge



Overpass on ÖBB line, Kratzerau, Austria

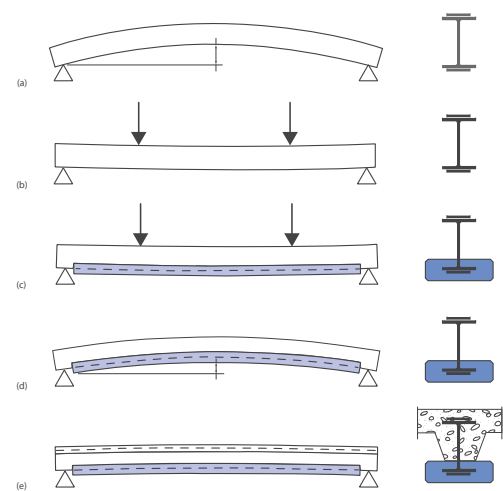


# Prestressed steel girder bridge decks

The principle of this technology is the following:

- fabricate an H rolled sections with a special curvature shape
- prestress the steel girder by mechanical bending
- encase the steel girder in a concrete prefabricated flange or slab
- release the prestressing reinforced steel girder, which acts compositely with the reinforce concrete and put it under compression
- associate the elements together to realize the whole piece through whole deck concreting

For special project requirements, prestressed steel girder bridges turn out to be the best adapted solution. We are able to offer fabricated steel girders and technical advices.



**Schematic principle of Preflex girder**



**Preflex girder for bridge in Kerpen Horren, Germany**

## 4. Building applications



**Mistral Residential Tower, Izmir, Turkey**

Eurostructures Beam Finishing Centre provides steel structures for various building's constructions. Whether it's heavy, medium or small sections, our workshops are able to offer a wide range of finishing works to comply with your requirements and provide additional services to the standard product.

The fabricated products are used for structures used in single and multi-storey buildings, skyscrapers, towers, car parks or industrial halls. The advantages of prefabrication in steel buildings give a shortened construction time and lower impact in cost and environment.

Beside traditional structural systems, we are keen to propose innovative solutions such as ACB®, Angelina® castellated beams or Slim Floor beams for smart floor solutions. We fabricate heavy columns in special steel grades (such as HISTAR®) used in tall buildings all over the world.



**Conference Centre, Kirchberg, Luxembourg**



**Parc des Sports, Oberkorn, Luxembourg**

## ACB® Cellular Beams

The use of cellular beams allows new forms of architectural expression. Structures are lightened and spans increased, pulling spaces together. This flexibility goes together with the functionality of allowing technical installations (pipes and ducts) to pass through the openings. The lightweight appearance of cellular beams, combined with their high strength, never ceases to inspire architects to new structural shapes.

### Finishing

- oxygen or plasma flame cutting of the shape
- cambering of the cellular beams
- assembling and welding
- welding of shear studs connectors for composite constructions
- openings filling to allow assembly joints
- surface treatment – corrosion and / or fire protection



Sede di Air Vergiale, Sesto Calende, Italy



## Angelina® beams

Angelina® beam is the realization of an architectural dream: A castellated beam with smooth and elegant shape of web openings which can be tailored-made.

The sinusoidal shape of the opening optimizes furthermore the load bearing resistance of the beams in respect to the Vierendeel effect, and allows fabrication cost reduction.

### Finishing

- flame cutting of the shape by oxygen or plasma
- cambering of the Angelina® beams
- assembling and welding
- welding of shear studs connectors for composite constructions
- filling of the openings to allow assembly joints
- surface treatment – corrosion and / or fire protection



P. de Coubertin gymnasium, Bourges, France

## Slim Floor beams

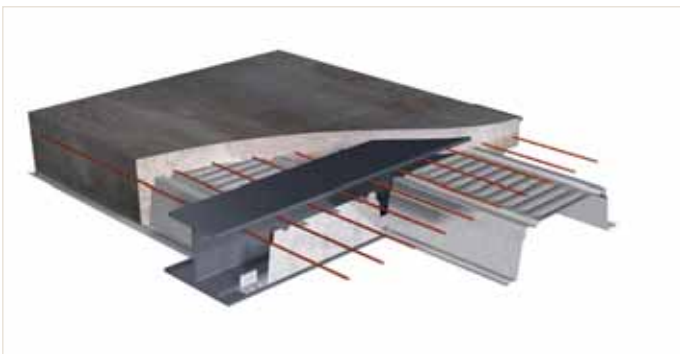


Pétrusse building, Luxembourg

Further developed by the ArcelorMittal group, the composite “Slim Floor” concept is a fast, innovative and economical solution which combines concrete or composite slabs with built-in steel beams.

The design specificity lies in a special kind of girder whose lower flange is wider than the upper flange.

This arrangement allows fitting the floor slabs directly onto the lower beam flange.



### Finishing

- cambering of the beams
- drilling of the web of the beams fitted to allow passage of reinforcement bars
- assembling and welding of lower plate
- if required, welding of stud shear connectors



CHL Eich, Luxembourg

## Chamfering and heavy beam preparation

High-strength steel is the material of choice for tall buildings all around the world. Heavy H-rolled sections are mainly used for the columns bearing gravity loads, as well as for the outrigger systems for the wind and earthquake loads. The use of high-strength steel allows structural frames optimization and consequently cost reduction.

In combination with our heavy Jumbo profiles, we offer some finishing possibilities for the heavy elements in order to optimize the cooperation with the steel contractor.

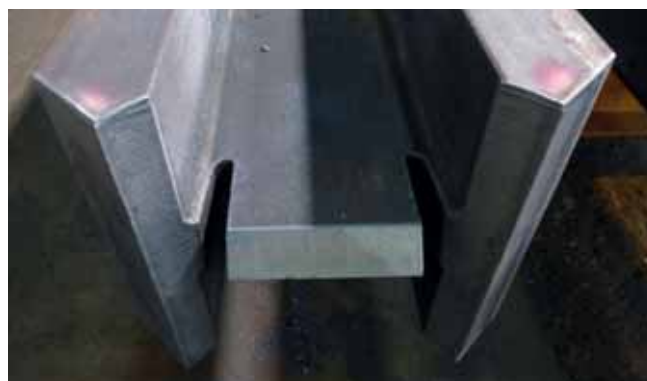
Heavy beams are often straightened up after rolling to achieve stricter tolerances than the rolling standard. We are equipped with oxygen-cutting and milling machines able to work on the whole thickness range. Furthermore, we can also offer heavy columns assembling in cross-shape or with cover plates to increase the load bearing capacity.

### Finishing

- beam double straightening to minimal tolerances
- cut-to exact length
- drilling and hole preparation in any thickness range
- oxycutting for the weld preparation
- beam end preparation for special connection details (e.g. outrigger truss systems)
- assembling in form of cross or cover plate sections

### Milling

Our customers' are interested in operating heavy beams milling at customized shapes.





# Trusses



**Truss structure for the runway crane in Belval still mill, Luxembourg**

A truss is an assembly of steel members that are connected at their ends. Trusses are used since the beginning of the steel construction until our days for buildings, bridges and special structures. The principle of trusses consists of external forces acting on the nodes and resulting in forces on the tensile or compressive members.

## Finishing

- flame cutting of the structural shape by oxygen or plasma
- drilling in the web / flanges of the beams to prepare for bolted connections
- alternatively, beam end preparation
- welding of gusset plates to ensure the connection of the truss members
- eventually pre-assembly in workshop to verify the geometric consistency of the elements
- surface treatment



## Industrial halls & runway beams

Single storey buildings are often steel framed structures with metallic cladding. Large open spaces can be created, easy to maintain and flexible for future adaptation. The important load bearing capacity is an asset for installing powerful cranes for heavy pieces handling inside the hall.

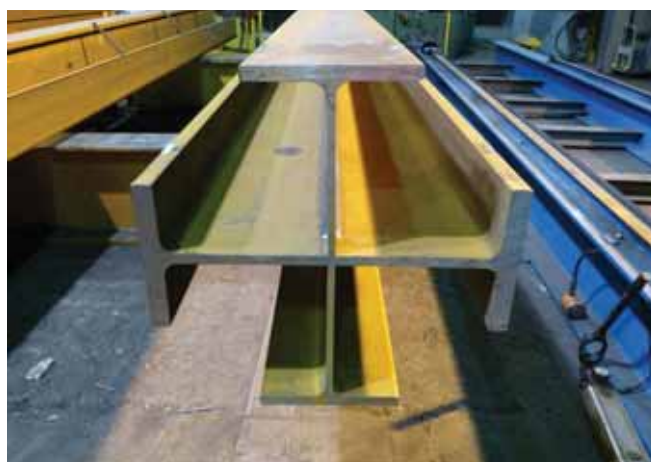
### Runway beams for industrial cranes

The use of hot rolled sections as runway beams is well established in the construction practice. With time, fatigue loads on runway beams are due to cranes running on them, increasing pressure on tiny welded parts. Rolled sections offer the possibility to avoid some of the critical design details, enhancing the fatigue resistance of the structure.

Over the last years, Eurostructures Beam Finishing Centre made relevant projects with special developed sections such as HD sections with welded plates in form of double T hot-rolled sections with a hut in form of a U shape. In both cases the design choice is linked with the avoidance of having sensible fatigue details below the crane ways rail, as well as ensuring relevant weak axis inertia of the upper flange.

### Finishing

- full fabrication of columns, roof girders and corner frames
- Angelina® and ACB® which are an economic option for large spans
- surface treatment – corrosion and / or fire protection



# Composite structures for car parks

In the construction of multi-storey car parks, economical and optimisation approaches prevail.

Steel construction makes it possible to:

- reduce construction cost
- optimize car park occupation
- improve return on investment by gaining floor area

The design of the façade is used by the architect to make the building fit perfectly in the urban landscape. The use of oblique strips, inclined panels, glazed or perforated units etc. help to break the simplicity of prefabricated buildings.

## Finishing

- cutting to exact length
- cambering along strong axis
- drilling on the web and flanges of beams to ensure connections
- assembling and welding of connections plates
- welding of shear studs connectors
- Angelina® and ACB® are an interesting alternative to full web beams
- corrosion protection, often realized by hot-dip galvanizing



Odysseum circe car park in Montpellier, France



Enovos car park in Esch-sur-Alzette, Luxembourg



Géric car park in Thionville, France



## 5. Foundation applications



In the frame of geotechnical structures, we are mainly active for the finishing of H-sections for three different applications:

### H-pile structures

The steel sections are driven directly into the soil. The pile head is prepared to ensure a better driveability and penetration capacity. The loads are transmitted from the steel sections directly to the soil.

### Encased profile composite piles

A steel section is handled in a pre-excavated hole, which is afterwards filled with reinforced concrete. Such composite pile sections allow for very high load-bearing capacity. The loads applied on the head of the steel column are transmitted to the reinforced concrete which is in direct contact with the soil.

### Soldier pile / Berliner retaining wall

Consisting of wooden or concrete shield elements lying on vertical H-profiles vibro-driven in the soil, the load is transferred by the steel section directly into the soil.

### Finishing

- cut-to exact length and splice preparation
- drillings and eventual shear stud application
- assembling of beams into couples in the case of heavy king piles
- pile end preparation for improving driveability / penetration / load-bearing capacity



## 6. Sustainable development challenges

We are convinced that steel will provide solutions to build a greener future. As a world leader in steel, we thus have a key role to play and Luxembourg, with its cutting-edge products and facilities, is at the heart of this action.

### Hot-rolled steel: Eco-friendly material and solutions

Thanks to its ability to recover the original properties without loss of quality after melting makes steel the most recycled material in the world. In the built environment, 99% of the hot-rolled steel sections can be re-used or recycled at their end of life. Being flexible and adaptable, the functional life of steel sections can be extended in refurbished and new constructions. As 100% of the recovered scrap will be used as a raw material in the steel industry and thus provides between 65% and 95% energy savings compared to primary production, recycling process contributes to resources savings and a better environment.



ArcelorMittal has developed solutions which fulfil most of sustainable aspects needed by rating systems or by assessment of sustainable performance of buildings. The 5 common sustainable goals:

### Environmental aspects of sustainability

The purpose of the environmental performance of buildings or products constituting the building is to get a quantitative evaluation of the different environmental impacts generated during the whole life cycle.

### Economical aspects of sustainability

Hot-rolled sections are industrially produced to a high quality, in a full range of sizes and steel grades, including HISTAR®.

### Socio-cultural aspects of sustainability

Steel sections provide the user with transparent and lean structures combined with robustness and safety.

### Technical aspects of sustainability

Structures made of rolled beams have the advantage of being able to resist high level utilization.

### Functional aspects of sustainability

Among ArcelorMittal sustainable solutions, HISTAR® grades allow, to reduce weight and material cost and thus CO<sub>2</sub> emissions of about 30% in steel columns and about 20 % in beams. Large span composite flooring systems including slim-floor beams or castellated beams like ACB® and Angelina® beams achieve also drastic impact reduction up to 50%.

## 7. Structural design softwares

ArcelorMittal offers free software and technical documents to support design and the conception of steel structures. These tools can be downloaded at: [sections.arcelormittal.com](https://sections.arcelormittal.com). For specific questions please send your email at [sections.tecom@arcelormittal.com](mailto:sections.tecom@arcelormittal.com)

### Cost Estimation

**ACE** – Cost Estimator for steel structure (single storey industrial buildings and multistorey commercial and residential buildings)

### Steel solutions

**PORTAL+** – Pre-design of single span portal frame

**A3C** – Verification of steel members in bending and axial compression

**ABC** – Composite beam/steel beam Calculator

**ACoP** – Connexion Design

### Composite solutions

**A3C** – Verification of steel members in bending and axial compression

**CoSFB** – ArcelorMittal Composite Slim-Floor Beams – Calculation of composite integrated beams (SFB, IFB) in cold condition

**ABC** – Composite beam/steel beam Calculator

**COP2** – Design of composite connexions

**ACP** – Construction phase for composite beam. Check lateral torsional buckling during construction

### Castellated beams solutions

**ACB+** – cellular beams to optimize spans and usable ceiling height

**Angelina** – facilitate design of Angelina beams with sinusoidal opening

### Sustainability

**AMECO** – life cycle assessment of building structures and composite bridges

### Bridges

**ACOBRI** – Predesign of composite bridges for roads, rails and pedestrians

### Fire

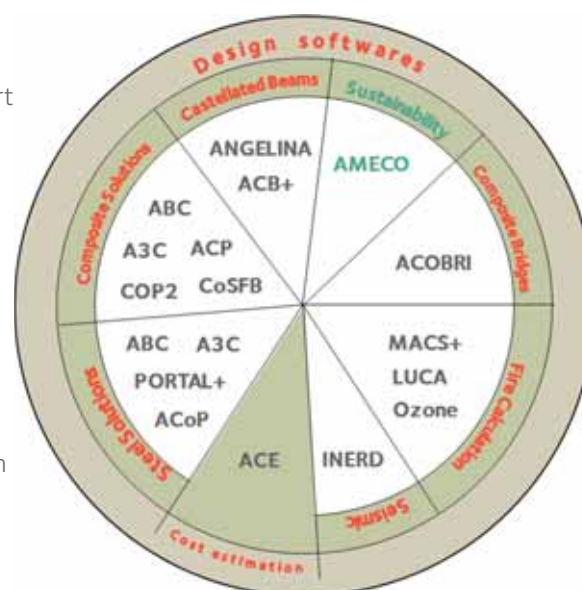
**Ozone** – Gas temperature in the event of fire and corresponding steel temperature

**Luca** – Design guide for industrial hall in fire condition

**MACS+** – Partially protected composite slabs at elevated temperatures

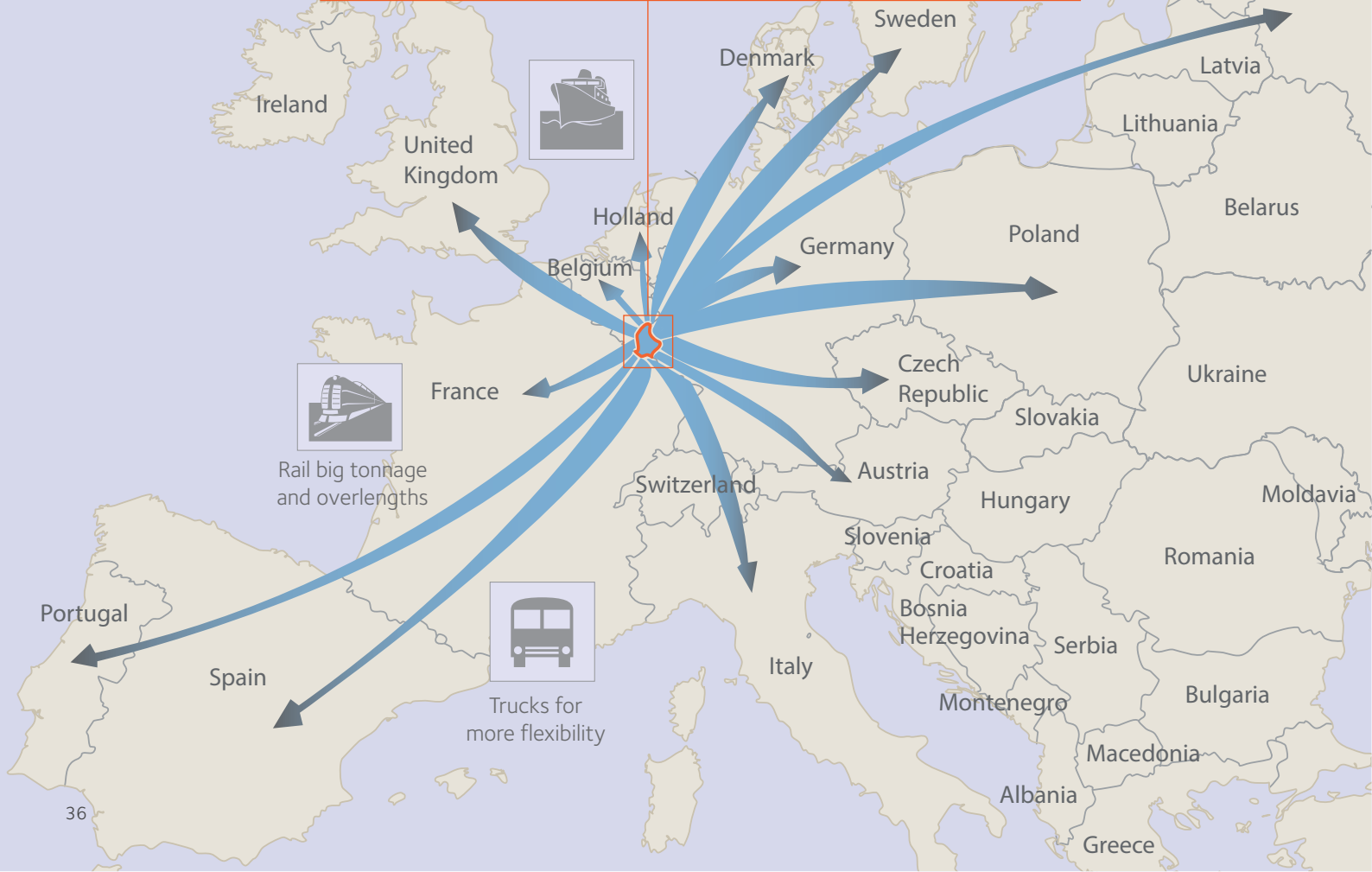
### Seismic

**INERD** – Reinforce concrete column with encased steel profile to avoid soft storey failure





# An extended gateway for our customers



## 8. Logistics

### Logistic hub Luxembourg

Luxembourg's central location in Western Europe makes it a perfect hub for regional, European and Worldwide exportation for all types of goods. Located at the junction of the major European road and rail networks, Luxembourg provides the perfect access to the European market.

ArcelorMittal offers a complete and professional service such as handling, transshipment, storage and loading of containers. An important number of qualified players (i.e. handling agents, forwarding agents and logistics services providers) provide quality service allowing just-in-time access to all European countries.

Our logistic partners operate daily railway and multimodal connections to the ports of the North Sea making Luxembourg also a hinterland port of Antwerp, Zeebrugge, Amsterdam, Rotterdam and Hamburg.

Inland navigation constitutes a further reliable and safe transportation mode. Luxembourg has a river port on the Mosel (port of Merttert), which is connected to the Rhine and can be used for materials dispatching to other inland and North Sea destinations.

### Supply chain

The scale of ArcelorMittal's supply chain means we can make a significant contribution to raising social and environmental standards. As a major buyer of goods and services, ArcelorMittal plays a significant role in local economies.

We firmly believe that our long-term growth is linked directly to our wider commitment to the communities in which we operate, our employees and the environment. As the leader in all major global steel markets around the world, with an industrial presence in 19 countries spanning four continents, we are convinced that steel will provide solutions to build a greener future.

### Production process control for on-time delivery

We aim to provide a service, based on predefined deadlines and deliver the product to the customer in the best conditions. A preliminary analysis can be carried out by experts for each specific need. Whether for the delivery of extra-long beams by rail or truck, shipping of full-finished steelwork to exotic locations, multimodal transport or "just in time" delivery on site, our experience will be at your service.

### Conventional and oversize road transport

With our central location at the heart of Europe, on the cross-roads of the North-South and East-West transport axes, our partners operate trains across all borders in cooperation with the subsidiaries in Denmark, Germany, France and Sweden, as well as with external partners.

- up to 4 trucks per day from each single workshop; conventional and exceptional trucks
- up to 42m length and 5.0m width on very special requirement



### Conventional and oversize rail transport

In close collaboration with our partners we continuously develop our know-how in oversize load transportation and loading techniques, in order to execute all special transports. Rail has a competitive advantage over the road in the area of oversize transports. Indeed, rail freight can more easily accommodate special needs of these extraordinary transports because of lesser restrictions and higher speeds, thus saving you a considerable amount of time and money. In addition, we offer shunting services at the Bettembourg marshalling yard and regional feeder services.

The handling depends on your needs: Full trains and block trains, as well as single wagon load. Thanks to our multilingual staff, multi-system locomotives and fleet of rail freight wagons, we are able to efficiently coordinate cross-border transports throughout Europe. Examples of extra-long products transported by rail include ultra-long steel beams (up to 60 m):

- daily train departures from Differdange mills to major destinations
- length per element: up to 40m (max. 60m on very special requirement)
- width per element: up to 2.4m



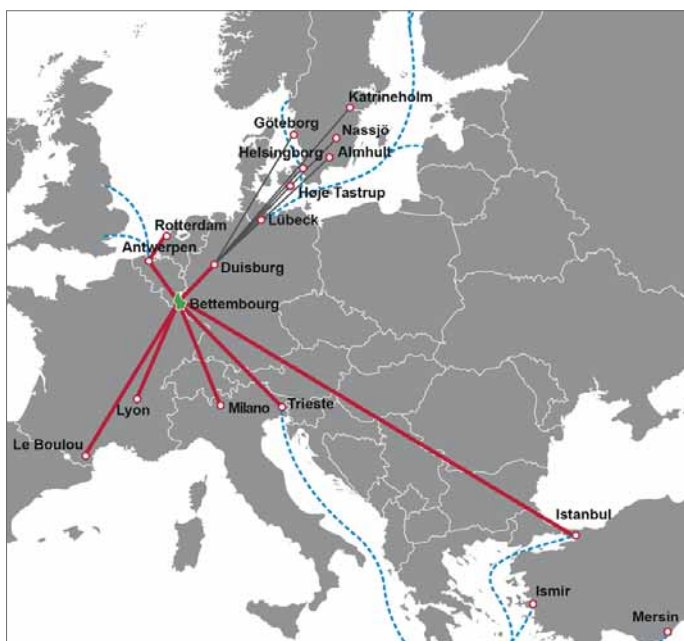


### Maritime shipping

ArcelorMittal's shipping and logistics team assists our steel operations with flexible and competitive transportation solutions. Our shipping and logistics team is an integral part of our supply chain and strives constantly to deliver value through competitive shipping solutions and excellent customer service.

We have an innovative approach to fulfill ArcelorMittal's freight needs, not just providing freight and cargo services for our customers but also offering legal and contractual knowledge of the maritime industry, port and cargo handling expertise, and making sure the supply chain from sea to land is as efficient as possible.

We operate our own fleet of ships, leased ships, time charter, contracts and spot fixtures to transport finished products to our customers. Our ships range from very large dry bulk carriers with a capacity of more than 200,000 tonnes to smaller ships of 5,000 tonnes. Safety is the number one priority at ArcelorMittal ensuring our products are transported safely, whether it is done by external companies or us.



### Multi-modal combined transport

Our partner continuously adds new destinations for combined transport shuttles to offer our customers a constantly developing network of combined transport relations.

Our ideal location at the crossroads of the North-South and East-West rail freight axes, as well as the highway networks, enables us to reach the ports of the North Sea, the Baltic Sea and Southern Europe, as well as the main European industrial centres.

The development of combined transport, i.e. transferring containers, swap bodies and semi-trailers from the road to rail, is one of our main focus areas because of its positive impact on the environment.

Currently, we offer connections to/from the following countries:

**Luxembourg:** Bettembourg; **Belgium:** Antwerpen; **Denmark:** Hoje Taastrup; **France:** Lyon, Le Boulou; **Germany:** Lübeck – continuing to Scandinavia; **Italy:** Trieste – continuing to Turkey via ship; **Spain:** Le Boulou – at the border between France and Spain; **Sweden:** Almhult, Göteborg, Helsingborg, Katrineholm, Näsäjo.

# Experience a global service



Canada



USA



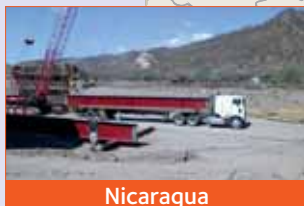
Panama



Guyana



Morocco



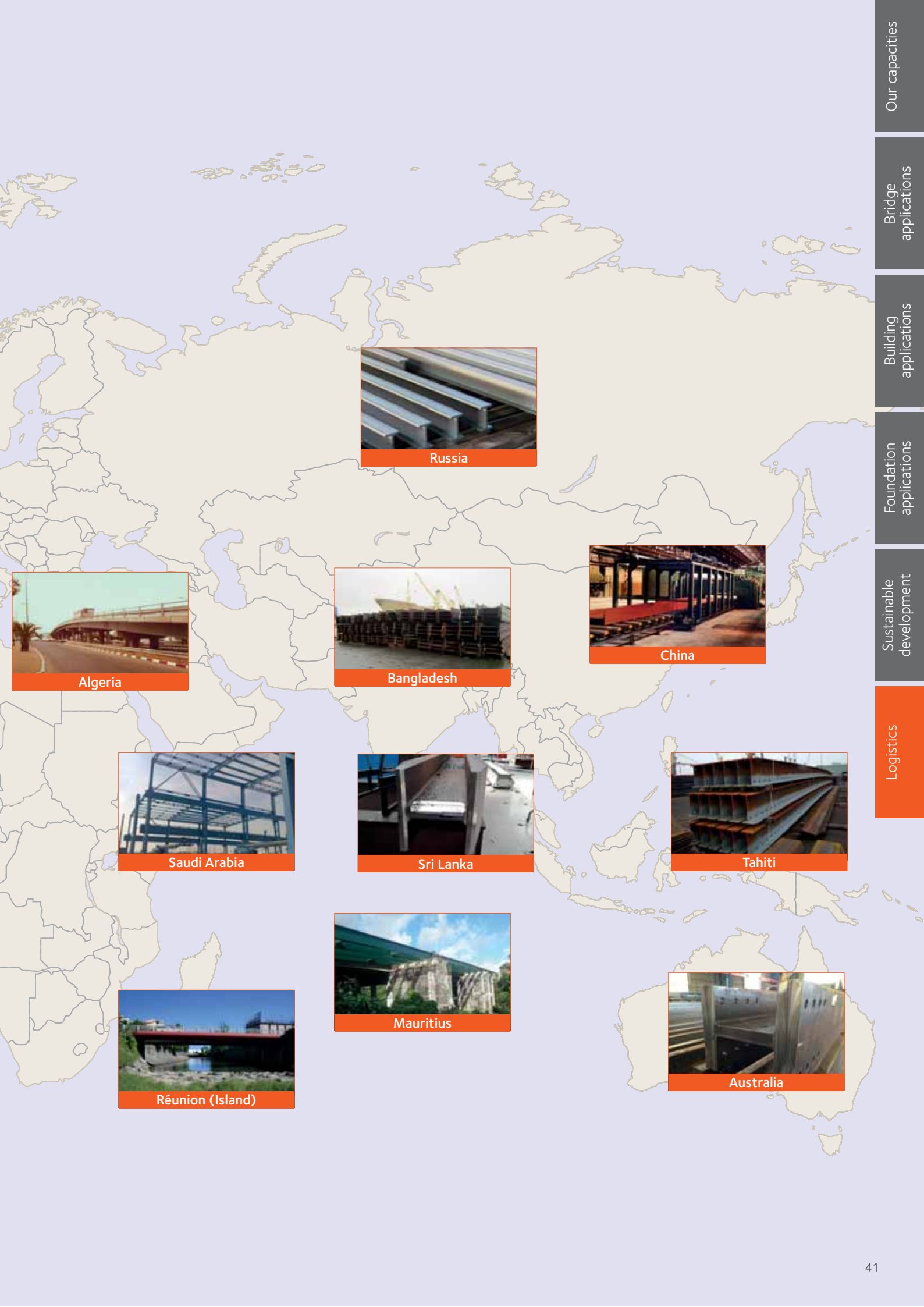
Nicaragua



Argentina



Senegal



Our capacities

Bridge applications

Building applications

Foundation applications

Sustainable development

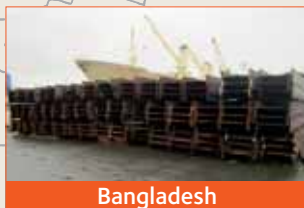
Logistics



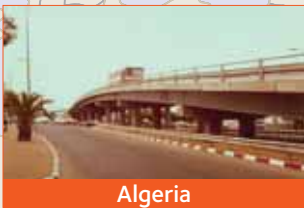
Russia



China



Bangladesh



Algeria



Saudi Arabia



Sri Lanka



Tahiti



Mauritius



Réunion (Island)



Australia



## 9. Quality and certifications

Quality is a priority in our daily work and we ensure high quality standards for our products are respected with a complete traceability from the mill to the final destination.

The teams in our workshops are regularly trained and evaluated. This ensures performance in manual finishing works, implementing state-of-the-art techniques. Flexibility and commitment are some of the pillars of our Human Resources development philosophy.

### **Certification:**

EN 1090 – Execution class 4 (EXC4) – Mark CE / CPR  
ISO 9001:2008  
ISO 14001:2004  
BS OHSAS 18001:2007  
DB Q1 (Differdange-Mill)  
DB : Finishing according to DBS 918005  
Accreditation of the Polish Ministry of Transport  
for the construction of bridges Nr 56/10  
BES 6 001: Responsible sourcing

### **Certification for welding works:**

DIN ISO 15614-1 and DVS 1702

### **Controls:**

Ultrasonic testing level 2 according EN10306  
Magnetic control level 2 according EN A7.638  
Penetrant control Level 2 according EN 571-1

### **Surface treatment:**

According to EN ISO 12944  
German railways: TL 918300  
German road authorities (BAST) : “ZTV-ING”  
French certification body : “ACQPA”  
French railways: “Livret 2.59”  
Italian railways: “RFI”  
Austrian authorities: “RVS 15.05.11”  
French road authorities “Fascicule 56”



**Non destructive testing on welded details**

## 10. How to find us

To reach us under normal driving conditions, it takes you about 10 minutes from Esch/Alzette and about 25 minutes from Luxembourg city.

Whilst driving on the highway A13 from Esch/Alzette to Differdange, please take exit #3. Cross the highway bridge and turn right, some sign boards will give you further guidance.

### ArcelorMittal Europe - Long Products

Eurostructures Beam Finishing Centre  
Z.I. Gadderscheier  
L-4984 Sanem

[sections.arcelormittal.com](https://sections.arcelormittal.com) > Products & Services > Beam finishing  
M.: [cs.eurostructures@arcelormittal.com](mailto:cs.eurostructures@arcelormittal.com)  
T.: +352 5313 3057



## Technical Advisory Department

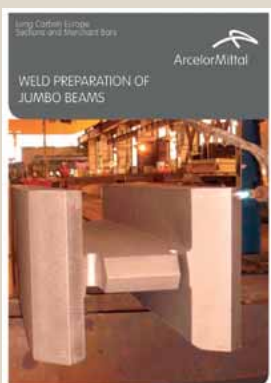
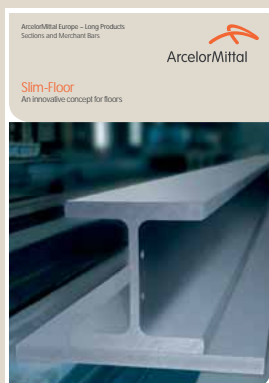
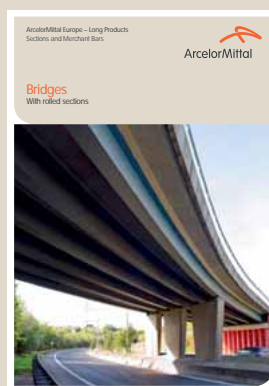
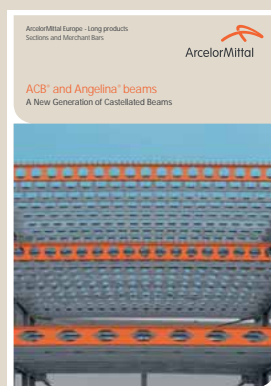
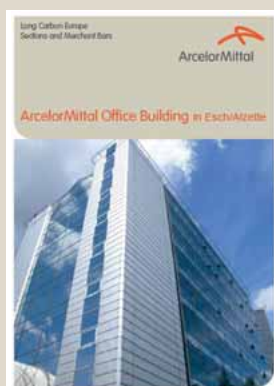
### Sections & Merchant Bars

66, rue de Luxembourg  
4221 Esch-sur-Alzette  
LUXEMBOURG

T: +352 5313 3010

M: [sections.tecom@arcelormittal.com](mailto:sections.tecom@arcelormittal.com)

[sections.arcelormittal.com](http://sections.arcelormittal.com)



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Your partner