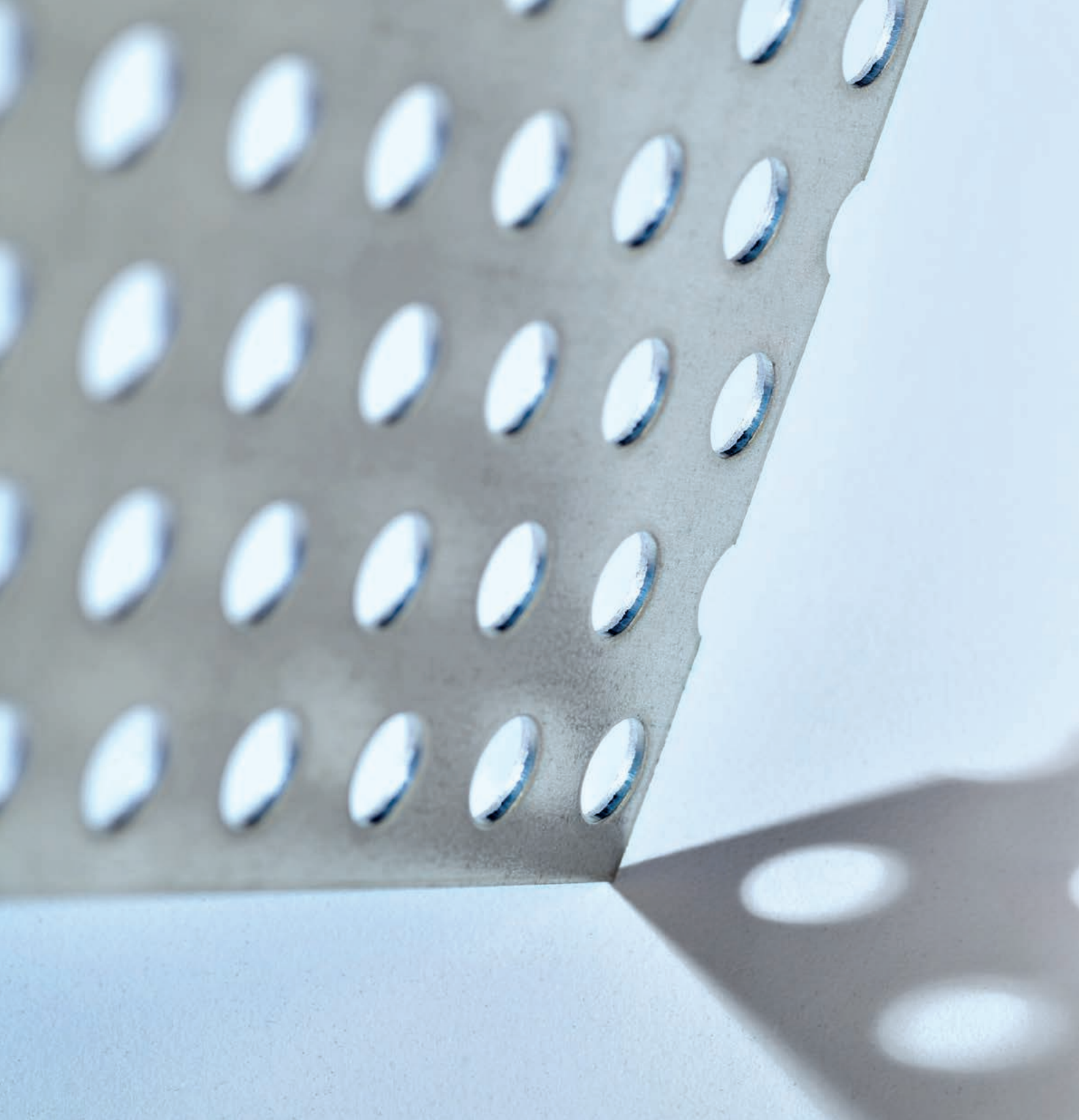




ArcelorMittal

Magnelis[®]
Think strategy





Magnelis®
Think strategy



Magnelis®

Think strategy

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Main advantages

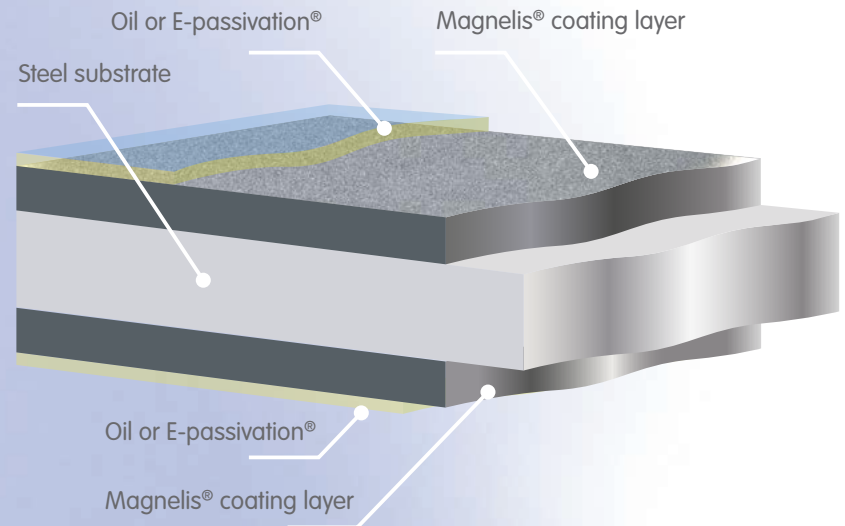
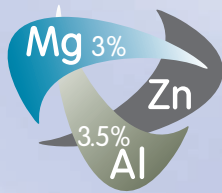
- Excellent corrosion resistance: three times better than galvanised steel (based on outdoor tests)
- Self-healing effect ensures excellent edge protection
- Best and most cost-effective alternative to post-galvanised steels
- Wide feasibility range
- Excellent processing properties
- Environmentally friendly

What is Magnelis®?

Magnelis® is an exceptional metallic coating which provides a breakthrough in corrosion protection. Magnelis® is also the best choice for a wide variety of applications.

Thanks to its unique composition, Magnelis® provides an unprecedented level of surface and cut-edge protection, even in the most hostile environments.

Magnelis® is produced on a classic hot dip galvanising line, but the molten bath has a unique chemical composition including zinc, 3.5% aluminium, and 3% magnesium.



*Magnelis® has a naturally dark grey aspect.
It is available with an environmentally friendly
E-passivation® or it can be oiled on request.*

Magnelis®
provides outstanding
corrosion resistance,
even in harsh
environments

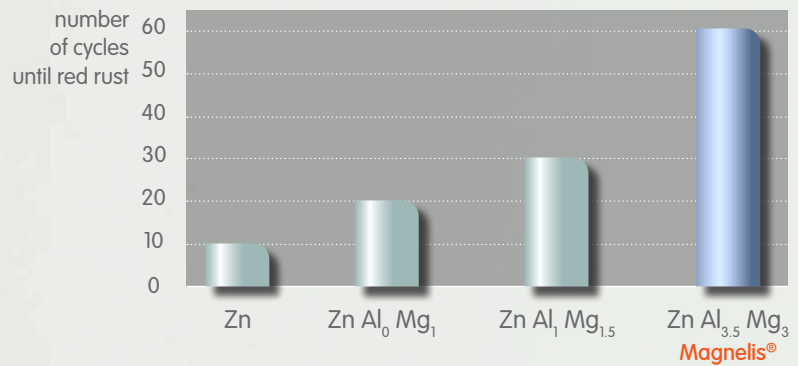


Outstanding corrosion performance

Magnelis® resists corrosion for longer than standard galvanised products and it outperforms coatings containing less magnesium.

The specific composition of Magnelis® (3% Mg and 3.5% Al) is crucial as it leads to a stable and durable layer across the entire surface and edges of the steel. This provides more effective corrosion protection than coatings with a lower magnesium content.

Corrosion resistance in cyclic test for different Zn, Al, Mg compositions



10 µm of coating submitted for an alternated cycling of 8 hours fog cycle (5% NaCl) / dry cycle / humidity cycle
Source: ArcelorMittal R&D



Magnelis® offers
deformed surfaces
extra protection

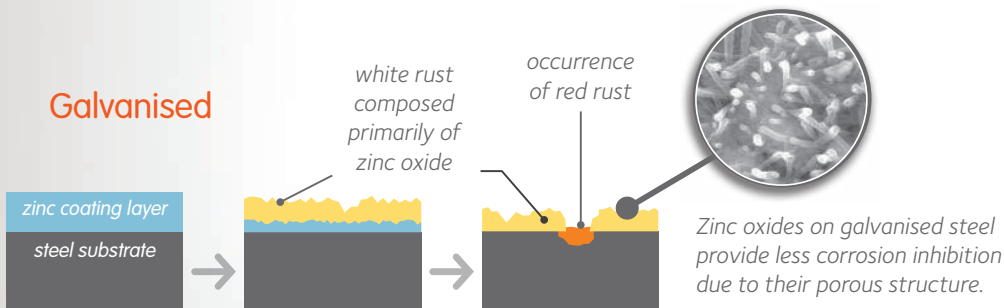
Corrosion protection mechanism

The specific composition of Magnelis® (3% Mg and 3.5% Al) is crucial as it leads to the formation of a very dense, stable, and durable layer of protection. The compact layer of Magnelis® acts as a barrier to corrosion, preventing the underlying steel from coming into contact with the ambient environment. The result is highly effective corrosion protection, even in the harshest environments.

Best protection for deformed areas

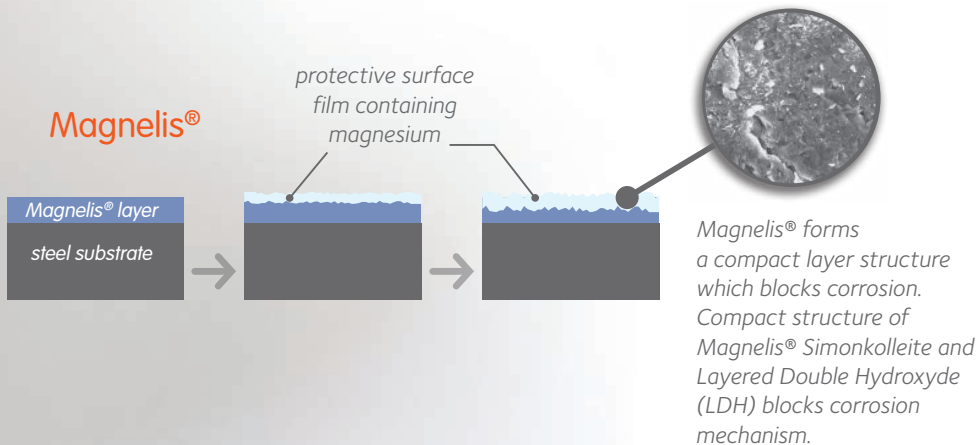
Magnelis® will even form a dense layer on highly deformed zones. This gives deformed steel shapes the same protection as flat surfaces. This is a key advantage of Magnelis® compared to other metallic coatings.

Galvanised



Galvanised

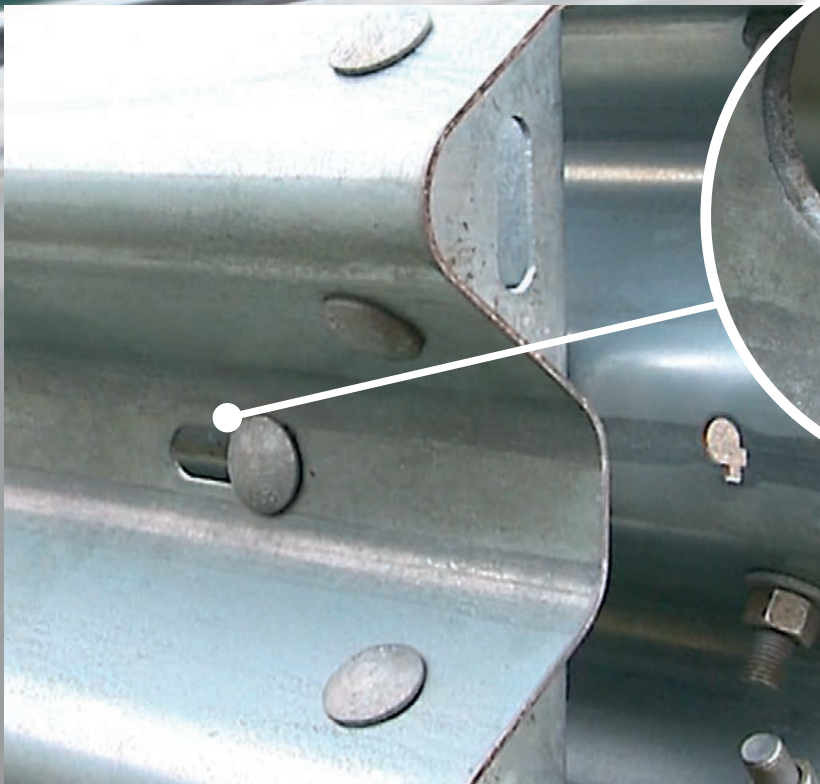
Magnelis®



Magnelis®

No red rust observed after 1440 hours of salt spray testing on Magnelis® cup, where the galvanised cup is completely corroded.

The self-healing effect of Magnelis® ensures the protection of uncoated edges, scratches and perforations



The perforated zone on a safety barrier is protected by the self-healing effect of Magnelis®.

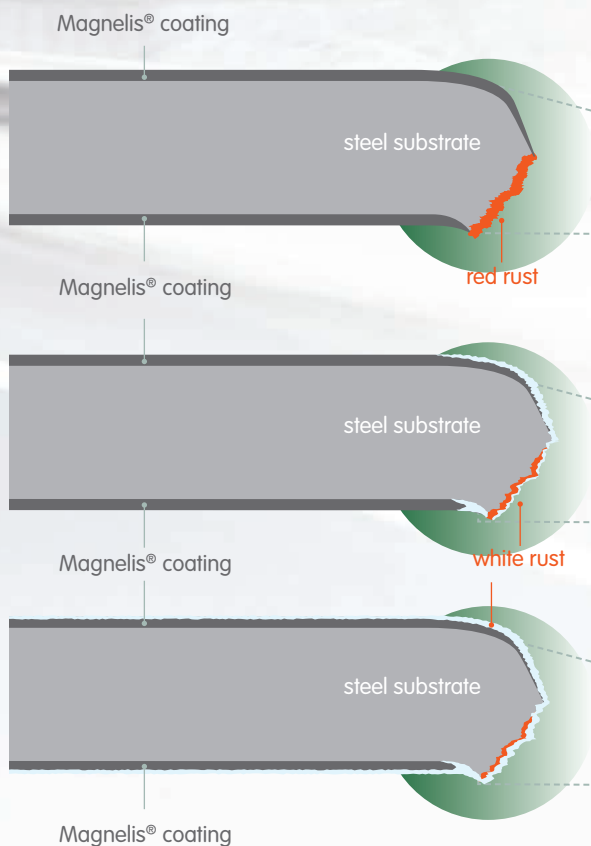
Edge protection with self-healing effect

When exposed to the environment, Magnelis® forms a very dense zinc-based protective film, unlike galvanised where the film is very porous.

This unique dense film is also formed on edges, welds, perforations and scratches. In case some red rust was present on these uncoated zones, the red

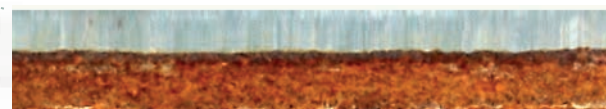
rust will be gradually covered by the Magnelis® film.

It is almost impossible for the environment to penetrate this film. The result is that Magnelis® provides perfect protection of the whole structure, even on the uncoated edges, scratches and perforations.



Initial exposure period (up to several weeks)*

The exposed cut end of the substrate is oxidised and forms red rust.



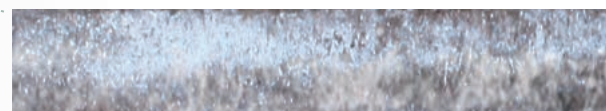
Subjected to rain and condensation (beyond several weeks)*

The zinc-based film containing magnesium on the coating layer migrates over the cut end.




Long exposure period (after more than a year)*

Disappearing of red rust and increasing of white rust.



** The speed of the self-healing may depend on the environment.*

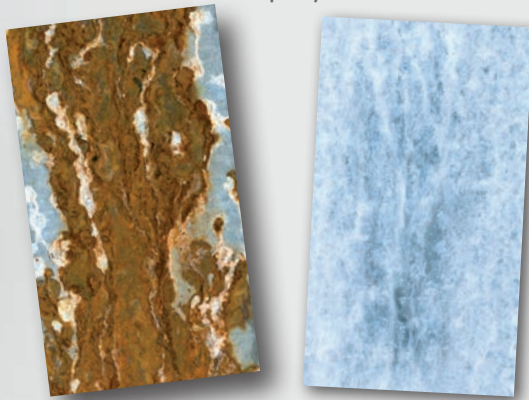
A woman with dark hair tied back, wearing a white lab coat and safety glasses, is seen from the side, working in a laboratory. She is positioned in front of a fume hood, which is emitting a thick layer of white vapor. The background consists of a brick wall with various pipes and conduits. The overall scene is brightly lit, typical of a laboratory environment.

The superior corrosion resistance of Magnelis® has been demonstrated in accelerated laboratory testing and proven through outdoor tests

Magnelis® samples are tested in the laboratory.

Corrosion resistance, accelerated corrosion tests

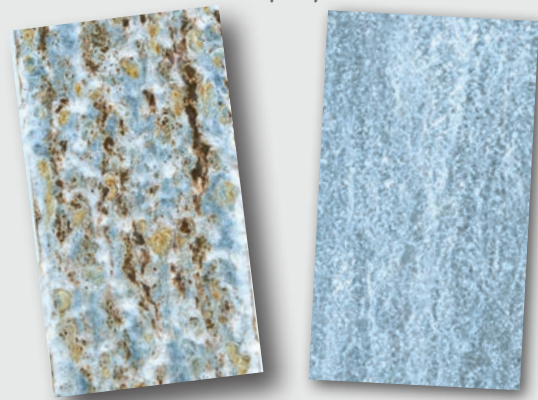
Magnelis® versus pre-galvanised
(salt spray test)



Hot dip galvanized 20 µm
after 6 weeks

Magnelis® 20 µm
after 34 weeks

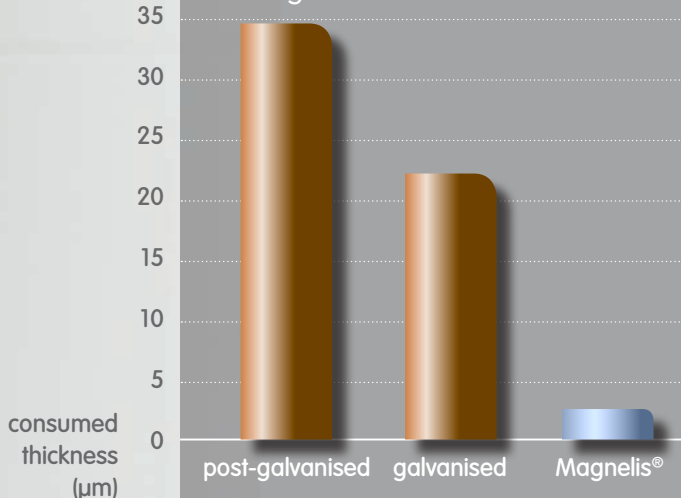
Magnelis® versus post-galvanised
(salt spray test)



Post-galvanised 85 µm
after 12 weeks

Magnelis® 20 µm
after 12 weeks

Coating loss after 6 weeks



Salt spray and cyclic corrosion test results highlighted the superior performance of Magnelis® compared to other metallic coatings.

No red rust was observed on steel with a 20 µm coating of Magnelis® after 34 weeks of salt spray testing. Magnelis® offers a real advantage over post-galvanised steel.

These are results from a 3CT (VDA 621-415) cyclic corrosion test. Source: ArcelorMittal R&D

Magnelis® outperforms
galvanised steel in all
types of environments

*Magnelis® samples
at the French Corrosion
Institute in Brest.*

Corrosion resistance, proven outdoors

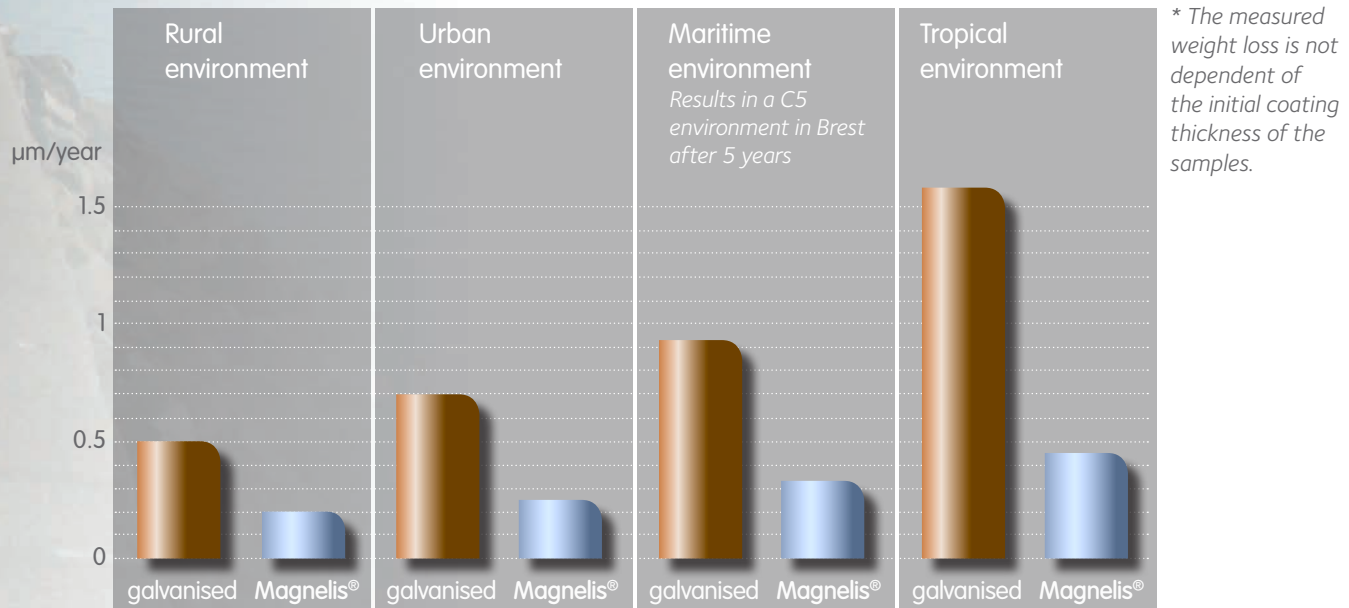
More than thousand Magnelis® samples have been exposed to a variety of different environments around the world in outdoor tests. The samples included shapes such as flat sheets, tubes, and profiles, and a range of different dimensions.

Every test has confirmed the optimal protection provided by Magnelis® against long-term corrosion.

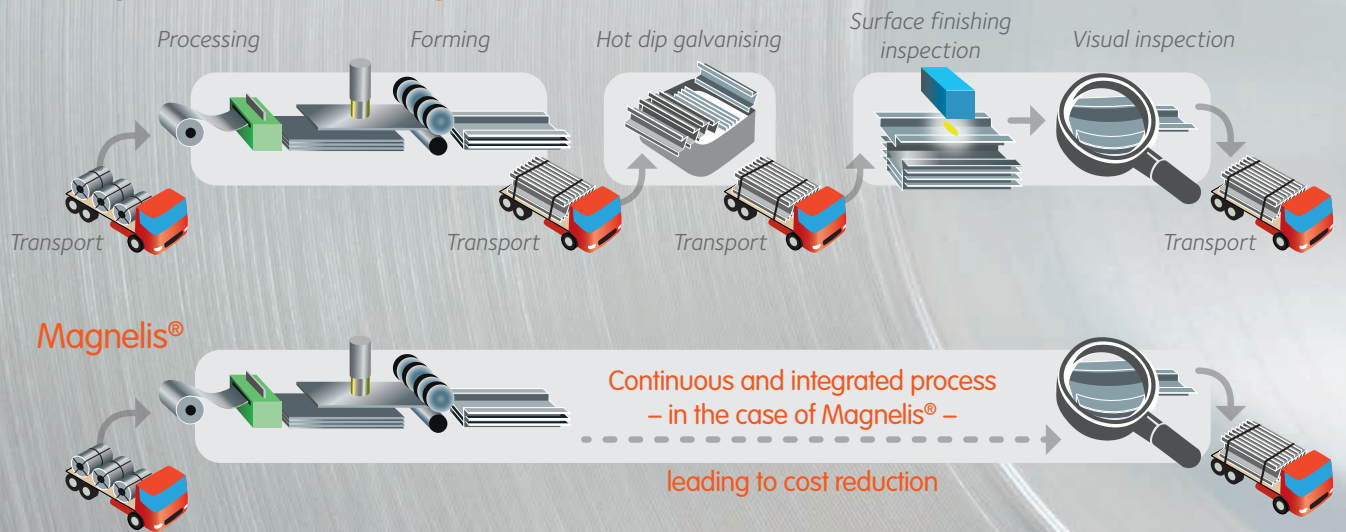
Magnelis® shows three times better protection than galvanised steel in all types of environments, and even more in very aggressive environments.

Mean yearly consumed thickness* in different environments in microns/year (after 2 years)

Source: ArcelorMittal R&D



Post-galvanised versus Magnelis®



Cost advantages over competing solutions

Advantages over post-galvanised steels

- Freedom to optimise designs thanks to the ability of Magnelis® to protect deformed shapes
- Lower weight of Magnelis® coating (depending on environment) to obtain the same level of corrosion resistance
- Protects flat and deformed surfaces as well as cut edges
- Shortens the logistics chain thanks to simpler fabrication processes.

Cost effective compared to stainless steel and aluminium

- Magnelis® provides the high level corrosion resistance of stainless and aluminium at a significantly lower cost.

Reduces maintenance costs compared to post-painting:

- The use of Magnelis® can avoid the need for post-painting. This leads to cost savings and productivity improvement
- The extended durability of Magnelis® results in reduced maintenance.

Magnelis®
Think strategy



Technical specifications

Magnelis® is applied to the steel on a continuous hot dip galvanising line.

The steel strip is dipped into a molten bath of Magnelis® which includes zinc, 3.5% aluminium, and 3% magnesium.

By closely controlling the process conditions, ArcelorMittal is able to ensure the optimal properties of the final product.

Magnelis® can be applied to a very wide range of steel grades. These include steels for cold forming and deep drawing applications, as well as structural and high strength, low alloy steels.

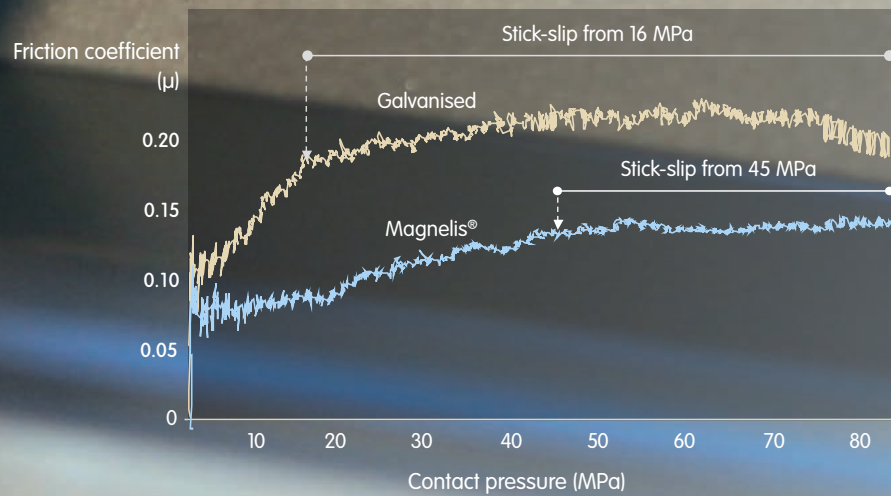
Steel thickness can range from 0.45 to 6 mm, while the coating can be from 5 to 35 µm/per side (ZM430).

Coating Designation		ZM70	ZM90	ZM120	ZM175	ZM200	ZM250	ZM310	ZM430
Coating Mass (total both sides)	g/m ²	70	90	120	175	200	250	310	430
Coating Thickness	(µm/per side)	5	7	10	14	16	20	25	35
Aspect	MA and MB aspect*								
Surface Treatment	C (E-Passivation® CrVI-free), O (oiled)								
Thickness	0.45 to 6.00 mm								
Width	Up to 1680 mm								
Steel grades*									
DX51D to DX57D+ZM									
S220GD to S450GD+ZM (according to EN 10346:2015)									
S420GD-HyPer® to S700GD-HyPer®+ZM (Eurocode compliant)									
HX260LAD up to HX500LAD+ZM (according to EN 10346:2015)									
HX600LAD and HX700LAD+ZM									

* Contact us for the detailed feasibility of each grade. Other grades on request.

Friction test

Magnelis® offers improved friction behaviour.



Lubrication Oil Fuchs 41075 in excess
Source: ArcelorMittal R&D

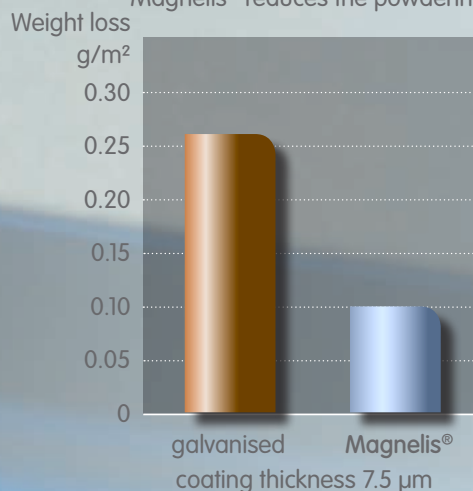
Easy to process

Thanks to its highly resistant, adherent metallic layer, Magnelis® can be processed using a variety of methods. These include bending, drawing, and profiling. Magnelis® maintains a high level of corrosion protection, even in the deformed zones.

Outdoor exposure tests have confirmed the exceptional corrosion resistance of Magnelis® on deformed parts compared to galvanised steel. The Magnelis® barrier protects the entire surface including cut edges and perforations.

Powder behaviour comparison

Magnelis® reduces the powdering behaviour.



Lubrication Oil Fuchs 41075 in excess
Source: ArcelorMittal R&D

Formability

Magnelis® proves better results on workability of the product and protection of the processing tools.

Friction tests show that Magnelis® performs better than hot dip galvanised steel.

Steels coated with Magnelis® are easy to process and do not harm processing tools. Magnelis® also enables manufacturers to deform the steel without the need for a lubricant, something that is not possible with galvanised steels.

Weldability

Magnelis® offers improved weldability due to its thinner coating. The process to weld Magnelis® is the same as that used for zinc-coated parts. The same welding consumables, procedures, and guidelines can be used. Arc, spot, and high frequency induction (HFI) welding techniques are all compatible with Magnelis®.

In cases where welded areas need to be re-protected, Magnelis® demonstrates even better corrosion resistance than a post-galvanised coating.

Paintability

Magnelis® can be post-painted and offers superior corrosion resistance compared to other metallic coated steels.



Magnelis® is
the only metallic
coating product
certified for use in
a C5 environment

Standards and certification

Magnelis® has been included in the European standard for hot dip galvanised steel (EN 10346) since July 2015. The composition of Magnelis® is classified as Type 2 in the ASTM A1046/A1046M-19 standard.

The excellent corrosion resistance of Magnelis® has seen it certified for use by independent authorities including: CSTB (France), DIBt (Germany), RISE (Sweden).

DIBt Z-30.11-51 allows the use of Magnelis® ZM310 in C4, Magnelis® ZM250 in C3 and Magnelis® ZM120 in C2 with durability H – high (>15 years) in accordance with DIN 55634-1:2018 and EN ISO 12944-1 and -2 of 2017.

Magnelis® is the only metallic coating product certified for use in a C5 environment by the RISE certification body in Sweden.

Magnelis® is suitable for food contact applications in accordance with European regulation EC 1935/2004.

Magnelis® complies with the European directives covering:

- Restriction of Hazardous Substances (RoHS)
- Registration, evaluation, authorisation and restriction of chemicals (REACH)
- Waste Electrical and Electronic Equipment (WEEE)

CSTB / Direction Enveloppe, Isolation et Sols
Division Façades, Couvertures et Toitures

EVALUATION TECHNIQUE DE PRODUITS ET MATERIAUX
N° 20/0067 du 3 février 2020

concernant le produit de revêtement métallique sur tôle d'acier
« MAGNELIS® »

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LUXEMBOURG
Tél : +352 4792 1
E-mail : flatcarbon_europe@arcelormittal.com
Internet : www.flatcarbon.com

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86-4000 TROZ SAINT-PIERRE
Belgique

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Téléphone : 03 87 00 00 00 Fax : 03 87 00 00 00

DIBt
Deutsches Institut für Bautechnik

Zulassungsstelle für Bautechnische und Bauwesen
Bautechnisches Prüfamt
Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des öffentlichen Rechts
Möglichkeit zur EÜTA, der ÜBFA und der WFTAC

National technical approval / General construction technique permit

Number: Z-30.11-51
Validity: from 17 September 2019 to 17 September 2024

Applicant: ARCELORMITTAL FLAT CARBON EUROPE
24-26, Boulevard d'Auranches
1160 LUXEMBOURG
LUXEMBOURG

Subject of decision:
Steel strips protected against corrosion by "Magnelis®", a metallic coating, to be used for the production of thin-walled, cold formed members

The subject named above is herewith granted a national technical approval (allgemeine bauaufsichtliche Zulassung) / general construction technique permit (allgemeine Baugenehmigung). This decision contains eight pages. The subject concerned was granted the first national technical approval on 23 July 2013.

Translation authorised by DIBt

DIBt
Deutsches Institut für Bautechnik

DIBt | Kolonnenstraße 10 | D-10585 Berlin | Tel.: +49 30 7070 0 | Fax: +49 30 7070 220 | Mail: diba@dib.de | www.dib.de

RISE
Type Approval and decision on production control
SC0559-13

Magnelis ZM310, Corrosion protection

Manufacturer: ArcelorMittal Europe - Flat Products
24-26 boulevard d'Auranches, L-1160 Luxembourg
Organisation number/VAT number: LU939172034
Web: www.flatcarbon.com/arcelormittal.com/

Information supplied by: ArcelorMittal Europe - Flat Products, Rue Verte-vole -40, BE-4400 Sclémien, Belgium
Tel: +32 4 232 21 99, E-mail: sc0559@arcelormittal.com

Product description: Corrosion protection coating, Magnelis ZM310, is a special coating composed by a matrix of zinc, aluminium and magnesium.

Intended use: Intended as corrosion protection of steel sheet for indoor and outdoor applications. The corrosion protection is suitable for corrosivity class C5, according to EN ISO 12944-2 described class based on observed expected lifetime of 25 years.

Trade Name: Magnelis ZM310C.

Approval: The product satisfy the requirements set forth in chapter B.4.5.5 PBL in respect to and under conditions stated in this certificate, and is therefore approved in accordance with the provisions of the following sections of Swedish mandatory provisions on application of the European construction standards (Eurocodes) (ENS):

ENX: Durability
ENX: Durability

Section A.10.5
Section G.4.5

Associated documents: -

Comment: The factory production control (FPC) is monitored by an independent inspection body. Control agreement: Approval date: 2020-02-03, inspection body: Kurator Institut für Technische Control (insamant: 200-54-0513, inspection body: RISE Research Institute of Sweden AB.

In production and during its service life, Magnelis® has a significant lower environmental impact compared to its competitors



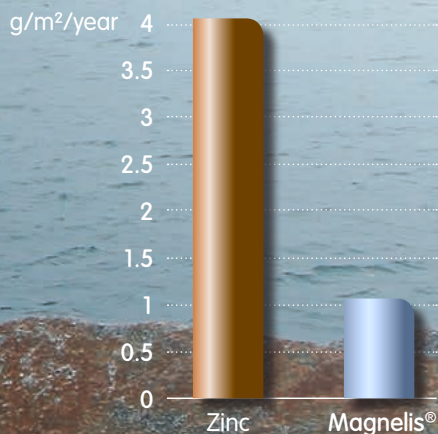
The environmentally responsible coating

The application of a Magnelis® coating ensures the preservation of natural resources as it uses significantly less zinc than pure zinc coatings. Magnelis® also reduces zinc runoff* to soils.

Magnelis® is 100% recyclable and does not contain any harmful elements. It is REACH compliant and an environmental product declaration (EPD) is available.

Zinc runoff rate*

Magnelis® considerably reduces zinc runoff into soil.



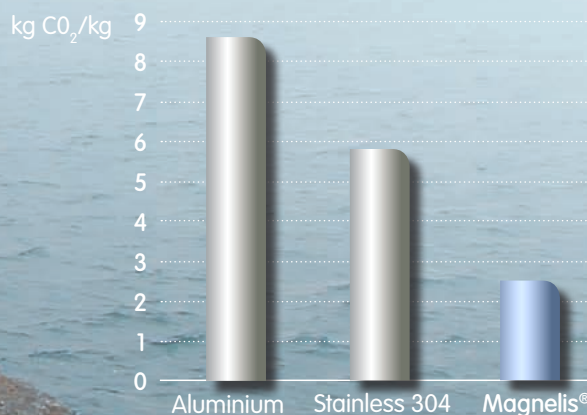
* the rate of dissolution of a material from its surface into the soil

Source: French Corrosion Institute

The production of Magnelis® also has a lower environmental impact compared to other highly durable materials such as stainless steel or aluminium.

Production impact on CO₂ emissions

CO₂ emissions for the production of Magnelis® are much lower than for aluminium, a difference that is not compensated by aluminium during the use phase, even when aluminium parts are lighter than steel parts.



Sources: ArcelorMittal R&D, European Aluminium Association, World Steel Association, Eurofer

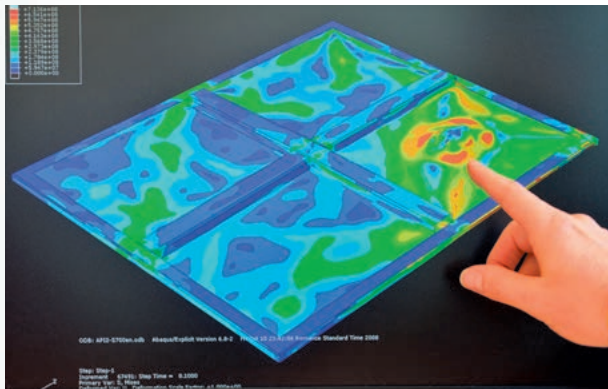


Our support can help
you to optimise the
use of Magnelis®

Co-engineering Magnelis® solutions

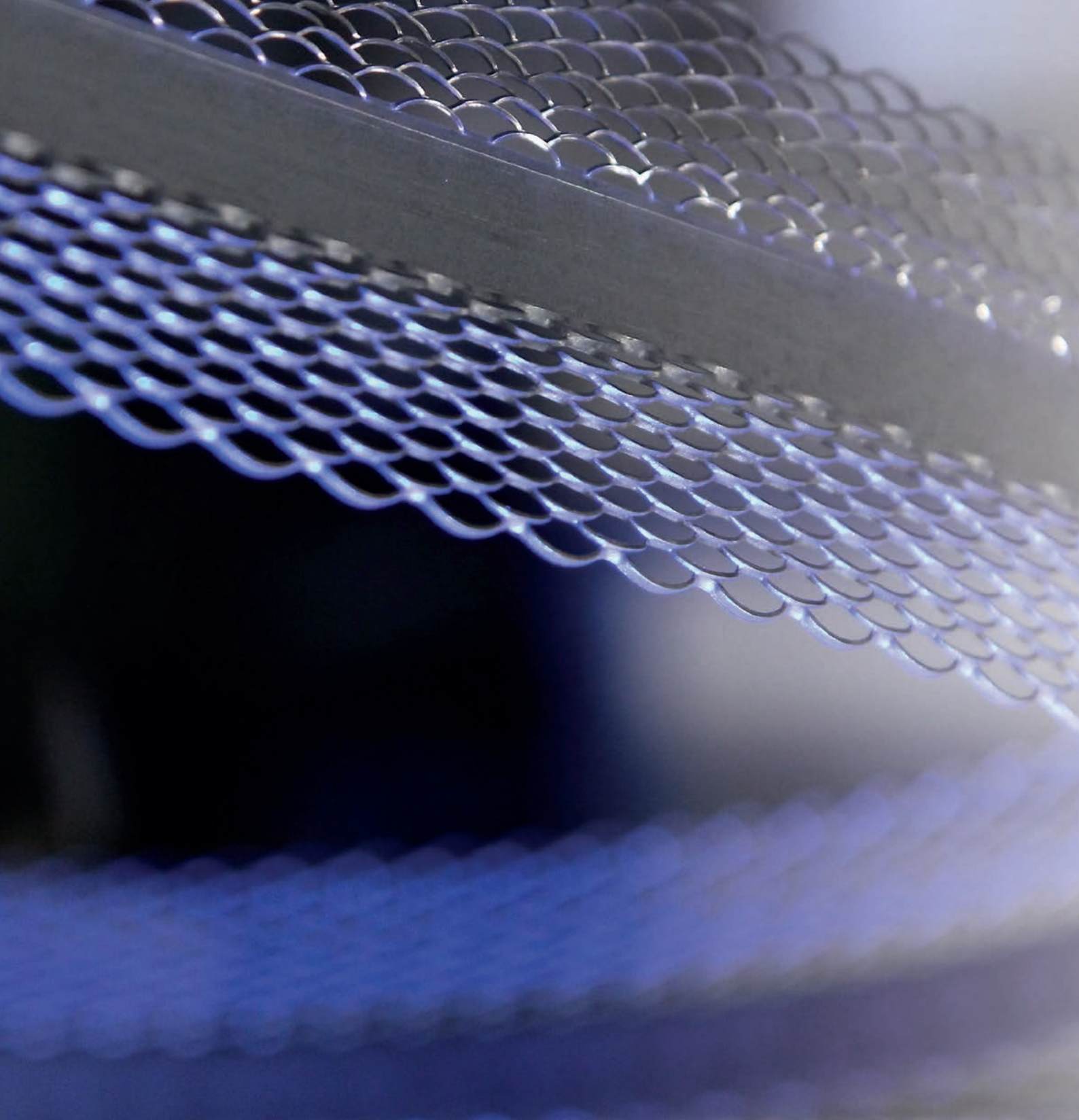
ArcelorMittal is offering an innovative co-engineering approach to its customers in order to optimise the use of Magnelis® and to achieve the best possible results and cost reduction.

Our co-engineering team includes researchers and technicians with a strong background in mechanical design.



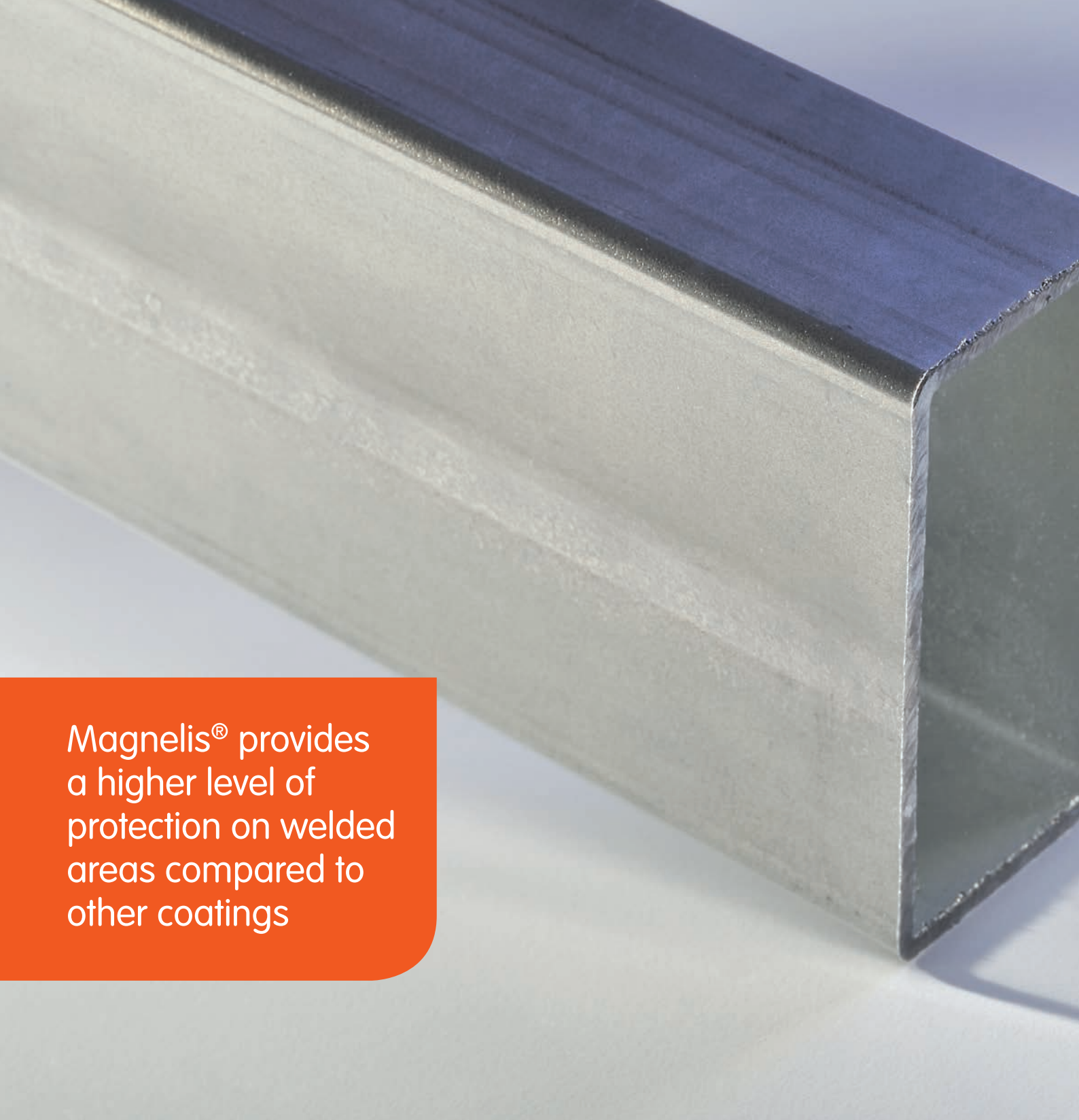
ArcelorMittal's assistance to customers can be applied at all stages of product development, from initial design through to serial production. We can help you to take every advantage of the benefits Magnelis® can offer:

- The most suitable steel grade and coating for your application
- Cost optimisation through thickness reduction and process improvements (using finite element simulations)
- Improving the quality and durability of your product
- Definition of minimal mechanical properties and thicknesses for successful production
- Deformation analysis of stamped parts to validate the theoretical analysis
- Technical support during production.



Magnelis[®], the best metallic coating through a large panel of markets

- 33 ■ Magnelis[®] outperforms pre-coated welded tubes
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- 51 ■ Industry – Appliances and electrical equipment

A close-up photograph of a metal profile, likely a C-channel, showing a weld joint. The top surface is coated with a blue material, while the rest of the profile is a light grey metal. The weld joint is visible on the right side, showing a textured, metallic surface. The background is a plain, light-colored surface.

Magnelis® provides
a higher level of
protection on welded
areas compared to
other coatings

Magnelis® outperforms pre-coated welded tubes

Magnelis® has very clear advantages when it comes to tubes. On a standard galvanised tube, the welded area is the weak point for corrosion. Magnelis® increases the protection and lifetime of the welded zone to unprecedented levels.

Processing

Magnelis® offers similar weldability to standard hot dip galvanised steel. The same welding consumables, procedures, and guidelines can be used for structural tubes and pipes. Arc welding, spot welding, and high frequency induction (HFI) welding are all compatible with Magnelis®.

Self-healing effect

Magnelis® self-heals on cut edges and thin welded zones. The zone is progressively covered with protective Magnelis® compounds which act as a barrier to corrosion. The result is outstanding corrosion resistance, even on welded zones.

The life of a welded tube can be extended significantly beyond that of a post-galvanised tube if the welded area is re-protected with Magnelis®.

Magnelis® versus pre-galvanised



Magnelis® ZM120 welded, not re-protected

Galvanised Z275 welded, not re-protected

Magnelis® versus post-galvanised



Magnelis® ZM310 welded and re-protected

Post-galvanised welded



The durable coating for solar structures

35

solar

Magnelis® supports moves to generate clean and renewable energy by offering advanced corrosion protection for solar installations.

Magnelis® is the preferred coating solution for both concentrating solar power (CSP) plants and structural solutions for photovoltaic (PV) solar farms (ground-mounted or floating structures). It offers increased durability, the best possible protection against corrosion and abrasion.

Magnelis® extends the life of solar structures so operators can maximise the return on their investment. Its key advantages in these applications are:

- Guaranteed durability up to 25 years
- Improved resistance against abrasion
- Effective against corrosion even placed in soil
- Large feasibility range both in thickness and steel grade
- Cost effective
- Rapid installation
- Reduces environmental impact.

In moderate soil conditions or areas that are subject to high levels of abrasion, we recommend Magnelis® ZM430 (35 µm coating per side). If the soil is highly aggressive, Magnelis® ZM620 (50 µm/side) is recommended.

Magnelis® can be supplied in a wide range of steel grades and thicknesses up to 6 mm. This flexibility allows operators to optimise the design and total cost of their solar structures.



A 25-year guarantee* is available for Magnelis® ZM310 used in the support structures of solar applications. It is the first metallic coating to be guaranteed in marine conditions (C5-M, ISO 12944-2).

* Guarantee for Magnelis® ZM310 is subject to project-specific conditions. Contact us for more information.

Magnelis® is
the preferred material
for the structural
components
of solar fields



Optimum abrasion resistance for steel solar structures in deserts

Magnelis® has much higher hardness compared to standard zinc coatings. This has a direct and positive impact on the abrasive wear resistance of the coating.

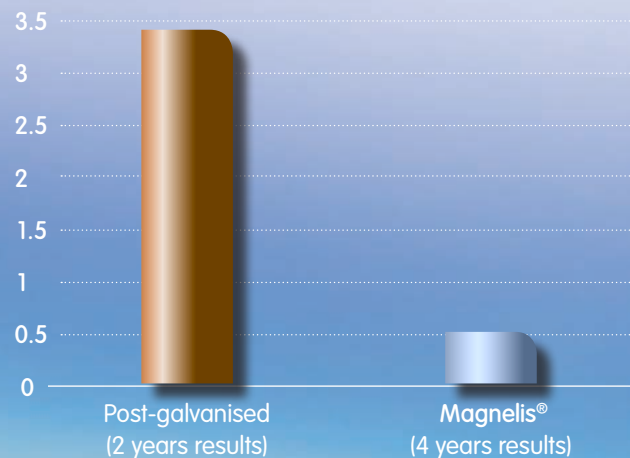
The hardness of Magnelis® is much higher than that of hot dip galvanised coatings, increasing its resistance to abrasion

Galvanised		64
Magnelis®		141

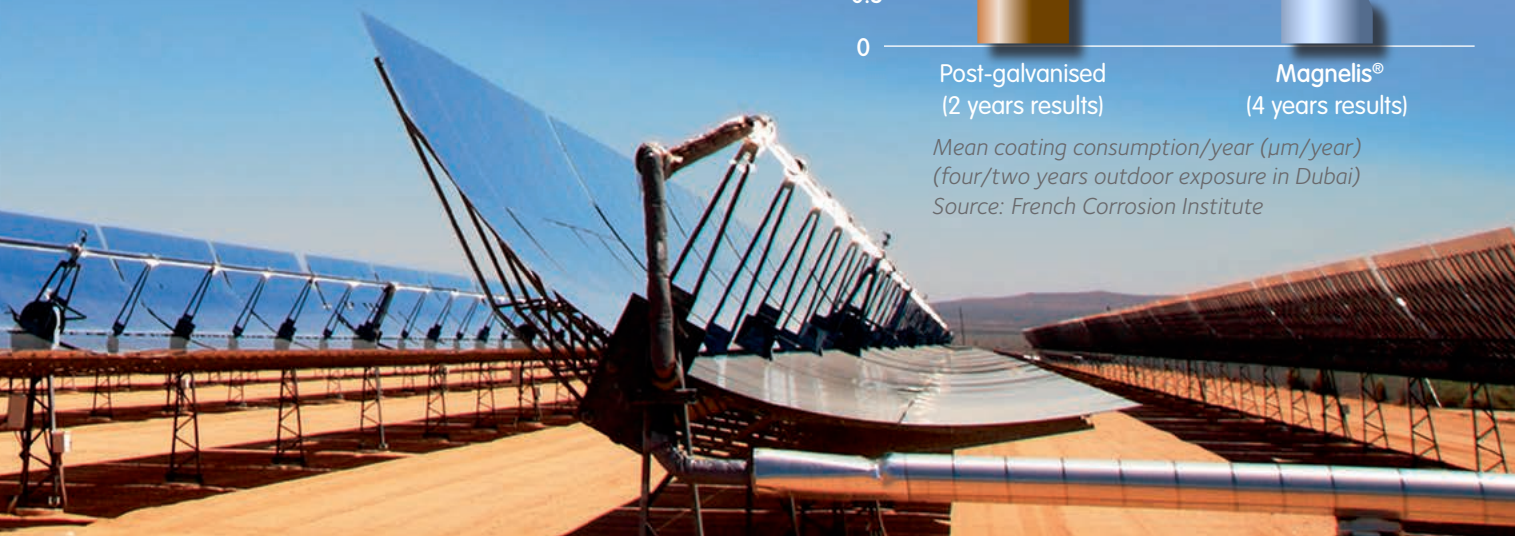
Hardness Vickers (HV)


The excellent abrasion resistance of Magnelis® has been proven through outdoor exposure tests in desert environments.

Magnelis® performs much better than galvanised steels in sandy environments



*Mean coating consumption/year (µm/year)
(four/two years outdoor exposure in Dubai)
Source: French Corrosion Institute*





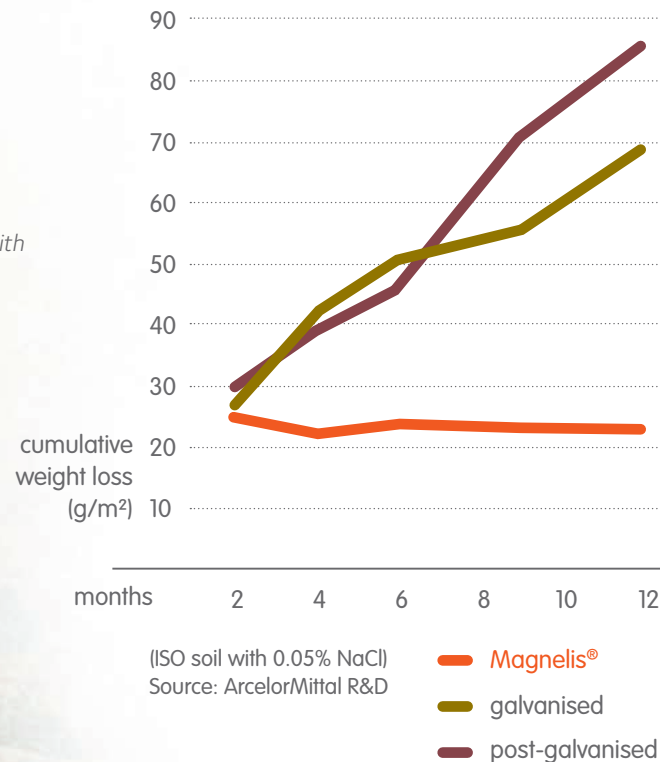
The very dense film
of Magnelis® assures
the best possible corrosion
protection in soil

Magnelis[®], superior behaviour in soils

When it comes into contact with soils, Magnelis[®] also produces its protective film to cover the steel surface. This very dense film reduces the contact between the steel and the soil, dramatically slowing the progression of corrosion.

Magnelis[®] ZM430 and ZM620 provide excellent corrosion protection for steel structures which are placed in soil. The exact coating should be chosen based on the local soil conditions in consultation with ArcelorMittal.

Comparison of corrosion rates for galvanised, post-galvanised, and Magnelis[®] coated steels during one year in soil.







Optimal protection for **agricultural** applications

Magnelis® is used in a variety of agricultural applications due to its excellent corrosion resistance in highly alkaline atmospheres (pH between 10 and 13) and those rich in ammonia.

Vineyards

Magnelis® ensures ultimate corrosion protection for vineyard poles. Poles coated with Magnelis® have a life span in line with that of the vines they support.

Poles account for more than 60% of the cost of vineyard fences. Magnelis® poles are at least 20% more cost-effective than wood and galvanised poles and can perform over the total lifetime of the vines.

Outdoor tests have proven that Magnelis® has superior corrosion resistance in soils compared to zinc-heavy coatings. Magnelis® is more stable than conventional coatings when it is placed in contact with soil.

Magnelis® is eco-friendly and reduces zinc runoff to soil considerably compared to post-galvanised products.

Greenhouses

Greenhouse structures must sustain extremely warm and humid atmospheres. Magnelis® offers excellent corrosion resistance in this application due to its very dense protective layer.

In addition to its excellent formability, Magnelis® also provides a high level of corrosion resistance on deformed parts.



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Optimal protection for agricultural applications

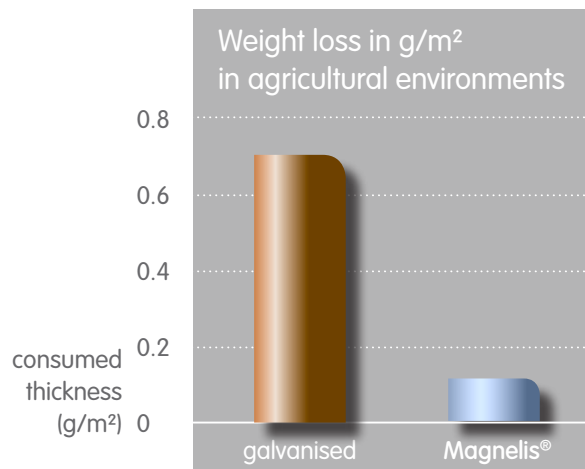
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Animal housing

Farm buildings housing cattle, pigs, and poultry face severe challenges from atmospheric corrosion. Magnelis® coated profiles and tubes are the ideal answer to guarantee the durability of these structures. Multiple tests (including accelerated tests and long exposure on real farms) have demonstrated the outstanding corrosion performance of Magnelis® in animal housing. Magnelis® reduces the risk of corrosion and disease as bacteria have no corrosive areas in which to hide.

Thanks to its high surface hardness Magnelis® is also better at resisting animal scratches. Magnelis® also eliminates the need for post-painting, and can replace stainless steel or aluminium.

Magnelis® is available in all dimensions required for animal housing, and offers a very cost-effective solution.



Measurement of mass loss:
pH: 11.7 – Solution with 5% NH₃ –
T: 20°C – Test duration 24 h

Source: ArcelorMittal R&D

Silos

Magnelis® offers excellent outdoor corrosion protection for silos, wherever they are located. The hard surface of Magnelis® also reduces the abrasive effect of grain on the coating.

Magnelis® is suitable for food contact applications such as the interiors of fermentation silos and meets the requirements of European regulation EC 1935/2004.

Magnelis® is available in thicknesses ranging from 0.45 to 6 mm, and in various steel grades, coating weights, and levels of protection.



Magnelis® guarantees
a cost effective and
long life solution



Construction

Durability guaranteed

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construction

The remarkable corrosion resistance of Magnelis® allows it to be used for a wide range of structural applications. These include the sub-structures of ventilated facades, composite floors, purlins for roofs, side rails for walls, rainwater systems, and light steel framing. But it can also be used for roof and wall profiles in some corrosive environments such as coastal areas, agricultural structures, and water transport systems.

Longer lifetime

Magnelis® increases the lifetime of structures by a factor of three compared to hot dip galvanised solutions. In more severe environments, the benefits of Magnelis® can be even greater.

Self-healing effect

When cut, perforated, or scratched, Magnelis® slows down corrosion by forming a very dense zinc-based protective film. This ensures perfect protection of the whole structure.

Excellent workability

Profiling processes are facilitated by the excellent forming behaviour of Magnelis® as it has a lower friction coefficient than galvanised steel. The Magnelis® coating also adheres firmly to the steel to prevent powdering during processing.

Reduced coating thickness

The superior corrosion protection of Magnelis® offers our customers two possibilities. They can increase the level of corrosion protection with the same metallic coating thickness; or they can achieve the same protection while significantly reducing coating thickness.

Low total cost of ownership

Magnelis® offers significant cost reductions as it reduces the need for ongoing maintenance and avoids the need for additional painting. This makes Magnelis® the most cost-effective solution compared to galvanised and post-galvanised corrosion protection.

Contact with concrete

As concrete hardens, a very alkaline environment is created. This can be extremely aggressive against coated steel. Magnelis® resists corrosion in these applications much better, and is the preferred metallic coating for applications which come into contact with concrete.

Wide feasibility range

Magnelis® is available in a wide range of high strength steels, allowing design optimisation.



Construction

Diverse range of applications

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construction

Building structures

Magnelis® is the perfect corrosion protection solution for roof structures and purlins, wall side rails, facade sub-structures, and light steel-framed structures. It can be utilised in outdoor, exposed, semi-exposed, or unexposed environments to ensure a longer lifetime than hot dip galvanised steel and other traditional coatings. The performance of Magnelis® has been proven in outdoor tests.

Rainwater and roofing systems

Magnelis® can be utilised for roofs and corrugated profiles in aggressive environments such as marine or agricultural areas. It is the first metallic coating steel to be classified for use in a C5 environment and comes with a guarantee up to 20-years. In non-marine environments, the guarantee can be up to 25-years. When used in rainwater systems, a 10-year guarantee is available.

Flooring

Composite floor systems made with steel and concrete are flexible and adaptable to any kind of structure or renovation. They allow large spans and reduce floor thickness while maximising interior space.

Metallic coated steel with Magnelis® is the ideal solution for durable, long lasting composite floors. It offers excellent corrosion performance when in contact with concrete or in high alkaline atmospheres.



Magnelis® is the only metallic coating with a 20-year guarantee for roofing and in marine environments (C5-M more than 300 m from the sea). A guarantee of up to 25 years can be provided for inland roofing applications.



Infrastructure

Durable safety barriers, lighting poles, acoustic walls...

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Magnelis® is widely used to protect safety barriers, lighting poles, road signs, acoustic walls, bridge parapets, and many other infrastructure applications.

Outstanding corrosion protection

The excellent corrosion behaviour of Magnelis® has been extensively proven in outdoor tests. Magnelis® outperforms galvanised steel by a factor of three, and higher in more severe environments.

Self-healing effect

Magnelis® offers protection for cut edges and perforations thanks to its inbuilt self-healing properties.

Reduced corrosion in soil

Outdoor tests have proven that Magnelis® has superior corrosion resistance in soils compared to zinc-heavy coatings. Magnelis® is more stable than conventional coatings when it is buried in the soil and results in less zinc runoff. Magnelis® ZM430 offers the best possible corrosion protection in soil.

Wide feasibility range

Magnelis® can be provided in a range of thicknesses and grades suitable for road safety and other infrastructure applications.

Cost competitive compared to post-galvanisation

Using Magnelis® for infrastructure applications offers clear cost advantages. Total cost of ownership is optimised as production, logistic, installation, and maintenance costs are reduced significantly.



Arcelor S.A. offers a guarantee of up to 20-years on Magnelis® in road safety applications.

Magnelis® is now included in the EN 10346 standard for continuously hot dip coated steel flat products, and the EN 1317 standard for road safety systems. Magnelis® solutions have also been certified by bodies which oversee the Construction Product Regulation. Certifications have been granted in Austria, Belgium, the Czech Republic, Norway, and Spain. Certification is ongoing in other countries.



Appliances and electrical equipment

Manufacturers of appliances and electrical equipment are requesting significantly improved corrosion protection, while maintaining processing and cost effectiveness. Magnelis® is the answer to these demands. Magnelis® is already widely used for the casings, structures, and hinges of appliance units, cable trays, and cooling towers.

Outstanding corrosion protection

The excellent corrosion behaviour of Magnelis® has been proven through extensive outdoor tests. Magnelis® outperforms galvanised steel by a factor three.

Self-healing effect

Magnelis® also protects edges and perforations thanks to its inbuilt self-healing properties.

Significantly improved protection against white rust

Conventionally galvanised steel shows substantial signs of white rust after a salt spray test. Magnelis® offers a huge improvement in white rust resistance. Salt spray tests have shown it lasts much longer.

Reduced coating thickness

The superior corrosion protection of Magnelis® offers our customers two possibilities. They can increase corrosion protection by applying the same coating thickness, or target the same level of protection with a significantly thinner metallic coating layer.

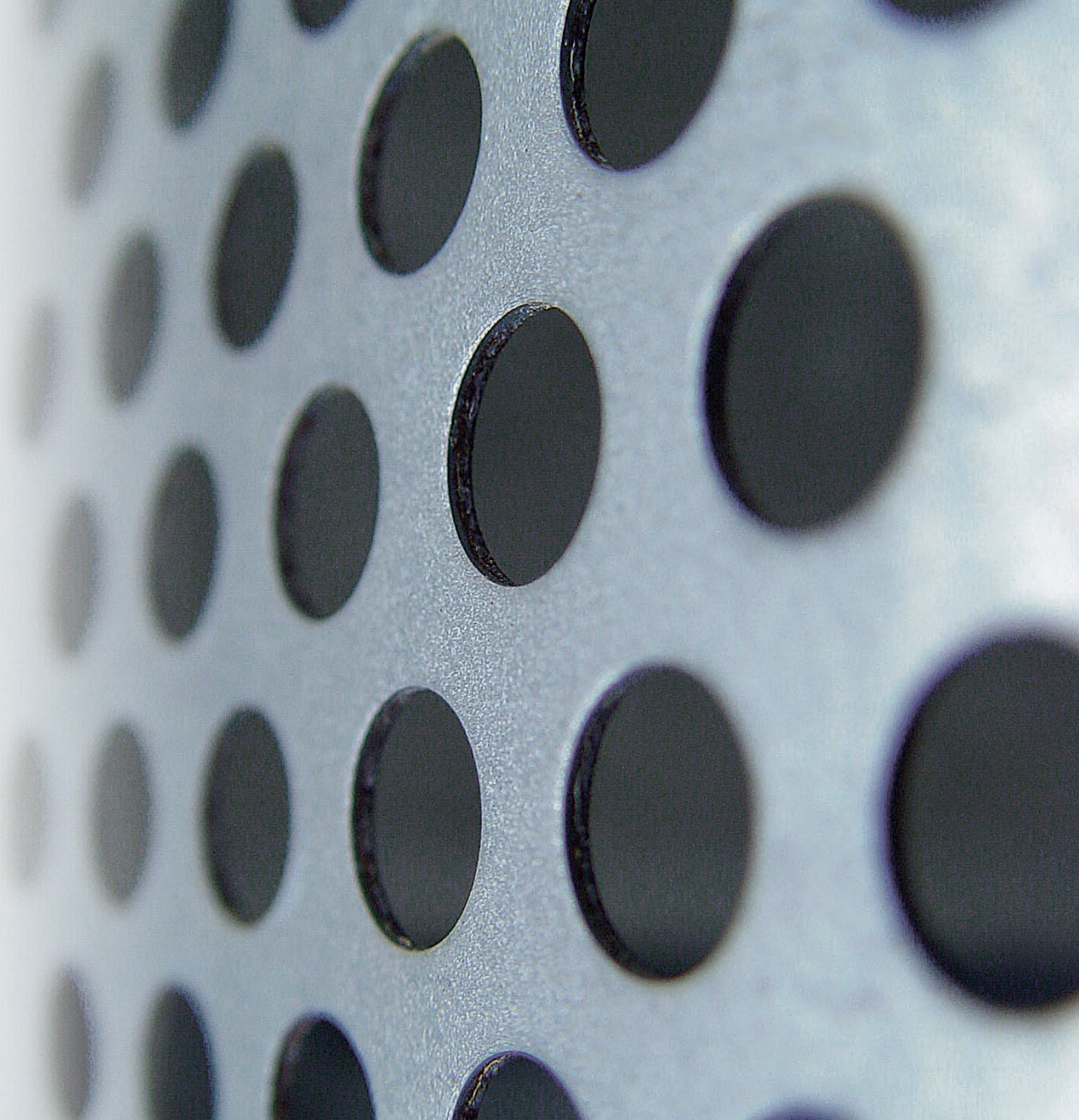
Scratch resistance

Thanks to its very high hardness, Magnelis® offers excellent wear and abrasion resistance.

Improved productivity and paintability

The lower friction coefficient and improved adhesion of Magnelis® increases its processing properties. The easiness to post paint Magnelis® can bring a further improvement of corrosion resistance versus galvanised steel.

Magnelis® ensures corrosion resistance while maintaining the electrical conductivity of cable trays.



Benefits of **Magnelis®** in a nutshell

Features		Magnelis® versus hot dip galvanised (Zn)
Anti-corrosion properties	Outdoor corrosion	+++
	Agricultural buildings (animal housing, barns, greenhouses, silos...)	+++
	Marine environments (construction, swimming pools...)	+++
	Industrial environments (acid- or alkaline-rich environments)	+
	High humidity	+++
	Contact with concrete	+++
	Abrasion	+++
	Soil corrosion	+++
	Edge protection thanks to self-healing effect	+++
	Perforations or scratches on exposed applications	+++
	Corrosion of formed parts (bent or stamped)	+++
	Temporary protection (transport, storage)	+++
Processing properties	Bending and profiling	+
	Forming and shaping	+
	Welding (equivalent coating thickness)	=
	Painting	++

Credits

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