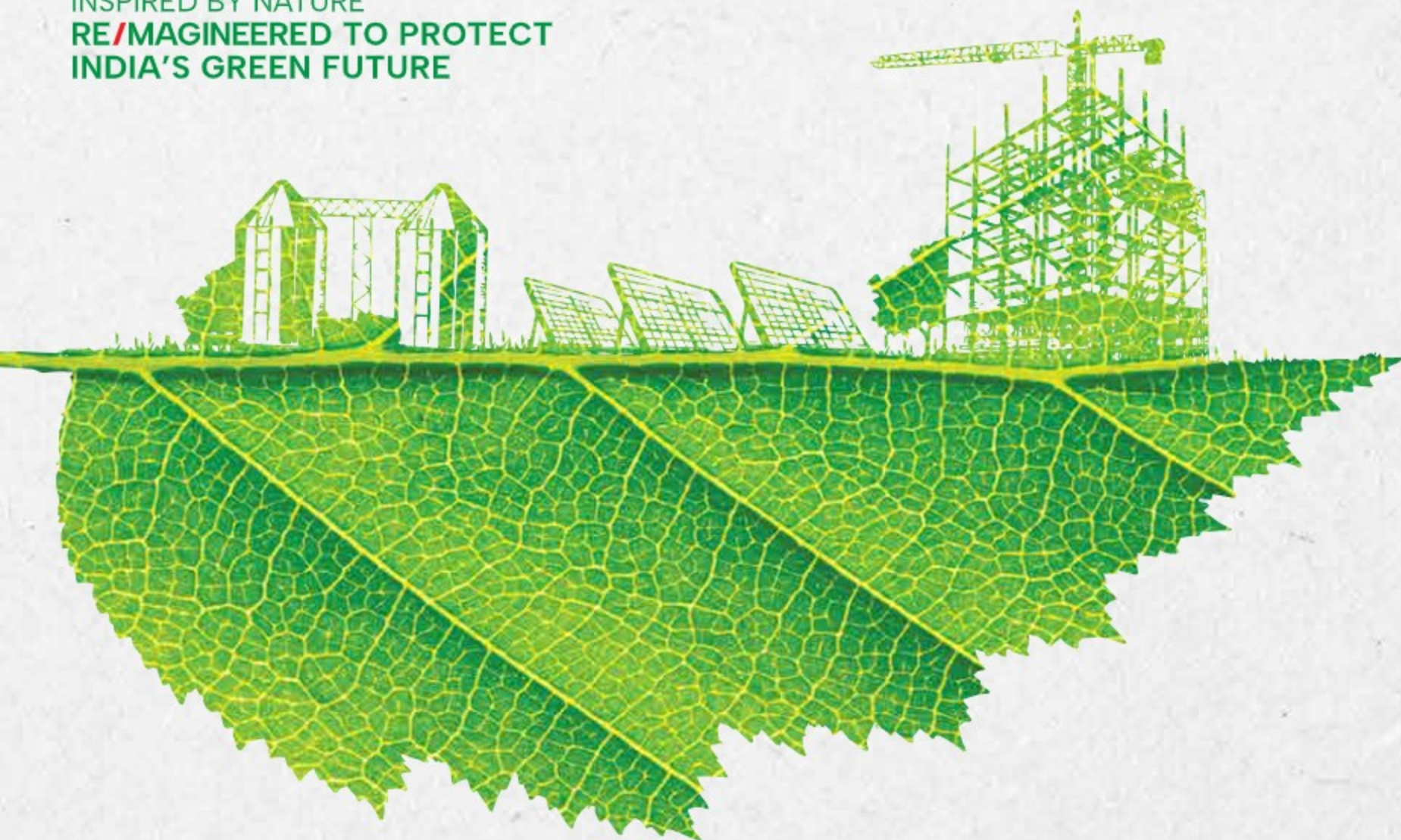


Magnelis®

INSPIRED BY NATURE
RE/MAGINEERED TO PROTECT
INDIA'S GREEN FUTURE



**AM/NS
INDIA**

ArcelorMittal Nippon Steel India

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ABOUT

AM/NS INDIA

ArcelorMittal Nippon Steel India

AM/NS India is the joint venture between ArcelorMittal and Nippon Steel – two of the world's leading steel companies. As an integrated steel manufacturer with iron-making, steel-making and downstream facilities spread across India, we produce over 600 varieties of steel for a range of applications across industries. Our goal is to create smarter, more sustainable steels for India that empower its growth trajectory and enable brighter futures for all.

OUR HAZIRA STEEL PLANT

With a capacity of 10 Million Tonnes Per Annum (MTPA), the AM/NS India Hazira Steel Plant in Gujarat is an integrated, sophisticated and environment-friendly facility. The plant incorporates comprehensive support infrastructure that includes power, lime and oxygen plants, a township and a captive port that can accommodate capesize vessels. This modern operations and handling system enables self-sufficiency and global logistics.

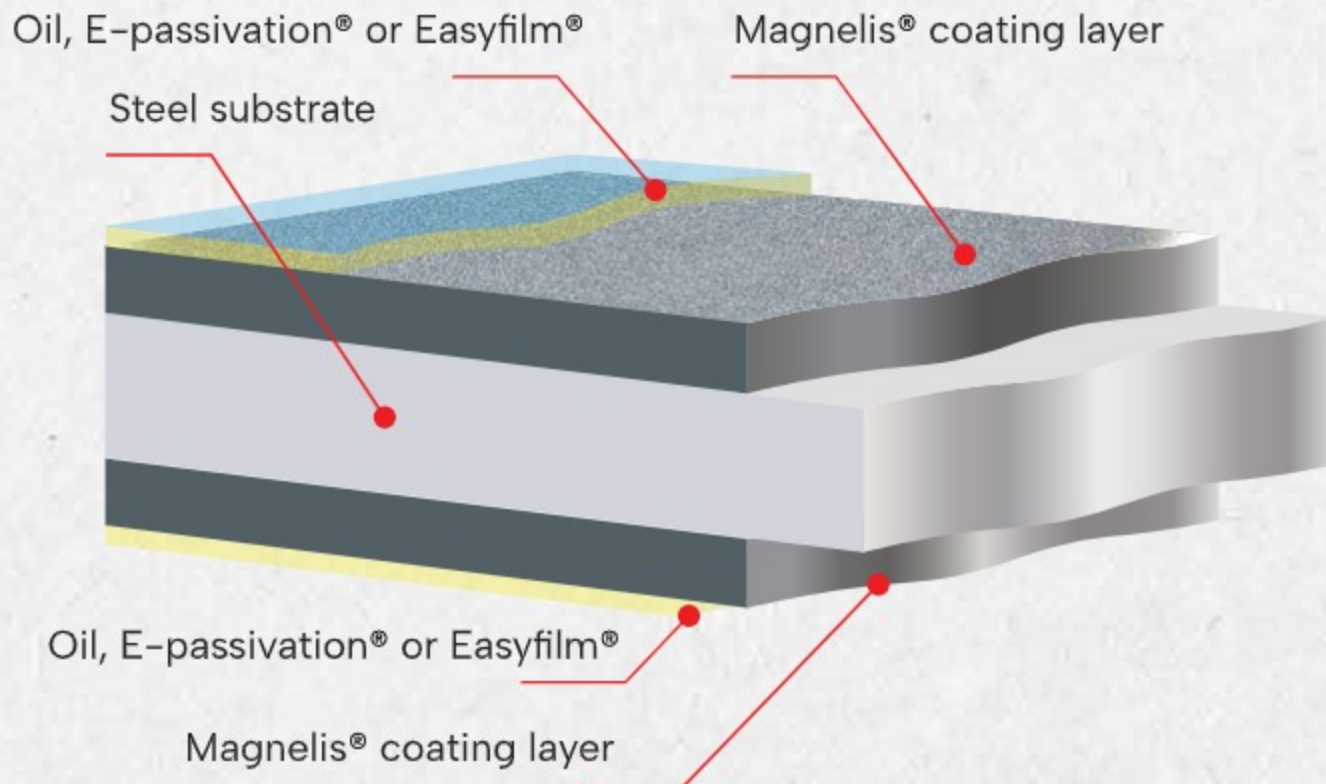
Hazira is one of the world's largest single-location flat steel plants.



DISCOVER EXCEPTIONAL PERFORMANCE WITH Magnelis®

Nature has many amazing examples of resilience, from trees that use resin to heal and seal wounds to pearls formed by oysters to protect themselves. So, when we decided to help build a more sustainable, green future for India, we introduced Magnelis® to emulate nature.

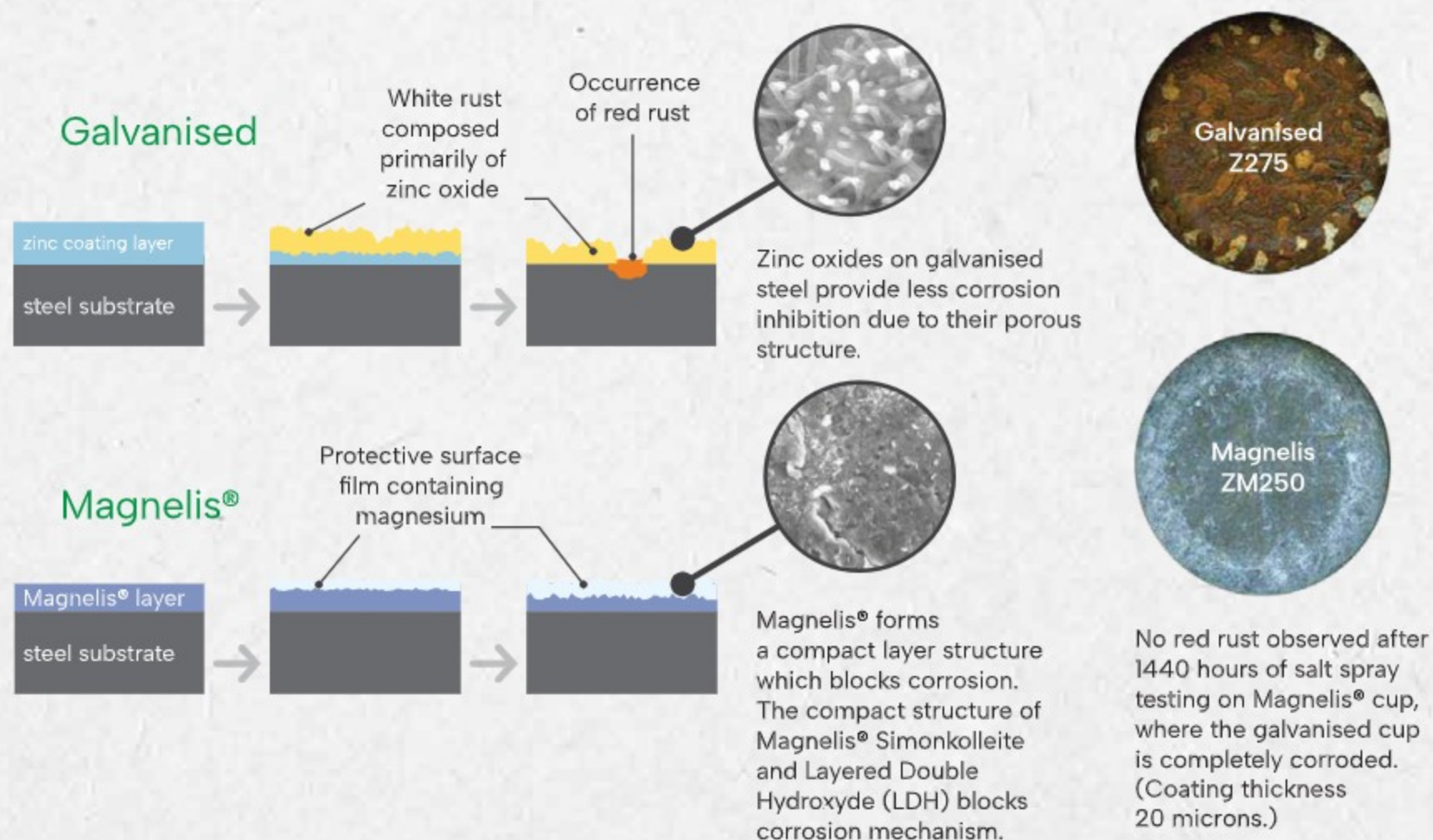
Magnelis® is an exceptional metallic coating which provides a breakthrough in corrosion protection. Produced on a classic hot dip galvanising line, with a unique chemical composition including Zinc, 3.5% Aluminium, and 3% Magnesium. Thanks to its unique composition, Magnelis® proprietary metallic coating provides an unprecedented level of protection against corrosion creep from cut edges, local damage or sub-layer scratches, even in the most hostile environments.



Magnelis® ADVANTAGES

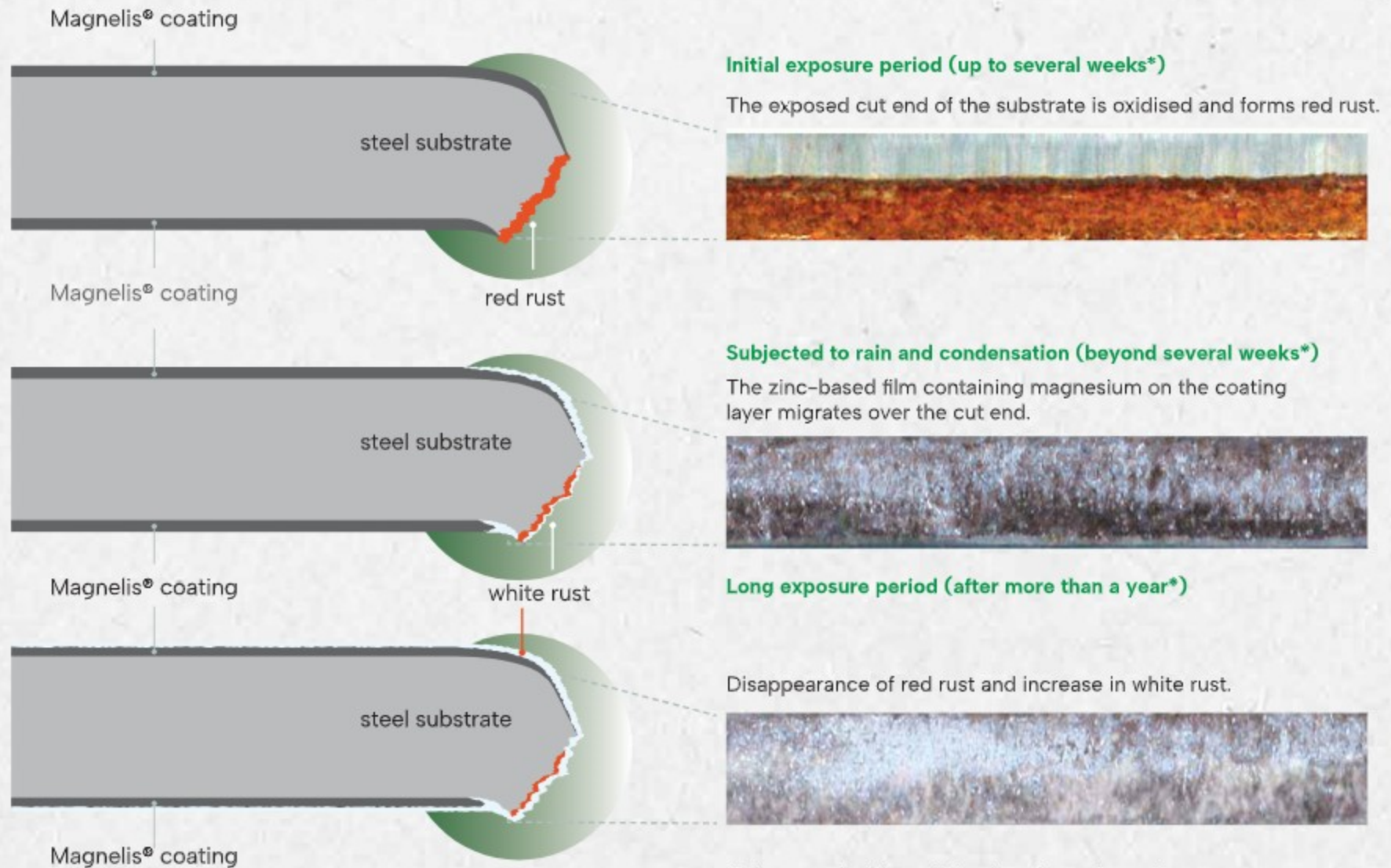
EXCELLENT CORROSION RESISTANCE

The specific composition of Magnelis® leads to the formation of a dense and durable protective barrier, preventing any exposed steel from even the harshest corrosive effect of a hostile environment.



SELF-HEALING EFFECT

When exposed to the environment, Magnelis® forms a very dense zinc-based protective film, unlike galvanised steel 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 gradually be 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. Increasing the coating weight will improve edge protection, especially for thick material.



EXCELLENT PROCESSING PROPERTIES

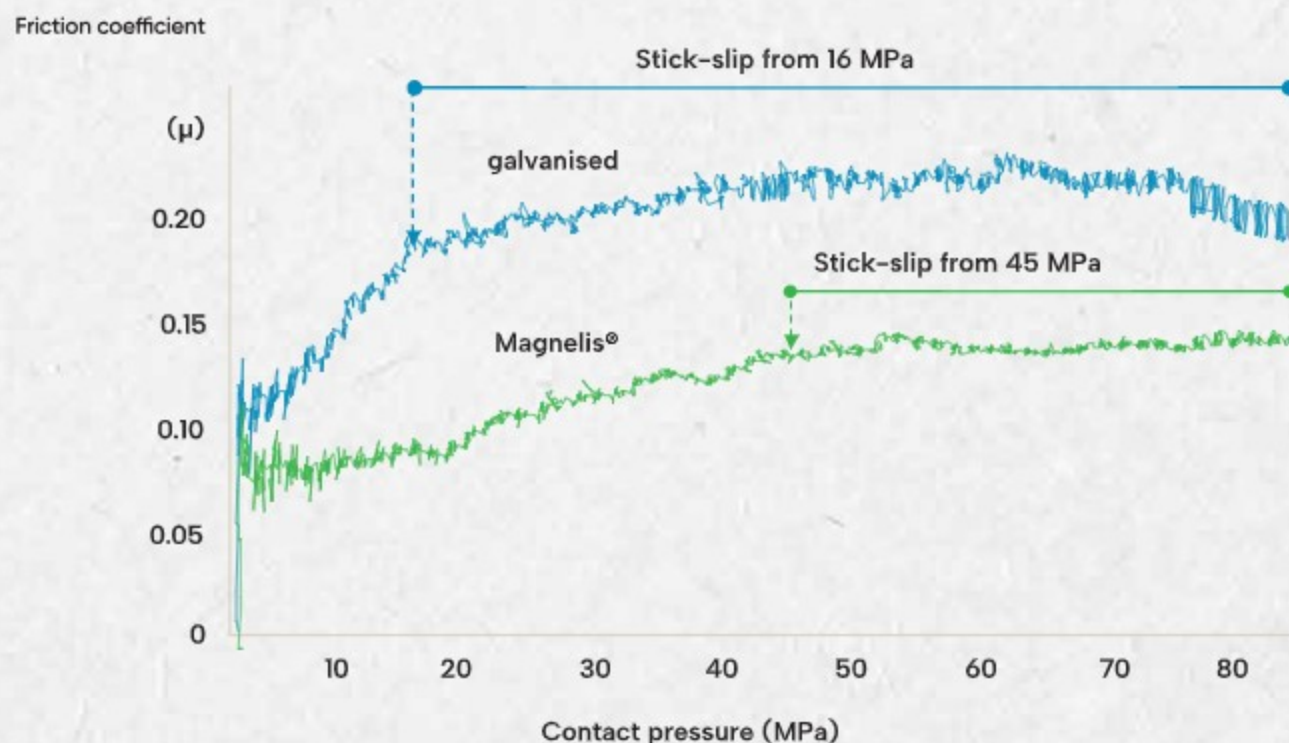
Formability – Magnelis® provides better results for workability of the product and protection of the processing tools. Friction tests show that Magnelis® performs better than hot dip galvanised steel. Steels coated with Magnelis® are easy to process and do not harm processing tools. Magnelis® also enables manufacturers to deform the steel without the need for a lubricant, something that is not possible with galvanised steels.

Weldability – Arc, spot, and high frequency induction (HFI) welding techniques are compatible with Magnelis® which offers improved weldability due to its thinner coating. Magnelis® can be welded with similar processes to zinc-coated products with adjusted parameters on a case by case basis. For arc welding, the same welding consumables, procedures, and guidelines can be used. 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.

FRICITION TEST

Magnelis® offers improved friction behaviour.



Lubrication Oil Fuchs 41075 in excess

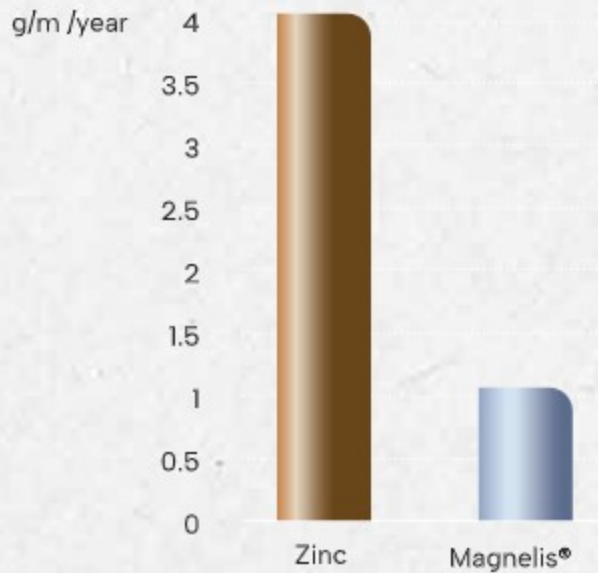
Source: ArcelorMittal Global R&D

ENVIRONMENTALLY FRIENDLY

- 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* into the soil
- Magnelis® is 100% recyclable and does not contain any harmful elements. It is REACH compliant and an environmental product declaration (EPD) is available. The production of Magnelis® also has a lower environmental impact compared to other highly durable materials such as stainless steel or aluminium

ZINC RUNOFF RATE*

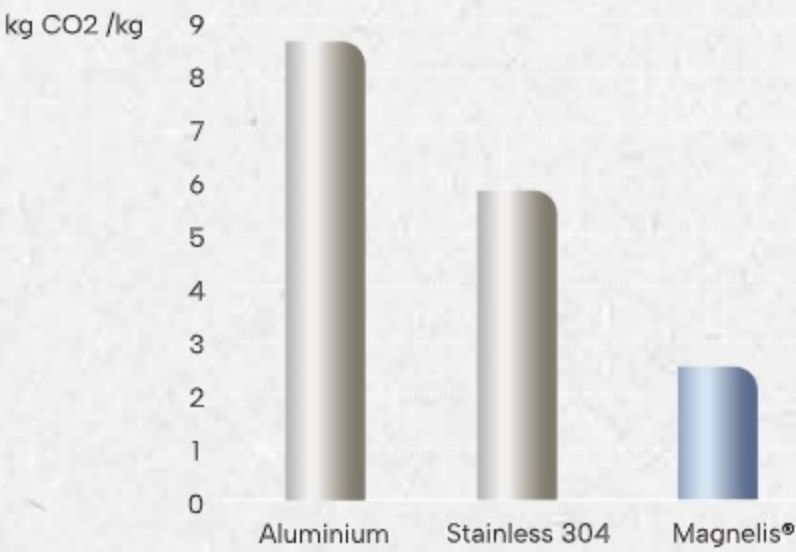
Magnelis® considerably reduces zinc runoff into soil.



* the rate of dissolution of a material from its surface into the soil
Source: French Corrosion Institute

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 Global R&D, European Aluminium Association, World Steel Association, Eurofer



WHY IS **Magnelis®** A VALUE CHOICE?

LONGER LIFETIME

The remarkable corrosion resistance of Magnelis increases the lifetime by a factor of 3 compared to hot dip galvanised solutions (extensively proven in outdoor tests).

MAXIMISES RETURN ON INVESTMENT

Cost advantages over post-galvanised steels

- Freedom to optimise designs due 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 due to simpler fabrication processes

Cost effective compared to stainless steel and aluminium

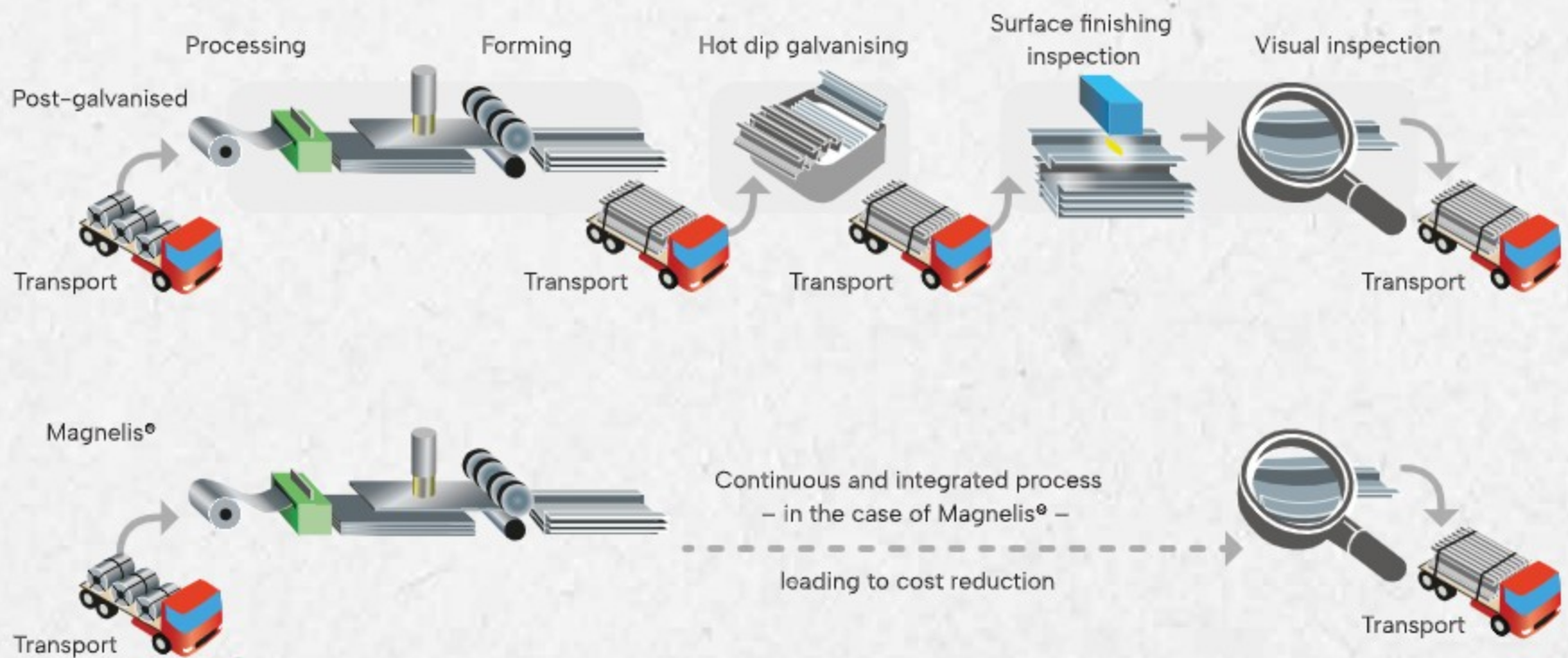
- Magnelis® provides the high level corrosion resistance of stainless steel and aluminium at a significantly lower cost

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



POST-GALVANISED VERSUS MAGNELIS®



TECHNICAL SPECIFICATIONS

Thickness	0.4 – 3.2 mm	
Width	750 – 1650 mm	
Coating	Upto ZM450	
Steel grades:	EN10346 – 2015	
	Commercial Quality	DX 51 D
	Forming Quality	DX 52 D – DX56 D
	Structural Quality	S 250 GD – S550 GD
	HSLA Grades	HX340 LAD – HX 500 LAD
	IS 18513-2023	
	Commercial Quality	IZMCCR0 – IZMCCR1
	Forming Quality	IZMCCR2
	Structural Quality	IZMC300S – IZMC570S
	HSLA Grades	IZMC310LA – IZMC620LA
Surface type	Skinpassed/Non Skinpassed as per requirement	
Surface treatment	Epassivation, Chrome free passivation, Easy film*	

*On request

RANGE OF COATING WEIGHTS

According to EN 10346:2015*

Coating Grade	Minimal total coating mass both surfaces (g/m2)		Theoretical guidance values for coating thickness per surface in the single spot test (µm)	
	IS18513		EN10346	
	Triple Spot	Single Spot	Triple Spot	Single Spot
ZM60	60	50	60	50
ZM70	70	60	70	60
ZM80	80	70	80	70
ZM90	90	80	90	80
ZM100	100	85	100	85
ZM120	120	100	120	100
ZM130	130	110	130	110
ZM140	140	120	140	120
ZM150	150	130	150	130
ZM160	160	130	160	130
ZM175	175	145	175	145
ZM180	180	155		
ZM190	190	160	190	160
ZM200	200	170	200	170
ZM220	220	190		
ZM250	250	210	250	210
ZM275	275	235		
ZM300	300	255	300	255
ZM310	310	265	310	265
ZM350	350	300	350	300
ZM430	430	365	430	365
ZM450	450	385		



Magnelis® AREAS OF APPLICATION

Magnelis® is the preferred material for an increasing number of applications, including solar support structures, light steel framing in construction, agricultural applications and road infrastructure.

SOLAR ENERGY

Magnelis® offers advanced corrosion protection for solar power projects and associated installation structures. With its increased durability, and the best possible protection against corrosion and abrasion, Magnelis® extends the life of solar structures so operators can maximise the return on their investment.

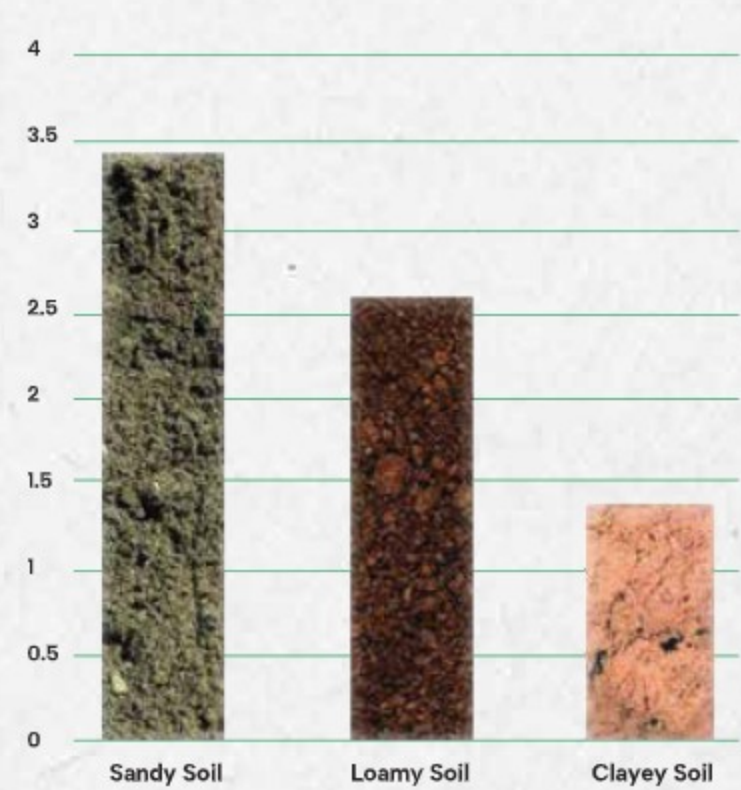
HERE'S WHY MAGNELIS® IS A SMARTER CHOICE FOR THE SOLAR ENERGY INDUSTRY

- Excellent durability
- Improved resistance against abrasion
- Effective against corrosion even when placed in soil
- Large feasibility range both in thickness and steel grade
- Cost effective
- Rapid installation
- Reduces environmental impact

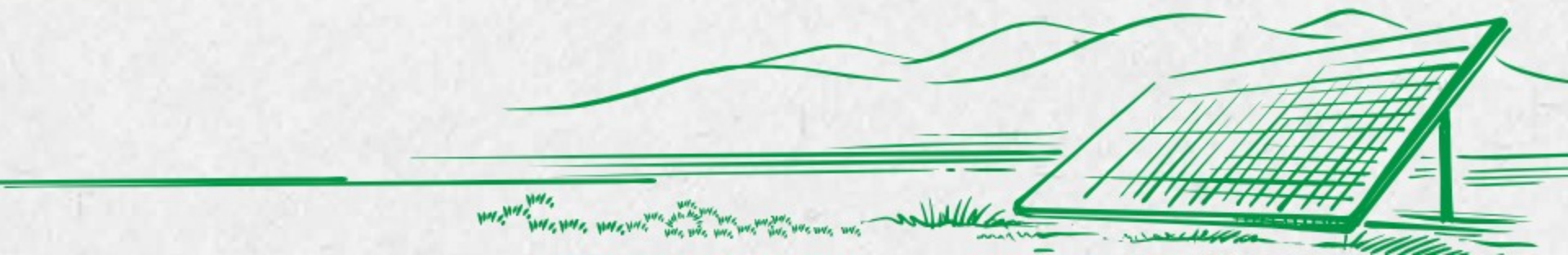


MAGNELIS® SUPERIOR BEHAVIOUR IN SOILS

When it comes into contact with soils, Magnelis® produces a protective film to cover the steel surface. This very dense film acts as a barrier between the steel and the soil, dramatically slowing the progression of corrosion.



Source: ArcelorMittal Global R&D



PLUMBING TUBES

Magnelis® offers a significant advantage when it comes to plumbing tube products. Its self-healing properties on cut edges and welded zones act as a protective barrier for outstanding corrosion resistance.

HERE'S WHY MAGNELIS® IS A BETTER CHOICE FOR PLUMBING TUBES

- Magnelis® offers improved weldability due to its thinner coating and high tolerance to deforming and bending
- The self-healing effect of Magnelis® ensures that joints are protected along seams post welding

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

CYCLIC TEST 3CT (VDA 621-415) AFTER 33 WEEKS OF TESTS



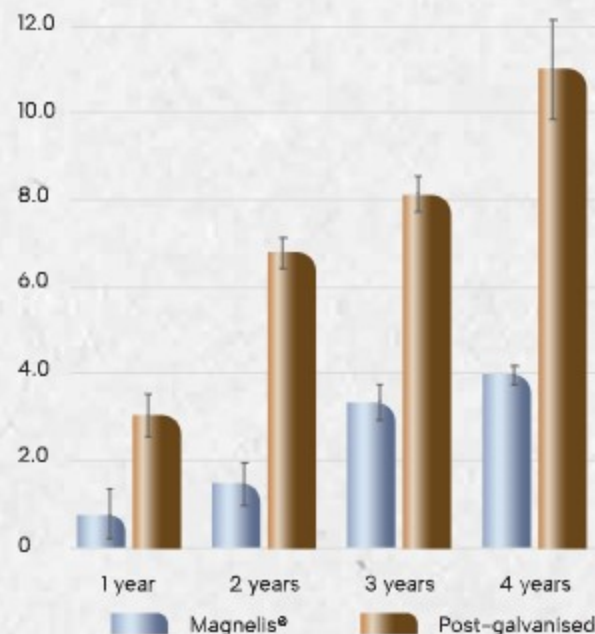
OUTDOOR BUILDING STRUCTURES

Magnelis® is a preferred choice for pre-engineered buildings, roof spans and a wide range of structural applications such as sub-structures of ventilated facades, composite floors, purlins for roofs, side rails for walls, rainwater systems, and light steel framing. It offers corrosion protection during fabrication processes such as bending, drawing, and profiling. Structural elements in direct contact with cement are also highly resistant to corrosion.

HERE'S WHY MAGNELIS® IS A COST-EFFECTIVE CHOICE FOR OUTDOOR CONSTRUCTION

- Profiling processes are facilitated by the excellent forming behaviour and coating adherence of Magnelis® that prevents powdering and ensures excellent workability
- The remarkable self-healing effect of Magnelis® increases the lifetime of structures and ensures higher durability in harsh environments
- Magnelis® increases the level of corrosion protection with a standard metallic coating thickness or provides a similar level of protection with reduced coating thickness
- Magnelis® resists the aggressive alkaline action during concrete curing and is therefore a preferred choice for concrete contact applications
- Structural designs can be optimised without drastic deviations and compromises as Magnelis® is available in a wide feasibility range of high strength steels
- Large and long-life projects can gain significant cost reductions as Magnelis® reduces the need for continuous upkeep such as additional coating or painting. This extended life and low cost of maintenance makes Magnelis® a preferred choice for low Total Cost of Ownership

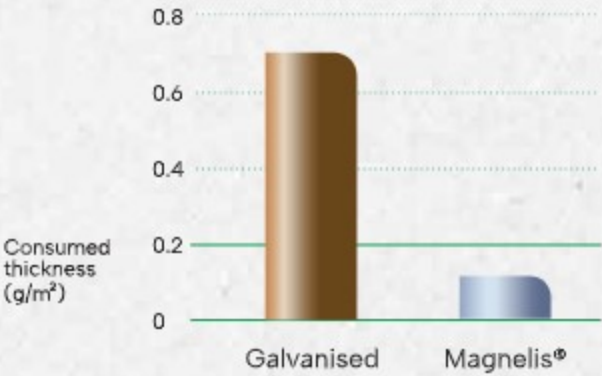
AVERAGE TOTAL COATING CONSUMPTION (µM)
WITH STANDARD DEVIATION



GRAIN SILOS

Magnelis® offers excellent outdoor corrosion protection for silos, wherever they are located. The hard surface of Magnelis® coating reduces the abrasive effect of grain during storage and transfer, while the self-healing properties ensure corrosion protection over dents and deformations that might occur during regular silo operations. Magnelis® is suitable for food contact applications such as the interiors of fermentation silos.

WEIGHT LOSS IN G/M² IN AGRICULTURAL ENVIRONMENTS



Measurement of mass loss:
pH: 11.7 – Solution with 5% NH3 –
T: 20°C – Test duration 24 h
Source: ArcelorMittal Global R&D

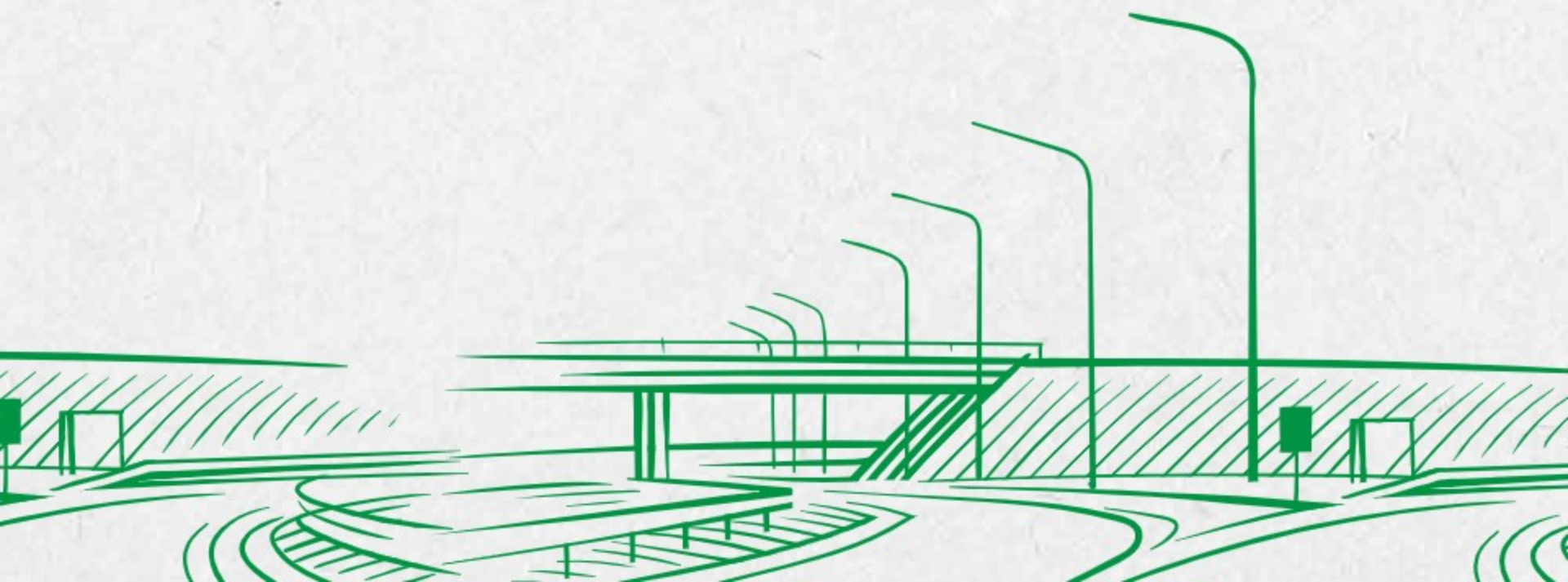


ROAD SAFETY AND CRASH BARRIERS

Magnelis® has been extensively proven in outdoor tests to outperform standard crash barrier steel in corrosion resistance. The unique self-healing coating effect on uncoated edges, scratches and perforations extends the life of the safety barriers significantly. Magnelis® is also the only coated product certified for use in a C5 environment.

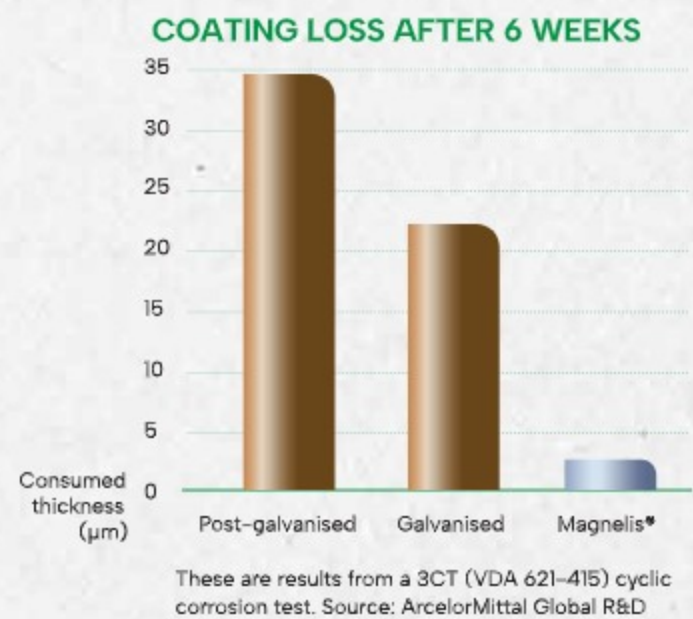
HERE'S WHY MAGNELIS® IS A BETTER CHOICE FOR ROAD BARRIER CONSTRUCTION

- As safety and crash barriers are highly exposed to both weather and soil corrosion actions, the excellent corrosion resistance of Magnelis® is proven to outperform standard options, especially in harsher environments
- With its self-healing behaviour, Magnelis® ensures a high level of corrosion protection for cut edges, deformation and perforations – both at the time of fabrication and outdoor usage
- Crash barrier designs can be optimised to specific design considerations as Magnelis® is provided in a wide feasibility range of thicknesses and grades suitable for road safety infrastructure applications
- 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

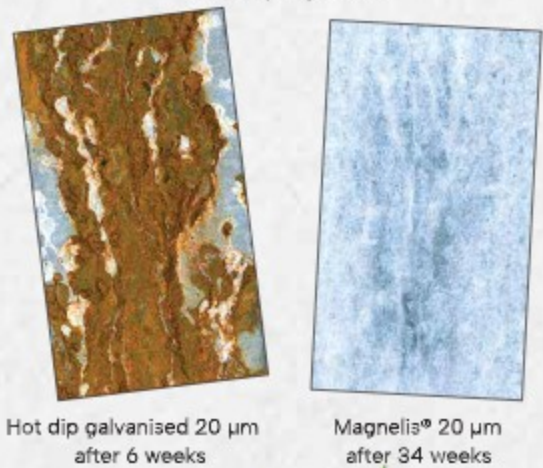


TESTED FOR ASSURED PERFORMANCE

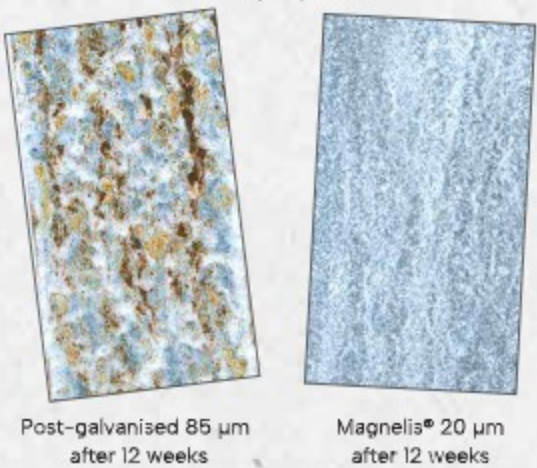
Salt spray and cyclic corrosion test results highlight the superior performance of Magnelis® compared to other metallic coatings. No red rust was observed on steel with a 20 µm coating of Magnelis® after 34 weeks of salt spray testing. Magnelis® offers a real advantage over post-galvanised steel.



MAGNELIS® VERSUS PRE-GALVANISED (salt spray test)



MAGNELIS® VERSUS POST-GALVANISED (salt spray test)



CERTIFIED FOR EXCELLENCE



Scan this QR code to view/download the full list of Magnelis® certifications



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
Scan to know more about the
product attributes


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