

Magnelis® for HVAC systems

High protection against corrosion

Magnelis® is an exceptional steel coating which provides breakthrough corrosion protection. Steels coated with Magnelis® are highly suitable for heating, ventilation, and air conditioning (HVAC) equipment in many types of buildings including: residential, commercial, industrial, data centers, hospitals, marine structures, warehouses, waste treatment plants, swimming pools and sports centers, and agricultural buildings and animal housing.

HVAC equipment is often at risk of oxidation due to condensation or the aggressive atmospheres found in industrial and agricultural buildings. The local environment can also play a part, particularly if the building is located in a marine or tropical climate.

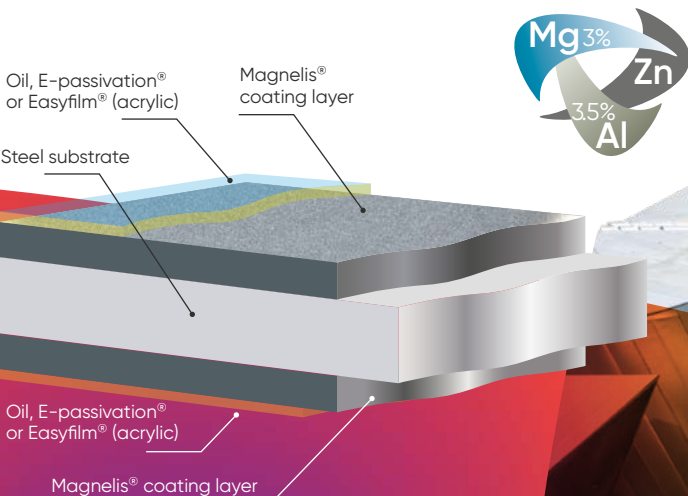
These factors can impact the HVAC equipment's structural integrity, its external appearance, and the overall durability of the HVAC system.

What is Magnelis®?

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 continuous hot dip galvanizing line which molten bath has a unique chemical composition including zinc, aluminum, and magnesium.

This innovative coating alloy, compatible with high strength steels, is an ideal solution for durable casings, frames, structures, ducts, ventilators, blades, supports, containers, air handling units and ventilation grills in HVAC systems.



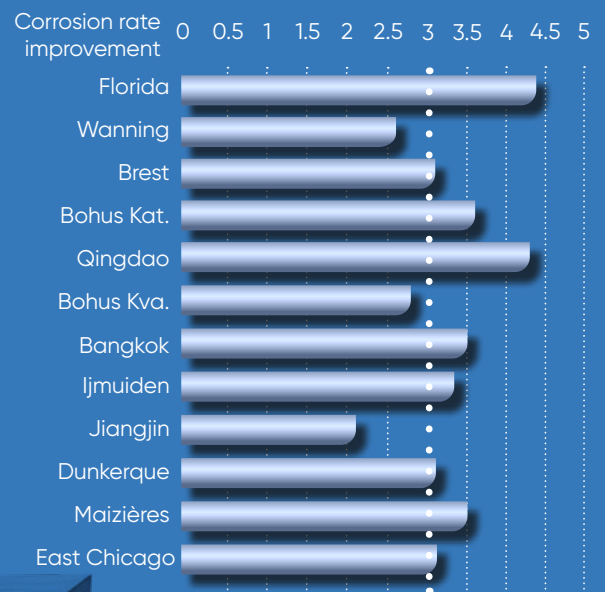
Proven outdoor corrosion resistance

HVAC equipment can be at risk of corrosion due to condensation or extreme environments. This makes durability a key consideration when selecting materials for HVAC systems. As a durable coating with excellent corrosion resistance properties, Magnelis® is ideally suited for HVAC applications.

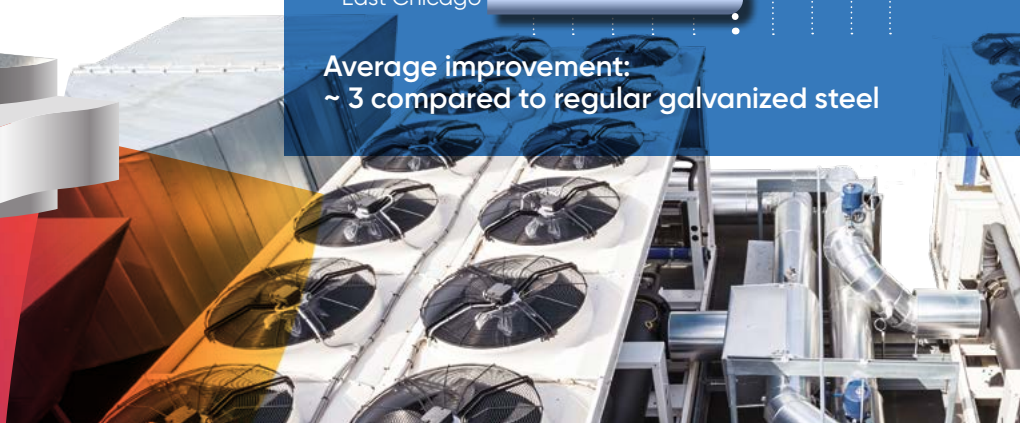
More than a thousand Magnelis® samples have been exposed to a variety of different environments around the world in outdoor tests.

Every test has confirmed the optimal protection provided by Magnelis® against long-term corrosion. Magnelis® offers at least twice the corrosion resistance of galvanized steel in all types of environments. In very aggressive environments, the performance of Magnelis® is even higher.

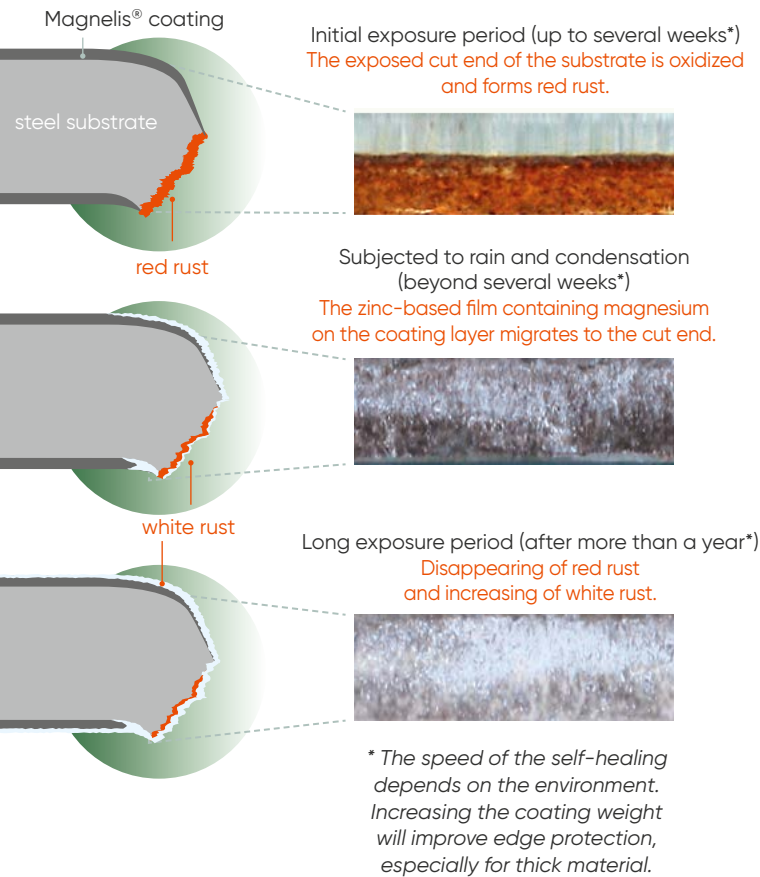
Improvement factor between Magnelis® and regular galvanized steel in field testing



Average improvement: ~ 3 compared to regular galvanized steel



Technical features of Magnelis®



Edge protection with self-healing effect

Steel sheets are typically punched, perforated, and assembled to create complete electrical systems. The self-healing effect of Magnelis® ensures the protection of cut edges, scratches, and perforations.

When exposed to the environment, Magnelis® forms a very dense, protective film, unlike galvanized coatings where the film is very porous. If red rust is present on uncoated zones, it will gradually be covered by a film of Magnelis®. The speed of this effect depends on local environmental conditions and Magnelis® coating thickness.

It is almost impossible for the environment to penetrate this film. The result is perfect protection of the whole structure, even when the coating is scratched, cut, or perforated.

Technical specifications

Coating designation	ASTM A1046M	ZMM90	ZMM120	ZMM180	ZMM300	ZMM450	ZMM600
	ASTM A1046	ZM30	ZM40	ZM60	ZM100	ZM140	ZM210
Coating mass (total both sides)	g/m ²	90	120	180	300	450	620
	oz/ft ²	0.30	0.40	0.60	1.00	1.40	2.00
Coating thickness	µm/per side	7	10	14	24	36	50
	mils/side	0.28	0.38	0.55	0.94	1.41	1.95
Surface treatment	E-Passivation® (CrVI-free), Easyfilm® (acrylic), Oiled						
Thickness	0.016 to 0.236 inches (0.4 to 6.0 mm)						
Width	Up to 66 inches (1680 mm)						
Steel grades*	CS Type A, B and C Grades 50 up to 100 (including high-elongation grades)						

* The coating weight selected must match the environment where the HVAC equipment will be installed. ArcelorMittal can advise the appropriate coating weight for each application and location.

Air and ventilation systems

Air handling units, ducts, air filters, humidifiers, ventilation systems, smoke/heat exhaust fans, air diffusion equipment, industrial fans, heat exchangers, drain pans, dampers, silencers

Indoor air quality is a key consideration in modern building design and a key driver for HVAC systems design. Due to its excellent resistance to corrosion, Magnelis® limits the formation of oxide particles which affect air cleanliness. It is also free of volatile organic compounds (VOCs). The excellent scratch resistance of Magnelis® also limits damage caused by maintenance during the system's lifetime. This significantly improves the durability of air and ventilation systems.



Magnelis® ZMM120 can be used as an alternative to G90 galvanized steel. Magnelis® provides at least equivalent corrosion protection plus an improved cut-edge protection.

Within an air handling unit, all metal parts must be corrosion-resistant.



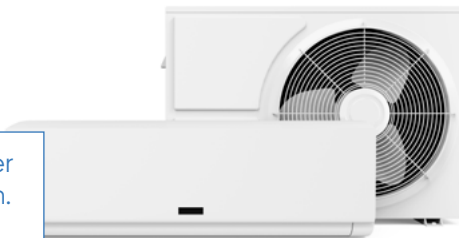
Benefits of using Magnelis®:

- Improved durability
- Reduced maintenance costs
- Suitable for retrofitting and re-use for a second life
- Better behavior in roll forming and bending operations thanks to a low friction coefficient
- Resistance to fire: non-combustible
- Coating is free of VOCs

Cooling and refrigeration systems

Air conditioning equipment, cooling towers, cooling exchangers, water chillers, compressors, transport refrigeration systems

Durability is a key requirement for air conditioners and cooling systems in any environment. Magnelis® is certified for use in C5 marine environments and can resist corrosion in extreme outdoor conditions. The durability of Magnelis® leads to an increase in the service life of HVAC equipment, particularly in marine and tropical climates. Magnelis® can be applied on high strength steels up to Grade 100 (including high-elongation grade).



In extreme outdoor conditions, choose a thicker Magnelis® coating to protect against corrosion. In C5 environments, the appropriate coating weight for HVAC equipment is ZMM300 or higher.

Benefits of using Magnelis®:

- Improved durability
- Less maintenance thanks to self-healing effect and improved scratch resistance due to the hardness of the Magnelis® coating
- Better behavior in roll forming and bending operations due to lower friction coefficient
- Improved corrosion resistance after painting
- Cost-effective solution compared to aluminium and stainless steel

Heating systems

Boilers (gas, oil, biomass), burners, fume extraction systems, buffers, radiators, heat pumps

Heating systems can be at risk of corrosion due to condensation inside the equipment or if they are installed outside. Magnelis® provides better corrosion protection and a longer life for the internal and external surfaces of heating equipment.

Magnelis® ZMM450 or ZMM620 can be used as alternative to stainless steel.



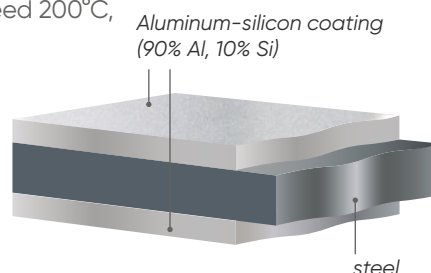
Benefits of using Magnelis®:

- Resistance to fire: non-combustible
- Improved scratch resistance
- Ensures the durability of heating systems and lower maintenance costs

If the temperature of the heating system will exceed 200°C, ArcelorMittal recommends aluminum-silicon metallic coated offering:

- Heat resistance up to 800°C
- Heat reflectivity
- Corrosion resistance
- RoHS compliance

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Protected by Magnelis®

Magnelis® for HVAC in a nutshell

Benefits at every stage of a HVAC system's lifecycle.

Manufacturing

- Excellent manufacturability (forming, welding, painting...)
- Cost savings possible when used as a substitute for aluminum or stainless steel

In use

- Lower maintenance costs
- Reduced oxidation
- Improved scratch resistance, healing effect on cut edges, and cleanliness
- Increased service life

End-of-life

- Suitable for reuse and remanufacturing
- Can be easily removed from waste streams with magnets
- 100% recyclable



More information about Magnelis®

Visit the Magnelis® homepage at industry.arcelormittal.com/magnelis

Documentation available:

- Safety datasheet
- Environmental product declaration (EPD)
- Corrosion certificate
- Fire certificate
- RoHS certificate



Visit also

industry.arcelormittal.com/HVAC

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ArcelorMittal International America, LLC

1 N. Wacker Dr., Ste. 2905

Chicago, IL 60606 USA

T +312 777 1879

Magnelis.USA@arcelormittal.com



ArcelorMittal

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