

MAGNELIS[®]

A REVOLUTION IN ONE WORD

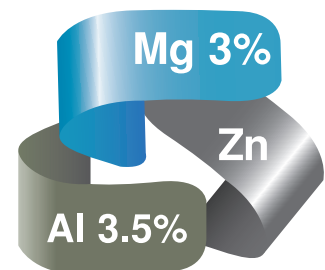
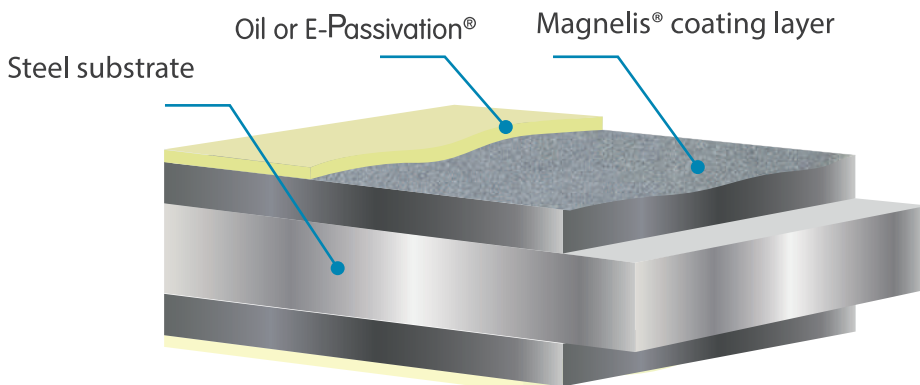
The durable, corrosion resistant and environmental responsible tube coating.

Magnelis[®] is a **special coating alloy**, which provides a real breakthrough in corrosion resistance thanks to its unique composition, **including zinc, 3.5% of aluminum and 3% magnesium**. Basically, a standard steel strip is dipped into a molten bath of this metallic coating and the result is a new and groundbreaking material.

Magnelis[®] creates a **stable and durable layer of protection** on the steel substrate, which thanks to its precise composition can outperform other coatings containing less magnesium and aluminium.

MAGNELIS[®] TUBES IN A NUTSHELL

- Outstanding corrosion resistance;
- Long-lasting quality;
- Excellent edge protection thanks to the self-healing effect;
- Environmentally sustainable;
- Best alternative to galvanized steel tubes;

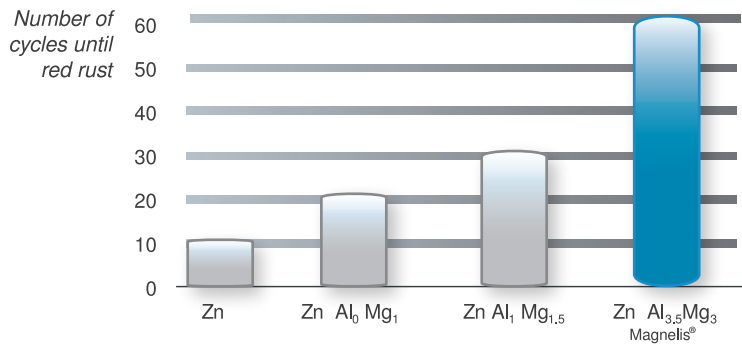


At first glance, the aesthetic difference between a galvanized and a Magnelis® tube is almost imperceptible, but if we look more carefully, the Magnelis® one is slightly less shiny since this metallic coating has a naturally dark grey aspect, which makes the tube more similar to an aluminized one rather than a galvanized.

Eurotubi's production range for galvanized tubes goes **from Ø40 mm to Ø304 mm with 1.5 mm to 4.5 mm**

as to wall thickness, and it is the widest in Europe. This same range of measures is now available also for **Magnelis® coated tubes**, which are all **fin cut** and **perfectly welded**. This metallic coating can be applied to a wide variety of steel grades, as shown below. Moreover, the new Magnelis® tubes undergo an eco-friendly E-Passivation®, can be post-painted without changing their **incredible corrosion resistance**, and ultimately they are oiled.

Corrosion resistance in recurring testing on different Zn, Al, Mg compositions



Production Range

Diameters: Ø40 mm to Ø304 mm

Wall Thickness: 1.5 mm – 4.5 mm

Surface Treatment: O (oiled) / E (E-Passivation®)

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

Coating Designation

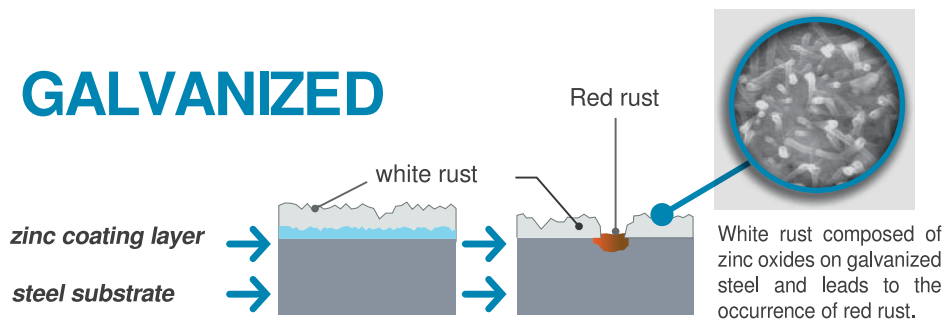
Coating Designation	ZM70	ZM90	ZM120	ZM175	ZM200	ZM250	ZM310	ZM430
Coating Mass (both sides) g/m ²	70	90	120	175	200	250	310	430
Coating Thickness µm/per side	5	7	10	14	16	20	25	35



Outstanding Corrosion Resistance

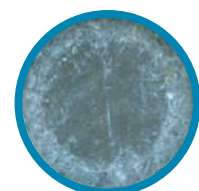
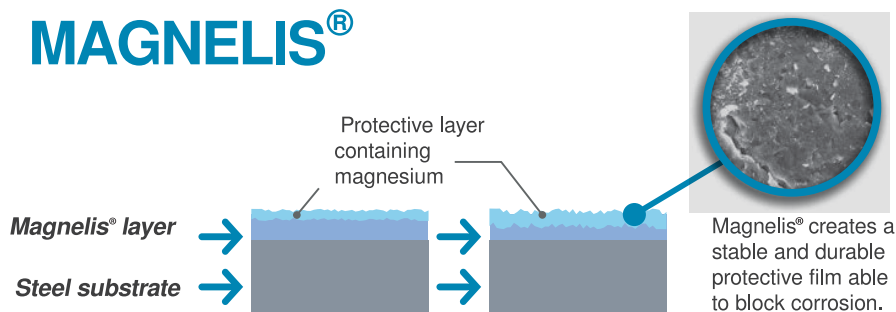
Magnelis® coating acts as a barrier to corrosion and prevents the creation of red rust. This is a key advantage of Magnelis® tubes compared to galvanized ones. In fact, if zinc coated tubes will generally oxide when in contact with the external environment due to the porous structure formed by the coating, Magnelis® ensures the **maximum resistance both on flat and even on highly deformed areas** (bending and profiling) thanks to its precise composition, which creates a **very dense protective film that blocks corrosion**. This was deeply observed during the several laboratory tests performed by ArcelorMittal, one of the best and most important steel producers worldwide, who has developed this particular coating. More precisely, after 6 weeks of salt spray testing, no red rust has been observed on Magnelis® strips compared to galvanized ones. For this reason, we can state that for the environment it is almost **impossible to pierce this magnesium-based film, even after long exposures, making this material a proof of long-lasting quality**.

GALVANIZED



Galvanized Z275 after 1440 hours of salt spray testing.

MAGNELIS®



Magnelis® ZM120 after 1440 hours of salt spray testing. No red rust observed after salt spray testing on Magnelis® strips compared to galvanized ones.

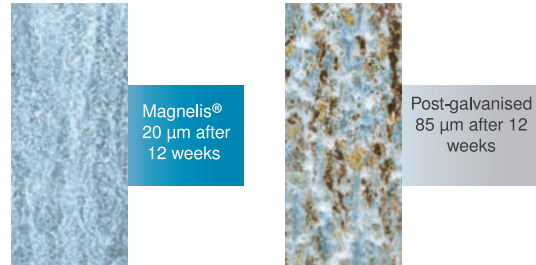


Salt spray testing results

Magnelis® versus pre-galvanized



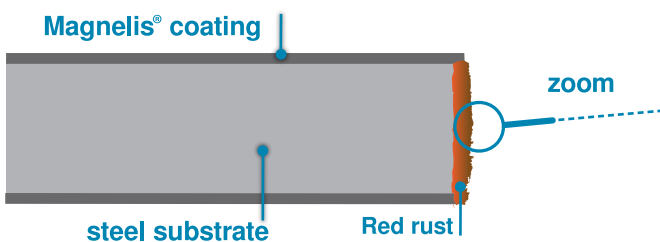
Magnelis® versus post-galvanized



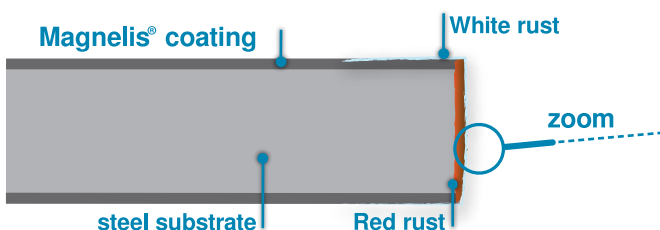
Have you ever heard of *self-healing effect*?

Another unique characteristic of the Magnelis® coating is the so-called *self-healing effect*. By this term, we intend its **ability of creating a protective layer also on uncoated edges, perforations and scratches**. For example, if a galvanized tube gets unfortunately scratched, red rust appears immediately all around the damaged area. On the contrary, if this happens on a Magnelis® coated tube, the red rust will be gradually covered by the magnesium and aluminum alloy composing our special coating and, at the end of the process, red rust will be substituted by white rust.

By so doing, we can definitely state that **Magnelis® tubes are able to self-repair** therefore protecting both the surface and deformed zones, especially on the welded area which is one of the weakest points as to corrosion. This advantage extends well beyond **the life of the Magnelis® welded tubes compared to post-galvanized ones**.

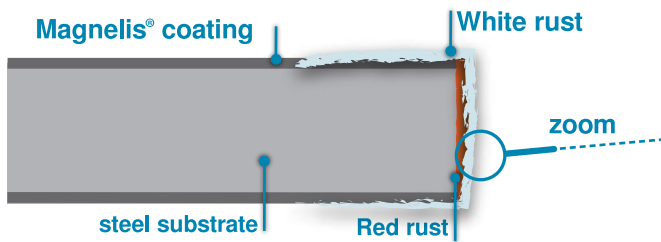


Initial exposure period (up to several weeks*)
The cut or scratch oxidizes and forms red rust.



After rain and condensation exposure (beyond several weeks*)
The zinc-based film containing magnesium and aluminum migrates over the cut or scratch.





Longer period of exposure (after more than one year*)
Red rust disappears and white rust increases.



*All measurements performed by ArcelorMittal.
The speed of the self-healing depends on the environment.

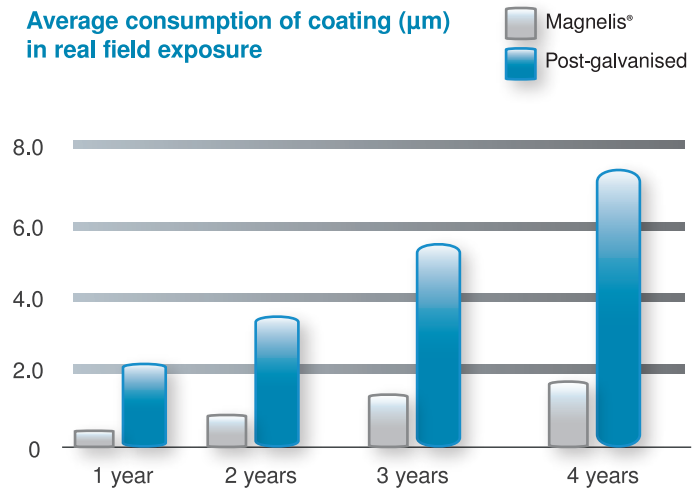
The exceptional coating for a wide range of applications

Tubes manufactured by Magnelis® steel strips are **up to three times more resistant to corrosion than galvanized ones**, even in the most hostile environments. Indeed, Magnelis® tubes showed an improved durability in every external environment compared to both pre- and post-galvanized tubes.

For this reason, Magnelis® tubes are the best choice for **outdoor applications** such as in the **agricultural sector**, in which they can be used to manufacture screw conveyors, animal housing or grain storage systems. In particular, they are widely used in the construction of silos, since their specific composition reduces the abrasive effect of grain and other cereals on the internal part of the tube. Moreover, Magnelis® tubes can make the difference even in viticulture, where they are generally employed as vineyard poles or for the building of greenhouses.

Another field in which our Magnelis® tubes are the right option is the **building sector**, especially for industrial doors or geodesic domes manufacturing. In fact, in the construction industry, Magnelis® coating can be the optimal solution when it comes to safety barriers, lightening poles, bridge parapets and many other infrastructure applications.

Average consumption of coating (µm) in real field exposure



Agriculture



Building



Why choose Magnelis® over hot-dip galvanized?

Magnelis® Vs Galvanized

Anti-corrosion properties

Outdoor corrosion	+++
Agricultural applications (animal housing, greenhouses, silos...)	+++
Industrial environments (acid- or alkaline-rich environments)	+
High humidity	+++
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	++



The environmental sustainable choice

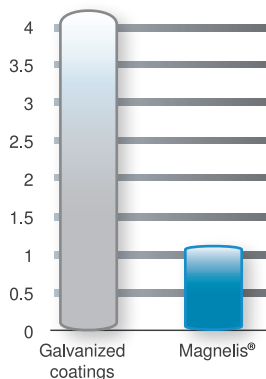
Magnelis® is a real **eco-friendly material**, therefore by choosing it you can definitely contribute to the creation of a cleaner and more sustainable world.

In fact, **CO₂ emissions** associated with the production of Magnelis® are **much lower** than with the production of aluminum or stainless steel. For this reason, **Magnelis® carbon footprint** is substantially **smaller compared to other highly durable materials**.

The use of Magnelis® also makes it possible to **reduce the extraction of zinc from the soil** by limiting its depletion. This is because significantly less zinc is used in the production of Magnelis® than, for example, pure galvanized coatings.

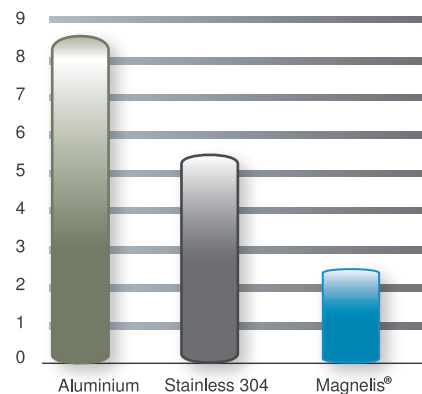
Moreover, **Magnelis® is 100% recyclable and contains no harmful elements**.

**Zinc depletion rate
into the soil**



g/m²/year

**CO₂ emission per 1 kg
of material produced**



Kg CO₂/Kg

Magnelis® commitment to the environment is not limited to its special characteristics, but it goes much beyond supporting the generation of green and renewable energy. Indeed, **Magnelis® tubes** can be used for the **building of Photovoltaic Solar Farms (PV)** or **Concentrated Solar Power Plants (CSP)** because it ensures the maximum durability against corrosion and abrasion even placed in soil or in desert environments.

