SILOS CORDOBA

Magnelis Coating Presentation

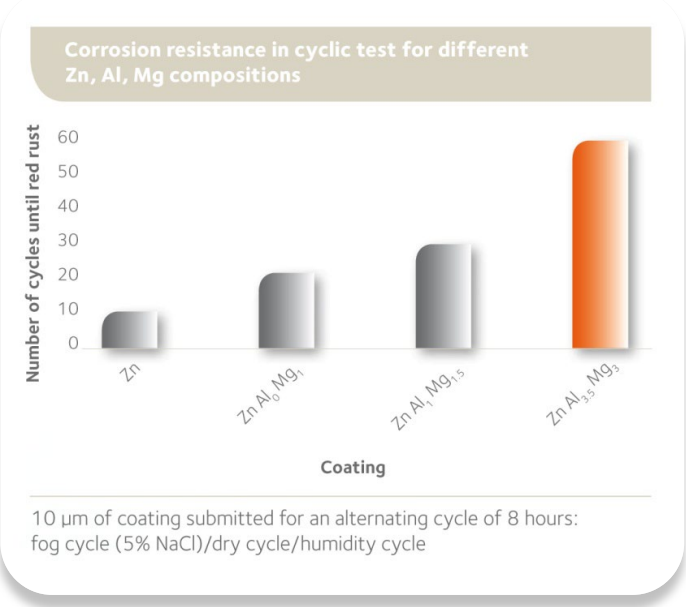
Magnelis Coating

Silos Córdoba has introduced an innovative metallic coating that offers protection in the harshest environments.
It is an exceptional, new metallic steel coating providing surface protection in a variety of applications against long-term wear and tear.
This unique coating offers a combination of attributes and provides:

- ✓ **The best corrosion resistance performance; up to 10 times better than galvanised steel**
- ✓ **The best suited protection to withstand harsh environments**
- ✓ **The most cost-effective alternative to the post-galvanised process**

The chemical composition of this coating has been optimized to provide the best corrosion-resistance results.:

It is produced on a classic industrial hot dip galvanising line, but dipped in a molten bath with a unique metallic chemical composition of zinc with 3.5% aluminium and 3% magnesium. The 3% magnesium is crucial as it creates a stable and durable layer across the entire surface and gives a far more effective corrosion protection than coatings with a lower magnesium content. As such, this coating offers significantly superior performance than alternative European products.



10 µm of coating submitted for an alternating cycle of 8 hours: fog cycle (5% NaCl)/dry cycle/humidity cycle

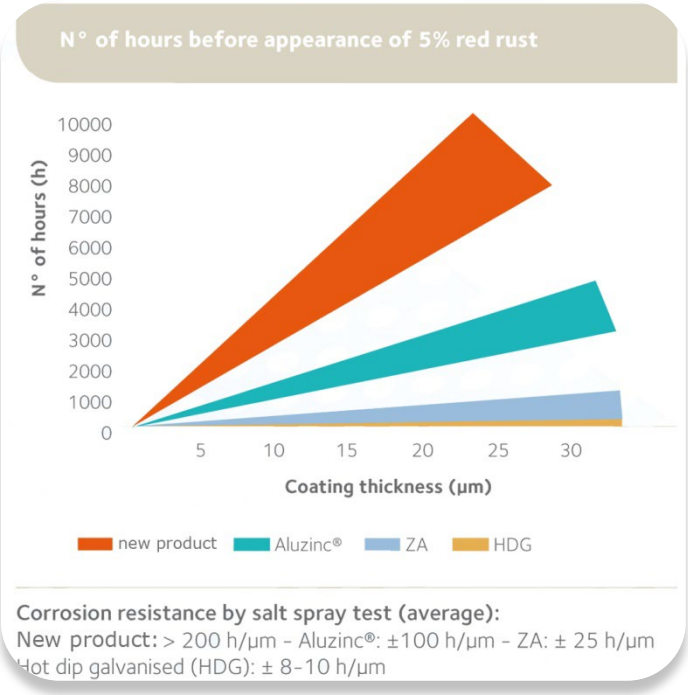
Magnelis Coating

Key benefits – Superior corrosion resistance

Nothing offers better protection than this new coating in chloride or ammonia environments. Due to its unique chemical composition, it provides superior corrosion resistance than standard hot dip galvanised steel.

The destruction of coating that occurs in an ammonia environment is seven times less with this new coating than with a standard zinc coating. In addition, it guarantees a longer-lasting, active coating protection over time.

Over an eight-month period, a range of metallic coated products were submitted to salt spray tests. The results clearly highlighted the superior corrosion resistance performance of the new coating over other metallic coatings. No red rust was observed on the product sample.



Corrosion resistance by salt spray test (average):
New product: > 200 h/µm - Aluzinc®: ±100 h/µm - ZA: ± 25 h/µm
Hot dip galvanised (HDG): ± 8-10 h/µm

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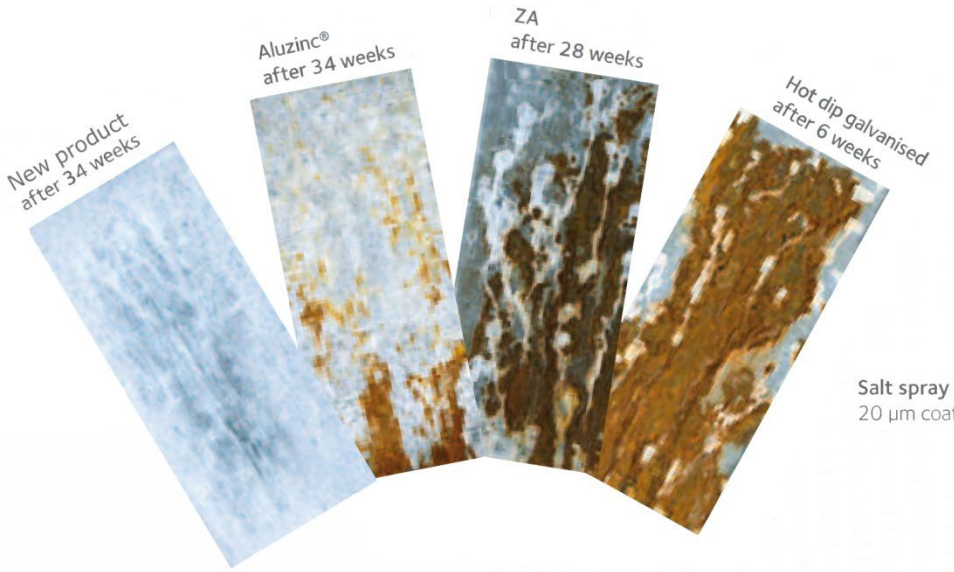
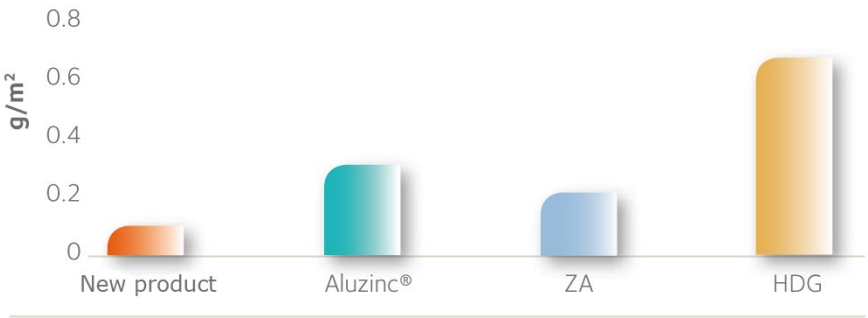


Salt spray test
20 µm coating per side

In highly alkaline environments (pH between 10 and 13), the new product demonstrates superior corrosion resistance compared to other metallic coatings.
Due to its chemical composition, the product has better quality characteristics in terms of barrier protection against corrosion in an ammonia environment.

Weight loss in harshest environments



Measurement of mass loss
pH: 11.7 - Solution with 5% NH_3 - T: 20°C - Test duration 24 h

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Key benefits – Self-repairing protection on cut edges

In addition to being fortified by a cathodic protection equivalent to zinc coating, the new product protects exposed cut edges with a thin zinc-based protective film with magnesium, which prevents corrosive reactions. The nature of this film varies depending on the environment and the properties according to the aluminium and magnesium content.

6 months
30-40% red rust - 60% white rust

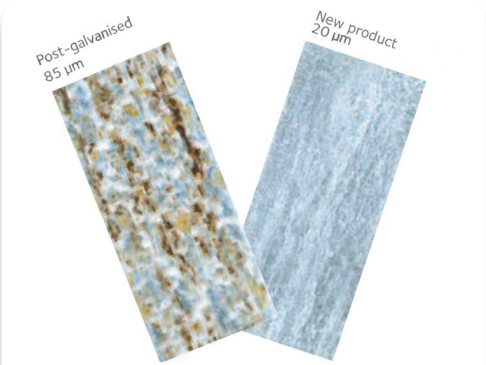
16 months
10% red rust - 70% white rust

Outdoor exposure over different time periods of New product with 2 mm thickness in Brest (France)
Marine category C5-M (the most severe)

Key benefits – An alternative to post-galvanising and other metals

The new product offers a real advantage over post-galvanised products (with a ZM coating weight greater than 250 g/m²) and even over high value products such as stainless and aluminium.

Depending on the environment to which it is exposed, the new product delivers a significant coating weight reduction of 2 to 4 times less than post-galvanised products, while still performing significantly better in terms of corrosion resistance and cost-effectiveness.



Salt spray test 2000 hours
Post-galvanised 85 µm coating **New product** ZM250/20 µm coating

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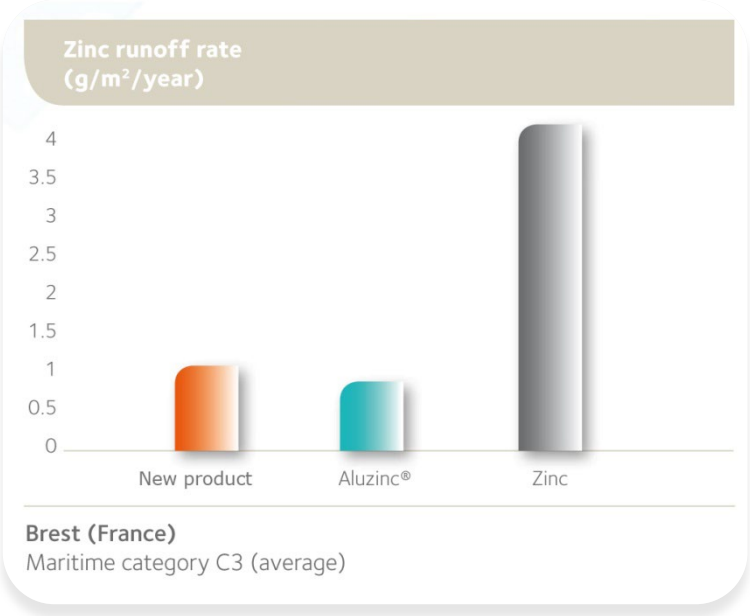
Key benefits – Environmentally responsible

The application of the new product ensures the preservation of natural resources since it uses less zinc than pure zinc coatings. Moreover, like Aluzinc®, the new product reduces considerably the zinc runoff* in soils.



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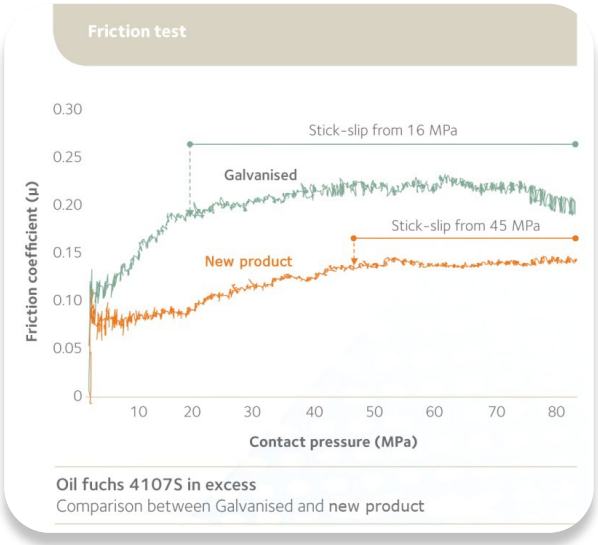
Excellent workability

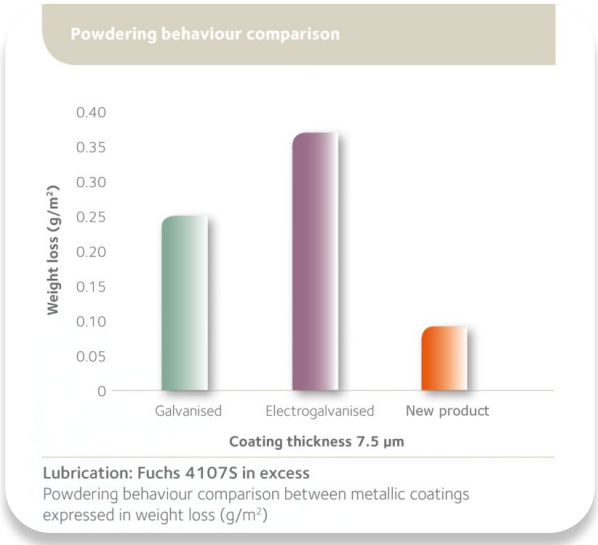
Thanks to its highly resistant, adherent metallic layer, the new product can be formed in a variety of methods, including bending, drawing, profiling etc.

By decreasing the amount of metallic coating, while safeguarding corrosion resistance levels, spot welding is consequently improved. A protective oxide barrier covers the weld, preventing the development of red rust. Thinner coating facilitates processing and delivers substantial savings.

The new product performs three times better than standard galvanised steel, reduces powdering effect and loses less coating weight in processing tools.



Oil fuchs 4107S in excess
Comparison between Galvanised and new product



Lubrication: Fuchs 4107S in excess
Powdering behaviour comparison between metallic coatings expressed in weight loss (g/m²)

Metallic coatings features comparison

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Product features	HDG Zn	ZA	Aluzinc®	New product
Anti-corrosion properties				
In a chloride environment (marine site, swimming pool)	Reference	+	++	+++
In an ammonia environment (stable, farm, greenhouse)	Reference	+	=	++
In an SO_2 environment (acid industrial environment)	Reference	+	++	+
Temporary protection (transport, storage)	Reference	+	+++	+++
Edge protection (heavy gauge, perforated sheet)	Reference	+	–	+++
Corrosion of a deformed part (bent or stamped)	Reference	+	–	++
Forming properties				
Bending & roll-forming	Reference	=	–	+
Drawing	Reference	+	–	+
Assembling properties				
Spot welding (equivalent thickness)	Reference	–	– –	=
Aspect				
Visual appearance	Reference	–	+	=

= Equivalent *+ Superior* *– Inferior*

Range

New product coating range	ZM90	ZM120	ZM175	ZM195	ZM250	ZM310
Coating thickness (µm/per side)	7	10	14	16	20	25
Steel grades	DX51D to DX57D +ZM HX260LAD to HX420LAD +ZM		S220GD to S390GD +ZM		H240D +ZM	
Surface aspect	MA		MB			
Surface treatment	C (E-Passivation® CrVI-free)		O (oiled)			
Thickness range	From 0.45 mm to 2 mm					
Width range	Up to 1630 mm					

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