

Building Systems UK

A Tata Steel enterprise



MagiZinc[®]

Innovative replacement for conventional galvanised steel





What is MagiZinc®?

MagiZinc® is an innovative replacement for conventional galvanised steels. It provides superior corrosion protection even in harsh environments.

A product that performs...

MagiZinc® provides superior protection, extending product life and offering excellent formability and weldability. It is a hot-dip zinc coating alloyed with magnesium and aluminum.

A chromium-free passivating agent makes MagiZinc® compatible with common paint systems.





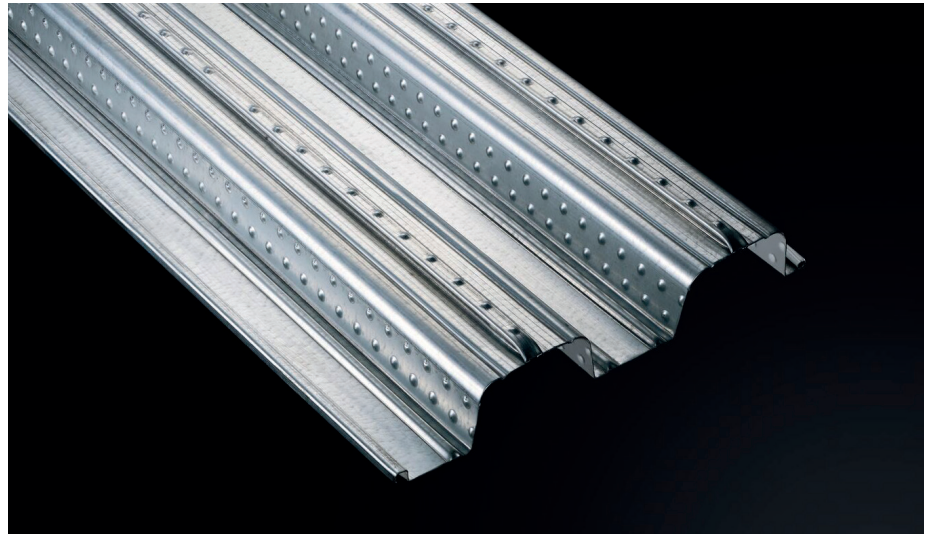
ComFlor® & RoofDek MagiZinc® Products

ComFlor® MZ140

Our ComFlor® composite metal floor decking with a 140g/m² MagiZinc® coating weight.

ComFlor® MZ310

Our ComFlor® composite metal floor decking with a 310g/m² MagiZinc® coating weight.



RoofDek MZ140

Our structural RoofDek product with a 140g/m² MagiZinc® coating weight.

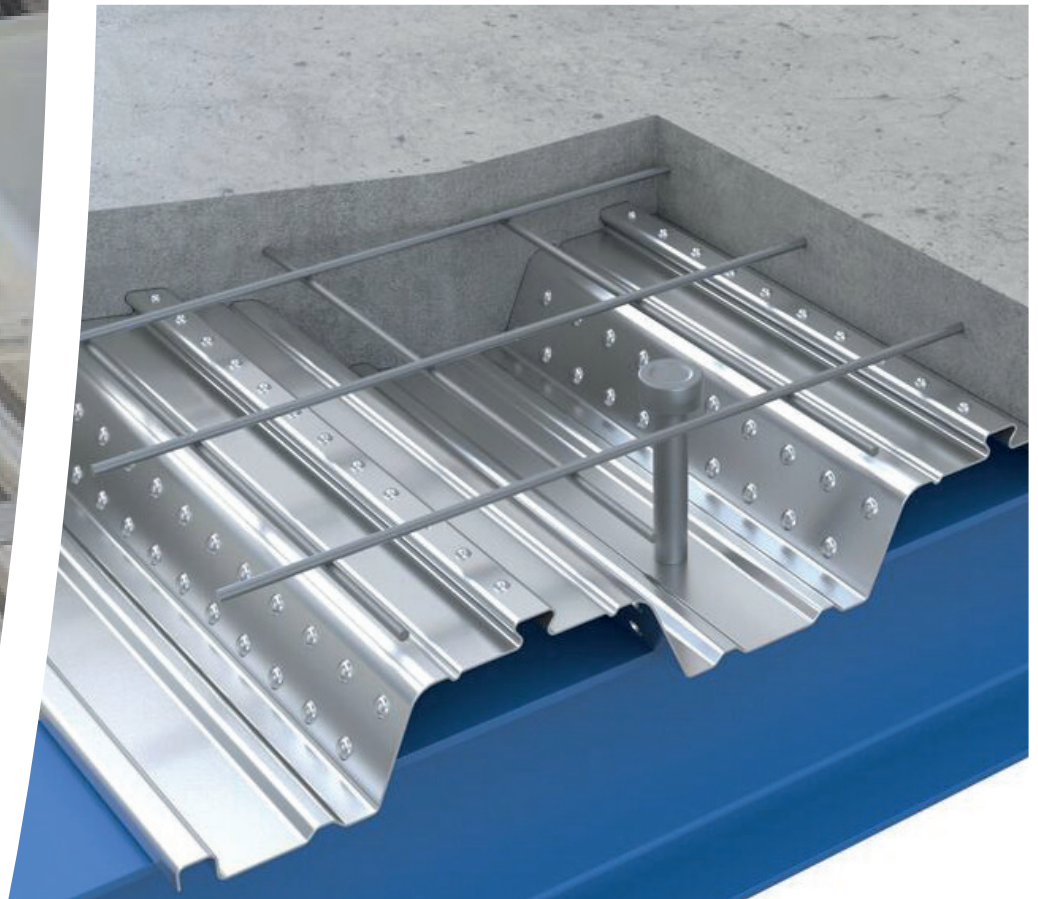


Why use MagiZinc® on our ComFlor® and RoofDek products?

The testing work undertaken on our roofing and floor decking products with the MagiZinc® coating shows an improved product performance over our standard galvanised coating.

We have built up a significant amount of test data on our MagiZinc® products which provides evidence for improved product performance through the life of your project.

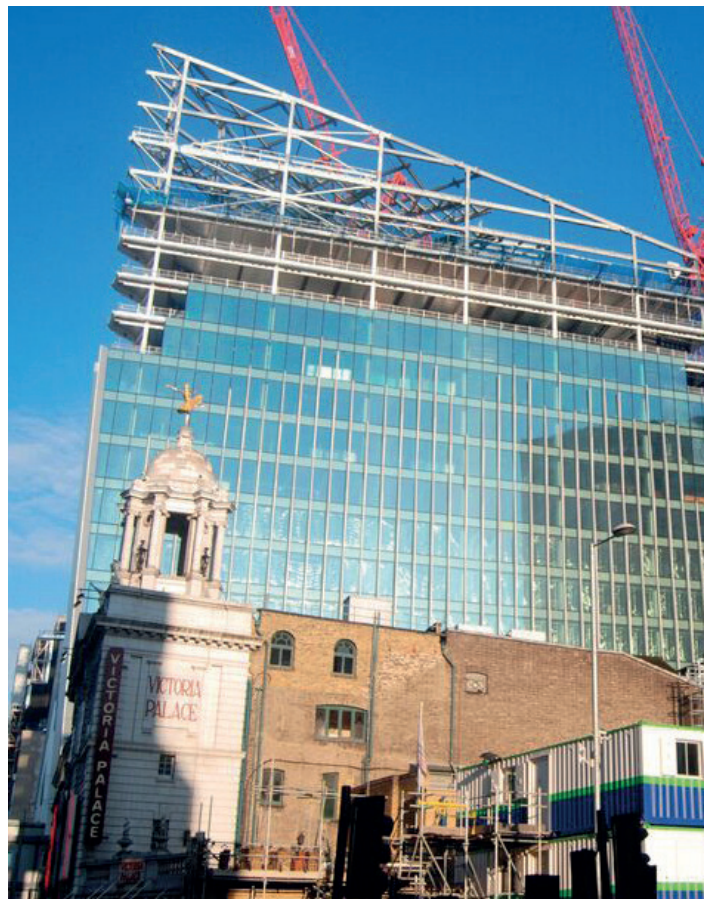

Our ComFlor® and RoofDek MZ140 and MZ310 products have a lower whole life carbon performance when compared with standard Z275 galvanised coating. Our ComFlor® and RoofDek MZ products have lower coating embodied carbon when compared with standard Z275 galvanised coating.




Improved corrosion performance and resource use

Superior corrosion protection to extend product life.

- Our ComFlor® & RoofDek MZ140 products deliver a 37% reduction in coating CO₂ when compared with Z275 galvanised coating.
- The coating process for our MZ products requires fewer resources but delivers improved product performance.
- Our ComFlor® MZ310 is a premium product delivering enhanced durability over the whole life of your project.
- Tata Steel has over 60 years experience of galvanising and coating steel.

37% Lower coating CO₂ *



Lower whole life carbon



Shorter lead time



60 years of coating experience

* ComFlor® & RoofDek MZ140

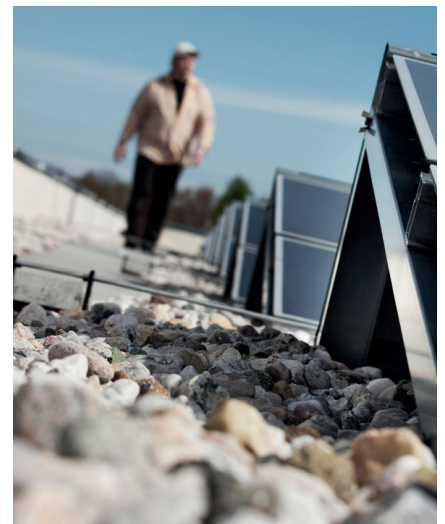
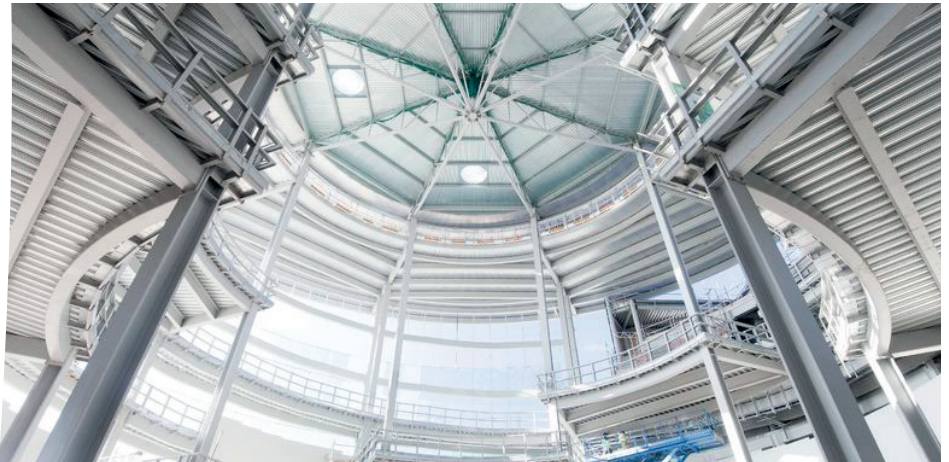
MagiZinc®

A new, advanced solution for ultimate corrosion protection...

MagiZinc® was developed over ten years ago by Tata Steel. During that time, it has been thoroughly tested in renewable, automotive and construction applications, and has accrued many years of practical use in a wide range of environments.

Based on our experience of design, manufacture and supply of metallic coated structural composite floor decking for over 60 years, our enhanced ComFlor® MZ310 product with MagiZinc® has an expected life to first maintenance of up to 50 years in a C3 environment.

The expected life to first maintenance is the estimated duration of effective protection of the composite floor decking by the MagiZinc® coating against perforation.





Testing results

Type	Reference	Standard / Institution	Outcome
Durability	External Exposure (Z vs ZM)	Brest (C4) / French Corrosion Institute	Mass loss results after one year of exposure show double mass loss for Z275 Vs ZM140
	Salt Spray Flat Samples (Z275g/m ² vs ZM140g/m ²)	ASTM B117	Visual inspection – MagiZinc® improvement
	Salt Spray Forming / Draw Samples (Z275g/m ² vs ZM140g/m ²)	ASTM B117	Visual inspection – MagiZinc® improvement
	Salt Spray Forming Samples - 180 degree bend (Z275g/m ² vs ZM140g/m ²)	ASTM B117	Visual inspection – MagiZinc® improvement
	Salt Spray Laser Welding (Z275g/m ² vs ZM140g/m ²)	ASTM B117	Visual inspection – MagiZinc® improvement
	Salt Spray Spot Welding (Z275g/m ² vs ZM140g/m ²)	ASTM B117	Visual inspection – MagiZinc® improvement
	Salt Spray ComFlor® Profiled Samples (Z275g/m ² vs MZ140)	ASTM B117	6 week salt spray results clearly showing MZ140 superiority. Average mass loss to Z275g/m ² three times that of MZ140
	Humidity ComFlor® Profiled Samples (Z275g/m ² vs MZ140 & MZ310)	ASTM D2247	Mass loss of samples in Humidity chamber showing a 118% greater mass loss on Z275g/m ² vs MZ310
Application	Cast concrete exposure (Z275g/m ² vs MZ140 & MZ310)	Swansea University Study	Neither of the 3 coatings experienced any significant damage from the concrete
	Stud Welding comparison	Physical Testing with Installation contractor	No variation in weldability or performance
	Longitudinal shear bond resistance of ComFlor® system (Z275g/m ² vs MZ140)	BS EN 1994-1-1	Eurocode Tau Shear resistance for MZ140 was higher than Z275g/m ² so no negative impact

Salt spray testing at Swansea University



Stud welding check and shear testing



Longer Term Testing

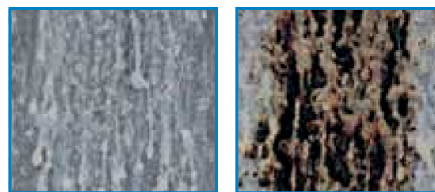
As part of the development process, Tata Steel has undertaken considerable long-term testing of MagiZinc® coated substrate:

- Tata Steel has participated in 'World Coat Project', a four year worldwide outdoor exhibition with the following results for MagiZinc® 310g/m² coating (refer to table below).

Location	Result
Bohus Malmon (Katakana)	3.5
Bohus Malmon (Kvamvil)	6.5
Ijmuiden	3.0
Brest	3.9
Cadiz	2.0
Qingdao	4.6
Jiangjin	4.1
Wanning	6.8
Singapore	5.5
Sattahip	1.5
Dubai	5.4
Bangkok	1.5
Daytona	3.5

Annual weight loss of MagiZinc samples per location (g/m²)

MagiZinc® (140gr/m²) and Zinc (275gr/m²) after 5 weeks in salt spray test



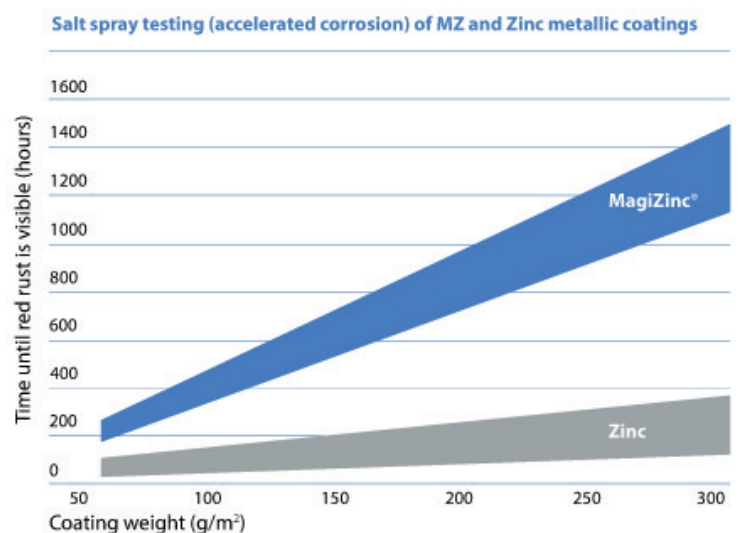


Why does MagiZinc® perform better?

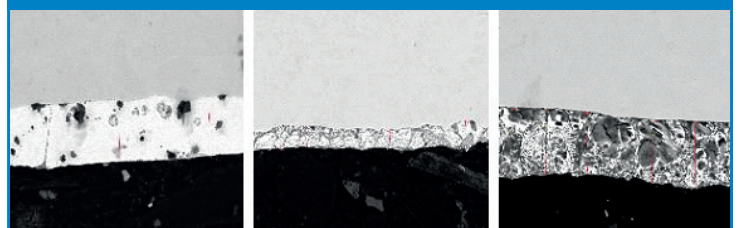
MagiZinc® is a 3-phase system that utilises the electrochemical properties of zinc in combination with the favourable properties that aluminium and magnesium offer to cathodically protect the steel.

The addition of magnesium helps to increase the corrosion resistance several times over when compared to standard galvanised coating in standard salt spray testing (ASTM B117).

This increase in performance is attributed to the dramatic change in microstructure of the coating where there are 3 phases present. The 3 phases are: primary zinc dendrites, binary eutectic, consisting of Zinc and Dizinc Magnesium, and ternary eutectic, consisting of Zinc and Dizinc Magnesium and Aluminium nodules. The 3-phase microstructure allows for the formation of new oxide layers and complex corrosion products which aren't found on standard galvanised coating.



SEM images showing Z275 (left), MZ140 (middle) and MZ310



Key factors in our Supply Chain Security

- Full traceability and provenance of our products.
- Our direct rail link from the Llanwern plant to the Building Systems UK Deeside Shotton site.
- International independent 3rd Party testing and certification scheme approvals across our range of products.





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