

HIGH SPEED CORRODER PRETEST

XXXXX YYYYYY lightweight steel roofing tiles.



Product description from the manufacturer: YYYYYY offers a choice of lightweight roof tile profiles for pitched roofs, available in a wide range of colours.

YYYYYY lightweight steel roofing tiles are designed to provide an attractive and economic finish for all types of roof down to 10° pitch. The lightweight roofing system comprises coated, galvanised steel tile panels with the appearance of traditional roof tiles.

A comprehensive choice of roofing accessories, including eaves, ridge and tile ventilators, completes the system which is totally dry fixed throughout.

Guarantee: sold with a 30-year warranty.

Short conclusion: After 18 days of total exposure, the metal roof plate is heavily attacked by the assumed Zinc oxides and also some Iron oxides. The coating is also showing corrosion bubbles indicating the degradation is taking place under the coating. There is a greater concentration of the white oxides at the edge bend of the metal plate and the bubbles is largest at the bend area.

Synopsis

This is a pre-test of the High speed corroder (HSC) chamber being developed, the test subject is a piece from a XXXXX YYYYYY lightweight steel roofing tiles. This report contains the data and results for a tested the highest product level: “YYYYYY® Elegance” sold with a 30-year warranty.

The HSC is expected to corrode and degrade the test subject as described: The XXXXX metal roof is expected to degrade quickly were the bare metal is exposed.

Apparatus and test conditions

HSC 512 is running the standard 6 hours' cycles were each cycle consistent consist of:

1. 5 minutes' salt spray in a 5% salt brine.
2. 1-hour dehumidification.
3. 4 hours and 55 minutes' humidification.

Temperature through all cycles is maintained at +70 °C and the test space is kept at a very high air circulation, except for the spray process. After the spray, the humidity is lowered as much as possible. This is done by the low temperature of the water mirror and insures deep dehumidification process, typical <35%rH. In the last step of the cycle, humidity is being held at 95% or above for the humidification cycle, while the temperature is +70°C.

The process is monitored by a PLC and the humidity and temperature data in the HSC chamber is logged for documentation purpose.

Method

XXXXX YYYYY lightweight steel roofing tiles as a piece from a roof construction had not been exposed to water/humidity before this test. The metal piece had visible cutting marks and the bare metal was visible on the cutting edge, the plate was also intestinally scratched with an X on the middle top by a sharp knife. The specimen was laying directly in the drainer unit.

Conclusion

After 18 days' exposure to a "Highly Accelerated Corrosion Test", the metal roof plate is heavily attacked by the assumed Zinc oxides and also some Iron oxides. The coating is also showing corrosion bubbles indicating the degradation is taking place under the coating. There is a greater concentration of the white oxides at the edge bend of the metal plate and the bubbles is largest at the bend area.

The HSC chamber managed to do significant damages to subject. Even this test does not conclude any "real life" expectancy, these results could be used to improve the finale product. The value lies in the ability to compare the results from several runs of identical tests in which the subject has been improved between each HACT. In this case, the data could be used to determine the quality of the galvanization and coating and perhaps select in-between different alternatives.

Furthermore, the HACT method gives the producer a fast and reliable method to maintain product quality, as any deviant from the product benchmark would show itself in days instead of waiting for potential customer and end-user complaints.

Detailed photos of the damage created by the HACT process:

The XXXXX steel roofing tiles has had a 7 days' test before this test. The metal roof is showing signs of corrosion and it is assumed to be white Zinc oxides from an electro galvanization of the metal plates. Image showing the metal plate after 4 days of pre-exposure 3 days before this test begun.



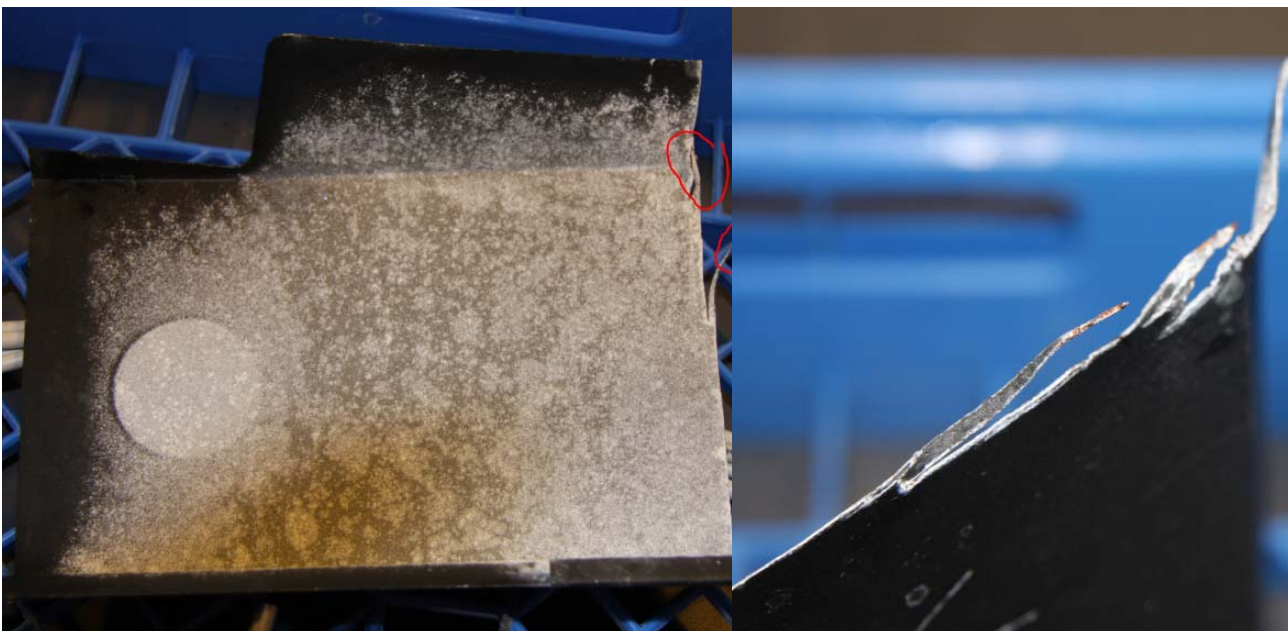
After 7 days of pre-exposure the inside coating is also showing signs of corrosion, metal oxides penetrating the coating is assumed to be Zinc oxides, there is no visible red Iron oxides present.



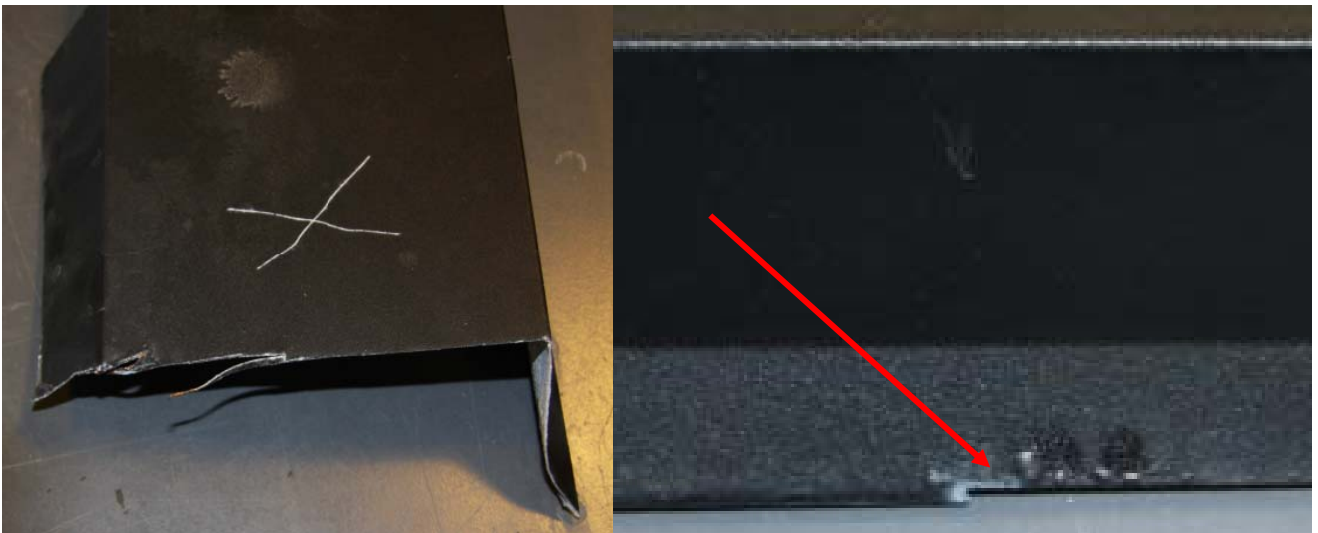
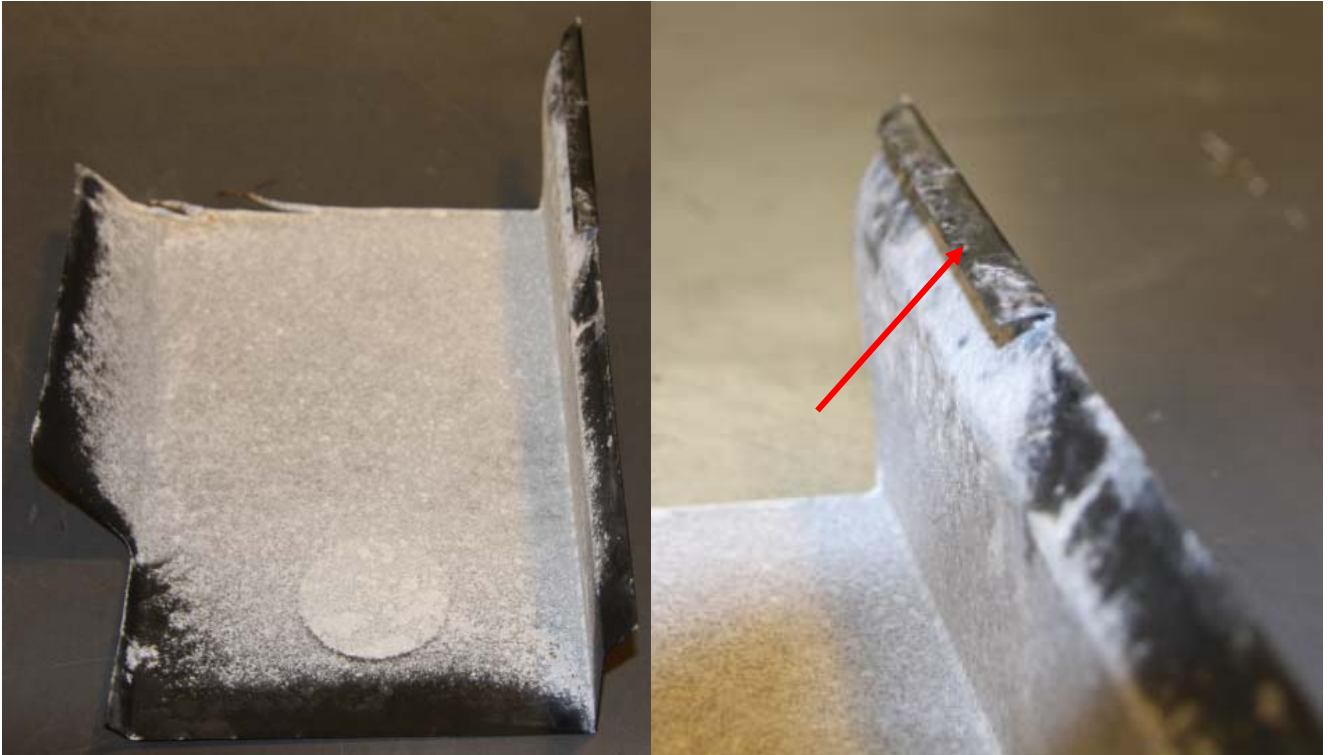
After 10 days of total exposure the metal roof is clearly showing degradation from the assumed Zinc oxides, the x scratch on the top of the plate is visible and the inside coating is showing an almost uniform degradation.



After 14 days of total exposure the metal roof plate is showing more degradation and now assumed red Iron oxides is present at the cutting edges and inner surfaces (red arrows).



After 18 days of total exposure, the metal roof plate is now heavily attacked by the assumed Zinc oxides and also some Iron oxides. The coating is also showing corrosion bubbles indicating the degradation is taking place under the coating (red arrows). There is a greater concentration of the white oxides at the edge bend of the metal plate and the bubbles is largest at the bend area.



For more information about our new test chamber, please visit our website:

<http://www.citrotek.dk/produkter/high-speed-corroder>