P2351177

Report of Testing

Issued date	:	November 20, 2023
Objective	:	Testing of Corrosion Resistance of Electrical Parts by Salt Spray Technique
Customer	:	UI TRUNKING & METAL WORK CO., LTD. 939 Moo 15 Theparak Industrial Estate, Theparak Rd, T.Bangsaothong, A.Bangsaothong, Samutprakarn 10570
Serviced by	:	Smart Manufacturing and Maintenance Technology Research Team Rail and Modern Transports Technology Research Center (RMT) National Science and Technology Development Agency
Received date	:	September 28, 2023
Tested date	:	October 2 – 3, 2023
Sample	:	Wire way, cable tray, and able ladder
Samples Identification:		- CABLE TRAY EPOXY 20x10x60 cm. (Thickness 1.6-2.0 mm.) - WIREWAY EPOXY AND COVER 10x10x60 cm.(Thickness 1.6 mm.) - WIREWAY EPOXY AND COVER 10x10x60 cm. (Thickness 1.2 mm.) - WIREWAY EPOXY AND COVER 10x10x60 cm. (Thickness 1 mm.) - COVER TRAY /LADDER EPOXY 20x60 cm. (Thickness 1.6 mm.) - CABLE TRAY HOT DIP GALVANIZED 20x10x60 cm. (Thickness 1.6-2.0 mm.) - COVER TRAY /LADDER HOT DIP GALVANIZED 20x60 cm. (Thickness 1.6 mm.) - WIREWAY HOT DIP GALVANIZED AND COVER 10x10x60 cm. (Thickness 1.6 mm.) - CABLE LADDER HOT DIP GALVANIZED 20x10x60 cm. (THICKNESS 2.0 mm.)
Tested method	:	-Salt Spray (Fog) Test according to ISO 9227
Tested instrument	:	-Salt Spray (Fog) Chamber (Q-FOG-CCT1100) -Digital Camera (Nikon D7500)

สถาบันวิทยาศาสตร์และเทคโนโลยีแห่งชาติ National Science and Technology Development Agency
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1. Background Information

UI TRUNKING & METAL WORK CO., LTD., is a manufacturer and distributor of wire way, cable tray, cable ladder, floor trunking, electrical conduit pipes, electrical conduit joints lightning protection and lighting coated steel pipe products, electrical conduit pipes, and electrical conduit joints under the UI trademark. In service, these products must be exposed to the general atmosphere. There may be different corrosion resistances in different areas. Therefore, it is often tested to evaluate its ability to resist corrosion. The test that is commonly used is the salt fog test. This is an accelerated corrosion testing method. Its purpose is to evaluate the material's ability to resist corrosion by simulating actual use conditions in the field and testing them in the laboratory. It is a method that allows scientists and engineers to develop new products in a short period of time: for example, the development of coated steel sheet products, finding a new type of coating, etc.

Therefore, the company has sent these products, as shown in **Fig. 1,** to the Smart Manufacturing and Maintenance Technology Research Team, the Rail and Modern Transports Technology Research Center (RMT), National Science and Technology Development Agency, which performed according to ISO 9227 standards for 24 hours to evaluate corrosion resistance using the salt spray technique in order to use the information to improve the design process and the production process for a longer lifespan.

Fig. 1: Samples of wire way, cable tray, and able ladder and used to test corrosion resistance by the salt spray technique.

2. Testing Methods

2.1 Salt Spray Test

2.1.1 Testing apparatus and spraying system

- Q-FOG Model CCT-1100

2.1.2 Sample preparation

- Samples were prepared according to the company's specification.

2.1.3 Surface cleaning and preparation

2.1.3.1Surface cleaning before testing:

- None

2.1.3.2 Surface cleaning after testing:

- Remove excessive salts with flowing tap water, but do not remove corrosion products, and then the surfaces were photographed.

2.1.4 Testing conditions

2.1.4.1Testing standard: ***ISO 9227***

-Type of testing: Neutral salt spray test -Grade of NaCl: ***AR grade 99.5%***

-Type of solvent: ***Deionized water***

-Concentration of solution: ***5 ± 1 wt. % of NaCl***

-pH of solution: ***6.85***

-Conductivity: ***62 mS/cm²***

4.2 Temperature around the samples during testing: ***35 ±2 oC***

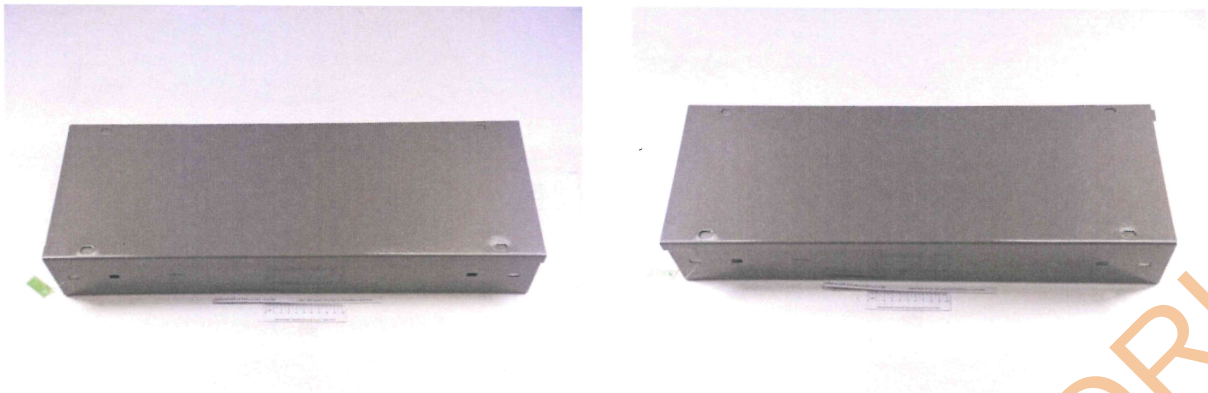
2.1.4.2 Orientation of samples: ***Horizontal***

2.1.4.3 Testing period: ***24 hours***

2.1.4.5 Interruption during testing: ***Non***

3. Results

The physical appearances of the samples of wire way, cable tray and able ladder and before and after salt spray testing at 24 hours are shown in **Figs. 2–10**, respectively.

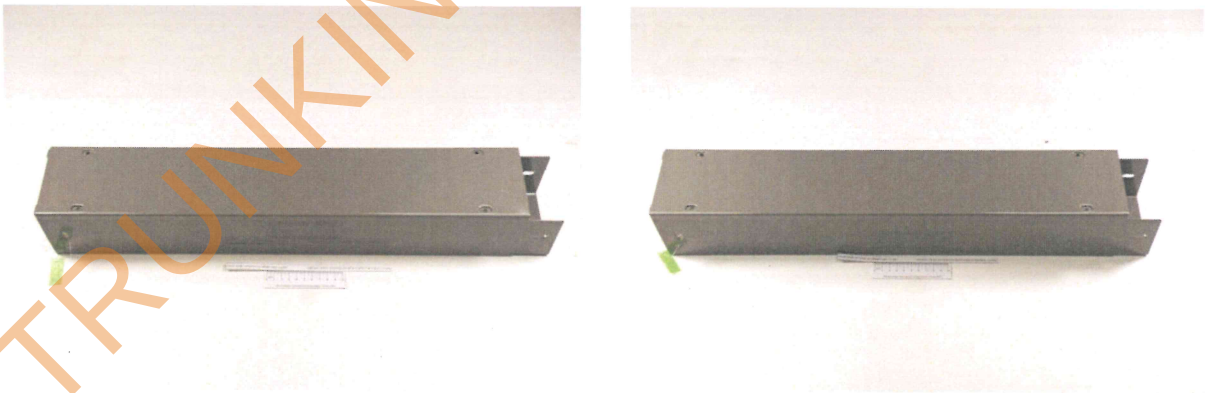


Sample before salt spray test Sample after 24-hours salt spray test

Fig. 2: CABLE TRAY EPOXY 20x10x60 cm. (Thickness 1.6-2.0 mm.) before-after salt spray test.

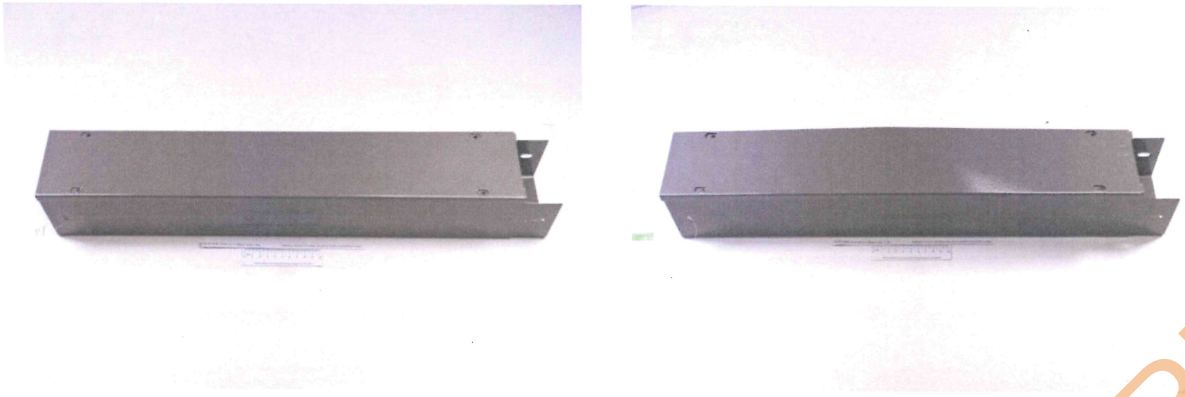
Sample before salt spray test Sample after 24-hours salt spray test

Fig. 3: WIREWAY EPOXY AND COVER 10x10x60 cm.(Thickness 1.6 mm.) before-after salt spray test.



Sample before salt spray test Sample after 24-hours salt spray test

Fig. 4: WIREWAY EPOXY AND COVER 10x10x60 cm. (Thickness 1.2 mm.) before-after salt spray test.

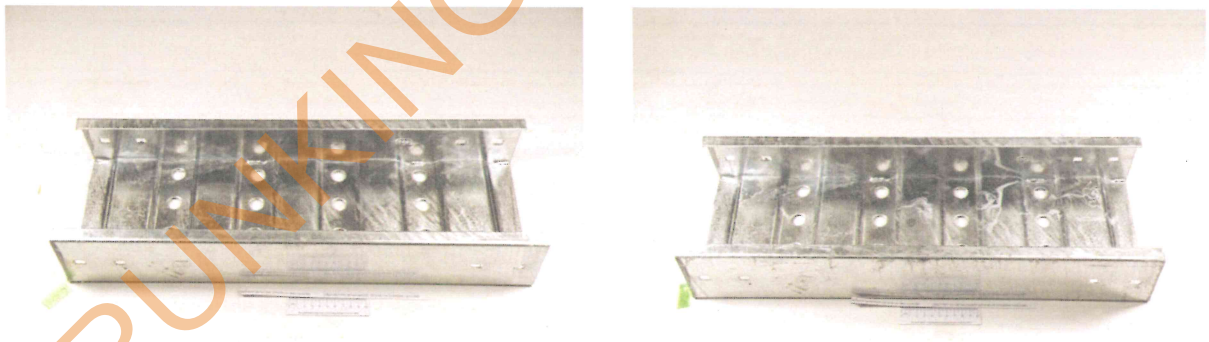


Sample before salt spray test Sample after 24-hours salt spray test

Fig. 5: WIREWAY EPOXY AND COVER 10x10x60 cm. (Thickness 1 mm.) before-after salt spray test.

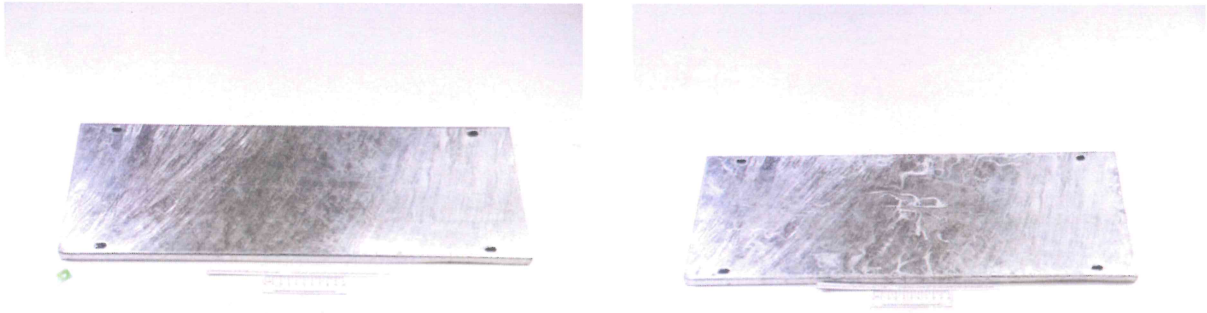
Sample before salt spray test Sample after 24-hours salt spray test

Fig. 6: CABLE LADDER EPOXY 20x10x60 cm. (Thickness 2.0 mm.) before-after salt spray test.



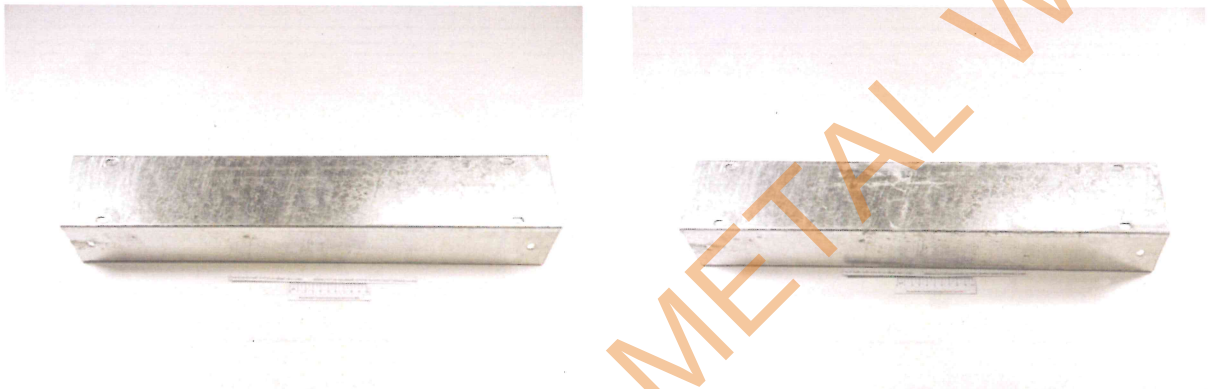
Sample before salt spray test Sample after 24-hours salt spray test

Fig. 7: CABLE TRAY HOT DIP GALVANIZED 20x10x60 cm. (Thickness 1.6-2.0 mm.) before-after salt spray test.



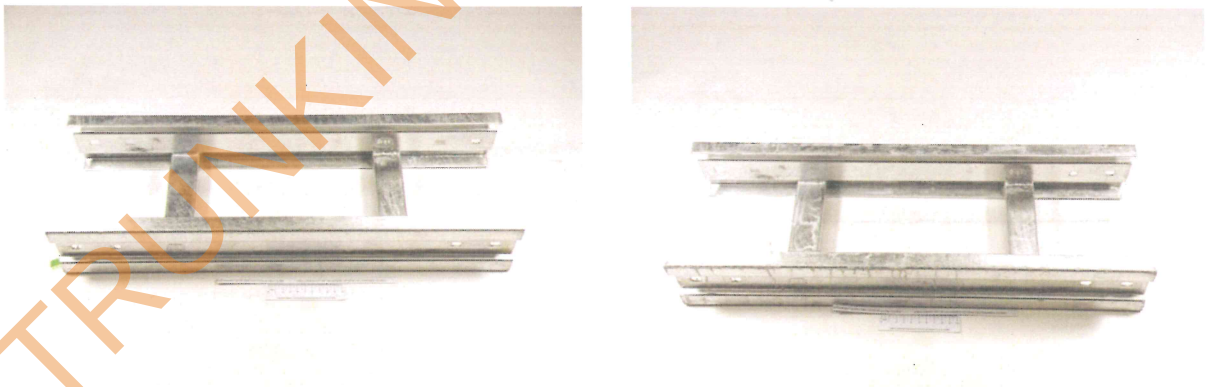
Sample before salt spray test Sample after 24-hours salt spray test

Fig. 8: COVER TRAY /LADDER HOT DIP GALVANIZED 20x60 cm. (Thickness 1.6 mm.) before-after salt spray test.



Sample before salt spray test Sample after 24-hours salt spray test

Fig. 9: WIREWAY HOT DIP GALVANIZED AND COVER 10x10x60 cm. (Thickness 1.6 mm.) before-after salt spray test.



Sample before salt spray test Sample after 24-hours salt spray test

Fig. 10: CABLE LADDER HOT DIP GALVANIZED 20x10x60 cm. (Thickness 2.0 mm.) before-after salt spray test.

4. Conclusion

The results of salt fog corrosion resistance testing of all samples of wire way, cable tray and able ladder samples after a 24-hour salt spray test are summarized in **Table 1**. It can be concluded that no rust spots can be detected (OK) in all samples.

Table 1: Summary of salt spray testing for 24 hours

Samples	24 hours
CABLE TRAY EPOXY 20x10x60 cm. (Thickness 1.6-2.0 mm.)	OK
WIREWAY EPOXY AND COVER 10x10x60 cm.(Thickness 1.6 mm.)	OK
WIREWAY EPOXY AND COVER 10x10x60 cm. (Thickness 1.2 mm.)	OK
WIREWAY EPOXY AND COVER 10x10x60 cm. (Thickness 1 mm.)	OK
CABLE LADDER EPOXY 20x10x60 cm. (Thickness 2.0 mm.)	OK
CABLE TRAY HOT DIP GALVANIZED 20x10x60 cm. (Thickness 1.6-2.0 mm.)	OK
COVER TRAY /LADDER HOT DIP GALVANIZED 20x60 cm. (Thickness 1.6 mm.)	OK
WIREWAY HOT DIP GALVANIZED AND COVER 10x10x60 cm. (Thickness 1.6 mm.)	OK
CABLE LADDER HOT DIP GALVANIZED 20x10x60 cm. (Thickness 2.0 mm.)	OK

5. Reference

1. ISO 9227-2017, Corrosion tests in artificial atmospheres - Salt spray tests.
2. ASTM D610-01, Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces.
3. EN 12329:2000, Corrosion protection of metals Electrodeposited coatings of zinc with supplementary treatment on iron or steel.

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