



POLITECNICO
MILANO 1863

MATERIALS TESTING LABORATORY

To: FRIULSIDER S.p.a.
Via Trieste ,1
33048 S.Giovanni al Natisone (UD)

Test report no. 2018/0490 issued in Milano on 23/05/18

Applicant: FRIULSIDER S.p.a.

Samples arrival date: 22/03/2018

TEST REPORT

SALT SPRAY TEST

In following pages are reported:

- sample description and test methods;
- test results.

The test results apply only to the tested samples.

This Test Reports consists of 6 pages.

This Test Report can be reproduced only integrally and shall be subjected to duty stamp for use according to Italian Law D.P.R. 642/72.

THE SERVICE HEAD

Roberto Minerva

Milano headquarter - Materials Acceptance and Certification Office
via Celoria, 3 – 20133 Milano – Phone +39 02 2399 4210 Fax +39 02 2399 4211

Lecco headquarter
via Gaetano Previati 1/C – 23900 Lecco – Phone +39 0341/48 8793 Fax +39 0341/48 8771

Official Laboratory (art. 20 Law no. 1086 5 November 1971) – NB 1777 Reg. (EU) 305/2011



POLITECNICO
MILANO 1863

MATERIALS TESTING LABORATORY

SALT SPRAY TEST

Period of test: March 26, 2018 ÷ May 7, 2018

Description and specimens identification

n. 5 - FM-X5 -3DG Grey/ Opaque



FM-X5 -3DG Grey/ Opaque

Standard

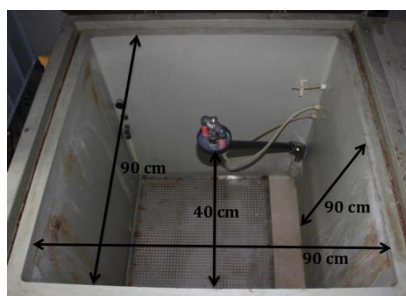
EN ISO 9227 (2017) – Corrosion test in artificial atmosphere – Salt spray test - Method NSS – Neutral salt fog test

Test equipment

Salt spray chamber for ambient test simulation, model WEISS 1000
Cabinet dimensions: 900x900x900 (LxWxH) mm



Salt spray



Salt spray cabinet



pH tape control

The Technical Head
Massimo Iscandri

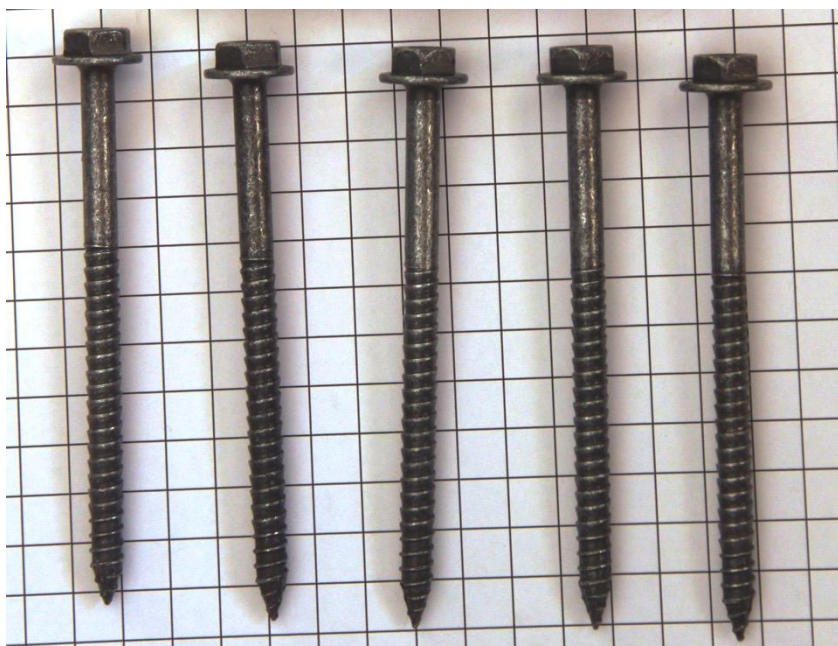
Milano headquarter - Materials Acceptance and Certification Office
via Celoria, 3 – 20133 Milano – Phone +39 02 2399 4210 Fax +39 02 2399 4211

Lecco headquarter
via Gaetano Previati 1/C – 23900 Lecco – Phone +39 0341/48 8793 Fax +39 0341/48 8771
Official Laboratory (art. 20 Law no. 1086 5 November 1971) – NB 1777 Reg. (EU) 305/2011



POLITECNICO
MILANO 1863

MATERIALS TESTING LABORATORY



FM-X5 - 3DG Grey/ Opaque – Before salt spray test

Arrangement of the test specimens

The test specimens were placed in the cabinet so that they are not in the direct line of travel of the spray from the atomizer.

The angle at which the surface of the test specimen is exposed in the cabinet is an angle as close as possible to 20° to the vertical.

The test specimens were suspended with a plastic wire so that they do not come into contact with the cabinet and so that surfaces to be tested are exposed to free circulation of spray.

Operating conditions

Operating conditions are summarized in table.

Test method Item	Neutral salt spray (NSS)
Temperature	35°±2 °C
Average collection rate for a horizontal collecting area of 80 cm²	1,5 ml/h ±0,5 ml/h
Concentration of sodium chloride (collected solution)	50 g/l ±5 g/l
pH (collected solution)	6,5 to 7,2

Duration of tests

The period of exposure was of 1 000 h without any interruptions.

The Technical Head
Massimo Iscandri

Milano headquarter - Materials Acceptance and Certification Office
via Celoria, 3 – 20133 Milano – Phone +39 02 2399 4210 Fax +39 02 2399 4211

Lecco headquarter
via Gaetano Previati 1/C – 23900 Lecco – Phone +39 0341/48 8793 Fax +39 0341/48 8771
Official Laboratory (art. 20 Law no. 1086 5 November 1971) – NB 1777 Reg. (EU) 305/2011



POLITECNICO
MILANO 1863

MATERIALS TESTING LABORATORY

Intermediate inspections

The cabinet was opened only for brief visual inspections of the test specimens after 6 h, 24 h, 48 h, 96 h, 192 h (8 d) , 264 h (11 d), 384 h (16 d), 552 h (23 d), 696 h (29 d), 888 h (37 d).

Treatment of specimens after test

At the end of the test period the test specimens were removed from the cabinet and allowed to dry for 0,5 h to 1 h before rinsing, in order to reduce the risk of removing corrosion products. The residues of spray solution from their surfaces were carefully remove by rinsing in clean running water at a temperature not exceeding 40 °C. Then specimens were immediately dried in a stream of air, at an overpressure not exceeding 200 kPa and at a distance of approximately 300 mm.

Results

The specimens were observed in order to detect the appearance of the first sign of corrosion, i.e. pits, cracks, blisters, rusting at every intermediate inspection, at the end of the test and after removing superficial corrosion products .

The results are shown in the photographs below



Samples before the test

The Technical Head
Massimo Iscandri

Milano headquarter - Materials Acceptance and Certification Office
via Celoria, 3 – 20133 Milano – Phone +39 02 2399 4210 Fax +39 02 2399 4211

Lecco headquarter
via Gaetano Previati 1/C – 23900 Lecco – Phone +39 0341/48 8793 Fax +39 0341/48 8771

Official Laboratory (art. 20 Law no. 1086 5 November 1971) – NB 1777 Reg. (EU) 305/2011



POLITECNICO
MILANO 1863

MATERIALS TESTING LABORATORY



Samples after 23gg (552h)



Samples after 29gg (696h)



Samples after 37gg (888h)



Samples after 42gg (1000h)

The Technical Head
Massimo Iscandri

Milano headquarter - Materials Acceptance and Certification Office
via Celoria, 3 – 20133 Milano – Phone +39 02 2399 4210 Fax +39 02 2399 4211

Lecco headquarter
via Gaetano Previati 1/C – 23900 Lecco – Phone +39 0341/48 8793 Fax +39 0341/48 8771
Official Laboratory (art. 20 Law no. 1086 5 November 1971) – NB 1777 Reg. (EU) 305/2011



POLITECNICO
MILANO 1863

MATERIALS TESTING LABORATORY



*Sample FM-X5 -3DG Grey/ Opaque n. 1
End of the test after washing for salts removal*



*Sample FM-X5 -3DG Grey/ Opaque n. 2
End of the test after washing for salts removal*



*Sample FM-X5 -3DG Grey/ Opaque n. 3
End of the test after washing for salts removal*



*Sample FM-X5 -3DG Grey/ Opaque n. 4
End of the test after washing for salts removal*



*Sample FM-X5 -3DG Grey/ Opaque n. 5
End of the test after washing for salts removal*

The Technical Head
Massimo Iscandri

Milano headquarter - Materials Acceptance and Certification Office
via Celoria, 3 – 20133 Milano – Phone +39 02 2399 4210 Fax +39 02 2399 4211

Lecco headquarter
via Gaetano Prevati 1/C – 23900 Lecco – Phone +39 0341/48 8793 Fax +39 0341/48 8771
Official Laboratory (art. 20 Law no. 1086 5 November 1971) – NB 1777 Reg. (EU) 305/2011