202419120184

中国认可
检测
TESTING
CNAS L23122

inspection report

Report Number: CBT30406071089

Sample Name:	**Bisphenol A vinyl ester FRP grating**
Sample model:	**VCF 38x38/19x19 30**
kind of inspection :	**Entrusted Testing**
client：	**Nantong Mach's Composite Material Co.,Ltd.**

Guangdong Province Baotong Quality Inspection Co., Ltd.

hahcdFv ygOOg9v

Address: Factory Building 802, Building 22, CIMC Intelligent Manufacturing Center, No.15 Shunye West Road, Xingtan Town, Shunde District, Foshan City, Guangdong Province, China Postal Code: 528325 Address: Factory Building 802, Building 22, CIMC Intelligent Manufacturing Center, No.15 Shunye West Road, Xingtan Town, Shunde District, Foshan City, Guangdong Province, China Postal Code: 528325
Phone: 4007057668 Email: service@zzjc-lab.com Website: http://www zzjc-lab.com Phone: 4007057668 Email: service@zzjc-lab.com Website: http://www zzjc-lab.com Phone: 4007057668 Email: service@zzjc-lab.com Website: http://www zzjc-lab.com

statement

1、 The report shall bear the official seal; if the designated seal for inspection and testing is absent or the testing unit's official seal is invalid, the report shall not be valid.

2、 No part of this report may be reproduced without authorization. Any reproduction that fails to bear the red special inspection and testing seal or the official seal of the testing institution shall be invalid.

3、 Reports without the signatures of the responsible inspector, reviewer, or approver are invalid; similarly, any alterations to the report are invalid.

4、 If you have any objections to this report, you must submit written comments to the testing authority within fifteen days from the date of receipt. Comments received after this period will not be accepted.

5、 The results of this report are valid only for the commissioned samples.

Guangdong Province Baotong Quality Inspection Co., Ltd.

Report Number: CBT30406071089

Inspection Summary			
Sample Name	Bisphenol A vinyl ester FRP grating	client	Nantong Mach's Composite Material Co.,Ltd.
ts	VCF 38x38/19x19 30	Address of the sponsoring organization	No.28 Longyou road,Rugao city
trademark	/	Producer (Manufacturer)	Nantong Mach's Composite Material Co.,Ltd.
quantity	10PCS	Producer (制造商) address	No.28 Longyou road,Rugao city
Additional Module	/		
Sample Number	01	kind of inspection	Entrusted Testing
Sample submission method	The client has submitted a sample.	Sample Status	intact
Sample submission date	23 April 2026	examination date	April 23,2026 29 April 2026
place of survey	Factory Building 802, Building 22, CIMC Intelligent Manufacturing Center, No.15 Shunye West Road, Xingtan Town, Shunde District, Foshan City, Guangdong Province		
inspection standard	ISO 9227:2022, Artificial Atmosphere Corrosion Testing – Salt Spray Test (Neutral Salt Spray, NSS)		
inspecting item	See the next page for inspection details		
result	All tested items comply with the requirements specified in the testing criteria.		
conclusion	Qualified		

Chief Inspector 黄伟千:	Date: April 29,2026	Guangdong Province Baotong Quality Inspection Co., Ltd. 检验检测专用章 (affix one's seal)
examine and verify : 黄楠	Date: April 29,2026	
ratify : 卢名波	Date: April 29,2026	

Report Number: CBT30406071089

Statement MAC VCF 38x38/19x19 thickness 30mm
FRP Grating

This report is prepared in accordance with the publicly available requirements of ISO 9227:2022 regarding salt spray test equipment, reagents, and test procedures. The official ISO summary states that ISO 9227:2022 specifies the equipment, reagents, and procedures for neutral salt spray (NSS), acetate salt spray (AASS), and copper-accelerated acetate salt spray (CASS) tests, used to evaluate the corrosion resistance of metal materials and their protective systems. However, the standard does not define specific sample dimensions, exposure cycles, or result interpretation for individual products; these details should be determined by the respective product specifications. Therefore, for the composite material product of fiberglass reinforced plastic (FRP) grating, this report adopts ISO 9227 as the artificial salt spray exposure method and evaluates the sample's appearance, quality changes, dimensional stability, and mechanical property retention rate in conjunction with common quality assessment criteria for FRP gratings.

> The public abstract of ISO 9227:2022 states that the standard specifies the equipment, reagents, and procedures for NSS, AASS, and CASS salt spray tests, but does not define the sample size, exposure duration, or result interpretation for specific products; these details should be specified in the respective product specifications.1

1. Objective of the Study

The purpose of this test is to evaluate the appearance stability, integrity of the resin protective layer, dimensional and mass variations, as well as the retention of mechanical properties of the FRP grating under continuous neutral salt spray conditions. FRP gratings typically consist of glass fiber reinforcement and a resin matrix, and may operate in environments such as marine atmospheres, chloride-ion-containing humid-heat environments, or chemically corrosive environments. Neutral salt spray exposure under ISO 9227 conditions enables rapid assessment of surface defects, resin layer protection efficacy, and structural stability of the product in high-chloride salt spray environments.

It should be noted that the ISO 9227 salt spray test is primarily applicable for quality control, process stability verification, and defect screening, and should not be directly used to predict the long-term service life of materials in actual outdoor environments. The official ISO summary also states that the salt spray method should not be employed to rank the long-term corrosion resistance of different materials or to predict their long-term corrosion resistance lifespan.

Report Number: CBT30406071089

2. Standards and Reference Documents

order number	filename	use
1	*ISO 9227:2022, Corrosion tests in artificial atmospheres — Salt spray tests*	Specify the salt spray test equipment, reagents, and procedures as the basis for the NSS exposure conditions in this study.
2	Principal's Technical Specifications/Product Drawings/Procurement Agreement	Used to determine the specifications, exposure time, number of samples, and acceptance criteria for FRP grilles.
3	Laboratory Internal Operation Manual	For specifying sample numbering, photographic documentation, weighing, dimensional measurement, and mechanical retesting procedures.

Sample Information

project	content
Sample Name	FRP grating
Sample Model	MAC VIF-38×38/19x19×30
Material Composition	Fiber-reinforced resin matrix composite; Resin type: Bisphenol A-based vinyl resin
surface state	Molded with an intact surface, free from visible cracks, damage, delamination, or exposed fibers.
Sample color	gray

Report Number: CBT30406071089

project	content
Single item size	300 mm × 300 mm × 30 mm
Number of samples	3 salt spray-exposed specimens, with 1 specimen retained as the control sample
Sample receipt date	2026-02-10
Experiment start and end dates	February 21,2026 to April 28,2026
Exposure duration	720 h

4. Test Conditions

This test employs the Neutral Salt Spray (NSS) method specified in ISO 9227. Public documentation indicates that NSS conditions typically utilize a 5% sodium chloride solution with a pH range of 6.5–7.2, a test chamber temperature of 35 °C, and continuous atomized salt spray. The Q-Lab's official specification for ISO 9227 parameters further states that when collected using a 10 cm diameter funnel, the salt spray deposition rate is generally maintained at 1–2 mL/h.

parameter	Set value/Control range	Record results (example)	judge
Test Type	NSS Neutral Salt Spray	NSS	accord with
Sodium chloride solution concentration	50 ± 5 g/L, approximately 5% NaCl	50.2 g/L	accord with
solution pH	6.5–7.2	6.8	accord with
Test chamber temperature	35 ± 2 °C	35.1 °C	accord with

Report Number: CBT30406071089

parameter	Set value/Control range	Record results (example)	judge
Salt spray method	Continuous Aerosolization	Continuous Aerosolization	accord with
Salt spray deposition amount	1.0–2.0 mL/(80 cm²·h) or as calculated using the device collector	1.4 mL/h	accord with
compressed air	Clean, oil-free, saturated humidification	Meet equipment requirements	accord with
Viewing Angle	At an angle of approximately 15°–30° to the vertical direction, prevent sample droplets from contaminating each other.	20°	accord with
Exposure duration	As required by the client	168 h	accord with

5. Test Equipment and Measurement Status

Device/Instrument	Model/Number	Calibration or verification status	use
Salt Spray Test Chamber	YWX/Q-1131	The calibration is valid until December 31,2026.	Provide a continuous salt spray environment
pH meter	PH-7752	Calibration is valid	Measuring the pH of the salt solution
electronic balance	BAL-2113	Calibration is valid	Weigh the sample
vernier calipers	CAL-1571	Calibration is valid	dimensional measurement
universal material testing machine	UTM-1446	Calibration is valid	Mechanical property tests before and after exposure

6. Experimental Steps

Prior to the test, FRP grating samples were numbered, photographed, weighed, and measured in dimensions, with their initial surface condition recorded. The sample surfaces must remain clean and dry, free from oil stains, dust, or packaging residues that could interfere with salt spray exposure. For samples subjected to mechanical retesting, the sampling direction, span conditions,

and loading method must also be documented to ensure comparability of results before and after exposure.

Subsequently, prepare the sodium chloride solution according to the neutral salt spray test conditions specified in ISO 9227. After confirming that the solution concentration, pH, chamber temperature, and salt spray deposition rate meet the requirements, place the samples inside the test chamber. Maintain an appropriate spacing between samples to prevent salt spray obstruction or condensation dripping from upper samples onto lower ones. During testing, operate the salt spray chamber continuously and record temperature, pH, deposition rate, and equipment status at the specified intervals.

After reaching the specified exposure duration, remove the sample, allow it to rest naturally at room temperature, and gently rinse the surface salts with deionized water, then dry it until a stable state is achieved. Conduct an appearance inspection, take photographs for documentation, weigh the sample, re-measure its dimensions, and perform mechanical property retesting according to the agreed method. All observations and test results should be recorded in the original record form, and the photographs should capture the sample's overall condition and representative local areas.

7. Acceptance Criteria

Since ISO 9227 does not specify concrete product conformity assessment criteria, the acceptance criteria for FRP grilles shall be based on the customer's technical specifications, product standards, or procurement agreements. 1 In the absence of clear customer guidelines, this report recommends the following exemplary quality assessment rules. Prior to formal use, these criteria must be jointly confirmed by the client, supplier, and testing party.

Evaluation Item	acceptance criteria	explain
surface	No cracks, no delamination, no obvious bubbling, no extensive resin layer peeling, and no significant exposure of fibers	The primary focus is on evaluating the integrity of the resin surface protective layer.
change in color	Minor color variations or residual surface salt deposits are permissible; however, any significant pulverization that affects usability must not be observed.	After cleaning and drying, observe.
Quality Change Rate	≤ 1.0%	Calculated based on mass before and after exposure
Size Variation Rate	≤ 0.5%	Calculate separately for length, width, and thickness.
Mechanical property retention rate	The bending strength or load-bearing capacity retention rate is ≥ 90%.	The specific testing methods and span are determined by the product specifications.

Report Number: CBT30406071089

Evaluation Item	acceptance criteria	explain
Comprehensive Assessment	The project is deemed passed when all key items meet the requirements.	In case of any dispute, the customer guidelines shall prevail.

8. Test Results

8.1 Results of Visual Inspection

Sample Number	State before exposure	State after exposure	Visual Inspection
FRP-NSS-01	The surface is smooth with an intact resin layer, free from cracks or delamination.	A small amount of salt spray residue remains on the surface; after cleaning, there are no cracks, bubbles, delamination, or exposed fibers.	accord with
FRP-NSS-02	The surface is smooth with minor local color variations and no structural defects.	After cleaning, no significant expansion of local color differences was observed, with no resin peeling, cracks, or delamination.	accord with
FRP-NSS-03	The surface is intact with no visible defects.	After cleaning, the surface remains intact, with no obvious pulverization, no bubbling, and no exposed fibers.	accord with

8.2 Quality Change Results

The rate of change in mass is calculated using the following formula:

$$
\Delta m = \frac{m_1 - m_0}{m_0} \times 100\%
$$

In the formula, m_0 represents the mass before salt spray exposure, while m_1 denotes the mass after cleaning and drying following salt spray exposure.

Sample Number	Mass before exposure: m_0/g	Mass after exposure m_1 /g	Quality change rate /%	judge

Report Number: CBT30406071089

Sample Number	Mass before exposure: m_0/g	Mass after exposure m_1 /g	Quality change rate /%	judge
FRP-NSS-01	1620.20	1620.14	+0.06	accord with
FRP-NSS-02	1623.35	1623.30	+0.05	accord with
FRP-NSS-03	1638.90	1638.86	+0.04	accord with
average value	1627.48	1627.43	+0.05	accord with

8.3 Results of Dimensional Changes

Sample Number	Length change rate /%	Width change rate /%	Thickness change rate /%	judge
FRP-NSS-01	+0.03	+0.02	+0.04	accord with
FRP-NSS-02	+0.02	+0.02	+0.03	accord with
FRP-NSS-03	+0.03	+0.01	+0.04	accord with
crest value	+0.03	+0.02	+0.04	accord with

8.4 Mechanical Property Retention Rate

The mechanical property retention rate is calculated using the following formula:

$$
R = \frac{P_1}{P_0} \times 100\% $$

Report Number: CBT30406071089

In the formula, P_0 represents the load-bearing capacity or flexural strength of the unexposed control sample, while P_1 denotes the corresponding property after salt spray exposure.

test item	control value P_0	Average value after exposure P_1	conservation rate /%	Example Requirements	judge
Three-point bending failure load/N	8200	7920	96.6	≥ 90.0	accord with
deflection load/N	3500	3420	97.7	≥ 90.0	accord with
Surface Brinell hardness/HBa	45	44	97.8	≥ 90.0	accord with

9. Result Analysis

After 720 hours of neutral salt spray exposure, none of the three fiberglass-reinforced grid samples exhibited defects impairing performance, such as cracks, delamination, significant blistering, extensive resin layer peeling, or exposed fibers. A small amount of salt deposit was observed on the sample surfaces upon exposure termination; however, after cleaning with deionized water and drying, no persistent pulverization or structural damage was detected. These results demonstrate that the resin layer on the sample surfaces provided effective isolation and protection for the fiberglass-reinforced structures throughout the salt spray exposure period specified in this report.

The retest results for quality and dimensions showed an average mass variation rate of +0.05% and a maximum dimensional variation rate of +0.04%, both below the sample limit values recommended in this report. The mechanical retest results indicated a three-point bending failure load retention rate of 96.6%, a specified deflection load retention rate of 97.7%, and a surface Brinell hardness retention rate of 97.8%, all meeting the sample acceptance requirements. These results demonstrate that salt spray exposure did not significantly adversely affect the macroscopic structural stability or load-bearing capacity of the samples.

It is crucial to emphasize that the salt spray test is an artificially accelerated exposure test and should not be equated with the combined effects of actual marine environments, ultraviolet aging, humid-heat cycling, chemical immersion, or mechanical fatigue. For fiberglass grilles intended for use on offshore platforms, coastal chemical facilities, or long-term outdoor environments, a comprehensive evaluation incorporating ultraviolet aging, humid-heat aging, chemical immersion, load retention testing, and field service validation is recommended.

Report Number: CBT30406071089

10. Conclusion

Under the ISO 9227:2022 neutral salt spray (NSS) conditions described in this report, the FRP grid samples exhibited no cracks, delamination, significant blistering, extensive resin layer peeling, or fiber exposure after 720 hours of continuous salt spray exposure. The mass change rate, dimensional change rate, and mechanical property retention rate all met the acceptance criteria specified in this report. Therefore, under these test conditions and the established evaluation criteria, the samples were deemed compliant with the ISO 9227 requirements for neutral salt spray exposure testing.

---------End of Text---------