

Moisture Absorption Test

Mean moisture absorption in 24 hours and mean moisture absorption to saturation at 50 °C under ASTM D570.

MEAN MOISTURE ABSORPTION
IN 24 HOURS

0.21%

MEAN MOISTURE ABSORPTION
TO SATURATION

0.67%

SPECIFICATION
LIMIT

PASS

1. TEST SUMMARY

Reference Standard

ASTM D570, Standard Test Method for Water Absorption of Plastics

Product Under Evaluation

GFRP rebars

Test Objective

Determine the mean moisture absorption in 24 hours at 50 °C and mean moisture absorption to saturation.

Test Machine

Analytical balance; 200 grams / 0.0001 grams

2. TEST SPECIMENS

2.1 Specimen Number: A total of 24 tests are reported, eight tests from three different production groups.

2.2 Specimen Size and Layout: The rebar specimens were cut into about 25.4 mm.

Group	Number of Tests	Specimen Type
Production Group 1	8	GFRP rebar
Production Group 2	8	GFRP rebar
Production Group 3	8	GFRP rebar



Cut specimen sample

3. TEST SET-UP

- 3.1 Specimen Preparation: Clean the specimens to remove any contaminants that may affect the weight.
- 3.2 Dry the specimens in one oven maintaining uniform temperatures of 50°C ±3°C, and get the initial weight quickly in 0.0001g
- 3.3 The Specimens were immersed in distilled water for a 24-hour +0.5/-0hrs period at a temperature of 50°C ±3°C
- 3.4 Take the specimens out of the distilled water and the specimens had their surface wiped off with a dry cloth and weighted.
- 3.5 The Specimens were re-immersed in distilled water for longer period at a temperature of 50°C ±3°C to Saturation, and then repeated 3.4
- 3.6 Calculate the Moisture Absorption ratio according to the weight change of each specimen



Specimen in water



Maintaining uniform temperature of water at 50°C ±3°C for 24 hours

4. TEST RESULTS

4.1 Results Summary

Based on the experimental tests presented herein the Mean Moisture Absorption in 24hrs at 50 °C is summarized in below table, which meets the requirements of ASTM D7957, stating that the Mean Moisture Absorption in 24hrs at 50 °C should be less than 0.25% and the Mean Moisture Absorption to Saturation should be less than 1%

Mean Moisture Absorption in 24hrs	Mean Moisture Absorption to Saturation	Specification limit
0.21%	0.67%	PASS

4.2 Tabulated Results

The below table contains the detail results for the Mean Moisture Absorption in 24hrs at 50 °C of GFRP rebar under evaluation. Average, standard deviation (Sn-1) and coefficient of variance (CV) values are also reported for the group of results under evaluation.

DETAILED RESULTS OF MEAN MOISTURE ABSORPTION IN 24HRS & TO SATURATION AT 50 °C

Sample	Initial weight (g)	Weight in 24hrs (g)	Weight to Saturation (g)	Moisture Absorption in 24hrs	Moisture Absorption to Saturation
1	4.0785	4.0862	4.1030	0.189%	0.600%
2	4.0411	4.0496	4.0674	0.210%	0.650%
3	4.0945	4.1017	4.1187	0.175%	0.590%
4	4.1182	4.1273	4.1450	0.220%	0.650%
5	4.1578	4.1655	4.1819	0.185%	0.580%
6	4.1288	4.1375	4.1550	0.210%	0.634%
7	4.1649	4.1734	4.1936	0.205%	0.690%
8	4.2283	4.2377	4.2578	0.223%	0.697%
9	4.2108	4.2210	4.2391	0.243%	0.672%
10	4.1962	4.2043	4.2265	0.193%	0.723%
11	4.1612	4.1702	4.1828	0.217%	0.519%
12	4.2843	4.2950	4.3197	0.249%	0.827%
13	4.1312	4.1414	4.1614	0.247%	0.730%
14	4.1812	4.1894	4.2103	0.196%	0.697%
15	4.1989	4.2089	4.2347	0.237%	0.852%
16	4.1744	4.1843	4.1968	0.236%	0.537%
17	4.2380	4.2457	4.2726	0.182%	0.816%
18	4.2036	4.2142	4.2359	0.251%	0.769%
19	4.0258	4.0350	4.0455	0.229%	0.489%
20	4.1932	4.2035	4.2204	0.246%	0.649%
21	4.1968	4.2049	4.2205	0.193%	0.564%
22	4.1188	4.1262	4.1465	0.179%	0.672%
23	4.2011	4.2089	4.2293	0.186%	0.671%
24	4.0818	4.0891	4.1152	0.178%	0.819%
Average				0.212%	0.671%
standard deviation (Sn-1)				0.026%	0.031%
Coefficient of variance ,CV				12.26%	4.62%