

Client Name: شركة الفا وان

Testing Name: Heat and Humidity Tolerance

Supplier Code: BPI/H/CO.122

Delivery Date: 20/03/2024

Sample Description: مادة سائله عازله للرطوبة

Thermal and Moisture Department

Moisture laboratory

(Technical Report)

Scope:

In general, the physical properties of materials are influenced by temperature in a manner that materially affects its behavior, as well as the temperature, to which the building material subjected can cause building materials to change in size and lose natural moisture, Heat changes the expansion dimensions of materials, leading to misaligned joints during construction, Material properties are dependent on the temperature, the tensile strength, yield strength and modules of elasticity decrease with increasing temperature. This practice defines procedures for evaluating the effect of heat and humidity on the apparent form of the sample.

Significant and Use:

Exposure to temperature and humidity can cause degradation into materials. Knowledge on how a material resists temperature and humidity is helpful in predicting its service life. Failure in temperature and humidity exposure may be caused by a number of factors including material type, deficiency in the material itself, and certain weakness in the material itself during manufacture. The test is therefore useful for evaluating the effect of temperature and humidity on the sample.

Report No. 1

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22/04/2024

P.O. BOX 1770
87 El-Tahrir St., Dokki, Cairo, Egypt

• **Results:**
✦ **Virtual examination**

The sample was exposed to 60°C and 85% RH for 2 hr and then was virtually examined.

Observation

- No cracks were observed.
- No change in color.
- No observable separation occurred on layers.
- No observable weakness took place.
- The temperature inside the container was 40.1°C while the outside temperature was 60 °C

Notes:

- The sample was delivered to the laboratory by the entity requesting the test.
- The sample was delivered to the laboratory applied on a sealed box.
- The test was conducted according to the client demands for 2 hr at 60°C.
- The sample was supplied to the lab applied on a sealed container.
- The aforementioned data according to what was mentioned in the letter of the body requesting the test without any responsibility on the center.
- The attached results are applied only for the samples delivered to the thermal laboratory and not valid for approval of any quantitative production / and practices / supplies / as well as export and are not considered as a conformity certificate
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22/04/2024

Report No. 1

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Client Name: شركة الفاوان

Testing Name: Water Resistance of Coating Using Water Immersion

Supplier Code: BPI/H/CO.62

Testing Date: 15/02/2024

Sample Description: مادة سائلة عازلة للرطوبة

Delivery Date: 07/12/2023

Thermal and Moisture Department

Moisture laboratory

Water Resistance of Coating Using Water Immersion

• Scope

This practice covers the basic principle and operation procedures for testing water resistance of coating by complete immersion of coated specimens at ambient temperature this practice is limited to tests in water alone. With the guide of the standard ASTM D-870.

• Significant and Use:

Immersion in water can cause the degradation of coatings knowledge on how a coating resists water immersion is helpful in predicting its service life. Failure in a water immersion may be caused by a number of factors including a deficiency in coating itself, contamination of the substrate, or inadequate surface preparation. The test is useful for evaluating coating alone or complete coating systems.

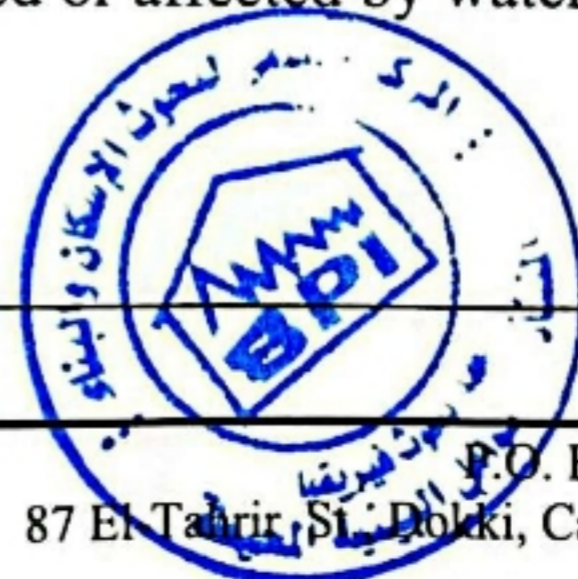
• Terminology

- **Water resistance**, designed to not be easily harmed or affected by water or to not allow water to pass through easily.

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- **Summary of test method:**

Coated specimens are partially or wholly immersed in water in a container that is resistance to corrosion. The exposure conditions are 24 h of immersion in ambient temperature.

- **Results:**

No color change, blistering, loss of adhesion, softening or embrittlement are observed

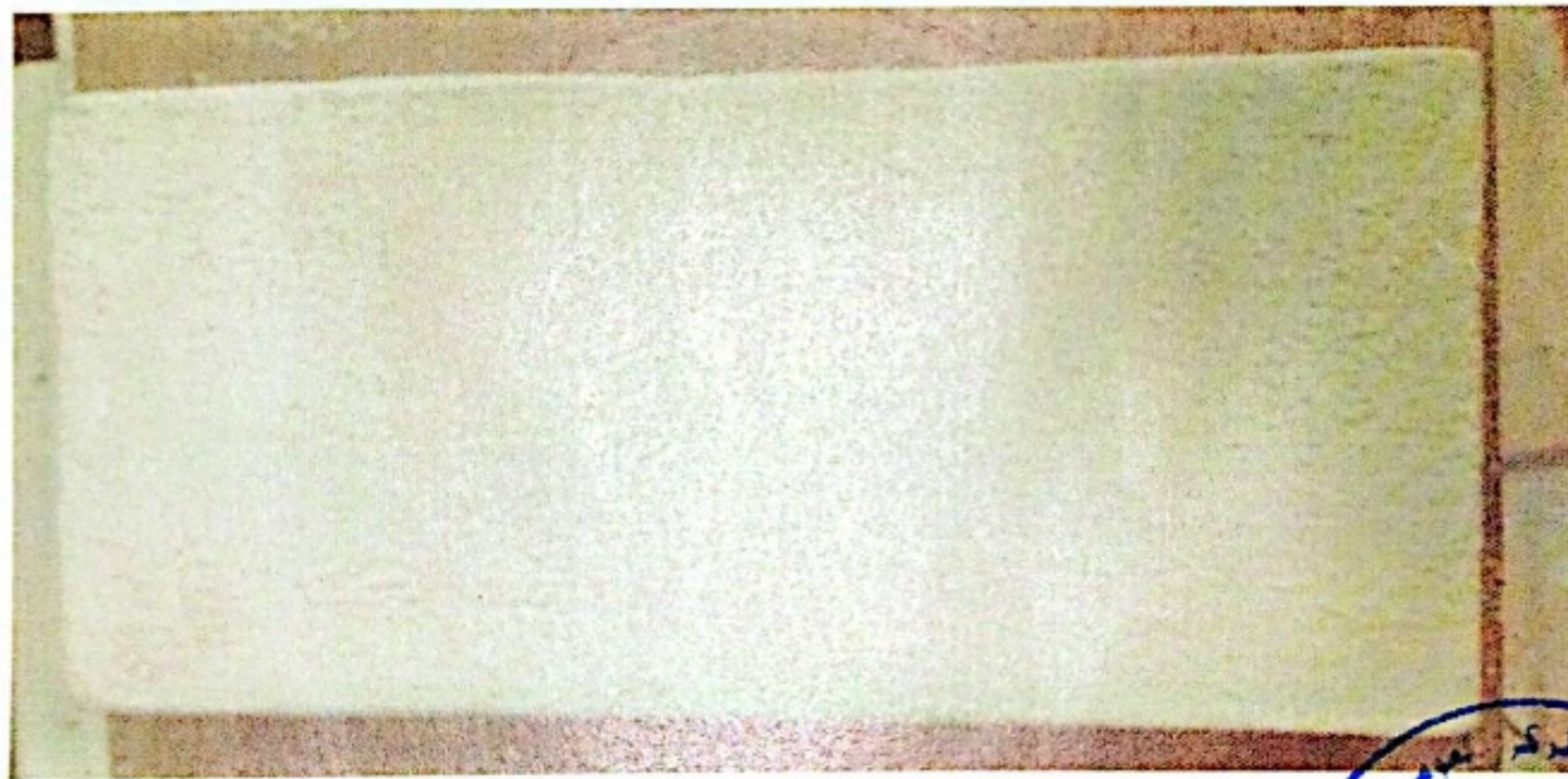


Fig 1: Samples before immersion



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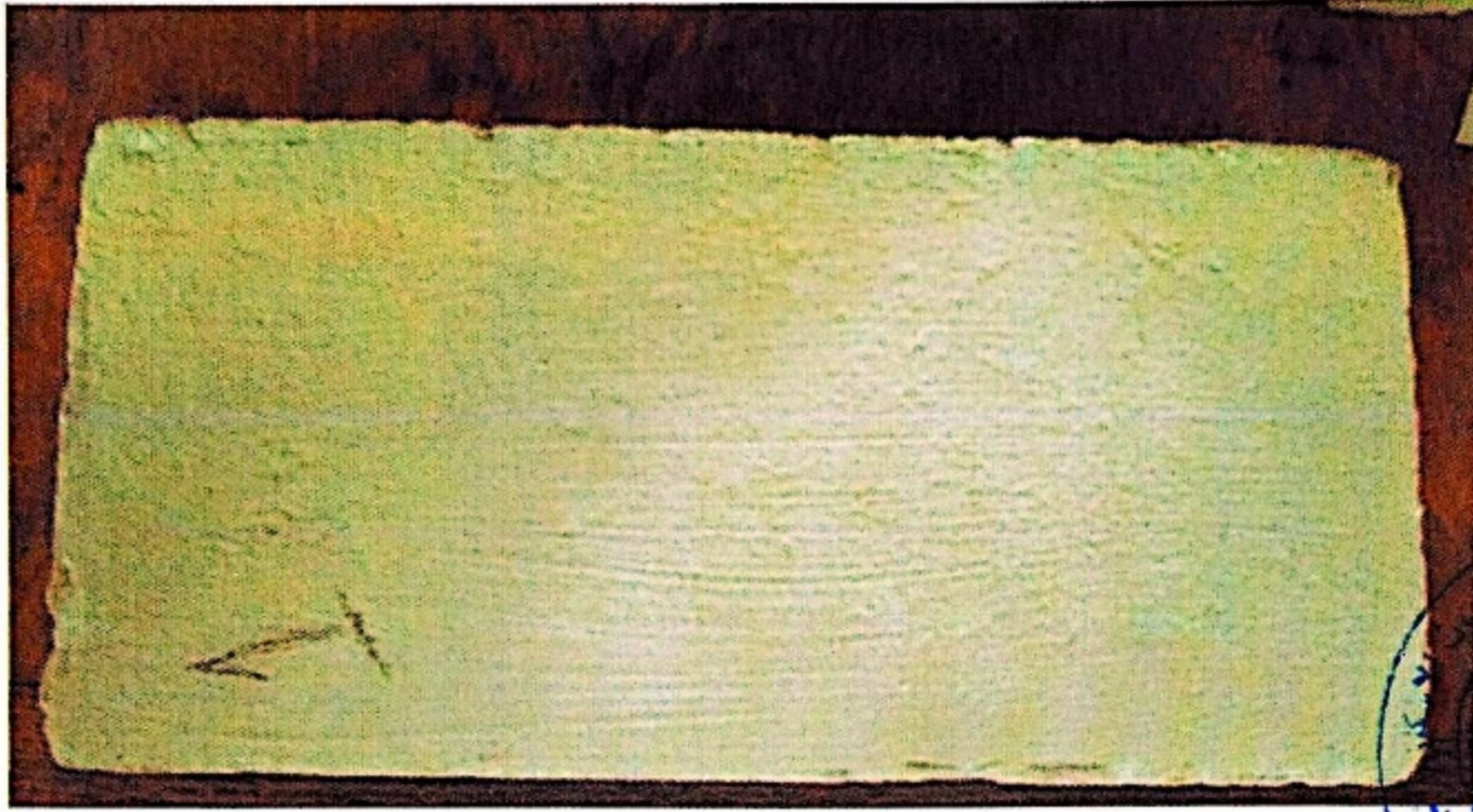


Fig 2: Samples after immersion

Notes:

- The sample was delivered to the laboratory by the entity requesting the test.
- The test was conducted according to the client demands. With the guide of the standard ASTM D-870.
- The aforementioned data according to what was mentioned in the letter of the body requesting the test without any responsibility on the center.
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Client Name: شركة الفا وان

Testing Name: Effect of Household Chemicals on Clear and Pigmented Organic Finishes

Supplier Code: BPI/H/CO.122

Delivery Date: 20/03/2024

Sample Description: مادة سائلة عازله للرطوبة

Testing Date: 01/04/2024

Thermal and Moisture Department

Moisture laboratory

Effect of Household Chemicals on Clear and Pigmented Organic Finishes

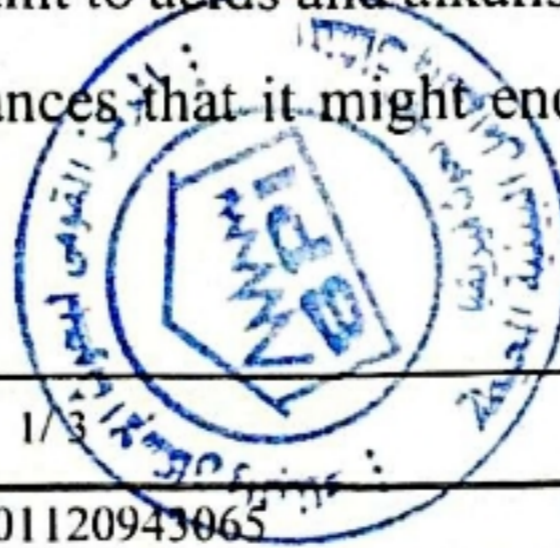
- **Scope**

This test method covers determination of the effect of household chemicals on clear and pigmented organic finishes, resulting in any objectionable alteration in the surface, such as discoloration, change in gloss, blistering, softening, swelling, loss of adhesion, or special phenomena. With the guide of ASTM D1308 to study Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

- **Significant and Use:**

The test standard for acid and alkali resistance of paint is a critical consideration in the paint manufacturing industry. It is especially important in industrial and household applications, where the protective coating must endure harsh environments, including exposure to corrosive chemicals and salts. The primary objective of this test is to determine the ability of the paint coating to resist chemical attack by a range of acids and alkalis. It is important to determine the resistance of a paint to acids and alkalis to ensure that the coating can withstand corrosive substances that it might encounter during its service life.

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- **Summary of test method:**

Immersion method:

Immerse panels to a depth in the specified reagents contained in beakers, at a temperature and length of time agreed upon with the client. Withdraw the panels, wash with distilled water, and examine immediately for any of the effects (discoloration, change in gloss, blistering, softening, swelling, loss of adhesion, or special phenomena).

Results:

<i>Reagent</i>	<i>Observation</i>
Acid Solution (HCl 5%)	Swelling and loss of adhesion were observed (Fig 1)



Fig 1: Sample after immersion in 5% HCl



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Notes:

- The sample was delivered to the laboratory by the entity requesting the test.
- The test was conducted according to the client demands with the guide of ASTM D1308.
- The aforementioned data according to what was mentioned in the letter of the body requesting the test without any responsibility on the center.
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Client Name: شركة الفاوان

Testing Name: Water leakage

Delivery Date: 07/12/2023

Supplier Code: BPI/H/CO.62

Testing Date: 07/02/2024

Sample Description: مادة سائلة عازلة للرطوبة

Thermal and Moisture Department

Moisture laboratory

Water leakage

(Technical Report)

Scope:

Although faulty plumbing is frequently the source of water leaks, leaks can also originate from a foundation crack or rainfall seeping through the walls. Long-term leaks have the potential to seriously harm your walls' structural integrity and create mold issues. Leaks in walls can be found by observing critical indicators of water damage, such as discolored spots or peeling paint or wallpaper. Indoor musty odors may also be a sign of a water leak. Using a water meter or making a hole in your wall can help you locate a leak precisely.

Introduction:

Problem known as water leakage arises when water seeps out of pipelines, sewers, roofs, or other sources. Leaks in water can raise water costs and harm houses and other structures. A water leak can be expensive, meaning it raises the water bill, or disastrous, meaning it destroys the house. Numerous things, such damage, clogging, or natural calamities, might result in water leaks.



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Results



Fig (1) before testing

At 5 Cm, 0.477 Kpa



Fig (1) The water column level is 5cm for 10 days no water leakage appeared



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At 10 Cm, 0.953 Kpa



Fig (2) The water column level is 10cm for 10 days no water leakage appeared



At 15 Cm, 1.5 Kpa



Fig (3) The water column level is 15cm for 15 days no water leakage appeared



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Remarks:

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Client Name: شركة الفا وان

Testing Name: Effect of Household Chemicals on Clear and Pigmented Organic Finishes

Supplier Code: BPI/H/CO.62

Delivery Date: 07/12/2023

Sample Description: مادة سائله عازله للرطوبة

Testing Date: 29/02/2024

Thermal and Moisture Department

Moisture laboratory

Effect of Household Chemicals on Clear and Pigmented Organic Finishes

- **Scope**

This test method covers determination of the effect of household chemicals on clear and pigmented organic finishes, resulting in any objectionable alteration in the surface, such as discoloration, change in gloss, blistering, softening, swelling, loss of adhesion, or special phenomena. With the guide of ASTM D1308 to study Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

- **Significant and Use:**

The test standard for acid and alkali resistance of paint is a critical consideration in the paint manufacturing industry. It is especially important in industrial and household applications, where the protective coating must endure harsh environments, including exposure to corrosive chemicals and salts. The primary objective of this test is to determine the ability of the paint coating to resist chemical attack by a range of acids and alkalis. It is important to determine the resistance of a paint to acids and alkalis to ensure that the coating can withstand corrosive substances that it might encounter during its service life.



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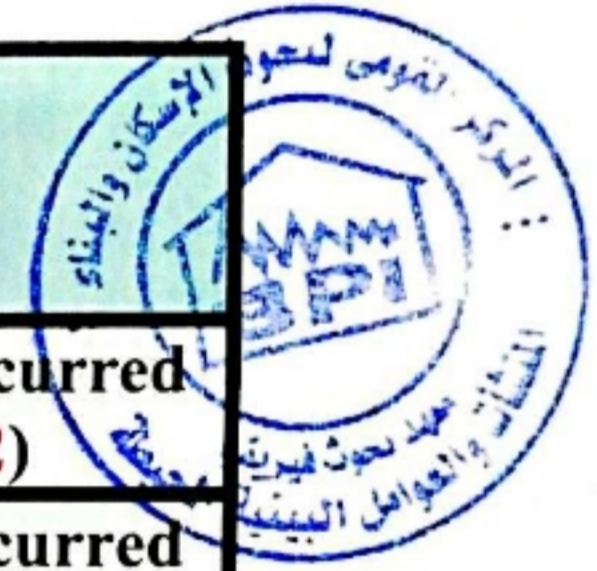
- **Summary of test method:**

Immersion method:

Immerse panels to a depth of 50 % in the specified reagents contained in beakers, at a temperature and a length of time agreed upon with the client. Withdraw the panels, wash with distilled water, and examine immediately for any of the effects (discoloration, change in gloss, blistering, softening, swelling, loss of adhesion, or special phenomena).

Results:

<i>Reagent</i>	<i>Observation</i>
Alkali solution (5%)	No observable change occurred in the sample (Fig 2)
Salt Solution (15%)	No observable change occurred in the sample (Fig 3)
Detergent Solution	No observable change occurred in the sample (Fig 4)



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Fig 2: Sample after immersion in 5% Alkali solution





Fig 3: Sample after immersion in 15% Salt solution

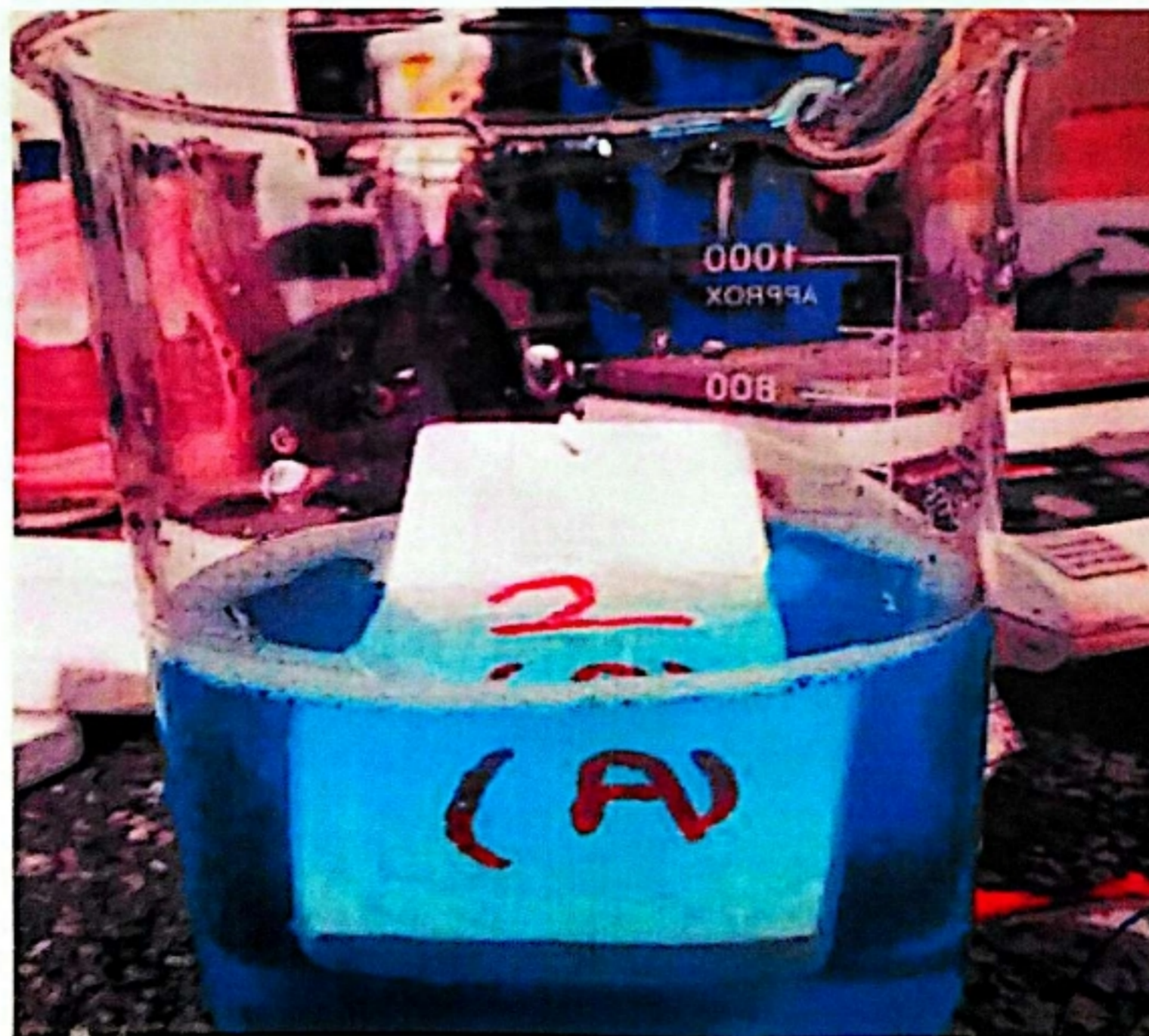


Fig 4: Sample after immersion in Detergent Solution



Notes:

- Sample was exposed to 50°C & 0% RH for 24 hours for pre-conditioning.
- The sample was delivered to the laboratory by the entity requesting the test.
- The test was conducted according to the client demands with the guide of **ASTM D1308**.
- The aforementioned data according to what was mentioned in the letter of the body requesting the test without any responsibility on the center.
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Client Name: شركة الفاوان

Testing Name: UV-Weathering test

Supplier Code: BPI/H/CO.62

Sample Description: مادة سائلة عازلة للرطوبة

Testing Date: 15/02/2024

Delivery Date: 07/12/2023

Thermal and Moisture Department

Moisture laboratory

UV-Weathering Test (Technical Report)

Scope

These test method covers the basic principles for using fluorescent UV light, temperature and water to reproduce the weathering effects that occur when materials are exposed to sunlight (either direct or through window glass) and moisture as rain or dew in actual usage with the guide of **ASTM G154-12a** and **ASTM G151-10** to study the ability of the material to maintain performance for an extended period of time

• Significant and Use:

UV Accelerated weathering produces an accurate result through interpretation of data to evaluate the products performance of any non-ferrous, organic, rubber, plastic and building materials which help researchers to innovative or improve their product quality as the tester produces damages that may occur over months or even years, outdoors ultraviolet light causes almost all the photo degradation to material exposed outdoors.

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Mainly the weathering tests performed are based on the **regular observation** of characteristics reflecting aging process such as **mechanical properties** [elongation at break, tensile properties or impact strength] or visible characteristics include cracking, change in color or gloss.

- **Note:**

- Variation in results may be expected when operating conditions are varied within the accepted limits of this test. Therefore, no references shall be made to results from the use of this test unless accompanied by a report detailing the specific operating conditions in conformance with the standard

- **Terminology**

Weathering

the breakdown of the indoor and outdoor materials by the effect of sunlight, temperature and humidity.

- **Apparatus**



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1- Laboratory Light Source:

- The light source shall be fluorescent UV lamps. A variety of fluorescent UV lamps can be used for this procedure. Differences in lamp intensity or spectrum may cause significant differences in test results.
- Actual irradiance levels at the test specimen surface may vary due to the type or manufacturer of the lamp used, or both, the age of the lamps, the distance to the lamp array, and the air temperature within the chamber and the ambient laboratory temperature.

Several factors can affect the spectral power distribution of fluorescent UV lamps:

- Aging of the glass used in some types of lamps can result in changes in transmission. Aging of glass can result in a significant reduction in the short wavelength UV emission of some lamp types.
- Accumulation of dirt or other residue on lamps can affect irradiance.
- Thickness of glass used for lamp tube can have large effects on the amount of short wavelength UV radiation transmitted.
- Uniformity and durability of phosphor coating.

2- Moisture:

Moisture the test specimens may be exposed to moisture in the form of water spray, condensation, or high humidity.

3- Relative Humidity

The test chamber may be equipped with a means to measure and control the relative humidity.



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- **Results:**

Observation after 200h of exposure:

Table1: Observation after 200h of exposure.

Maximum Exposure time	Observation after 200 h of exposure
200 h	-No cracks were observed. -Slight change in color accrued after 200 h of exposure (Fig 1).

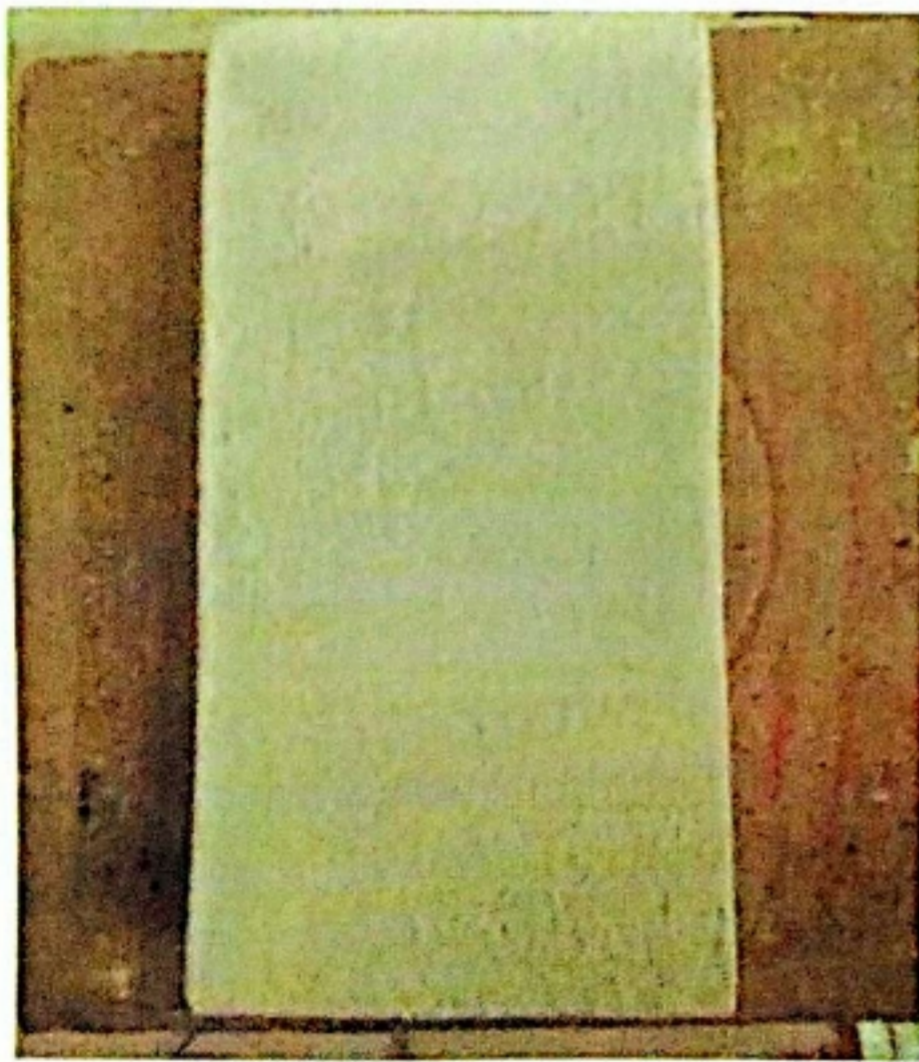


Fig.1: sample before and after exposure



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Notes:

- This test was conducted in a sealed chamber with temperature 60 °C & relative humidity 95%.
- The sample was delivered to the laboratory by the entity requesting the test.
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Client Name: شركة الفا وان

Testing Name: Water vapor Permeability

Delivery Date: 07/12/2023

Supplier Code: BPI/H/CO.62

Testing Date: 04/02/2024

Sample Description: مادة سائله عازله للرطوبة

Thermal and Moisture Department

Moisture laboratory

Determination of Water Vapor Transmission Rate (Technical Report)

Scope

These test method covers the determination of Water Vapor Transmission (WVT) of materials with the guide of ASTM E96-15, through which the passage of water vapor may be of importance, for this test the **Desiccant Method** are provided for the measurement of permeance, where low humidity on one side and high humidity on the other.

Significant and use:

The purpose of these tests is to obtain, by means of simple apparatus, reliable values of water values of water vapor transfer through permeable and semipermeable materials. Expressed in suitable units. These values are for use in design, manufacture and marketing. A permeance value obtained under a different set of conditions. For this reason, the test conditions should be selected that most approach the conditions of use.

Terminology

- **Water vapor permeability:**

The time rate of water vapor transmission through unit area of flat material of unit thickness induced by unit vapor pressure difference between two specific surfaces, under specified temperature and humidity conditions.



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- **Permeability:**

A property of a material, but the permeability of a body that performs like a material may be used. Permeability is the arithmetic product of permeance and thickness.

Note:

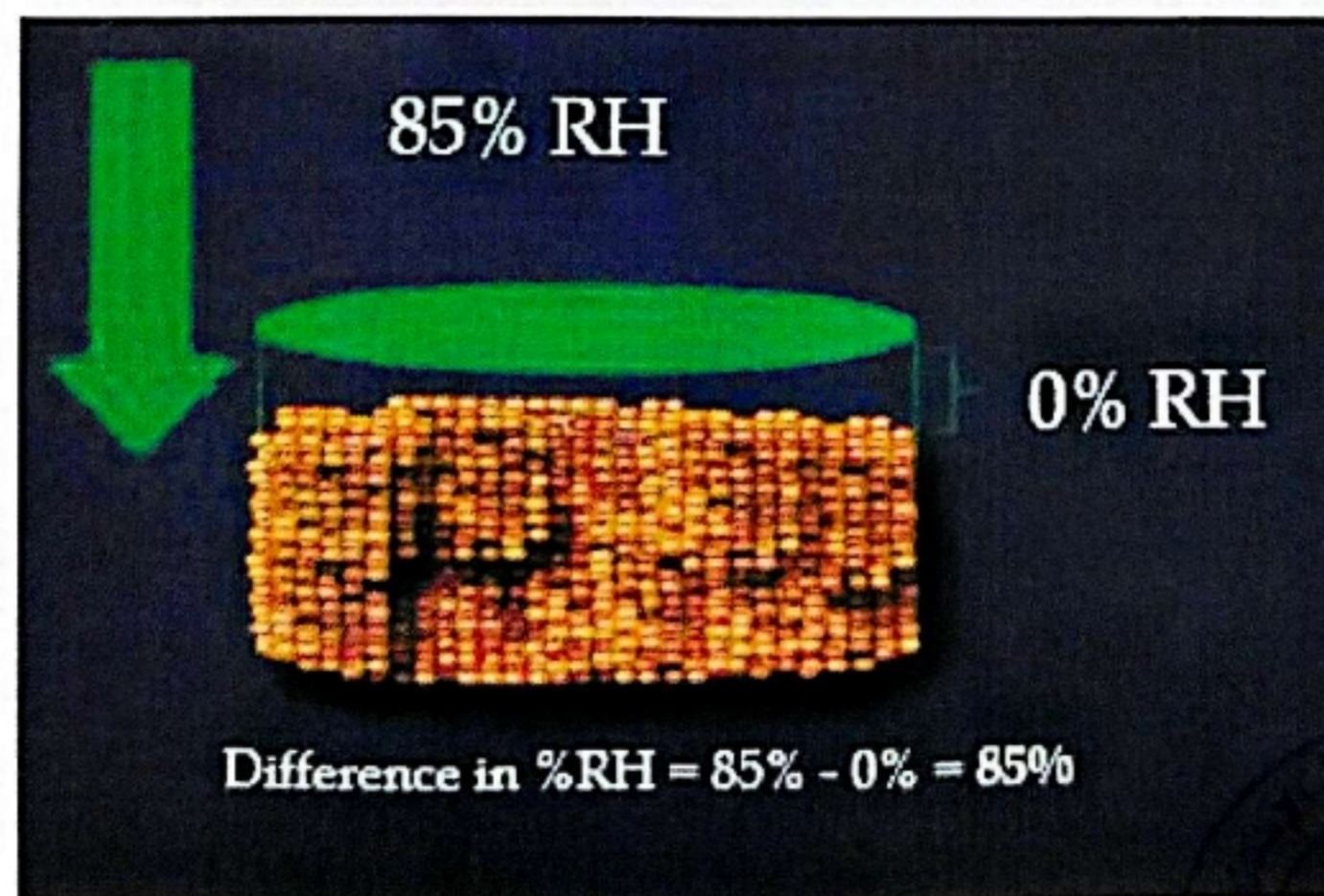
- *Permeability is a property of a material. Permeance depends on the thickness of the material and therefore is a performance evaluation and not a property of a material.*
- *Permeability should only be calculated if the test specimen is homogeneous (not laminated) and at least 1/2" thick*

- **Water vapor permeance:**

The time rate of water vapor transmission through unit area of flat material or construction induced by unit vapor pressure difference between two specific surfaces, under specified temperature and humidity conditions. Permeance is a performance evaluation and not a property of a material.

Note:

- *For hygroscopic materials, the higher the relative humidity, the higher the water vapor permeance.*



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- **Water Vapor Resistance**

A measure of the material's reluctance to let water vapour pass through. The vapour resistance takes into account the material's thickness, so can only be quoted for a particular thickness of material. It is usually measured in MNs/g (“Mega- Newton seconds per gram”).

Note:

*If a specimen has a high Water Vapor Permeance, it has low Water Vapor Resistance.
Conversely, if a specimen has a low Water Vapor Permeance, it has a high Water Vapor Resistance*

Laboratory Procedure

Determination of the Water Vapor Transmission, Water Vapor Permeance and Permeability of the supplied materials:

Three Factors That Affect Rate of Weight Change:

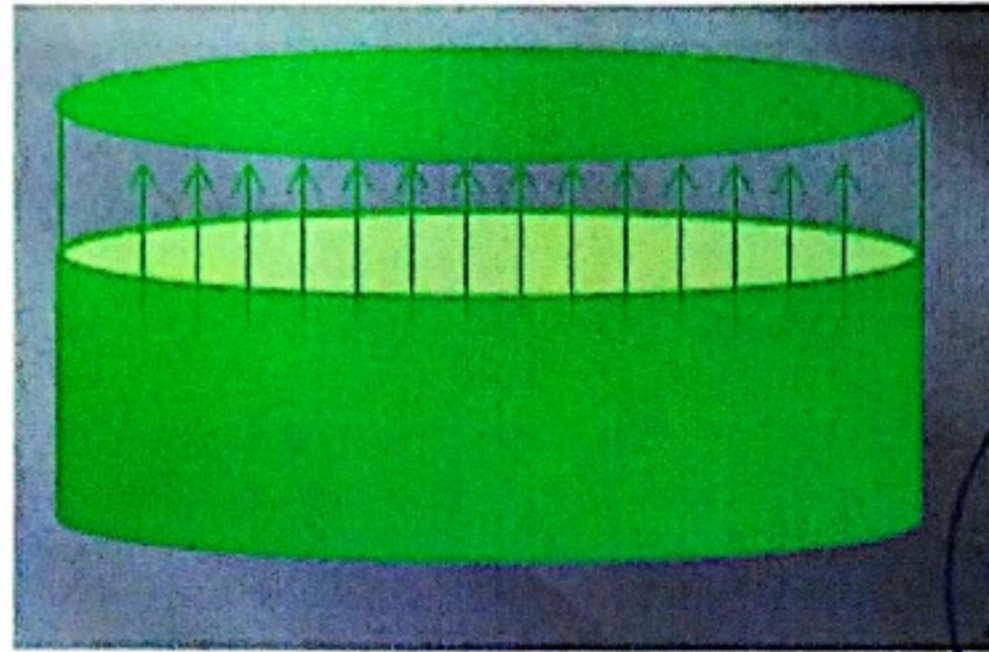
- The **area** of the specimen (used to calculate the Water Vapor Transmission Rate).
- The **driving force** – difference between the concentration of water molecules on one side of the membrane versus the other side (used to calculate the Water Vapor Permeance).

* **Area of the Material under Test (for calculating Water Vapor Transmission Rate)**

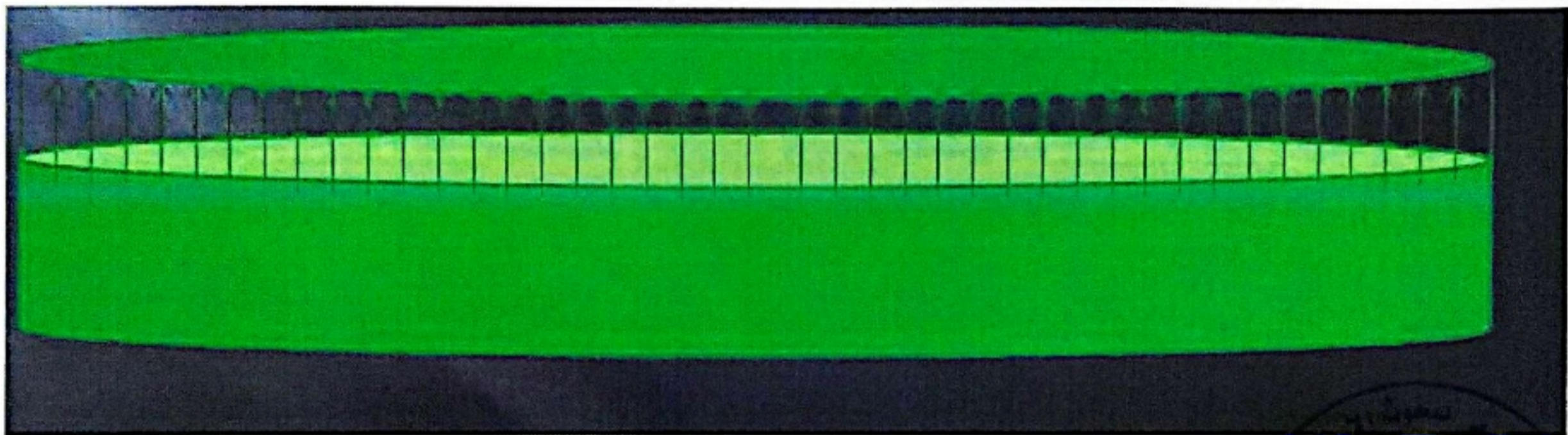


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Small area



Large area



✚ Calculations Water Vapor Transmission Rate, WVT

$$WVT = (\text{Rate of Weight Change}) \div (\text{The Area of the Specimen})$$

Metric Units: $\frac{g}{m^2 \cdot h}$ (i.e., grams per square meter per hours)

✚ Calculations of Water Vapor Permeance:

$$\text{Permeance} = \text{Water Vapor Transmission} \div \text{Vapor Pressure Difference}$$

$$= WVT \div [(\%RH)(\text{Saturation Vapor Pressure})]$$

Metric Units: Metric Perm = $\frac{g}{m^2 \cdot h \cdot mmHg}$, $\frac{ng}{m^2 \cdot (s) \cdot Pa}$

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Results:

No.	Property	Results in Metric Units
1	Water vapor Transmission	1.48 g/h.m ²
2	Permeance	0.83 g/Pa.s.m ²

Notes:

- This test was conducted in a sealed chamber with temperature 30 °C & relative humidity 85%.
- The sample was delivered to the laboratory by the entity requesting the test.
- The aforementioned data according to what was mentioned in the letter of the body requesting the test without any responsibility on the center.
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