MFPA Leipzig GmbH

Testing, Inspection and Certification Authority for
Construction Products and Construction Types

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Test Report No. PB 4.1/18-315-2

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Contracting body:	Normaizol Ltd. 6 Dymytrova Street Apartment 41 Kyiv, 3150 UKRAINE
Task:	Test of water vapour permeability according to DIN EN ISO 12572 - initial value - after 336 hours ageing at UV radiative stress according to DIN EN 13859-2 and 90 days thermal stress according to DIN EN 1296 Test of watertightness according to DIN EN 1027
Material:	Internal and External window tapes
Product:	*Alenor® Internal* *Alenor® External*
Samples delivery:	31 August 2018
Testing period:	11 October 2018 - 21 February 2019
Handling:	Dipl.-Ing. (FH) Franziska Volke Stefan Laut, head of laboratory

This report consists of 8 pages and 1 annex.

DAkkS Deutsche Akkreditierungsstelle D-PL-11021-01-00

Testing laboratory accredited by DAkkS GmbH according to DIN EN ISO/IEC 17025. The certificate can be seen on www.mfpa-leipzig.de

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1 Objectives

MFPA Leipzig GmbH was commissioned with the testing of two window sealing tapes including artificial ageing by UV and thermal stress.

The following tests were carried out for inside window tape *Alenor® Internal:*

- water vapour permeability according to DIN EN ISO 12572 for wet cup climate (23 °C and 50/93 % r.h.).

The following tests were carried out for the outside window tape *Alenor® External*:

- water vapour permeability according to DIN EN ISO 12572 for wet cup climate (23 °C and 50/93 % r.h.),
- water vapour permeability according to DIN EN ISO 12572 for wet cup climate (23 °C and 50/93 % r.h.) after 336 hours ageing at UV radiative stress at black standard temperature of 50 °C (according to EN 13859-2) followed by 90 days thermal stress at 70 °C (according to DIN EN 1296),
- watertightness according to DIN EN 1027 (carried out by EPH Dresden).

The following standards had to be applied:

[1] DIN EN 13859-2:2014-07: Flexible sheets for waterproofing – Definitions and characteristics of underlays – Part 2: Underlays for walls

[2] DIN EN 1296:2001-03: Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Method for artificial ageing by long term exposure to elevated temperature

[3] DIN EN ISO 12752:2017-05: Hygrothermal performance of building materials and products - Determination of water vapour transmission properties

[4] DIN EN 1027:2000-09: Windows and doors - Watertightness - Test method; German version EN 1027:2000

On 31 August 2018 appropriate specimen of Alenor® Internal and Alenor® External were delivered to MFPA Leipzig GmbH.

2 Test laboratory

MFPA Leipzig GmbH laboratory is working under the strict rules of DIN EN ISO 17025 Quality Management system. The test of water vapour permeability according to DIN EN ISO 12572 belongs to the accredited test methods (Accreditation with flexible scope).

3 Test results - *Alenor® Internal*

3.1 Water vapour permeability

Sorbent: ammonium dihydrogen phosphate 93 (±3) % r.h. at 23 (±0.5) °C

Climatic chamber: Memmert ICH 256 50 (±3) % r.h. at 23 (±0.5) °C

Testing period: 15.10.2018 – 21.02.2019

Medium air pressure (p) while testing: 1005 hPa

Specimen details

Specimen		Int-1	Int-2	Int-3	Int-4	Int-5
Diameter of testing area	mm	77	77	77	77	77
Thickness	µm	200	204	191	204	199
Testing area	cm²	47	47	47	47	47
Aerolar mass	g/m²	168	171	170	171	170

Results

Specimen	Water vapour diffusion flux density g [kg/(m² · s)]	Water vapour diffusion transmission coefficient W [kg/(m² · s · Pa)]	Water vapour diffusion equivalent air layer thickness S_d [m]
Int-1	< 1.58E-10	< 1.31E-13	> 1500
Int-2	< 1.58E-10	< 1.31E-13	> 1500
Int-3	< 1.58E-10	< 1.31E-13	> 1500
Int-4	< 1.58E-10	< 1.31E-13	> 1500
Int-5	< 1.58E-10	< 1.31E-13	> 1500
Mean value	**< 1.6E-10**	**< 1.3E-13**	**> 1500**

4 Test results - *Alenor® External*

4.1 Water vapour permeability

4.1.1 Initial value

Sorbent: ammonium dihydrogen phosphate — 93 (±3) % r.h. at 23 (±0.5) °C

Climatic chamber: Memmert ICH 256 — 50 (±3) % r.h. at 23 (±0.5) °C

Testing period: — 17.10.2018 – 23.10.2018

Medium air pressure (p) while testing: — 1005 hPa

Specimen details

Specimen		Ext_iv-1	Ext_iv-2	Ext_iv-3	Ext_iv 4	Ext_iv-5
Diameter of testing area	mm	77	77	77	77	77
Thickness	µm	471	429	398	409	395
Testing area	cm²	47	47	47	47	47
Aerolar mass	g/m²	149	147	141	141	144

Results

Specimen	Water vapour diffusion flux density g [kg/(m² · s)]	Water vapour diffusion transmission coefficient W [kg/(m² · s · Pa)]	Water vapour diffusion equivalent air layer thickness s_d [m]
Ext_iv-1	2.67E-07	2.24E-10	0.877
Ext_iv-2	2.85E-07	2.39E-10	0.824
Ext_iv-3	2.66E-07	2.24E-10	0.879
Ext_iv-4	2.77E-07	2.33E-10	0.844
Ext_iv-5	3.70E-07	3.10E-10	0.635
Mean Value	**2.9E-07**	**2.5E-10**	**0.81**

4.1.2 Value after ageing

Sorbent: ammonium dihydrogen phosphate — 93 (±3) % r.h. at 23 (±0.5) °C

Climatic chamber: Memmert ICH 256 — 50 (±3) % r.h. at 23 (±0.5) °C

Testing period: — 11.02.2019 – 20.02.2019

Medium air pressure (*p*) while testing: — 1010 hPa

Specimen details

Specimen		Ext-ag-1	Ext-ag-2	Ext-ag-3	Ext-ag-4	Ext-ag-5
Diameter of testing area	mm	77	77	77	77	77
Thickness	µm	580	573	575	563	593
Testing area	cm²	47	47	47	47	47
Aerolar mass	g/m²	144	147	143	142	145

Results

Specimen	Water vapour diffusion flux density g [kg/(m² · s)]	Water vapour diffusion transmission coefficient W [kg/(m² · s · Pa)]	Water vapour diffusion equivalent air layer thickness s_d [m]
Ext-ag-1	2.75E-07	2.10E-10	0.942
Ext-ag-2	2.24E-07	1.70E-10	1.145
Ext-ag-3	3.05E-07	2.32E-10	0.841
Ext-ag-4	3.06E-07	2.33E-10	0.840
Ext-ag-5	3.05E-07	2.32E-10	0.846
Mean value	**2.8E-07**	**2.2E-10**	**0.92**

4.2 Driving rain impermeability (watertightness)

The test of watertightness was carried out by EPH Dresden. The corresponding report is attached as Annex 1. The results are summarized below.

Window test facility:	TYP KS, modell 2427/650 PC (FT02)
Measurement equipment:	Temperature/humidity meter 2290-8 (FT51)
Ambient conditions:	24 °C / 55 % r.h.
Medium air pressure (p) while testing:	1016 hPa
Driving rain:	3 water nozzles, each with a flow rate of 2 l/min

Three sections, each measuring 1000 mm in length, of the window sealing tape *Alenor® External*: have been tested. The tapes were glued to a specially prepared adapter plate made of high pressure laminate (HPL). With the help of a CNC-machine, the plate was provided with three cut-outs with dimensions of 15 mm x 1000 mm.

Results

Row	Amount of water: 6 l/min		Watertightness *Alenor® External*		
	Pressure	Duration	Sample 1	Sample 1	Sample 1
[-]	[Pa]	[min]	[-]	[-]	[-]
1	0	15	no water ingress	no water ingress	no water ingress
2	50	5	no water ingress	no water ingress	no water ingress
3	100	5	no water ingress	no water ingress	no water ingress
4	150	5	no water ingress	no water ingress	no water ingress
5	200	5	no water ingress	no water ingress	no water ingress
6	250	5	no water ingress	no water ingress	no water ingress
7	300	5	no water ingress	no water ingress	no water ingress
8	450	5	no water ingress	no water ingress	no water ingress
9	600	5	no water ingress	no water ingress	no water ingress

5 Summary

The results of the tests of water vapour permeability according to DIN EN ISO 12572 are summarised below.

Specimen	Testing condition	Climate	Water vapour diffusion equivalent air layer thickness s_d [m]
Alenor® Internal	Initial value	23 °C, 50/93 %.	>1500
Alenor® External	Initial value	23 °C, 50/93 %.	0,81
	After ageing	23 °C, 50/93 %.	0,92

When testing the watertightness of *Alenor® External*, no water ingress was detected during the test without and with pressure load up to 600 Pa. This assessment refers exclusively to the specified test cut-outs with dimensions of 15 mm x 1000 mm. According to DIN EN 12208 this result corresponds to watertightness class 9A.

The results of the tests exclusively relate to the items tested. This document does not replace a certificate of conformity or suitability according to national and European building codes.

Leipzig, 4 March 2019

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