

Evidence of performance

Of the physical attributes of the edge seals
of insulating glass units according to DIN EN 1279-4



Test report
no. 17-002666-PR05
(PB-H01-09-en-02)

Client ZHENGZHOU ZHONGYUAN SILAND HIGH TECHNOLOGY CO., LTD
No. 28 Dongqing West St,
Zhengzhou Hi-tech Development Zone
450001 Zhengzhou
China

Product Sealant for use in the edge seals of insulating glass units
System designation MF910
Order Test according to DIN EN 1279-4

Basis

DIN EN 1279-4 : 2002-10;
Glass in building – Insulating
glass units;
Part 4: Methods of test for the
physical attributes of edge
seals.

Chapter: 5.2 Moisture vapour
transmission rate

Chapter: 5.3 Gas permeation
rate

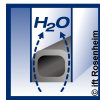
Replaced Test report
No. 17-002666-PR05 (PB-H01-
09-en-01) dated 19.10.2017

Instructions for use

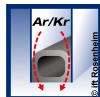
This test report serves to
demonstrate the physical
attributes of edge seals of
insulating glass units.

It serves as a basis for
substitution of sealants used
in insulating glass units.
according to EN 1279-1.

The sealant based on MF910 , made by
original client (desposited at ift), displays the following
properties according to DIN EN 1279-4:



5.2 Moisture vapour transmission rate $MVTR = (0.26 \pm 0.02) \frac{\text{Gramm H}_2\text{O}}{\text{m}^2 \cdot 24\text{h} \cdot 2\text{mm}}$



5.3 Gas permeation rate $(1.3 \pm 0.3) \times 10^{-3} \text{ g}/(\text{m}^2 \text{ h})$

Validity

The data and results given
relate solely to the tested and
described specimen.

Notes on publication

The ift-Guidance Sheet
'Conditions and Guidance for
the Use of ift Test Documents'
applies.

The cover sheet can be used
as an abstract.

ift Rosenheim
29.11.2017

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Contents

The report contains a total of
6 page/s

- 1 Object
- 2 Procedure
- 3 Detailed results
- 4 Summary

1 Object

1.1 Test specimen for testing the moisture vapour transmission rate

Sealant

Product designation	MF910
Type	Hot Applied Butyl Sealant for insulating glas
Manufacturer	original client (desposited at ift)
Colour	black
Diameter dimensions in mm	approx. 200

Films as described in DIN EN 1279-4

Thickness	Film 2	d = 2.2 mm
	Film 3	d = 2.1 mm
	Film 4	d = 2.3 mm

Surface approximately (20 x 20) cm².

1.2 Test specimen for testing the gas permeation rate

Films as described in DIN EN 1279-4

Thickness	Film 1	d = 2.5 mm
	Film 2	d = 2.3 mm
	Film 4	d = 2.2 mm

Area approximately (20 x 20) cm².

The description is based on inspection of the test specimen at **ift**.

Item designations/numbers as well as material specifications were given by the original client (desposited at ift).

2 Procedure

2.1 Sampling

The samples were selected and produced by the original client (desposited at ift).

2.1.1 Test specimens for testing the moisture vapour transmission rate (MVTR)

Quantity	5 films
Delivered	April 16th 2012 by the original client (desposited at ift)
Registration No.	32228

2.1.2 Test specimen for testing the gas permeation rate

Quantity	5 films
Delivered	April 16th 2012 by the original client (desposited at ift)
Registration No.	32228

2.2 Process

Basis

DIN EN 1279-4 : 2002-10 Glass in building – Insulating glass units.
Methods of test for the physical attributes of edge seals.
Chapter 5.2 Moisture vapour transmission rate
Chapter 5.3 Gas permeation test on film

Boundary conditions According to the requirements of the standard

Deviations There have been no deviations from the test method and test conditions

2.3 Test equipment

2.3.1 Moisture vapour transmission rate

Normal climate chamber	Appliance number: 22040
Precision balance	Appliance number: 22431
Test chamber with hygrostat	Appliance number: 22589
moisture sensor	Appliance number: 22562

2.3.2 Gas permeation rate on film

Normal climate chamber	Appliance number: 22040
Gasleakage measurement device with gas chromatograph	Appliance number: 22503

2.4 Testing

Date/Period	May 14th 2012 to August 20th 2012
Testing personnel	Thomas Breu, Dipl.-Ing. (FH), Thomas Eder



3 Detailed results

3.1 Moisture vapour transmission rate test according to DIN EN 1279-4. Chapter 5.2

Table 1 shows the moisture vapour transmission rate results for three test specimens. The moisture vapour transmission rate can be found from the gradient of the lines in the graph (Fig. 1).

The moisture vapour transmission rate is calculated according to the following formula:

$$MVTR = \frac{G}{tA} = \frac{G/t}{A}$$

G = Mass change, grams of H₂O

t = Time in days (24 h)

G/t = Gradient of the lines, grams of H₂O x (24 h)⁻¹

A = Area tested in m²

Table 1 Testing moisture vapour transmission rate on films

	Sample 2	Sample 3	Sample 4
Slope of the regression line	0.0019	0.0017	0.0017
Membrane thickness in mm	2.2	2.1	2.3
Tested area in m ²	0.0077	0.0074	0.0075
MVTR g_{H2O}/(m²*1d*2mm)	0.27	0.24	0.26
MVTR (average value)	(0.26 ± 0.02) g_{H2O}/(m²*1d*2mm)		

Error of measurement in the test procedure according to EN 1279-4, Annex C, is specified as 25 % standard deviation from the average value

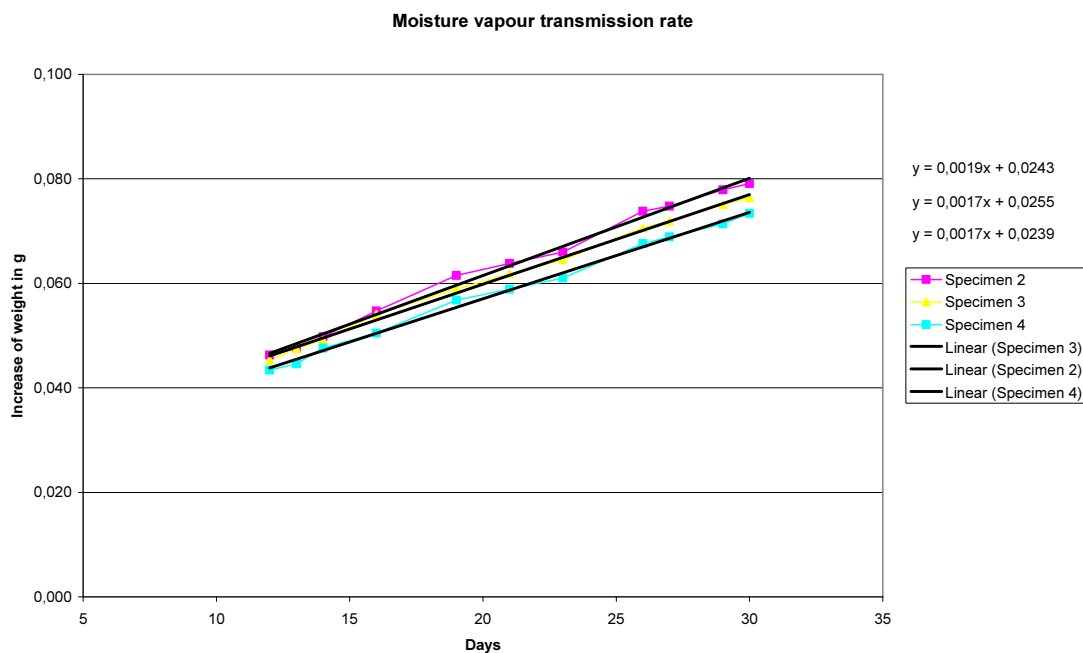


Fig. 1 Graph of the moisture vapour transmission rate of 3 test specimen

3.2 Gas permeation rate, test according to DIN EN 1279-4, Chapter 5.3

The gas permeation rate test was carried out on three test specimens. The testing area of the films was approx. 46 cm². Once a constant state had been reached, the value of the average gas permeation rate for each of the films was determined on the basis of four measurements. The results are presented in table 2.

Table 2 Gas permeation rate test on films

	Gas permeation rate in g/m ² h		
	Test specimen 1	Test specimen 2	Test specimen 4
Membrane thickness in mm	2.5	2.3	2.2
Average value for the measured film	1.1 x 10 ⁻³	1.4 x 10 ⁻³	0.96 x 10 ⁻³
Average value for film (relating to 2 mm membrane thickness)	1.3 x 10 ⁻³	1.6 x 10 ⁻³	1.1 x 10 ⁻³
Average value of gas permeation rate calculated from the 3 individual values	(1.3 ± 0.3) x 10⁻³ g/(m² h)		

Error of measurement in the test procedure according to EN 1279-3 is specified as 20 % standard deviation for all individual values.

4 Evaluation and summary according to the specifications of DIN EN 1279-4

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Sealant specification: MF910

4.1 Moisture vapour transmission rate test

Film thickness	Based on a thickness of 2 mm
ΔP_{H_2O}	Initial load on desiccant 3.0 %; Climatic chamber average 99 %rh; $\Delta P_{H_2O} = 99 \%$
Temperature	(23±1) °C
Moisture vapour transmission rate	(0.26 ± 0.02) $\frac{\text{Gramm H}_2\text{O}}{\text{m}^2 \cdot 24\text{h} \cdot 2 \text{ mm}}$

4.2 Gas permeation rate test

Film thickness	Based on a thickness of 2 mm
Surface	Average approx. 0.0046 m ²
Gas permeation rate	(1.3 ± 0.3) x 10⁻³ g/(m² h)

Result of the testing of the strength of the edge seal:

MF910, made by original client (deposited at ift) fulfils the criteria: **YES**

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29.11.2017