

Evidence of Performance

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



Test Report 601 38734/3e U*

*) Translation of test report 601 37734/3 dated
13 October 2009

Client **GSS German Spacer
Solutions GmbH**
Reichspräsidentenstr. 21-25

45470 Mülheim
Germany

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

Test report 601 38734/1e dated
13 October 2009

Product	Sealant for use in the edge seals of insulating glass units
System designation	Polyisobutylene, KU 83B, NEDEX Kimya Sanayi A.S.
Order	Test according to DIN EN 1279-4, chapter 5.2 and 5.3.

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 Polyisobutylene, KU 83B, made by
NEDEX Kimya Sanayi A.S., displays the following
properties according to DIN EN 1279-4:

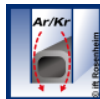
Validity

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



5.2 Moisture vapour transmission rate

$$MVTR = (0,12 \pm 0,01) \frac{\text{Gramm H}_2\text{O}}{\text{m}^2 \cdot 24\text{h} \cdot 2\text{mm}}$$



5.3 Gas permeation rate

$$(1,41 \pm 0,22) \times 10^{-3} \text{ g}/(\text{m}^2 \text{ h})$$

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
13. October 2009

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6 page/s

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Notified Body Nr.: 0757
Anerkannte PUZ-Stelle: BAY 18
 Deutscher
Akreditierungs
Rat
DAP-FL-0808.01
DAP-ZE-2288.00
TGA-ZM-16-63-00
TGA-ZM-16-63-00

1 Object

1.1 Test specimen moisture vapour transmission rate and gas permeation rate

Manufacturer	NEDEX Kimya Sanayi A.S., Kartal - Istanbul
Date of manufacture	08 January 2009
Substrates A and B	Foil according to DIN EN 1279-4
Sealant	
Product designation	Polyisobutylene, KU 83B, NEDEX Kimya Sanayi A.S. Kartal - Istanbul
Type	thermoplastic primary sealant of insulating glass units
Manufacturer	NEDEX Kimya Sanayi A.S., Kartal - Istanbul
Colour	black
Thickness in mm	approx. 2
Diameter in mm	approx. 150

The description is based on inspection of the test specimen at the **ift**. Item designations / numbers as well as material specifications have been provided by the client.

2 Procedure

2.1 Sampling

The samples were selected and produced by the client.

2.1.1 Test specimen for the adhesion test

Quantity	15 pieces
Delivered	21 April 2009 by the client
Registration No.	25822

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
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Boundary conditions

According to the requirements of the standard

Deviations

There have been following deviations from the test method and test conditions

Some of the tested films don't meet the standard requirements on the thickness of films.

2.3 Test equipment

2.3.1 Adhesion

Normal climate chamber

Appliance number: 22040

Precision balance

Appliance number: 20277

Test chamber with moisture sensor

Appliance number: 22562

2.3.3 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

11 May 2009 to 10 July 2009

Testing personnel

Irina Hausstetter, Dipl.-Ing. (FH)

Rita Sanftl, 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 5 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. 6).

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 H_2O

t = Time in days (24 h)

G/t = Gradient of the lines, grams of $H_2O \times (24 h)^{-1}$

A = Area tested in m^2

Table 5 Testing moisture vapour transmission rate on films

	Sample 1	Sample 2	Sample 3
Slope of the regression line	0,0007	0,0007	0,0006
Membrane thickness in mm	2,4	2,8	3,2
Tested area in m^2	0,008012	0,008012	0,007854
MVTR $g_{H_2O}/(m^2 \cdot d \cdot mm)$	0,105	0,122	0,122
MVTR (average value)	$(0,12 \pm 0,01) g_{H_2O}/(m^2 \cdot d \cdot mm)$		

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

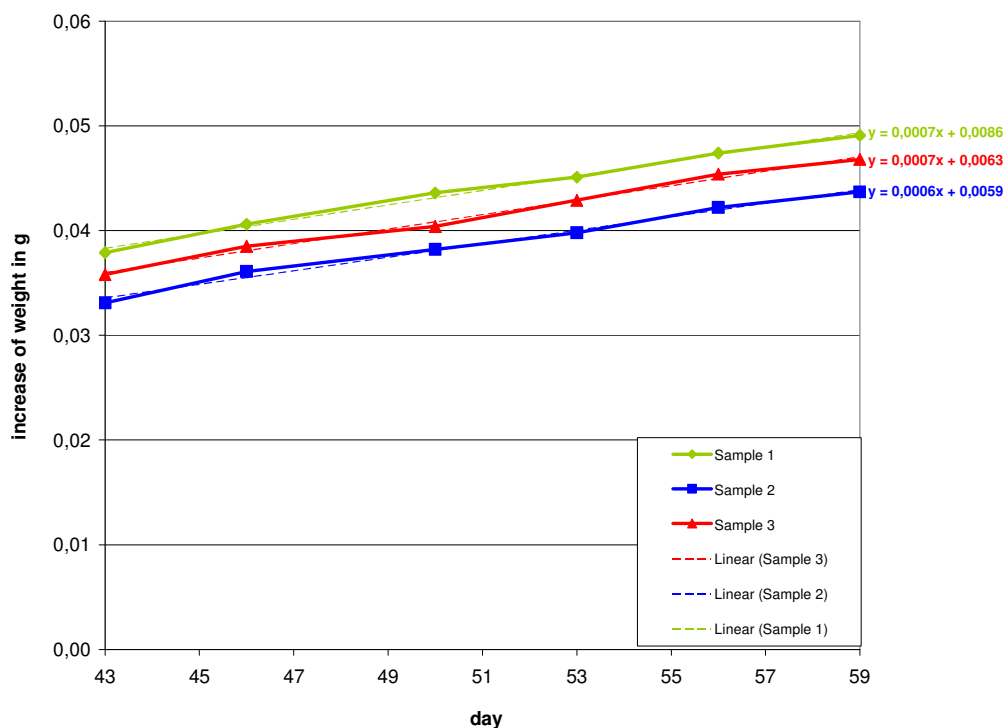


Fig. 6 Graph of the moisture vapour transmission rate of 3 test specimen

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. 0,006 m². 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 6.

Table 6 Gas permeation rate test on films

	Gas permeation rate in g/m ² h		
	Test specimen 1	Test specimen 2	Test specimen 3
Membrane thickness in mm	1,84	1,96	2,40
Average value for the measured film	1,57 x 10 ⁻³	1,65 x 10 ⁻³	< 1,0 x 10 ⁻³ (0,974 x 10 ⁻³)
Average value for film (relating to 2 mm membrane thickness)	1,45 x 10 ⁻³	1,61 x 10 ⁻³	1,17 x 10 ⁻³
Average value of gas permeation rate calculated from the 3 individual values	(1,41 ± 0,22) 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

Client: GSS German Spacer
Solutions GmbH

Reichspräsidentenstr. 21-25

45470 Mülheim

Sealant specification: Polyisobutylene, KU 83B
NEDEX Kimya Sanayi A.S., Kartal - Istanbul

4.1 Moisture vapour transmission rate test

Film thickness	Based on a thickness of 2 mm
ΔP_{H_2O}	Initial load on desiccant 2.0 %; Climatic chamber average 99 %rh; $\Delta P_{H_2O} = 97 \%$
Temperature	(23±1) °C
Moisture vapour transmission rate	$(0,12 \pm 0,01) \frac{\text{Gramm H}_2\text{O}}{\text{m}^2 \cdot 24\text{h} \cdot 2\text{mm}}$

4.2 Gas permeation rate test

Film thickness	Based on a thickness of (2 ± 0,1) mm
Surface	Average approx. 0,006 m ² , square
Gas permeation rate	$(1,41 \pm 0,22) \times 10^{-3} \text{ g}/(\text{m}^2 \text{ h})$

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

The sealant Polyisobutylene, KU 83B, made by NEDEX Kimya Sanayi A.S., fulfils the criteria: YES

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13. October 2009