

Evidence of Performance

Ageing behaviour of insulating glass units as per DIN EN 1279-2 and DIN EN 1279-3

Test Report 10-001373-PB02-H01-09-en-01



Client **Nedex Chemie Deutschland GmbH**
Konrad-Zuse-Str. 33

47445 Moers
Germany

Product	Insulating glass units - gas filled
Designation	Neutralux advance 1.1
Exterior dimensions (W x H)	350 mm x 500 mm
Configuration	4 / 12 / 4 mm
Spacers Sealants	Aluminium, Vitromatic, company Erbslöh
External internal	Polysulphide, PS-545R, company Nedex Chemie Polyisobutylene, PIB-969, company H.B. Fuller
Special features	-/-

Basis

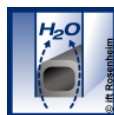
DIN EN 1279-2 : 2003-06;
Glass in building - Insulating glass units - Part 2: Long term test method and requirements for moisture penetration
DIN EN 1279-3 : 2003-05;
Glass in building - Insulating glass units - Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances
Test report no. 601 34977/3 dated 10 April 2008

Instructions for use

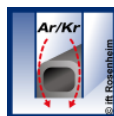
This test report serves to demonstrate the moisture penetration, gas leakage rate and gas concentration tolerances of insulating glass units.

It serves as a basis (ITT) for CE-marking according to EN 1279-5.

The insulating glass unit fulfils the requirements of



DIN EN 1279-2



DIN EN 1279-3

Validity

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

The long term test does not imply any statement on characteristics regarding performance and quality.

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 abstract.

ift Rosenheim
9. February 2011

Karin Lieb, Dipl.-Ing. (FH)
Head of Testing Department
Building Material & Semifinished Products

Irina Hausstetter, Dipl.-Ing. (FH)
Operating Product Officer
Building Material & Semifinished Products

Contents

The test report comprises a total of 6 pages

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

1 Object

1.1 Description of test specimen

Building element	Insulating glass unit, gas filled
Manufacturer	Badischer Glashandel Karl Arnoldt GmbH & Co. KG, D-74927 Eschelbronn
Date of manufacture	25 May 2007
Product designation	Neutralux advance 1.1
Exterior dimensions (W x H)	350 mm x 500 mm
Total thickness	approx. 20 mm
Configuration	4 / 12 / 4 mm
Spacers	
Material / Manufacturer	Aluminium, Vitromatic, company Erbslöh
Corner connection	4x bendes with linear connector (plastic); without additional butylation of the connection on the spacer back
Desiccant	
Type / Manufacturer	NEDEX ZEOLAN, company Nedex Chemie
Amount / Type of desiccant	approx. 30 g, foursided filled
Sealing system	two level
External	
Type / Manufacturer	Basis Polysulphide, PS-545R, company Nedex Chemie Batch N° D571507851/D571507045
Design	thickness of sealant on spacer back: approx. 2.5 mm - 5 mm
Internal	
Type / Manufacturer	Basis Polyisobutylene, PIB-969, company H.B. Fuller Batch N° D571709372
Design	visible width of butyle: approx. 5 mm - 6 mm butyle application: approx. 4.3 g/m, on one side
Coating	Pos. 3, Planibel Top N, company AGC Flat Glass Europe
Decoating of glazing edge	approx. 10 mm
Gas filling of cavity	manufacturers instructions
Type of gas	Argon
Nominal volume	90 %
Closing plug for gas filling	none
Special features	-/-

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 original client.

2 Procedure

2.1 Sampling

The test specimen were manufactured and selected by the original client.

Number	21
Delivered on	08 November 2007 by the original client
Number of registration	22792

2.2 Methods

Basis

DIN EN 1279-2 : 2003-06 Glass in building, Insulating glass units – Part 2: Long term test method and requirements for moisture penetration.

DIN EN 1279-3: 2003-05 Glass in building – Insulating glass units – Part 3: Long term test method and requirements for the gas leakage rate and for gas concentration tolerances.

Boundary conditions As specified by the standards

Deviation There have been no deviations from the test method and/or test conditions.

2.3 Test equipment

Cyclic test cabinet	Device No. 22601
Constant climate cabinet	Device No. 22173
Normal climate chamber	Device No. 22040
Balance (moisture content)	Device No. 22534
Furnace	Device No. 22567
Gas installation with gas chromatograph	Device No. 22503

2.4 Testing

Date/Period	19 November 2007 - 11 March 2008
Testing personnel	Irina Hausstetter, Katharina Simon, Thomas Eder

3 Detailed results

3.1 DIN EN 1279-2

The initial dew point temperature of all units supplied in new condition was < -60 °C.

Table 1 Moisture content of desiccant

Unit No.	Moisture content of desiccant T in %		Moisture penetration I in %
	T_i		
7	2.3	$T_{i,av} = 2.5$	
8	2.7		---
9	2.6		---
10	2.3		---
		T_f	
4	---	3.7	6.9
5	---	3.4	5.1
6	---	4.0	8.6
11	---	3.6	6.3
12	---	3.8	7.4
Average values	---	$T_{f,av} = 3.7$	$I_{av} = 6.9$

The following symbols were used:

T_i initial moisture content of desiccant

T_{iav} average initial value of moisture content of desiccant

T_f final moisture content of desiccant

T_{fav} average final value of moisture content of desiccant

T_{cav} average standard moisture adsorption capacity of desiccant

I_{av} average value of moisture penetration in %

3.2 Results of the DIN EN 1279-3

The results of the gas leakage rate for the gas type Argon are represented in Table 2.

Table 2 Results of the gas leakage rate

Sample No.	Gas leakage rate L_i in % a ⁻¹	measured gas concentration c_i in Vol.%	nominal value of the gas concentration $c_{i,0}$ in Vol.%	Difference $(c_i - c_{i,0})$ in Vol.%
1	0.71	92	90	+2
2	0.61	95	90	+5
Requirements	$L_i < 1.00$ % a ⁻¹	----	----	The difference must be included within $c_{i,0}$ (-5/+10) Vol.%

4 Evaluation

Calculation of the moisture penetration index I_{av} was based on the average standard moisture adsorption capacity of the desiccant $T_{cav} = 20$ % (DIN EN 1279-2, Annex D, Table D.1).

In summary, the results were as follows:

– Average initial moisture content of desiccant	$T_{iav} = 2.5$ %
– Average final moisture content of desiccant	$T_{fav} = 3.7$ %
– Average value of moisture penetration index	$I_{av} = 6.9$ %
– Maximum individual value of moisture penetration index	$I = 8.6$ %
– Requirements set out by DIN EN 1279-2 for average value	$I_{av} \leq 20$ %
– Requirements set out by DIN EN 1279-2 for individual values	$I \leq 25$ %
– Measured individual values as per DIN EN 1279-3	0.71 % a ⁻¹ 0.61 % a ⁻¹
– Requirements set out by DIN EN 1279-3 for at least two individual values	$L_i < 1.00$ % a ⁻¹

Based on the results listed in Table 1 and Table 2 the insulating glass system

Neutralux advance 1.1

fulfils the requirements set out by DIN EN 1279-2 and DIN EN 1279-3.



5 Summary of test report No. 601 10-001373-PB02-H01-09-en-01 dated 9. February 2011

Insulating glass units – Moisture penetration results according to DIN EN 1279-2 and evaluation of gas leakage rate and gas concentration, measured according to DIN EN 1279-3

For details, see the test report.

Company:

Nedex Chemie Deutschland GmbH
Konrad-Zuse-Str. 33

47445 Moers
Germany

Plant:

Badischer Glashandel
Karl Arnoldt GmbH & Co. KG
Bahnhofstr. 68

74927 Eschelbronn
Germany

System description: Not submitted to test body
Product designation: Neutralux advance 1.1

Moisture penetration index $I_{av} = 6.9 \%$

Gas leakage rate and gas concentration:

Applied gas	Argon			
Unit number	1	2	3	4
c_i in %	95	95	92	95
$c_{i,0}$ in %	90	90	90	90
L_i in %/a	nr	nr	0.71	0.61

System conforms: YES

ift Rosenheim
9. February 2011

Irina Hausstetter, Dipl.-Ing. (FH)
Operating Product Officer
Building Material & Semifinished Products