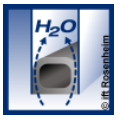
Evidence of Performance

Ageing behaviour of insulating glass units according to DIN EN 1279-2 and DIN EN 1279-3

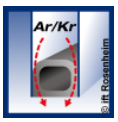
Test Report 601 42789/1e

Client	**EPAL s.a.** 2 klm Sindos-Halastra 57200 Halastras Greece
Product	Insulating glass units - gas filled
Designation	Insulating glass unit
Exterior dimensions (W x H) in mm	301 x 502
Configuration in mm	4 / 12 / 4
Spacers	Aluminium, H 6.5 Standard, company Profilglass S.p.A
Sealants	
External	Polysulfide, PS-998R, H.B. Fuller
internal	Polyisobutylene, PIB-969, company H.B. Fuller
Special features	-/-

The insulating glass unit fulfils the requirements of



DIN EN 1279-2



DIN EN 1279-3

ift Rosenheim
30. June 2010

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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

Instructions for use

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

The determined results can be used as a basis (ITT) for CE-marking by the producer. The regulations according to EN 1279-5 have to be observed.

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.

Contents

The report contains a total of 6 pages

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DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-80

1 Object

1.1 Description of test specimen

Building element	Insulating glass unit, gas filled
Manufacturer	EPAL s.a., GR-57200 Halastras
Date of manufacture	April 2010
Product designation	Insulating glass unit
Exterior dimensions (W x H)	301 x 502
Total thickness	approx. 20
Configuration	4 / 12 / 4
Spacers	
Material / Manufacturer	Aluminium, H 6.5 Standard, company Profilglass S.p.A
Corner connection	4 corner connector made of plastic material (colour white respectively grey); without additional butylation on the corner back.
Desiccant	
Type / Manufacturer	Zeolith 3Å, Phonosorb 558, company Grace
Amount / Type of desiccant	approx. 55 g, four sides filled
Sealing system	two level
External	
Type / Manufacturer	Basis Polysulfide, PS-998R, H.B. Fuller
Design	thickness of sealant on spacer back: approx. 4.5 mm to 5.5 mm
Internal	
Type / Manufacturer	Basis Polyisobutylene, PIB-969, company H.B. Fuller
Design	visible width of butyl: approx: 3.0 mm to 5.0 mm Butyl application on one side: approx. 1.4 g/m
Coating	none
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 client.

2 Procedure

2.1 Sampling

The test specimen were manufactured and selected by the client.
The sampling report has been submitted.

Number	16
Delivered on	22 January 2010
Number of registration	27398

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 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	Device No. 20339
with gas chromatograph	Device No. 20351

2.4 Testing

Date/Period	01 Feburary 2010 to 18 May 2010
Testing personnel	Irina Hausstetter, Thomas Eder, Rita Sanftl

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	2.4	$T_{i,av}$ = 2.7	---
8	2.8		---
9	2.8		---
10	2.9		---
		T_f	
4	---	5.7	16
5	---	5.8	16
6	---	5.7	16
11	---	4.9	11
12	---	5.8	16
Average values	---	$T_{f,av}$ = 5.6	I_{av} = 15

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	0.82	95	90	+ 5
2	0.75	95	90	+ 5
Require-ments	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 moisture adsorption capacity of the desiccant T_{cav} = 22 %, as stated by the client. This T_c-Value was determined according to the specifications of EN 1279-2, Annex D (**ift** test report 509 33586 / 2).

In summary, the results were as follows:

– Average initial moisture content of desiccant	T_{iav} = 2.7
– Average final moisture content of desiccant	T_{fav} = 5.6
– Average value of moisture penetration index – Maximum individual value of moisture penetration index	I_{av} = 15 I = 16 %
– Requirements set out by DIN EN 1279-2 for average value – Requirements set out by DIN EN 1279-2 for individual values	$I_{av} \leq$ 20 % I ≤ 25 %
– Measured individual values as per DIN EN 1279-3	0.82 % a^{-1} 0.75 % 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

Insulating glass unit

fulfils the requirements according to DIN EN 1279-2 and DIN EN 1279-3.

5 Summary of test report No. 601 42789/1e dated 30. June 2010

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:

EPAL s.a
2 klm Sindos-Halastra

57200 Halastras
Greece

Plant:

EPAL s.a
2 klm Sindos-Halastra

57200 Halastras
Greece

System description: Not submitted
Product designation: Insulating glass unit

Moisture penetration index I_{av} = 15 %

Gas leakage rate and gas concentration:

Applied gas	Argon			
Unit number	1	2	3	4
c_i in %	91	91	95	95
$c_{i,o}$ in %	90	90	90	90
L_i in %/a	nr	nr	0.82	0.75

ift Rosenheim
30. June 2010

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