Test report

Test report relating to a glass product according to European standard EN 1279-3, concerning the product marked as: Test unit - PolyChem, Demonstrator: PolyChem Sealants Ltd.

Report number	89214824-02
Date	13 March 2019
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Client	PolyChem Sealants Ltd. Páfrány forduló 14 H-1221 Budapest Hungary
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Project name	19.A029 - EN1279-3
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Contents

1 Introduction

1.1 Purpose

The tests have been performed in order to establish whether or not an insulating glass unit with PolyChem Sealants MAT77 and MAT70 sealants meets the requirements of the European standard EN 1279-3 [1].

1.2 Description of the test specimen

General

Name of the manufacturer (demonstrator)	PolyChem Sealants Ltd.
Address of the manufacturer	Páfrány forduló 14 H-1221 Budapest, Hungary
Production plant sealant	N/A
Line ID where the product is made	N/A
Production date	N/A
Sampling date	N/A
The product was marked as	Test unit - PolyChem

Insulating glass units – Declaration manufacturer	
Name of the manufacturer	Anonymous
Address of the manufacturer	-
Production plant of the samples	-
Production date	-
Trade mark and /or product name	IGU
System description, file number	N/A
Exterior dimensions:	353x502
Total thickness:	20 mm
Construction:	4float/12/4 Climaguard Premium 2
Spacer:	
Spacer material:	Aluminium
Corner construction:	Bended
Corner keys:	None
Linear connector:	1
Desiccant:	PolyChem MATMol Z
Desiccant type:	Molecular sieve 3A
Standard Moisture adsorption capacity (T_C)	20 %
Desiccant amount:	2 sides filled
Outer sealant:	PolyChem MAT77
Polymer type:	Polysulfide

Average sealant depth on spacer back (u)	±3 mm
Average sealant width on glass surface (s)	5 mm
Inner sealant:	PolyChem MAT70
Polymer type:	Butyl
Average sealant width (r):	11 mm (total width butyl and polysulfide)
Mass of inner sealant/length and side (R)	2.5 – 3.5 g/m
Coating:	Guardian Climaguard 2.0 for the second gas panel
Edge deletion:	10 mm mechanically
Gas filling:	Argon 90%±5%
Temperature during production	25°C
Pressure during production	100.16 hPa
Altitude during production	127 m
Closing of gas filling holes:	None
Special features:	None

1.3 Sampling procedure

TÜV Rheinland B.V., acting as Notified Test Laboratory, has had no influence on the selection of the sample. All test specimen within the sample were test-worthy.

1.4 Application

The request for testing was submitted by the assignor, order or reference number or name: -/-. Quotation number / Assignment Form number: 19.A029.

1.5 Method of testing

All applicable tests have been performed according to the European standard EN 1279-2 [1].

1.6 Put out to contract

No tests were performed at third parties.

1.7 Privacy statement

Due to privacy reasons, the names of involved personnel that executed the tests, are not disclosed in the report. However, this information is available on internal work sheets, test forms etc. in the project file.

1.8 Remark concerning this report

This report can be used to demonstrate that the sealant PolyChem MAT77 and PolyChem MAT70 can pass when used in an insulating glass system when tested according to EN 1279-3 [1].

Reference to test report for moisture penetration index according to EN 1279-2 [2]: 89214824-01.

1.9 Notifications, accreditations, designations

TÜV Rheinland Nederland B.V. has been notified by the Dutch Ministry of Infrastructure and the Environment as Notified Laboratory (number 1750) and Notified (Factory Production Control) Certification Body (number 0336) for the European Construction Products Regulation 305/2011 (EU).

TÜV Rheinland Nederland B.V. has been accredited by the Dutch Accreditation Council (RvA) as ISO 17025 Test Laboratory (nr. L 484) and ISO 17065 Certification Body (nr. C078).

TÜV Rheinland Nederland B.V. has been designated as Technical Service (Laboratory) by the Approval Authorities for Germany (KBA – E1) and the Netherlands (RDW – E4) for automotive safety glass (ECE R43, 92/22/EC, 2009/144/EC).

TÜV Rheinland Nederland B.V. has been recognised by the German Institute for building technics (DIBt) under number NL005 as test, control and certification body.

Remark

The reported tests were performed under ISO 17025 accreditation.

2 Test results

2.1 Description of the test

The six test specimens (insulating glass unit or IGU's) are conditioned for a minimum of one week at standard laboratory conditions. Four pre-selected specimens are submitted to the specified climate test.

The climate test consists of two parts. The first part consists of 28 cycles of 12 hours from -18 °C to +53 °C with slopes of 14 °C/h where at -18 °C and at +53 °C the temperature is constant for 1 hour. This part is followed by a second part consisting of a period of 4 weeks at a constant temperature of 58 °C. For both parts a relative humidity of > 95 % is applied in case the temperature is above 0 °C.

After the climate test the specimens are stored at (23±2) °C and (50±5) % relative humidity for at least 4 weeks and maximal 7 weeks.

Minimal two specimens (IGU's) are installed into separate test frames. The frame encloses the unit with some space left between the IGU and the frame.

After placing the IGU's in the test frames, the test frames are hermetically closed and purged with a helium flow of ± 200 ml/min for 1 hour. At the end of this purge time, the inlet and outlet valves are closed in succession to ensure an atmospheric pressure inside the frame (start of standing time). After a minimum of 10 hours standing time, the helium in the frame is measured for its argon, oxygen and nitrogen concentration using gas chromatography (490 Micro GC). This is repeated at least six times.

The amount of gas leaking out the IGU into the frame is then determined. The amount of gas leakage (L_i) per time (year) of the IGU is calculated based on the measured amount of argon gas per standing time (m_i), the internal gas volume of the IGU (V_{int}) and the argon gas concentration (c_i),.

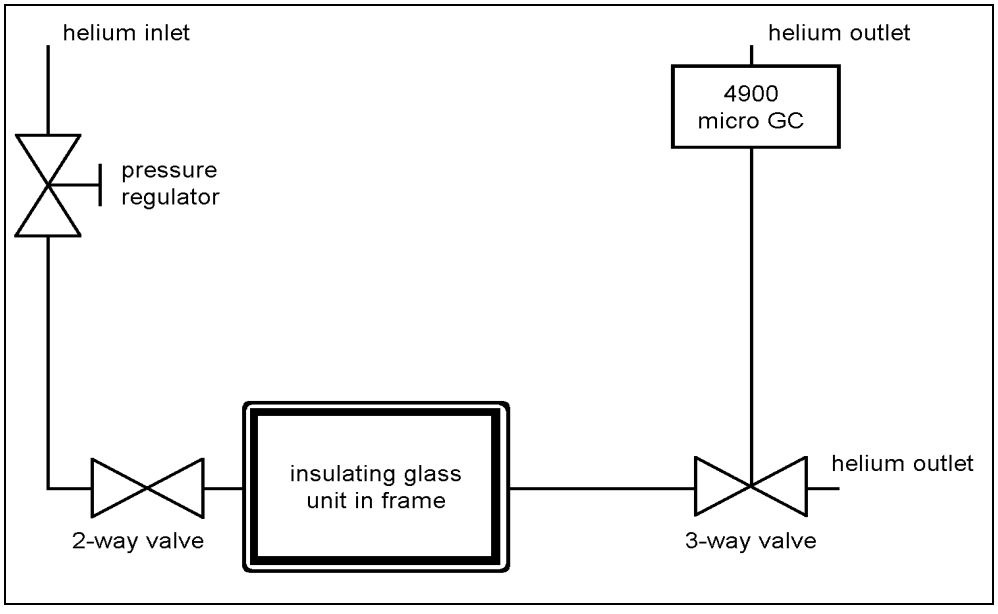
$$L_i = 87,6 \cdot 10^6 \frac{m_i}{c_i \cdot V_{int} \cdot \rho_{o,i}} \cdot \frac{T}{T_o} \cdot \frac{P_o}{P} \text{ in \%.a}^{-1}$$

With $\rho_{0,Ar}$ = 1,762; $\rho_{0,Kr}$ = 3,690; $\rho_{0,Xe}$ = 5,897 µg/mm³ at T_o = 293 K (20 °C) and P_o = 1000 hPa (mbar)

The requirement is an argon gas leakage rate of less than 1 % per year [%.a^{-1}].

The measurement uncertainty is estimated at 15 % or 0.05 %.a^{-1}, whichever value is greater.

The schematic diagram of the equipment is as follows:



2.2 Detailed test results

Test results after performing all applicable tests according to European standard EN 1279-3 [1].

Gas leakage rate determination

Six insulating glass units were visually inspected. No special deviations above variations due to the production process were found. The test specimens were randomly numbered and the units were aged. After ageing the gas leakage rate was determined on minimal two insulating glass units.

For the calculation of the gas leakage rate of the IGU/specimen, the temperature (T) and the pressure (P) values during the sealing of the units are used or if no values are given/known a standard temperature of 293 K and pressure of 1013 hPa are used.

Evaluation of the gas leakage rate and gas concentration measured in accordance with EN1279-3:2002

Corner construction	Bent
Average sealant depth on spacer back (u)	2 – 3.5 mm
Average sealant width on glass surface (s)	4 – 6 mm
Average inner sealant width (r)	4.5 – 5.5 mm
Closing of gas filling holes	n.a
Special features	No
Markings	On spacer bar

Test specimen	Thickness [mm]	V_{int} [mm^3]	c_i [% Ar]	L_i [% a^{-1}]	Pass / fail
1	19.8	1948642	88.2	0.32	pass
2	19.9	1934761	89.7	0.18	pass
3	-	-	-	-	not applicable
4	-	-	-	-	not applicable
Average				0.25	

Requirements and end result

Required	Pass / fail
EN1279-3:2002 §4.1 Gas leakage rate	
The gas leakage rate, L_i, for gases with concentrations higher than 15 %, and also for air, measured as described in clause 5 shall be: L_i < 1.00 in % a^{-1} (one year)	pass

3 Conclusion

The tested glass product, marked by the client or manufacturer as: Test unit - PolyChem, manufactured by: PolyChem Sealants Ltd., with inner sealant with trade mark/type: PolyChem MAT70 and outer sealant with trade mark/type: PolyChem MAT77, meets the applicable requirements as stated in the European standard EN 1279-3 [1].

The test results exclusively relate to the tested objects.

Remark 1

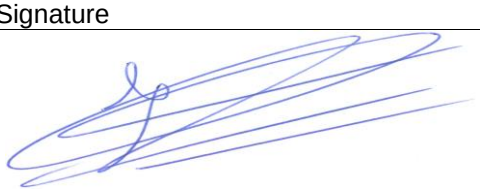
Due to the fact that the purpose of this test report is not an initial type test for an IG manufacturer no system description can be mentioned to be used as reference. This report is thus also not allowed to be used in cascading and/or shared ITT procedures (if allowed or applicable). The identification of the actual IG manufacturer for this ITT report is not relevant and is called anonymous or published only if the IG manufacturer has given written agreement that his/her name is allowed to be mentioned. When this statement is not communicated on forehand to TÜV Rheinland, then anonymous will be used per default.

4 References

1 European standard EN 1279-3:2002 (E),
Glass in building – Insulating glass units – Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances,
European Committee for Standardization, November 2002.

2 European standard EN 1279-2:2002 (E),
Glass in building – Insulating glass units – Part 2: Long term test method and requirements for moisture penetration, European Committee for Standardization, November 2002.

5 Signatures

Author	Signature
Mr. M.A.A.M. Schets, B.Sc. Specialist	
Peer review	Signature
Mr. S. el Bardai Specialist	
Approved by	Signature
Mr. H. van Ginkel LSM	

Appendix A, Summary of test results

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P.O. Box 2220, 6802 CE Arnhem, The Netherlands,
Notified Laboratory no. 1750

Summary of report nº: 89214824-02 **Date: 13 March 2019**

Insulating glass units - Evaluation of the gas leakage rate and gas concentration measured according to EN 1279-3

For details is referred to the complete test report.

Company: (Demonstrator)	Name:	PolyChem Sealants Ltd.
	Address:	Páfrány forduló 14, H-1221 Budapest Hungary
Plant:	Name:	Anonymous
	Address:	
System description, file number:		-/-
Product name:		Test unit - PolyChem Edge seal composition: inner sealant: PolyChem MAT70 outer sealant: PolyChem MAT77 and aluminium spacer
Reference to test report for moisture penetration index according EN 1279-2:		89214824-01

Applied gas(es) *i*:	Argon	Argon	Argon	Argon
Unit number	1	2	3	4
Measured concentration c_i, (in %):	88.2	89.7	-	-
Nominal concentration $c_{i,o}$, (in %):	90	90	-	-
Gas leakage rate L_i, (in %·a^{-1}):	0.32	0.18	-	-
System conforms:	**YES**			

Signature: M.A.A.M. Schets
Specialist

Signature: Mr. H. van Ginkel
LSM

NOTE: This Summary is not a certificate.

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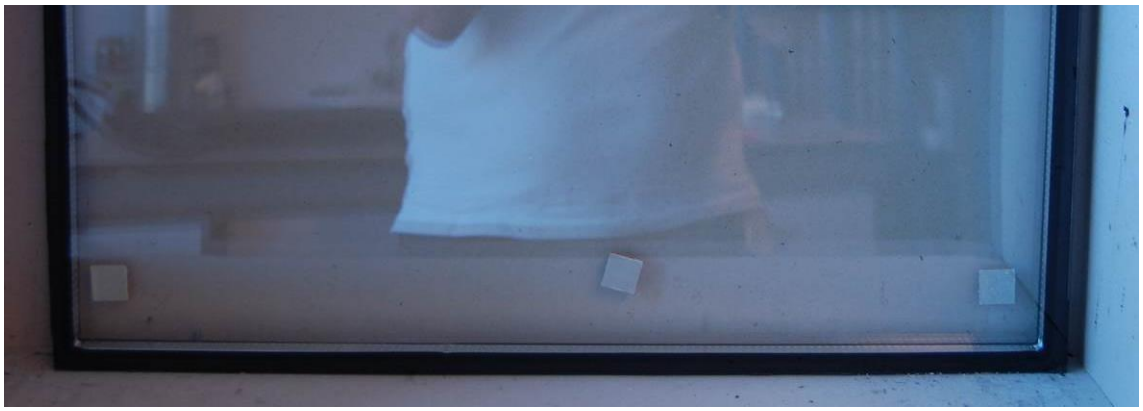
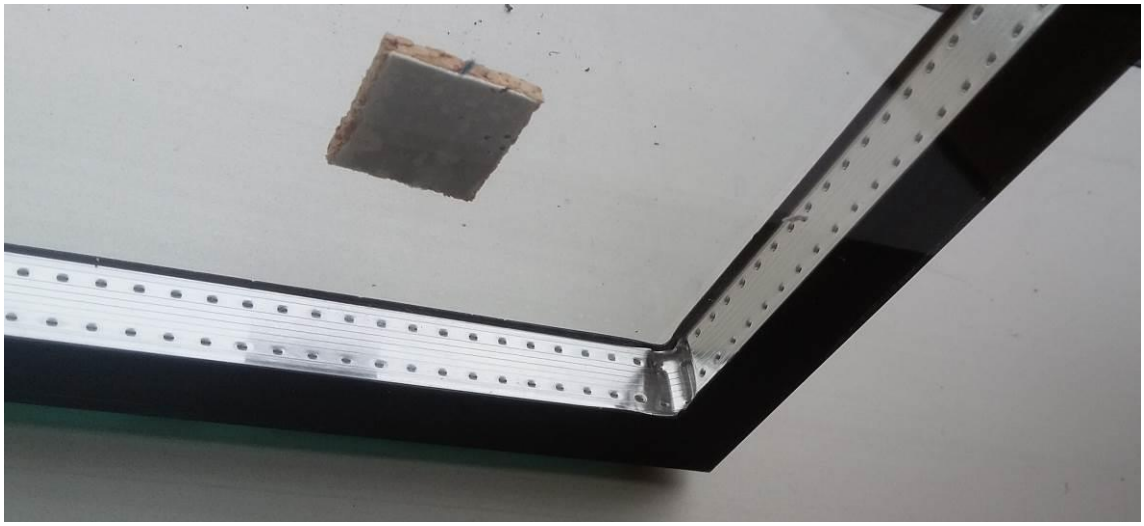
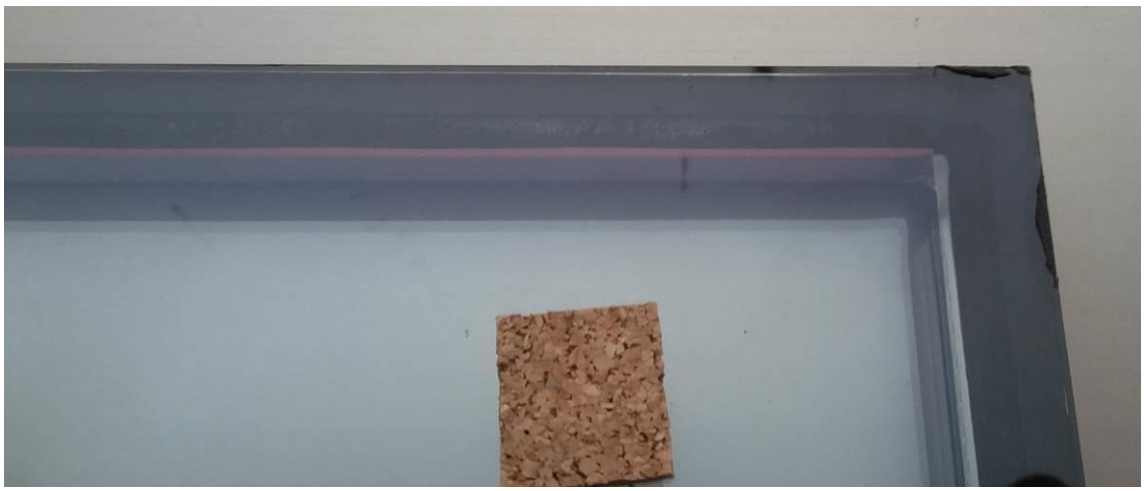
Appendix B, Pictures of the test specimen







- End of report -