Test report

Test report relating to a glass product according to European standard EN 1096-4:2018, Coated glass, concerning the product marked as: Sapphire AR™99 Protect 4.2 mm, manufactured by: Groglass SIA

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Author(s)	S.el Bardai
Client	Groglass Ltd. Katlakalna iela 4B Riga, LV-1073, Latvia
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Headoffice:
Westervoortsedijk 73
NL - 6827 AV Arnhem
P.O. Box 2220
NL - 6802 CE Arnhem

Location Leek:
Eiberkamp 10
NL - 9351 VT Leek
P.O. Box 37
NL - 9350 AA Leek

info@nl.tuv.com
www.tuv.com/nl

Tel. +31 (0)88 888 7 888
Fax +31 (0)88 888 7 879

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VAT number: NL815820380B01
IBAN: NL61DEUT0265155096

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1 Introduction

1.1 Purpose

The tests have been performed in order to establish whether or not the product meets the requirements of the European standard EN 1096-4 [1] when tested according to EN 1096-2 [2].

1.2 Description of the test specimen

General

Name of the manufacturer	Groglass SIA
Address of the manufacturer	Katlakalna iela 4B, Riga, LV-1073,Latvia
Production plant of the samples	Katlakalna iela 4B, Riga, LV-1073,Latvia
Line ID where the samples are made	Sidrabe 2SV2215MR In-Line System
Production date	29.04-01.05.2021
Sampling date	24.05.2021
The product was marked as	Sapphire AR™99 Protect 4.2 mm
Dimensions of the samples	300 x 300 mm

Specific

Class of the coating	A
Commercial name of the coating	Sapphire AR™99 Protect 4.2 mm
Method of spectrophotometric measurement (for toughened or heat-strengthened coated glass)	Not applicable

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 and were received on 25th June 2021.

1.4 Application

The request for testing was submitted by the manufacturer on 6th April 2021, order or reference number or name: -. Assignment Form number: 19.A269.

1.5 Method of testing

All applicable tests have been performed according to the European standard EN 1096-2 [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 Notifications, accreditations, designations

TÜV Rheinland Nederland B.V. has been notified by the Dutch Minister for Housing and the Central Government Sector 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.

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2 Test results

Test results after performing all applicable tests according to European standard EN 1096-2 [1].

Description of the requirement	Required	Value of the test	Pass / fail
Requirements The coated glass complying with this European Standard shall respect the requirements related to the different characteristics given in table 1 of the Standard.			
Visual inspection			
Condensation resistance	• No defect > 3 mm • Max. 1 defect between 2 and 3 mm • Max. 5 defects between 1 and 2 mm • No scratches, staining of the coating or clusters of pinholes > 1 mm • When compared with the reference test piece, in both reflection and transmission, no significant colour change	• No defect > 3 mm • Number: 0 • Number: 0 • No scratches, staining of coating, clusters of pinholes > 1 mm • No significant colour change	**Initial** pass **Final** pass
Acid resistance	No requirements	--	not applicable
Neutral salt spray resistance	• No defect > 3 mm • Max. 1 defect between 2 and 3 mm • Max. 5 defects between 1 and 2 mm • No scratches, staining of the coating or clusters of pinholes > 1 mm • When compared with the reference test piece, in both reflection and transmission, no significant colour change	• No defect > 3 mm • Number: 0 • Number: 0 • No scratches, staining of coating, clusters of pinholes > 1 mm • No significant colour change	**Initial** pass **Final** pass
Abrasion resistance	No requirements other than to ensure that the abraded area is uniform	Abraded area is uniform	pass
Spectrophoto-metric measurements			

Description of the requirement	Required	Value of the test	Pass / fail
Condensation resistance Acid resistance Neutral salt spray resistance	Transmittance measured at 550 and 900 nm shall differ no more than ± 0,03 from the corresponding measured value on the reference test piece. For a glass claimed to have a low emissivity coating, the reflectance at 8 µm shall decrease by no more than 0,02.	Difference < ± 0,03 Decrease of reflectance at 8 µm < 0,02	pass not applicable
Abrasion resistance	Total (diffuse plus direct) transmittance measured at 550 and 900 nm shall differ no more than ± 0,05 from the corresponding measured value on the reference test piece.	Difference < ± 0,05	pass

Information relating to the tests

Number of tested samples	• Condensation resistance: 4 • Acid resistance: 4 • Neutral salt spray resistance: 4 • Abrasion resistance: 1 • Spectrophotometric measurements: 4
Condensation resistance test	• Total area of pieces tested at the same time: 600 cm² • Daily temperature: 40 °C • Weekly pH: week 1: 6.5; • Observation of condensation on reference glass piece: yes
Acid resistance test	• Total area of pieces tested at the same time: 600 cm² • Daily temperature in high temp. phase of the test: 40 °C • pH at the end of the cycle: 1.5-2 • Interruption time between tests: 8 hours
Neutral salt spray resistance test	• Total area of pieces tested at the same time: 600 cm² • Daily temperature: 35 °C
Abrasion resistance test	• Uniformity of abraded area: yes • Number and frequency of strokes: 500, 55/min.

Period of testing

The tests took place in the period July till October 2021.

Condensation test for class A, total of 21 days

Spectrophotometric measurements				
Sample 1	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,0857	97,9422	0,1435	OK
Transmittance at 900 nm	77,1826	76,9633	0,2193	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 2	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,0985	97,9218	0,1767	OK
Transmittance at 900 nm	77,1458	77,8335	-0,6877	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 3	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,1147	98,1182	-0,0035	OK
Transmittance at 900 nm	77,1374	76,4066	0,7308	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 4	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,1029	98,0831	0,0198	OK
Transmittance at 900 nm	77,1506	76,5213	0,6293	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-

Acid resistance test for class A, 5 cycle

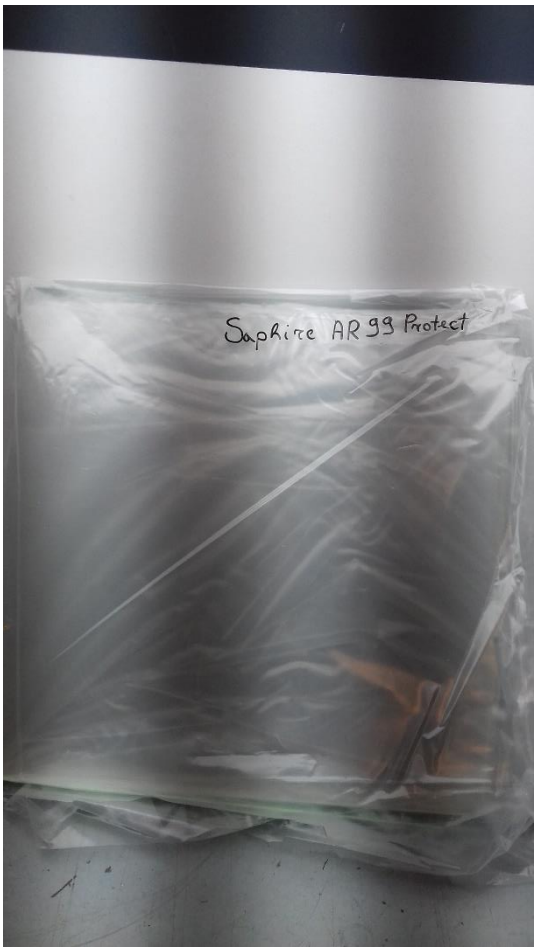
Spectrophotometric measurements				
Sample 1	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,0857	97,9175	0,1682	OK
Transmittance at 900 nm	77,1826	77,5952	-0,4126	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 2	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,0985	98,2088	-0,1103	OK
Transmittance at 900 nm	77,1458	76,8106	0,3352	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 3	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,1147	98,1522	-0,0375	OK
Transmittance at 900 nm	77,1374	77,8722	-0,7348	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 4	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,1029	97,8338	0,2691	OK
Transmittance at 900 nm	77,1506	76,6949	0,4557	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-

Neutral Salt Spray test for class A, total of 21 days

Spectrophotometric measurements				
Sample 1	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,0857	98,1778	-0,0921	OK
Transmittance at 900 nm	77,1826	76,3245	0,8581	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 2	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,0985	98,0639	0,0346	OK
Transmittance at 900 nm	77,1458	77,3422	-0,1964	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 3	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,1147	98,2034	-0,0887	OK
Transmittance at 900 nm	77,1374	77,4009	-0,2635	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 4	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	98,1029	98,1329	-0,0300	OK
Transmittance at 900 nm	77,1506	77,2163	-0,0657	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-

Abrasion test (P1)

Spectrophotometric measurements				
Measurement 1 at 500 cycles	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 5%)
Transmittance at 550 nm	98,0857	98,0260	0,0597	OK
Transmittance at 900 nm	77,1826	77,3808	-0,1982	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Measurement 2 at 500 cycles	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 5%)
Transmittance at 550 nm	98,0985	98,0936	0,0049	OK
Transmittance at 900 nm	77,1458	77,3833	-0,2375	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-



3 Conclusion

The tested glass product, marked by the client or manufacturer as: Sapphire AR™99 Protect 4.2 mm, manufactured by: Groglass SIA, meets the applicable requirements as stated in the European standard EN 1096-4 [1].

The test results exclusively relate to the tested objects.

Remark 1

When and if changes are made in production method and/or equipment, assessment according to this standard shall be reconsidered and re-tests shall be performed when the changes can lead to different specifications of the glass. The decision and responsibility lies at the manufacturer.

Remark 2

It was to the manufacturer's responsibility that the samples delivered for initial type test are representative to the production and deviations from perfection were included in the delivered test samples.

4 References

1 European standard EN 1096-4:2018 (E),
Glass in building – Coated glass – Part 4: Evaluation of conformity/Product standard,
European Committee for Standardization, October 2004.

2 European standard EN 1096-2:2012 (E),
Glass in building – Coated glass – Part 2: Requirements and test methods for class A, B and S coatings,
European Committee for Standardization, January 2012.

5 Signatures

Author	Authorized by
X 	X 
Sachverständige(r)/Expert Ondertekend door: Salah El Bardai	Sachverständige(r)/Expert Ondertekend door: Marc Schets

(This is the end of this report).