

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™ Hard low E 3.8 mm, manufactured by: Groglass SIA

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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	17-23.04.2021
Sampling date	24.05.2021
The product was marked as	Sapphire AR™ Hard low E 3.8 mm
Dimensions of the samples	300 x 300 mm

Specific

Class of the coating	A
Commercial name of the coating	Sapphire AR™ Hard low E 3.8 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.

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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> No defect > 3 mm Number: 0 Number: 0 No scratches, staining of coating, clusters of pinholes > 1 mm No significant colour change 	<p>Initial pass</p> <p>Final pass</p>
Acid resistance	No requirements	--	not applicable
Neutral salt spray resistance	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> No defect > 3 mm Number: 0 Number: 0 No scratches, staining of coating, clusters of pinholes > 1 mm No significant colour change 	<p>Initial pass</p> <p>Final pass</p>
Abrasion resistance	No requirements other than to ensure that the abraded area is uniform	Abraded area is uniform	pass

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

Information relating to the tests

Number of tested samples	<ul style="list-style-type: none"> • Condensation resistance: 4 • Acid resistance: 4 • Neutral salt spray resistance: 4 • Abrasion resistance: 1 • Spectrophotometric measurements: 4
Condensation resistance test	<ul style="list-style-type: none"> • Total area of pieces tested at the same time: 600 cm^2 • Daily temperature: $40 \text{ }^\circ\text{C}$ • Weekly pH: week 1: 6.5; • Observation of condensation on reference glass piece: yes
Acid resistance test	<ul style="list-style-type: none"> • Total area of pieces tested at the same time: 600 cm^2 • Daily temperature in high temp. phase of the test: $40 \text{ }^\circ\text{C}$ • pH at the end of the cycle: 1.5-2 • Interruption time between tests: 8 hours
Neutral salt spray resistance test	<ul style="list-style-type: none"> • Total area of pieces tested at the same time: 600 cm^2 • Daily temperature: $35 \text{ }^\circ\text{C}$
Abrasion resistance test	<ul style="list-style-type: none"> • 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	93,7316	93,4319	0,2975	OK
Transmittance at 900 nm	77,2274	76,9515	0,2759	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	93,7421	93,2118	0,5303	OK
Transmittance at 900 nm	77,2233	77,5192	-0,2959	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	93,7062	93,5871	0,1191	OK
Transmittance at 900 nm	77,2192	77,6176	-0,3984	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	93,7019	93,6330	0,0689	OK
Transmittance at 900 nm	77,2242	77,4760	-0,2518	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-

Acid resistance test for class A, 5 cycle

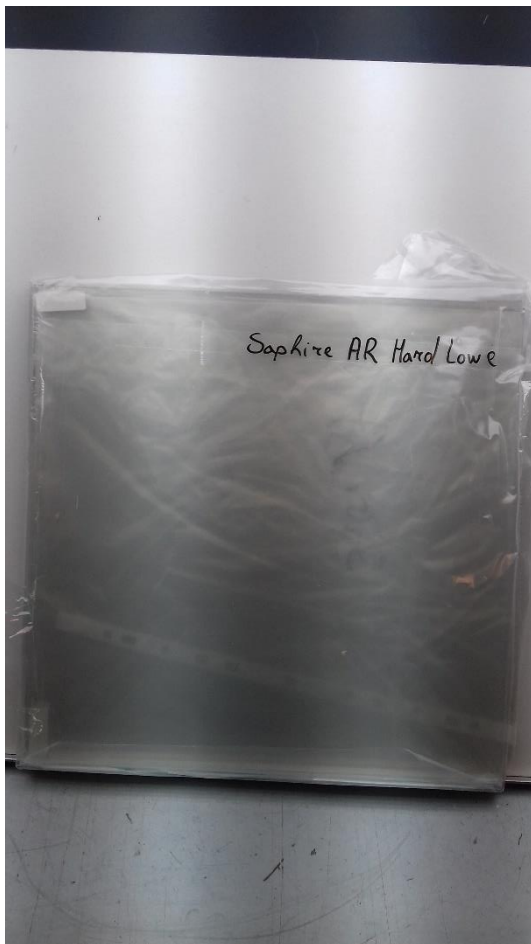
Spectrophotometric measurements				
Sample 1	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	93,7316	92,9226	0,8090	OK
Transmittance at 900 nm	77,2274	77,3028	-0,0754	OK
Reflectance at 8 µm (low e glass)	n.a.	n.a.	-	-
Spectrophotometric measurements				
Sample 2	Reference test piece (%)	Exposed test piece (%)	Difference (%)	Result within Limits (+/- 3%)
Transmittance at 550 nm	93,7421	93,5601	0,1820	OK
Transmittance at 900 nm	77,2233	77,1257	0,0976	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	93,7062	93,6846	0,0216	OK
Transmittance at 900 nm	77,2192	77,4566	-0,0274	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	93,7019	93,1813	0,5206	OK
Transmittance at 900 nm	77,2242	77,4283	-0,2041	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	93,7316	93,5572	0,1744	OK
Transmittance at 900 nm	77,2274	77,5859	-0,3585	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	93,7421	93,6154	0,1267	OK
Transmittance at 900 nm	77,2233	77,7845	-0,5612	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	93,7062	93,6075	0,0987	OK
Transmittance at 900 nm	77,2192	77,5830	-0,3638	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	93,7019	93,5236	0,1738	OK
Transmittance at 900 nm	77,2242	77,5924	-0,3682	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	93,7316	93,7030	0,0286	OK
Transmittance at 900 nm	77,2274	77,2714	-0,0440	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	93,7421	93,7373	0,0048	OK
Transmittance at 900 nm	77,2233	77,2708	-0,0475	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™Hard low E 3.8 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
<p>X </p>	<p>X </p>
<p>Sachverständige(r)/Expert Ondertekend door: Salah El Bardai</p>	<p>Sachverständige(r)/Expert Ondertekend door: Marc Schets</p>

(This is the end of this report).