TEST LABORATORY

The test laboratory is accredited in compliance with DIN EN ISO/IEC 17025 by the Deutsche Akkreditierungsstelle GmbH. The accreditation is also valid for products of Regulation EU 2016/425. Test methods not included in the scope of accreditation are marked by a *.

SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

TEST REPORT

Order no. STFI:	**P2022 1604**
Order no. applicant:	none
Report date:	26th July 2022
Testing officer:	Reinhardt
Applicant:	Vescom B.V. Sint Jozefstraat 20 5753 AV DEURNE NETHERLANDS
of:	29th June 2022
order receipt on:	25th July 2022
sample receipt on:	25th July 2022

Chairman of the Board
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Material to analyse:

signed by client		code for order processing
Elara	colour: 0040	P1604_22_1
Elara	colour: 0061	P1604_22_2
Elara	colour: 0065	P1604_22_3

Sampling was carried out by the client; the testing laboratory has no information on this.

Analysis content:

(1) Remission and transmission in the visible light range in accordance with DIN EN 14500: 2021-09

(2) Remission and transmission in the global radiation range in accordance with DIN EN 14500: 2021-09

(3)* Calculation of the total energy permeability degree g_{tot} of a window system with sun protective material, following DIN EN ISO 52022-1: 2018-01 and approximate calculation of the reduce factor F_c

(4) Measurement of the direct und diffuse transmission in the visible light range in accordance with DIN EN 14500: 2021-09

(5)* Classification of glare control in accordance with DIN EN 14501: 2021-09 (p.20; paragraph 6.3; table 7)

(6)* Classification of privacy night in accordance with DIN EN 14501: 2021-09 (p.21; paragraph 6.4; table 8)

(7)* Classification of the visual contact with the outside in accordance with DIN EN 14501: 2021-09 (p.22; paragraph 6.5; table 9)

(8)* Classification of the daylight utilisation in accordance with DIN EN 14501: 2021-09 (p.22; paragraph 6.6; table 10) on the basis of the diffuse/hemispherical light transmission degree $\tau_{v,dif-h}$, approximately calculated after equation 32 in DIN EN 14500: 2021-09

* Standards for calculation and assessment are not allowed for accreditation

Conditions:

Optical tests

test parameter	symbol	range of radiation
light transmission degree	$\tau_{v,n-h}$	(380 – 780) nm (standard light D65)
light remission degree	$\rho_{v,n-h}$	(380 – 780) nm (standard light D65)
light absorption coefficient	α_v	(380 – 780) nm
UV - transmission degree	$\tau_{t,UV}$	(280 – 380) nm
solar transmission degree	$\tau_{e,n-h}$	(300 – 2500) nm
solar remission degree	$\rho_{e,n-h}$	(300 – 2500) nm
solar absorption coefficient	α_e	(300 – 2500) nm
normal/normal light transmission degree	$\tau_{v,n-n}$	(380 – 780) nm (standard light D65)
normal/diffuse light transmission degree	$\tau_{v,n-dif}$	(380 – 780) nm (standard light D65)

Equipment: UV-VIS-NIR double beam spectrophotometer, company PERKIN - ELMER Corp., USA; 150 mm integrating sphere; irradiation perpendicular to the integrating sphere opening; 8° slope of the sample area to the light incidence axis for remission measurements

For each material sample of the client three samples in the format (55 x 75) mm are taken, one in the machine direction, one in the cross machine direction and one diagonally. The irradiation takes place, if not otherwise noted, on the material side which is faced to the solar radiation in usage (marked by client). The results are mean values of three measurements.

Description of classification for visual comfort:

Description of classification for glare control, privacy night, visual contact with the outside and the daylight utilisation is given in DIN EN 14501: 2021-09 (p.16; paragraph 6.1, table 5).

Influence on visual comfort					
class	**0**	**1**	**2**	**3**	**4**
	very small effect	small effect	moderate effect	high effect	very high effect

Test results:

(1) Light range **UV-range**

Code	light transmission degree	light remission degree	light absorption coefficient	UV-transmission degree[1)]
P1604_22	$\tau_{v,n-h}$	$\rho_{v,n-h}$	α_v	τ_{UV}
1	0,454	0,525	0,021	0,233
2	0,355	0,385	0,260	0,156
3	0,278	0,328	0,394	0,127

[1)] For textile products that have fluorescence effects (e.g. due to the finishing with optical brighteners) the measured result of the UV-transmission degree using the measurement method described above can be incorrect (increased).

(2) Global radiation range

Code	solar transmission degree	solar remission degree	solar absorption coefficient
P1604_22	$\tau_{e,n-h}$	$\rho_{e,n-h}$	α_e
1	0,435	0,522	0,043
2	0,385	0,452	0,163
3	0,351	0,431	0,218

(3)* Total energy permeability degree g_{tot} and reduce factor F_c

Usage as internal sun protection material

	Single glazing		Double glazing with air filling		Double glazing with argon filling and low-e coating	
Codierung Prüfstelle	U_g = 5,8 W/(m²K) g = 0,85		U_g = 2,9 W/(m²K) g = 0,76		U_g = 1,2 W/(m²K) g = 0,59	
P1604_22	g_{tot}	F_c	g_{tot}	F_c	g_{tot}	F_c
1	0,47	0,55	0,46	0,60	0,41	0,69
2	0,50	0,59	0,49	0,64	0,43	0,73
3	0,51	0,60	0,50	0,65	0,43	0,74

	Solar controlled double glazing with argon filling and low-e coating		Triple glazing with argon filling and low-e coating	
Codierung Prüfstelle	U_g = 1,1 W/(m²K) g = 0,32		U_g = 0,8 W/(m²K) g = 0,55	
P1604_22	g_{tot}	F_c	g_{tot}	F_c
1	0,27	0,83	0,39	0,71
2	0,27	0,85	0,41	0,75
3	0,27	0,85	0,42	0,76

Mounting assumptions:

- sun protective material inside and closed
- aerated air interspace to the glazing

The mathematical model in DIN EN ISO 52022-1: 2018-01 (simplified method) for calculation of g_{tot} is appropriated to a coarse compare of sun protection materials. The model is only valid for the following boundary requirements:

- $0 \leq \tau_{e,n\text{-}h} \leq 0{,}5$
- $0{,}1 \leq \rho_{e,n\text{-}h} \leq 0{,}8$

If the above mentioned boundary requirements are not fulfilled, the calculation of F_c from g_{tot} and g is not guaranteed either. The calculation is recommended in accordance with DIN EN ISO 52022-3: 2018-01 (detailed calculation method). There for it is necessary to measure the reflection of the sample side which is not directly exposed by the sun radiation and the sample thickness at least in addition to the data of this order. In case of known conditions to be used at a building it is unalterable.

(4) Diffuse und normal transmission degree

Code	normal/hemispherical light transmission degree	normal/diffuse light transmission degree	normal/normal light transmission degree
P1604_22	$\tau_{v,n\text{-}h}$	$\tau_{v,n\text{-}dif}$	$\tau_{v,n\text{-}n}$
1	0,454	0,395	0,059
2	0,355	0,300	0,055
3	0,278	0,221	0,057

(5-8)* Classification

Code	glare control	privacy night	sight contact with the outside
P1604_22			
1	0	1	1
2	0	1	1
3	0	1	1

Code	diffuse/hemispherical light transmission degree	daylight utilisation
P1604_22	$\tau_{v,dif\text{-}h}$	
1	0,395	3
2	0,308	3
3	0,239	2

Further information on the test procedures or results are available at the accredited testing laboratory and can be provided to the client upon request.

The test results refer to the delivered specimen. This test report should not be published in parts. The testing period is defined as timeframe between receipt of the sample and issue date of test report.

All materials received in connection with this order will be stored for a maximum period of six months unless agreed otherwise. Exempted from this practice are materials which will not be stored due to technical or safety-related reasons.

stfi geprüft

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