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 *.

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SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

TEST REPORT

Order number STFI:	**20201503.1**
Order number client:	none
Report date:	9 July 2020
Person responsible:	Reinhardt
Orderer:	Vescom B.V. Sint Jozefstraat 20 5753 AV Deurne NETHERLAND
Test order:	
Date:	2 July 2020
Order received:	3 July 2020
Material received:	3 July 2020

Chairman of the Board
Prof. Dr.-Ing. Hilmar Fuchs

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Material to analyse:

signed by client		code for order processing
NALTAR	col.: 07	P1503_20_4
NALTAR	col.: 10	P1503_20_5
NALTAR	col.: 03	P1503_20_6

The sampling was supplied by the client. The test department is not informed about the sampling procedure.

Analysis content:

(1) Remission and transmission in the visible light range in accordance with DIN EN 410: 2011-04 (DIN EN 14500: 2008-08)

(2) Remission and transmission in the global radiation range in accordance with DIN EN 410: 2011-04 (DIN EN 14500: 2008-08)

(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 following DIN EN 14501: 2006-02

(4)* Calculation of the total energy permeability degree g_{tot} and the direct solar transmittance $\tau_{e,tot}$ 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 and the secondary heat transfer factor $q_{i,tot}$ following DIN EN 14501: 2006-02 (only for reference glazing C of DIN EN 14501: 2006-02)

(5) Direct and diffuse transmission measurement in the visible light range in accordance with DIN EN 410: 2011-04 (DIN EN 14500: 2008-08)

(6)* Classification of glare control in accordance with DIN EN 14501: 2006-02 (p.15; paragraph 6.3; table 8)

(7)* Classification of privacy night in accordance with DIN EN 14501: 2006-02 (p.16; paragraph 6.4; table 9)

(8)* Classification of the visual contact with the outside in accordance with DIN EN 14501: 2006-02 (p.17; paragraph 6.5; table 10)

(9)* Classification of the daylight utilisation in accordance with DIN EN 14501: 2006-02 (p.18; paragraph 6.6; table 11) on the basis of the rotational symmetric diffuse/hemispherical light transmission degree $\tau_{v,dif-h}$, approximately calculated after equation 18 in DIN EN 14500: 2008-08

* Standards for calculation and assessment are not allowed for accreditation

Conditions and equipment for 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	τ_{uv}	280...380 nm (UV-radiation)
solar transmission degree	$\tau_{e,n-h}$	280...2500 nm (global radiation)
solar remission degree	$\rho_{e,n-h}$	280...2500 nm (global radiation)
solar absorption coefficient	α_e	280...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 window system.

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: 2006-02 (p.13; 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)]
P1503_20	$\tau_{v,n\text{-}h}$	$\rho_{v,n\text{-}h}$	α_v	τ_{UV}
4	0,2387	0,6027	0,1586	0,1247
5	0,0557	0,2807	0,6636	0,0173
6	0,0033	0,0443	0,9524	0,0070

[1)] In textile samples which were finished with an optical brightener the measured values of the UV-transmission degree could be doubtful (higher) under the use of the above described measuring method.

(2) Global radiation range

code	solar transmission degree	solar remission degree	solar absorption coefficient
P1503_20	$\tau_{e,n\text{-}h}$	$\rho_{e,n\text{-}h}$	α_e
4	0,2503	0,6067	0,1430
5	0,1593	0,4550	0,3857
6	0,0680	0,2793	0,6527

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

	single glazing		double glazing with air interspace		double glazing with low emission degree and argon interspace		triple glazing with low emission degree and argon interspace	
code	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		U_g=0,8 W/(m²K) g=0,55	
P1503_20	g_{tot}	F_c	g_{tot}	F_c	g_{tot}	F_c	g_{tot}	F_c
4	0,39	0,46	0,40	0,53	0,38	0,64	0,36	0,66
5	0,47	0,55	0,47	0,62	0,42	0,72	0,41	0,74
6	0,56	0,66	0,55	0,73	0,48	0,81	0,46	0,83

	reference glazing - DIN EN 13363-1: 2007-09			
code	triple glazing U_g=2,0 W/(m²K) g=0,65		double glazing with thermal protective covering U_g=1,6 W/(m²K) g=0,70	
P1503_20	g_{tot}	F_c	g_{tot}	F_c
4	0,39	0,60	0,40	0,57
5	0,44	0,68	0,46	0,66
6	0,51	0,78	0,54	0,77

(4)* Total energy permeability degree g_{tot}, direct solar transmittance $\tau_{e,tot}$, reduce factor F_c and secondary heat transfer factor $q_{i,tot}$

	double glazing with low emission degree (reference glazing C of DIN EN 14501: 2006-02)			
code	U_g=1,2 W/(m²K) g=0,59		τ_e =0,49 ρ'_e =0,27	
P1503_20	g_{tot}	F_c	$\tau_{e,tot}$	$q_{i,tot}$
4	0,38	0,64	0,15	0,23
5	0,42	0,72	0,09	0,33
6	0,48	0,81	0,04	0,44

Mounting assumptions:

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

The mathematical model in DIN EN ISO 52022-1: 2018-01 (simplified method) for calculation of g_{tot} and $\tau_{e,tot}$ 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). The fore 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.

(5) Diffuse and normal transmission in the visible light range

code	normal/hemispherical light transmission degree	normal/diffuse light transmission degree	normal/normal light transmission degree
P1503_20	$\tau_{v,n\text{-}h}$	$\tau_{v,n\text{-}dif}$	$\tau_{v,n\text{-}n}$
4	0,2387	0,2353	0,0034
5	0,0557	0,0553	0,0004
6	0,0033	0,0020	0,0013

(6-8)* Classification

code	glare control	privacy night	sight contact with the outside
P1503_20			
4	1	2	0
5	1	2	1
6	3	2	2

(9)* Classification of the daylight utilisation

code	diffuse/hemispherical light transmission degree	daylight utilisation
P1503_20	$\tau_{v,dif-h}$	
4	0,2120	2
5	0,0495	1
6	0,0028	0

The results are mean values from three measurements; spectrograms are kept in the test department.

Unless otherwise agreed, all materials we received within this order will be kept for a maximum time of 6 month. Materials which are not stored because of technical or safety reasons are excluded from that.

The testing period is defined as timeframe between receipt of samples and issue date of test report.

The test results are referring to the submitted samples. The test report is not allowed to copy in parts.

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stfi geprüft

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