

TEST LABORATORY



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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 *.



TEST REPORT

Order no. STFI: P2024 0769
Order no. applicant: none

Report date: 10th April 2024
Testing officer: Reinhardt / Schröter

Applicant: Zimmer+Rhode GmbH
Mrs. Oda Nimmer
Zimmersmühlenweg 14-18
61440 Oberursel

of: 5th April 2024
order receipt on: 5th April 2024
sample receipt on: 4th April 2024



Material to analyse:

signed by client	code for order processing
Sample: 1290 Material: 96% PES CS 4% PES FR	P0769_24_1

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

* 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	τ_{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

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.

Test results:**(1) Light range****UV-range**

Code	light transmission degree	light remission degree	light absorption coefficient	UV-transmission degree ¹⁾
P0769_24	$\tau_{v,n-h}$	$\rho_{v,n-h}$	α_v	τ_{UV}
1	0,284	0,681	0,035	0,158

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
P0769_24	$\tau_{e,n-h}$	$\rho_{e,n-h}$	α_e
1	0,277	0,666	0,057

(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	
Code	$U_g = 5,8 \text{ W/(m}^2\text{K)}$ $g = 0,85$		$U_g = 2,9 \text{ W/(m}^2\text{K)}$ $g = 0,76$		$U_g = 1,2 \text{ W/(m}^2\text{K)}$ $g = 0,59$	
P0769_24	g_{tot}	F_c	g_{tot}	F_c	g_{tot}	F_c
1	0,36	0,42	0,37	0,49	0,36	0,60

	Solar controlled double glazing with argon filling and low-e coating		Triple glazing with argon filling and low-e coating	
Code	$U_g = 1,1 \text{ W/(m}^2\text{K)}$ $g = 0,32$		$U_g = 0,8 \text{ W/(m}^2\text{K)}$ $g = 0,55$	
P0769_24	g_{tot}	F_c	g_{tot}	F_c
1	0,25	0,78	0,35	0,63

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:

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

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.

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.



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