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29.03.2019

Betreff: Prüfauftrag 20190802

Sehr geehrte Frau Mühlethaler,

als Anlage erhalten Sie den Untersuchungsbericht zu dem o.g. Prüfauftrag.

Für Rücksprachen stehen wir gern zur Verfügung.

Wir bedanken uns für Ihren Auftrag und das entgegengebrachte Vertrauen.

Mit freundlichen Grüßen

Patrick Reinhardt, M.Sc.
Fachgebietsverantwortlicher

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 *.



Authorized for the testing of heat and flame-resistant protective clothing for car racers according to FIA 8856-2000 standard by the Fédération Internationale de l'Automobile (FIA) Paris.

TEST REPORT

Order number STFI: 20190803

Report date: 29 March 2019
Person responsible: Reinhardt

Orderer: Création Baumann AG
Frau Katrin Mühlethaler
Bern-Zürich-Str. 23
4901 LANGENTHAL
SCHWEIZ

Test order:
Date: 21 March 2019
Order received: 27 March 2019
Material received: 27 March 2019

Material to analyse:

2 samples sun protective material

signed by orderer	colour	code for order processing
SONOR II R	7229	P0802_19_1
SECRET	404	P0802_19_2

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

* 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

Equipment: UV/Visible/NIR spectrophotometer Lambda 900, 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 (marked by the client). During the measurement an circular area with a diameter of 25 mm (integrating sphere port) is covered by the sample.

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

Code	light transmission degree	light remission degree	light absorption coefficient	UV-transmission degree
P0802_19	$\tau_{v,n-h}$	$\rho_{v,n-h}$	α_v	τ_{uv}
1	0,5373	0,4287	0,0340	0,5383 ¹⁾
2	0,0037	0,6037	0,3926	0,0000

¹⁾ Because of optical brightener the measurement result of the UV-transmission degree could be defective (higher) under the use of the above described measuring method.

(2) Global radiation range

Code	solar transmission degree	solar remission degree	solar absorption coefficient
P0802_19	$\tau_{e,n-h}$	$\rho_{e,n-h}$	α_e
1	0,5447	0,4353	0,0200
2	0,0080	0,5747	0,4173

(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	$U_g=5,8 \text{ W/(m}^2\text{K)}$ $g=0,85$		$U_g=2,9 \text{ W/(m}^2\text{K)}$ $g=0,76$		$U_g=1,2 \text{ W/(m}^2\text{K)}$ $g=0,59$		$U_g=0,8 \text{ W/(m}^2\text{K)}$ $g=0,55$	
P0802_19	g_{tot}	F_c	g_{tot}	F_c	g_{tot}	F_c	g_{tot}	F_c
1	0,53	0,63	0,51	0,67	0,44	0,74	0,42	0,76
2	0,38	0,44	0,40	0,53	0,38	0,64	0,37	0,67

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} 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). Therefore it is necessary to measure reflection to the not the radiation exposed side and 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.



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

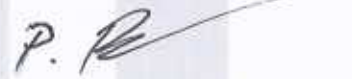
Unless otherwise agreed, all materials we received within this order will be kept for a maximum time of 6 month. Materials which are not stored because of technical or safety reasons are excluded from that

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. These test report is not allowed to copy in parts.



Dipl.-Ing. Marian Hierhammer
head of test department



Patrick Reinhardt, M.Sc.
field responsible collaborator