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ZLS ZLS-P-846/09

Von der Federation Internationale de L'Automobile (FIA) Paris zugelassene Stelle zur Prüfung von hitze- und flammresistenter Schutzkleidung für Auto-Rennfahrer gemäß Standard FIA 8856-2000

UNTERSUCHUNGSBERICHT | TESTREPORT

Order number STFI: **20110706 /20120347**

Report date: 2011-02-21
Person responsible: Mehlhorn

Orderer:
DELIUS GmbH
Frau Angelika Schmidt-Koch
Goldstraße 16-18
33602 Bielefeld

Test order:

Date: 2011-04-06
Order received: 2011-04-08
Material received: 2011-04-08

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Material to analyse:

1samples sun protective material

signed by orderer	code for order processing
Alpha silber	P0706_11_1

The samples had been extracted by the orderer, concerning this no information is existing in the test department

Analysis content:

(1) Remission and transmission in the visible light range in accordance with DIN EN 410: 2011

(2) Remission and transmission in the global radiation range in accordance with DIN EN 410: 2011

(3) Calculation of the total energy permeability degree g_t of window system with sun protective materials, following DIN EN 13363-1 2007 and approximated calculation of reduce factor Fc following DIN EN 14501 2006

(4) Spectral values in the radiation range 300nm – 2500nm

Conditions for optical tests:

test parameter	symbol	range of radiation
light transmission degree	$\tau_{v,B}$	380...780 nm (standard light D65)
light remission degree	$\rho_{v,B}$	380...780 nm (standard light D65)
light absorption degree	$\alpha_{v,B}$	380...780 nm
UV- transmission degree	τ_{UV}	280...380 nm (UV-radiation)
solar transmission degree	$\tau_{e,B}$	280...2500 nm (global radiation)
solar remission degree	$\rho_{e,B}$	280...2500 nm (global radiation)
solar absorption degree	$\alpha_{e,B}$	280...2500 nm

Equipment: spectral photometer Lambda 900, PERKIN - ELMER Corp., USA
150 mm sphere

Test results:

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

Code	light transmission degree	light remission degree	light absorption coefficient	UV-transmission degree
	$\tau_{v,B}$	$\rho_{v,B}$	$\alpha_{v,B}$	τ_{UV}
P0706_11_1	0,2105	0,6668	0,1227	0,1535

(2) Global radiation range

Code	solar transmission degree	solar remission degree	solar absorption coefficient
	$\tau_{e,B}$	$\rho_{e,B}$	$\alpha_{e,B}$
P0706_11_1	0,2079	0,6728	0,1193

(3) Total energy permeability degree g_t and reduce factor Fc

Code	g_t	F_c
P0706_11_1	0,36	0,52

Fc and g_t results are valid for the following presumptions in accordance with DIN EN 13363-1:

- Double glass with thermal protective covering , thermal permeability degree U = 1,6 W/m²K and total energy permeability degree g = 0,70
- sun protective material inside, closed.

4) Spectral values

Sample code: P0706_11_1

λ in nm	T in %	R in %	A in %
300	8,6534	21,8970	69,4496
310	9,6645	25,9340	64,4015
320	12,0503	44,5727	43,3770
330	12,9153	51,6193	35,4653
340	13,3683	54,0507	32,5810
350	14,1793	57,1950	28,6257
360	16,0057	61,7153	22,2790
370	18,3787	66,3147	15,3067
380	19,6397	68,0787	12,2817
390	20,1103	68,4783	11,4113
400	20,3397	68,4177	11,2427
410	20,4977	68,4327	11,0697
420	20,6257	68,4063	10,9680
430	20,7190	68,2657	11,0153
440	20,7850	68,1110	11,1040
450	20,8510	67,9313	11,2177
460	20,9043	67,8327	11,2630
470	20,9297	67,8183	11,2520
480	20,9893	67,7157	11,2950
490	21,0193	67,5297	11,4510
500	21,0323	67,2647	11,7030
510	21,0297	67,1203	11,8500
520	21,0390	67,0723	11,8887
530	21,0603	67,0590	11,8807
540	21,0557	67,0427	11,9017
550	21,0717	66,8947	12,0337
560	21,0833	66,6680	12,2487
570	21,0650	66,4600	12,4750
580	21,0960	66,2213	12,6827
590	21,0800	66,0977	12,8223
600	21,0460	66,0910	12,8630
610	21,0473	66,0503	12,9023
620	21,0273	66,0450	12,9277
630	20,9767	65,9963	13,0270
640	20,9723	65,8250	13,2027

λ in nm	T in %	R in %	A in %
650	20,9553	65,5377	13,5070
660	20,8950	65,2360	13,8690
670	20,8620	64,9043	14,2337
680	20,8390	64,5877	14,5733
690	20,8233	64,3370	14,8397
700	20,7813	64,1713	15,0473
710	20,7417	64,1347	15,1237
720	20,7383	64,1370	15,1247
730	20,7400	63,9863	15,2737
740	20,7293	63,7937	15,4770
750	20,6963	63,6330	15,6707
760	20,6950	63,4193	15,8857
770	20,7000	63,0507	16,2493
780	20,6927	62,5830	16,7243
790	20,6653	62,0433	17,2913
800	20,6493	61,5087	17,8420
850	21,9937	62,2883	15,7180
900	21,7387	64,9423	13,3190
950	21,9753	68,0817	9,9430
1000	22,0920	69,5537	8,3543
1100	22,3393	71,3807	6,2800
1200	22,1460	72,9523	4,9017
1300	22,3713	73,8387	3,7900
1400	21,9907	73,4197	4,5897
1500	22,0557	73,8750	4,0693
1600	22,1620	74,1383	3,6997
1700	20,9850	73,0597	5,9553
1800	21,4393	74,3517	4,2090
1900	20,5120	73,9223	5,5657
2000	21,4683	75,9657	2,5660
2100	20,6560	76,0397	3,3043
2200	20,2993	73,8810	5,8197
2300	17,4333	67,6413	14,9253
2400	17,8033	68,9033	13,2933
2500	16,1450	70,5907	13,2643

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

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.

Dr. Matthias Mägel
head of test department

stfi geprüft

Dipl.-Phys. Heidrun Mehlhorn
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