out

Serge 10%

COLLECTION 2018-2021
REFLECTS SUNLIGHT OUTDOORS
GLASSFIBRE
OF = 10%

copaco®
screenweavers

Screens that reflect & absorb solar energy outside the house. Meet OUT.

Serge 10%

GLASSFIBRE

OF = 10%

Technical specifications

TECHNICAL SPECIFICATION		UNITY		STANDARD	RESULT
composition				Glassfibre 42% - PVC 58 %	
openness factor		%		NBN EN 410	10%
weight		g/m²		NF EN 12127	490
thickness		mm		ISO 5084	0,83
density		yarn/cm	warp	ISO 2286-3	18
			weft		12
colour fastness to artificial light				ISO 105 B02	>7
colour fastness to artificial weathering				ISO 105 B04	>7
tear strength	original	daN	warp	ISO 4674-1 method 2	9,6
			weft		7,6
elongation up to break	original	%	warp	ISO 1421	5,2
			weft		4,9
breaking strength	original	daN/5 cm	warp	ISO 1421	312
			weft		200
elongation up to break	after colour fastness to artificial weathering	%	warp	ISO 1421	5,8
			weft		5
breaking strength	after colour fastness to artificial weathering	daN	warp	ISO 1421	289
			weft		190
elongation up to break	after colour fastness to artificial light	%	warp	ISO 1421	6,7
			weft		5,2
breaking strength	after colour fastness to artificial light	daN/5 cm	warp	ISO 1421	289
			weft		185
tear strength	after climatic chamber -30°C	daN	warp	ISO 4674-1 method 2	8,6
			weft		7,1
elongation up to break	after climatic chamber -30°C	%	warp	ISO 1421	5,0
			weft		4,8
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	ISO 1421	271
			weft		174
tear strength	after climatic chamber +70°C	daN	warp	ISO 4674-1 method 2	8,8
			weft		7
elongation up to break	after climatic chamber +70°C	%	warp	ISO 1421	4,8
			weft		4,2
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	ISO 1421	217
			weft		139
air permeability		l/m².s		ISO 9237	
fire classification	Europe			UNE-EN 13501-1:2007	
	France			NF P92-503	M1
	Italy			UNI 9177	Class 1
	Germany			DIN 4102	B1
	UK			BS 5867	C
	USA			NFPA 701	FR
roll length	**50 m**				
cleaning	with soapy water				
confection	by heat, high frequency or ultrasonic welding				

These properties are given as indicative and don't have any contractual value

Serge 600 010010 - charcoal | charcoal **(OF= 5%)**

Serge 10% 010010 charcoal | charcoal **(OF= 10%)**

Serge 10%

GLASSFIBRE

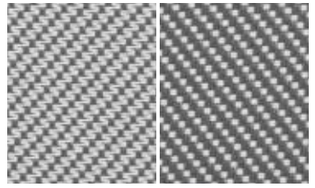
OF = 10%

Colours & references

front back

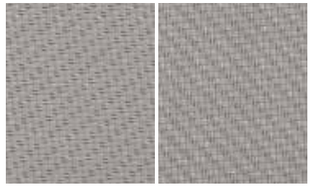
Serge 10% 002002 white | white

front back



Serge 10% 001002 grey | white

front back



Serge 10% 007007 pearl grey | pearl grey

front back

Serge 10% 001001 grey | grey

front back

Serge 10% 001010 grey | charcoal

front back

Serge 10% 010010 charcoal | charcoal

Serge 10%	270 cm
002002 white | white	•
001002 grey | white	•
007007 pearl grey | pearl grey	•
001001 grey | grey	•
001010 grey | charcoal	•
010010 charcoal | charcoal	•

Solar energetic properties

Serge 10%
European Standard EN 14501
Calculation G-value according to EN 13363-1 version 7.0

SOLAR ENERGETIC PROPERTIES													VISUAL PROPERTIES	
FABRIC				FABRIC + GLAZING										
				EXTERIOR				INTERIOR						
				G-factor = total solar energy transmittance										
references	colours			As = Solar Absorptance %	Rs = Solar Reflectance %	Ts = Solar Transmittance %	Glazing A - Gv = 0,85 - U = 5,8	Glazing B - Gv = 0,76 - U = 2,9	Glazing C - Gv = 0,59 - U = 1,2	Glazing D - Gv = 0,32 - U = 1,1	Glazing A - Gv = 0,85 - U = 5,8	Glazing B - Gv = 0,76 - U = 2,9	Glazing C - Gv = 0,59 - U = 1,2	Glazing D - Gv = 0,32 - U = 1,1	Tv = Visible Light Transmittance %	Tuv = UV Transmittance %
		front	back													
002002	white | white			front	10,3	60,5	29,2	0,30	0,27	0,21	0,14	0,41	0,41	0,38	0,26	29,5	6,0
				back	9,5	61,3	29,2	0,30	0,27	0,21	0,14	0,41	0,41	0,38	0,26	29,5	6,0
001002	grey | white			front	59,2	29,6	11,2	0,23	0,18	0,13	0,10	0,55	0,55	0,47	0,28	11,2	9,8
				back	66,2	22,6	11,2	0,23	0,18	0,13	0,10	0,55	0,55	0,47	0,28	11,2	9,8
007007	pearl grey | pearl grey			front	42,9	39,7	17,4	0,29	0,25	0,17	0,13	0,55	0,53	0,45	0,28	14,7	10,3
				back	40,7	41,9	17,4	0,29	0,25	0,17	0,13	0,55	0,53	0,45	0,28	14,7	10,3
001001	grey | grey			front	82,6	12,8	4,6	0,27	0,21	0,13	0,12	0,70	0,66	0,54	0,30	5,0	4,8
				back	82,6	12,8	4,6	0,27	0,21	0,13	0,12	0,70	0,66	0,54	0,30	5,0	4,8
001010	grey | charcoal			front	84,7	9,3	6,0	0,23	0,18	0,11	0,10	0,67	0,65	0,54	0,30	6,0	5,7
				back	82,8	11,2	6,0	0,23	0,18	0,11	0,10	0,67	0,65	0,54	0,30	6,0	5,7
010010	charcoal | charcoal			front	89,8	4,1	6,1	0,31	0,24	0,15	0,13	0,76	0,71	0,57	0,31	6,1	6,1
				back	90,2	3,7	6,1	0,31	0,24	0,15	0,13	0,76	0,71	0,57	0,31	6,1	6,1

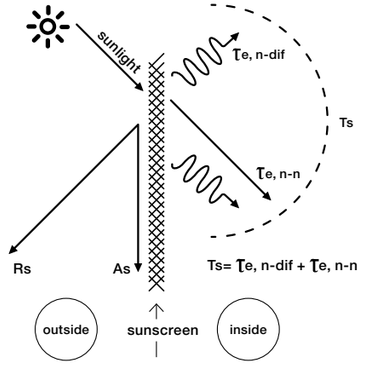
Values are given as indicative and don't have any contractual value.

GLAZING A = clear single glazing 4 mm	Gv = 0,85
GLAZING B = clear double glazing (4/12/4), space filled with air	Gv = 0,76
GLAZING C = double glazing (4/16/4), with a low emissivity coating in position 3, space filled with argon	Gv = 0,59
GLAZING D = reflective double glazing (4/16/4), with a low emissivity coating in position 2, space filled with argon	Gv = 0,32

Working of a sunscreen

Sunscreen = protection against sunrays

Sunscreen means protection against the sunrays, so the function is the protection against light and heat, which is expressed in several properties.



Rs	Solar reflectance
As	Solar absorptance
Ts	Solar transmittance
τe,n-dif	Diffuse solar transmittance
τe,n-n	Normal solar transmittance

Classes indicate effect of a sunscreen

Based on certain properties, the screen can be split up in classes, from 0 to 4. Those classes are used, starting from the norm EN 14501, to indicate the effect of a certain sunscreen.

influence on thermal and visual comfort	
Class 0	very little effect
Class 1	little effect
Class 2	moderate effect
Class 3	good effect
Class 4	very good effect

Visual properties

Openness factor

The openness of a screen is indicated by the openness factor **= OF.** The openness coefficient is the relative area of the openings in the fabric seen under a given incidence. The openness factor is seen under a normal incidence.

The sunrays are subdivided in: **Visible light, UV-light** and **IR-light.**

Visible light (55% of the sun-energy) is that part for which our eyes are most sensitive. How larger the light intensity, how more detrimental for our eyes.

The factor Visible Light Transmittance = **Tv,** is the ratio of visible light that will be transmitted. How lower this factor can be kept, how better for the eyes.

UV-light (3% of the sun-energy) is the part of radiation which is detrimental for our health. This factor is indicated by the UV Transmittance = **Tuv.** This is the quantity UV-light transmitted by the sunscreen.

IR-light is invisible. This is however 42% of the sun-energy. These rays care for the reheating of solid substances and gases.

Influence of colours

The choice of the colour has direct influence on the criteria which justify the use of sunscreen protection:

- Protection against visible light, expressed by the factor **Tv.**
- Protection against sun-energy, expressed by the **G** value.
- Protection against secondary heat, expressed by the factor **Qi.**
- Protection against UV-light, expressed by the factor **Tuv.**

Visual properties: classes

Glare control

The capacity of the solar protection device to control the luminance level of openings and to reduce the luminance contrasts between different zones within the field.

τv,n-n	τv,n-dif			
	τv,n-dif < 0,02	0,02 ≤ τv,n-dif < 0,04	0,04 ≤ τv,n-dif < 0,08	τv,n-dif ≥ 0,08
τv,n-n > 0,10	0	0	0	0
0,05 < τv,n-n ≤ 0,10	1	1	0	0
τv,n-n ≤ 0,05	3	2	1	1
τv,n-n = 0,00	4	3	2	2

Privacy at night

Night privacy is the capacity of an internal or external blind or a shutter in the fully extended position or fully extended and closed position to protect persons, at night in normal light conditions from external view. External views means the ability of an external observer located 5m from the fully extended and closed product, to distinguish a person or object standing 1m behind the protection device in the room.

τv,n-n	τv,n-dif		
	0 < τv,n-dif ≤ 0,04	0,04 < τv,n-dif ≤ 0,15	τv,n-dif > 0,15
τv,n-n > 0,10	0	0	0
0,05 < τv,n-n ≤ 0,10	1	1	1
τv,n-n ≤ 0,05	2	2	2
τv,n-n = 0,00	4	3	2

Visual contact with the outside

Visual contact with the outside is the capacity of the solar protection device to allow an exterior view when it is fully extended. This function is affected by different light conditions during the day.

τv,n-n	τv,n-dif		
	0 < τv,n-dif ≤ 0,04	0,04 < τv,n-dif ≤ 0,15	τv,n-dif > 0,15
τv,n-n > 0,10	4	3	2
0,05 < τv,n-n ≤ 0,10	3	2	1
τv,n-n ≤ 0,05	2	1	0
τv,n-n = 0,00	0	0	0

Daylight utilisation

Daylight utilisation is characterised by:

- the capacity of the solar protection device to reduce the time period during the artificial light is required.
- the capacity of the solar protection device to optimise the daylight which is available.

CLASS	0	1	2	3	4
τv,dif-h	τv,dif-h < 0,02	0,02 ≤ τv,dif-h < 0,10	0,10 ≤ τv,dif-h < 0,25	0,25 ≤ τv,dif-h < 0,40	τv,dif-h ≥ 0,40

Working of a sunscreen

Thermal comfort

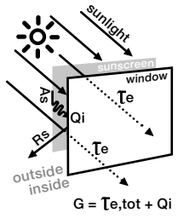
Fabric

Energy radiated by the sun, will be split up in 3 factors:

factor 1:	factor 2:	factor 3:
As = **Solar absorptance** is the ratio of the absorbed flux to the incident flux.	**Rs =** **Solar reflectance** is the fraction of the incident solar radiation that is directly reflected by the component.	**Ts =** **Solar transmittance** is the sum of the (normal) direct solar transmittance and the diffuse solar transmittance. This is the fraction of the total transmitted energy to the total incident solar radiation.
These 3 factors together are always 100%		

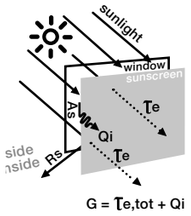
The G-factor

exterior sunscreen



G = Te,tot + Qi

interior sunscreen



G = Te,tot + Qi

Rs	Solar reflectance
As	Solar absorptance
Te	Direct solar transmittance
Qi	Secondary heat transfer factor
G	G-factor = total solar energy transmittance

Sunscreens are always used in combination with a glazing. These together will prevent a large quantity of energy, sent by the sun to the earth, which is indicated by the: Total Solar Energy Transmittance, or **G-factor.**

The **G** value is the ratio between the total solar energy transmitted into a room through a window and the incident solar energy on the window. The **Gtot** is the solar factor of the combination of glazing and solar protection device.
The **Gv** is the solar factor of the glazing alone.
The shading coefficient is defined as the ratio of the solar factor of the combined glazing and solar protection device **Gtot** to that of the glazing alone **Gv.**

The total solar energy transmitted through a window consists of two parts:
1) Radiation: measured by the solar transmittance: **Te,tot**
2) Heat: measured by the secondary heat transfer: **Qi**

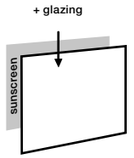
G = Te,tot + Qi

The factor **Te,tot,** is the quantity of energy, which will pass the combination solar protection device and window.
The factor **Qi** is the quantity of heat which is released by the absorption of energy in the sunscreen protection system = combination sunscreen + glazing.

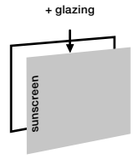
The **G-factor** is the most important factor to explain the efficiency of a combination sunscreen + glazing, as protection against the energy of the sun. The **G-factor** divided into his components explains the difference in efficiency between exterior and interior sunscreen.

G = Te,tot + Qi

exterior sunscreen



interior sunscreen



The direct solar transmittance **Te,tot** is the same for interior and exterior use of sunscreens.
The secondary heat factor **Qi** for interior sunscreen is bigger then for exterior sunscreen. For interior use, the heat, produced by the absorption of energy, will be transmitted to the room inside. By exterior use, the heat will be transmitted to the outside, without any inconvenience at the inside.

Also the colour of the sunscreen has an influence on the **G-factor.** Dark colours will absorb a lot of sun energy and will transmit this to heat. If the screen is used for exterior, heat will have no influence inside the room, contrary to a screen used for interior. This is why a darker screen is ideal for exterior use and a lighter screen for interior use.

Thermal comfort: classes

Total Solar energy Transmittance = G-factor

CLASS	0	1	2	3	4
Gtot	Gtot ≥ 0,50	0,35 ≤ Gtot < 0,50	0,15 ≤ Gtot < 0,35	0,10 ≤ Gtot < 0,15	Gtot < 0,10

Secondary Heat transfer = Qi

CLASS	0	1	2	3	4
Qi	Qi ≥ 0,30	0,20 ≤ Qi < 0,30	0,10 ≤ Qi < 0,20	0,03 ≤ Qi < 0,10	Qi < 0,03

Normal Solar transmittance = protection against direct transmission
The ability of a solar protection device to protect persons and surroundings from direct irradiation is measured by the direct/direct solar transmittance of the device in combination with the glazing. Te,n-n is used as measure for this property.

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