Serge 600 BO Solar

GLASSFIBRE

OF = 3%

Technical specifications

TECHNICAL SPECIFICATION		UNITY		STANDARD	RESULT
composition				Fibreglass 34 % - PVC 48 % - PVC laminate 18 %	
openness factor		%		NBN EN 410	3%
weight		g/m²		NF EN 12127	645
thickness		mm		ISO 2286-3	0,70
density		yarn/cm	warp	ISO 7211/2	18,0
			weft		14,0
colour fastness to artificial weathering				ISO 105 B04	>7
tear strength	original	daN	warp	ISO 4674-1 method 2	9,0
			weft		9,9
elongation up to break	original	%	warp	ISO 1421	5,7
			weft		7,0
breaking strength	original	daN/5 cm	warp	ISO 1421	205,7
			weft		169,8
elongation up to break	after colour fastness to artificial weathering	%	warp	ISO 1421	5,9
			weft		6,7
breaking strength	after colour fastness to artificial weathering	daN	warp	ISO 1421	200,1
			weft		154,6
tear strength	after climatic chamber -30°C	daN	warp	ISO 4674-1 method 2	10,0
			weft		11,0
elongation up to break	after climatic chamber -30°C	%	warp	ISO 1421	5,5
			weft		6,4
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	ISO 1421	210,0
			weft		146,8
tear strength	after climatic chamber +70°C	daN	warp	ISO 4674-1 method 2	9,8
			weft		10,0
elongation up to break	after climatic chamber +70°C	%	warp	ISO 1421	5,9
			weft		6,2
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	ISO 1421	215,3
			weft		147,2
air permeability		l/m².s		ISO 9237	0,0 l/m²/s
fire classification	Europe			UNE-EN 13501-1:2007	
	France			NF P92-503	M1
	Italy			UNI 9177	Classe 1
	Germany			DIN 4102	
	UK			BS 5867	
	USA			NFPA 701	
roll length	30 m				
cleaning	with soapy water				
confection	by heat, high frequency or ultrasonic welding				

Recommendation: to be used in sunscreensystems with Zipscreens.

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

Serge 600 BO Solar 010010 charcoal | charcoal

Serge 600 BO Solar

GLASSFIBRE

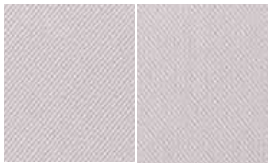
OF = 3%

Colours & references

front back

Serge 600 BO Solar 002002 white | white

front back

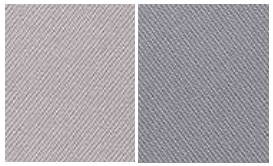


Serge 600 BO Solar 002007 white | pearl grey

front back

Serge 600 BO Solar 007007 pearl grey | pearl grey

front back



Serge 600 BO Solar 001002 grey | white

front back

Serge 600 BO Solar 033001 oyster shell

front back

Serge 600 BO Solar 001001 grey | grey

back front

Serge 600 BO Solar 001010 grey | charcoal

front back

Serge 600 BO Solar 010010 charcoal | charcoal

Serge 600 BO Solar	300 cm
002002 white | white	•
002007 white | pearl grey	•
007007 pearl grey | pearl grey	•
001002 grey | white	•
033001 oyster shell	•
001001 grey | grey	•
001010 grey | bronze	•
010010 charcoal | charcoal	•

Solar energetic properties

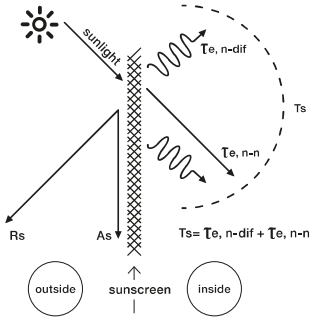
Serge 600 BO Solar European Standard EN 14501 Calculation G-value according to EN 13363-1, version 7.0					SOLAR ENERGETIC PROPERTIES											VISUAL PROPERTIES	
					FABRIC			FABRIC + GLAZING									
								EXTERIOR				INTERIOR					
								G-factor = total solar energy transmittance									
references	colours	front	back		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 %
002002	white | white			front	28,4	67,3	4,3	0,08	0,06	0,04	0,03	0,31	0,34	0,35	0,25	4,5	0,2
				back	30,9	64,8	4,3	0,08	0,07	0,04	0,03	0,32	0,35	0,35	0,25	4,5	0,2
002007	white | pearl grey			front	41,3	47,7	11,0	0,16	0,13	0,09	0,07	0,42	0,44	0,41	0,26	10,3	0,2
				back	35,8	53,2	11,0	0,15	0,13	0,09	0,06	0,39	0,42	0,39	0,26	10,3	0,2
007007	pearl grey | pearl grey			front	60,3	35,1	4,6	0,13	0,10	0,06	0,05	0,47	0,49	0,45	0,27	4,8	0,2
				back	59,6	35,8	4,6	0,13	0,10	0,06	0,05	0,47	0,49	0,44	0,27	4,8	0,2
001002	grey | white			front	53,0	40,1	6,9	0,14	0,11	0,07	0,05	0,45	0,47	0,43	0,27	6,9	0,2
				back	62,9	30,2	6,9	0,15	0,12	0,08	0,06	0,50	0,52	0,46	0,28	6,9	0,2
033001	oyster shell			front	76,9	18,2	4,9	0,15	0,12	0,07	0,06	0,56	0,57	0,50	0,29	4,9	0,2
				back	73,3	21,8	4,9	0,15	0,11	0,07	0,06	0,54	0,56	0,49	0,28	4,9	0,2
001001	grey | grey			front	77,9	17,3	4,8	0,15	0,12	0,07	0,06	0,56	0,58	0,50	0,29	4,8	0,2
				back	74,8	20,4	4,8	0,15	0,11	0,07	0,06	0,55	0,56	0,49	0,29	4,8	0,2
001010	grey | charcoal			front	85,2	10,5	4,3	0,16	0,12	0,07	0,06	0,60	0,61	0,52	0,29	4,5	0,2
				back	78,8	16,9	4,3	0,15	0,11	0,07	0,06	0,56	0,58	0,50	0,29	4,5	0,2
010010	charcoal | charcoal			front	89,8	5,6	4,6	0,17	0,13	0,08	0,06	0,62	0,63	0,54	0,30	4,8	0,2
				back	85,5	9,9	4,6	0,16	0,12	0,08	0,06	0,60	0,61	0,52	0,29	4,8	0,2

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

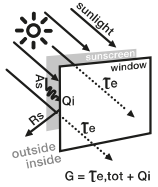
Fabric

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%		

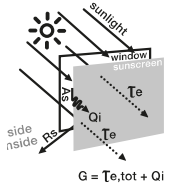
The G-factor

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**

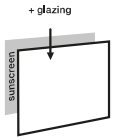
G = Te,tot + Qi

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.

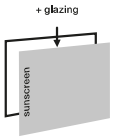
The **G-factor** is the most important factor to explain the efficiency of a combination sunscreen + glazing, as protection against the energy of the sun. The **G-factor** divided into his components explains the difference in efficiency between exterior and interior sunscreen.

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.