

Verso 1%

OF = 1%

Verso 3%

OF = 3%

Technical specifications

TECHNICAL SPECIFICATION		UNITY	STANDARD	RESULT
composition			Glassfibre 36% - PVC 64%	
openness factor		%	NBN EN 410	1%
weight		g/m ²	NF EN 12127	480,6
thickness		mm	ISO 2286-3	0,694
density		yarn/cm	warp	24
			weft	25
colour fastness to artificial light			ISO 105 B02	>7
tear strength	original	daN	warp	2,2
			weft	2,4
elongation up to break	original	%	warp	2,85
			weft	2,4
breaking strength	original	daN/5 cm	warp	185
			weft	130
elongation up to break	after colour fastness to artificial light	%	warp	3,1
			weft	2,9
breaking strength	after colour fastness to artificial light	daN/5 cm	warp	175
			weft	140
tear strength	after climatic chamber -30°C	daN	warp	2,05
			weft	2,1
elongation up to break	after climatic chamber -30°C	%	warp	2,1
			weft	2,6
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	115
			weft	120
tear strength	after climatic chamber +70°C	daN	warp	2,3
			weft	2,7
elongation up to break	after climatic chamber +70°C	%	warp	2
			weft	2,7
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	100
			weft	100
fire classification	Europe		UNE-EN 13501-1:2007	C-s3,d0
	Germany		DIN 4102	B2
roll length	30 m			
cleaning	with soapy water			
confection	by heat, high frequency or ultrasonic welking			

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

Technical specifications

TECHNICAL SPECIFICATION		UNITY	STANDARD	RESULT
composition			Glassfibre 36% - PVC 64%	
openness factor		%	NBN EN 410	3%
weight		g/m ²	NF EN 12127	452,8
thickness		mm	ISO 2286-3	0,693
density		yarn/cm	warp	24
			weft	23
colour fastness to artificial light			ISO 105 B02	>7
tear strength	original	daN	warp	5,9
			weft	4,6
elongation up to break	original	%	warp	2,7
			weft	3,6
breaking strength	original	daN/5 cm	warp	155
			weft	180
elongation up to break	after colour fastness to artificial light	%	warp	2,9
			weft	3,3
breaking strength	after colour fastness to artificial light	daN/5 cm	warp	160
			weft	170
tear strength	after climatic chamber -30°C	daN	warp	6,3
			weft	5,5
elongation up to break	after climatic chamber -30°C	%	warp	2,75
			weft	2,4
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	150
			weft	110
tear strength	after climatic chamber +70°C	daN	warp	6
			weft	4,7
elongation up to break	after climatic chamber +70°C	%	warp	2,3
			weft	2,35
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	100
			weft	100
fire classification	Europe		UNE-EN 13501-1:2007	B-s2,c0
	Germany		DIN 4102	B2
roll length	30 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



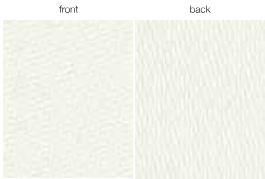


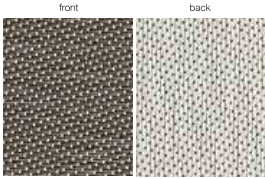
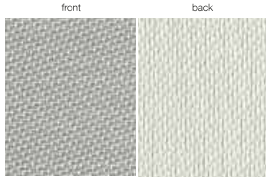
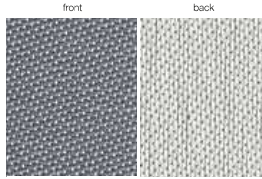
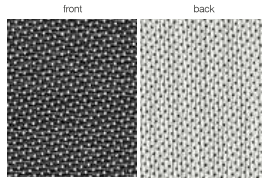
Verso 1%



GLASSFIBRE

OF = 1%

Colours & references

 <p>Verso 1% 002002 white white</p>	 <p>Verso 1% 002008 white linen</p>	 <p>Verso 1% 002003 white sand</p>																																
 <p>Verso 1% 002011 white bronze</p>	 <p>Verso 1% 002007 white pearl grey</p>	 <p>Verso 1% 002001 white grey</p>																																
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Solar energetic properties

Verso 1% European Standard EN 14501 Calculation G-value according to EN 15305-1 version 7.0		SOLAR ENERGETIC PROPERTIES								VISUAL PROPERTIES		
		FABRIC			FABRIC + GLAZING				INTERIOR			
					G-factor = total solar energy transmittance							
		As = Solar Absorbance %	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	Tv = Visible Light Transmittance %			Tuv = UV Transmittance %
references	colours	front	back	front	back	front	back	front	back			
002002	white white	front	back	15,1	65,7	19,2	0,35	0,37	0,36	0,25	18,5	2,0
		front	back	15,0	65,8	19,2	0,35	0,37	0,36	0,25	18,5	2,0
002008	white linen	front	back	32,4	53,5	14,1	0,42	0,43	0,40	0,26	11,3	1,9
		front	back	24,2	61,7	14,1	0,37	0,39	0,37	0,25	11,3	1,9
002003	white sand	front	back	38,8	48,2	13,0	0,45	0,46	0,41	0,27	9,2	1,8
		front	back	27,7	59,3	13,0	0,38	0,40	0,38	0,26	9,2	1,8
002011	white bronze	front	back	80,9	14,4	4,7	0,63	0,62	0,52	0,30	4,0	1,9
		front	back	49,9	45,4	4,7	0,45	0,46	0,42	0,27	4,0	1,9
002007	white pearl grey	front	back	53,2	37,5	9,3	0,51	0,51	0,45	0,28	7,0	2,1
		front	back	36,1	54,6	9,3	0,41	0,42	0,39	0,26	7,0	2,1
002001	white grey	front	back	75,2	20,7	4,1	0,60	0,59	0,50	0,29	3,2	1,4
		front	back	47,6	48,3	4,1	0,44	0,45	0,41	0,27	3,2	1,4
002010	white charcoal	front	back	86,1	11,1	2,8	0,65	0,64	0,53	0,30	2,7	1,4
		front	back	53,9	43,3	2,8	0,46	0,47	0,43	0,27	2,7	1,4

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

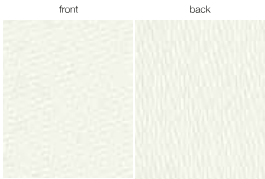


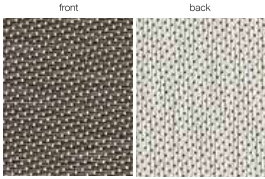
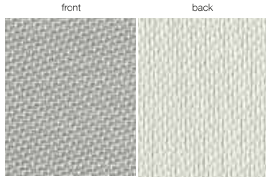
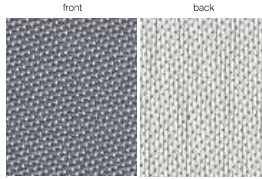
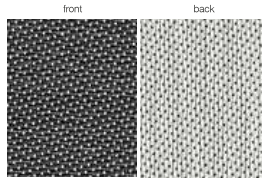
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Solar energetic properties

Verso 3%		SOLAR ENERGETIC PROPERTIES								VISUAL PROPERTIES		
		FABRIC			FABRIC + GLAZING				VISUAL PROPERTIES			
					INTERIOR							
references		As = Solar Absorbance %	Rs = Solar Reflectance %	Ts = Solar Transmittance %	G-factor = total solar energy transmittance				Tv = Visible Light Transmittance %	Tuv = UV Transmittance %		
colours	front				back	front	back	front			back	front
002002	white white	front	13,4	65,8	20,8	0,36	0,37	0,36	0,25	20,1	3,0	
		back	13,0	66,2	20,8	0,35	0,37	0,36	0,25	20,1	3,0	
002008	white linen	front	29,0	53,7	17,3	0,42	0,43	0,40	0,26	14,9	3,2	
		back	21,2	61,4	17,3	0,38	0,39	0,37	0,25	14,9	3,2	
002003	white sand	front	35,6	49,0	15,4	0,45	0,45	0,41	0,27	12,0	3,0	
		back	24,7	59,9	15,4	0,38	0,40	0,38	0,26	12,0	3,0	
002011	white bronze	front	73,1	17,6	9,3	0,62	0,61	0,51	0,29	7,9	4,0	
		back	45,0	45,7	9,3	0,46	0,47	0,42	0,27	7,9	4,0	
002007	white pearl grey	front	50,2	37,6	12,2	0,51	0,51	0,45	0,28	10,3	3,6	
		back	32,9	54,8	12,2	0,41	0,42	0,39	0,26	10,3	3,6	
002001	white grey	front	69,6	22,2	8,2	0,59	0,59	0,50	0,29	7,3	3,2	
		back	43,1	48,7	8,2	0,44	0,45	0,41	0,27	7,3	3,2	
002010	white charcoal	front	81,6	12,0	6,3	0,65	0,64	0,53	0,30	6,2	3,2	
		back	48,4	45,2	6,3	0,46	0,47	0,42	0,27	6,2	3,2	

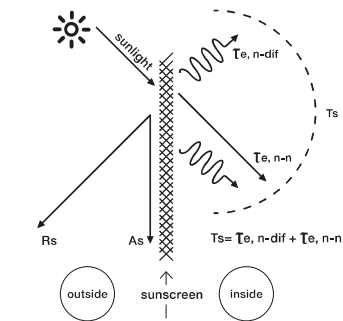
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GLAZING D = reflective double glazing (4/16/4), with a low emissivity coating in position 2, space filled with argon	Gv = 0,32

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
Te, n-dif	Diffuse solar transmittance
Te, n-n	Normal solar transmittance

Classes indicate effect of a sunscreen

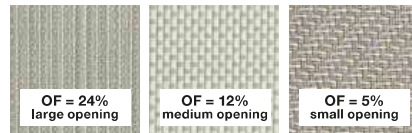
Based on certain properties, the screen can be split up in classes, from 0 to 4. Those classes are used, starting from the norm EN 14501, to indicate the effect of a certain sunscreen.

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.

Tv, n-n	Tv, n-dif			
	Tv, n-dif < 0,02	0,02 ≤ Tv, n-dif < 0,04	0,04 ≤ Tv, n-dif < 0,08	Tv, n-dif ≥ 0,08
Tv, n-n > 0,10	0	0	0	0
0,05 < Tv, n-n ≤ 0,10	1	1	0	0
Tv, n-n ≤ 0,05	3	2	1	1
Tv, 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.

Tv, n-n	Tv, n-dif		
	0 < Tv, n-dif ≤ 0,04	0,04 < Tv, n-dif ≤ 0,15	Tv, n-dif > 0,15
Tv, n-n > 0,10	0	0	0
0,05 < Tv, n-n ≤ 0,10	1	1	1
Tv, n-n ≤ 0,05	2	2	2
Tv, 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.

Tv, n-n	Tv, n-dif		
	0 < Tv, n-dif ≤ 0,04	0,04 < Tv, n-dif ≤ 0,15	Tv, n-dif > 0,15
Tv, n-n > 0,10	4	3	2
0,05 < Tv, n-n ≤ 0,10	3	2	1
Tv, n-n ≤ 0,05	2	1	0
Tv, 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
Tv, dif-h	Tv, dif-h < 0,02	0,02 ≤ Tv, dif-h < 0,10	0,10 ≤ Tv, dif-h < 0,25	0,25 ≤ Tv, dif-h < 0,40	Tv, dif-h ≥ 0,40

Working of a sunscreen



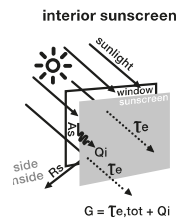
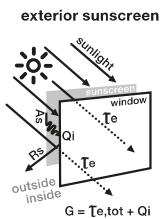
Thermal comfort

Fabric

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

factor 1:	factor 2:	factor 3:
<p>As = Solar absorptance is the ratio of the absorbed flux to the incident flux.</p>	<p>Rs = Solar reflectance is the fraction of the incident solar radiation that is directly reflected by the component.</p>	<p>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.</p>
These 3 factors together are always 100%		

The G-factor



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 **G_{tot}** is the solar factor of the combination of glazing and solar protection device.

The **G_v** 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 **G_{tot}** to that of the glazing alone **G_v**.

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**

$$G = Te,tot + Qi$$

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

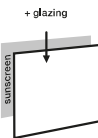
The factor **Te,tot**, is the quantity of energy, which will pass the combination solar protection device and window.

The factor **Qi** is the quantity of heat which is released by the absorption of energy in the sunscreen protection system = combination sunscreen + glazing.

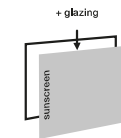
The **G-factor** is the most important factor to explain the efficiency of a combination sunscreen + glazing, as protection against the energy of the sun. The **G-factor** divided into his components explains the difference in efficiency between exterior and interior sunscreen.

$$G = Te,tot + Qi$$

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
G _{tot}	G _{tot} ≥ 0,50	0,35 ≤ G _{tot} < 0,50	0,15 ≤ G _{tot} < 0,35	0,10 ≤ G _{tot} < 0,15	G _{tot} < 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.