

visi

Natté P

CLARITY & COMFORT
POLYESTER
OF = 1-10%



screenprotectors[®]
a brand of

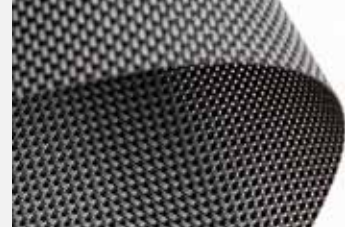
copaco[®]
screenweavers

**Your view is key.
Maintain your
privacy and filter
out unnecessary
sunlight.
Meet Visi.**





Natté P



POLYESTER

OF = 1-10%

Natté 300P 002002 white | white

Natté 380P 002002 white | white

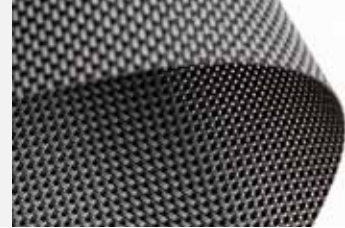
Natté 390P 002002 white | white

Natté 420P 002002 white | white





Natté P



POLYESTER

OF = 1-10%

Natté 300P 010010 charcoal | charcoal

Natté 380P 010010 charcoal | charcoal

Natté 390P 010010 charcoal | charcoal

Natté 420P 010010 charcoal | charcoal



Natté 300P

OF = 10%

Natté 380P

OF = 5%

Technical specifications

TECHNICAL SPECIFICATION		UNITY		STANDARD	RESULT
composition				29% Polyester + 71% PVC coated	
openness factor		%		NBN EN 410	10%
weight		g/m ²		NF EN 12127	330
thickness		mm		ISO 5084	0,35
density		yarn/cm	warp	ISO 7211/2	18
			weft		18
colour fastness to artificial light				ISO 105 B02	>7
tear strength	original	daN	Warp	ISO 4674-1, meth.B	5,2
			Weft		4,5
elongation up to break	original	%	Warp	ISO 1421, Meth. 1	24,5
			Weft		25,6
breaking strength	original	daN/5cm	Warp	ISO 1421, Meth. 1	146
			Weft		129
elongation up to break	after ISO 4892-2, 1000 hr.	%	Warp	ISO 1421, Meth. 1	25
			Weft		23,7
breaking strength	after ISO 4892-2, 1000 hr.	daN/5cm	Warp	ISO 1421, Meth. 1	154
			Weft		127
tear strength	after climatic chamber -30°C	daN	warp	ISO 4674-1 method 2	4,8
			weft		4,9
elongation up to break	after climatic chamber -30°C	%	warp	ISO 1421	3,1
			weft		2,7
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	ISO 1421	135
			weft		130
tear strength	after climatic chamber +70°C	daN	warp	ISO 4674-1 method 2	4,8
			weft		4,9
elongation up to break	after climatic chamber +70°C	%	warp	ISO 1421	2,7
			weft		2,7
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	ISO 1421	100
			weft		120
fire classification	Europe			UNE-EN 13501-1:2007	C-s3,d0
	France			NF P92-503	M1
	Italy			UNI 9177	Class 1
	Germany			DIN 4102	B1
	UK			BS 5867	C
	USA			NFPA 701	FR
	Spain			UNE EN 13773-2003	Clase 1
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



Technical specifications

TECHNICAL SPECIFICATION		UNITY		STANDARD	RESULT
composition				29% Polyester + 71% PVC coated	
openness factor		%		NBN EN 410	5%
weight		g/m ²		NF EN 12127	385
thickness		mm		ISO 5084	0,35
density		yarn/cm	warp	ISO 7211/2	20
			weft		20
colour fastness to artificial light				ISO 105 B02	>7
tear strength	original	daN	Warp	ISO 4674-1, meth.B	5,1
			Weft		4,2
elongation up to break	original	%	Warp	ISO 1421, Meth. 1	24,6
			Weft		25
breaking strength	original	daN/5cm	Warp	ISO 1421, Meth. 1	141
			Weft		150,5
elongation up to break	after ISO 4892-2, 1000 hr.	%	Warp	ISO 1421, Meth. 1	23,3
			Weft		24,5
breaking strength	after ISO 4892-2, 1000 hr.	daN/5cm	Warp	ISO 1421, Meth. 1	142
			Weft		154
tear strength	after climatic chamber -30°C	daN	warp	ISO 4674-1 method 2	5,1
			weft		5,15
elongation up to break	after climatic chamber -30°C	%	warp	ISO 1421	4
			weft		3
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	ISO 1421	150
			weft		140
tear strength	after climatic chamber +70°C	daN	warp	ISO 4674-1 method 2	5,3
			weft		4,8
elongation up to break	after climatic chamber +70°C	%	warp	ISO 1421	3,6
			weft		2,9
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	ISO 1421	120
			weft		120
fire classification	Europe			UNE-EN 13501-1:2007	C-s3,d0
	France			NF P92-503	M1
	Italy			UNI 9177	Class 1
	Germany			DIN 4102	B1
	UK			BS 5867	C
	USA			NFPA 701	FR
	Spain			UNE EN 13773-2003	Clase 1
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



Natté 390P

OF = 3%



Natté 420P

OF = 1%

Technical specifications

TECHNICAL SPECIFICATION		UNITY		STANDARD	RESULT
composition				29% Polyester + 71% PVC coated	
openness factor		%		NBN EN 410	3%
weight		g/m ²		NF EN 12127	390
thickness		mm		ISO 5084	0,4
density		yarn/cm	warp	ISO 7211/2	25
			weft		15
colour fastness to artificial light				ISO 105 B02	>7
tear strength	original	daN	Warp	ISO 4674-1, meth.B	4,9
			Weft		4,9
elongation up to break	original	%	Warp	ISO 1421, Meth. 1	26,4
			Weft		25,3
breaking strength	original	daN/5cm	Warp	ISO 1421, Meth. 1	164
			Weft		147
elongation up to break	after ISO 4892-2, 1000 hr.	%	Warp	ISO 1421, Meth. 1	26
			Weft		23,9
breaking strength	after ISO 4892-2, 1000 hr	daN/5cm	Warp	ISO 1421, Meth. 1	159
			Weft		155
tear strength	after climatic chamber -30°C	daN	warp	ISO 4674-1 method 2	8,49
			weft		5,22
elongation up to break	after climatic chamber -30°C	%	warp	ISO 1421	7,21
			weft		4,33
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	ISO 1421	252,7
			weft		174,7
tear strength	after climatic chamber +70°C	daN	warp	ISO 4674-1 method 2	8,09
			weft		4,9
elongation up to break	after climatic chamber +70°C	%	warp	ISO 1421	7,15
			weft		3,85
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	ISO 1421	259,4
			weft		156,3
fire classification	Europe			UNE-EN 13501-1:2007	C-s3,d0
	France			NF P92-503	M2
	Italy			UNI 9177	Class 1
	Germany			DIN 4102	B1
	UK			BS 5867	C
	USA			NFPA 701	FR
	Spain			UNE EN 13773-2003	Clase 1
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



Technical specifications

TECHNICAL SPECIFICATION		UNITY		STANDARD	RESULT
composition				29% Polyester + 71% PVC coated	
openness factor		%		NBN EN 410	1%
weight		g/m ²		NF EN 12127	420
thickness		mm		ISO 5084	0,45
density		yarn/cm	warp	ISO 7211/2	25
			weft		18
colour fastness to artificial light				ISO 105 B02	>7
tear strength	original	daN	Warp	ISO 4674-1, meth.B	5,6
			Weft		4
elongation up to break	original	%	Warp	ISO 1421, Meth. 1	27,2
			Weft		22,2
breaking strength	original	daN/5cm	Warp	ISO 1421, Meth. 1	185,3
			Weft		129,8
elongation up to break	after ISO 4892-2, 1000 hr.	%	Warp	ISO 1421, Meth. 1	26,1
			Weft		21,1
breaking strength	after ISO 4892-2, 1000 hr.	daN/5cm	Warp	ISO 1421, Meth. 1	191,5
			Weft		134,2
tear strength	after climatic chamber -30°C	daN	warp	ISO 4674-1 method 2	5,19
			weft		3,44
elongation up to break	after climatic chamber -30°C	%	warp	ISO 1421	6,93
			weft		4,02
breaking strength	after climatic chamber -30°C	daN/5 cm	warp	ISO 1421	266,8
			weft		175,8
tear strength	after climatic chamber +70°C	daN	warp	ISO 4674-1 method 2	5,47
			weft		3,59
elongation up to break	after climatic chamber +70°C	%	warp	ISO 1421	6,66
			weft		3,75
breaking strength	after climatic chamber +70°C	daN/5 cm	warp	ISO 1421	244,5
			weft		162,6
fire classification	Europe			UNE-EN 13501-1:2007	C-s3,d0
	France			NF P92-503	M2
	Italy			UNI 9177	Class 1
	Germany			DIN 4102	B1
	UK			BS 5867	C
	USA			NFPA 701	FR
	Spain			UNE EN 13773-2003	Clase 1
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



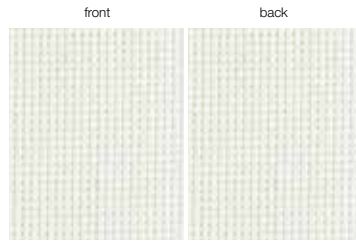
Natté 300P



POLYESTER

OF = 10%

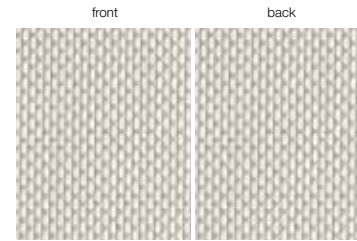
Colours & references



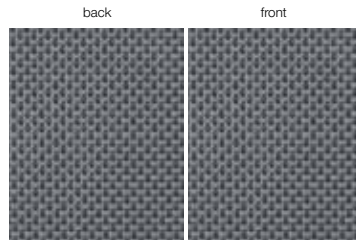
Natté 300P 002002 white | white



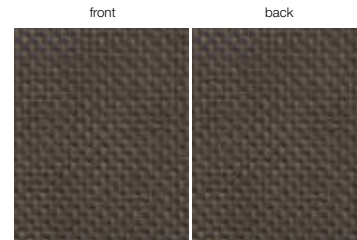
Natté 300P 002008 white | linen



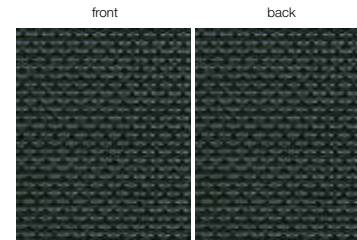
Natté 300P 002007 white | pearl grey



Natté 300P 010001 charcoal | grey



Natté 300P 010011 charcoal | bronze



Natté 300P 010010 charcoal | charcoal

Natté 300P	200 cm	320 cm
002002 white white	•	•
002008 white linen	•	•
002007 white pearl grey	•	•
010001 charcoal grey	•	•
010011 charcoal bronze	•	•
010010 charcoal charcoal	•	•

Solar energetic properties

Natté 300P European Standard EN 14501 Calculation G-value according to EN 13363-1 version 7.0		SOLAR ENERGETIC PROPERTIES										VISUAL PROPERTIES	
		FABRIC		FABRIC + GLAZING				INTERIOR					
				G-factor = total solar energy transmittance				Tv = Visible Light Transmittance %	Tuv = UV Transmittance %				
references	colours			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	
								front	back				
002002	white white	front	back	11,6	64,0	24,4	0,37	0,38	0,36	0,25	23,6	10,7	
		front	back	11,6	64,0	24,4	0,37	0,38	0,36	0,25	23,6	10,7	
002008	white linen	front	back	19,8	57,7	22,5	0,41	0,41	0,38	0,26	20,4	11,8	
		front	back	19,9	57,6	22,5	0,41	0,41	0,38	0,26	20,4	11,8	
002007	white pearl grey	front	back	33,1	46,6	20,3	0,47	0,47	0,42	0,27	17,7	11,8	
		front	back	33,5	46,2	20,3	0,47	0,47	0,42	0,27	17,7	11,8	
010001	charcoal grey	front	back	77,0	10,0	13,0	0,62	0,62	0,53	0,30	12,7	12,7	
		front	back	77,0	10,0	13,0	0,62	0,62	0,53	0,30	12,7	12,7	
010011	charcoal bronze	front	back	79,5	6,7	13,8	0,64	0,64	0,54	0,30	13,6	13,6	
		front	back	79,5	6,7	13,8	0,64	0,64	0,54	0,30	13,6	13,6	
010010	charcoal charcoal	front	back	81,5	5,7	12,8	0,70	0,67	0,55	0,30	12,7	12,7	
		front	back	81,5	5,7	12,8	0,70	0,67	0,55	0,30	12,7	12,7	

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



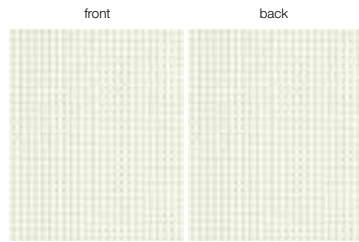
Natté 380P



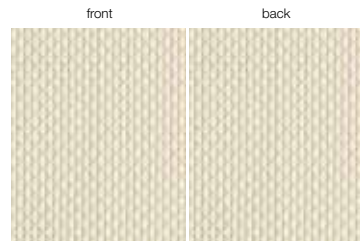
POLYESTER

OF = 5%

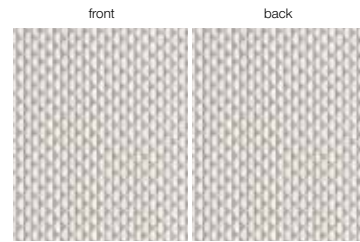
Colours & references



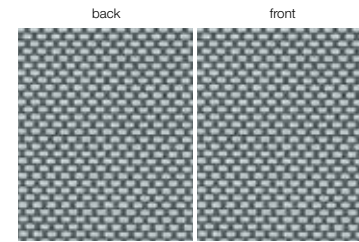
Natté 380P 002002 white | white



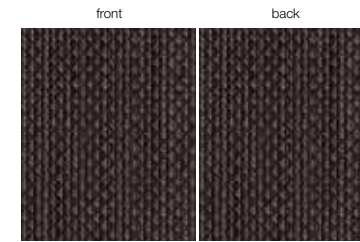
Natté 380P 002008 white | linen



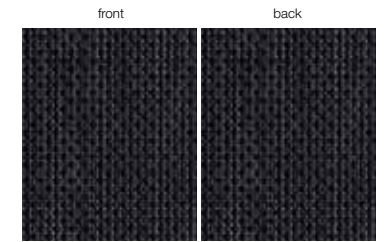
Natté 380P 002007 white | pearl grey



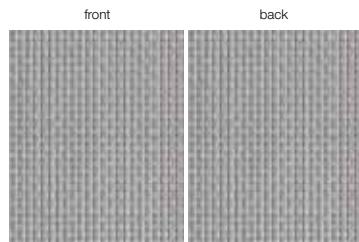
Natté 380P 010007 charcoal | pearl grey



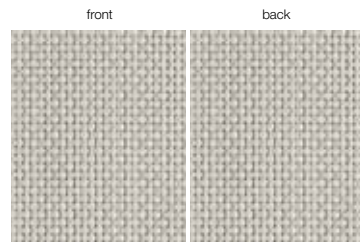
Natté 380P 010011 charcoal | bronze



Natté 380P 010010 charcoal | charcoal



Natté 380P 007007 pearl grey | pearl grey



Natté 380P 007008 pearl grey | linen

Natté 380P	200 cm	250 cm	320 cm
002002 white white	•	•	•
002008 white linen	•	•	•
002007 white pearl grey	•	•	•
007007 pearl grey pearl grey	•	•	•
007008 pearl grey linen	•	•	•
010007 charcoal pearl grey	•	•	•
010011 charcoal bronze	•	•	•
010010 charcoal charcoal	•	•	•

Natté 380P



POLYESTER

OF = 5%

Solar energetic properties

Natté 380P European Standard EN 14501 Calculation G-value according to EN 13363-1 version 7.0			SOLAR ENERGETIC PROPERTIES										VISUAL PROPERTIES	
			FABRIC		FABRIC + GLAZING									
					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	Tv = Visible Light Transmittance %	Tuv = UV Transmittance %		
002002	white white	front		10,0	66,6	23,4	0,36	0,37	0,36	0,25	21,8	10,9		
		back		9,9	66,8	23,4	0,35	0,37	0,36	0,25	21,8	10,9		
002008	white linen	front		21,3	59,8	18,9	0,39	0,40	0,38	0,26	16,9	7,9		
		back		21,5	59,7	18,9	0,39	0,40	0,38	0,26	16,9	7,9		
002007	white pearl grey	front		35,2	48,8	16,1	0,45	0,45	0,41	0,27	13,6	8,5		
		back		35,4	48,5	16,1	0,45	0,46	0,41	0,27	13,6	8,5		
007007	pearl grey pearl grey	front		50,8	36,4	12,8	0,52	0,52	0,45	0,28	10,0	7,9		
		back		50,6	36,7	12,8	0,52	0,51	0,45	0,28	10,0	7,9		
007008	pearl grey linen	front		39,3	45,7	15,0	0,47	0,47	0,42	0,27	11,9	8,2		
		back		39,2	45,8	15,0	0,47	0,47	0,42	0,27	11,9	8,2		

Natté 380P European Standard EN 14501 Calculation G-value according to EN 13363-1 version 7.0			SOLAR ENERGETIC PROPERTIES										VISUAL PROPERTIES	
			FABRIC		FABRIC + GLAZING									
					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	Tv = Visible Light Transmittance %	Tuv = UV Transmittance %		
010007	charcoal pearl grey	front		73,4	17,7	8,9	0,57	0,58	0,50	0,29	8,5	8,1		
		back		73,4	17,7	8,9	0,57	0,58	0,50	0,29	8,5	8,1		
010011	charcoal bronze	front		84,8	7,3	7,9	0,68	0,66	0,55	0,30	7,6	7,5		
		back		84,8	7,3	7,9	0,68	0,66	0,55	0,30	7,6	7,5		
010010	charcoal charcoal	front		88,0	5,7	6,3	0,69	0,67	0,55	0,30	6,3	6,3		
		back		88,0	5,7	6,3	0,69	0,67	0,55	0,30	6,3	6,3		

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

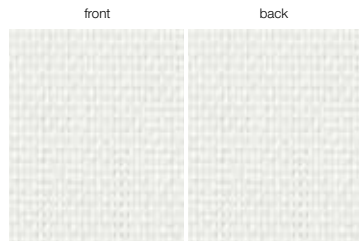
Natté 390P



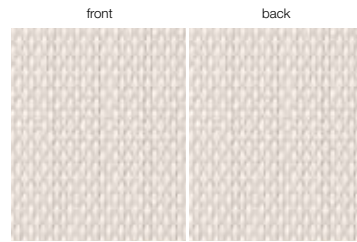
POLYESTER

OF = 3%

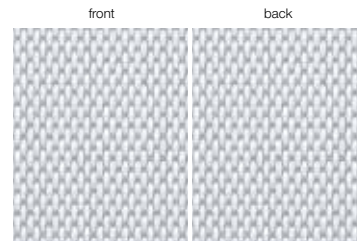
Colours & references



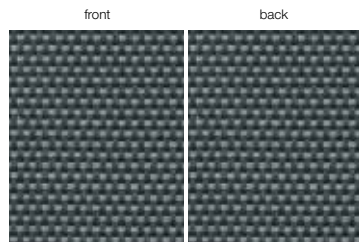
Natté 390P 002002 white | white



Natté 390P 002008 white | linen



Natté 390P 002007 white | pearl grey



Natté 390P 010001 charcoal | grey



Natté 390P 010011 charcoal | bronze



Natté 390P 010010 charcoal | charcoal

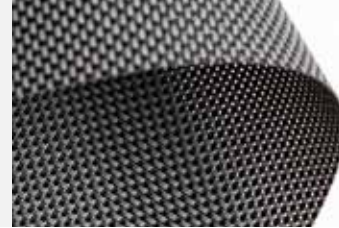
Natté 390P	200 cm	320 cm
002002 white white	•	•
002008 white linen	•	•
002007 white pearl grey	•	•
010001 charcoal grey	•	•
010011 charcoal bronze	•	•
010010 charcoal charcoal	•	•

Solar energetic properties

Natté 390P European Standard EN 14501 Calculation G-value according to EN 13363-1 version 7.0		SOLAR ENERGETIC PROPERTIES										VISUAL PROPERTIES	
		FABRIC		FABRIC + GLAZING									
				INTERIOR									
references		colours		As = Solar Absorbance %	Rs = Solar Reflectance %	Ts = Solar Transmittance %	G-factor = total solar energy transmittance				Tv = Visible Light Transmittance %	Tuv = UV Transmittance %	
		front	back				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			
002002	white white	front	back	12,5	61,4	26,1	0,38	0,39	0,37	0,25	25,2	8,3	
		front	back	12,5	61,4	26,1	0,38	0,39	0,37	0,25	25,2	8,3	
002008	white linen	front	back	20,4	55,8	23,8	0,40	0,42	0,39	0,26	21,6	9,4	
		front	back	20,4	55,8	23,8	0,40	0,42	0,39	0,26	21,6	9,4	
002007	white pearl grey	front	back	32,2	51,4	16,4	0,41	0,43	0,40	0,26	14,3	5,5	
		front	back	32,2	51,4	16,4	0,41	0,43	0,40	0,26	14,3	5,5	
010001	charcoal grey	front	back	83,2	8,5	8,3	0,62	0,62	0,53	0,30	8,2	8,3	
		front	back	83,2	8,5	8,3	0,62	0,62	0,53	0,30	8,2	8,3	
010011	charcoal bronze	front	back	87,5	6,8	5,7	0,62	0,63	0,53	0,30	5,7	5,7	
		front	back	87,5	6,8	5,7	0,62	0,63	0,53	0,30	5,7	5,7	
010010	charcoal charcoal	front	back	88,2	6,0	5,8	0,62	0,63	0,54	0,30	5,8	5,9	
		front	back	88,2	6,0	5,8	0,62	0,63	0,54	0,30	5,8	5,9	



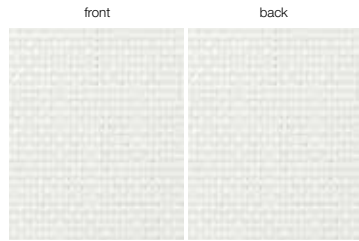
Natté 420P



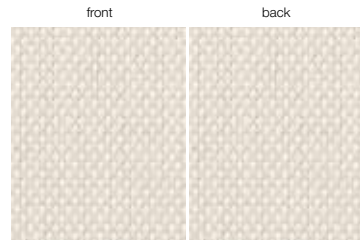
POLYESTER

OF = 1%

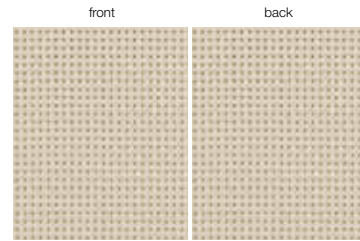
Colours & references



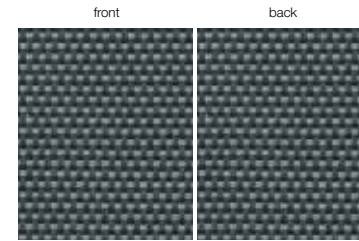
Natté 420P 002002 white | white



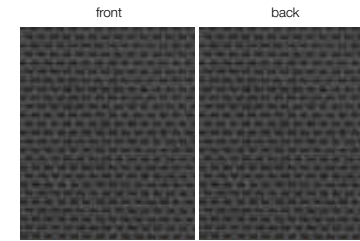
Natté 420P 002008 white | linen



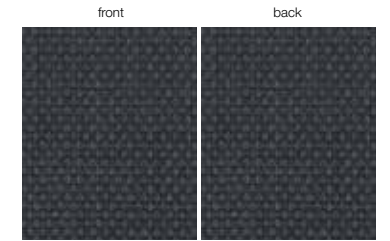
Natté 420P 008008 linen | linen



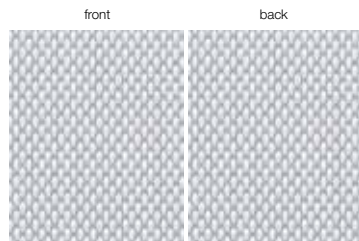
Natté 420P 010001 charcoal | grey



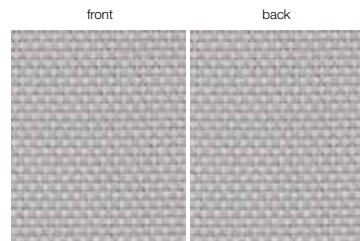
Natté 420P 010011 charcoal | bronze



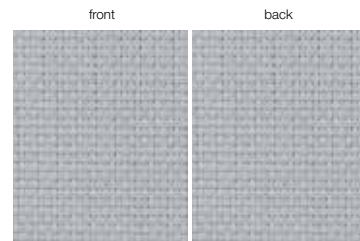
Natté 420P 010010 charcoal | charcoal



Natté 420P 002007 white | pearl grey



Natté 420P 007008 pearl grey | linen



Natté 420P 007007 pearl grey | pearl grey

Natté 420P	200 cm		
	200 cm	250 cm	320 cm
002002 white white	•	•	•
002008 white linen	•	•	•
008008 linen linen	•	•	•
002007 white pearl grey	•	•	•
007008 pearl grey linen	•	•	•
007007 pearl grey pearl grey	•	•	•
010001 charcoal grey	•	•	•
010011 charcoal bronze	•	•	•
010010 charcoal charcoal	•	•	•

Natté 420P



POLYESTER

OF = 1%

Solar energetic properties

Natté 420P European Standard EN 14501 Calculation G-value according to EN 13363-1 version 7.0			SOLAR ENERGETIC PROPERTIES									VISUAL PROPERTIES	
			FABRIC			FABRIC + GLAZING				G-factor = total solar energy transmittance			
						INTERIOR							
						As = Solar Absorptance %	Rs = Solar Reflectance %	Ts = Solar Transmittance %	Glazing A - Gv = 0,85 - U = 5,8				
references	colours	front	back	front	back	front	back	front	back	Tv = Visible Light Transmittance %	Tuv = UV Transmittance %		
002002	white white	front		13,1	66,2	20,7	0,34	0,36	0,35	0,25	19,4	3,5	
		back		13,1	66,2	20,7	0,34	0,36	0,35	0,25	19,4	3,5	
002008	white linen	front		23,0	59,1	17,9	0,38	0,39	0,38	0,26	15,0	4,2	
		back		23,0	59,1	17,9	0,38	0,39	0,38	0,26	15,0	4,2	
008008	linen linen	front		35,3	46,2	18,5	1,0	1,0	1,0	2,0	12,6	3,4	
		back		35,3	46,2	18,5	1,0	1,0	1,0	2,0	12,6	3,4	
002007	white pearl grey	front		36,4	48,9	14,7	0,42	0,44	0,41	0,26	12,2	5,1	
		back		36,4	48,9	14,7	0,42	0,44	0,41	0,26	12,2	5,1	
007008	pearl grey linen	front		52,6	39,7	7,7	0,45	0,48	0,43	0,27	5,0	3,2	
		back		52,6	39,7	7,7	0,45	0,48	0,43	0,27	5,0	3,2	

Natté 420P European Standard EN 14501 Calculation G-value according to EN 13363-1 version 7.0			SOLAR ENERGETIC PROPERTIES									VISUAL PROPERTIES	
			FABRIC			FABRIC + GLAZING				G-factor = total solar energy transmittance			
						INTERIOR							
						As = Solar Absorptance %	Rs = Solar Reflectance %	Ts = Solar Transmittance %	Glazing A - Gv = 0,85 - U = 5,8				
references	colours	front	back	front	back	front	back	front	back	Tv = Visible Light Transmittance %	Tuv = UV Transmittance %		
007007	pearl grey pearl grey	front		60,1	33,9	6,0	0,48	0,50	0,45	0,27	4,0	2,9	
		back		60,1	33,9	6,0	0,48	0,50	0,45	0,27	4,0	2,9	
010001	charcoal grey	front		86,8	9,8	3,4	0,60	0,61	0,52	0,29	3,3	3,3	
		back		86,8	9,8	3,4	0,60	0,61	0,52	0,29	3,3	3,3	
010011	charcoal bronze	front		89,6	7,1	3,3	0,61	0,62	0,53	0,30	3,2	3,3	
		back		89,6	7,1	3,3	0,61	0,62	0,53	0,30	3,2	3,3	
010010	charcoal charcoal	front		90,6	6,2	3,2	0,62	0,63	0,54	0,30	3,2	3,2	
		back		90,6	6,2	3,2	0,62	0,63	0,54	0,30	3,2	3,2	

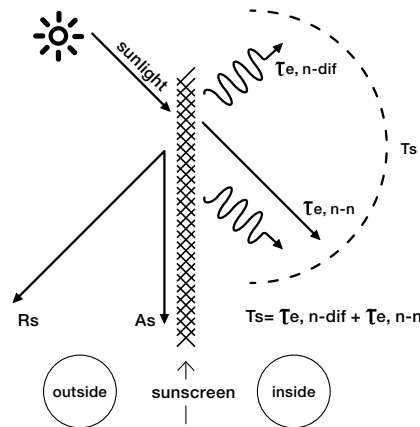
GLAZING A = clear single glazing 4 mm	Gv = 0,85
GLAZING B = clear double glazing (4/12/4), space filled with air	Gv = 0,76
GLAZING C = double glazing (4/16/4), with a low emissivity coating in position 3, space filled with argon	Gv = 0,59
GLAZING D = reflective double glazing (4/16/4), with a low emissivity 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
Te,n-dif	Diffuse solar transmittance
Te,n-n	Normal solar transmittance

Classes indicate effect of a sunscreen

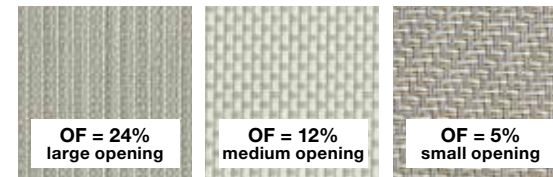
Based on certain properties, the screen can be split up in classes, from 0 to 4. Those classes are used, starting from the norm EN 14501, to indicate the effect of a certain sunscreen.

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



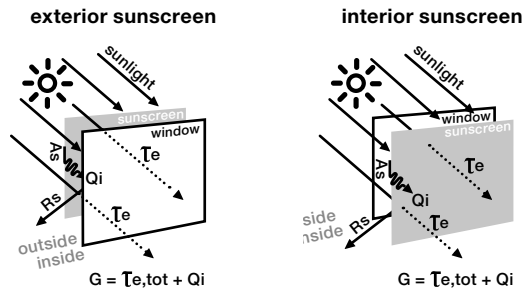
Thermal comfort

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



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 **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**

$$G = \overline{Te,tot} + Qi$$

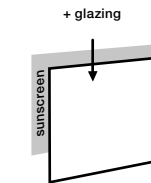
The factor **Te,tot**, is the quantity of energy, which will pass the combination solar protection device and window.

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

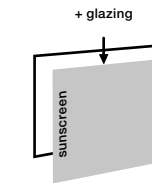
The **G-factor** is the most important factor to explain the efficiency of a combination sunscreen + glazing, as protection against the energy of the sun. The **G-factor** divided into his components explains the difference in efficiency between exterior and interior sunscreen.

$$G = \overline{Te,tot} + Qi$$

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 than 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.



Screen Protectors SL · c/ Alessandro Volta Nau 6A-7^a · Pol. Ind. Plans d'Arau
08787 La Pobla de Claramunt, Barcelona · T +34 93 8088004 · screen@screenprotectors.com · www.copaco.be