JM Technical Textiles

Opera Alu 7%

Opera Alu 7%

PVC, halogen- und antimony-free finish

high reflection in all colours

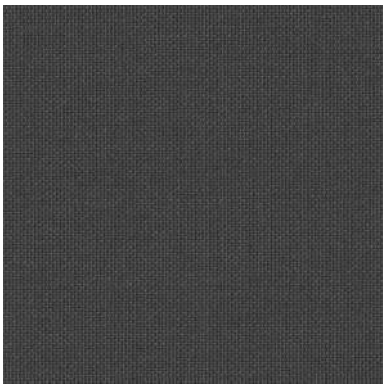
improved glare control

low thermal emissivity (low E)

improved visual contact in light colours

improved colour rendering index

textile appearance

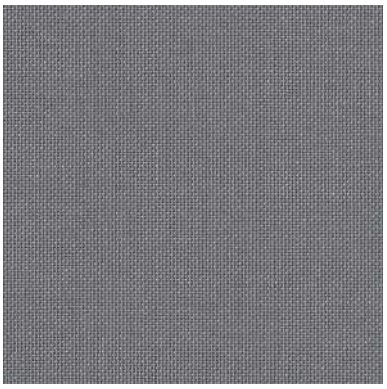


11349
Charcoal

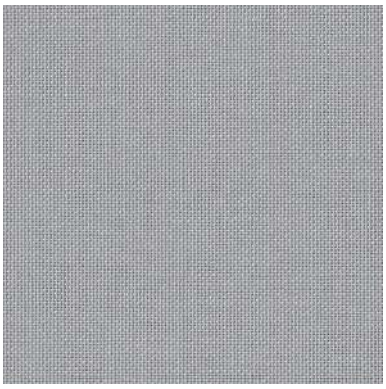
11291
Nordic Coal

11351
Dark Taupe

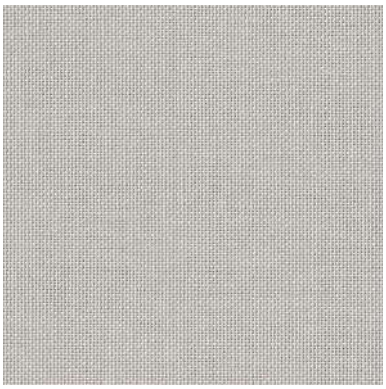
11350
Siltstone



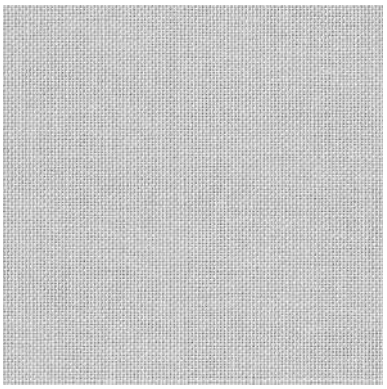
11347
Basalt



11346
Silver



11348
Canvas



11345
Arctic

The colours shown may deviate from the original

Technical specification

Article		Opera Alu 401103
Width		290 cm / 114"
Basic material		100 % polyester
Weight approx.	EN 12127	160 g/m² / 4,7 oz/yd²
Thickness approx.	EN ISO 5084	0,35 mm / 0,014"
Openness factor OF	EN 14500	7 %
Flame retardancy		B1
Light fastness (window side)	EN ISO 105-B02	7
Tensile properties: Determination of max. force Elongation at max. force	EN ISO 13934-1	 warp: > 80 daN - weft: > 80 daN warp: approx. 16 % - weft: approx. 23 %
Suitable for moist atmosphere		no
Manufacturing guidance		to cut with ultrasonic knife, non-railroading (fabric length for drop) recommended
Roll length approx.		40 m / 44 yd
Care instruction		brush off, vacuum cleaning

Optical and thermal factors

	optical factors										thermal factors						
	fabric						classification				fabric					fabric + glazing	
colour	visible light (%)										solar radiation (%)				IR	glazing E g=0,55 U_g=0,8	
	T_v	R_v	A_v	$T_{v,n-n}$	$T_{v,n-dif}$	R_a	glare control	night privacy	visual contact	daylight utilisation	T_s	R_s	A_s	T_{UV}	ε	g_{tot}	class
11349	10	43	47	7,7	1,8	99	1	1	3	1	12	47	41	10	0,37	0,40	1
11291	9	43	48	6,9	2,1	99	1	1	3	1	11	45	44	9	0,46	0,41	1
11351	10	47	43	6,7	3,4	99	1	1	3	1	12	49	39	11	0,38	0,40	1
11350	11	51	38	8,2	3,1	99	1	1	3	1	13	52	35	12	0,38	0,39	1
11347	12	44	44	8,3	3,6	97	0	1	3	1	13	46	41	12	0,41	0,40	1
11346	15	44	41	8,9	5,7	96	0	1	2	2	15	46	39	15	0,43	0,41	1
11345	14	41	45	7,5	6,9	98	0	1	2	2	14	43	43	14	0,45	0,41	1
11348	17	45	38	9,6	7,0	98	0	1	2	2	17	46	37	16	0,42	0,41	1

Data is measured according to EN 410:2011 and EN 14500:2008. Calculations of g_{tot} are defined according to EN ISO 52022-1:2017 using triple glazing type E (g=0,55; U_g=0,8). Other glazing types can be calculated on request.

Classifications: 0 (very little effect), 1 (little effect), 2 (moderate effect), 3 (good effect) and 4 (very good effect) refer to EN 14501:2005.

All specifications are based on average values and may deviate within the standard tolerance limits. Subject to technical modifications.

The life span of these products is at least four years, starting from the commercial launch of these items. Please request the individual life span for each product by contacting our customer service team.

Product certificates and guarantees

Sustainable building certificates

All JM fabrics certified according to SCS Advantage™ Gold can contribute to credits in sustainable building certifications, such as LEED, DGNB and BREEAM.

made in Germany

Explanations

Classification of optical and thermal comfort properties

According to standard EN 14501 certain properties of solar protection devices are to be considered. The standard lists properties which quantify visual and thermal comfort and therefore are to be taken into consideration for comparison. While the optical properties are defined by glare control, night privacy, visual contact with the outside and daylight utilization as well as by the color rendering index R_a, the thermal comfort is influenced by total solar energy transmittance g_{tot}. The comfort properties are specified in five classes shown in the following table:

Influence on optical or thermal comfort

Class	0	1	2	3	4
Effect	very little effect	little effect	moderate effect	good effect	very good effect

Optical factors – for wavelengths between 380 nm and 780 nm – verified in accordance with EN 410 and EN 14500/14501

T_v	Normal/hemispherical light transmittance ($T_{V,\ n\text{-}h}$); specifies the relation of transmitted to total incident light; states the sum of transmitted diffuse light ($T_{V,\ n\text{-}dif}$) and transmitted normal light ($T_{V,\ n\text{-}n}$)
R_V	Normal/hemispherical light reflectance; specifies the relation of reflected to total incident light
A_v	Normal/hemispherical light absorptance; specifies the relation of absorbed to total incident light
$T_{v,\ n\text{-}n}$	Normal/normal light transmittance; value is usually close to OF
$T_{v,\ n\text{-}dif}$	Normal/diffuse light transmittance
R_a	Color-Rendering-Index with values between 0 and 100; specifies an object's change of color due to alteration of incident light; the higher the index value, the lower the color distortion
Glare control	Specifies a solar protection device's capacity to protect a person against unpleasant luminance contrasts and thereby glare; it may be caused by solar spots on the work surface as well as direct view into the sun or other light sources with high luminance
Night privacy	Specifies a solar protection device's capacity to protect a person at night against external view in fully extended position
Visual contact	Specifies a solar protection device's capacity to allow a person's view to the outside in fully extended position
Daylight utilization	Specifies a solar protection device's capacity in fully extended position to optimize the usage of daylight and reduce the time during which artificial light is required

Thermal factors – for wavelengths between 280 nm and 2500 nm – verified in accordance with EN 410 and EN 14500

T_s	Normal/hemispherical solar transmittance; specifies the relation of transmitted to total incident solar radiation
R_s	Normal/hemispherical solar reflectance; specifies the relation of reflected to total incident solar radiation
A_s	Normal/hemispherical solar absorptance; specifies the relation of absorbed to total incident solar radiation
T_{UV}	Ultraviolet light transmittance (wavelengths from 280 nm to 380 nm); specifies the relation of transmitted to total UV-radiation
IR (ε)	Emissivity; ratio of energy radiated from a material's surface to that radiated from a blackbody at the same temperature; value between 0 and 1; the lower the number, the better the insulation effect; determined in accordance with EN 15976
g	Total solar energy transmittance of a glazing; specifies the relation of transmitted to total incident solar energy
U_g	Heat transfer coefficient; specifies the glazing's insulation properties, as it reflects the energy flow through a window at a certain temperature; expressed in W/m²K
g_{tot}	Total solar energy transmittance of a glazing in combination with a solar protection device; can either be calculated according to a simplified (EN ISO 52022-1) or detailed method (EN ISO 52022-3)

Technical specifications

Openness Factor OF	Specifies the relation of the area of openings to the total area of a textile fabric; measured in accordance with EN 14500
α_W / NRC	Sound absorption coefficient between 0 and 1; specifies a material's absorption properties; the higher the value, the better the textile's capacity to absorb sound; determined in accordance with EN ISO 354, assessed in accordance with EN ISO 11654 and ASTM C423
Light fastness	Specifies a fabric's resistance to fading when exposed to artificial light which equals natural daylight; classified in 8 classes (the higher the class, the better the light fastness); measured according to EN ISO 105-B2 for the interior

Flame retardancy

B1	Items labelled B1 fulfill the German fire protection requirements in accordance with DIN 4102-1, building material class B1
BS	Items labelled BS fulfill the British fire protection requirements in accordance with BS 5867-2 Type B
M1	Items labelled M1 fulfill the French fire protection requirements in accordance with NF P 92-507, M1
C1	Items labelled C1 (Classe Uno) fulfill the Italien fire protection requirements in accordance with UNI 9177
European Classification	Describes a material's fire behavior in various criteria according to EN 13501-1; justifies the classification into German or French fire protection classes; e.g. B-s1, d0 or B-s2, d0
NFPA 701	Items labelled NFPA 701 fulfill the US-American fire protection requirements in accordance with NFPA 701-2015 TM#1

Product certificates

SCS Advantage™ Gold	Indoor air quality performance certification for furniture or building materials regarding the emission of VOCs (volatile organic compounds); fulfills requirements of standard SCS-EC10.3-2014v4.0; tested in accordance with CDPH/EHLB Standard Method, ANSI/BIFMA Furniture Emissions Standard and ANSI/BIFMA e.3-2014e
REACh	Registration, Evaluation, Authorisation and Restriction of Chemicals; describes potential human health and environmental impacts in realms of production and use of chemicals; JM products fulfill the requirements of the current REACh regulation
OEKO-TEX® Standard 100	Independent test and certification system for textiles, which shows that products meet international human-ecological requirements for consumers or following downstream production stages

Sustainable building certifications

BREEAM	Building Research Establishment Environmental Assessment Method; point-based evaluation system of ecological and sociocultural consequences of buildings through all life cycle phases; certification is performed by third parties
LEED	Leadership in Energy and Environmental Design; US-classification system for environmental friendly, resource preserving and sustainable buildings through all life cycle phases
DGNB	German Sustainable Building Council; national green building system that commits to social aims and certification systems for buildings in all life cycle phases; besides social aspects, environmental and economic issues are of interest; thereby the UN Sustainable Development Goals and subjects like Circular Economy or Responsible Sourcing play a dominant role

Sustainability

More and more articles from our extensive JM house range are made of 100% recycled post-consumer polyester, or more precisely from recycled PET bottles. One square meter of this UPcycling material contains about nine PET bottles. On the one hand, this helps to curb the worldwide pollution caused by plastic waste. On the other hand, recycling also extends the life cycle of raw materials. The eco-balance of such processes is convincing! Energy and, above all, water consumption are much lower than when conventional chemical fibers are used - a contribution to reducing the ecological footprint.

Guarantee declaration

Solar protection products by Junkers & Müllers GmbH are exclusively manufactured at the production site in Mönchengladbach, Germany. A machinery with state-of-the-art equipment guarantees highest quality standards. Our highly skilled employees are aware of our responsibility to customers and end consumers with respect to quality and security. Since 2003, Junkers & Müllers GmbH has maintained a quality management system in accordance with ISO 9001, which is constantly reviewed for accuracy by approved institutes. In compliance with recommended care and processing information, we guarantee the above-mentioned quality properties for a total of 5 years after transfer of risks to the customer. Consequences of incorrect handling, processing and care of our products are excluded, as well as not confirmed properties.

Icons

- transparent
- semi-transparent
- dimout
- blackout
- flame retardant
- pearlised
- fungistatic and / or antimicrobial finish
- Trevira CS
- recyclable as secondary derived fuels
- certified for HP-Latex inks

made in Germany