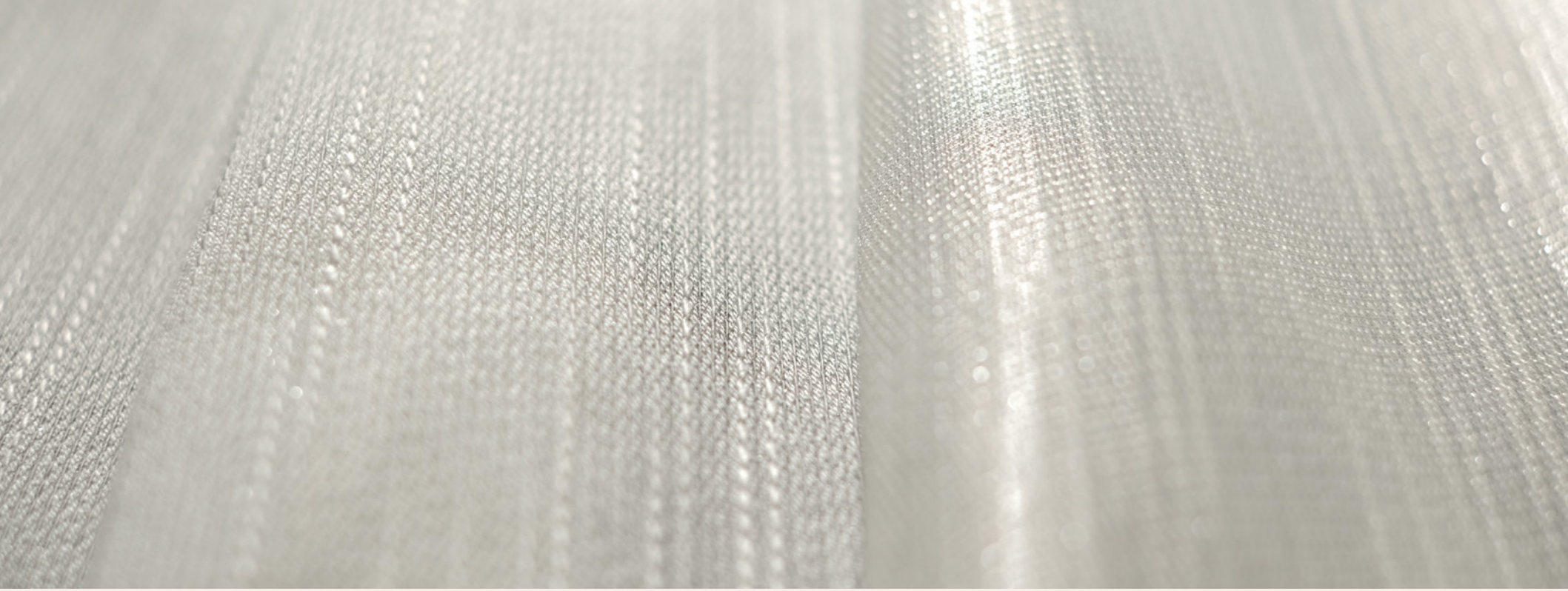
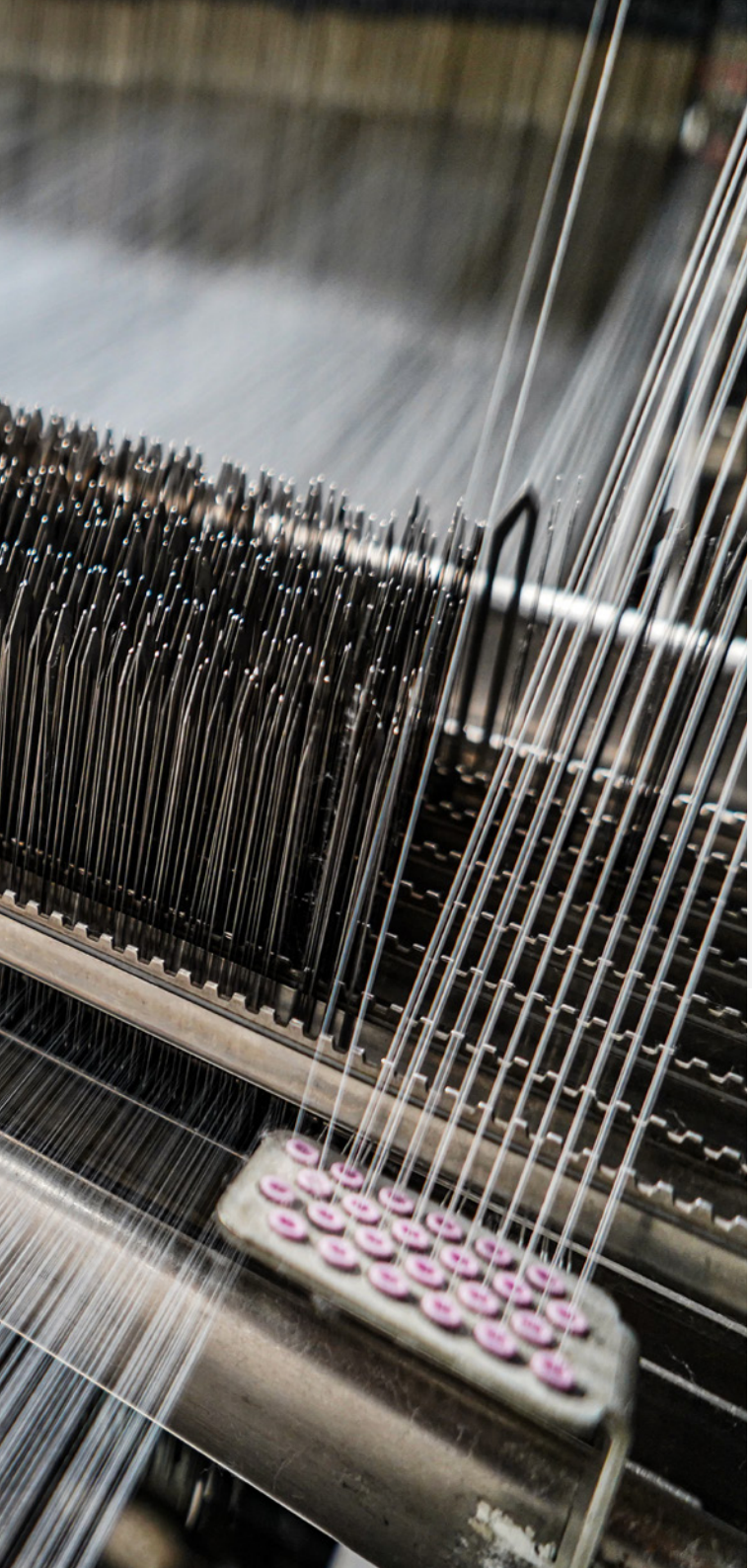


THERMAL FABRICS

VANELLI



“Design is a balance between the function and the look and feel of the fabric, while at the same time holding on to high quality.”

Global Energy Outlook

In recent years, energy consumption has increased rapidly, and concerns about the problem of energy deficiency and environmental effects such as global warming, climate change, and depletion of the ozone layer have come to the fore.

Global energy consumption will grow by just 1.3% in 2023 amid a slowing economy and high energy prices.

— Why is energy efficiency so important?

Improving the thermal performance of buildings is vital in complying with international regulations.

Fenestration – windows, doors, and skylights – are significant components in buildings. Ensuring these architectural elements are as energy efficient as possible can save energy – reduce heating, cooling, and lighting costs – and improve the comfort of your home.

Adjustable shading by textiles, such as curtains and blinds, can be used in addition to heating and air conditioning to isolate the cold, regulate the sun's heating effects, optimise indoor climate comfort and reduce energy consumption.

Heating and cooling consume **44%** of energy at home.

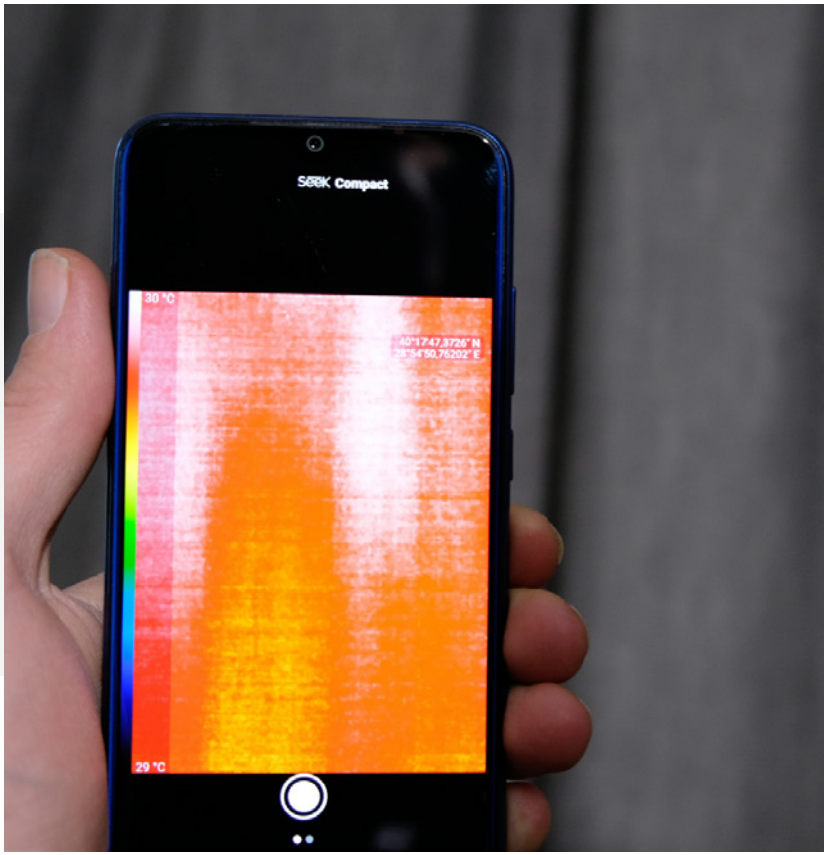
Technical Specifications


Vanelli Thermal Fabrics —
Energy efficiency begins at
home.

Heat Transfer

According to the rules of thermodynamics, heat flows from a higher to a lower temperature.

It is transferred via one of three different methods.

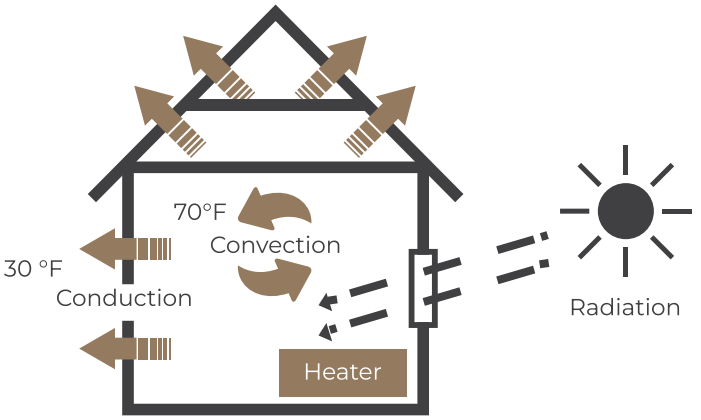


—Residential Heat Loss

Conduction: heat moving through walls of a home from a high inside temperature to a low outside temperature.

Convection: heat circulating within the rooms of a house.

Radiation: heat from the sun entering a home.



Convection

Radiation

Conduction

More heat escaping from home → More heat from furnace → More energy used → More fuel needed → Higher heating costs

— Thermal Performance

Two commonly used measurements to quantify the energy efficiency of solar protection of glazing and other insulation materials are the g-value and the u-value.

Thermal Insulation (heat loss in glazing, textiles and other insulation materials: u-value)

Solar Radiation Protection (solar gain control in glazing: g-value)

— Solar Radiation Protection

What is the Solar Heat Gain Coefficient (SHGC/g-value)

When sunlight hits the glass, a portion of the light is reflected. The remainder is either absorbed by the glass or transmitted through the glass.

g-value

Also called the solar heat gain coefficient or solar factor, the g-value describes the window's total solar energy transmittance (primary and secondary) on a 0 to 1 scale. The value 1 indicates the maximum possible solar heat gain, and 0 shows no solar heat gain. In other words, the lower the g-value, the lower the solar heat gain.

g_{tot}

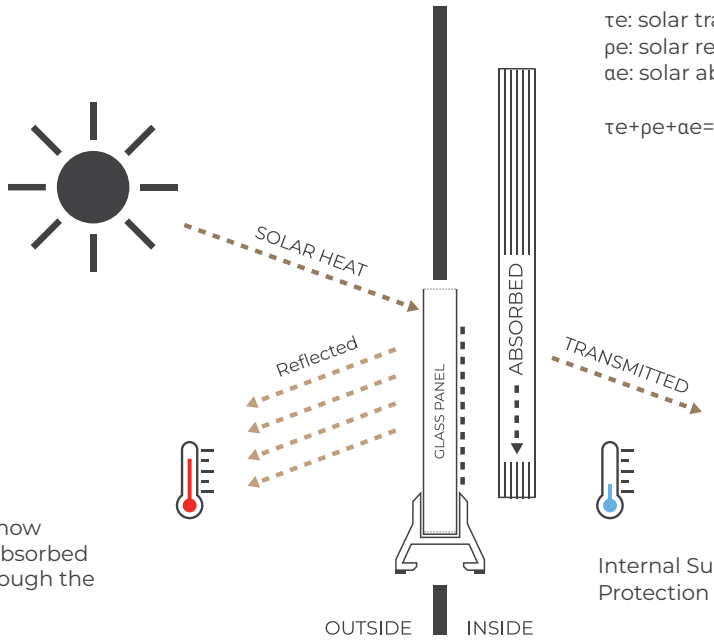
Ratio of solar transmittance through solar protected glazing (glass + solar shading, textles and other insulation materials). The lower the g_{tot}, the lower the solar gain.

How to assess the gtot value?

Textiles can significantly enhance indoor climate comfort. Regional climate conditions affect the type of solar radiation protection needed in windows.

Solar energy can be used beneficially in cold climates when absorbed and transmitted. In this case, the gtot value should be at the maximum level.

On the contrary, reflecting solar energy and protecting indoor spaces from solar heat are needed in hot climates. In sunny, hot regions, a lower gtot value improves the energy rating of an indoor space as it consistently regulates the temperature. Thus, less energy is required to cool the room via air-conditioning devices.



τe: solar transmission
ρe: solar remission
αe: solar absorption coefficient

τe+ρe+αe= 100%

gtot is a measure of how much solar heat is absorbed and transmitted through the glass+textiles

Internal Sun Protection Textiles

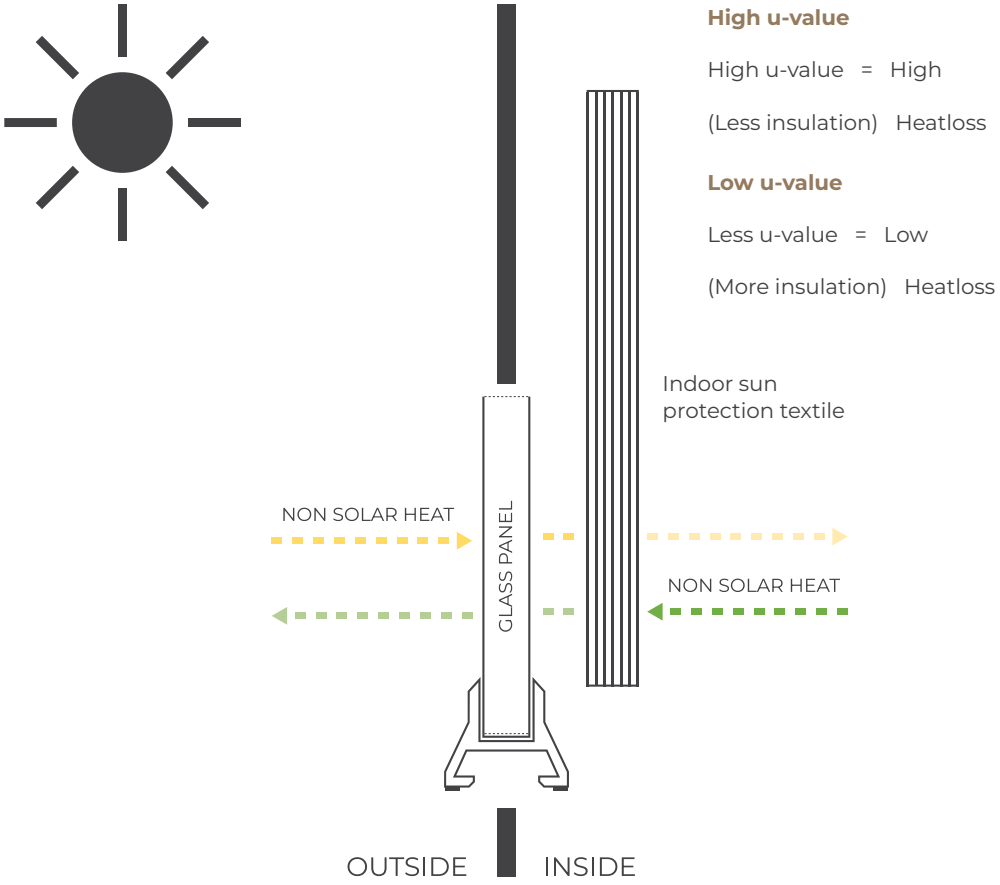
— Thermal Insulation

What is the u-value?

The u-value indicates the efficiency of window glazing, textile and other materials as insulators. It measures the level of conductivity. The lower a material's u-value, the longer it takes for heat to pass through. In contrast, the g-value refers to how much solar heat gain the glazing transfers due to sunlight.

A lower u-value means that the textile's insulating properties are higher – less heat or cold escapes and enters the home. Furthermore, less energy is required to maintain and regulate the temperature indoors, as it will not fluctuate as much with external conditions.

u-value measures the amount of heat energy (non-solar heat)
transferred through the glass and the textile



High u-value

High u-value = High

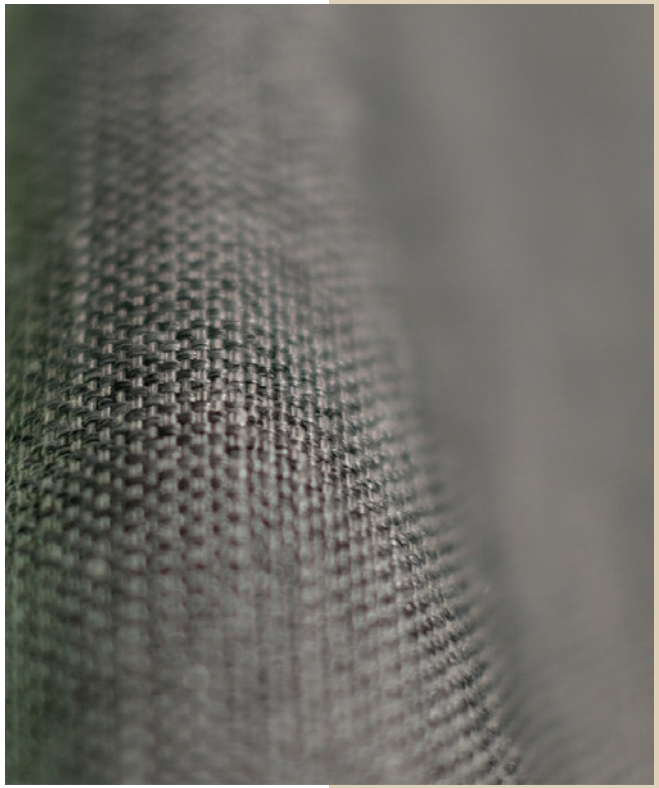
(Less insulation) Heatloss

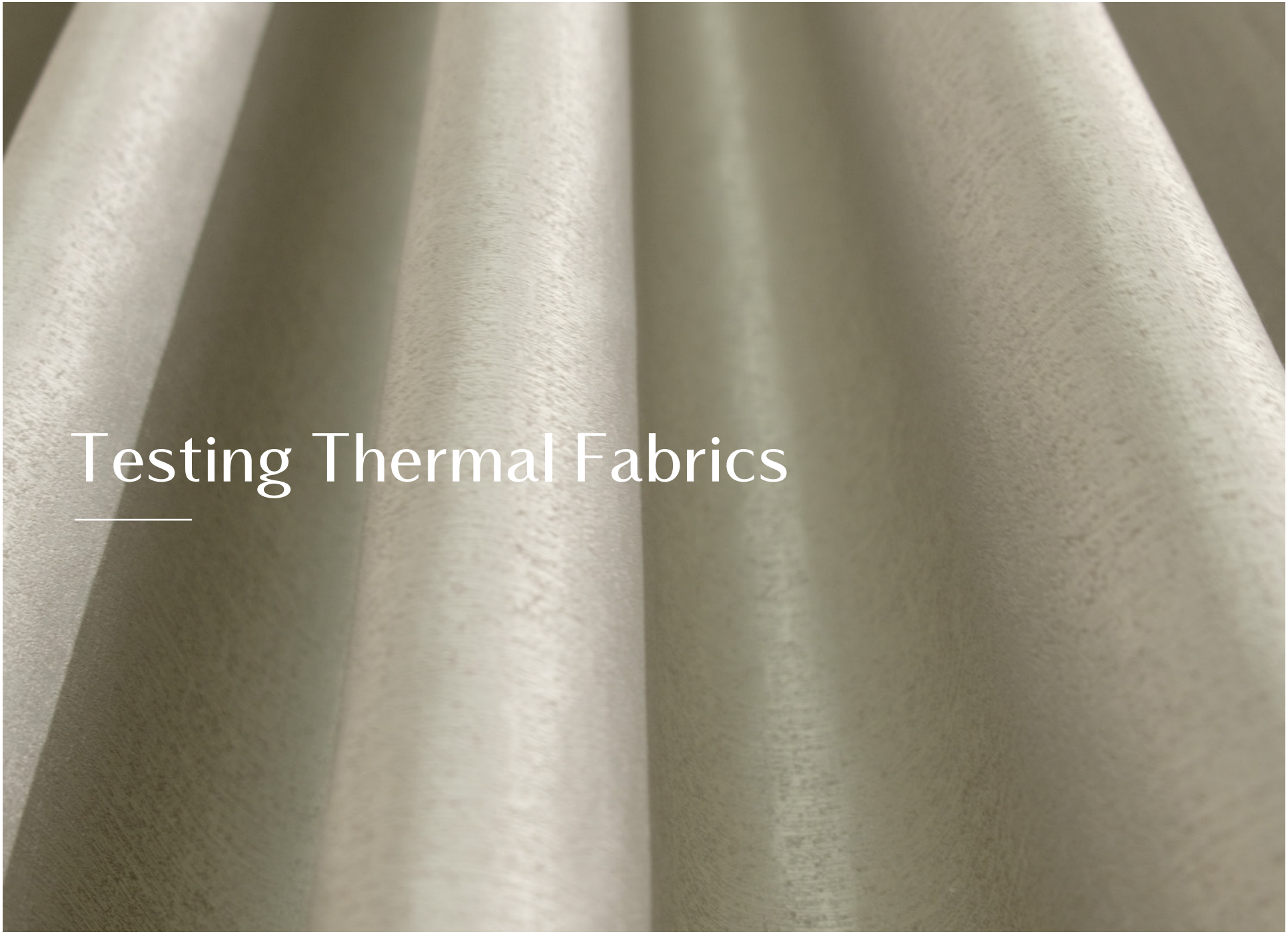
Low u-value

Less u-value = Low

(More insulation) Heatloss

Indoor sun
protection textile




Testing Thermal Fabrics

Thermal-testing standards

DIN EN 14500: 2021 Blinds and shutters. Thermal and light comfort. Test and calculation methods.

INDOOR THERMAL COMFORT: Covering the following characteristics: Solar factor, secondary heat transfer factor, direct solar transmittance.

INDOOR VISUAL COMFORT: Covering the following characteristics: Opacity control, night privacy, visual contact with the outside, glare control, daylight utilisation, rendering of colours.

DIN EN 14501: 2021 Blinds and shutters - Thermal and visual comfort - Performance characteristics and classification

DIN EN ISO 52022-1: 2018-01 Energy efficiency of the buildings. Thermal, solar and daylight properties of building components and elements. Part 1: Simplified method for calculating solar and daylight characteristics of sun protection devices combined with glazing.

DIN EN 410: Glass for building. Determination of the luminous and solar characteristics of the glazing.

ISO 8301: Thermal insulation: Determination of steady.-state thermal resistance and related properties using the heat-flow meter apparatus.

DIN EN ISO 8990:1996-09: Thermal insulation: Determination of steady-state thermal transmission properties using the calibrated and guarded hot boxes.

Light Range and UV-Range

(DIN EN 14500: 2021)

VANELLI ARTICLE	VANELLI CODE	Light transmission degree τv,n-h	Light remission degree ρv,n-h	Light absorption coefficient αv	UV-transmission degree τ UV
FVISFYT4AMA261129815	AMA261	26,93%	33,45%	39,62%	2,53%
FVIDFPT4AMA541129815	AMA541	38,54%	58,84%	2,62%	2,36%
FVIDFDTRAM10311298G6	AM1031	0%	2,5%	97,5%	0%
FVIDFDTRJN85511300G6	JN8551	0%	2,8%	97,2 %	0%
FVIDFDPYJN86211300G6	JN8621	0%	2,5%	97,5%	0%
FVIDFDPYJN89131300G6	JN8913	0%	2%	98%	0%

Light reflection: The visible amount of the light radiation that gets reflected back by the sun blind. The higher a fabric's level of reflectance, the smaller the amount of light that gets through.

Light transmission: The visible amount of the light radiation that gets let through by the sun blind. The higher a fabric's level of transmittance, the greater the amount of light that gets let through.

Light absorption: The visible amount of the light radiation that gets absorbed by the sun blind and transformed into heat and given off again in the form of long wave infra-red rays.

R % + T % + A % = 100 % of the sunlight

Degree of UV transmission: The degree of UV transmission as defined by DIN EN 410 indicates how much ultraviolet light is being allowed through the vertical blinds. UV light destroys textile pigmentation, resulting, for instance, in faded furniture and carpets

Global Radiation Range

(DIN EN 14500: 2021)

VANELLI ARTICLE	VANELLI CODE	Solar transmission degree τe,n-h	Solar remission degree ρe,n-h	Solar absorption coefficient αe
FVISFYT4AMA261129815	AMA261	27%	33%	40%
FVIDFPT4AMA541129815	AMA541	37,97%	55,67%	6,36%
FVIDFDTRAM10311298G6	AM1031	0%	3%	97%
FVIDFDTRJN85511300G6	JN8551	0%	2,5%	97,5%
FVIDFDPYJN86211300G6	JN8621	0%	3%	97%
FVIDFDPYJN89131300G6	JN8913	0%	2,5%	97,5 %

Solar reflectance: Proportion of solar radiation reflected by the fabric. A high percentage means the fabric performs well at reflecting solar energy.

Solar transmittance: Proportion of solar energy transmitted through the fabric. A low percentage means the fabric performs well at reducing solar energy.

Solar absorbency: Proportion of solar radiation absorbed by the fabric. A low percentage means the fabric absorbs little solar energy.

SR + ST + SA = 100% of solar energy

Total Energy Permeability Degree Gtot And Reduce Factor FC

(DIN EN ISO 52022-1: 2018)

VANELLI ARTICLE	VANELLI CODE	Single Glazing		Double glazing with air filling		Double glazing with argon filling and low-e coating		Solar controlled double glazing with argon filling and low-e coating		Triple glazing with argon filling and low-e coating	
		Ug = 5,8 W/(m²K) g = 0,85		Ug = 2,9 W/(m²K) g = 0,76		Ug = 1,2 W/(m²K) g = 0,59		Ug = 1,1 W/(m²K) g = 0,32		Ug = 0,8 W/(m²K) g = 0,55	
		g_{tot}	Fc	g_{tot}	Fc	g_{tot}	Fc	g_{tot}	Fc	g_{tot}	Fc
FVISFYT4AMA261129815	AMA261	0,51	0,60	0,50	0,65	0,44	0,74	0,27	0,85	0,42	0,76
FVIDFPT4AMA541129815	AMA541	0,44	0,52	0,43	0,57	0,39	0,67	0,26	0,82	0,38	0,69
FVIDFDTRAM10311298G6	AM1031	0,70	0,82	0,68	0,89	0,56	0,95	0,31	0,96	0,53	0,96
FVIDFDTRJN85511300G6	JN8551	0,70	0,82	0,68	0,90	0,56	0,95	0,31	0,96	0,53	0,96
FVIDFDPYJN86211300G6	JN8621	0,70	0,82	0,68	0,89	0,56	0,95	0,31	0,96	0,53	0,96
FVIDFDPYJN89131300G6	JN8913	0,70	0,82	0,68	0,90	0,56	0,95	0,31	0,96	0,53	0,96

g_{tot}

Total solar factor – g_{tot} Percentage of solar energy which actually penetrates into a room through the blind and glazing. A low value means good thermal performance. The standard defines the glazing C as the default glazing (when the glazing used for calculations is not declared by the manufacturer).

FC

Fc describes the efficiency of sun protection in intercepting incident solar radiation in relation to the sun protection used and the type of glazing. So, the lower the energy class, the higher the efficiency and therefore the energy savings. Thus, if the value Fc is used properly, it will minimize energy consumption for air conditioning.

Influence on thermal comfort					
Class	0	1	2	3	4
	Very little effect	Little effect	Moderate effect	Good effect	Very good effect

Total solar energy transmittance g-value - Classification					
Class	0	1	2	3	4
g-value	g≥0.50	0.35≤ g<0.50	0.15≤ g<0.35	0.10≤ g<0.15	g<0.10

Class	Fc values of classes	Improvement in room's thermal comfort
1	0.20 - 0.39	very high
2	0.40 - 0.59	high
3	0.60 - 0.79	medium
4	0.80 - 0.89	low
5	>0.90	neutral

Visual Performances

(DIN EN 14501: 2021)

VANELLI ARTICLE	VANELLI CODE	Glare control	Night privacy	Sight contact with the outside	diffuse/ hemispherical light transmission degree τv,dif-h	Daylight utilisation
FVIDFDTRAM10311298G6	AM1031	4	4	0	0%	0
FVIDFDTRJN85511300G6	JN8551	4	4	0	0%	0
FVIDFDPYJN86211300G6	JN8621	4	4	0	0%	0
FVIDFDPYJN89131300G6	JN8913	4	4	0	0%	0

The standard EN 14501 specifies a classification for the following visual performances.

Glare control: The capacity of a textile to control the luminance level of windows (disruptive luminosity) and to reduce the luminance contrasts between different zones within the field of vision.

Night privacy: The capacity of a textile to protect persons indoors from external view, at night, in normal lighting conditions.

Visual contact with the outside: The capacity of a textile to allow an exterior view when it is fully extended.

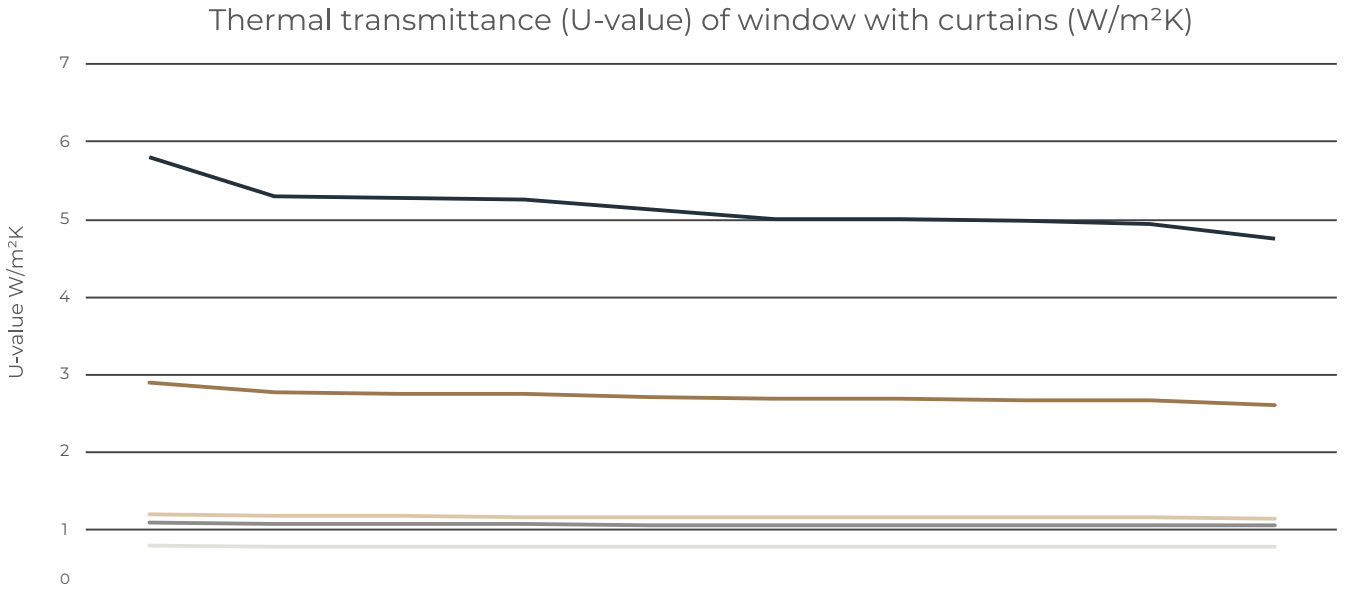
Opacity control: The capacity of a textile to preclude the vision of outside light. The performance of products is expressed by the level of illuminance (in lux) under which no light is perceivable by an observer behind the device, the textile being illuminated

Daylight utilisation: The capacity of a textile to optimise the available daylight.

Influence on visual comfort					
Class	0	1	2	3	4
	Very small effect	Small effect	Moderate effect	High effect	Very high effect

Thermal Insulation

(ISO 8301)



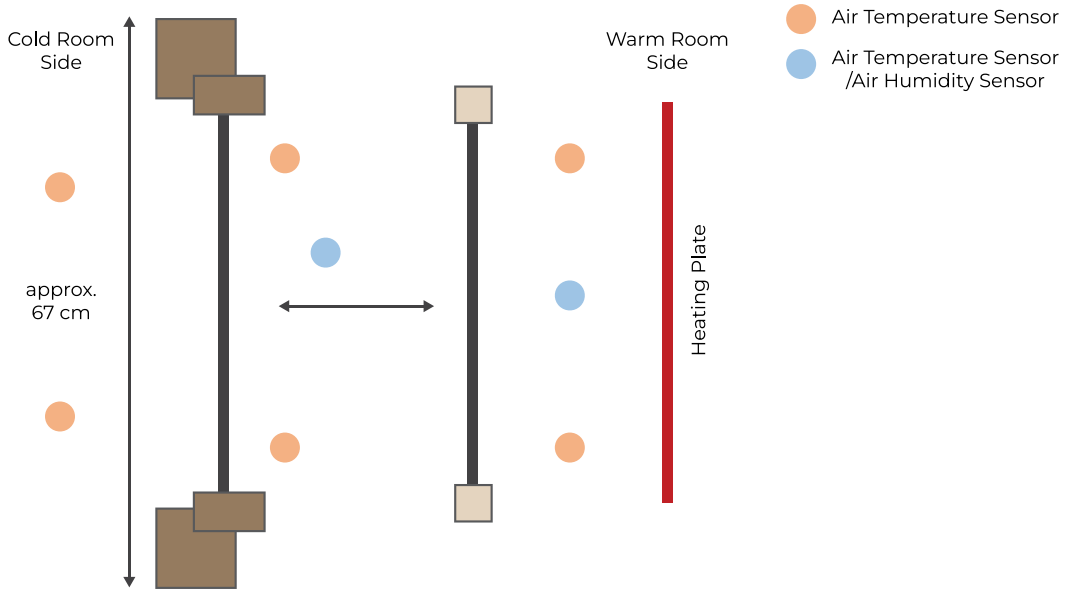
	Glazing only	JN8571 + glazing	AMA831 + glazing	JK0321 + glazing	AKC901 + glazing	JM1131 + glazing	JM1151 + glazing	AKD051 + glazing	AKD081 + glazing	AHB171 + glazing
A	5,8	5,29	5,27	5,25	5,13	5,01	5,01	4,97	4,93	4,74
B	2,9	2,77	2,76	2,75	2,72	2,69	2,69	2,68	2,67	2,61
C	1,2	1,18	1,18	1,17	1,17	1,16	1,16	1,16	1,16	1,15
D	1,1	1,08	1,08	1,08	1,07	1,07	1,07	1,07	1,06	1,06
E	0,8	0,79	0,79	0,79	0,79	0,78	0,78	0,78	0,78	0,78

The test on the specified Vanelli thermal fabrics was carried out on the Alembeta device. Its principle depends on the mathematical processing of the time heat passes through a textile. The test is based on the different temperatures of a heating plate (32°C) and the sample temperature (22°C). The measuring head with the sensing block touches the sample, and the instrument registers the changes in the surface temperature of the sample and solves the transient temperature field. The test then calculates the u-value from thermal conductivity, thermal resistance and sample thickness values obtained from the fabrics.

***A-Single glazing, B-Double glazing with air filling, C-Double glazing with argon filling and low-e coating, D-Solar controlled double glazing with argon filling and low-e coating, E-Triple glazing with argon filling and low-e coating.

Heat Box Test

(DIN EN ISO 8990: 1996)



The construction of the test device and the sensor positions are shown schematically.

Arithmetic main sensor data in steady-state conditions		Window	Window with inlying sun protection material P2538_22_4
Air temperature °C	Warm room side	21,0	20,9
	Cold room side	6,0	6,1
	Interspace	20,5	15,9
Temperature difference [K] (warm room side - cold room side		15,0	15,0
Air humidity warm room side [% r.H.]		51,0	48,0

Measurement of heat transfer through the combination of an inlying sun protection material and a window with the heat box test DIN EN ISO 8990: 1996-09

Vanelli Code	Relative reduction of the heat transfer caused by the use of the inlying sun protection material
AM1031	32%

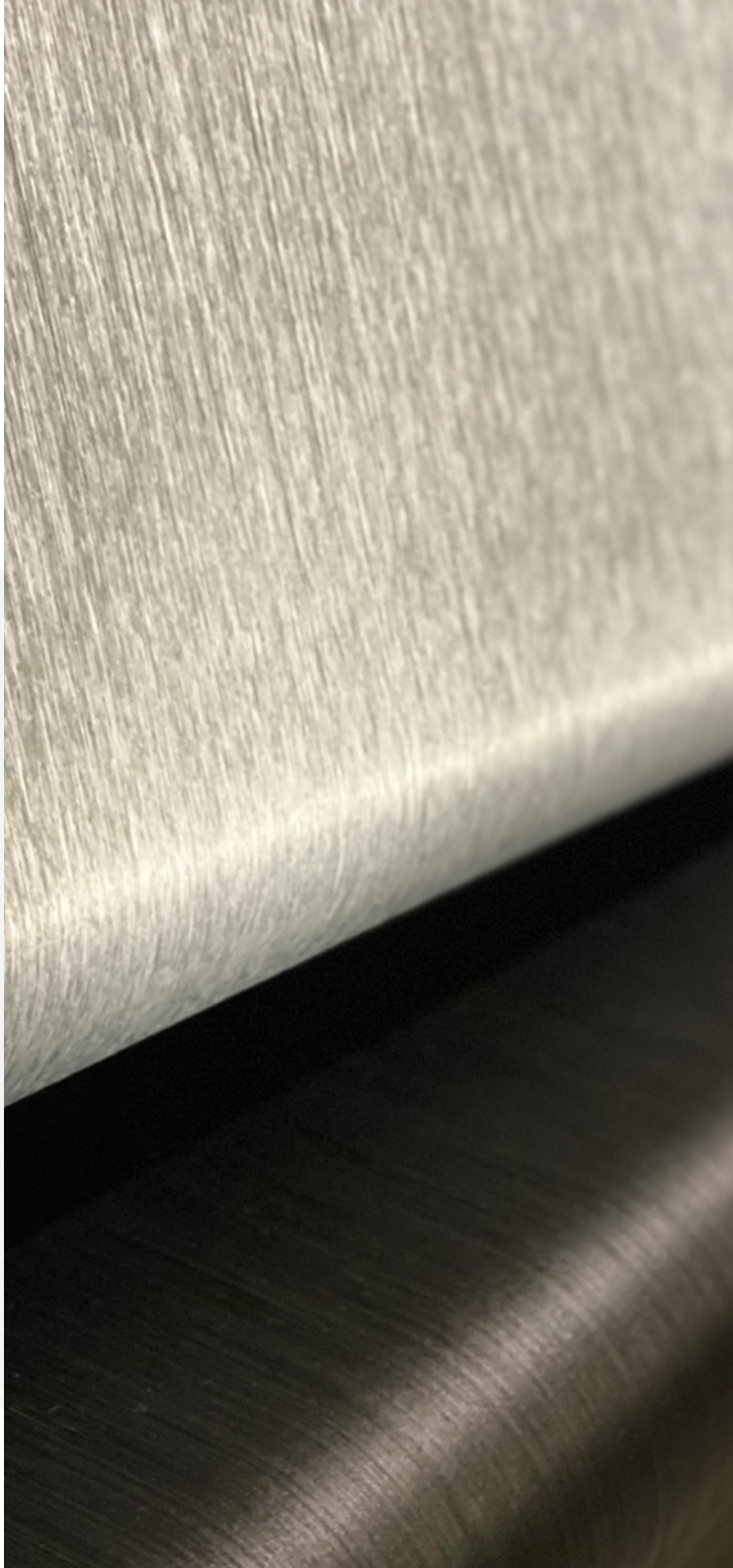
The basis to determine the relative heat transfer reduction is represented by the needed electrical heating powers to upkeep the set temperature in a warm room (21°C), testing with and without additional sun protection material.

The calculated relative heat transfer reduction is the ratio between the saved electrical heat power while using an additional sun protection material and the needed electrical power at testing without the protection. The heat transfer reduction is perceived in the cooling temperature between the window and the additional sun protection material.

Vanelli Thermal Fabrics - Keypoints

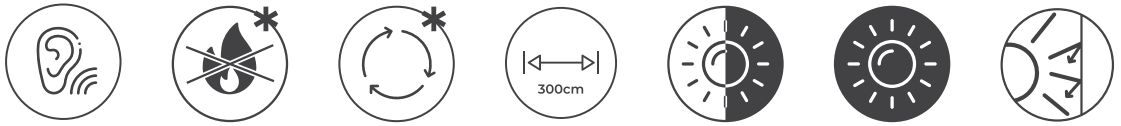
Vanelli Thermal Fabrics add functionality to interior space without forgetting beauty. The collection comprises textures, small-scale designs, and geometrics in a versatile heritage colour palette to create homely and comforting indoor spaces.

- indoor climate comfort regulation
- a possibility to save on energy costs
- privacy, shield from views
- darkening, when needed
- sound absorption
- wide-width fabrics
- privacy and openness



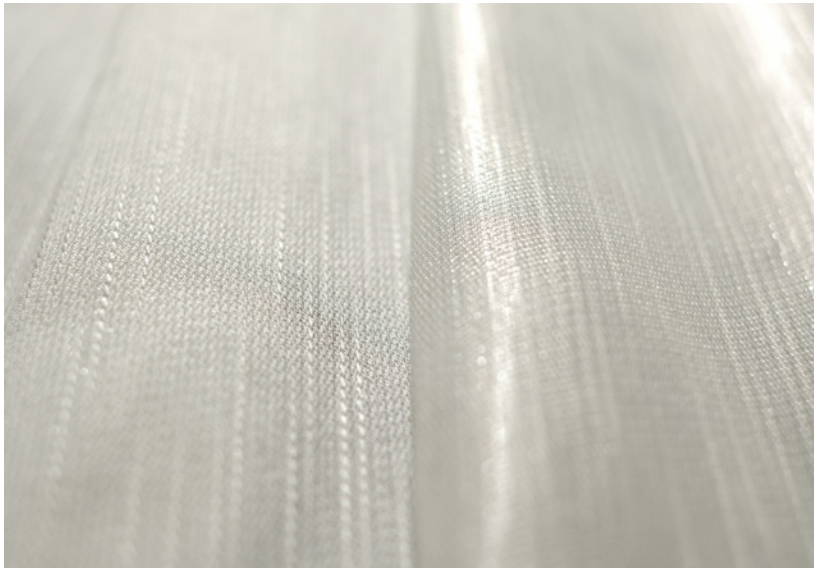
Vanelli thermal fabrics are recommended for homes and other spaces requiring optimal indoor climate control

Available in a wide variety of styles – piece-dyed melange-effect plains, textures and jacquards – Vanelli thermal fabrics offer functionality: thermal protection, up to 100% light-blocking and noise reduction. The collection consists of 100% Trevira cs and 100% PES fabrics, with some fabrics available with recycled content. FR properties are optional.



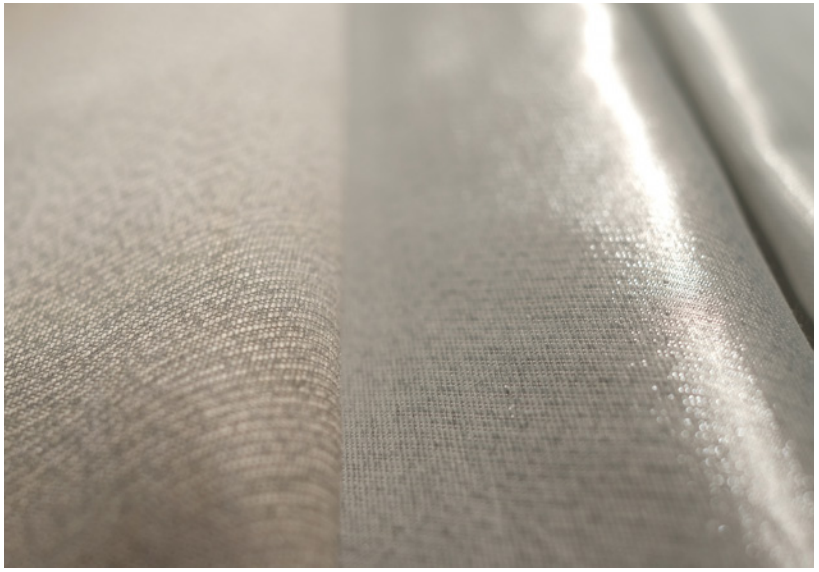
Sound Absorbing | Flame Retardant | Recycled Content | Wide Width | Dimout | 100% Blackout | Light Protection

* varies by product



Vanelli AMA261

Rating according to ISO 11654	Rating according to ASTM C423
Weighted sound absorption coefficient	**Noise Reduction coefficient = 0.65**
α_w = 0,50 (MH)	**Sound absorption Average SAA = 0.67**
Sound absorption class: D	



Vanelli AMA541 (digital print)

Rating according to ISO 11654	Rating according to ASTM C423
Weighted sound absorption coefficient	**Noise Reduction coefficient = 0.65**
α_w = 0,65 (MH)	**Sound absorption Average SAA = 0.68**
Sound absorption class: C	

Semi-sheer FR fabrics for solar protection and sound absorption

Vanelli has developed transparent, wide-width curtain fabrics offering solar protection and excellent sound-absorption ratings. These semi-sheer polyester FR fabrics, woven with unique split-film yarns instead of an aluminium metallised coating on the back of the fabric, are inherently flame-retardant and, therefore, a multi-purpose solution suitable for public spaces.

Class	Fc values of classes	Improvement in room's thermal comfort
1	0.20 - 0.39	very high
2	0.40 - 0.59	high
VANELLI	0.60 - 0.79	medium
4	0.80 - 0.89	low
5	>0.90	neutral

Well-chosen interior textiles offer an opportunity to save on heating and cooling costs. Properly insulated indoor spaces have a smaller carbon footprint and offer impeccable indoor climate comfort. Saving energy is our obligation!

VANELLI

Think. Act. Save.

VANELLİ

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