



MICROLOUVRE KOOLSHADE®

TECHNICAL PRODUCT GUIDE





**THE LARGER THE PROJECT, THE
GREATER THE ENERGY SAVINGS**

**FOR NEW CONSTRUCTION
AND RETROFIT PROJECTS**

WHAT IS SOLAR SHADING?

Solar shading is a general term for a range of methods used to mitigate the amount of solar radiation in the form of **heat** and **light** in buildings.



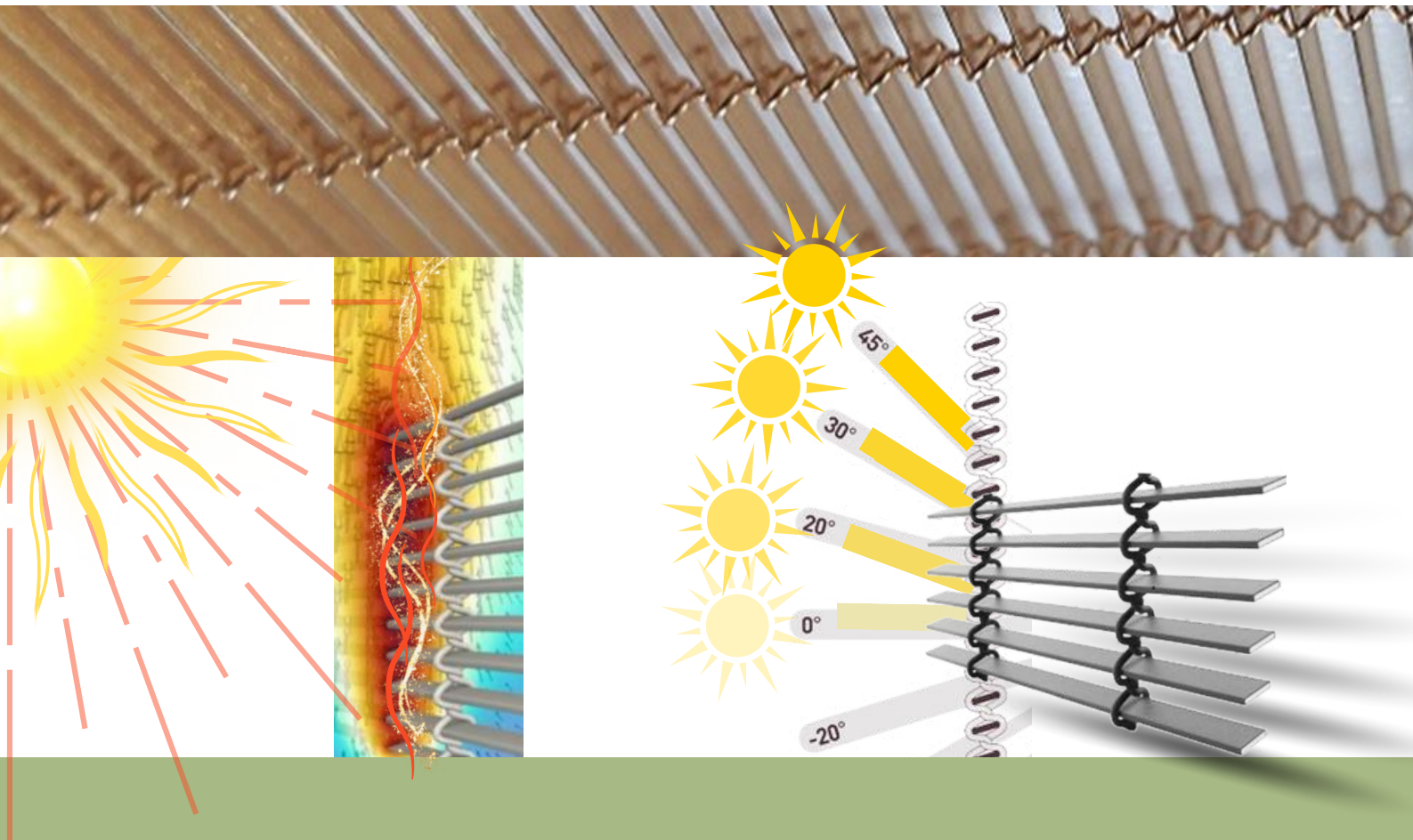
Our MicroLouvre KoolShade® Screens fit easily on the outside of windows thus reducing the amount of heat gain and direct sunlight whilst still allowing a clear view through the window.



THE PRODUCT

MicroLouvre KoolShade® is an angular selective solar shading solution that has been scientifically designed to provide:

- Excellent solar heat protection
- Uninterrupted view to the outside
- Balanced daylighting & glare control
- No upward light pollution
- Energy conservation



For architects, designers, consultants, and building service engineers focused on energy-efficient building envelopes, architectural facades, and highly glazed structures.

MICROLOUVRE KOOLSHADE®

Frame options:

Various to suit application

Frame composition:

Extrusions - Aluminium EN AW6063 T6

Lacer Wire:

316 Stainless Steel

Anti-Vibration Wedge :

EPDM

Finishes:

Polyester powder coat in any RAL colour (with the ability to create designs on the fabric which are directionally visible)

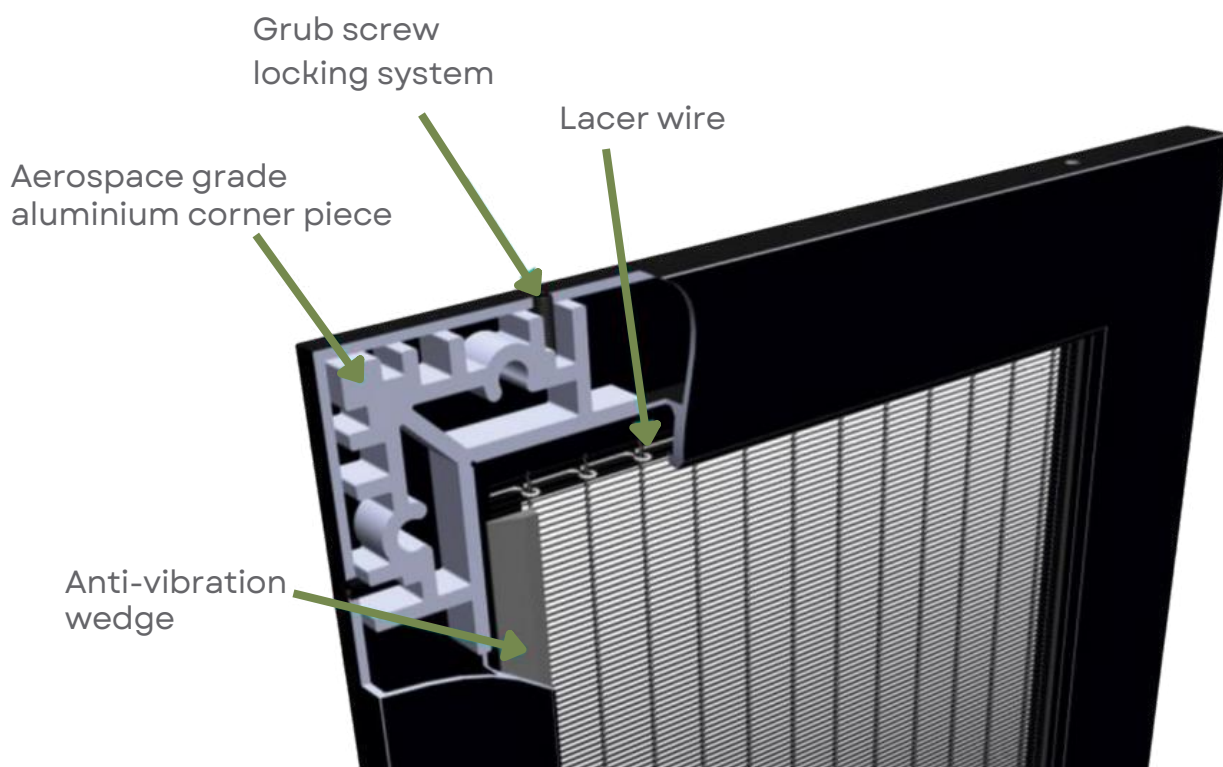
Fire rating:

Class A1/A2-s1,d0 in accordance with BS EN 13501-1:2007+A1:2009

Resistance to wind:

Hurricane proof: 100mph/160kph

CONSTRUCTION



A result of decades of extensive international research and development, KoolShade is a high-performance, woven metal fabric, with its weft construction of bronze louvres.

Window covering screens are constructed by tensioning the fabric in aluminium framing and incorporating an antivibration wedge to enhance the screen's integrity at wind speeds in excess of 100mph/160kph.

The micro-fine louvres are angled to suit a number of applications; whether to ensure optimum light in, and visibility out, whilst blocking heat and glare, or to allow ventilation and even provide privacy from external viewing.

SCREEN WEIGHTS IN KILOGRAMS (KG)

	DROP	WIDTH					Vertical Sliding Overlapping	TRACKS	
		400mm	600mm	800mm	1000mm	1200mm		DT34 + DT34	
FE25	400mm	0.92	1.18	1.44	1.70	1.97	Screens of these sizes require care when hinged. Please refer to SmartLouvre for advice.	DT34 + DT34	0.38
	600mm	1.19	1.50	1.81	2.12	2.43		0.58	
	800mm	1.46	1.82	2.17	2.53	2.89		0.77	
	1000mm	1.73	2.13	2.54	2.94	3.35		0.96	
	1200mm	1.99	2.45	2.90	3.36	3.81		1.15	
	1400mm	2.26	2.76	3.27	3.77	4.27		1.34	
	1600mm	2.53	3.08	3.63	4.18	4.73		1.54	
1800mm	2.80	3.40	3.99	4.59	5.19	1.73			

	DROP	WIDTH							Vertical Sliding Overlapping	TRACKS	
		400mm	600mm	800mm	1000mm	1200mm	1400mm	1600mm		DT34 + DT34	
FE38	400mm	1.12	1.42	1.73	2.04	2.34	2.65	2.96	Screens of these sizes require care when hinged. Please refer to SmartLouvre for advice.	DT34 + DT34	0.38
	600mm	1.43	1.79	2.14	2.50	2.85	3.21	3.56		0.58	
	800mm	1.74	2.15	2.55	2.96	3.36	3.76	4.17		0.77	
	1000mm	2.06	2.51	2.96	3.42	3.87	4.32	4.77		0.96	
	1200mm	2.37	2.87	3.37	3.87	4.38	4.88	5.38		1.15	
	1400mm	2.69	3.24	3.78	4.33	4.88	5.43	5.98		1.34	
	1600mm	3.00	3.60	4.20	4.79	5.39	5.99	6.59		1.54	
	1800mm	3.31	3.96	4.61	5.25	5.90	6.54	7.19		1.73	
	2000mm	3.63	4.32	5.02	5.71	6.41	7.10	7.79		1.92	
	2200mm	3.94	4.69	5.43	6.17	6.91	7.66			2.11	
	2400mm	4.26	5.05	5.84	6.63	7.42	8.21			2.30	

	DROP	WIDTH								Vertical Sliding Overlapping	TRACKS	
		400mm	600mm	800mm	1000mm	1200mm	1400mm	1600mm	1800mm		DT34 + DT34	
FE51	400mm	1.40	1.76	2.11	2.47	2.82	3.18	3.53	3.89	Screens of these sizes require care when hinged. Please refer to SmartLouvre for advice.	DT34 + DT34	0.38
	600mm	1.77	2.17	2.57	2.98	3.38	3.78	4.19	4.59		0.58	
	800mm	2.13	2.58	3.03	3.48	3.94	4.39	4.84	5.29		0.77	
	1000mm	2.49	2.99	3.49	3.99	4.49	4.99	5.49	5.99		0.96	
	1200mm	2.85	3.40	3.95	4.50	5.05	5.60	6.14	6.69		1.15	
	1400mm	3.21	3.81	4.41	5.01	5.60	6.20	6.80	7.39		1.34	
	1600mm	3.58	4.22	4.87	5.51	6.16	6.80	7.45	8.09		1.54	
	1800mm	3.94	4.63	5.33	6.02	6.71	7.41	8.10	8.80		1.73	
	2000mm	4.30	5.04	5.78	6.53	7.27	8.01	8.75	9.50		1.92	
	2200mm	4.66	5.45	6.24	7.03	7.83	8.62	9.41	10.20		2.11	
	2400mm	5.02	5.86	6.70	7.54	8.38	9.22	10.06	10.90		2.30	
	2600mm	5.39	6.27	7.16	8.05	8.94	9.82	10.71	11.60		2.50	
	2800mm	5.75	6.68	7.62	8.56	9.49	10.43	11.36	12.30		2.69	
3000mm	6.11	7.09	8.08	9.06	10.05	11.03	12.02	13.00	2.88			

TRACKS	CODE	WIDTH	400mm	600mm	800mm	1000mm	1200mm	1400mm	1600mm	1800mm
	DT34 + BT32	Lift in/Lift out	0.31	0.47	0.62	0.78	0.94	1.09	1.25	1.40
	RT37 + DT34	Lateral Sliding	0.46	0.70	0.93	1.16	1.39	1.62	1.86	2.09

IMPORTANT: Smartlouvre reserves the right to change prices or specifications without prior notice. Nominal weights are in Kg. All dimensions are nominal. Metric to imperial conversions are to the nearest 1/8th". Subject to Smartlouvre Standard Terms and Conditions copies of which are on our website.

BESPOKE COLOURS & PRINTS



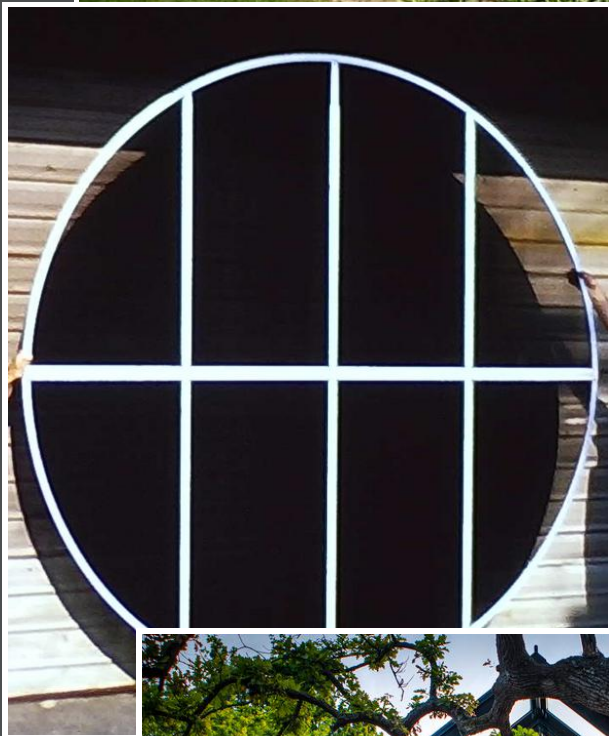
Bespoke Fabric & Frame colours, any shade, any hue.



Bespoke printing: UV stable 5 colour printing up to 2m x 3m



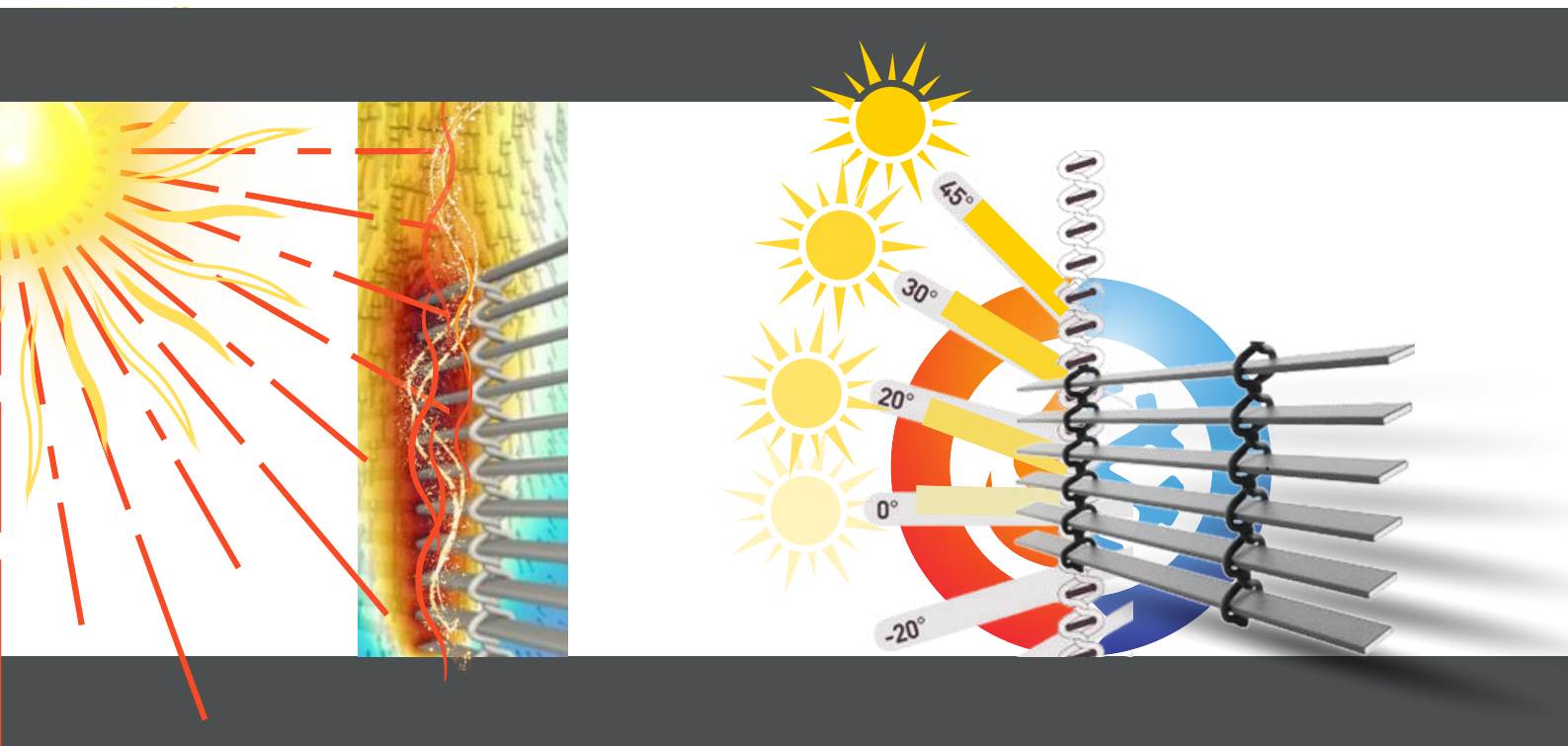
BESPOKE SHAPES



HOW IT WORKS

The system is thermally broken from a building with a typical 30mm gap between the fabric and window glass.

This creates a vertical flow or chimney effect, driving the air surrounding the screen upward, pulling cool air past the glass and convecting the heat back out to the atmosphere.

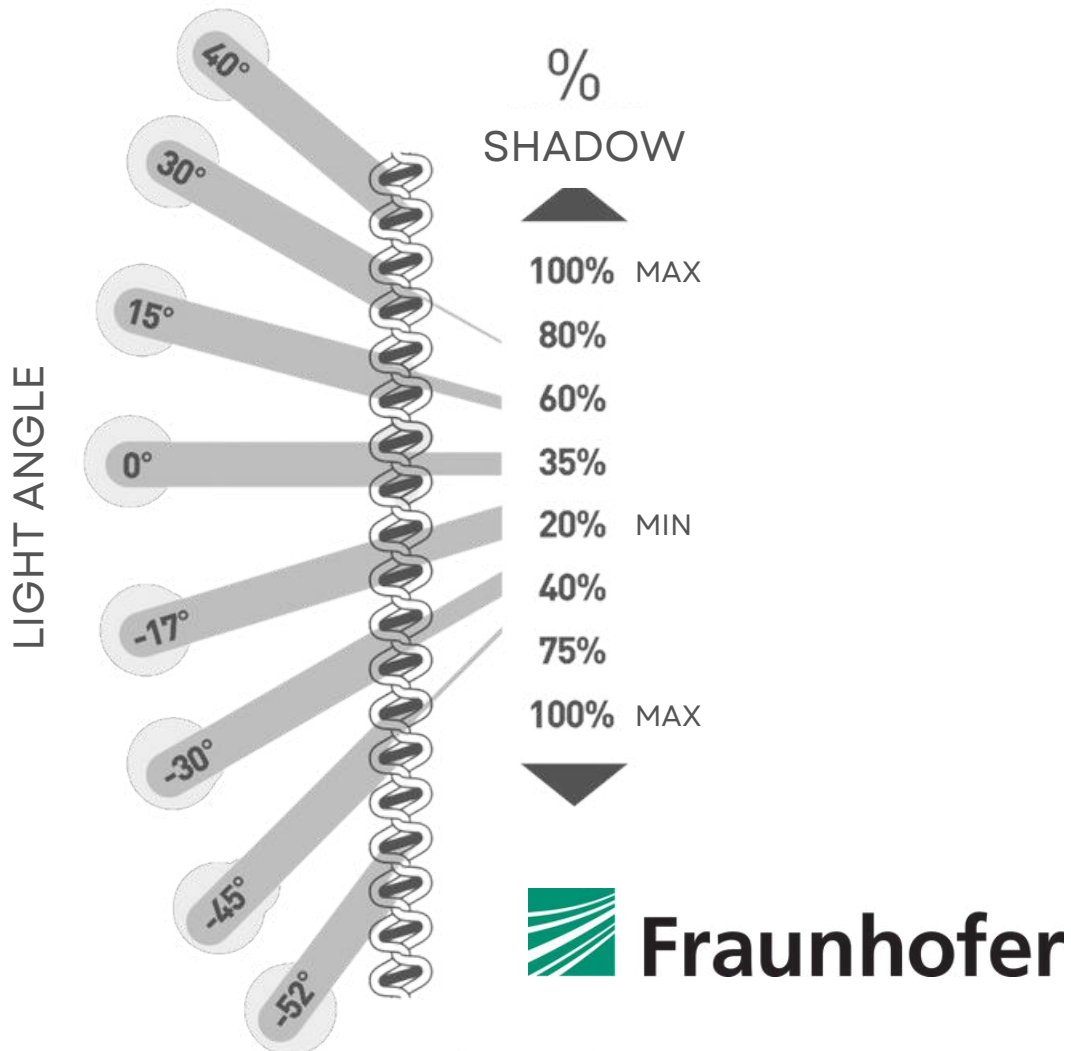


MicroLouvre® is fitted externally to the window or building façade and coated in a matt black, which is designed to absorb the sun's radiation like a sponge, blocking the sun's heat at the window.

Due to the 1.25mm paper-thin micro louvres, there is very little thermal mass. Therefore, the heat transfers very quickly. The same as when aluminium foil comes out of the oven, it cools almost instantly. They both have a very high surface area but a small mass, so they lose their stored heat very quickly.

SUN CUT OFF ANGLES

Fraunhofer ISE states that MicroLouvre KoolShade® fabric is an angle-selective product, therefore angle-dependent transmittance and reflectance values have been tested at positive and negative angles of incidence.

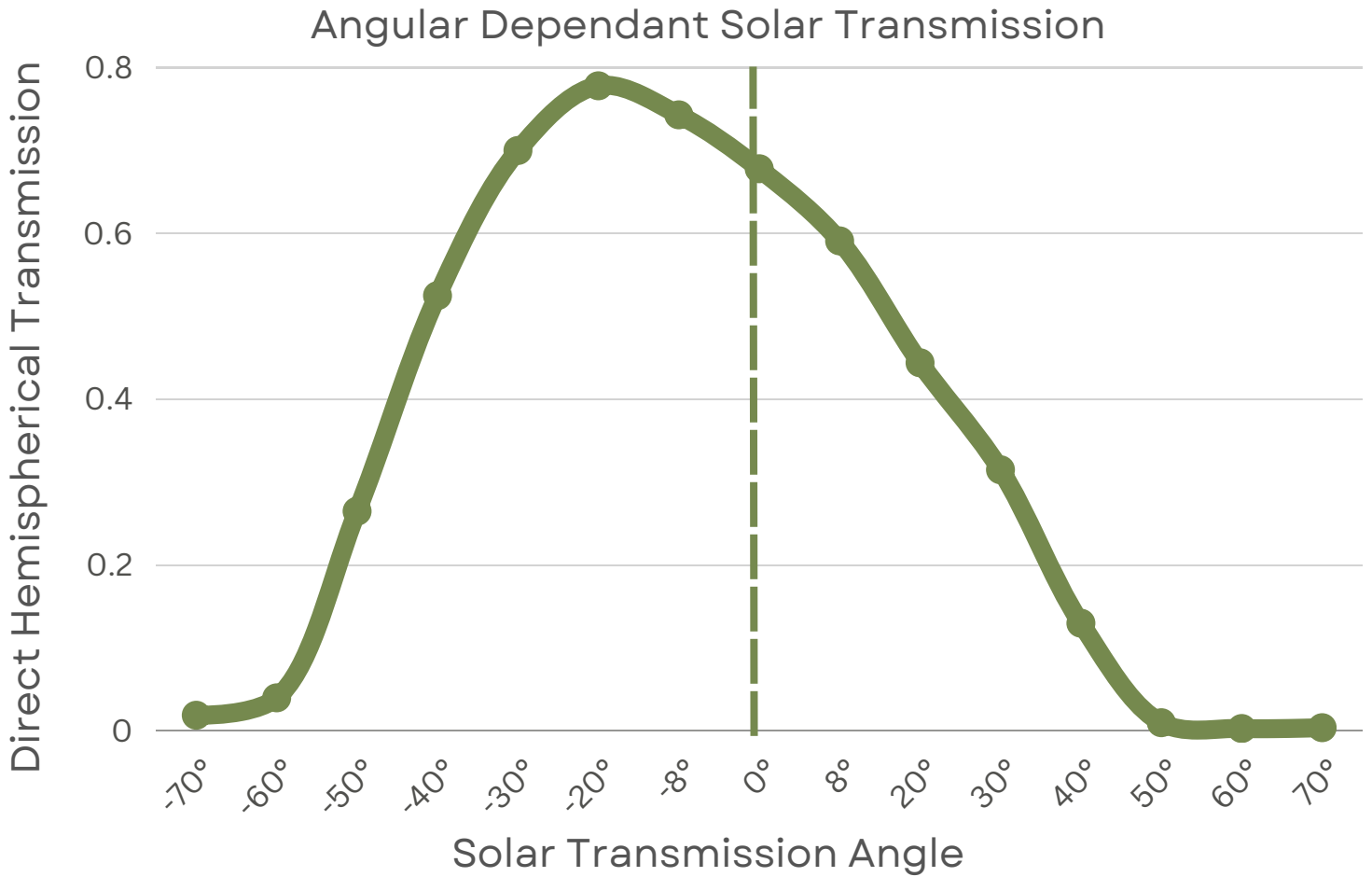


This illustrates the shading performance of MicroLouvre KoolShade® at positive & negative angles.

The defined standards of EN14501 specify reporting results only at normal incidence (0°) and thus do not adequately indicate true performance at other, highly relevant angles of incidence.

Angular Dependent: meaning that the performance varies with the position of the solar altitude.

ANGLE DEPENDENT SOLAR DATA



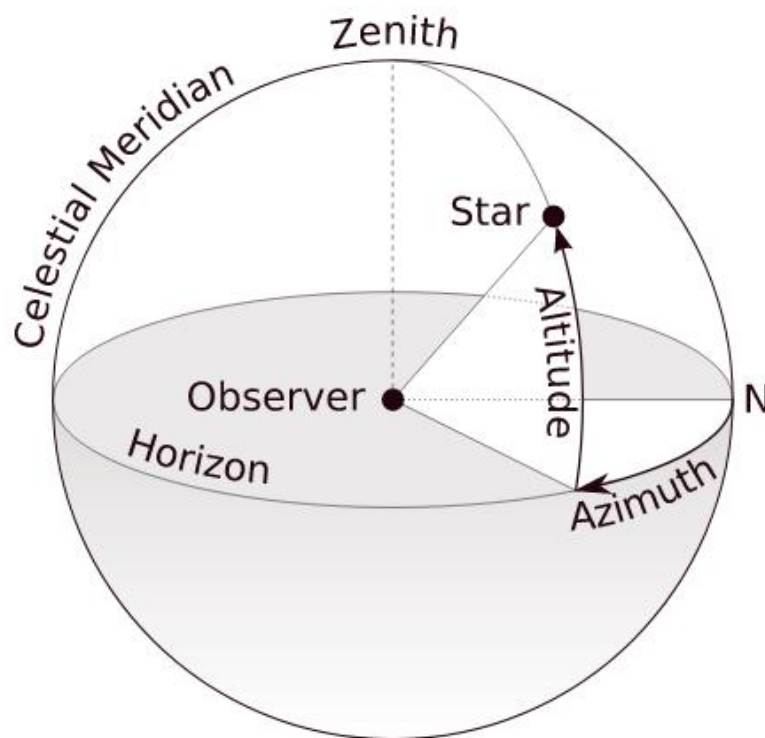
This illustrates MicroLouvre KoolShade® fabric - Solar Transmittance, Reflectance & Absorptance among different angles

	τ_e Solar Transmittance	ρ_e Solar Reflectance	α_e Solar Absorptance
70°	0.004	0.046	0.950
60°	0.003	0.036	0.961
50°	0.010	0.025	0.965
40°	0.130	0.015	0.855
30°	0.315	0.009	0.676
20°	0.444	0.004	0.552
8°	0.591	0.003	0.406
0°	0.678	0.002	0.320
-8°	0.743	0.001	0.256
-20°	0.778	0.001	0.221
-30°	0.700	0.003	0.297
-40°	0.525	0.004	0.471
-50°	0.265	0.008	0.727
-60°	0.040	0.010	0.950
-70°	0.019	0.012	0.969

WHAT IS ANGULAR SELECTIVE?

Angular Selective: is a special case of angular dependence. Angular selective means that the performance varies with the position of the sun, both in the solar altitude direction and azimuth direction.

In this figure, the two directions are illustrated.



The angular selective performance in the solar altitude direction is the most important of the two directions. However, the azimuth angle can also be very significant, with angular selective shading systems.

Therefore, it will give the most accurate results if both directions are considered.

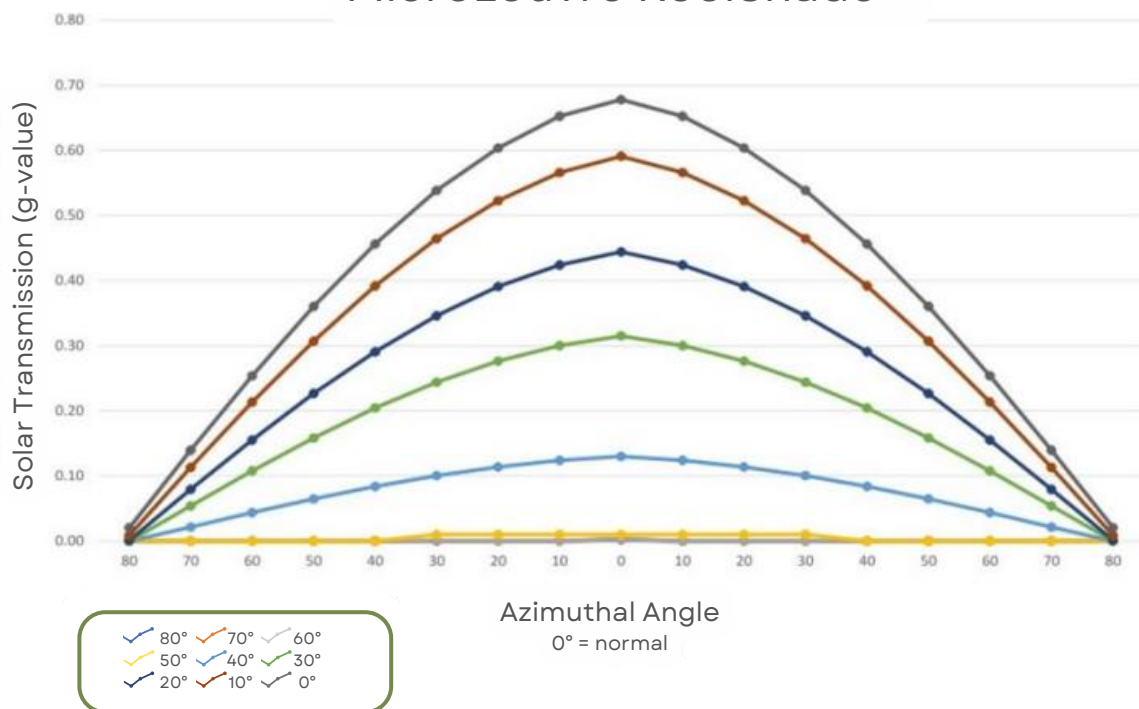
The performance is always angular selective, as the sun never stops moving in both directions.

*Azimuth angle is the compass direction from which the sunlight is coming and it varies throughout the day

ANGULAR SELECTIVE SOLAR TRANSMISSION OF MICROLOUVRE KOOLSHADE®

Angular selective shading systems are generally static, energy efficient window treatments that are suitable for new construction or retrofit projects.

Angular Selective Solar Transmission (Ts) of MicroLouvre KoolShade®

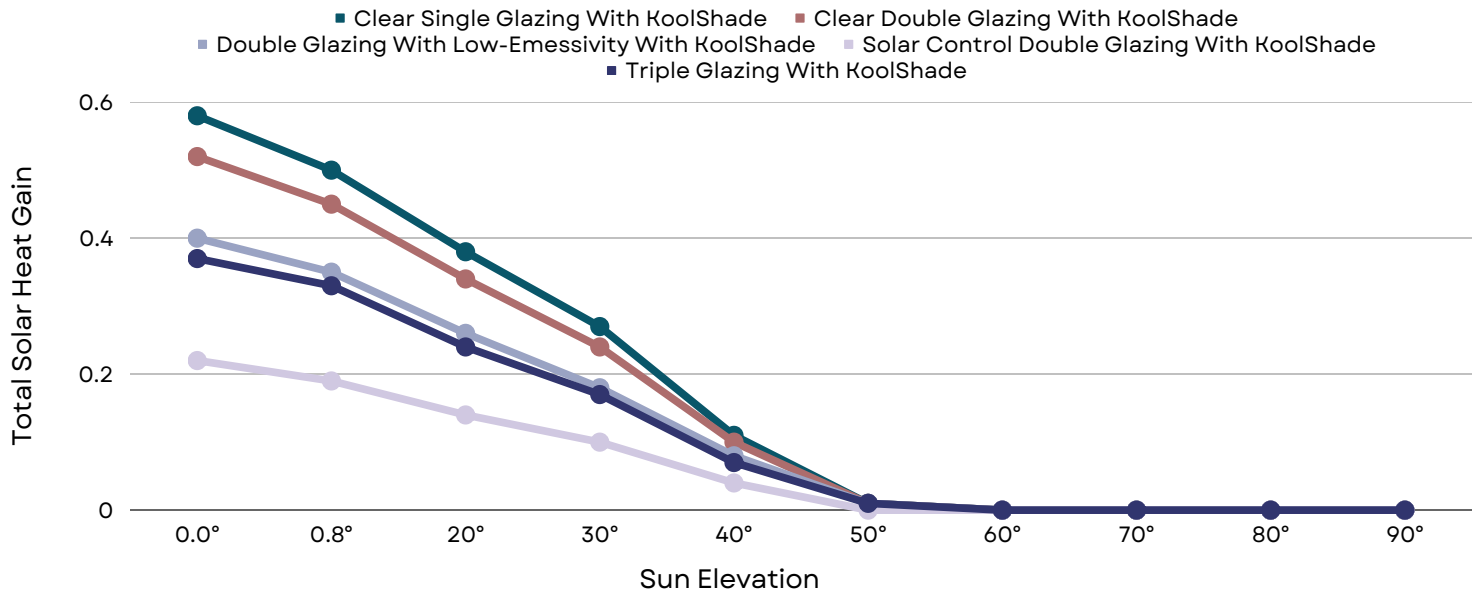


They block or filter direct sunlight while allowing diffused daylight to pass through windows within a specific range. Static, angular selective shading systems offer a potentially low-cost option to reduce window heat gains and control glare while permitting the admission of useful daylight, natural ventilation and access to views.

These passive systems are optically complex, designed to have characteristics that allow them to selectively assume different properties related to the solar transmission.

Building computer simulation software allows accurate modelling of the behaviour of optically complex fenestration systems such as angular selective systems.

MICROLOUVRE KOOLSHADE® WITH GLASS



Based on European Standards EN14501, EN145000 and EN52022. Calculated combination results based on Fraunhofer ISE Report EEB3-HRW-1812-E18

This is a g_{tot} graph with MicroLouvre KoolShade® (externally fitted) in combination with different EN reference glazing types at sun elevations 0° - 90°.

Computer models tend to use solar shading performance data and apply them to the reference glazing combinations from EN 14501.

This illustrates MicroLouvre KoolShade's performance in combination with different glazing types and how it can stop up to 100% of the solar heat gain. MicroLouvre KoolShade® can improve the performance of any glazing type. When combined on the exterior, or even in between double and triple pane glazing systems, the performance is rivalled by none.

g_{tot}: The measure of the total energy transmittance of the glazing in combination with the blind or shading device when exposed to solar radiation. Also known as the Solar Factor.

MICROLOUVRE KOOLSHADE®

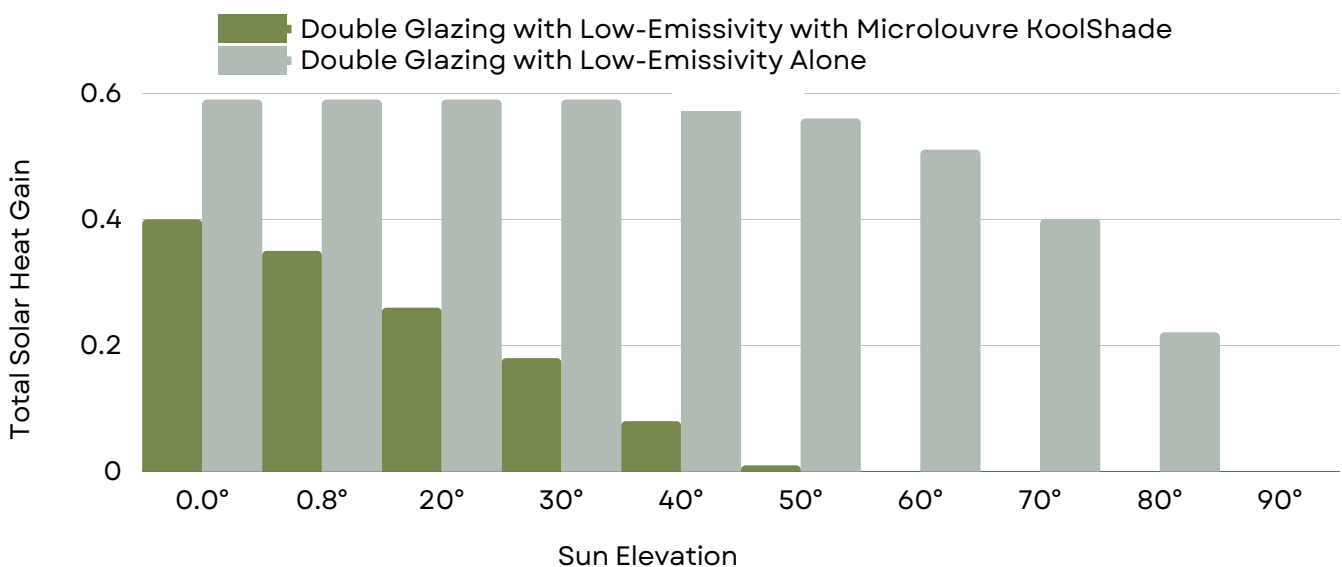
WITH GLASS

Modern buildings are typically designed with a heavy focus on preventing heat loss for the cooler months and less on preventing window solar gains.

New low-e glazing systems are very thermally efficient that help with this strategy.

However, during the warmer summer months once the glazing is exposed to the sun and solar heat gain enters the building, it creates a greater risk of overheating.

External shading is critical for this type of glazing system.



This graph illustrates MicroLouvre KoolShade's performance in combination with a low-e (C) glazing system and how it can stop up to 100% of the solar heat gain during the warmer summer months, significantly reducing the overheating risk.

MICROLOUVRE KOOLSHADE® WITH GLASS

g_{tot} with MicroLouvre KoolShade (Installations > = 30mm Open Airspace)

Standard	EN Ref	Glazing / glazing combination	U-value	g-value					effective g-value				
				0°	8°	20°	30°	40°	50°	60°	70°	80°	90°
EN 14501	A	Clear single glazing with MicroLouvre® Clear single glazing alone	5.8	0.58 0.85	0.50 0.85	0.38 0.85	0.27 0.84	0.11 0.84	0.01 0.82	0.00 0.76	0.00 0.63	0.00 0.39	0.00 0.00
EN 14501	B	Clear double glazing with MicroLouvre Clear double glazing alone	2.9	0.52 0.76	0.45 0.76	0.34 0.76	0.24 0.75	0.10 0.75	0.01 0.72	0.00 0.67	0.00 0.53	0.00 0.30	0.00 0.00
EN 14501	C	Double glazing with low emissivity with MicroLouvre® Double glazing with low emissivity alone	1.2	0.40 0.59	0.35 0.59	0.26 0.59	0.18 0.59	0.08 0.58	0.01 0.56	0.00 0.51	0.00 0.40	0.00 0.22	0.00 0.00
EN 14501	D	Solar control double glazing with MicroLouvre® Solar control double glazing alone	1.1	0.22 0.32	0.19 0.32	0.14 0.32	0.10 0.32	0.04 0.31	0.00 0.29	0.00 0.26	0.00 0.20	0.00 0.11	0.00 0.00
EN 14501	E	Triple glazing with MicroLouvre® Triple glazing alone	0.8	0.37 0.55	0.33 0.55	0.24 0.55	0.17 0.55	0.07 0.54	0.01 0.52	0.00 0.46	0.00 0.30	0.00 0.18	0.00 0.00

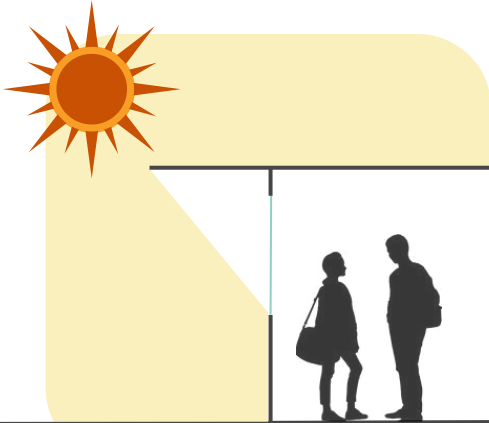
MicroLouvre KoolShade angular dependent with glazing types



SHADING COMPARISON

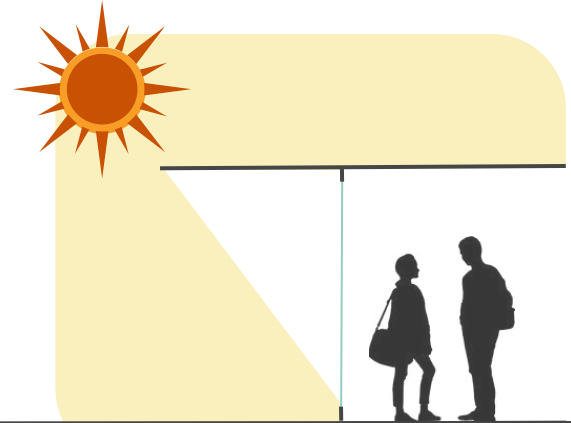
Direct sunbeam radiation through unprotected standard double glazing can heat horizontal surface temperatures to over **500C**. This includes those inside working near a window, causing unnecessary heat stress and risk to their health.

To achieve 100% shading during hottest sun exposure a 1450mm high window it must have a 1600mm overhang.



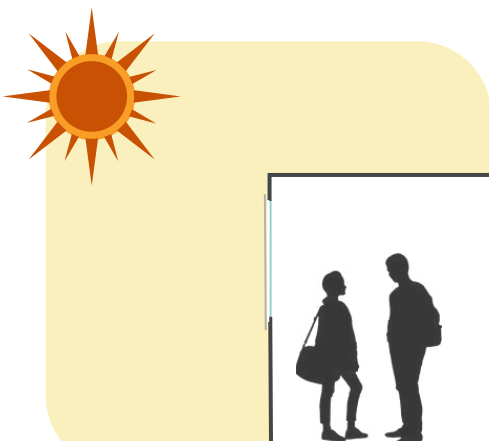
**WITH
OVERHANGS**

To achieve 100% shading during hottest sun exposure a 2400mm high window it must have a 2430mm overhang.



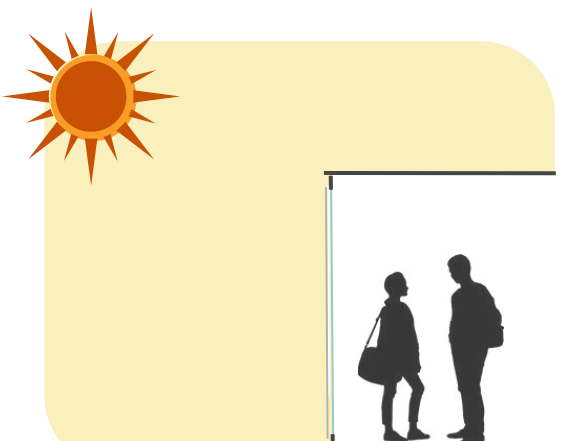
MicroLouvre KoolShade's utilises solar ground reflection more effectively than overhangs, helping the architect to design more efficient usage of the space.

To achieve 100% shading during hottest sun exposure a 1450mm high window with KoolShade replaces overhangs.



**WITH
KOOLSHADE®**

To achieve 100% shading during hottest sun exposure a 2400mm high window with KoolShade replaces overhangs.



This direct sunbeam radiation proportional to the window opening will prevent workers operating safely in the space near windows.

For example; a single window opening of 1.2m wide by 1.5m high will cast an area of direct hot sunbeam of 1m² (10.8ft²) at noon on peak summer to 3m² (32ft²) at noon near both equinox.

CONTACT WITH THE OUTSIDE



With **MicroLouvre KoolShade®**. Stop the heat, not the light or view.

CONTACT WITH THE OUTSIDE



With MicroLouvre KoolShade®. Stop the heat, not the light or view.

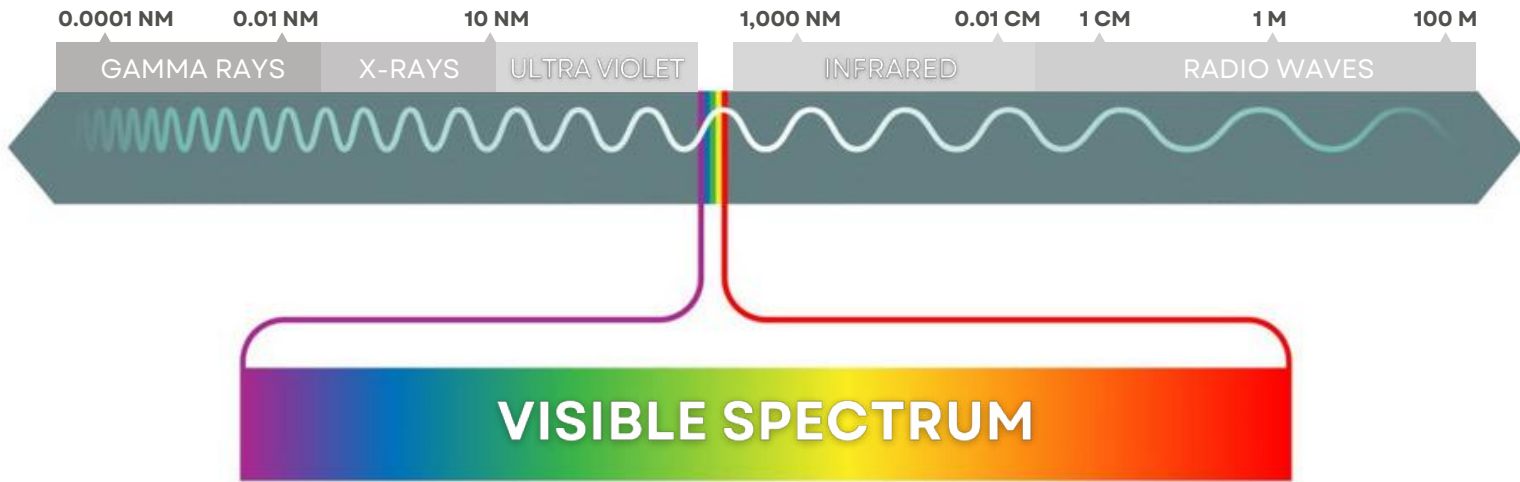
CONTACT WITH THE OUTSIDE



With MicroLouvre KoolShade®. Stop the heat, not the light or view.

VISIBLE SPECTRUM

The amount of light is important, but the spectral composition of the light is also important. MicroLouvre KoolShade® releases the entire spectrum of light – **100% CRI**



SUSTAINABILITY

Air conditioning is hugely expensive, and proven to be very detrimental to the environment in both its manufacture and use of electricity to run.

Air Conditioning Biggest Factor in Growing Electricity Demand

Global electricity demand growth from 2018 to 2050, by energy use category



- 37.0% Space Cooling
- 25.5% Residential Appliances
- 12.4% Heating
- 7.8% Lighting
- 17.4% Other Services

Source: IEA



Campus Pictet De Rochement in Geneva. With MicroLouvre KoolShade® completely enveloping it, it will become the most sustainable building in Europe once completed (2025).

Introducing air conditioning and comfort cooling is a common way to control overheating. Cooled floor space area is increasing by 6.5% annually in the UK.

This can substantially increase a building's energy consumption. A BRE case study estimated that installing air conditioning in a typical open-plan office would require an extra 55 kWh/m²/year, resulting in overall air-conditioning running costs of £15/m²/year.

MicroLouvre KoolShade® embraces these principles with a fabric made from over 90% recycled scrap copper waste, with a proven life span and durability of 60+ years and 100% recyclability. Reducing air conditioning costs by 68% and original equipment, whilst costing a fraction of traditional dynamic shading system which has limited life spans and recyclability.

KEY ADVANTAGES

The list of advantages from using MicroLouvre KoolShade® is long. A few of the most relevant are below alongside images of MicroLouvre KoolShade® installations from around the world.



Building appearance is improved when MicroLouvre KoolShade® is installed at the exterior of the window.

The woven metal louvre fabric provides a uniform look to windows with blinds or shades drawn to differing light levels.

MicroLouvre KoolShade® has been purposefully designed to provide protection from the sun.

Whilst at the same time provides the optimum contact with the outside allowing natural full spectrum light to minimise the need for artificial lighting.



MicroLouvre KoolShade® screens provide maximum shading for mid-high sun angles when installed in close proximity to the exterior face of the window.



From a design standpoint, MicroLouvre KoolShade® will help to balance the perimeter areas of the building.

Since MicroLouvre KoolShade® is not adjustable, the engineer can confidently design a cooling load that will not fluctuate as greatly as buildings which have adjustable dynamic shading devices.



KEY BENEFITS

MicroLouvre KoolShade® will lower fossil - fuel consumption, lower Green House Gas Emission and the savings in energy should pay for the screens in usually 5 years. A/C equipment will never pay for itself.

It will always require fossil - fuels to operate, MicroLouvre KoolShade® does not require any energy source. A/C equipment requires the use of a stationary engineer and it will require maintenance.



MicroLouvre KoolShade® allows a virtually unobstructed view to the exterior. The use of conventional glass will always require the interior shades to be closed whenever the sun is shining on the windows.



Winter - time energy costs will be reduced by a minimum of 15%. Low - angled winter - time sun will come through the MicroLouvre KoolShade® and add some heat to the building's interior space.



KEY BENEFITS

Glare is also a problem with conventional tinted and even some high - performance glass. Conventional glass and some high-performance glass, combined with interior shades, will cut out 30% to 40% of the solar heat. MicroLouvre KoolShade® will cut out up to 100% of it.

MicroLouvre KoolShade® has a gtot as low as 0.0 (no solar transmittance) vs conventional glass that often has a gtot of 0.59 (low-e) to 0.76 (double clear).



MicroLouvre KoolShade® is maintenance free. It has no moving parts.



MicroLouvre KoolShade® will allow the use of lower cost, double - pane, clear glass. Window washing frequency can be cut in half.



Every building where our MicroLouvre KoolShade® screens are installed helps avoid bird collisions.

ACCREDITATIONS



The Fraunhofer Institute for Solar Energy Systems ISE, with a staff of 1200, is the largest solar research institute in Europe.

When tested at Fraunhofer, the angle selective MicroLouvre achieved impressive results confirming MicroLouvre as the most comprehensive solution for Thermal and Visual Comfort in one system.



SimScale have evaluated the thermal and pressure flow characteristics of MicroLouvre® and simulated the fabric in their digital wind tunnel set up at various wind speeds and angles.

The results have allowed us to validate previous performance data and determine an appropriate discharge coefficient (Cd) which can be inputted directly into thermal modelling software such as IES, TaS and DesignBuilder.



BERKELEY LAB

The Lawrence Berkeley National Laboratory California is a multiThe Berkeley Lab included MicroLouvre in a major research project for one of America's largest Energy companies. With MicroLouvre, daily cooling loads were reduced by 68% on sunny days when compared with dual pane, high performance solar control glass with an internal blind.



Building Research Establishment (BRE) the world's leading building science centre, wind tunnel tested MicroLouvre screens from different angles to simulate severe wind conditions on high buildings.

MicroLouvre proved to be indestructible at winds exceeding 100mph+, in excess of Hurricane Force 12 on the Beaufort Scale and a Category 2 Hurricane on the Saffir-Simpson scale.



Recognised internationally as the go-to professionals in all aspects of fire safety. We are very proud to be working with one of the world's leading fire engineering and solution providers, trusted by many of the most prestigious construction firms, architects and estate owners.



ISO 9001 is defined as the international standard that specifies requirements for a quality management system (QMS). Organizations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements.



Manufacturer of
MicroLouvre KoolShade® fabric
A unique remedy to the challenges of
solar climate change on our habitat.

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