GLARE & HEAT

FUNCTIONAL TEXTILES FOR OPTIMUM REGULATION OF LIGHT AND HEAT

Our highly functional textiles have been developed specifically to simultaneously provide sun and heat protection, privacy and glare protection plus UV-protection for windows in the contract and residential sector furnishing. The metallised textiles reflect the sun's rays as they impinge upon them, regulate the incidence of daylight and radiation and reduce the entry of solar energy into the building, thus helping to improve the environment within the interior space during the summer.

OPTIMUM LIGHT CONTROL

Protection against excessive solar radiation is indispensable in modern buildings and offices. It is important for people's sense of wellbeing and productivity in the workplace that the best use should be made of daylight, while simultaneously avoiding glare. Individually controllable privacy and glare protection is vital for flexibility of use.
The best internal sun protection option combines design with function and reacts to the user's requirements with regard to the influence of light and heat from outside, as well as the need for illumination. Even in larger spaces with extensive glass surfaces, a pleasant atmosphere and sense of comfort can be designed into the space conveniently by using the right textile.

INDIVIDUAL DESIGN

Création Baumann's comprehensive, forward-looking GLARE&HEAT collection offers a large range of functional textiles in a variety of transparency levels, looks, structures and colours for individually controllable, flexible interior design.

FUNCTIONAL TEXTILES

Textiles are metallised with aluminium, steel, brass and copper to achieve excellent functional values that are impossible with conventional materials. The metallised side of the material must be used against the window to fully develop the specific properties of the textile.

TEST RESULTS

All the textiles are fully tested and evaluated. The reflective and transmission values in the visible light spectrum and global radiation ranges are determined in accordance with standardised procedures for all qualities and colours, as are the overall total energy transmittance level and the reduction factor in relation to reference glazing. These official test certificates are available on the Création Baumann website and will allow specialists in this subject to carry out light and energy calculations.
www.creationbaumann.com/Glare-Heat-Protection

THE BENEFITS OF THE INTERNAL SUN AND GLARE PROTECTION

- Individual control and a high degree of flexibility in interior design
- Effective protection against glare, mirroring and reflections with strong direct incident light
- Improved ergonomics and a reduction in contrast at the workplace/screen
- Optimum space lighting, incorporating the use of daylight and visual contact with the outside world
- Protection against excessive heat irradiation
- Reduction in the energy entering the building, and the resulting cooling load on climate control systems
- Reduction in UV-radiation for both people and furnishings
- Easy care, maintenance and installation
- Improved room acoustics

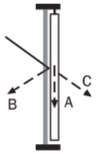
THE FUNCTION OF THE INTERNAL SUN AND GLARE PROTECTION

Three terms and their numerical values are of vital importance in internal sun protection:

- Transmission: The level of penetration of solar radiation/energy
- Reflection: The solar radiation/energy reflected back
- Absorption: The absorption of the solar radiation/energy

These key parameters determine what happens to the radiation falling on the transparent part of a building with sun protection. When they are added together, these values (coefficients) always add up to 100%.
In radiation physics, light (the visible range of the spectrum) is differentiated from energy (the overall range of the spectrum). The physical values are defined accordingly.

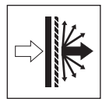
ILLUSTRATION OF TRANSMISSION, REFLECTION AND ABSORPTION OF SOLAR RADIATION



The glare protection product takes up part of the light by absorption (A), while the remaining light is reflected (B). Transmission (C) is used to describe the part of the light that can penetrate through the hanging. The glare protection product allows sufficient daylight into the room while retaining the potential for visual connection with the outside world.

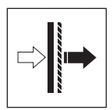
SYMBOLS AND INFORMATION LIGHT SPECTRUM

Light transmission degree of the sun protection material normal - hemispheric $\tau_{v,\ n\text{-}h}$



The amount of light (380 nm to 780 nm in the visible light range), that penetrates through the textile hanging into the room, weighted by the sensitivity distribution of the human eye.
The total hemispheric light transmission level, made up of diffuse and direct light transmission, indicates the proportion of the light transmitted (allowed) through the sun protection product when light falls vertically.

Light transmission degree of the sun protection material normal - normal $\tau_{v,\ n\text{-}n}$



The amount of light (380 nm to 780 nm in the visible light range), that directly penetrates the textile hanging and into the room.
The level of directed light transmission indicates the proportion of the light that is transmitted through the sun protection product when light falls vertically. This parameter is also a measure of how well direct visual contact can be broken with the sun, which is extremely bright.

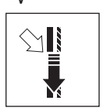
Light transmission degree of the sun protection material normal - diffuse $\tau_{v,\ n\text{-}dif}$

The volume of light (380 nm to 780 nm in the visible light range), that penetrates in a diffuse manner through the textile hanging and into the room.
The level of diffuse light transmission indicates the proportion of the light that is transmitted and diffused through the sun protection product when light falls vertically. This parameter is a measure of how brightly the curtain lights up when the sun shines upon it.

Light reflection degree of the sun protection material $\rho_{v,\ n\text{-}h}$

The volume of light (380 nm to 780 nm in the visible light range) that is radiated back (reflected) in the direction of the window by the metallised side of the textile, weighted by the sensitivity distribution of the human eye.

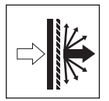
Light absorption degree of the sun protection material α_v



The volume of light (380 nm to 780 nm in the visible light range) that is absorbed by the textile hanging.

SYMBOL AND INFORMATION UV-SPECTRUM

UV-transmission degree of the sun protection material τ_{uv}



A measure of the UV-radiation (280 nm to 380 nm UV-radiation) that penetrates through the textile hanging into the room.

SYMBOLS AND INFORMATION SOLAR SPECTRUM

Solar transmission degree of the sun protection material $\tau_{e,\ n\text{-}h}$

A measure of the radiation/energy (280 nm to 2500 nm global radiation range) that penetrates through the textile hanging into the room.

Solar reflection degree of the sun protection material $\rho_{e,\ n\text{-}h}$

A measure of the solar radiation/energy (280 nm to 2500 nm global radiation range) that is reflected back by the metallised side of the textile.

Solar absorption degree of the sun protection material α_e

The volume of solar radiation/energy (280 nm to 2500 nm global radiation range) that is absorbed by the textile hanging. This heats up the hanging.

* Further information →

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REDUCTION FACTOR Fc-factor
The reduction factor describes the effectiveness of the sun protection product against the ingress of solar radiation in connection with a specified form of glazing. This is calculated from the total level of energy transmittance of a transparent component of the construction in connection with the sun protection equipment (g_{tot}-value) and the g-value of the glazing. g_{tot} is used to evaluate the effect of the sun protection equipment on the summer heat protection properties, in accordance with EN 14501 (thermal comfort given by the sun protection equipment).
The Fc-factor is partly dependent on the particular glass being used and varies accordingly. The approximate values calculated in accordance with DIN EN 13363-1 relate (for example) to double glazing with a thermal protection coating (Glass g-value: 0.70; U=1.6 W/m²K).

LEVEL OF ILLUMINATION, LUX
The level of illumination is a measure of the amount of light that falls upon a surface and lights it up. The higher the volume of radiation per unit of surface area, the greater the level of illumination. The unit of measurement is the Lux (lm/m2). The level of illumination is one of the most important measures in lighting engineering, as all the statutory regulations regarding workplace lighting relate to the level of illumination. An ideal office work station should have a level of illumination from a minimum of 500 to a maximum of 1,500 Lux.
Typical levels of illumination:
Bright sunny day 100,000 lx / Cloudy summer's day 20,000 lx / In the shade in summer 10,000 lx / Cloudy winter's day 3,500 lx / Office or room lighting 500 lx

EU STANDARD RELATING TO VISUAL DISPLAY UNITS / INTERIOR SHADING, DIN EN ISO 9241
This standard governing health and safety for work on VDUs applies in the European Union. It sets out the general requirements of the law governing health and safety protection at work in the area of VDUs in specific terms.
Spatial position, illuminated internal surfaces and the location of the screen must all be taken into account in order to provide effective glare protection at the workplace. The directives and standards governing PC work stations require that disturbing reflections should be avoided, mirroring and heat radiation should be prevented and it should be possible to have a visual connection with the outside world. It is also necessary for the equipment at the windows to be adjustable.

GLARE PROTECTION
Glare protection is used to avoid reflections and glare on a monitor. Surfaces that are too bright can lead to subjective glare as a result of high light densities. The higher the light density, the greater the glare. A distinction is made between direct glare and reflective glare. Direct glare is caused by the sun or a bright sky and the light falls directly into the eye. Reflective glare is caused by rays of light that are reflected off surfaces before they enter the eye (e.g. mirroring effect on the monitor screen).

TOTAL ENERGY TRANSMITTANCE OF THE GLAZING g
The total level of energy transmittance g indicates how much of the total solar energy enters the space through the glazing. The g-value is made up of the component of the radiation that penetrates directly plus the component of the radiation that is absorbed by the glass and emitted slightly later into the space via thermal radiation with long wavelengths and convection (heat transfer by moving air). The g-value is established in accordance with the EN 410 standard. The smaller the g-value, the less solar energy (heat) penetrates through that part of the building and the lower is the temperature behind the glazing.

TOTAL ENERGY TRANSMITTANCE OF GLAZING WITH SUN PROTECTION g_{tot}/g_t
Control of the ingress of solar heat is one of the most important aspects of thermal comfort in summer in the absence of a climate control system. The total level of energy transmittance is directly proportional to the ingress of solar heat.
The total level of energy transmittance g_{tot} indicates which component of the solar energy arrives within the space through glazing with sun protection.
The effectiveness of the internal sun protection always depends on the glazing actually in use and varies accordingly. In order to calculate an approximate g_{tot}-value, it is necessary to have the g-value of the glazing and the technical radiation coefficients of the sun protection material. The details provided refer to reference glazing. We recommend that the g_{tot} and Fc-values for the intended combination of sun protection and glazing in the specific construction project should be established in accordance with DIN EN 13363 (known installation conditions).

GLOBAL RADIATION
The global radiation is the sum of the direct, diffuse and reflected solar radiation falling onto the whole horizontal unit surface area. The atmosphere reduces the solar radiation by absorption, reflection and diffusion, such that the intensity at the Earth's surface falls to 1120 W/m² (summer, clear sky, middle of the day). Global radiation is made up of direct and diffuse radiation. In the case of diffuse radiation, the sunlight is scattered by fog, vapour or clouds and strikes the surface of the Earth from different directions. In direct radiation, the sun's rays arrive at the surface of the Earth without being scattered.

LUMINANCE L
Luminance (cd/m²) is a specific measure of the brightness of a luminescent or illuminated surface. It is defined as a quotient of the light intensity of a light source in a given direction and the vertical projection of the radiating surface in relation to the direction of radiation. Humans' impression of brightness created by a luminescent or illuminated surface depends on its luminance. It is therefore an important value for the subject of glare and glare protection.

THE CARE AND USE OF METALLISED TEXTILES
Metallisation is a highly technical process in which metal vapour is deposited onto the surface of the textile. The sheer layer of metal is prone to creasing and breakage. Do not crease or crumple the textiles as you work on them (creases are visible in penetrating light!). If necessary, creases can be removed by ironing lightly on the dyed side. Do not use a steam iron and iron on Setting 1.
The layer of brass used in Brass Base and copper in Copper Base is prone to showing fingerprints (from grease or acids, hand cream, etc.). In order to avoid permanent marking, we make the following recommendations:
- Wear gloves for manufacturing and installation
- Use a whirling rod
- Make up large seams at the side to not touch the metallised coating

PROTECTIVE COATING
Special protection is used to make the textiles resistant to water spots, water vapour, corrosion of the metal layers and soiling. Acidic and slightly alkaline dirt (fly droppings) and cleaning products may, however, damage the protective coating and cause the metallised layer to become detached.

PRIVACY
In architecture, transparency is a pivotal theme. Glass is more than a functional construction material: it is a stylistic device, representing transparency and light. Large amounts of daylight and the necessity for a visual connection with the outside world have influence on workplace design. The visual connection with the outside world promotes the sense of wellbeing, prevents a feeling of being hemmed in and increases user acceptance. Individually controllable privacy protection is used to prevent outsiders looking in and to preserve the employee's privacy.

SOLAR RADIATION
Solar radiation is the radiation emitted by the sun, and is also known as global solar radiation. This is the measurement parameter for the intensity of the solar radiation that reaches the surface of the Earth. The solar radiation is made up of diffuse and direct radiation. Together, direct and diffuse solar radiation produce the global radiation.
The energy of the sun travels to the Earth as rays (electromagnetic waves) and penetrates freely – through glass – into interior spaces. This is possible because uncoated glass is largely permeable to most of the radiation arriving here. Once they enter the room, rays with a particular range of wavelengths (energy) are converted into heat. The warm layer of air that accumulates between the glass and the sun protection product should ideally be removed by a ventilation system in order to avoid any heat reflection between the glass and the textile.

SUN PROTECTION
The term sun protection is used to describe protection against the excessive ingress of solar radiation. The architectural sector distinguishes between primary, secondary and tertiary sun protection. Primary sun protection methods include the alignment of the building itself, but also static, unmovable sun protection features, such as walls, trees, neighbouring buildings, etc. Secondary, controllable sun protection is fixed in front of the building's facade, and might include external Venetian blinds, facade awnings, etc. Internal, controllable sun protection such as textiles or other interior shading products are known as tertiary sun protection.
The amount of sun protection required depends on the actual solar radiation entering the building and the vertical and horizontal angle of entry of the solar radiation onto the building's façade. This varies, depending on the time of day or year and on the orientation of the facade towards a compass direction.

THERMAL COMFORT
Room climate is of particular importance for room comfort. Thermal comfort is achieved if the person within the room feels that the temperature, humidity and movement of the air and the radiation of heat within his or her environment is ideal.
The best internal sun protection option reacts to the user's requirements with regard to flexibility, the influence of light and heat from outside, as well as the need for illumination. Room comfort and room temperature can be controlled by reducing the entry of solar heat and in addition, energy can be saved – particularly the energy used for cooling.

UV-PROTECTION τ_{uv}
Studies have shown that UV (ultraviolet) radiation is increasing, and it is well recognised that this is caused by the reduction in the level of ozone in the atmosphere. More attention is also now being paid to the significance of UV-protection in interior design for buildings such as museums (to protect objects from degradation) and for glass frontages that cover a large area (to protect the furnishings and fittings from fading).
Sunlight includes visible radiation (wavelengths in nanometres, from 380 nm to 700 nm) and invisible radiation (wavelengths from 280 nm to 380 nm). The range of invisible radiation with wavelengths lower than the visible wavelength range is generally known under the term UV-radiation. According to EN 410, the ultraviolet radiation transmission degree τ_{UV} is recorded in the range from 280 nm to 380 nm and is significant for internal shading (it penetrates uncoated window glass). The higher the value, the more UV-radiation penetrates through the textile.

HEAT TRANSFER COEFFICIENT, U-VALUE
The heat transfer coefficient (U-value) is the measurement unit used to determine the penetration and loss of heat in a building component. The U-value indicates the amount of heat that travels per unit of time through 1 m² of a building component at a temperature difference of 1 K between the adjoining room and the outside air. The unit of measurement is W/m²K (Watt per square metre and Kelvin). The U-value probably represents the most important key parameter for glazing in general. The lower the U-value, the lower the loss of heat to the outside and therefore the lower the energy consumption.

HEAT PROTECTION
Heat protection is a term used in construction for a subarea of structural physics, and is split into winter and summer heat protection. All newly-built or renovated buildings are required to fulfil the requirements for heat protection. Modern, energy-efficient construction methods with highly thermally-insulated cavity walls and the architectural trend towards ever larger areas of glazing call for lower thermal loading within the rooms and targeted methods of ventilation. As anticipated, the type of sun protection as well as the ventilation and cooling methods used to carry away the thermal load exert the greatest influence on the internal temperatures.
Heat protection is becoming ever more vital in summer because of the similarly increasing external temperatures and expectation of comfort. All buildings should therefore be equipped with energy-optimised sun and glare protection as a matter of course.