

Room Darkening

Summary

- ✓ We know of no shading product that provides 100% light exclusion therefore the term 'Black Out' should not be used to refer to a shading product's visual performance. Fabrics may be 100% opaque but not the entire shading product.
- ✓ A product can be evaluated for its room darkening performance if tested to BS EN 14500 and classified by BS EN 14501.
- ✓ The room darkening performance of a product considers the frame (or lack of frame) and the shading material tested in situ. The opacity performance considers just the shading materials performance.
- ✓ Room darkening performance is classed on a scale of A - E and 1 - 4. The number identifies the opacity performance of the material, and the letter determines how good the frame is at stopping light from entering the room.

1. Introduction

Keeping light out completely is more difficult to achieve because of how sensitive the human eye is to the smallest amount of light. Light exposure at the wrong times of day can mean we do not get a good night's sleep (e.g., street lights and external light pollution) so it is important to manage consumers expectations by understanding the terminology used to determine a shading products ability to keep light out - particularly in bedrooms. This guidance notes outlines how British Standards determine room darkening performance and the recommendations this standard provides for different room types.

2. Room Darkening

A room darkening product is a shading product which limits the amount of light that can pass through it when it is fully extended and in a closed position. Even though all shading products affect the amount of light that passes through them some products are better than others at excluding light.

The room darkening performance of a product is a way of identifying how they perform and allow comparisons to be made. BS EN 14500 (2021) provides a way of testing shading products for their room darkening performance and BS EN 14501 (2021) provides a way of classifying their performance so differing shading products can be compared.

The best room darkening shading products use a shading material that has a low Visible Light Transmittance (Tvis) and are installed within a light exclusion system (i.e., frame). These products stop light from passing through the shading material and reduce light filtering round the edges of the blind.

Where a light exclusion system is not possible to install, it is still possible to reduce the amount of light entering a room by selecting a shading material that has a low Tvis and installing it outside of the window reveal. A low Tvis material allows less light to pass directly through the fabric and less light to be reflected and diffused by the fabric itself. Installing a shading product outside of the window reveal as opposed to inside the window reveal will reduce the amount of light filtering round the edges of the blind but will not stop it completely. A Tvis of zero means no light passes through the fabric i.e., it is opaque.

As far as we are aware no blind system is 100% light tight.



Roller Blind with Light Exclusion System
(Image Credit: SHY)

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3. Room Darkening Performance Classes

The shading material (fabric, slat or louvre) is tested and classified for their opacity performance and a room darkening performance is given to the combined performance of the material and the frame (or lack of frame) of the shading system when tested.

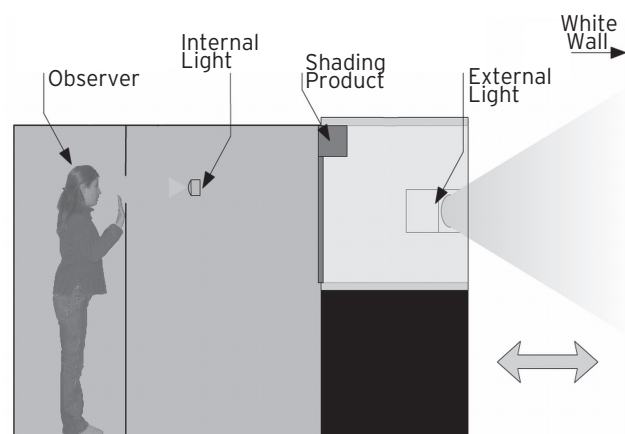
What the test involves?

Currently no electronic device is sensitive enough to replicate the human eye or practical enough for manufacturers to use.

Therefore, a person - termed the observer - is used to determine the opacity performance and the room darkening of a shading product.

The test requires the observer to sit in a light-tight environment and detect whether any light is perceptible through either the shading material or the material and frame when the outer surface is illuminated at different light levels. The shading product is observed for 15 minutes by the observer to enable the human eye to adjust to the darkness. The smallest pin prick of light will begin to appear as a bright beam of light overtime.

For some classes, an additional light source is placed in the observer room, to reproduce the light of an alarm clock, or light passing under a door in real conditions.



Example representation of Test Equipment (BS EN 14500: 2021)

The room darkening performance of a product is classed on a 0 - 4 and a A - E scale. The number identifies the opacity performance of the material, and the letter determines how good the frame (or lack of frame) at stopping light from entering the room. The classification table provided in BS EN 14500 is presented below where a class A.4 identifies that a product has a 'very good effect' on room darkening and a class E.0 has a 'very little effect' on room darkening.

The bottom row of the table identifies that the best class a free hanging blind can achieve is a E.4 (i.e., when a blind is installed without a light exclusion system). As the frame installation is critical to performance the manufacturer must define the fitting requirements to meet the test standard claimed. If not, then class D or E apply.

			Internal light level in the observer area (millilux)	No light perceived at the following external light levels (lux)	Curtain Material Class				
					0	1	2	3	4
Shading Frame	A	With light exclusion system	No light	75 000 lux					A.4
	B	With light exclusion system	2 millilux	30 000 lux				B.3	B.4
	C	With light exclusion system	2 millilux	1 000 lux			C.2	C.3	C.4
	D	With light exclusion system		No test		D.1	D.2	D.3	D.4
	E	Without light exclusion system		No test	E.0	E.1	E.2	E.3	E.4

Darkening Performance Classification Table from BS EN 14500: 2021

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4. When should a room darkening product be considered?

In certain situations, a room darkening shading product maybe crucial to the use of a room or a building. For example in:

- medical rooms
- laboratories
- in rooms where photosensitive materials are in use e.g., photography dark rooms
- in non-domestic buildings within a residential area
- and in all rooms in buildings within conservation or dark sky areas

A room darkening product could also be beneficial for occupants in:

- bedrooms
- rooms where A/V equipment is in use



Example of room darkening products within a living room and a child's bedroom (Image credit: Louvolite and Bloc Blinds)

Occupants may also simply prefer to have a blind that blocks out a significant amount of light. So, it is also important to simply ask the question - "What are you hoping you're blind will do for you in terms of light control?" - no matter what the room type is. This way you can be sure to inform them of the positive and negative effects associated with the shading product type they are considering and potentially offer them a better solution.

4.1. Room darkening in bedrooms

Access to daylight is essential for our health and well-being, however exposure to light at the wrong time of day can really upset our sleep/wake cycles - also known as our circadian rhythm. Exposure to light - particularly blue light which forms part of the light spectrum - can interfere with how sleepy we feel as it affects the production of a hormone called melatonin. Melatonin is the sleepy hormone the body produces that helps regulate our sleep/wake cycle. When we're exposed to less light our bodies start to produce it - making us feel sleepy.

4.2 Room darkening and audio and visual equipment

Limiting the amount of light within a room where audio and visual (A/V) is used can enhance a person's viewing experience of screens. Shading windows not only helps reduce the internal light levels but also simultaneously helps avoid glare issues which can cause people to feel uncomfortable.

For glare control an opaque material can create the need for artificial lighting and so is site dependent. For more details on how to specify shading for glare control please see our Guidance Note L-02.

4.3 Room darkening and photosensitive environments

Some room types may require complete darkness as the activities being undertaken in these rooms maybe photosensitive. For example, in test laboratories where the materials being used are light sensitive. In these cases, it is recommended in BS EN 14500 that a A4 room darkening performance shading product is used and suggests that a class B frame may be suitable for photography work.

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4.4 Room darkening for neighbours

Some non-domestic buildings may need to protect their residential neighbours and the surrounding natural environment from being exposed to light pollution from their establishment. For example, bars, night-clubs and 24hr gyms are often required to protect their neighbours from unwanted light exposure.

4.5 Room darkening for conservation

Buildings in conservation areas or dark sky areas may have specific requirements regarding the management of light pollution from buildings. This is because light pollution from buildings can negatively affect the animals and wildlife in the surrounding area.

BS EN 14500 gives class recommendation for some room types (i.e., for light sensitive laboratory work and for photography work) however other room/building types (e.g., bedrooms, rooms with A/V equipment, and buildings in conservation areas) are not provided.

This is because different users have different needs and expectations. It is therefore important that when specifying any shading product that the pro's and con's of a shading solution are fully explained to the consumer to ensure their expectations are adequately managed. The pro's and con's for each product type are covered in the 'Light Exclusion' section in the BBSA's Product Characteristics documents. These can be found in the Members Section at www.BBSA.org.uk.

5. Further Resources

ES-SO Webinar Master the revised Standards EN 14500 and EN 14501 - June 2021 - <https://www.youtube.com/watch?v=mmD-MDBOkU0&t=11s>

Guidance Note L-02 Glare Control - <https://www.shadeit.org.uk/type/guidance-notes/>

For further manufacturer guidance on testing please contact the BBSA Technical Working Group - zoe@bbsa.org.uk.