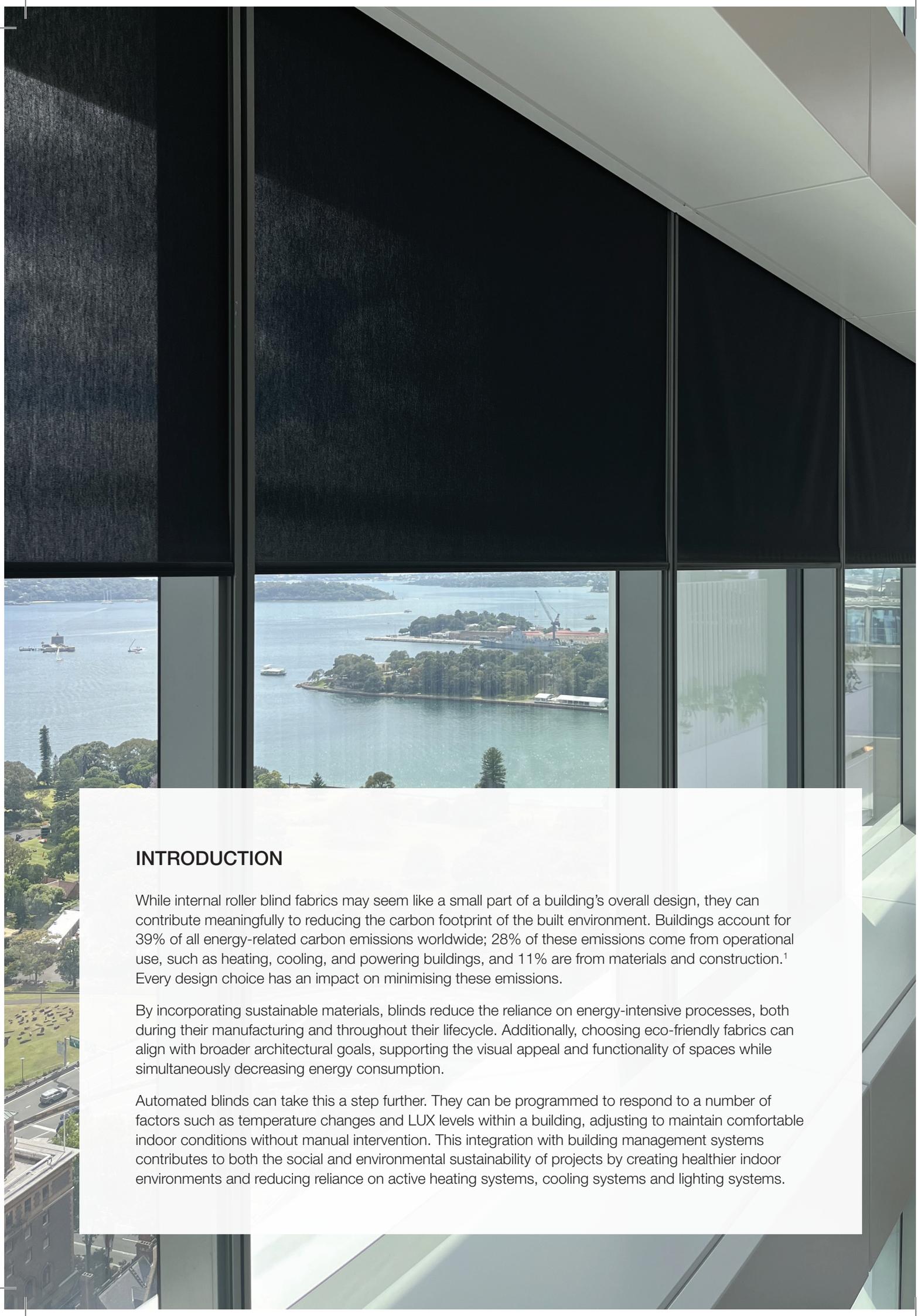
Internal roller blind fabrics

A Key Component in Reducing Carbon Emissions and Improving Building Performance

horiso®



INTRODUCTION

While internal roller blind fabrics may seem like a small part of a building's overall design, they can contribute meaningfully to reducing the carbon footprint of the built environment. Buildings account for 39% of all energy-related carbon emissions worldwide; 28% of these emissions come from operational use, such as heating, cooling, and powering buildings, and 11% are from materials and construction.[1] Every design choice has an impact on minimising these emissions.

By incorporating sustainable materials, blinds reduce the reliance on energy-intensive processes, both during their manufacturing and throughout their lifecycle. Additionally, choosing eco-friendly fabrics can align with broader architectural goals, supporting the visual appeal and functionality of spaces while simultaneously decreasing energy consumption.

Automated blinds can take this a step further. They can be programmed to respond to a number of factors such as temperature changes and LUX levels within a building, adjusting to maintain comfortable indoor conditions without manual intervention. This integration with building management systems contributes to both the social and environmental sustainability of projects by creating healthier indoor environments and reducing reliance on active heating systems, cooling systems and lighting systems.

TYPES OF INTERNAL BLINDS

Traditional internal roller blinds operate with a straightforward yet efficient system. They consist of a fabric panel connected to a rolling mechanism, which is mounted at the top of the window. As the blind is lowered, the fabric extends, offering control over light and ensuring privacy. This simple design has made roller blinds a versatile and widely used option in both residential and commercial settings.

Different fabric types offer varying levels of light control and energy efficiency. Block-out blinds provide complete darkness and privacy, ideal for bedrooms, boardrooms, hotel rooms and spaces requiring light exclusion. Light-filtering blinds soften incoming daylight while maintaining a level of privacy. Sheer blinds allow more natural light to filter through, enhancing visibility and providing a more open atmosphere within the space. Metallised fabrics, designed for higher performance, offer enhanced thermal regulation by reflecting sunlight.

SYSTEM DESIGN AND CONSTRUCTION

The main categories of fabric performance are as follows:

- **Openness factor:** Refers to how tightly the fabric is woven and is represented as a percentage. A higher percentage allows for greater visibility and more natural light but offers less privacy and reduced UV protection. Conversely, a lower percentage provides more privacy and UV protection while allowing less natural light and visibility.
- **GTOT or total solar factor:** The percentage of solar energy which penetrates into a room through the blind and the glazing. A low value means good thermal performance.
- **Solar absorption (AS):** This factor measures the proportion of the solar radiation absorbed by the fabric alone. A low percentage indicates low absorption of solar energy by the fabric.
- **Solar transmittance (TS):** Represents the proportion of solar energy transmitted through the fabric. A low percentage means the fabric performs well at reducing solar energy.
- **Solar reflectance (RS):** This measures the amount of solar radiation the fabric reflects. A high percentage means the fabric performs well at reflecting solar energy.
- **Ultraviolet radiation transmittance (TUV):** Indicates the percentage of ultra-violet radiation with wavelengths of 280 to 380 nm (nanometres) passing through the fabric. UV radiation accelerates natural ageing. All forms of solar protection provide protection in relation to UV rays.
- **Visible light transmittance (TV):** This refers to the total percentage of light radiated through the fabric over a wavelength of 380 to 780 nm (nanometers), called the visible spectrum (total illumination).
- **Visible light reflectance (RV):** This value represents the amount of light reflected by the fabric.
- **Fire resistance:** The ability of a material to prevent the spread of flames and avoid contributing to the intensity of a fire.
- **Acoustic absorption:** Is the fabric's ability to reduce sound reflections and minimise echo by absorbing sound waves thereby enhancing acoustic comfort in a space.

MAXIMISING ENERGY EFFICIENCY

A study commissioned by the European Solar Shading Organization (ES-SO) for the EU Commission found that dynamic facade shading could save up to 60 percent of the energy required for mechanical cooling by 2050.[2] Therefore, shading products can greatly decrease the demand for cooling and ventilation and lead to lower operational and embodied carbon emissions.

Section J of the National Construction Code (NCC) acknowledges the role of window coverings in improving thermal performance. To meet or exceed these standards, designers and specifiers must assess products for both energy efficiency and functionality. Tools such as the NCC Facade Calculator or third-party modeling software can assist in this evaluation, but consultation with manufacturers of high-performance window coverings is also essential.

Section J classifies external walls and glazing as components of the building's "external facade". As the glazing ratio increases, stricter Solar Heat Gain Coefficient (SHGC) requirements apply. Glazing units with superior SHGC performance can occupy a larger portion of the facade. This may necessitate the use of higher-performance coatings to meet requirements but they are not the only option—using performance blinds can be an effective alternative that allows you to maintain a high ratio of glazing on the building exterior.

Internal roller blinds enhance energy efficiency by controlling solar heat and natural light with fabrics that balance light filtering and privacy. The right fabric can greatly lower a building's carbon footprint by enhancing insulation and solar control, reducing reliance on heating and cooling systems. Below are some relevant fabric design considerations:

- Lighter fabric colors reflect more heat and light, increasing brightness within a room. Darker fabric colors absorb heat and light, effectively reducing glare.
- Metallised solar screens combine the benefits of both light and dark fabrics, with aluminium backing reflecting heat and reducing glare. Metallised fabrics offer high solar reflectivity but can create external glare affecting nearby buildings. The metallised coating on fabrics enhances solar heat and light reflection, reducing indoor temperatures and reliance on air conditioning.
- Performance white-backed fabrics deliver high reflectivity and privacy without compromising aesthetics. The white backing on performance fabrics significantly increases solar heat and light reflection while maintaining a clean, neutral look.
- Non-metallised fabrics offer decorative options. They create more ambient spaces, but offer lower reflectivity than performance alternatives. Non-metallised fabrics are also more aesthetically appealing when specified because the internal and external sides of the fabric match.

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MATERIAL SELECTION AND ENVIRONMENTAL IMPACT

Fabric blinds are typically composed of polyester, PVC (polyvinyl chloride), fibreglass or acrylic and are available in a variety of colours, patterns, and opacities. These materials provide varying degrees of light control and insulation, catering to diverse design and functional needs.

Polyester, a synthetic fabric derived from petroleum-based chemicals, begins its life as polyethylene terephthalate (PET), which is then processed into yarn fibres. This material is valued for its versatility, durability, and relatively low maintenance, making it a common choice for roller blinds.

PVC is created by laminating a layer of polyvinyl chloride film over a base fabric such as polyester or fibreglass. This lamination process increases durability and enables the application of different surface textures. PVC blinds offer notable benefits, including waterproofing, flame retardance, and resistance to degradation. However, PVC is less premium in feel compared to polyester, and its production involves significant environmental and health concerns due to the use of chlorine, mercury, and phthalates, alongside contributing to microplastic pollution.

The environmental footprint of PVC is concerning as it is energy-intensive to produce, difficult to recycle, and emits toxic chemicals during both production and disposal. Its lifecycle, from manufacturing to eventual disposal, releases hazardous chlorine-based chemicals, positioning PVC as one of the largest sources of dioxins globally.[3] Sustainable alternatives and innovations in recycling should be pursued to mitigate these significant challenges.

A more sustainable option is the use of post-consumer recovered ocean plastic. Recycled plastics, sourced from waste materials collected from oceans and shorelines, offer a viable solution for creating sustainable blind fabrics and reducing reliance on virgin petroleum-based materials.

One example is Sea-Tex, developed by yarn innovation company Bionic, which is a sustainable roller shade fabric made from 50% recovered ocean bound plastic polution. Sea-Tex fabric offers a significant environmental advantage compared to traditional cotton fabric, using only 70-85 litres of water per kilogram of fabric, whereas cotton production requires a staggering 8,000-12,000 litres per kilogram. Sea-Tex fabric production also leads in wastewater management, with its German facility employing the most advanced wastewater recycling systems in Europe, ensuring that water used during the manufacturing process is treated and reused efficiently.

The Sea-Tex manufacturing plant, which operates under some of the strictest environmental regulations in the world, generates 85% of its electricity from renewable energy sources, primarily solar power. The remaining 15% of the energy required is sourced from renewable suppliers, making the facility almost entirely reliant on clean energy, further supporting sustainable manufacturing practices.

HEALTH AND WELLBEING

Fabrics that offer effective control of natural light and glare can significantly enhance occupant health and wellbeing by regulating temperature and minimising the strain caused by excessive light exposure. This improves overall thermal comfort and visual clarity, leading to reduced stress and enhanced user satisfaction.

Selecting fabrics that minimise external reflectivity can help create a comfortable surrounding environment when considering the impact on neighbouring buildings. Metallised fabrics offer high performance with added reflectivity benefits, while white-backed performance fabrics effectively manage glare and visual comfort, supporting harmonious integration with surrounding structures. Privacy is another key factor; by increasing privacy, roller blinds help reduce anxiety and promote a sense of security.

Fabrics with low or zero volatile organic compound (VOC) emissions should be specified to maintain healthy indoor air quality. In addition, selecting fabrics treated with non-toxic dyes and finishes prevents the introduction of harmful chemicals into indoor spaces.

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CREATING A CIRCULAR ECONOMY

Specifying roller blind fabrics with high durability and UV resistance is critical to supporting a circular economy. High-quality fabrics that maintain their appearance and functionality over time reduce the need for frequent replacements, conserving resources and minimising waste. Fabrics with UV-resistant properties are particularly valuable as part of building systems that are continuously exposed to the sun, as they resist fading and degradation, extending their lifespan.

In addition to durability, selecting fabrics that are easily recyclable at the end of their life cycle is essential for promoting circularity. By ensuring that materials can be reused or repurposed after their initial use, waste is minimised, and the life cycle of products is extended.

SUSTAINABILITY CERTIFICATIONS AND STANDARDS

TOXICITY: Product certification plays a crucial role in ensuring that roller blind fabric specifications align with sustainable architecture goals. Certifications like OEKO-TEX® STANDARD 100 guarantee that fabrics are tested for harmful substances, ensuring that they meet rigorous safety standards throughout the production process. In addition to these safety standards, certifications like Greenguard ensure that roller blind fabrics meet stringent requirements for low chemical emissions.

CIRCULARITY: Cradle to Cradle certification further supports sustainability by evaluating the environmental and social impact of fabrics, emphasising recyclability, resource conservation, and responsible manufacturing practices.

CHAIN OF CUSTODY: The Recycled Claim Standard verifies the chain of custody for recycled materials, offering transparency in the use of recycled content in fabric production. Ocean Bound Plastic certification complements this by verifying the use of reclaimed plastic waste from coastal areas.

Together, these certifications ensure that specified fabrics not only perform well but also support sustainable architecture by minimising environmental impacts and promoting healthier, more responsible material use.

COMBINING FABRIC AND FUNCTION

SEA-TEX: A TRULY SUSTAINABLE BLINDS FABRIC

Sea-Tex is a high-performance roller shade fabric composed of 50% recovered ocean bound plastic pollution. For a commercial project like Sydney's Quay Quarter Tower, this translates to over 2,505 kg of ocean-bound plastic pollution re-purposed into the Sea-Tex fabric used to make their blinds. Developed in collaboration with yarn innovation company Bionic, the product aims to mitigate the environmental impact of ocean bound plastic pollution.

Sea-Tex fabric is suitable for manual, motorised, and automated solar-control roller shade systems, providing comprehensive technical support for both commercial and residential applications through Horiso. Available with options for non-metallised, metallised, and performance white-backed variants, Sea-Tex is 100% recyclable, fire retardant, and free from PVC. It holds certifications including Cradle to Cradle, Greenguard Gold, and Confidence in Textiles, ensuring low chemical emissions and no harmful substances.

HORISO INTERNAL ROLLER BLIND SYSTEMS

Horiso is a leading manufacturer of technical shading systems. By harnessing the power of light and shade, Horiso's solutions become an integral part of the building's design, enhancing both function and aesthetics.

Horiso is an Australian company specialising in solar shading systems, offering innovative and sustainable solutions for architects, designers, developers, and builders across various sectors, including commercial, hospitality, government, and residential. They manufacture and supply a range of solar control shading systems, such as external and internal Venetian blinds, rack arm louvre systems, tensioned shading systems, and drapery tracking systems. These systems are designed to optimise natural light, reduce solar heat gain, and enhance energy efficiency, making them a preferred choice for sustainable building projects.

What truly sets Horiso apart is their unwavering commitment to sustainability and innovation. Additionally, these systems are highly customisable, allowing them to seamlessly integrate with various architectural designs.

By focusing on sustainable solutions, product development and cutting-edge technology, Horiso continues to lead the way in the solar shading industry, providing architects, designers, developers, and builders with the tools they need to create social, economical and environmentally sustainable spaces.

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