



TECHNICAL GUIDE:  
**Meeting project specifications  
with high-quality glass**

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## Introduction

Glass plays a huge role in determining a building's aesthetic appeal, energy efficiency, structural integrity, and sustainability. As the demand for versatile, high-performing materials grows, selecting the right type of glass to meet project specifications has never been more important.

This technical guide provides an in-depth exploration of the factors involved in choosing high-quality glass that will suit your project perfectly.



## The changing role of glass in modern construction

Glass has evolved from being a basic component of architectural structures to becoming a sophisticated material that influences all aspects of a building's performance. It has allowed architects and engineers to create new designs that maximise light, reduce energy consumption, and improve comfort. Today, glass is used in façades, partitions, skylights, and even floors, each with specific performance and aesthetic requirements.

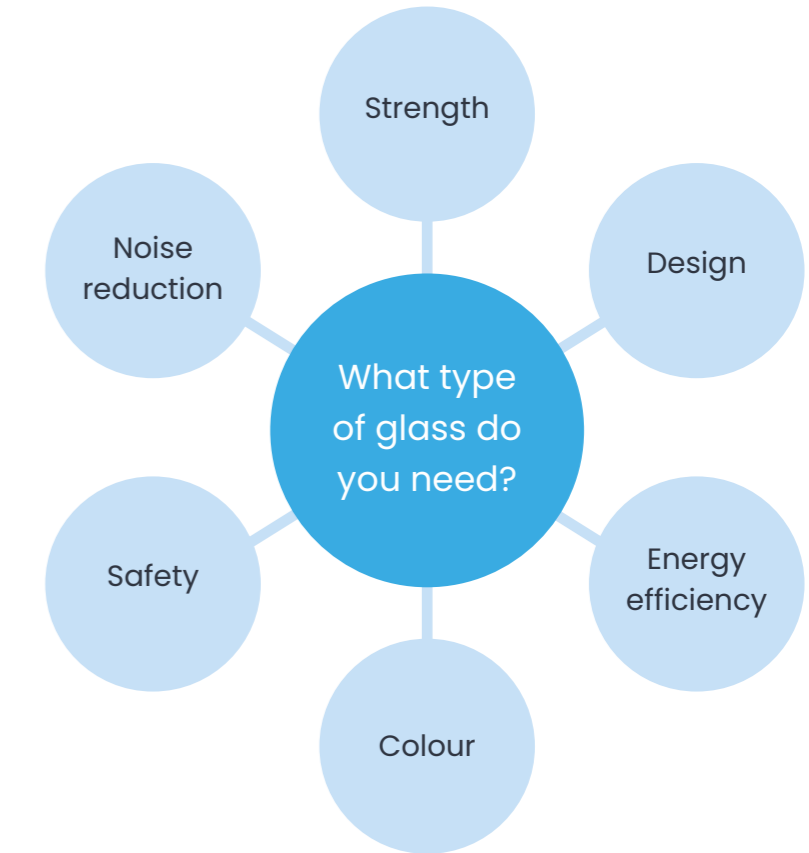
Understanding how glass works in these contexts is key to meeting project specifications. Glass is always part of the design and construction process, ensuring its properties align with the functional and environmental demands of the project.

## Choosing the right glass

Different types of glass offer varying levels of strength, safety, insulation, and design. Selecting the right option begins with understanding its intended application and how it interacts with the building environment.

Laminated glass consists of two or more layers of glass bonded together with a layer of polyvinyl butyral (PVB) or other interlayers. This composition ensures that the glass holds together when broken, making it an ideal choice for safety-critical applications.

It is often used in areas that require impact resistance, such as overhead glazing, balustrades, or areas exposed to potential breakage. Laminated glass also offers sound insulation properties, making it suitable for applications where noise reduction is necessary.



## The power of structural silicone bonding with glass

In modern architecture, there is a big demand for new ideas. ESG is proud to offer its cutting-edge structural bonding services, addressing this need for unobstructed, expansive glass facades and intricate architectural designs. Leveraging structural silicone bonding (SSB), enables architects and builders to create visually striking and structurally sound features, eliminating the need for obtrusive mechanical fixings such as frames, brackets, and channels.

Structural silicone bonding uses high-performance silicone sealants to bond glass and other building materials. It offers a superior combination of durability, weatherproofing, and it looks great. The silicone's high tensile strength can withstand various environmental stresses, from dynamic loads to extreme weather conditions. Moreover, this technique creates sleek, uninterrupted façades that align with the architectural trends of clean lines and open spaces.



The service covers bonding for canopies, partitions, balustrades, floors, doors, and expansive architectural elements such as facades and atriums. One of the key advantages is the ability to complete the bonding process in controlled factory conditions, reducing on-site installation risks and ensuring the highest quality standards. This controlled environment, operated according to stringent ETAG002 guidelines, allows for the application of Sikasil SG500 silicone in a climate-regulated space, ensuring optimal adhesion and performance.

This pre-assembly of glazed features significantly streamlines the construction process, cutting down on labour costs

and installation time, while maintaining the structural integrity of the project. For architects and designers seeking more creative freedom, ESG offers permanent bonding of glass panels without the use of frames, enabling uninterrupted views and bold architectural statements.

The structural bonding process is versatile, facilitating applications in both public and private spaces. From enhancing security and visibility in airports and train stations to providing the modern bi-fold doors and balcony bonding systems that are increasingly favoured in residential developments. Whether installed on-site or completed at the factory, these bonded solutions meet the aesthetic and functional

demands of today's construction projects. Furthermore, the company offers comprehensive advice and guidance, working closely with architects and builders to ensure the most appropriate materials and techniques are used for each project.

As a trusted partner in structural silicone bonding, ESG is helping to redefine the possibilities of architectural glazing. Its dedication to innovation, combined with decades of experience, ensures that clients receive not only a superior product but also the support needed to realise their architectural vision.



## Toughened glass

Tempered glass is heat-treated to increase its strength. It is up to four times stronger than annealed glass, making it highly resistant to impact. When it does break, it fractures into small, harmless pieces, reducing the risk of injury. Due to its strength, tempered glass is commonly used in doors, windows, curtain walls, and other high-traffic areas. Its durability makes it suitable for structural applications, including glass walls and railings.

Once the appropriate type of glass has been identified, the next step is to evaluate its performance characteristics. Meeting project specifications often requires glass to excel in areas such as acoustic performance, safety and structural integrity

## Acoustic performance

Noise pollution can significantly affect occupant comfort, especially in urban environments or near transportation hubs. In these cases, high-quality glass should be selected based on its ability to provide sound insulation. Laminated glass is particularly effective at reducing noise due to its interlayer, which dampens sound vibrations.

Thicker glass or double glazing systems with wider air gaps between panes also improves acoustic insulation. Acoustic glass is often specified for schools, hospitals, offices, and residential buildings where quiet indoor environments are essential.



## Safety and security

Safety is a fundamental consideration in glass selection. High-quality glass must be able to withstand impacts and break in a way that minimises harm to occupants. Laminated glass, with its protective properties, is ideal for applications where safety is critical, such as overhead glazing or areas with high pedestrian traffic.

Tempered glass, due to its strength, is ideal for doors, windows, and areas prone to accidental impact. Security is also a consideration for projects such as commercial buildings, banks, or high-security facilities. In these cases, toughened or laminated glass can be combined with additional security measures, such as alarms or reinforced frames, to deter break-ins and protect against vandalism.



## Structural integrity

For glass to be used in load-bearing applications, such as floors, stair treads, or large curtain walls, it must meet strict structural standards. High-quality glass used in these applications must be able to support significant weight and resist bending or deformation under stress. Laminated and tempered glass are often used due to strength and durability.

In structural glazing, the thickness and the type of interlayers used play a critical role in ensuring the glass can withstand both static and dynamic loads. Engineers must calculate the correct specifications to ensure the glass performs safely and reliably.

## Aesthetic considerations and design flexibility

Glass is beautiful. It plays a central role in the aesthetic design of any building. Its transparency, reflective qualities, and ability to transmit light make it ideal for creating visually striking spaces. However, aesthetics should not come at the expense of performance. High-quality glass should balance design flexibility with functionality to meet project objectives.



## Customised glass solutions

Glass can be customised in terms of tint, texture, and shape to suit specific architectural designs. Tinted glass, for example, can be used to control light and glare while adding colour to a building's façade. Frosted or patterned glass provides privacy while allowing light to pass through, making it a popular choice for partitions, balustrades, or shower enclosures.

Advances in glass processing technology allows for greater freedom in design. Architects can specify curved or shaped glass to create unique, dynamic structures. Glass can be printed with patterns or images to enhance the aesthetic appeal of a building while still meeting performance requirements.

## Daylighting

One of the key benefits of glass is its ability to bring natural light into a building. Daylighting not only improves occupant well-being but also reduces the need for artificial lighting. High-quality glass can be specified to maximise daylight without causing glare or heat gain. Expansive glazing offers unobstructed views, creating a seamless connection between indoor and outdoor spaces.





## Rules and regs

Building regulations and standards must be carefully considered when selecting glass. These regulations vary depending on the location, type of building, and intended use of the glass. Ensuring compliance with local codes is essential for both safety and performance. Acoustic regulations may also apply, especially in buildings located near noise sources. Acoustic testing ensures the selected glass provides adequate sound insulation to meet regulatory requirements.



## Safety standards

Safety standards dictate the type of glass that can be used in various parts of a building. For example, safety glass is typically required in doors, low-level glazing, and areas where there is a risk of human impact. Laminated and tempered glass are commonly specified to meet safety standards, providing both strength and impact resistance.

Fire-rated glass may also be required in certain applications to prevent the spread of flames and smoke. This type of glass is designed to maintain its integrity during a fire, allowing occupants to evacuate safely and minimising damage.

## Ensuring quality in manufacturing and installation

The quality of glass used in a project depends not only on the material itself but also on how it is manufactured and installed. High-quality glass is produced using advanced manufacturing techniques that ensure consistency in performance, clarity, and strength. Glass should be manufactured to meet international quality standards, such as ISO 9001 for quality management. This ensures the glass is produced to the highest standards of precision and durability. For example, reputable manufacturers provide certifications, verifying their glass meets performance criteria for safety, and acoustic performance.







Always providing superior quality

## Installation best practice

Proper installation is critical to ensuring the glass meets its performance specifications. Poorly installed glass can lead to air leaks, condensation, and structural instability, undermining the project's overall success.

Installation should be carried out by skilled professionals who follow industry best practices. This includes ensuring that the glass is properly sealed, framed, and supported to prevent issues such as water ingress or glass movement.

Meeting project specifications with high-quality glass requires a thorough understanding of both the material's properties and the specific needs of the project. From selecting the right type of glass to evaluating its performance in areas such as acoustic control, and safety, every aspect of glass specification must be carefully considered.

By choosing high-quality glass that aligns with the project's objectives & regulatory requirements, architects & engineers can create buildings that are not only functional & efficient but also visually stunning & sustainable.

**To discuss your next glass project,  
speak with one of our experts today.**

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