

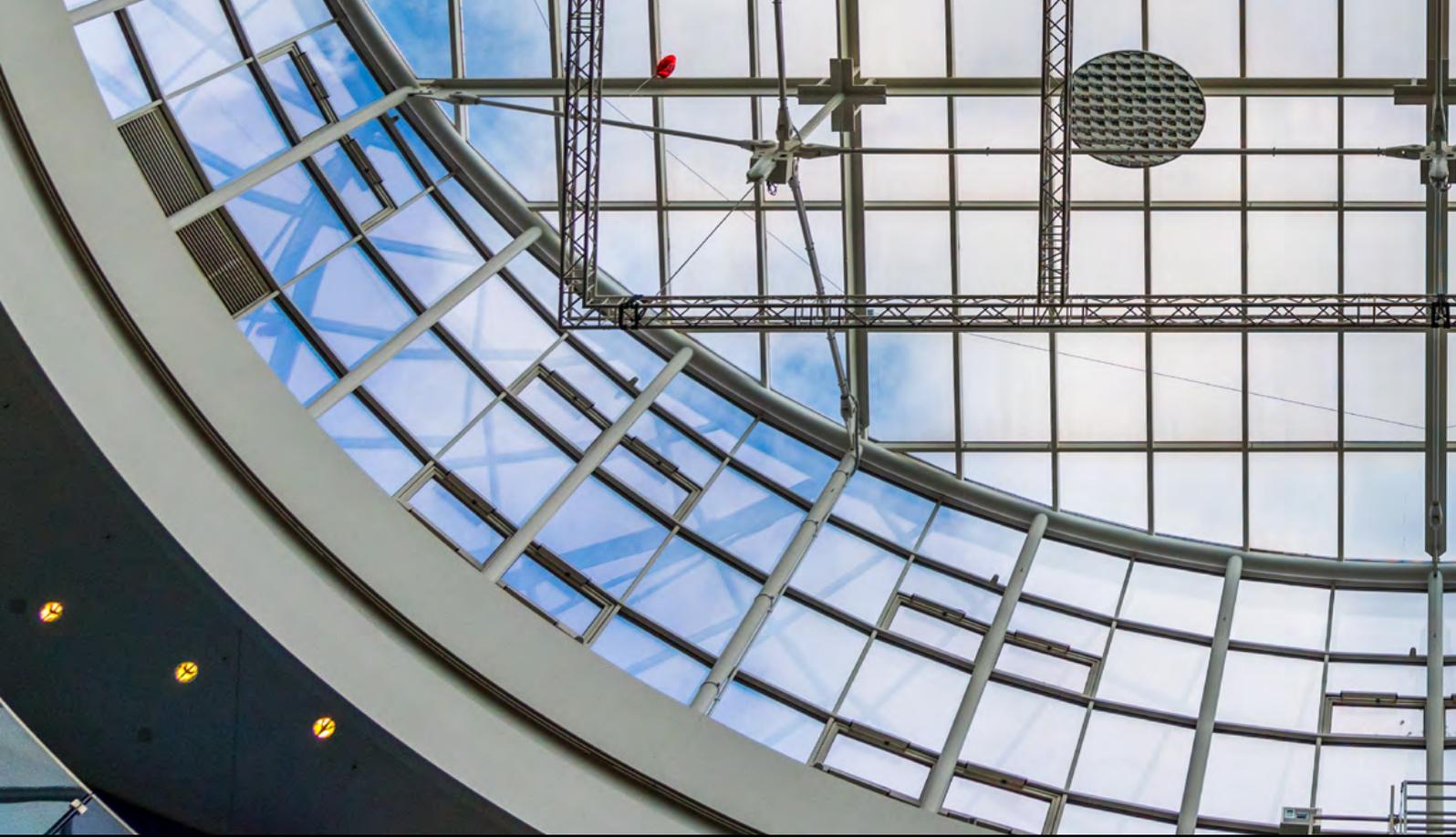


SANCO[®]
GROUP

SANCO[®] Safe

Effective protection from break-ins and injury risks
at home and in the work environment.

www.sanco.de



SANCO SAFE – THE BUILT-IN SAFETY MADE FROM



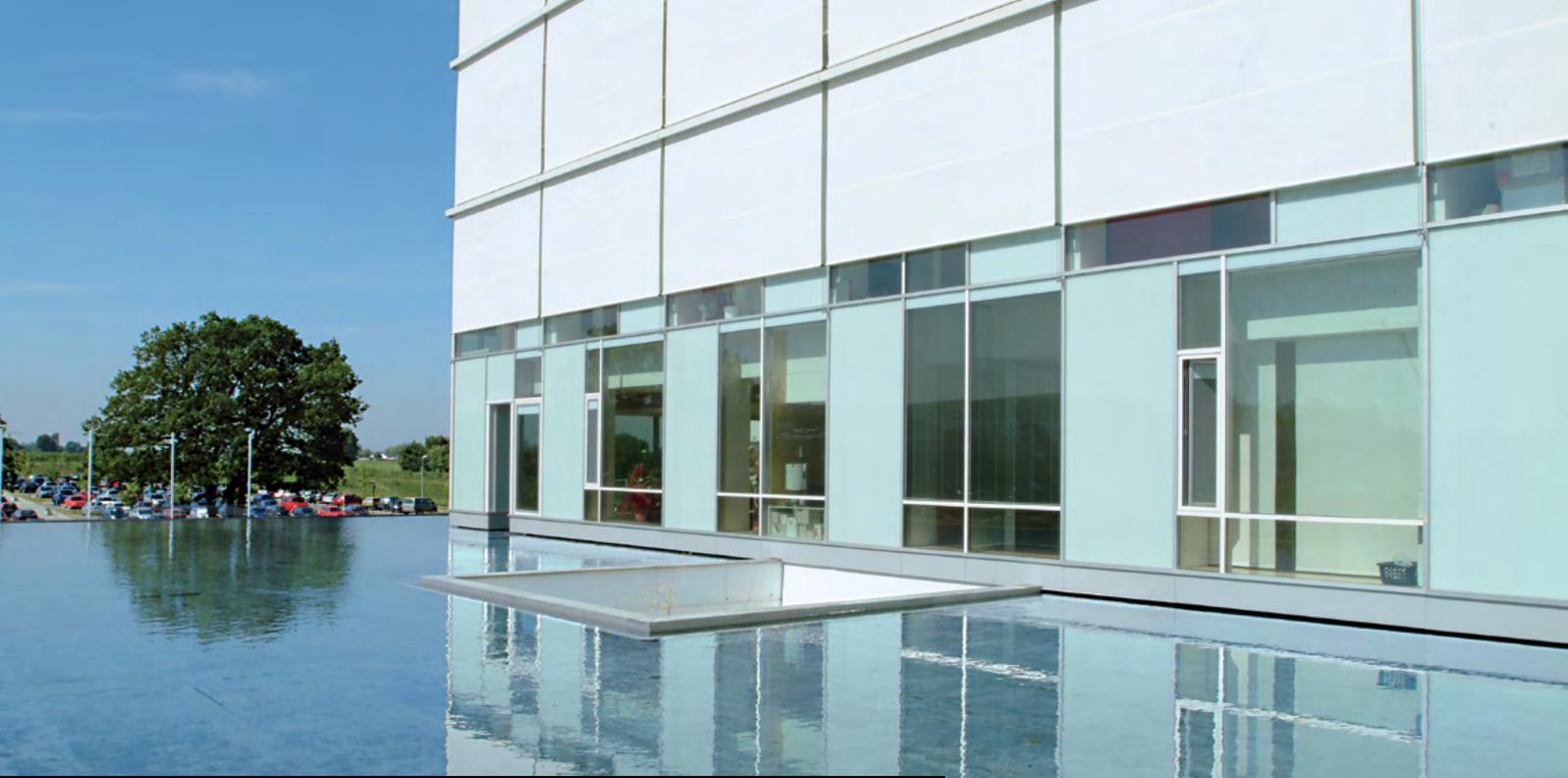


GLASS

Glass is different: helpful instead of brittle

Modern architecture is striking in its large glass facades, seemingly seamless glass surfaces that play with natural light. They reproduce the vistas of their surroundings, or they create their own points of focus by their form and dimension. Progressive and innovative techniques permit glazing solutions that just a few years ago were impossible. But in interior finishing too, glass dominates the atmospheric ambience. Very high standards are set for a transparent design both outside and inside. Bigger and more ambitious visualizations are continually calling for greater safety requirements too. SANCO offers products individually matched to requirements and catering to design and functional needs as well as to statutory provisions.

- Toughened safety glass SANCO DUR (ESG), laminated safety glass SANCO LAMEX (VSG) and heat-strengthened glass (TVG)
- For protection from break-ins, bullets and damage to health and property
- To protect against injury if the glass breaks
- For residual stability if the glass breaks
- Many possible combinations with functions such as thermal insulation, sound insulation and solar control
- Passive safety, e.g. for glass doors, balustrades, stairwells...
- Active safety, e.g. as attack-detering glass which is proof against thrown objects, penetration, bullets or falling



SAFETY GLASS AT A GLANCE

Glass is a very hard, highly resistant and yet brittle material that might break when subjected to high mechanical or thermal stress.

Further processing of the glass to match the stresses expected for it can give it special safety characteristics. Safety glass is understood as glass provided with defined and safetyrelevant characteristics by specific treatment, such as tempering or lamination. Safety in glass means: protection of people and property from outside effects, and protection of people if the glass breaks. Protection of people and property is understood to be protection from penetration, targeted attack such as break-ins, bullets and explosives, and protection from falls.

Protection of people if the glass breaks is understood to be protection from injuries, from falling or flying glass and from cuts by glass splinters.

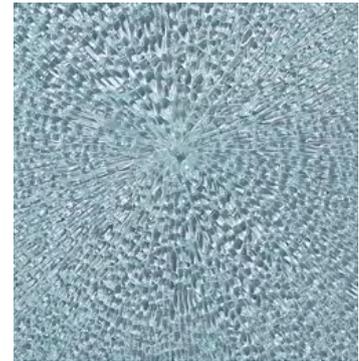


Toughened safety glass (ESG – SANCO DUR)

Thermally toughened safety glass (EN 12150) is distinguished by increased resistance to thermal stresses and blunt mechanical stresses. In the event of excessive stresses, it fragments into small and tiny chunks, some sharp-edged, sometimes interlocking with one another, particularly in the case of thick glass or additional enamelling. These glass fragments have a lower propensity to inflict injuries than untempered glass.

Heat-soaked toughened safety glass (ESG-HST)

Like ESG, but subjected to an additional and standardised heat-soak test (EN 14179), to avoid subsequent spontaneous fractures. Mainly required as a facade panel or where called for by technical construction regulations.



Heat-strengthened glass (TVG)

Heat strengthening imparts an increased resistance to thermal and mechanical stresses, although not as strong as in toughened safety glass, and results in a fracture pattern similar to that in a normally cooled float glass. Heat-strengthened glass (EN 1863) therefore cannot be safety glass when it is single-pane; it is however often the ideal safety glass when used as laminated safety glass.



Laminated safety glass (VSG – SANCO LAMEX)

Two or more glass sheets are laminated using a PVB laminate film (EN ISO 12543-2 and Construction Products List). The glass sheets are mostly float glass panes. In the event of the glass breaking, its fragments remain sticking to the film, thereby providing a high degree of residual structural strength. The glass sheets can however also consist of ESG or TVG or a combination of these. In laminated safety glass (VSG) made of two sheets of heat-strengthened glass, the residual structural strength is particularly high. With VSG made of two sheets of toughened safety glass, by contrast, it is however practically non-existent if both panes in the laminate are damaged.



Laminated glass (VG)

Cast-resin laminated glass and all other laminated panes with laminate materials not made of PVB in or on the glass (EN ISO 12543-2 outside Construction Products List and EN ISO 12543-3) afford certain safety characteristics. This applies particularly for higher-quality and multiple-laminated fire-resisting glass. They can however often not attain the safety level of a laminated safety glass. A special case is laminated glass with plastic panels integrated into it, among others. Safety properties of laminated glass must be verified separately by tests. To be recognised as laminated safety glass, general building authority approval is required.



SAFE AT HOME – PROTECTED IN DAILY LIFE AND AT WORK

SANCO Safe adapts to increasing safety requirements

SANCO Safe closes off the weak spots in the house that are at risk from break-in. Various features are available to ward off specific attack scenarios. Resistance to thrown objects, penetration and bullets are the standardised criteria to be met by SANCO Safe safety glass.

Active resistance is aimed protecting flats, houses or villas, as well as banks, jeweller's shops and shopping areas which are increasingly exposed to burglary and vandalism. Higher requirements, for example for government buildings, can also be met with enhanced safety features.

SANCO Safe offers a complete range of glass for protecting both private and public property. In addition to attack resistance alone, SANCO safety glass also offers fall prevention, e.g. for balustrades and glass surfaces in elevators.



Safe windows and balcony doors – the best protection against burglars

Most burglars try for windows and balcony doors. This is why it's worthwhile to take the necessary safety precautions in these areas. Every second break-in could be prevented if windows, conservatory doors and balcony doors were suitably equipped. 85 % of the windows fitted today fail to offer sufficient protection. Property and personal safety can be dramatically endangered in a matter of seconds.

Weak spots based on burglary frequency statistics



Balconies and patios	20 %
Ground floor windows	13 %
Roof windows	2 %
Garages	5 %
Cellar doors	25 %
Light wells	13 %
Front doors	9 %
Conservatory doors	2 %

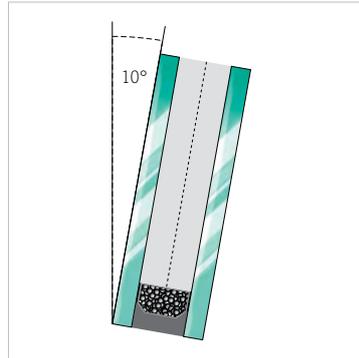
SANCO SAFE – ATTACK-RESISTANT GLAZING

Classification of requirements and resistance classes against attack

	EN standards	Resistance class as per DIN EN 356	Test criteria	Resistance class (old standard) as per DIN 52290		
				Part 3	Part 4	VdS 3163*
<p>SANCO Safe · Thrown-object resistance of resistance classes P1A - P5A</p> <p>Protection from break-in, spontaneous attack and vandalism. In conjunction with suitable fittings, the ideal protection in private surroundings.</p> <p>Test array for ball drop test A ball weighing 4.1 kg and 100 mm in diameter is dropped from varying heights (using which the safety classes P1A to P5A are defined) 3 times each onto a clamped glass sheet. The glass must not be penetrated even at the third attempt.</p> 	<p>DIN EN 356:2000-02 -; testing and classification of resistance against manual attack P1A - P5A</p>	P1A	1500 mm Ball drop height	-	-	-
		P2A	3000 mm Ball drop height	A1	-	-
		P3A	6000 mm Ball drop height	A2	-	-
		P4A	9000 mm Ball drop height	A3	-	EH 01
		P5A	9000 mm Ball drop height	-	-	EH 02
<p>SANCO Safe · Penetration resistance of resistance classes P6B - P8B</p> <p>These glass types fend off extremely severe attempted attacks. Penetration with an edged striking tool, e.g. an axe, must be prevented. Applications are jeweller's displays, shops with high-value articles and museums.</p> 	<p>DIN EN 356:2000-02 -; testing and classification of resistance against manual attack P6B - P8B</p>	P6B	30-50 Axe blows	-	B1	EH 1
		P7B	51-70 Axe blows	-	B2	EH 2
		P8B	über 70 Axe blows	-	B3	EH 3
*Transfer of DIN / EN classes only after additional VdS testing						
<p>SANCO Safe · Bullet resistance of resistance classes BR and SG</p> <p>Combination with different thicknesses of glass sheets and multi-layer films of highly tear-resistant material results in bulletresistant safety glass. Depending on their type and structure, these glass types can withstand different firearm types. The affixed letters non-split (NS) and split (S) indicate whether people are safe when close to the glass. It is used in state buildings, such as those used by government, police or justice, or in business premises.</p> 	<p>DIN EN 1063:2000-01 -; testing and classification of resistance against bullets BR1 – BR7, SG1 + SG2</p>	Resistance class as per DIN EN 1063	Type of firearm/ calibre	Resistance class (old standard) as per DIN 52290 Part 2		
		BR1 – S/NS	Rifle, calibre 0.22 LR	-		
		BR2 – S/NS	Pistol, calibre 9 mm Luger	C1 – SA/SF		
		BR3 – S/NS	Revolver, calibre 0.357 Magnum	C2 – SA/SF		
		BR4 – S/NS	Revolver, calibre 0.44 Rem. Magnum	C3 – SA/SF		
		BR5 – S/NS	Rifle, calibre 5.56 x 45	-		
		BR6 – S/NS	Rifle, calibre 7.62 x 51 (soft core)	C4 – SA/SF		
		BR7 – S/NS	Rifle, calibre 7.62 x 51 (hard core)	C5 – SA/SF		
		SG1 – S/NS	Shotgun, calibre 12/70 (1 hit)	-		
		SG2 – S/NS	Shotgun, calibre 12/70 (3 hits)	-		
<p>SANCO Safe · Blast-resistant security glazing</p>	<p>DIN EN 13541:2001-02 Special processes for blast-resistant security glazing – classes, classification and test methods ER1 – ER4</p>					

SAFETY IN STRUCTURAL USE OF GLASS

To ensure safety in glass products, the respective building regulations, laws and standards must be complied with. The examples cited here are only excerpts from the form valid at the time of going to print. No further claims may be lodged on the basis of these. Further information is available at www.sanco.de or from your SANCO company.



Vertical glazing

Vertical glazing is understood as a glass sheet or a glazing element inclined no more than 10° out of the vertical.

Structural use of glass

Supporting structures made of glass used as supports, beams or fins entail particular safety considerations when selecting the type of glazing and its dimensioning. Due to the required residual load-bearing capacity, only laminated safety glass (VSG) is used, predominantly of toughened (ESG) or heat-strengthened glass (TVG). Residual load-bearing capacity refer to the ability of a glass structure to prevent, after a glass fracture, breaking through or coming loose from its mounts under its own weight and under an additional load for a certain period.

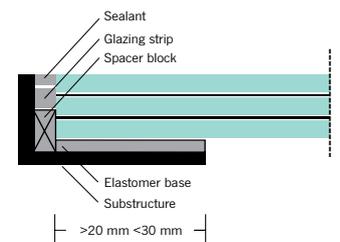


Walk-on glazing

Walk-on glazing is used for the steps in stairways, for parts of ceilings, for platforms or for pedestrian bridges. In addition to absorbing structural effects, a sufficient residual load-bearing capacity after fracture is required and can only be met by at least 3-sheet laminated safety glass. For safety reasons, the topmost covering layer is not included in the loadbearing concept.



Linear mounting of walk-on glazing



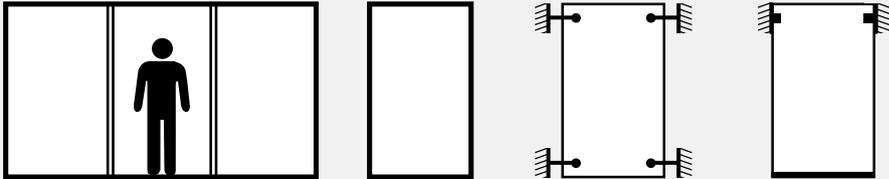
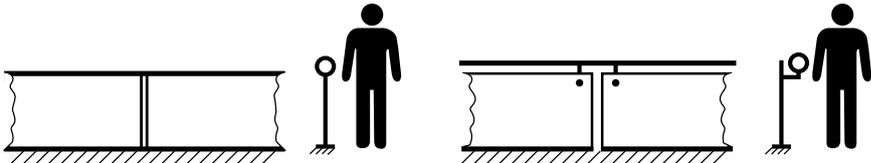
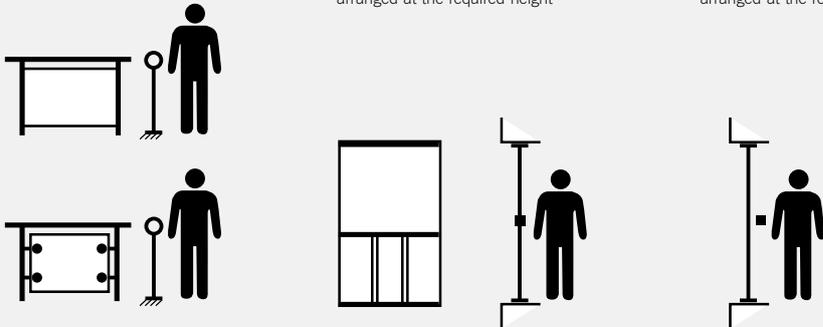
Tread-on glazing

Tread-on glazing differs from walk-on glazing in that only limited access is possible to a person for cleaning and maintenance purposes. The requirements are lower compared with walk-on glazing.



Fall-prevention glazing (DIN 18008 Part 4)

Fall-prevention glazing is subdivided into three categories depending on its design:

Cat.	Description according to DIN 18008-4
A	<p>Glazing in accordance with Parts 2 or 3 of this standard which has to transmit horizontal loads, as it does not have a load-bearing sill rail or forward rail at the required height for absorbing horizontal useful loads, in accordance with DIN EN 1991-1-1:2010-12 and with DIN EN 1991-1-1/NA:2010-12, 6.4.</p> 
B	<p>Glass balustrades mounted at the bottom, of which the individual sheets are connected by a continuous handrail at the required height. The handrail can be fastened on the top sheet edge or using plate holders in accordance with Part 3 of the present standard.</p> 
C	<p>Glazing in accordance with Parts 2 or 3 of this standard which does not have to transmit horizontal useful loads at the required level and which matches one of the following groups:</p> <p>C1: Balustrade compartments</p> <p>C2: Glazing below a load-absorbing cross-rail arranged at the required height</p> <p>C3: Glazing below a load-absorbing cross-rail arranged at the required height</p> 

Cat.	Permitted glass products for fall-prevention glazing in accordance with DIN 18008-4	
	Single-pane glass	Multi-pane insulating glass
A	VSG	<ul style="list-style-type: none"> - At least one pane of the MIG must be VSG - Side facing the shock (impact side) may only be VSG, ESG or laminated glass (VG) of ESG - MIG with ESG on the impact side may contain, directly behind this pane, coarse-fracturing glass types if no glass fracture of the ESG pane occurs on the impact side during the pendulum test
B	Only VSG permissible	Only VSG permissible
C1 and C2	<ul style="list-style-type: none"> - VSG - With linear mounting on all sides, ESG is also permissible 	<ul style="list-style-type: none"> - Side facing the shock (impact side) may only be VSG, ESG or laminated glass (VG) of ESG - For the other panes, all glass products permissible in accordance with Parts 2 and 3 are possible
C3	VSG	As for Category A



DESIGN AND SAFETY

More attractive home with glass:
atmospheric, individualised, safe

SANCO ROOF

A 'floating' projecting glass roof system with elegant design, without heavy supports obstructing the view. The important thing: SANCO ROOF is much more than just a facade set at an angle, because the glass projecting roof system has to meet stricter requirements in terms of safety, design and glazing technology.



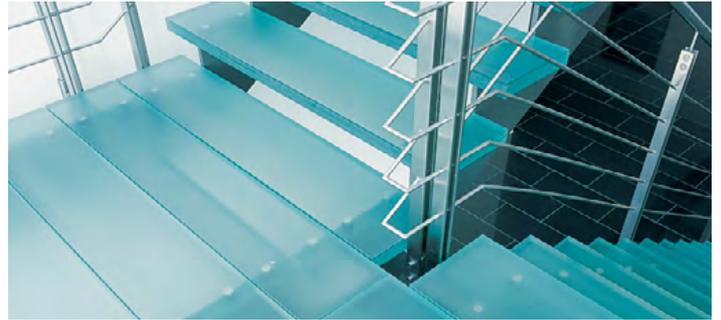
Glass partition walls

Glass acts not only as a transparent partition wall between indoors and outdoors: it also offers a wide range of options for the design of interiors - as accentuating wall panelling, as a partition wall or as a room divider. And it doesn't have to be always 'glass clear' here. Structured or coloured - sometimes it's just a detail that creates an entirely new effect.



Glass staircases

An invitation to step up: stairways and floors made of glass give a room a very special atmosphere. They are attractive highlights for interior decoration. Bright, lightweight and visually open, walk-on glass fits in outstandingly with every building style.



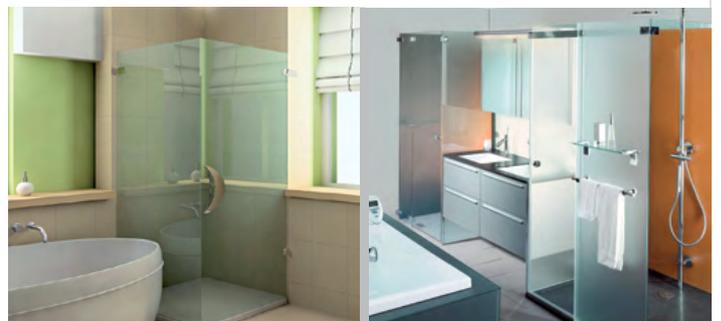
Glass doors

A truly transparent invitation to step inside, because glass creates a spatial separation that at the same time visually connects. For example, glass room doors or allglass door systems provide lots of room for light and a friendly ambience too. The proverbial 'open door' in your own four walls has a variable and imaginative appearance and design.



Glass shower cubicles

Open, translucent and hygienic – that makes glass ideal for use in the bathroom. Small floor areas or dark niches in particular make a real splash with a glass shower. Round or angular, with transparent or printed glass – there are almost no limits to individuality. With plenty of room to move plus an open feel in the room, the morning shower becomes an experience, almost as if it was outdoors.



Glass furniture

Cabinets, shelves, tables or hi-fi units can be made from glass – as standard versions or as imaginative one-offs. To do so, all methods of glass finishing can play a part: ornamenting, etching, sandblasting, enamelling, silvering – the range of possibilities extends from a simple showcase to a high-quality set.



LAMEX COLORDESIGN

Coloured safety glass for indoors and outdoors

It has the same basic properties as conventional laminated safety glass. In addition, it offers a universe of colours, if required in more than 1000 nuances. Coloured glass combines functionality and aesthetics in a unique way. It permits functional room partitions as well as the design of media facades. LAMEX COLORDESIGN conforms to European standards in respect of safety requirements.

Examples for application:

- Overhead glazing
- Balconies
- Partitions, stairs
- Entrance areas
- Facades



SANCO Phon SC and SANCO Phon PS – the all-rounders for sound insulation and safety

SANCO Phon SC and PS have been optimised to cope with more stringent sound insulation requirements, while allowing contractors to meet all safety-relevant protection criteria.

SANCO Phon SC and PS also offer, following their approval as laminated safety glass in line with TRAV and TRLV rules, solutions for overhead glazing and fall-proof glazing. SANCO Phon SC and PS thus provide all the safety characteristics of a laminated safety glass. Thanks to the sound control film, outstanding values are attained in the field of sound insulation. In practice, there are many multifunctional applications for the exterior design of facades as well as in building interiors, e.g. in the form of partition walls, as overhead glazing or as fall-proof glazing.



SANCO PRINT – Screen printing on glass makes ideas reality

SANCO PRINT is a thermally toughened safety glass in accordance with DIN 1249. In conjunction with colour and light, it offers splendid possibilities and architecturally attractive solutions for the exterior and interior design of buildings, facades and window surfaces. But screen printing also affords the option of printing arbitrary forms defying geometric definition or photos onto glass. Decors – applied selectively – are an effective instrument for light control, e.g. on windows and roofs.

Whether it's a brilliant white, a pastel yellow or a pale grey – the glass decor colours can be freely selected. Almost any required tone is possible. Even multi-coloured prints are possible, either next to or over one another. With SANCO PRINT, there are hardly any limits to your creativity: enamel colours according to RAL, one-off colours, and numerous decors with geometrically arranged dots, squares and stripes.



SANCO Alarm

An electrically conducting loop connected to an alarm system is embedded at a corner of a toughened safety glass. When the glass is smashed, the alarm is given immediately and automatically. Full surface protection with the certainty of the alarm being triggered even by the most minor tampering. Versatile combination options inside the insulating glass. No inadvertent interruption of the circuit (false alarm) thanks to the simple conducting loop.



SANCO POINT – the point mounting

The striking thing about SANCO POINT is the simple glass mounting. The glass holder is suitable for single glazing, for flush-mounted designs or with an outer clamping sheet. SANCO POINT can still be adjusted after the glass has been suspended. It has been inspected in accordance with the draft TRAV according to Categories A and C. SANCO POINT is used in stairway and balcony banisters, partition walls, room dividers and bus stops. Versions with toughened safety glass and laminated safety glass.



Accents for the glass facade

SWISSWALL – perfect mounting, versatile use. SWISSWALL opens up many possibilities for glass architecture and for impressively designed transparent facades. With rigid and movable point holders, in a flush-mounted version or with an outer clamping sheet. There are many uses for SWISSWALL: glass roofs, bus stops, elevator glass, stairway and balcony banisters, partition walls, room dividers, light protection walls and light ceilings as mono or insulating glazing.

SANCO scaled facade MONO + DUO

The MONO + DUO scale holder is a low-cost alternative. The toughened safety glass used does not need holes drilled into it. Glass thicknesses from 8 to 12 mm can be held by the scale holder.









GLASS CAN BE MORE!

SANCO Safe safety glass

A persuasive range of safety glass types for countless applications: Window and facade, structural use of glass, in interior or as fall prevention. This is design latitude that caters in every form to building law requirements and to the desired safety aspects.

You can get detailed information from your local SANCO partner.