arcon®
Safety glass

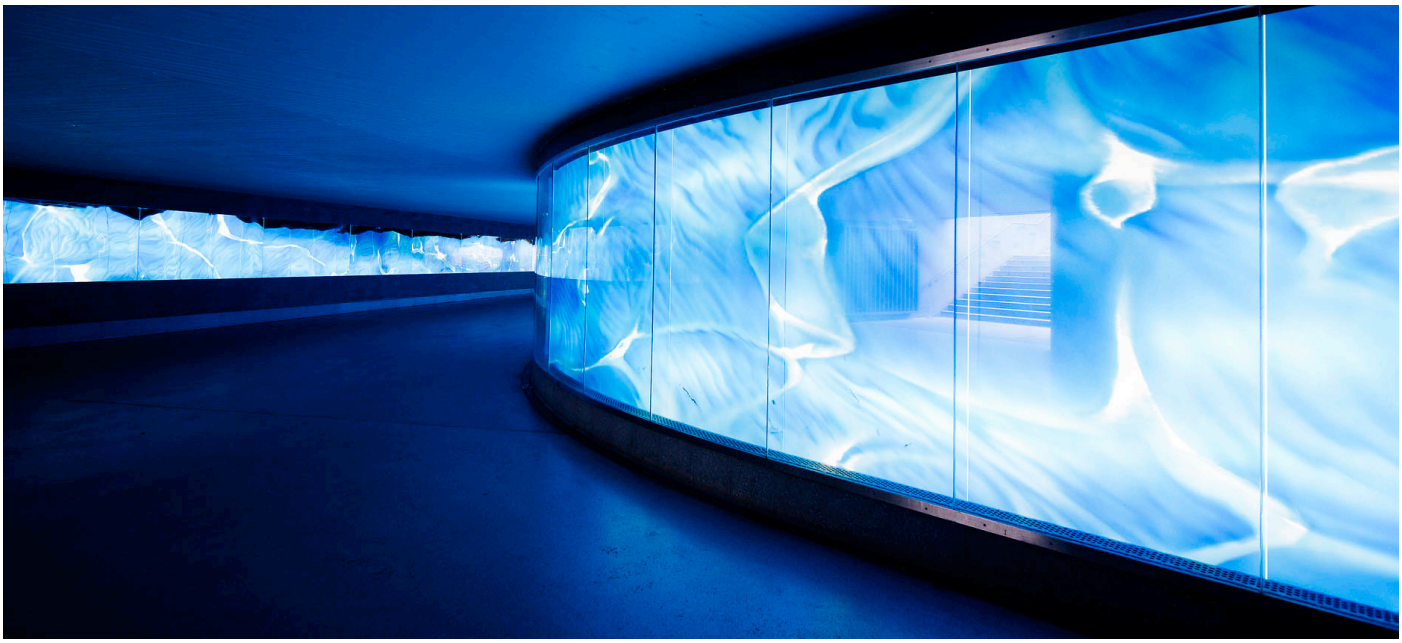
SAFETY GLAZING FOR CRYSTAL CLEAR SECURITY

arcon
perfection in glass

UNINVITED GUESTS OR UNWANTED CRASHES – WHATEVER YOU WANT TO PROTECT YOURSELF FROM: ARCON® SAFETY GLAZING PROVIDES YOU THE SECURITY YOU NEED TO LIVE AND WORK WITH GREATER PEACE OF MIND.

THE RIGHT GLASS TO SUIT EVERY NEED

Glass is not just a transparent material that creates brightness and a feeling of spaciousness. In fact, through special finishing and machining processes, glass can also perform protective functions in a variety of ways. Safety glazing protects people and animals when using properties with special safety requirements. That is why we offer safety glass for a wide range of applications and distinguishes between thermally toughened and laminated safety glass. Safety glazing by arcon® makes your home, store or office building safer – regardless of whether it is processed as an insulating glass unit or a monolithic glazing.



Laminated safety glass in an underpass in Wiesbaden, Germany.

LAMINATED SAFETY GLASS

Our l**aminated safety glass** consists of two or more layers of glass, which are bonded together with one or more elastic intermediate layers. This is usually a polyvinyl butyral (PVB) film. Depending on the requirements, the materials of the film differ: For example, there are softer films with sound-absorbing properties and particularly tear-resistant films for attack-resistant glazing. In addition, coloured films can be used to meet architectural preferences.

Our laminated safety glazing can be used to realise partition walls, floors, stairs or roofs made of glass. One of the many ways in which our glass provides protection is by ensuring that in the event of glass breakage, no large glass elements fall onto the traffic areas below it. Other areas of application can be fall-proof or attack-resistant glazing.

Stair treads consisting of laminated safety glass.

FALL PROTECTION GLAZING

In Germany, the requirements for fall protection glazing are defined in a standard. A fall is the unintentional falling down from or falling off through one surface onto another. People should therefore be protected from falling by appropriate vertical or horizontal glazing. Areas of application can be, for example, balcony parapet walls or floor-to-ceiling glazing above the ground floor. The fall protection function is only achieved through the combined action of glass, frame and the proper attachment to the building structure. According to DIN 18008-4, fall-protection glazing is divided into categories A, B and C, which differ in terms of their areas of application, the types of glass and glass structures that can be used, and additional requirements. Detailed information is available on request or as a download on our website.

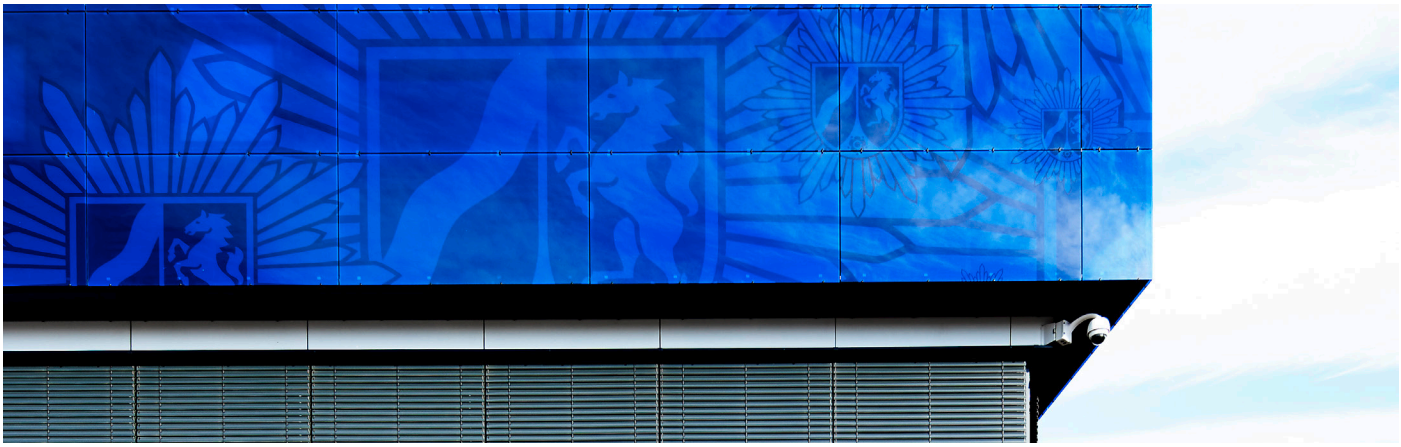
Fall-proof glass railing on a house roof.

ATTACK-RESISTANT GLAZING

Laminated safety glass processed into insulating glass with impact-resistant or breakthrough resistant properties makes it more difficult for burglars and violent criminals to break through the glass and windows. The effort and time required for the attack are increased. Thus the “object of desire” already becomes uninteresting for the perpetrator. After damage by projectiles, striking tools or even after explosions or gunfires, the glazings, which have been tested to standards, still exhibit considerable stability. This too provides the required protection to persons and property. The test of attack-resistant properties is carried out in accordance with the European standards EN 356 (impact and penetration resistance) and EN 1063 (ballistic security).

The attack-resistant properties are divided into the following four categories:

- MULTIPACT® PA
  with impact resistant properties
- MULTIPACT® PB
  with penetration resistant properties
- MULTIPACT® BR/SG
  with bullet resistant properties
- MULTIPACT® ER
  with blast resistant properties



Laminated safety glass at the Police Headquarters, Mönchengladbach, Germany.

LAMINATED SAFETY GLASS – THE KEY BENEFITS

- Reduction of the risk of injury
- High residual load bearing capacity for overhead application
- Improved sound insulation by the lamination film
- Protection of life and limb, possessions and property

TECHNICAL DETAILS AT A GLANCE

Attack-resistant glazing

Product name	Glass construction	EN 673	EN 410								Thick-ness	Weight
	Outer/Cavity/Mid/Cavity/Inner	U_g -Value	Light Transmission	g-Value	Light Reflection external	Light Reflection internal	Colour Rendering Index R_a	Resistance class according to				
		W/(m²K)	%	%	%	%		EN 356	EN 1063	EN 1522	mm	kg/m²
Laminated safety glass / 8 P2A	44.2	5,5	89	79	8	8	98	P2A	-	-	8	20
Laminated safety glass / 9 P4A	44.4	5,4	89	78	8	8	98	P4A	-	RC 2	9	20
Laminated safety glass / 10 P5A	44.6	5,3	89	77	8	8	98	P5A	-	RC 3	10	20
Laminated safety glass / 12 P5A	55.6	5,3	88	76	8	8	98	P5A	-	RC 3	12	25
Laminated safety glass N34 // 28 P2A	4: / 16 / 44.2	1,1	80	61	12	11	97	P2A	-	-	28	30
Laminated safety glass N34 // 29 P4A	4: / 16 / 44.4	1,1	80	61	12	11	97	P4A	-	RC 2	29	30
Laminated safety glass N34 // 30 P5A	4: / 16 / 44.6	1,1	80	61	12	11	97	P5A	-	RC 3	30	30
Laminated safety glass N34 // 32 P5A	4: / 16 / 55.6	1,1	80	60	12	11	97	P5A	-	RC 3	32	35
Laminated safety glass / 15 P6B	15	5,1	87	74	8	8	98	P6B	-	RC 4	15	30
Laminated safety glass / 20 P7B	20	4,9	86	71	8	8	97	P7B	-	RC 5	20	38
Laminated safety glass / 25 P8B	25	4,7	85	68	8	8	96	P8B	-	RC 6	25	50
Laminated safety glass N34 // 37 P6B	6: / 16 / 15	1,1	78	59	11	11	96	P6B	-	RC 4	37	45
Laminated safety glass N34 // 42 P7B	6: / 16 / 20	1,1	77	59	11	11	95	P7B	-	RC 5	42	53
Laminated safety glass N34 // 47 P8B	6: / 16 / 25	1,1	76	59	11	11	94	P8B	-	RC 6	47	65
Laminated safety glass / 41 BR5-S	41	4,4	79	60	7	7	93	-	BR5-S	FB 5	41	94
Laminated safety glass N34 // 69 BR5-NS	69	1,2	69	44	10	11	90	-	BR5-NS	FB 5	69	132

The following applies to the entire product range: In thicker glass packs, the intrinsic colour of glass becomes increasingly noticeable, which is why the design with glass products of particularly low intrinsic colour is particularly suitable for such applications. All types are also available as triple safety glass.

Fall protection glazing

Product name	Glass construction	EN 673	EN 410					DIN 18008	Thick-ness	Weight
	Outer/Cavity/Mid/Cavity/Inner	U_g -Value	Light Transmission	g-Value	Light Reflection external	Light Reflection internal	Colour Rendering Index R_a	Fall protection according to DIN 18008-4		
		W/(m²K)	%	%	%	%		Category	mm	kg/m²
Laminated safety glass N34 // 1,1 [1)]	6 ESG / 16 / :44.2	1,1	80	63	11	11	97	A, C2, C3	31	35
Laminated safety glass N34 // 1,1 [1)]	8 ESG / 16 / :55.2	1,1	79	61	11	11	96	A, C2, C3	35	45
Laminated safety glass N34 // 1,1 [1)]	44.2 / 16 / :6 ESG	1,1	80	59	11	11	97	A, C2, C3	31	35
Laminated safety glass N34 // 1,1 [1)]	44.2 / 16 / :8 ESG	1,1	79	59	11	11	97	A, C2, C3	35	40
Laminated safety glass N34 // 1,1 [1)]	33.1 / 16 / :44.2	1,1	80	60	12	11	97	A, C2, C3	31	35
Laminated safety glass N34 // 1,1 [1)]	44.1 / 16 / :44.2	1,1	79	59	11	11	97	A, C2, C3	33	40
Laminated safety glass N34 // 1,1 [1)]	8 ESG / 16 / :66.2	1,1	78	61	11	11	96	A, C2, C3	37	50
Laminated safety glass N34 /// 0,7 [1)]	44.2: /12 / 4 / 12 / :6	0,7	72	49	14	14	96	A, C2, C3	47	45

1) Refer to AbP P-2020-3094 for permissible dimensions for each category.

AVAILABILITY AND COMBINATIONS:

- Available as 6,000 x 3,210 mm
- All assemblies available as alarm glass
- Can be combined as desired with decorative

Walk-on terrace made of laminated safety glass in the Amici restaurant, Stuttgart.

THERMALLY TOUGHENED GLASSES

The thermal treatment that these glasses undergo makes them much more load-resistant and therefore suitable for all applications that demand enhanced safety characteristics or high resistance to thermal, dynamic or static loads. We offer thermally toughened glasses as thermally toughened safety glass, heat strengthened glass and heat-soaked thermally toughened safety glass. All variants are eminently suitable for both exterior and interior applications, and their entire surface can be enamelled or printed prior to the tempering process. Important areas of application for our thermally toughened glasses are: glazing systems in the façade that use linear or punctiform supports and are accessible, such as partition walls, door panels, all-glass installations, fall protection glazing, glass floors, roofs or even glass columns and pillars.

THERMALLY TOUGHENED SAFETY GLASS

Our **thermally toughened safety glass** have a higher flexural strength achieved through a thermal treatment, and produce a characteristic breakage pattern. The tempering process makes these glasses considerably more resilient and allows them to be subjected to up to five times greater stress than standard float glass. In the event of breakage, the fine, crumbled, blunt fragments – typical of tempered safety glass – also greatly reduce the risk of injury. This, coupled with the small size of the individual crumbled pieces, creates a certain safety characteristic.

During the tempering process, the glasses are first heated to a high temperature and then cooled down again with air. As a result, tensile stresses develop in the core of the glass, while compressive stresses develop near its surfaces. If the glass surface is damaged or the flexural strength is exceeded, the glass pane will break immediately. The energy retained in the glass due to internal tension is released abruptly and intensely, which in turn produces a high crack propagation velocity.

Thanks to the fracture behaviour that occurs over the entire surface, our glasses can be easily fitted with an alarm. This can be done by placing an alarm loop in one corner of the glass and connecting it to an alarm system. Any destruction of the glass also causes damage to the alarm loop and automatically triggers an alarm. This system has been tested and approved by the German VdS (Association of Non-Life Insurers).

Fine crumbly breakage of toughened safety glass.

HEAT-SOAKED THERMALLY TOUGHENED SAFETY GLASS

During the process of manufacturing glass, tiny nickel sulphide inclusions may remain present in the glass melt. These inclusions have the characteristic of transforming and increasing in volume over time. In tempered safety glass, this often causes what is called “spontaneous breakage” as a consequence of the tempering process – this a major nuisance for both the glass processing company and the customer. The remedy for this: Our **heat-soaked thermally toughened safety glazing**.

In order to minimize the probability of occurrence of such spontaneous breakage, the thermally toughened safety glass is heat-soaked for a defined period of time. During the heat soak, critical inclusions are destroyed and the glass now meets the statutory safety requirements for the use of heat-soaked thermally toughened safety glass in windows and façades at an installation height greater than 4 m above the ground and as structural glazing. Other than minimizing spontaneous breakage, the properties of heat-soaked thermally toughened safety glass and its breakage pattern in the event of glass breakage are no different from those of conventional thermally toughened safety glass.

Thermally toughened safety glass by arcon® at Busmannkapelle Dresden, Germany.

HEAT STRENGTHENED GLASS

Heat-strengthened glass is a heat-treated glass with high flexural strength and high temperature resistance, specially developed for the building and construction industry. Like thermally toughened safety glass, it is subjected to a thermal tempering process, but in such a way that the tensile and compressive stresses induced are lower. When such a glass pane breaks, some radial cracks run from the centre of the break to the edge of the pane – similar to the fracture behaviour of normal float glass. The lower pre-stressing compared to tempered safety glass means that in case of a "failure", large fragments will be produced. After further processing into laminated safety glass (laminated safety glass made from heat strengthened glass), the products that are created add a high residual load-bearing capacity to the existing advantages of toughened glass. The sum of the properties thus obtained from the increased bending tensile stress, the coarse fracture pattern and the resulting residual load-bearing capacity make laminated safety glass made from heat strengthened glass the ideal glass product for overhead glazing, structural glazing and point fixed glazing systems.

Glass roof of the library building of the University of Marburg, Germany.

THERMALLY TOUGHENED SAFETY GLASS – THE KEY BENEFITS

- Increased impact and shock resistance
- Increased flexural strength
- Increased temperature resistance
- Blunt, fine, crumbled fracture pattern minimizes the risk of injury

CLEAR BENEFITS WITH ARCON®

arcon® is one of the leading glass finishers in Europe. The product portfolio includes top products in the field of coated architectural glass such as high-performance thermal insulation coatings, solar control coatings and other special glasses. These include, for example, bird-friendly glass with transparent or metallic markings, radio-transparent thermal insulation glass and decorative glass coatings in metallic designs individually tailored to customer requirements. As a member of the Arnold Glas Group, we are able to exploit synergies for our customers. In addition to the arcon® range of services, this cooperation enables us to offer complete solutions from insulating glass to façade construction.

Heat insulation | Solar control | Bird protection | Design | Radio transparency | Sound insulation

WE'RE HERE TO HELP.

As part of the Arnold Glas Group, arcon® is your competent partner when it comes to flat glass finishing. We turn your wishes into clear solutions. Ask us.

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