



# Norms & Standards

- » **Security standards: Protection against forced entry, ballistic and blast attacks, fire, smoke**
- » **Building physical requirements**



# Our philosophy

## Protecting Lives and Property

All products in the **SYSTEM SÄLZER®** range are tested in house and externally by independent test institutes. They are tested according to international standards and to individual customer requirements. Over a number of years SÄLZER has conducted over 900 tests on its various products and can provide certification to substantiate all results from approved test institutes. All products also fulfil the necessary physical construction requirements needed to gain CE certification.

### Quality management

SÄLZER quality assurance management system according to ISO 9001 is reflected in all stages of the production, ranging from research and development, material management, permanent quality control and the constant auditing of suppliers. Only this way can we guarantee the quality of our products thus giving both ourselves as suppliers and our clients as end users confidence in knowing that the chosen elements will perform as required if the need arises. Before our products are tested by external test institutes they are rigorously checked in our own internal ballistic and forced entry test centres dependent on requirements.



Certified according to: **DIN EN ISO 9001:2008**

### Occupational health and environmental protection

Our philosophy "**Protecting Lives and Property**" can not only be applied in reference to our customers but is also applicable on our employees, colleagues and our environment. The Occupational Safety and Environmental Protection is tested and certified according to ECOSYS.



Occupational safety and environmental protection certified according to: **ECOSYS (Occupational safety according to BS OHSAS 18001 / Environmental protection according to ISO 14001).**

### Further qualifications:

- Registered with the association for the **prequalification** of Contractors e.V under registration number **011.080020**.
- „**Authorised Economic Operator|C**“, making the process of exporting our products easier.
- Production facility for VdS-approved safety grills.



### Combined protection – our specialty

Many threats require combined protection against forced entry, ballistic attack, fire, smoke and explosion in one element. Our products fulfil the sometimes contradictory requirements for individual types of threats and provide comprehensive protection.



The steel frame door **series SECUFIRE®** won the **security innovation award in gold**. The security fair in Essen honours particularly pioneering developments with this award.

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The **high security steel door series S4** won the **German Design Award**. This award distinguishes innovative products as well as their manufacturers and designer which are pioneering in the German and international design world.

# Forced entry resistance

The number of burglaries is very high but the detection rate is low. SAELZER offers a wide variety of tested and certified doors, windows, facades, grilles and many other products to protect against forced entry attempts. The elements are tested according to international standards by accredited testing institutes. The tests are documented by test certificates.

## Tests according to international standards

Extract from DIN EN 1627-1630 in accordance with DIN EN 356 <sup>1)</sup>				
class	glass	description testing tools	resistance time <sup>3)</sup>	total test time <sup>3)</sup>
RC1 N	no requirements <sup>2)</sup>	protection: the attacker using his own body as the attack vector	-	-
RC2 N	no requirements <sup>2)</sup>	additional: simple tool for example screwdriver, pliers, wedges, jig saw, pad saw, hack saw	3	15
RC2	P4A, 3 x steel ball drop test from 9.0 m height	additional: simple tool for example screwdriver, pliers, wedges, jig saw, pad saw, hack saw	3	15
RC3	P5 A, 9 x steel ball drop test from 9.0m height	additional: hand drill, second screwdriver and crowbar 	5	20
RC4	P6 B, 31-50 axe blows	additional: saws, power tools i.e. axe, crowbar, hammer, battery drill, chisel, hacksaw 	10	30
RC5	<b>P7 B, 51-70 axe blows</b> 	additional: electric power tools such as drill, jigsaw, sabre saw, angle grinder 	15	40
RC6	<b>P8 B, über 70 axe blows</b> 	additional: more efficient electric power tools than class RC5 	20	50

### Glazing for the levels RC5 and RC6: **Attention!**

Extract from the standard: "Construction products in the resistance classes 5 and 6 according to DIN EN 1627:2011 have to be attacked on the glass itself, the glazing and the filling connection system..."

That means the glass pane has to be tested **with the same** tools like the complete element if the glazing is bigger than 400 x 250 mm (rectangle), or 400 x 300 mm (ellipse), or 350 Ø (circle).

**P7B and P8B glazing are only tested with axe blows and do not fulfil these requirements. They need to be replaced by a higher valued glazing, which withstand the tools of resistant class RC5 | RC6.**

### Type of burglar and test duration

The European standard assumes that in the highest security classes RC5 and RC6 the burglar is experienced, well prepared, and professional. It is assumed that the burglar uses in addition to a crowbar and hammer, power tools like drill, jigsaw, sabre saw or an angle grinder. In higher resistant classes the perpetrator has also more time to enact the "burglary".



Aluminium window series S2es was tested with an angle grinder in the resistant class RC5.

<sup>1)</sup> The European standard is also used for the test and for the classification of break out resistant products, see on page 5.

<sup>2)</sup> In this resistance classes national requirements can be considered.

<sup>3)</sup> Maximal time in minutes.

# Forced entry resistance SÄLZER special

**SÄLZER is quality controlled by an accredited test institute and is recommended by police commission for crime prevention (LKA Bavaria).**



**Quality monitoring:** The accredited test institute Pfb Cert is allowed to observe all our manufacturing documents for the forced entry resistant products and is also authorized to observe the production. This voluntarily quality monitoring is an additional quality feature and a precursor in allowing the police commission for crime prevention (LKA Bavaria) in recommending the forced entry resistant windows, facades, and doors supplied by SÄLZER.



## Doors for emergency exit

### Entrance doors have two functions

Entrance doors have to protect against forced entry and often they are used as emergency exit. Doors in emergency exits must be equipped with anti-panic locks according to EN 179 or EN 1125. In case of emergency the door must be operable quickly by using the panic bar or the door handle. By using the panic-function all locks are pulled back at once. This type of mechanism increases the risk of burglary considerably, especially if the door has large glazing areas because the glazing can be easily drive through with a screwdriver. Through this small hole the door handle can then be easily pushed down and the door can be opened quickly (look photo on the right).

### SÄLZER solution

To negate this SÄLZER include in their construction glazing partly constructed utilising layers of polycarbonate and in tests conducted by an independent test institute it was not possible to create an opening by means of a hammer and chisel. SÄLZER fully glazed doors offers reliable protection against forced entry – despite the use of panic hardware - up to resistance class RC4 (see our forced entry test RC4: [www.youtube.com/user/saelzersecurity](http://www.youtube.com/user/saelzersecurity)).

The same problem exists if the forced entry resistant doors are equipped with louvers and with anti-panic locks. SÄLZER has also found a reliable solution for this scenario.



The P6B glazing can be pushed through within a few seconds. Therefore our glazed forced entry resistant doors which are equipped with anti-panic locks<sup>1)</sup> have glazing with integrated polycarbonate layer. The complete element is tested according to DIN EN 1627-1630.

## Forced entry protection also in tilted window position

Natural ventilation by using the tilted window position is pleasant and important - at home or in the office. But what happens if a burglar levers out the tilted window with a crowbar, saw and a chisel? A usual forced entry resistant window in the tilted window position can be broken in less than 30 seconds because the mechanism has very little protection or strength.

Not in the case of the SÄLZER window from its **SECURON®** range, **tested in the tilted position** and certified to resist the attack. Reinforced scissors and additional bolting devices prevent the successful levering, sawing or drilling. The window has been tested and certified according to the European standard in resistance class RC3.



<sup>1)</sup>Some of the multiple locking system locks are generally equipped with anti-panic function although this function is not needed. Often the user is not aware of this.



Only elements which were tested as a complete element offers protection against forced entry in case of emergency.

## Tested diversity

Many factors affect the resistance against forced entry, for example the frame material, design option, glass, installation of the glass, hinges, locks, fittings and the installation into the building. The protection can only be checked if the complete element is tested.

SÄLZER has tested different products with many variations of hardware and glazing.

## Break out resistance

**There is no own testing standard for break out resistance products. Because of this SÄLZER tests its products from both sides according to the standard for forced entry resistance DIN EN 1627-1630.**

On the one hand the window, the door and the grilles have to offer protection against forced entry respective relief attempts from the outside, on the other hand they must offer protection against escape attempts from the inside. Additionally the SÄLZER products provide maximum protection against vandalism and offer no possibility of any injury or suicide attempts by detainees. The cell doors from SÄLZER are additionally tested according to the cell door guidelines of Saxony-Anhalt.



Cell door **series S4Z**, large steel door with wooden planking and round arch, replica of an historical cell door, equipped with the latest security technology.



Security without grilles: cell windows **series METAS®**, e.g. fixed windows are tested on both sides up to resistant level RC4. No risk for suicide attempts.

## Further norms und standards

- » Tested according to the **standard of the US-Dept. of State SD-STD-01.01 Rev.G**.  
Doors, windows, louvers are also tested according to the US-American standard in different variations and resistant classes: 5FE, 15 FE/BR, 60 FE/BR (see also in separate brochure).
- » Vault door tested **according to DIN EN 1143-1** in resistance level 0 and 1.
- » Doors and windows tested according to **various Russian standards, as e.g. GOST R 51072-97**.

**SYSTEM SÄLZER®: All security-related components like reinforcements, safety bolts and safety interlocks are invisible integrated in the profile.**

# Bullet resistance

Under fire the bullets impart an enormous amount of energy into windows, facades or doors. To protect against this threat stability and mass is needed. Especially the connections:

- » glass-frame
- » casement-frame and
- » masonry-frame connections are weak points.

SÄLZER ensures reliable protection against a wide variety of weapons and ammunition up to the highest resistance classes FB7-NS (for windows, facades, doors).

## Tested according to international standards

Extract from the European standard DIN EN 1522 + 1523 in connection with DIN EN 1063					
class	glass	weapon   caliber	mass of the bullets (g)	bullet velocity (m)	speed of the bullet (m/s)
FB1	BR1	rifle 22R 	2,6 ± 0,1	10 ± 0,5	360 ± 10
FB2	BR2	handgun 9mm luger 	8 ± 0,1	5 ± 0,5	400 ± 10
FB3	BR3	handgun 357 magnum 	10,2 ± 0,1	5 ± 0,5	430 ± 10
FB4	BR4	handgun .44 Rem. magnum  	10,2 ± 0,1	5 ± 0,5	430 ± 10
			15,6 ± 0,1	5 ± 0,5	440 ± 10
FB5	BR5	rifle 5,56 x45 	4 ± 0,1	10 ± 0,5	950 ± 10
FB6	BR6	rifle 5.56 x45  	4 ± 0,1	10 ± 0,5	950 ± 10
			9,5 ± 0,1	10 ± 0,5	830 ± 10
FB7	BR7	rifle 7.62 x51 hard core 	9,8 ± 0,1	10 ± 0,5	820 ± 10

According to the European test standard resistance classes from FB1 to FB7 are distinguished. In the different security levels the elements will be shot from different distances, with different weapons, calibres and bullet velocities. The higher the class the larger the round used and the higher is the requirement for the construction. After each shot it will be checked as to whether splinters from the construction flew into the room, independently of the ballistic level.

It is divided into:

**NS = No Splinters**

**S = Splinters**

Extract from the US-American standard UL 752				
level	ammunition   caliber   bullet	weight (g)	min. velocity (m/s)	number of shots <sup>1)</sup>
1	9 mm, full metal copper jacket with lead core <sup>(1)</sup>	8,0	358	3
2	.357 Mag., jacketed lead soft point	10,2	381	3
3	.44 Mag, lead semi-wad cutter gas checked	15,6	411	3
4	.30 caliber rifle lead core soft point	11,7	774	1
5	7,62 mm rifle lead core full metal copper jacket, military ball <sup>(1)</sup>	9,7	838	1
6	9 mm full metal copper jacket with lead core <sup>(1)</sup>	8,0	427	5
7	5,56 mm rifle full metal copper jacket with lead core <sup>(1)</sup>	3,56	939	5
8	7,62 mm rifle lead core full metal copper jacket, military ball	9,7	838	5

## Further tests according to:

- » VPAM APR 2006
- » US-DOS SD-STD-01.01 Rev. G
- » GOST R 51112-97



<sup>1)</sup> Number of shots for the testing of materials are given. The number of shots and their angles are chosen by the testing institute when testing a complete unit (window or door).

## Customized tests

Different kinds of weapons and ammunition are used worldwide. To provide individual protection, SÄLZER tests not only according to international standards but also according to customer specifications; this means with the weapons which are used in the homeland of the customer. We tested for example the window, doors and facades with the AK-47 (caliber 7.62 x 39), the AK-74 (caliber 5.45 x 39) or with the sniper rifle (calibre: .300 Win.Mag., 7,62 x 54R and .30-06).



The Kalashnikov AK-47 is one of the most used weapons worldwide. The products from SÄLZER were tested amongst others with this weapon.

## Reliable fittings

Despite of high wing or casement weights (door up to 600 kg | window up to 300 kg) because of heavy bullet resistant glazing and strengthen profiles the SÄLZER doors and windows are easy to use.

Our aluminium door e.g. was tested in a life circle test with up to 500,000 cycles, our steel door with high performance hinges was tested with up to 2.5 Mio. cycles. Despite the high protective function they are suitable for high frequented entrances.



Result of the test: Classification in class **FB7-NS**. The complete window was tested with a gun calibre 7,62 x 51 steel hard core. The bullets have entered the outer profile and the glazing, **but did not come out of the profile on the room side! No splinters = NS**. In particular the weak points were tested: e.g. glass fittings.

## Complete element tested incl. wall connection

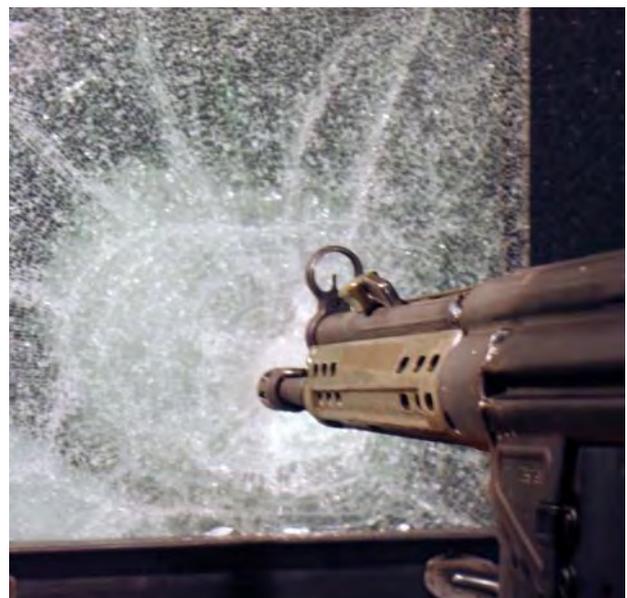
Only complete tested elements can offer protection in case of emergency. Particularly the connections (e.g. masonry-frame) cause the highest risks. Therefore we recommend securing the wall connection of the element against bullets, although this is not required by the European standard. We have tested the wall connection deliberately at a testing institute to provide complete security.

## Creative freedom

As with all products in the **SYSTEM SÄLZER®** high security does not mean that you have to renounce on the design. The safety components are integrated in the inside of the profile. Large areas of glazing, panels, narrow profiles, individual colours, coatings and shapes guarantee an individual and appealing design.

## Ballistic testing center

Before windows, doors, facades and louvers are tested and certified from an accredited and international recognized test institute, they are tested in our own ballistic testing center up to the highest resistant classes.



Our ballistic testing center.

# Blast resistance

The destructive power of an explosion depends on many factors e.g. from the size, type and geometry of the explosive charge, the duration of the pressure, the distance from the explosion source, the geometry of the building, wall construction as well as the size and the construction of the windows, facades and doors. To offer protection against the various possibilities of threats, SÄLZER conducted extensive tests with different test conditions in accordance with international standards or according to individual customer requirements.

**Independently from the different standards the following information are fundamental for the assessment of the requirements:**

- » Pressure in bar, psi, kPa
- » Impulse in bar-ms, psi-ms, kPa-ms
- » Duration in ms

## Explosion charge | distance | pressure duration

**3 threat scenarios can be derived:**

- 1. High explosive charge, large distance to the target:**  
e.g. so called car bomb, see also ISO 16933 and GSA.
- 2. Small explosive charge, short distance to the target:**  
So called backpack bomb, this complies with the threat according to European standard 13123-2 as well as ISO 16933.
- 3. Low pressure, long duration of the pressure**  
For example in an explosion with gas-air-mixture in a petro-chemical plant, in refineries, in the chemical Industry.



Car bomb.



Danger caused by pressure waves of air-gas-mixtures.



Backpack bomb.

## Standards | requirements | classification

- » Open range test: DIN EN 13123-2 and 13124-2
- » Shock tube test: DIN EN 13123-1 and 13124-1
- » Requirements of the petro-chemical industry
- » Blast resistant glazing according to ISO 16933, ISO 16934, DIN EN 13541 (special glazing)
- » Classification according to GSA TS01-2003
- » ASTM F1642-04
- » UFC 4-010-02 (US Department of Defence)

## European standard

**Test of the complete element:** SÄLZER tests complete windows, doors and facades with frames, wings, glazing according to the European standards. On the open range test also the installation of the elements are considered e.g. the elements are built into a stonework, concrete or in a steel structure. The installation of the products is simulated, so that a realistic test is given. Only in this way the elements can offer protection in case of emergency.

Open range: extract from DIN EN 13123-2   13124-2			Shock tube: extract from DIN EN 13123-1   13124-1		
facade, window, door, shutters	mass (kg TNT)	distance (m)	facade, window, doors, shutters	peak pressure (bar) <sup>1)</sup>	positive specific impulse (i+) (bar-ms)
EXR 1	3	5,0	EPR 1	0,50	3,7
EXR 2	3	3,0	EPR 2	1,00	9,0
EXR 3	12	5,5	EPR 3	1,50	15,0
EXR 4	12	4,0	EPR 4	2,00	22,0
EXR 5	20	4,0			

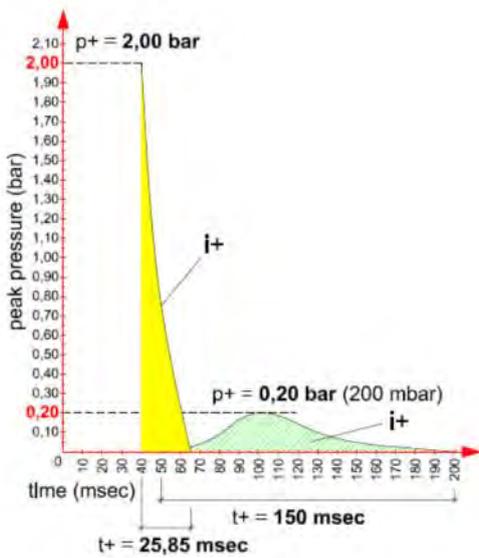
<sup>1)</sup> the duration of the positive phase (++) is not allowed to be less than 20 ms.

Test results according both test methods have the addition:

**S** = splinters

**NS** = no splinters

# Gas-air-mixture



For testing the effects from pressure waves which were caused by gas-air-mixtures special test methods must be applied. As it is seen in the pressure curves the gas-air-mixtures (green curve) causes a lower peak pressure than an explosion with TNT (yellow curve) but the pressure duration was much longer.

These various pressure curves cause different requirements for the construction of the products.

SÄLZER developed and tested for both scenarios special windows, doors and facades.

**Yellow curve:**

**Typical shock wave of an explosion with TNT**, the pressure increases immediately and rapidly to the peak pressure, and then it drops off almost linearly back to the ambient pressure.

**Green curve:**

**Typical shock wave of a petro-chemical explosion**, the pressure increases rather continuously up to the maximum pressure. The pressure drops in the same way. The duration of the pressure ( $t+ = 150$  msec) is much longer as a pressure which was caused by an explosion of a e.g.500 kg bomb ( $t+ = 25.85$  msec).

## Glass test according to ISO 16933

In the standard ISO 16933 test conditions and classifications are determined for blast resistant security glazing in open range tests. Two different threat scenarios are assumed:

- Small explosive charge | short distance to the target, so called backpack bomb.
- Explosive charge 100kg | larger distance to the target, so called car bomb.

According to ISO 16933 a defined glass size of 900 x 1,100mm is tested. The glazing is fixed in the test steel frame. The final window frame, glazing bead, integration of the glass in the frame etc. are not tested; **therefore it is not possible to make a statement on the blast resistance of the complete element.** The same test conditions are applied for the DIN EN 13541 (special glazing).

The test results according to ISO 16933 are divided into exposure classes and protection classes (the GSA guideline use a similar classification, see page 10).



Open range according to UFC 4-010-02 (US Department of Defence) with 100kg TNT. Installation in masonry, this was similar to the later installation of the window on the construction site.

**Assumption: portable high explosive blasting charges are placed a few meters in front of the target. (backpack bomb)**

classification code	pressure (kPa)	impulse (kPa-ms)	mass charge TNT (kg)	distance (m)	analogous EN 13123-2 open range
SB1(X)	70	150	3	9	-
SB2(X)	110	200	3	7	-
SB3(X)	250	300	3	5	EXR1
SB4(X)	800	500	3	3	EXR2
SB5(X)	700	700	12	5,5	EXR3
SB6(X)	1600	1000	12	4	EXR4
SB7(X)	2800	1500	20	4	EXR5

**Assumption: blasting charge 100 kg is placed in a car in a certain distance in front of the target (car bomb)**

classification code	pressure (kPa)	impulse (kPa-ms)	distance (m)
EXV45(X)	30	180	45
EXV33(X)	50	250	33
EXV25(X)	80	380	25
EXV19(X)	140	600	19
EXV15(X)	250	850	15
EXV12(X)	450	1200	12
EXV10(X)	800	1600	10

### Protection using blast resistant a film?

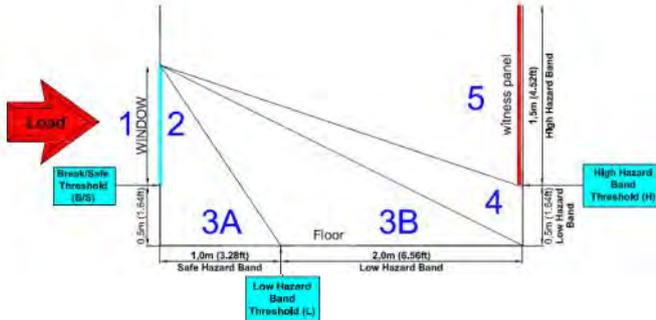
The film is applied on the glazing (900 x 1,100mm) and tested according to DIN EN 13541. Only film combined with glazing offer blast resistance.

**Casement, frame, wall connection are still unsecured. During an explosion the foil only offers splinter protection. The complete construction is not secured, and offers no protection.**

# GSA-TS01-2003 guideline

The GSA guideline does not determine any loading pressure, explosion pressure, impulse, duration of the pressure these are specified by the customer. The guideline divides the result of the explosion into **exposure classes and protection classes**. The ISO 16933 uses die same classification.

## Risk matrix



## SÄLZER recommend class GSA2

Level GSA2: The glazing has been damaged by the shock wave, but **no dangerous splinters flew inside**. Occupants can escape unharmed and e.g. react quickly in measuring stations and substations to prevent further damage.

## GSA-TS01-2003 | ISO 16933 - classification

GSA	ISO	description	expo- sure classes	protec- tion classes
1	A	Glazing does not break. No visible damage to glazing or frame.	none	very high
2	B	Glazing cracks but is retained by the frame. Dusting or very small fragments near sill or on floor acceptable.	none	very high
3a	C	Glazing cracks. Fragments enter space and land on floor not further than 1.006 mm from the window.	very low	high
3b	D	Glazing cracks. Fragments enter space and land on floor not further than 3.048 mm from the window.	low	high
4	E	Glazing cracks. Fragments enter space and land on floor and impact a vertical witness panel at a distance of no more than 3.048 mm from the window at a height no greater than 610 mm above the floor.	medium	medium
5	F	Glazing cracks and the window system fails catastrophically. Fragments enter space impacting a vertical witness panel at a distance of no more than 3.048 mm from the window at a height greater than 610mm above the floor.	high	low

## Test reports

All tests are certified by accredited test institutes, independently from the standard or the customer requirements.

**The derivation and projection of test results is limited and only possible by submitting many test results of realistic tests.**

## Tests according to individual customer requirements and international standards

### Extract from the extensive list of blast tested products

aluminium mullion transom construction, tested with 100kg + 500kg in different distances and design variations, GSA 2.

aluminium window, turn window hardware, shock tube test, refl. pressure: 2.49bar, refl. impulse 1.142 bar-ms, duration of the pressure 880ms, GSA 2.

glazed aluminium sliding door, 500kg TNT blasted in a distance of 29m, GSA 2.

double glazed steel door, shock tube test, refl. pressure 0.85bar, refl. impulse 2.100 bar-ms, duration of the pressure 4,500ms, GSA 2.

steel door, highest resistant level EXR5, refl. pressure 27.5 bar, refl. impulse 15.08 bar-ms, GSA 2.

inwards opening aluminium door<sup>1)</sup> tested with 50kg + 100kg, distance 15m, open range, GSA 2.

aluminium window tested in tilted position, refl. pressure 1.25 bar, refl. 4.850 bar-ms, GSA 2.

glazed aluminium double door, tested with 500kg, distance 29m, GSA 2 ... many more tests.

## Individual manufacturing

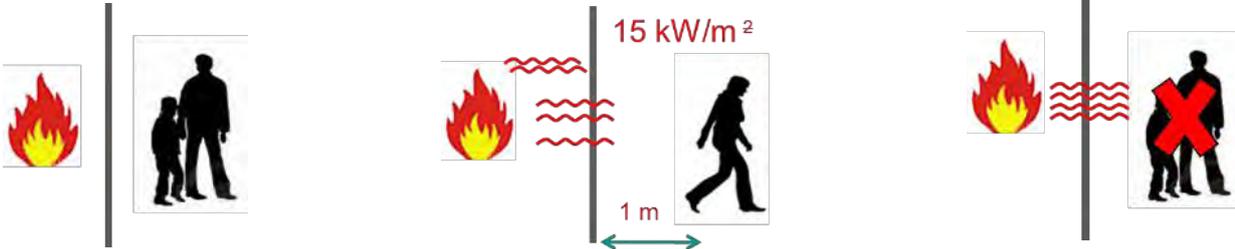
SÄLZER has 'no standard products', all products will be designed and produced according to the requirements of our customers, as e.g. inward opening blast resistant doors<sup>1)</sup>. The threat scenario is the basis for our protection concept.

<sup>1)</sup> Until recently the only doors available to combat the threat of explosion were outward opening due to the huge pressures acting on the door leaf being partially absorbed by the outer frame rebate. Inward opening doors do not have this support and rely on the hinges, interlocking sections and the locking mechanism to dissipate the pressures involved to the framing and structural connections.

# Fire & smoke protection

The fire resistance of our products is tested and classified according to the European standards DIN EN 1363-1, 1363-2, 1634-1 in connection with DIN EN 14600 and 13501-2.

## Classification according to DIN EN 13501-2



**EI:**  
Protection against fire, heated gas and smoke.  
**Thermal insulation.** Example EI30 = 30 minutes fire protection.

**EW:**  
Protection against fire, heated gas and smoke.  
Reduced passage of heat radiation.

**E:**  
Protection against fire, heated gas and smoke.  
Passage of heat radiation.

### Fire: Classification according to EN 13501-2

performance criteria	duration in minutes								
E	15	20	30	45	60	90	120	180	240
EI <sub>1</sub> *	15	20	30	45	60	90	120	180	240
EI <sub>2</sub> *	15	20	30	45	60	90	120	180	240
EW	-	20	30	-	60	-	-	-	-

\*EI<sub>1</sub> ≤ 140° max punctual < 180°    \*\*EI<sub>2</sub> ≤ 140° max punctual < 360°

**DIN EN 13501-2** replaces the familiar classification according to **DIN 4102**, in which fire doors are classified in the classes **T30 – 180**. The **former T30 corresponds e.g. to the today's EI30 (30 minutes fire protection)**. The class **EI45** is insert additionally in the revised classification standard.

SÄLZER doors are tested from both doors sides, thus provide protection against fire on both sides, at the corridor and room side.

### Smoke: Classification according to EN 13501-2

<b>S<sub>a</sub></b>	one test: ambient temperature
<b>S<sub>m</sub>   S<sub>200</sub></b>	two tests: ambient temperature and test with 200°C

## Smoke protection

Smoke inhalation is the major cause of death associated with the outbreak of a fire therefore fire doors should always be subjected to a smoke protection test. The test is performed in accordance with **DIN EN 1643-1**. The result is divided into 2 classes **S<sub>a</sub>** and **S<sub>m</sub>**. The class **S<sub>m</sub>** is also often referred as **S<sub>200</sub>**.



Multi functional door **SECUFIRE®** in the furnace, test EI45. Door is at the same forced entry resistant RC4 with anti-panic hardware, bullet resistant FB4-NS and tested in the explosive test with 500kg.

## Mechanical durability

A fire and smoke protection door is always tested concerning their mechanical durability. They must protect against fire and smoke e.g. even after 200,000 opening-closing cycles. After successful examination the doors are classified according to the European norm **DIN EN 14600**. C5 being the highest class with 200,000 completed cycles.

## Further tests according to:

British-Standard 476 Part 22.

<sup>1)</sup> Based on a positive test report, individual approval possible.

# Perimeter security

The threat caused by terrorist attacks has significantly increased the importance of physical security. Now more than ever it is imperative that buildings and other properties take necessary steps to deter a vehicular threat with bollards, steel blade barriers, drop arms.

## Standards and customers requirements

Specification US-DoS : SD-STD-02.01	
level	weight LKW / speed
K4	15,000 lbs / 31 mph
K8	15,000 lbs / 40 mph
K12	15,000 lbs / 50 mph

British standard PAS 68	
Multiplicity of different test conditions with different impact loads, truck weights and speeds.	

Customized requirements	
Test example: Crash test with a security drop arm barrier with a 44,000 lbs truck, speed 18 mph.	



Crashtest with a K12 barrier.

# Further protection concepts

## Resistance against cyclones

During negotiations with a client in the petro-chemical industry SALZER had a request for a window not only capable of resisting blast loads but also with the ability to with-stand airborne debris associated with tropical storm. SÄLZER then tested the blast resistant window in accordance with the Australian standards\*. The element was tested with: hard wood timber member of 4 kg mass with a nominal cross section of 100mm x 50mm impacting end on at 39.6 m/s (143 km/h) and spherical steel ball 8mm diameter (approx. 2 g mass) impacting at 39.6m/s (143 km/h). The window passed the test successfully.



Window in the test device.

## The guard house for special applications

### Tested according to NATO STANAG 2280

The test elements were tested with mortar shell and artillery shell according to NATO STANAG 2280. Even the largest pieces of shrapnel were absorbed by SÄLZER components in the test.

Security levels				
class	typ	caliber	distance	weight
C4	mortar shell	120mm	1m	approx. 16kg
C5	artillery shell	155mm	1.5m	approx. 43kg



Test element with artillery shell, 43kg, was detonated in 1.5m.



Steel partition and window after the successful test.

## Protection for action forces in crisis regions

The tested building components can be used to build a wide variety of buildings such as guard houses, residential or administration buildings. They could use also as protection wall in front of an existing building.



\* Australian standard AS/NZS 1170:2:2011 'structural design actions, part 2: wind actions' and according to the technical note no.4 'simulated windborne debris impact testing of building envelop components' by the James Cook University Australia.

# Our products

SÄLZER offers the complete range of products for building security. Starting with the protection of the driveway for example by drop arm barriers, to guard houses, doors, windows, facades, grilles and partition walls.

All products in the SYSTEM SÄLZER® are perfectly matched to each other and can be combined flexibly.

## Selection from our extensive product range:

- ⌘ doors in aluminium and steel
- ⌘ windows in aluminium and steel
- ⌘ aluminium facade
- ⌘ partition walls
- ⌘ grilles & louvers
- ⌘ panic room
- ⌘ guardhouse
- ⌘ drop arm barriers, bollards and steel blade barriers
- ⌘ cell doors and windows
- ⌘ security entrances
- ...and many more!

For more information there are individual brochures for each product .



Aluminium door integrated into facade



Cell window



Aluminium-glazing facade



Aluminium sliding door



Access protection with bollards



Double facade



Cell doors



Interlocking entrance door



Guard house



Partition wall



Steel door wood planked



Grilles



Steel door with side panel



Steel vault door



Multifunctional steel door

# Combined Protection

The profiles in the **SYSTEM SÄLZER** are specially designed for high levels of security. As a result, combined protection against various threat scenarios in spite of contradictory requirements on the design are possible.

## Product - und security matrix (extract)

Due to the diversity of our product groups, we can only show a selection of different product variations. More than 900 test certificates allow an individual protection against various threat scenarios<sup>1)</sup>.

Features <sup>1)</sup>	    						
	Pro- ducts	forced entry / break out <sup>2)</sup> DIN EN 1627- 1630	ballistic attacks DIN EN 1522- 1523	blast / pressure waves DIN EN 13123 –1 u. 13123-2 GSA classification customized tests	fire DIN EN 13501-2 <sup>3)</sup> BS476	smoke DIN EN 1641-1	further tests special features
Aluminium door <b>S2es, S6es</b>	up to RC4	up to FB7-NS	<ul style="list-style-type: none"> <li>up to EXR2S</li> <li>reflected pressure up to 7.9 bar</li> <li>tested with different charges 50kg, 100kg, 250kg, 500kg</li> <li>security level GSA2</li> </ul>	-	-	<ul style="list-style-type: none"> <li>UL 8,</li> <li>inward and outward opening</li> <li>tested up to RC4 with glazing and anti panic lock</li> </ul>	
Steel door <b>S4</b>	up to RC6	<ul style="list-style-type: none"> <li>up to FB7-NS</li> <li>individual tests according to customers requirements</li> </ul>	<ul style="list-style-type: none"> <li>up to EXR5</li> <li>reflected pressure up to 27.5 bar</li> <li>tested with high impulse and long blast duration up to 4,500 ms</li> <li>security level GSA2</li> </ul>	EI90 EI45 EI30 EW60 BS 120	S <sub>a</sub> , S <sub>200</sub>	<ul style="list-style-type: none"> <li>DOS SD-STD-01.01</li> <li>NATO STANAG 2280</li> <li>inward and outward opening</li> <li>tested up to RC4 with glazing and anti panic lock</li> <li>size, up to : 6 x 6 m</li> <li>Series <b>S4 HS</b> forced entry resistant up to RC6 , also tested according DIN EN 1143-1 level 0 + 1</li> </ul>	
Multifunctional door <b>SECUFIRE®</b>	up to RC4	up to FB4-NS	<ul style="list-style-type: none"> <li>tested with a charge of 500kg</li> <li>security level GSA2</li> </ul>	EI45, EI30 EW60, E60	S <sub>a</sub> , S <sub>200</sub>	<ul style="list-style-type: none"> <li>inward and outward opening</li> <li>tested up to RC4 with glazing and anti panic lock</li> </ul>	
Facade <b>(S1)</b>	up to RC5	up to FB7-NS	<ul style="list-style-type: none"> <li>reflected pressure up to 3.575 bar</li> <li>tested with different charges 100kg, 500kg</li> <li>security level GSA 2</li> </ul>	-	-	<ul style="list-style-type: none"> <li>double facade</li> <li>facade with rear tensioning cord</li> <li>curtain wall with large glazing areas possible</li> </ul>	
Aluminum window <b>S2es, S6es</b>	up to RC5 up to RC3 in tilted window position	up to FB7-NS	<ul style="list-style-type: none"> <li>up to EXR3-S</li> <li>reflected pressure up to 8.8 bar</li> <li>tested with high impulse and long blast duration up to 2,000 ms</li> <li>security level GSA2</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Australian standard AS/NZS 1170:2:2011</li> <li>available also as top hung window</li> <li>series <b>SECURON®</b> in tilted window position up to RC3, pressure load up to 1.55 bar</li> </ul>	
Steel window <b>SECUFIRE®</b>	up to RC4	up to FB4-NS	<ul style="list-style-type: none"> <li>reflected pressure up to 2.7 bar</li> <li>tested with 100kg</li> <li>security level GSA2</li> </ul>	EI45, EW60, E60	S <sub>a</sub> , S <sub>200</sub>		
Transaction window	up to RC5	up to FB7-NS	<ul style="list-style-type: none"> <li>up to EXR3S,</li> <li>reflected pressure up to 8.8 bar</li> <li>tested with high impulse and long blast duration up to 2,000 ms</li> <li>security level GSA2</li> </ul>	EI45, EW60, E60	S <sub>a</sub> , S <sub>200</sub>	in steel , aluminium security level depends on the used material.	
<b>Further products</b>							
Grilles <b>OXIR®</b>	up to RC4, VDS level B, tested on both sides <sup>2)</sup> .						
Cell window <b>METAS®</b>	up to RC4, high security without grilles, no risk for suicide attempts and vandalism, tested on both sides <sup>2)</sup> .						
Cell door <b>S4Z</b>	tested up to RC 4 <sup>2)</sup> . Additionally tested according to the guidelines for cell doors of the federal state of Saxony-Anhalt. Maximum protection against vandalism and no risk for suicide attempts.						
Louver	<ul style="list-style-type: none"> <li>tested according to European standard: protection against forced entry (up to RC5) and ballistic attacks (up to FB6-NS).</li> <li>tested according to standard from the US department of state: 5 FE, 60 FE/BR.</li> </ul>						
Guard house	<ul style="list-style-type: none"> <li>modular design, delivery as complete unit, turn-key solution, ready to use.</li> <li>tested according to European standard: protection against forced entry (RC5), ballistic attacks (FB7-NS) and explosion (up to 8.8 bar)</li> <li>tested according to standard of the US department of state: 5 FE, 15 FE/BR.</li> <li>tested according Nato STANAG, with artillery- and mortar grenades, for use in war zones.</li> </ul>						
Perimeter security	drop arm barriers, steel blade barriers und bollards tested according to US DoS : SD-STD-02.01, up to K12; individual tests according to customer requirement.						

<sup>1)</sup>The different protection classes or the combined protection against different threat scenarios depending on the size of the element, the material and glass content and the design variants (e.g. fixed panel or turn-tilt fitting, 1 or 2 leaf door) and therefore must always be considered individually.

<sup>2)</sup>For break out resistant products exists no test standard, that's why SÄLZER tests this products from both sides according to DIN EN 1627-1630.

<sup>3)</sup>Standard for classification.

# Building physical facts

## System tests according to the product standards EN 14351-1 + EN 13830 | CE Marking

SÄLZER had tested the performance properties of the windows, doors and facades by notified test institutes. In the production the products are controlled by the SÄLZER quality manager according to the specifications and manufacturing tolerances. This continuous self-monitoring ensure the high quality, completeness and functionality of the SÄLZER products.

Features							
	<b>resistance against wind load</b> DIN EN 12210	<b>water tightness</b> DIN EN 12208	<b>air permeability</b> DIN EN 12207	<b>thermal insulation</b> DIN EN ISO 10077-1	<b>impact resistance</b> DIN EN 13049	<b>life cycle test</b> DIN EN 12400 DIN EN 1191	<b>sound insulation</b> DIN 5221 ISO 140-3
<b>Aluminium door</b> <b>S2es, S6es</b>	up to C5 (2,000 Pa <sup>1)</sup> ) depending on the type	up to E750 (750Pa) depending on the type	up to level 4 (600 Pa) depending on the type	$U_D$ up to $W/m^2K$ values vary depending on the element size and glazing	up to level 5 (drop height 950 mm) depending on the type	500,000 cycles	up to 47db values vary depending the type
<b>Steel door</b> <b>S4</b>	up to C5 (2,000 Pa) depending on the type	up to E2700 (2,700 Pa) depending on the type	up to level 4 (600 Pa) depending on the type	$U_D$ up to $2.2 W/m^2K$ values vary depending on the element size and glazing	up to level 5 (drop height 950 mm) depending on the type	200,000 cycles	up to 50 dB values vary depending the type
<b>Multifunctional door</b> <b>SECUFIRE®</b>	up to C3 (1,200 Pa) depending on the type	up to E900 (900 Pa) depending on the type	up to level 4 (600 Pa) depending on the type	$U_D$ up to $0.9 W/m^2K$ values vary depending on the element size, glazing	up to level 1 (drop height 200 mm) depending on the type	200,000 cycles	up to 46dB values vary depending the type
<b>Façade according to DIN EN 13830</b> <b>S1</b>	up to B5 (3,000 Pa) depending on the type	up to RE900 (900 Pa) depending on the type	up to level AE (600 Pa) depending on type	$U_{cw}$ up to $0.9 W/m^2K$ values vary depending on the element size and glazing	up to E5 / I5 (drop height 950 mm) depending on the type	-	up to 47db values vary depending the type
<b>Aluminium window</b> <b>S2es, S6es</b>	up to C5 (2,000 Pa) depending on the type	up to E1050 (1,050 Pa) depending on the type	up to level 4 (600 Pa) depending on type	$U_w$ up to $0.8 W/m^2K$ values vary depending on the element size and glazing	up to level 5 (drop height 950 mm) depending on the type	level 2 tilt hardware: 20,000 cycles turn hardware: 10,000 cycles	up to 45db values vary depending the type
<b>Steel window</b> <b>SECUFIRE®</b>	up to C5 (2,000 Pa) depending on the type	up to E1050 (1,050 Pa) depending on the type	up to level 4 (600 Pa) depending on the type	$U_w = 1.4 - 2.0 W/m^2K$ values vary depending on the element size and glazing	up to level 1 (drop height 200 mm) depending on the type	-	up to 36db values vary depending the type

## Our Performance - your Benefits

### 5 important reasons why you should work with SÄLZER:

- over 40 years experience in the planning, production and installation of security products, worldwide.
- combined protection against forced entry, ballistic and blast attacks, fire and smoke.
- each product is customized planned, manufactured and installed.
- all products in the **SYSTEM SÄLZER®** are perfectly matched to each other and can be combined flexibly.
- our service includes consulting, planning, production, installation and maintenance.

<sup>1)</sup> Pa = pascal



# SYSTEM SÄLZER®

## Combined Protection

For more than 40 years SÄLZER has led the industry in the development and technology of forced entry, bullet, fire and blast resistant building components.

Each of our products is subject to a strict internal and external quality management.

Please ask for additional brochures about our further products: windows, facades, doors, gates, guard houses, partition walls, access control, barriers, bollards, accessory components etc.

**Spectacular test videos:**  
[youtube.com/user/saelzersecurity](https://www.youtube.com/user/saelzersecurity)



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