

Burglarproof to Bullet Resistant Security

Peace of Mind with Style

An investment in high-tech security windows and doors is the most important step in safeguarding your family and property.

When deciding on a security level, ask yourself the following questions:

- What is the level of threat to be expected? What are the most likely tools a potential intruder would use? All “A” level security is designed to resist hand tools such as hammers, crowbars. The “B” levels are designed to protect from sharp and heavier tools such as axes.
- If considering a “bullet resistant” security level, what caliber do you imagine is going to be used? Is there any chance that rifles would be used? The difference between a C 1 and a C 4 level glass is not only an over 100% increase in cost, it will also influence the design of your windows/doors as the glass weight increases from 100 to 290 lbs per sq.yard.
- Since we can’t know what caliber weapon potential intruders are going to use, we therefore have to assume the highest risk factor. The perfect protection would then be a bullet resistant steel framed window/door with C 5 security glass. Is your budget allowing for an average window cost of \$ 4,000.00? Are your walls built to the same level of security, with steel inlays or other armor plating? This is the time to consider a compromise.

Call SwissShade and we will be glad to work out different scenarios and help you getting the peace of mind you are looking for, keeping your budget and your building situation in mind.

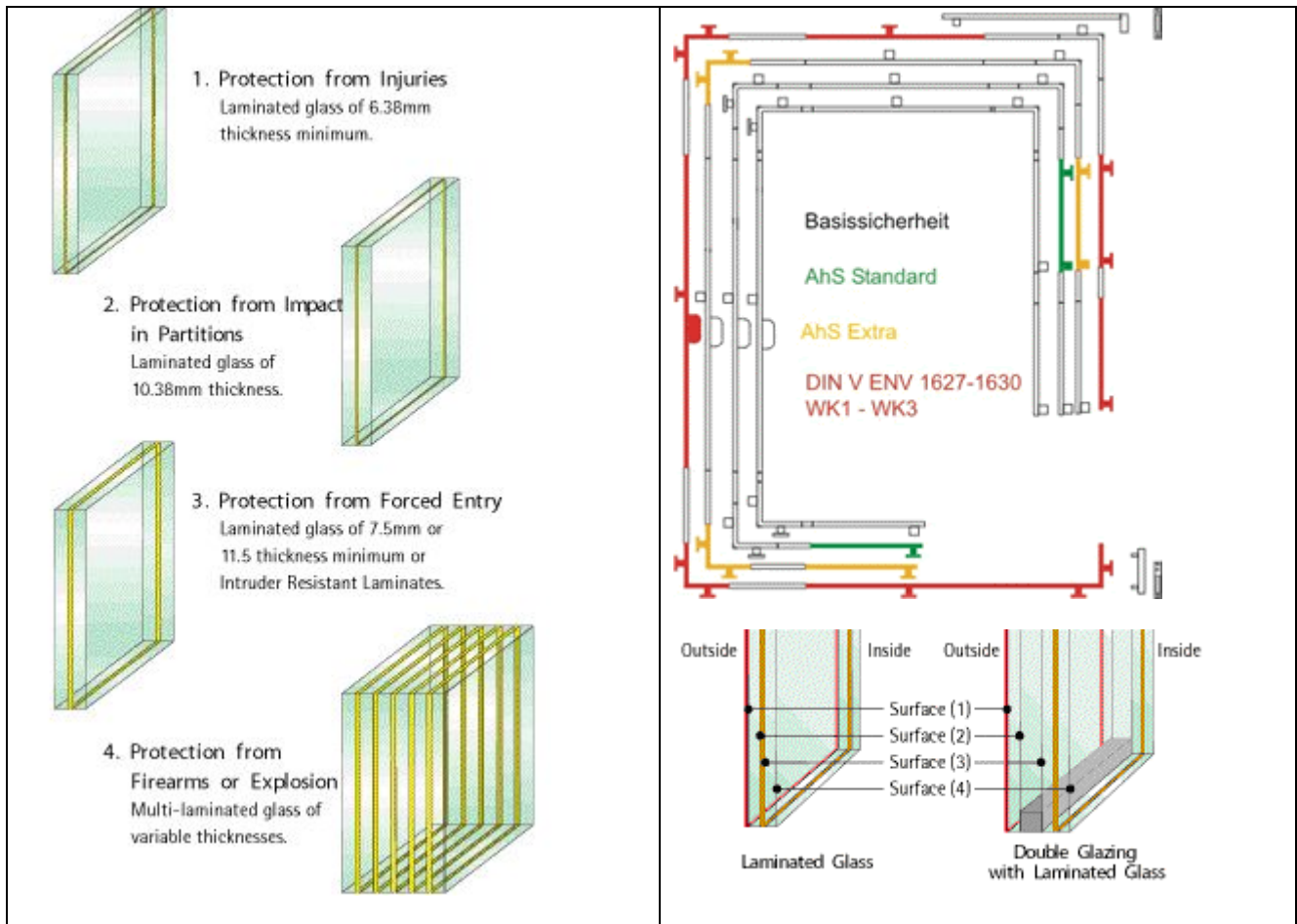
One other consideration when choosing a security level is the impact of the glass weight.

For an operational window or door, the limiting factor is the sash weight. The opening mechanism (multi-point locking) is designed to carry loads of up to 220 lbs. Fixed Windows can be made larger.

For security glass we usually recommend, in a normal setting, to have B1 level glass in any readily accessible openings (1st floor residential, storefronts etc.) and have A3 level in not so readily accessible positions.



fig 5 – security levels A3, B1, and C4 with respective laminated glass



Above left illustrates different laminates from burglarproof (A3) to Bullet resistant (C2). All security levels come with a minimum of 7 cam locks around the perimeter of the sash, above right outer layer.



Steel reinforced UPVC - Bullet Resistant to C 3



Steel reinforced UPVC - Bullet Resistant to C 3



Solid Wood Door, Bullet Resistant to C 3



B 3 security Level Aluminum Door with electric lock



Multi-Point Locking Mechanism



C 3 Bullet Resistant Windows, alu clad Steel Frame



A 3 Security Windows with built-in Rolling Shutters

Contracrim Level A

Tested and certified to DIN standards DIN 5229-4

Contracrim Level A	Class of Resistance	Glazing Single Pane Insulated	CC Type	Thickness of glass inch/mm	Weight pounds per sq. yard
Single family residences, multi family dwellings in low risk areas	A 1	Single	A 1,15	0,34 / 8,5	38
		Insulated	A 1,25 WS	0,89 / 22,5	57
Secluded homes	A 2	Single	A 2,15	0,35 / 9	40
		Insulated	A 2,25 WS	0,91 / 23	59
Secluded homes in high risk areas Vacation and weekend homes	A 3	Single	A 3,15	0,37 / 9,5	42
		Insulated	A 3,25 WS	0,93 / 23,5	61
All high risk residences	DH 4	Single	DH 4,15	0,43 / 11	42
		Insulated	DH 4,25	0,97 / 24,5	61

Test method for security levels A 1 through A 3 to DIN standards 52290-4-A :

Each test panel has to withstand the impact of a 9 pound steel ball, dropped from a given test height. This test is repeated 3 times.

Test height for the drop: Level A 1 = 11,5 feet

A 2 = 21,5 feet

A 3 = 31,2 feet

- All security glazing can be ordered with built-in "Alarm-Sekurit" wires. These invisible wires can be hooked up to an existing alarm systems or wired for a future security system.
- Level A, B, and C glazing is tested and certified for a maximum size of 5' x 7' per panel. Larger sizes are possible but loose their DIN certification.
- Maximum glazing panel size which can be manufactured 12' x 8,5'.
- U –Value for double pane security glazing is 0,29!

Important:

Depending on the level of security, the increased weight of the glazing is an important factor in designing opening windows and doors. Each opening mechanism can carry a given load.

A tilt / turn or turn only mechanism can carry up to a maximum of 270 pounds.

The tilt-slide sliding door up to 330 pounds and the slide only sliding door up to 660 pounds.

If the weight is above this limit, the openings have to be reconfigured by using a combination of fixed and opening panels.

Contracrine Level B

Tested and certified to DIN standards DIN 5229-3-B

Contracrine Level B	Class of Resistance	Glazing Single Pane Insulated	CC Type	Thickness of glass inch/mm	Weight pounds per sq. yard
Exclusive Homes, Parts of Shopping Malls, Photo and Video stores, Drug Stores	B 1	Single	B 1.14	0,71 / 18	79
		Insulated	B 1.23 WS	1,26 / 32	97
Museums, Art Galleries, Psychiatric Institutions, Abortion Clinics	B 2	Single	B 2,15	0,95 / 24	102
		Insulated	B 2,26 WS	1,5 / 38	121
Data Centers, Jewelers, Energy Plants, Prisons, Banks	B 3	Single	B 3,19	1,1 / 27	108
		Insulated	B 3,31 WS	1,62 / 41	126

Test method for security levels B 1 through B 3 to DIN standards 52290-3-B :

Each test panel is subjected to the repeated impact of a mechanically driven ax. This ax is sharp and weighs 4,5 pounds. The objective is to figure the number of hits it takes to create an opening of the size 1,3' by 1,3'.

Level B 1 = 30 to 50 hits
B 2 = 51 to 70 hits
B 3 = > 70 hits

- All security glazing can be ordered with built-in "Alarm-Sekurit" wires. These invisible wires can be hooked up to an existing alarm systems or wired for a future security system.
- Level A, B, and C glazing is tested and certified for a maximum size of 5' x 7' per panel. Larger sizes are possible but lose their DIN certification.
- Maximum glazing panel size which can be manufactured 12' x 8,5'.
- U -Value for double pane security glazing is 0,29!

Important:

Depending on the level of security, the increased weight of the glazing is an important factor in designing opening windows and doors. Each opening mechanism can carry a given load. A tilt / turn or turn only mechanism can carry up to a maximum of 270 pounds. The tilt-slide sliding door up to 330 pounds and the slide only sliding door up to 660 pounds.

If the weight is above this limit, the openings have to be reconfigured by using a combination of fixed and opening panels.

Contracrim Level C

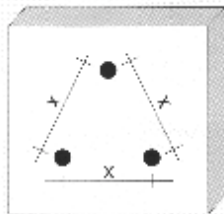
Tested and certified to DIN standards DIN 5229-2-C

Level	Caliber	Distance from Gun to Target In yards	Glazing Single Pane Insulated	CC Type	Thickness of glass inch/mm	Weight pounds per sq. yard
C 1	9mm x 19	3,3	Single	C 1.140.01	0,67 / 17	72
			Insulated	C 2.120.01WS	1,22 / 31	95
C 2	.357 Magnum	3,3	Single	C 1.240.01	0,91 / 23	99
			Insulated	C 2.240.02WS	1,18 / 30	90
C 3	.44 Magnum	3,3	Single	C 1.360.01	1,1 / 28	121
			Insulated	C 2.360.02WS	1,5 / 38	119
C 4	7,62mm x 51	11	Single	C 1.460.02	1,65 / 42	185
			Insulated	C 2.460.03WS	1,9 / 42	167
C 5	7,62mm x 51	27	Single	C 1.560.02	2,44 / 62	277
			Insulated	C 2.560.02WS	2,9 / 74	286

Test method for security levels C 1 through C 5 to DIN standards 52290-2-C :

3 shots fired at the test panel, distance and ammunition according to the above table.

As with all DIN test methods, the worst case scenario is the basis of each test.



x = 5"

- All security glazing can be ordered with built-in "Alarm-Sekurit" wires. These invisible wires can be hooked up to an existing alarm systems or wired for a future security system.
- Level A, B, and C glazing is tested and certified for a maximum size of 5' x 7' per panel. Larger sizes are possible but lose their DIN certification.
- Maximum glazing panel size which can be manufactured 12' x 8,5'.
- U-Value for double pane security glazing is 0,29!
- All glazing can be ordered with a splitter free laminate

Important:

"Fauser" steel reinforced frames can hold glazing up to a thickness of 31mm or 1,22 inch. For glazing thicker than that, a steel reinforced aluminum frame has to be used.

Depending on the level of security, the increased weight of the glazing is also an important factor in designing opening windows and doors. Each opening mechanism can carry a given load.

A tilt / turn or turn only mechanism can carry up to a maximum of 270 pounds.

The tilt-slide sliding door up to 330 pounds and the slide only sliding door up to 660 pounds.

If the weight is above this limit, the openings have to be reconfigured by using a combination of fixed and opening panels.

Contracrim Level D

Tested and certified to DIN standards DIN 5229-5-D

Level	Positive pressure in bar	Time of pressure phase in milliseconds	Glazing Single Pane Insulated	CC Type	Thickness of glass inch/mm	Weight pounds per sq. yard
D 1	0,5 bars	12	Single	D 1 – A 3,1	0,39 / 10	42
			Insulated	D 1 – A 3,2WS	0,99 / 25	60
D 2	1,0 bars	10	Single	D 2,11	1,02 / 26	110
			Insulated	D 2,21WS	1,54 / 39	128
D 3	2,0 bars	8	Single	D 3,11	1,97 / 50	220
			Insulated	D 3,21WS	2,52 / 64	238

Test method for security levels D 1 through D 3 to DIN standards 52290-5-D :

Test simulates the impact of an explosive similar and equal to TNT.
As with all DIN test methods, the worst case scenario is the basis of each test.

- All security glazing can be ordered with built-in "Alarm-Sekurit" wires.
- Level D glazing is tested and certified for a maximum size of 3' x 3,5' per panel. Larger sizes are possible but lose their DIN certification. Level D 3 glazing only with aluminum frame!
- U –Value for double pane security glazing is 0,29!
- All glazing can also be ordered with a splitter free laminate

Combination Level B - C - D

Tested and certified to DIN standards DIN 5229-3-2-5

All levels above C 1 – B 1 – D 2 only with aluminum frames! Receiving walls for combination levels above C3-B3-D3 may have to be pre-calculated by a civil engineer to ensure that they can safely carry the load!

Level	B Level	D Level	Glazing Single Pane Insulated	CC Type	Thickness of glass inch/mm	Weight pounds per sq. yard
C 1	B 1	D 2	Single	1.141.01	0,71 / 18	72
	B 1	D 2	Insulated	2.141.71WS	1,22 / 31	99
C 2	B 2	D 2	Single	1.232.01	1,02 / 26	116
	B 2	D 2	Insulated	2.232.71WS	1,58 / 40	134
C 3	B 3	D 3	Single	1.353.01	1,42 / 36	156
	B 3	D 3	Insulated	2.373.01WS	1,85 / 47	160
C 4	B 3	D 3	Single	1.463.21	2,52 / 64	286
	B 3	D 3	Insulated	2.463.01WS	1,97 / 50	176
C 5	B 3	D 3	Single	1.563.02	2,4 / 62	277
	B 3	D 3	Insulated	2.563.02WS	2,92 / 74	286

Blast Resistant Windows & Doors

Combined resistance ...

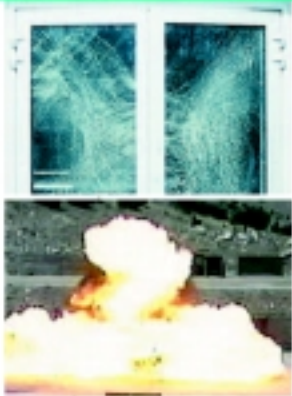
... against forced entry, bullets, and blasts. Sälzer combines all relevant security requirements into one element despite different product requirements for bullet, blast, and forced entry:

- stability
- elasticity
- blast mitigation

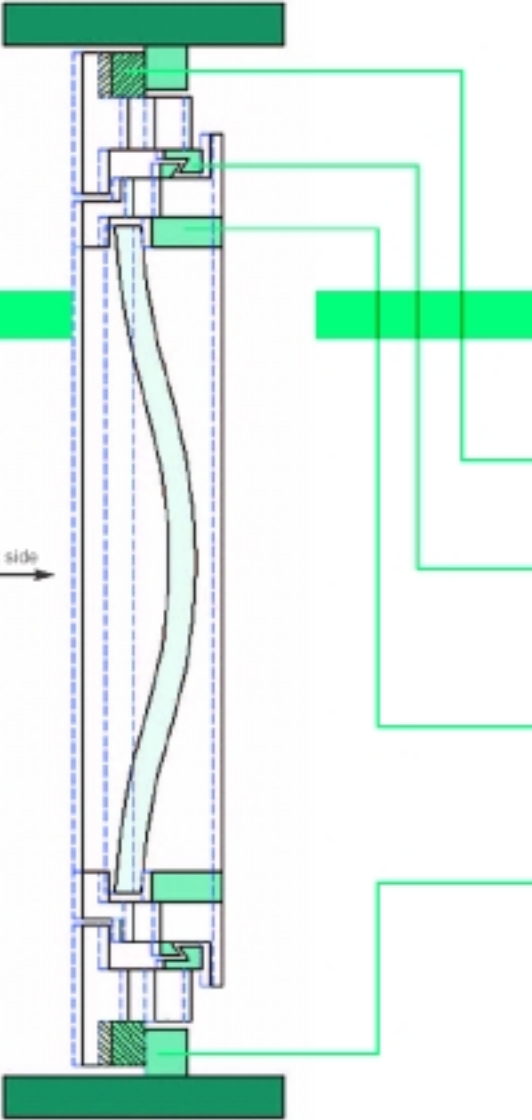
Customized from the lowest to the highest resistance classes: Tested according to international standards or to suit your special requirements. Our unique expertise has originated from extensive tests under real conditions as well as continuous research and development over the years.

Multi-mitigation technology.

Blast pressure stresses windows, doors, and buildings to the utmost. Sälzer patented the multi-mitigation technology, a 4-step absorption system integrated into the product to reduce this extreme load. Our expertise is the result of extensive open range blast tests and the investigation of real bombings. Sälzer can achieve or exceed all resistance levels for windows, doors, and facades with large glass surfaces through the use of the multi-mitigation technology.



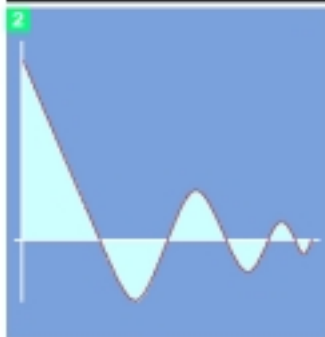
Numerous open range blast tests, as well as real attempts, have proven that Sälzer's products offer reliable protection.



Effective protection modeled after nature.



1 Permanently anchored, never the less flexible, even under heavy alternating loads. Sälzer constructions are based on nature.



2 Negative and reflecting pressures cause changing loads which can place an extreme strain on a building. Contrary to conventional solutions where pressure is reduced only through the use of flexible glazing, Sälzer integrates a complex 4-step absorption system. The multiple path reduction of pressure prevents the direct transmission of dangerous loads to the building. Furthermore, it allows stronger and more stiffer glazing for a combined protection against blasts and bullets.

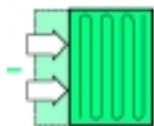
Sälzer hardware systems: durable and reliable

- Sälzer offers a wide choice of hardware systems for longevity and heavy duty applications particularly designed for high load absorption.

With Sälzer, you do not have to go without glazing:

- Heavy glass weights are feasible e.g. tilt and turn windows up to 180 kg
- Glass is more resistant to scratching and more durable than foil coatings and plastic finishes
- Economical
- Easy to clean
- Extensively tested and available in each resistance class

In addition: Bullet resistant glass can weigh more than 200 kg/qm in the highest resistant class.



The frames construction absorbs the pressure similar to the crash zone of a car

- Window frames and masonry absorb and redirect the pressure through double sliding surfaces and a triple locking device
- Integrated profiles, special glazing beads, and flexible seals can resist pressure of up to 500 kN/qm (no screws required)
- Absorption and sliding zones between building structure and frame

Reference:

Dotted lines show the positions of the different elements before the blast

Examples of our product line:



Tilt and turn windows



Multi-Section windows



Sliding doors



Partition walls



Double doors with overhead or sidelight detail



Facades



Revolving doors



Guard houses

Sälzer. Meeting the standards is not enough for us.

Shock tube test

Extract from DIN EN 13123-1

Facades, windows, doors, shutters

Peak pressure*

Positive specific impulse (I+) (bar-ms)

EPR 1	0.50 bar	3.7
EPR 2	1.00 bar	9.0
EPR 3	1.50 bar	15.0
EPR 4	2.00 bar	22.0

Gases must be used in the test element, which has already been tested in accordance with DIN EN 13541.

*The duration of the positive phase (a-) may not be less than 20 ms.

For open range and shock tube tests, the test results must contain the additional notation:

S = Splinters
MS = No splinters

Open range test

Extract from DIN EN 13123-2 (draft)

Facades, windows, doors, shutters

Charge

Stand-off

EXR 1	3 kg TNT	5.0 m
EXR 2	3 kg TNT	3.0 m
EXR 3	12 kg TNT	5.5 m
EXR 4	12 kg TNT	4.0 m
EXR 5	20 kg TNT	4.0 m

Selection of glazing by applicant.

Individual tests

Accord to customer requirements

Sälzer can test to the customers requirements through independent test institutes. Example testing as follows:

Aluminum double door with glazing, 100 kg TNT, 25 m
Aluminum four section window , 100 kg TNT, 15 m
Aluminum facade , 6 fields, 1 bar
Aluminum single wing window , 6 bar
Aluminum window w/ tilting skylight , 3.42 bar, impulse of 5.57 bar*ms
Window, contact charge on the window , 1 kg PETN
Steel double door , 100 kg TNT, 15 m

Further test results upon request ...



Notes

- Only in open range blast tests can the combination of the door, window, and masonry be tested under real conditions.
- Calculation of test results is limited and only possible if many test results are available.
- Our test results always refer to the complete window, door, or closure including glass or filling.

Product variety

Select from a variety of tested product styles ranging in sizes, materials, and colors. We will gladly assist you.