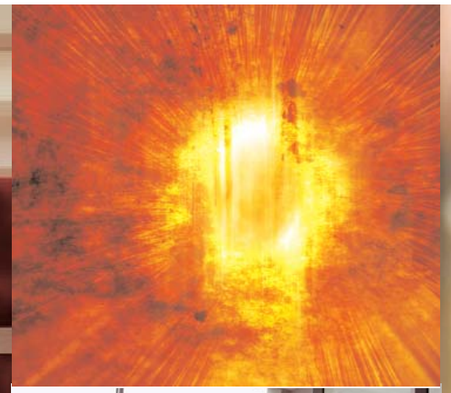
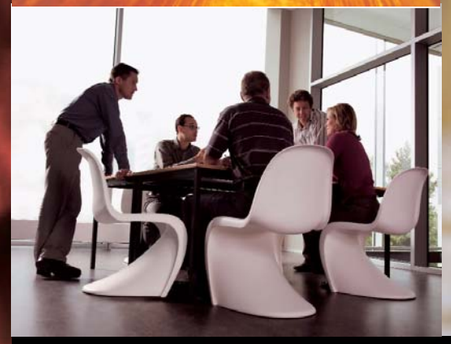
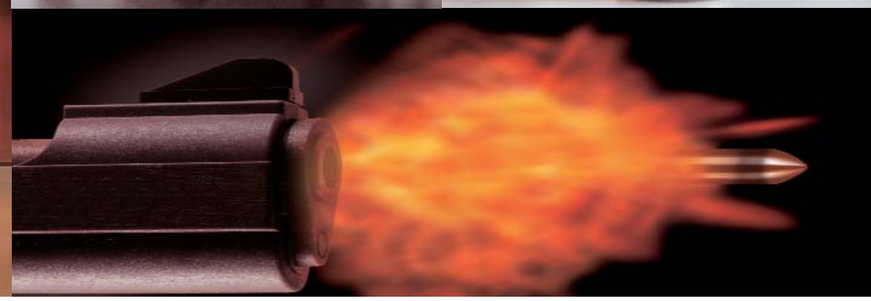
Architectural **Aluminium** Solutions







Protection systems

Fenestration solutions to protect buildings & personnel

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Sapa Building System

Building Understanding

Aluminium building products make buildings lighter, use less raw materials, are longer lasting and more efficient as a result of low maintenance needs.*

In addition, the combination of specialist glass and specialist frame design means that it can provide an effective barrier where the protection of personnel is of paramount importance.

*Source: European Aluminium Association 2006

Our business is aluminium. A corrosion resistant material with a unique combination of characteristics and many technical benefits.

We believe that the integral strength of this extraordinary material provides the natural solution when it comes to protecting buildings and personnel. Whatever the risk be it blast, fire, security, bullet or fire, our doors, windows and curtain walling provide the most suitable visual, practical and technical solution.

The threats that buildings and their occupants need to be protected from is apparent in our everyday news, be it the unpleasant face of terrorism or the unexpected accidents that occur at oil and gas sites such as the Buncefield depot.

At Sapa Building Systems we have built an unrivalled range of products that offer an effective line of defence in the event of a building coming under deliberate or accidental threat. By introducing this protection into a building's design specification you are providing the best possible protection to buildings and, most importantly, the people that work in them.

The breadth of our range is unique which ultimately means that you will not have to compromise at any stage of your design nor look to multiple suppliers to satisfy your design's ultimate requirements.

Left and above - Guildhall in London protected by Sapa Powerframe system. Top right - buildings around fuel depots can be vulnerable

No constraints, no compromise

Providing protection from different levels of risk places high demands on specifiers and building owners. We have built a reputation for our expertise in blast, fire, security and bullet resistant systems and by understanding the needs of this very specialist sector we have designed a range of products which offer all of the features that are essential to protect buildings and the people that work in them. The depth of thought and commitment to our systems is reflected in our investment in designing and testing to the very latest standards.

The need for specialist levels of protection is no longer confined to the more obvious risk areas but instead arises in many different buildings including:

- Airports
- Chemical plants
- Oil depots
- MOD buildings
- Government buildings
- Embassies
- Police HQ
- Private laboratories & research establishments

The risks exist for these buildings directly as well as for the buildings situated close by.

Design considerations

The choice of window design for sensitive applications is critical to the success of any build project, whether new-build or refurbishment.

Throughout any building the glazing requirements will vary according to a number of factors. Our systems have been designed with just this consideration in mind and include windows that open in any number of different ways according - from easy clean reversible and vertical sliding windows for hard to access areas; blast and bullet resistant designs for particular high risk areas to those providing natural ventilation systems that bring fresh air into the heart of a building. Fire doors and screens; automatic opening doors and windows; high secuirty locking; restricted window openings for safety - you'll find all of these within our range.

It is this design expertise that has seen our systems specified in countless projects the length and breadth of the country over the last 40 years.

When you combine these products with our specification support and expertise you can rest assured you've found the right solution for your project.

The following page offers an overview of our Powerframe and Fireframe system to enable you to initially identify, at a glance, the systems that are suitable for your project. The in-depth knowledge of our Project Consultants will help to ensure you find and specify the product that is right for your project.

Ballistic system

Excellence 92 BR Ballistic System is a thermally insulated, bullet resistant range of windows and doors. Fixed glazing, inward opening windows and doors feature aluminium or steel inserts and can accommodate tubular glazing bars, special locks, unique corner cleats and safety hardware to provide an effective deterrent to ballistic attack.

PERFORMANCE BULLET RESISTANCE

Standards

Aluminium profiles for windows, doors, glass and hardware must meet:

BS EN 1522 1999 Windows, doors, shutters and blinds - Bullet resistance - Requirements and classification.

BS EN 1523 1999 Windows, doors, shutters and blinds - Bullet resistance - Test method.

BS EN 1063 2000 Glass in building - Security glazing - Testing and classification of resistance against bullet attack.

Fillings, glass and panels, building construction and anchors must also withstand the above mentioned standards.

TABLE: Summary for bullet proof construction

Aluminium construction BS EN 1522	Glass BS EN 1063	Calibre
FB1	BR1	.22 LR
FB2	BR2	9mm Luger
FB3	BR3	0.357 Magnum
FB4	BR4	0.44 Remington & Magnum
FB5	BR5	5.56 x 45
FB6	BR6	7.62 x 51
FB7	BR7	7.62 x 51
FSG	SG2	Calibre 12/70

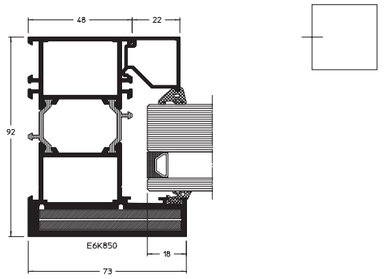
* Glass, tested according to BS EN 1063, can be applied in window constructions or other.

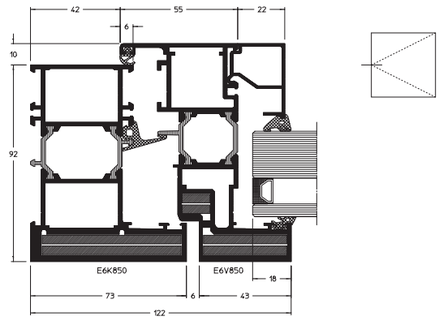
TABLE: Classification and test requirements fortesting the bullet resistance of glazing: hand guns and rifles - tested in accordance with BS EN 1522

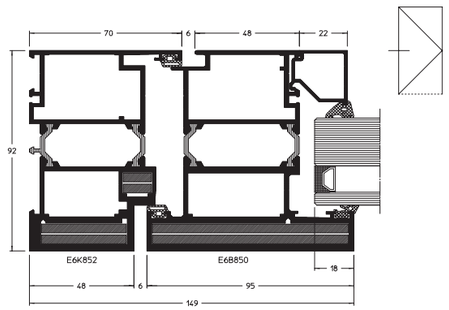
Class	Type of weapon	Calibre	Bullet type	Bullet mass (g)	Test range (m)	Bullet veolcity (m/s)
BR1	Rifle	.22 LR	L/RN	2.6 +/- 0,1	10 +/- 0,5	360 +/- 10
BR2	Hand gun	9mm Luger	FJ(1)/RN/SC	8.0 +/- 0,1	5 +/- 0,5	400 +/- 10
BR3	Hand gun	0.357 Magnum	FJ(1)/CB/SC	10.2 +/- 0,1	5 +/- 0,5	430 +/- 10
BR4	Hand gun	0.357 Magnum 0.44 Magnum	FJ(1)/CB/SC FJ(2)/FN/SC	10.2 +/- 0,1 15.6 +/- 0,1	5 +/- 0,5 5 +/- 0,5	430 +/- 10 440 +/- 10
BR5	Rifle	5.56 x 45*	FJ(2)/PB/SCP1	4.0 +/- 0,1	10 +/- 0,5	950 +/- 10
BR6	Rifle	5.56 x 45* 7.62 x 51	FJ(2)/PB/SCP1	4.0 +/- 0,1 9.5 +/- 0,1	10 +/- 0,5 10 +/- 0,5	950 +/- 10 830 +/- 10
BR7	Rifle	7.62 x 51**	FJ(2)/PB/HC1	9.8 +/- 0,1	10 +/- 0,5	820 +/- 10

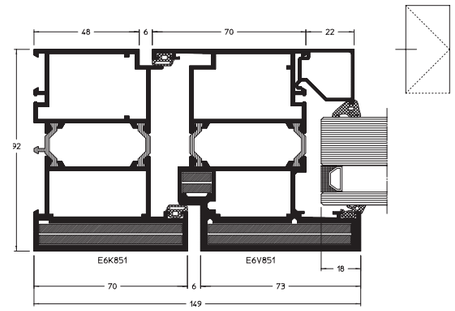
L lead
CB coned bullet
FJ full metal jacket bullet
FN flat nose
HC1 steel hard core, mass (3.7 +/- 0.1)g, hardness more than 63 HRC
PB pointed bullet
RN round nose
SC soft core (lead)
SCP1 soft core (lead) and steel penetrating (type SS109)

* To obtain the stated values for (5.56 x 45), the recommended barrel twist length equals (178 +/- 10) mm.
** To achieve the stated values for class FB7, the recommended barrel twist length equals (254 +/- 10) mm.
Note 1: When a shot is to be fired from a single point, the test range may be reduced to achieve the firing accuracy as defined in section 6 of EN 1523:1998. In this case it may not be possible to measure the velocity of the bullet.
Note 2:To be classified FB4 or FB6, the specimen shall be tested with both calibers listed.









EXCELLENCE92 BR: ACHIEVED LEVELS

- EX92BR with 2 x 4mm ALU - armour
  Open class Non Splitting with homologation according to EN1522 - EN1523 & Class FSG cal 12/70 Brenneke Non Splitting with homologation according to EN1522 - EN1523.
- EX92BR with 1 x 4mm steel armour HB 480-530 (Belgian banks - Post)
  Open class (Kalashnikov) caliber 7,62 x 39mm steel centre Non Splitting with homologation according to EN1522 - EN1523 & Class FSG cal 12/70 Brenneke Non Splitting with homologation according to EN1522 - EN1523.
- EX92BR with 2 x 4mm steel HB 480-530 Class FB6 Non Splitting homologation according to EN1522 - EN1523.

Excellence 65 SF

Security system

Excellence 65 SF Security System is a range of thermally insulated windows and doors with a specially developed three-chamber system that provides high levels of security. The robust frames have slim sightlines that are reinforced at the outside and ensure perfect resistance to even the most determined intruder when combined with burglar resistant glass, tubular glazing beads, safety hardware and multipoint locking. The system features open in/fixed light windows and single doors.

PERFORMANCE BURGLAR RESISTANCE

Standards

Aluminium profiles for windows, doors, glass and hardware must meet:

prEN 1627:1999 Windows, doors, shutters. Burglar resistance. Requirements and classification.

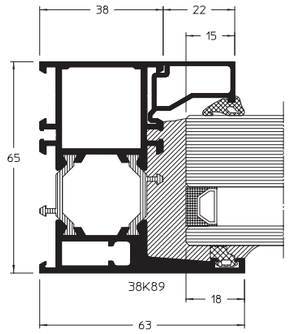
prEN 1630:1999 Windows, doors, shutters. Burglar resistance. Test method for the determination of resistance ot manual burglary attempts.

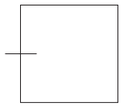
TABLE: Comparison of the Standards

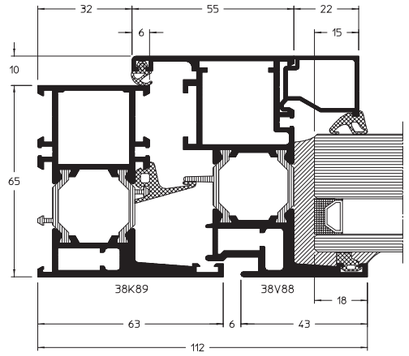
Europe		Netherlands		Germany						
Class	Glazing	Class	Glazing	Class	Glazing	Windows	Doors	Cylinder	Hardware	Lock
prEN 1627	EN356	NEN5096	NEN-N356	prEN 1627	DIN 52290	DIN 18054	DIN 18103	DIN 18254	DIN 18257	DIN 18251
1	-	1	2	WK1	-	-		PZ2	ES1	3
2	4	2	2	WK2	A3	EF0/1	ET1	PZ2	ES1	3
3	5	3	4	WK3	B1	EF2	ET2	PZ2	ES2	3
4	6	4	5	WK4	B1	EF3	ET3	PZ3	ES3	4
5	7	5	7	WK5	B2	-	-	-	-	-
6	8	6	8	WK6	B3	-	-	-	-	-

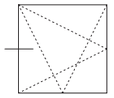
TABLE: Tests on forced entry resistance according to prEN 1627-1630 Class 3

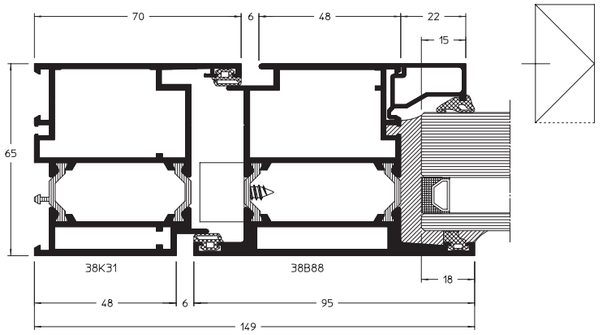
Excellence 65 SF Forced entry resistance				
Element + Dim. BXH	Standard	Report number	Languages	Result
Tilt/turn window 1250 x 1500mm	prEN 1627-1630	No. 23-18/00E	D/F/G/E	WK 3
Outward opening door 900 x 2100mm	prEN 1627-1630	No. 22-38/00E	D/F/G/E	WK 3
Inward opening door 900 x 2100mm	prEN 1627-1630	No. 22-37/00E	D/F/G/E	WK 3

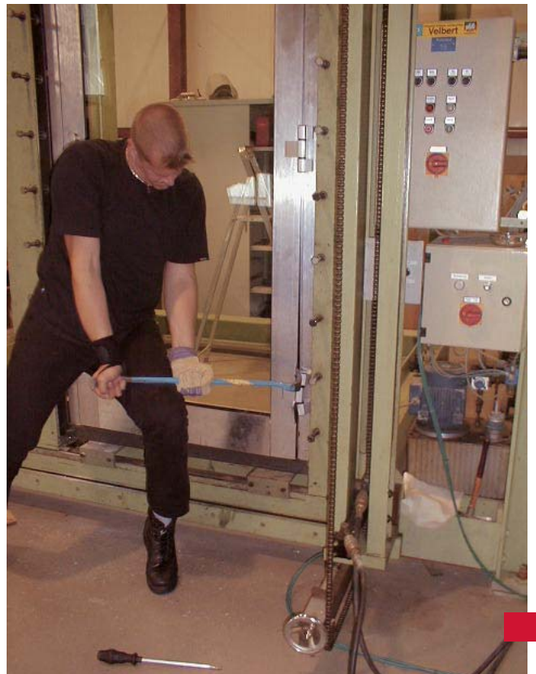




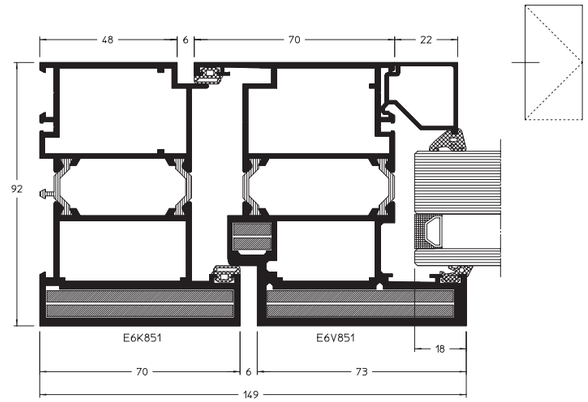








Excellence 65 SF testing in progress



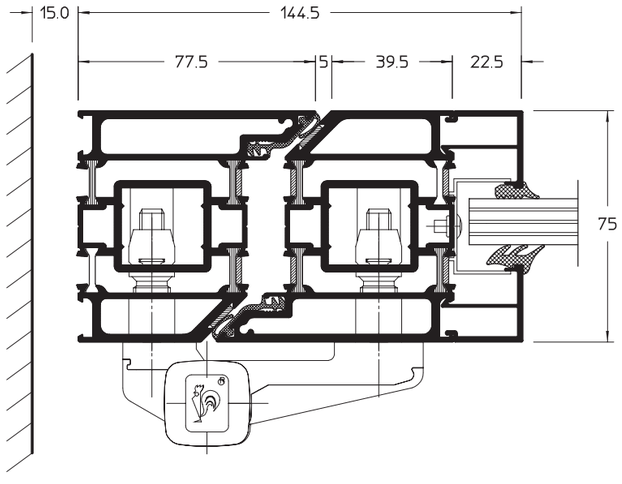
Secur II

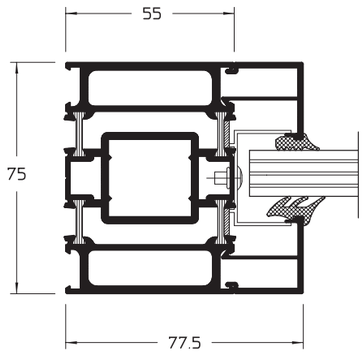
Fire resistant doors & partitions

Secur II is a fire resistant and thermally insulated aluminium system with a frame depth of 75mm, offering 30 minutes fire resistance for applications of fixed glazing and doors. Inward or outward opening doors in single or double door configurations are available as well as a wide range of hardware to suit commercial, residential and industrial applications.

SYSTEM FEATURES

- Secur II profiles have 5 chambers to ensure optimum stability making it possible to fabricate fire resistant doors up to 2700 mm in height, fixed screens up to 4500 mm in height and can be used for both internal and external applications
- The system can accommodate fire resistant glass or infill panels up to 32 mm in thickness
- The glass is centrally positioned in the profiles by means of fire resistant EPDM gaskets and retained by stainless steel security clips
- Foaming intumescent strips fully protect the areas between the hardware groove, the glass and profiles thus avoiding the need to insert additional insulating material inside the profiles
- The same profile can be utilized as an outer frame and vent keeping sight lines to a minimum also reducing stock levels and improving material optimization
- The flush finish to both inner and outer faces gives the system a neat and aesthetic appearance
- A wide range of hardware (locks, hinges, automatic door closers) are available to meet specific egress requirements
- Secur II when manufactured, installed and glazed strictly in accordance with our recommendations can achieve 30 minutes fire resistance for both integrity and thermal insulation (subject to the correct glass specification) when tested to EN 1634-1





Powerframe

Blast resistant windows, doors and curtain walling

Powerframe is a range of windows, doors and curtain walling that provide protection in the event of blast incidents. Designed specifically for this purpose the system derives the maximum benefit from the membrane action of laminated glass and its abilty to safely transmit complex loads to the perimeter fixing through the frames. Deep 30mm glass rebates ensure that the glass is retained within the frame to provide a safe barrier for a building's occupants or contents.

CURTAIN WALLING PERFORMANCE (BLAST)

Based on the detonation of a typical vehicle bomb charge equivalent of 100kg of TNT at a 20 metre standoff, a curtain wall screen size of 2480w x 3380h was successfully tested to meet the requirements of the MOD functional standard 02 for standard "Enhanced". Glass specification of 8mm toughened and 11.3mm laminated dry gasket glazed into 30mm rebates.

Target blast loading was:

- Peak design pressure 130kpa
- Specific impulse 630kpa.msec

WINDOW PERFORMANCE (BLAST)

Based on ISO 16933; Glass in Building - Explosion Resistant Security Glazing - Test and Classification for Arena Air Blast Loading (Classification Criteria - Vehicle Bombs) using explosives equivalent to 100kg of TNT.

Fixed light, top hung and tilt/turn window specimen sizes 1282w x 1582h in one pane. Single door with midrail specimen size 1070w x 2200h. Glass specification of 6mm toughened and 7.5mm Laminated.

- Classification code EXV25 (100kg charge at a 25 metre standoff)
- Peak design pressure 80kpa
- Specific impulse 380kpa.msec

Fixed light, top hung and tilt/turn window specimen sizes 1282w x 1582h in one pane. Glass specification of 6mm toughened and 11.5mm laminated.

- Classification code EXV19 (100kg charge at a 19 metre standoff)
- Peak design pressure 140kpa
- Specific impulse 600kpa.msec

Sapa Powerframe windows pre and post blast testing