



ESG Ballistic Bullet Resistant Glass

ESG Ballistic bullet resistant glass was developed for the security market by the team at ESG, one of the UK's leading glass processing specialists. Through extensive research and stringent testing, we developed **ESG Ballistic** bullet resistant glass as part of our innovative high security product range.

Bullet Resistant Solutions

ESG Ballistic bullet resistant glass provides high level resistance against the firing of specified weapons and ammunition. Created from layers of laminated glass and specialist interlayers, **ESG Ballistic** is manufactured under our quality controlled methods. This bullet resistant glazing is specially designed to absorb both the impact and the energy of a projectile, and to contain it within the glass panel. This affords protection to those on the other side of the glass, preventing life threatening injuries. Our combined expertise and experience has enabled us to reduce construction thicknesses, making **ESG Ballistic** thinner and lighter than many standard products on offer in the marketplace, with superior light transmission as an added bonus.

Applications

ESG Ballistic bullet resistant glass has a vast array of potential applications including military installations, government buildings and other secure institutions, personnel protection screens in banks, building societies, airports, post offices, betting shops, petrol filling stations and cash desks; as well as in armoured, cash transfer and private vehicles.

No Spall / Spall Allowed

ESG Ballistic bullet resistant glass is available in both No Spall and Spall Allowed options. No Spall is where all fragments, both from the projectile and glazing construction are fully contained and is achieved by using a hard coated polycarbonate layer to the non-attack face of the construction. Spall Allowed is where all the projectile fragments are fully contained within the glass construct but which permits glass fragments from the non-attack face.

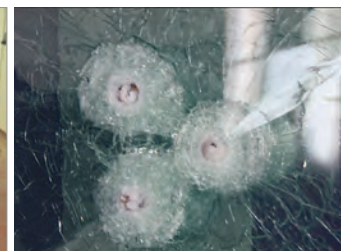
No Spall has the added safety measure of containing all fragments.



ESG's whole range of Ballistic Bullet Resistant Glass is independently tested and certified by Europe's leading accredited testing facilities. This commitment makes ESG a forerunner in the field of security glazing products.

Ultimate versatility

In addition to this, ESG has kept in mind the need to answer further challenges. ESG can combine **ESG Pyrotech™** with **ESG Ballistic** bullet resistant glass to provide unparalleled security and fire resistance to 30 and 60 minutes in a single product. ESG can provide added features such as sound attenuation and a switchable LCD interlayer, **ESG Switchable™**, which allows the panel to change from opaque white to optically clear at the flick of a switch.



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Technical Specification

Class Threat Level	Type of Weapon	Calibre	Ammunition		No Spall (mm/Kgm ²)	Fire Resistant No Spall (mm/Kgm ²)	Spall Allowed (mm/Kgm ²)	Fire Resistant Spall Allowed (mm/Kgm ²)
BR1	Rifle	0.22 LR	L/RN		19 / 38	27 / 53	23 / 54	38 / 84
BR2	Hand Gun	9mm Luger	FJ ¹ /RN/SC		19 / 38	27 / 53	23 / 54	38 / 84
BR3	Hand Gun	0.357 Magnum	FJ ¹ /CB/SC		19 / 38	27 / 53	27 / 64	41 / 95
BR4	Hand Gun	0.44 Rem Magnum	FJ ² /FN/SC		23 / 47 26 / 55	33 / 62	32 / 75	48 / 105
BR5	Rifle	5.56x45	FJ ² /PB/SCP1		34 / 72 38 / 73	42 / 88	36 / 85	52 / 115
BR6	Rifle	7.62x51	FJ ¹ /PB/SC		42 / 92	50 / 107	52 / 122	67 / 153
BR7	Rifle	7.62x51	FJ ² /PB/HC 1		68 / 157	75 / 172	77 / 183	92 / 214
SG1	Shot Gun	12/70	Solid Slug3		25 / 52	33 / 67	35 / 78	50 / 109
SG2	Shot Gun	12/70	Solid Slug3		34 / 72	42 / 87	47 / 112	61 / 142
AK47 DGU	Rifle	7.62 X 39	FJ ¹ /PB/SC		—	—	44 / 78	51 / 94

Notes:
 1) Full steel Jacket (plated)
 2) Full Copper Alloy Jacket
 3) Brenneke

Ammunition Legend:
L - lead
CB - coned bullet
FJ - full metal jacket bullet

FN - flat nose
HC1 - steel hard core
PB - pointed bullet
RN - round nose

SC - soft core (lead)
SCP1 - soft core (lead) and steel penetrator (type SS109)

Quality Standards

ESG Ballistic has been tested by a UKAS Accredited Test Laboratory to the British and European Standard BS EN 1063: 2000 – Security Glazing – Testing and classification of resistance against bullet attack. Testing has been conducted to this standard as the most stringent; ensuring the highest possible level of protection for the end user.

Our lamination process is also Kite Marked by the British Standards Institute to BS EN 14449: 2005, and tested for durability in accordance with BS EN 12543-4 : 1998, for which we also undergo regular auditing by the BSI for our Kite Mark Licences and Quality Management System to BS EN ISO 9001 : 2008 to ensure that our quality systems are operating at an optimum.

Glazing and Product Care

Due to the nature of the materials used, extreme caution must be exercised when using sealants; and in the handling, storing, maintenance and cleaning of glass panels - particularly those containing polycarbonate layers.

Please refer to our website for full glazing and product care technical information. www.esg.glass



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