



# BULLET RESISTANT GLASS

For high risk installations

Dellner-Romag has been manufacturing security glass for more than 70 years and is one of the UK's leading and most trusted manufacturers of bullet resistant glass. Constructed from several layers of glass bonded with various interlayers of tough polyvinyl butyral (PVB), polyurethane and polycarbonate. The construction of the glass is designed to absorb and disperse the impact energy of a projectile, safeguarding those behind the glass.

The thickness of the glass is determined by the perceived threat level. Dellner-Romag's reputation and passion for innovation ensures our Bullet Resistant glass is some of the thinnest available on the market, allowing for seamless integration into everyday constructions. Globally our glass provides protection for high risk military installations, government buildings, embassies, airports, banks and high value retail outlets, VIP residences, cash transfer vehicles, armoured personnel carriers and VIP limousines.

## SPALL ALLOWED VS NO SPALL

Dellner-Romag offer two fundamental options for bullet resistant glass; spall allowed and no spall. The requirement for spall allowed / no spall is part of the European standard BS EN 1063. Both options are very effective but are suited to different applications. Spall allowed will emit splinters of glass from the reverse of the panel when impacted. It makes it suitable for applications with a stand-off distance from the glass, e.g. a shop window, or similar.

No spall is constructed using both glass and polycarbonate, one of the strongest glazing materials available with an impact resistance many times greater than float or toughened glass. The polycarbonate fully absorbs the impact of the projectile resulting in a zero spall option which provides superior bullet resistance, enabling overall glass thickness to be reduced by up to 40% over conventional bullet resistant glass; enhancing light transmission and glass clarity. No spall could also be achieved with an antispall film. No spall constructions are particularly suited to applications such as cashier booths and vehicles; anywhere where people will be positioned within a close proximity of the glass.

## KEY FEATURES

- Wide range of sizes
- Some of the thinnest bullet resistant glass on the market
- High level of optical clarity for unobstructed vision
- Suitable for architectural and transport constructions
- Suitable for curves
- Printing and tinting options

## TYPICAL APPLICATIONS

- Military vehicles
- Armoured vehicles
- VIP transport
- Cash in Transit
- Airports and embassies
- Government buildings
- Museums and banks
- High value retail

## TESTING






















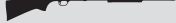
Dellner-Romag take quality standards and product testing very seriously. All our products are independently certified to BS EN 1063, with regular tests conducted at our in-house ballistic testing facility.

## SPECIFICATION

Dellner-Romag continually updates its products. If your requirements are not met by those in the product selector below, please contact the Dellner-Romag sales team for further assistance.

### BS EN 1063 PRODUCT SELECTOR

### TEST CLASSIFICATION

Ballistic Spec No Spall (NS) Spall Allowed (S)	Additional No Spall (NS) Spall Allowed (S)	Thickness (mm)	Type of weapon	Calibre	Ammunition
BR1 S (see note 3)		13.5	Pistol 	22LR	L/RN
BR2 NS		17.7	Hand Gun 	9mm Luger (see note 1)	FJ <sup>1</sup> /RN/SC
BR2 S (see note 3)		21.8	Hand Gun 	9mm Luger (see note 1)	FJ <sup>1</sup> /RN/SC
BR3 NS		17.9	Hand Gun 	.357 Mag (see note 1)	FJ <sup>1</sup> /CB/SC
BR3 S (see note 3)		26.3	Hand Gun 	.357 Mag (see note 1)	FJ <sup>1</sup> /CB/SC
BR4 S (see note 3)	SG1 S	31.0	Hand Gun 	.44 Rem Mag	FJ <sup>2</sup> /FN/SC
BR4 NS	SG1 NS	22.0	Hand Gun 	.44 Rem Mag (see note 2)	FJ <sup>2</sup> /FN/SC
BR4 NS	SG2 NS	30.7	Hand Gun 	.44 Rem Mag (see note 2)	FJ <sup>2</sup> /FN/SC
BR4 NS	SG1 NS	24.7	Hand Gun 	.44 Rem Mag (see note 2)	FJ <sup>2</sup> /FN/SC
BR5 NS	SG2 NS	35.7	Rifle 	5.56 x 45 (see note 2)	FJ <sup>2</sup> /PB/SCP-1
BR5 S (see note 3)		38.8	Rifle 	5.56 x 45 (see note 2)	FJ <sup>2</sup> /PB/SCP-1
BR6 S (see note 3)		52.0	Rifle 	7.62 x 51 (see note 1)	FJ <sup>1</sup> /PB/SC
BR6 NS	SG2 NS	37.5	Rifle 	7.62 x 51 (see note 1)	FJ <sup>1</sup> /PB/SC
BR6 NS (see note 3)		70.6	Rifle 	7.62 x 51 (see note 1)	FJ <sup>1</sup> /PB/SC
BR7 NS		73.8	Rifle 	7.62 x 51 (see note 1)	FJ <sup>2</sup> /PB/HC1
BR7 NS (see note 3)		83.3	Rifle 	7.62 x 51 (see note 1)	FJ <sup>2</sup> /PB/HC1
SG1 NS	BR4 NS	22.0	Shot Gun 	12/70	Solid Slug
SG1 NS	BR4 NS	24.7	Shot Gun 	12/70	Solid Slug
SG2 NS	BR4 NS	30.7	Shot Gun 	12/70	Solid Slug
SG1 S (see note 3)	BR4 S	31.0	Shot Gun 	12/70	Solid Slug
SG2 NS	BR5 NS	35.7	Shot Gun 	12/70	Solid Slug
SG2 NS	BR5 NS	37.5	Shot Gun 	12/70	Solid Slug

## NOTES

- 1 Full steel jacket (plated)
- 2 Full copper alloy jacket
- 3 All glass

## AMMUNITION KEY

- L** Lead  
**CB** Coned bullet  
**FJ** Full metal jacket bullet  
**FN** Flat nose  
**HC** 1 Steel hard core, mass 3.7g  
 0.1g hardnose more than 63 HRC  
**PB** Pointed bullet  
**RN** Round nose  
**SC** Soft core (lead)  
**SCPI** Soft core (lead) and steel penetrator (type SS 109)



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