TECHNICAL GUIDE

Safety, Security & Blast Mitigation Film

Explained and simplified

Applied film is the only way to upgrade the blast and safety performance of glass that is already in the building, without removing a single pane.

But film on its own is not a blast system. What turns it into one is the **anchoring** that holds the filmed glass into the frame. Almost every disappointment with film comes from specifying the first half and forgetting the second.

1 · What film actually does

A safety and security film is a multi-layered polyester laminate bonded to the room side of the glass with a pressure-sensitive adhesive. It does not stop the glass breaking. It holds the broken pieces to itself so they do not become projectiles.

- **Anti-fragmentation.** The primary function. Glass fragments stay adhered to the membrane rather than flying into the occupied space.
- **Blast mitigation.** The film stretches and absorbs a proportion of the shock energy before tearing, and — when anchored — keeps the pane in the opening.
- **Forced-entry delay.** The glass breaks, but the opening does not, delaying an intruder.
- **Spontaneous breakage containment.** Particularly relevant for toughened glass at height, where nickel sulphide inclusions can cause failure with no warning.
- **Solar control and UV rejection**, where a combined film is specified.

Film is measured in microns or mils — 1 mil = 25 micron. Typical architectural grades run from 100 micron (4 mil) safety film through to 375 micron (15 mil). For blast mitigation, **200 micron (8 mil) is the usual starting point**, and UK protective security guidance has long treated 100 micron as the minimum for any blast-mitigation purpose.

2 · The half everyone forgets — anchoring

Unanchored film holds the glass together but does not hold it in the frame. Under blast the whole filmed pane can be pushed into the room, or drawn out of the opening during the negative phase, as a single heavy sheet. Anchoring bonds the film to the frame so the assembly acts as one.

Method	How it works	Notes
Wet glaze	A structural silicone bead laps the frame, the glass edge and the film, bonding all three. 3M IPA or Dow 995 are the common products	Adapts to almost any frame. Requires cure time and a sound, clean frame surface

Method	How it works	Notes
Profile — bonded	An extruded rubber or aluminium profile with VHB tape on both legs, one to the film and one to the frame	No screws, no cure time, crisp finish. Adhesive performance governs
Profile — mechanical	The film is lapped onto the frame and clamped under a screwed aluminium batten	The strongest attachment. Needs frame metal that will hold a fixing
Cable arrest	Steel arrester cords across the opening, restraining the pane if it leaves the frame	Used where the frame cannot take an edge attachment

THE DETAIL THAT DECIDES FEASIBILITY

3M require a minimum **12.7 mm (½ in) bead onto both the frame and the film** for blast mitigation — explicitly *excluding* glazing stops and compression gaskets. The glazing arrangement therefore has to present bare frame metal on the room side. This single detail decides whether a wet-glaze upgrade is possible on an existing window.

3 · What the test data actually says

Blast performance belongs to the **combination** of a named film, a named attachment and a specific glass make-up — never to the film alone. The table below is published data for 3M Scotchshield Ultra S800, a 200 micron (8 mil) micro-layered film, tested to GSA-TS01-2003 and ASTM F1642.

Glass	Attachment	Load (psi / psi·ms)	Load (kPa / kPa·ms)	Result
6 mm annealed	IPA, 4 sides	6 / 42	41 / 290	GSA 2 · No Hazard
25 mm double pane annealed	IPA, 4 sides	6 / 42	41 / 290	GSA 2 · No Hazard
25 mm double pane annealed	IPA, 4 sides	9 / 60	62 / 414	GSA 2 · No Hazard
6 mm tempered	IPA, 4 sides	6 / 42	41 / 290	GSA 2 · No Hazard
25 mm double pane tempered	IPA, 4 sides	9 / 60	62 / 414	GSA 2 · No Hazard
25 mm double pane tempered	IPA, 4 sides	7.8 / 55	54 / 379	GSA 2
6 mm tempered	IPA, **2 sides**	6 / 42	41 / 290	GSA 3a · Minimal Hazard
25 mm double pane tempered	IPA, **2 sides**	6 / 42	41 / 290	GSA 3a · Minimal Hazard
6 mm annealed	IPA, 4 sides	9.4 / 55	65 / 379	GSA 3b

kPa figures are converted for reference. Read the table by comparing rows: the same film and the same load drop from **Condition 2 to Condition 3a** purely by moving from four-sided attachment to two-sided. The attachment, not the film, is doing the work.

The film's own properties, for context

Property	Ultra S800	Standard
Film thickness	200 micron (8 mil); 229 micron with adhesive	—
Tensile strength	227 MPa (33,000 psi) machine direction	ASTM D882
Break strength	46 N/mm (265 lb/in) machine direction	ASTM D882
Elongation at break	140% machine direction	ASTM D882
Safety glazing	EN 12600 Class 1B1 · ANSI Z97.1 Class A · 16 CFR 1201 Cat. 2	—
Manual attack	EN 356 P1A on annealed; P2A on 5 mm tempered	EN 356
Impact and cycling	Missile Level C at ±75 psf, with IPA	ASTM E1886 / E1996
Fire	EN 13501 B-s1,d0 · ASTM E84 Class A	—
Optical	87% visible light transmitted · 99% UV rejected	EN 410

4 · The families of film

Type	What it is for	Typical thickness
Safety / anti-shatter	Upgrading non-compliant glazing to safety-glass standards; containing fragments from accidental breakage	100–175 micron (4–7 mil)
Security / anti-intrusion	Delaying forced entry, smash-and-grab and opportunistic break-ins	175–300 micron (7–12 mil)
Blast mitigation	Fragment retention and glass containment under explosive overpressure, **with** edge retention	200–375 micron (8–15 mil)
Combined solar and safety	Blast or safety performance together with heat rejection and glare control — the usual choice for Gulf facades	Varies by product
Spontaneous breakage containment	Overhead and vertical toughened glazing at risk from nickel sulphide inclusions	100–200 micron, usually with anchoring
RF and EM shielding	Attenuating electromagnetic and radio-frequency transmission through glazing for secure rooms, control rooms and data halls	Specialist product
Privacy and decorative	Frosted, patterned, one-way and switchable finishes; manifestation	Varies by product

5 · What film cannot do

STATE THIS PLAINLY TO ANY CLIENT WHO ASKS

Applied film is not a ballistic product. No thickness of polyester film makes glass bullet-resistant, and no film carries an EN 1063, EN 1522 or UL 752 classification. Ballistic protection requires a laminated glass or glass-clad polycarbonate build-up in a tested frame. Film reduces the fragment hazard around a ballistic event; it does not stop the round.

- **It does not make the frame stronger.** If the existing frame or its anchorage cannot carry the blast reaction, film and anchoring will not change that.
- **It does not fix a failed insulating unit.** Film goes on the inner pane; the outer pane of an IGU is unprotected and will still be lost.
- **It has a service life.** Adhesive and polyester degrade under UV and heat, and Gulf exposure is severe. Manufacturers warrant flat-glass interior applications for a defined period; older installations should be assessed rather than assumed.
- **It does not survive being cleaned wrongly.** Abrasive or strongly acidic and alkaline cleaners damage the surface. Cleaning regimes need to be handed over with the building.

6 · Film or new glazing

	Applied film with anchoring	New blast-rated glazing
Programme	Days to weeks; largely out of hours	Months, including manufacture and lead time
Disruption	Building stays occupied and operational	Facade opened up; area handed over to the works
Cost	A fraction of replacement	Full system cost, plus any structural strengthening
Ceiling on performance	Limited by the existing frame, its anchorage, and the attachment detail	Limited only by what is engineered and tested
Evidence	Test data for the film, attachment and glass combination	Classification or calculation for the complete assembly

On most existing buildings the honest answer is that film with proper anchoring delivers a large proportion of the available benefit for a small proportion of the cost and disruption. It is rarely the highest-performing option, and it is very often the right one.

7 · The five things that go wrong most often

	The mistake	Why it matters
1	Specifying film with no attachment	The film holds the glass together; nothing holds it in the opening. This is the single most common error
2	Two-sided attachment where four was needed	Published data shows the same film and load dropping from GSA Condition 2 to 3a on that change alone
3	Quoting a film thickness as if it were a rating	“8 mil film” is a product, not a performance. The rating belongs to film, attachment and glass together

	The mistake	Why it matters
4	Not checking the frame before pricing	Wet glaze needs bare frame metal on the room side; mechanical attachment needs frame that will hold a fixing. Neither is guaranteed
5	Assuming film upgrades ballistic or fire performance	It does neither. Those are separate standards and separate products

8 · Quick reference

If you want to…	You need
Contain fragments only, on an occupied building	Safety film, 100–175 micron, no anchoring required
Achieve a GSA hazard rating	Blast film **plus** four-sided edge retention, with test data for that combination
Upgrade glazing that cannot be replaced	Film and anchoring, subject to a frame survey
Reduce heat and glare at the same time	A combined solar and safety film
Protect against bullets	Not film — a certified ballistic glazing assembly
Know what performance you will actually get	A survey of the existing frames before anything is priced

9 · What we supply

British Aluminium specifies, supplies and installs applied film and edge-retention anchoring across the GCC, working with the leading manufacturers rather than a single brand — including **3M Scotchshield**, **Saint-Gobain Solar Gard** and **Filmtek**. The right product is the one with test evidence for your glass, your frame and your threat.

- **Frame survey and feasibility.** We establish what attachment the existing frames will actually accept before anything is quoted.
- **Film and anchoring supply and installation**, including wet glaze, bonded and mechanical profiles and cable arrest systems.
- **Test evidence for the combination supplied** — film, attachment and glass — not a product datasheet on its own.
- **Integration with our certified systems.** Where film cannot reach the requirement, we can quote the replacement blast, ballistic or fire-rated system alongside it, so the comparison is on one page.

10 · The range at British Aluminium

We supply the complete range across both certification systems — EN and US — as certified assemblies, not assembled from separately rated parts.

Range	Products	Standards
Fire-rated doors	Hinged, pivoted, sliding and automatic sliding; solid and glazed	EN 13501-2 / EN 1634-1 · UL 10C / NFPA 252

Range	Products	Standards
Fire-rated windows and screens	Fixed and operable windows, glazed screens and partitions	EN 13501-2 / EN 1364-1 · UL 9 / NFPA 257 / ASTM E119
Fire-rated curtain wall	Stick-built and unitised, internal and external	EN 1364-3 · ASTM E119 / UL 263
Blast-resistant systems	Curtain wall, windows, aluminium and steel blast doors, bunker and hangar doors	EN 13123 / 13124 / 13541 · GSA-TS01 / ASTM F1642 / UFC
Ballistic-resistant systems	Aluminium and steel framed glazing, doors and public counters	EN 1522 / EN 1063 · UL 752 / NIJ 0108.01
Acoustic systems	80 mm and 100 mm double-glazed partitions, acoustic doors and screens	EN ISO 10140 / EN ISO 717-1 · ASTM E90 / E413 / E1332
Combined performance	Fire with blast, ballistic with acoustic, and other multi-requirement assemblies	Certified per configuration

The easiest way to start: send us an elevation, a photograph of a typical window head and jamb, and the glass make-up if you have it. We will tell you what attachment the frames will take and what performance is realistically achievable.

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Issued for information. Product data is reproduced from the manufacturers' published technical literature and is subject to their own terms; performance for any specific installation is established by test data for that combination of film, attachment and glass. Selection of the design threat and the required hazard rating is the responsibility of the project's security consultant and the authority having jurisdiction. Standards are cited as at the date shown and this guide is revised without notice; always work from the current issue.