BULLET RESISTANT, IMPLOSION RESISTANT AND SPLINTER RESISTANT COATING FOR GLASS

CHARACTERISTICS:

The main component of the coating is a thermoplastic polyester fibre made up of **polyethylene** terephthalate (PET). This part-crystalline fibre is extremely strong and resistant to moulds and many chemical agents.

The coating is produced using a specific lamination process improving its resistance a considerable amount. Using layers of PET and acrylic based adhesive responsive to pressure, it is possible to achieve extremely resistant films, which are also completely transparent. Furthermore, the film has a 98%-99% UV filter property.

The film comes with a lifelong guarantee against discoloration, peeling, cracking and delaminating.

IMPLOSION RESISTANCE

An example of everyday application is the installation of the film at the preferred points of access for robbers (ie. windows) where the coating will form an impenetrable barrier between the robber and the house thanks to its ability to "anchor" pieces of broken window together when the glass is broken.

If used in conjunction with an alarm system and good locks, it provides an efficient protection for the house, the workplace or even industrial settings where it guarantees security by decreasing the possibility of break-ins by removing the robber's ability of a fast and effective break in.

Moreover, it protects furniture and other valuable objects from discoloration by the sun.

Effective prevention of:

- Damage to furniture and other objects due to broken glass
- High repair costs of such damage
- House insurance cost increase (i.e. this product could decrease the cost of your insurance)
- Flesh wounds
- Damage to the house after a window is broken due to environmental factors (rain, wind etc.)

Furthermore, it reinforces glass fixtures against damage caused by storms, strong winds, explosion pressure and shrapnel and it can resist the impact of small missiles/rockets.

BULLET RESISTANT FUNCTION

By applying the film to one side of glass, it is possible to create a barrier against common bullets for hand held guns and weapons of medium calibre (cal. 9 Parabellum, 357 Magnum and 38 Special).

In fact, with a few simple applications it is possible to render car windows and any glass fixtures bullet resistant.

It is important to note that the film must be applied to form a coating on the side opposite to that of impact. This is the best way to ensure maximum resistance on impact as well as protection from any possible splintering.

APPARATUS REQUIRED FOR INSTALLATION:

Neutral glass detergent, tape measure, cutter, flexible spatula for uniform application

INSTALLATION

The film is to be applied to clean, undamaged glass with no cracks, scratches or surface damage. If the glass has already had a different type of coating applied, it needs to be removed.
Before starting, it is necessary to thoroughly clean the surface of the glass with an appropriate neutral detergent eliminating all traces of dust. To avoid the formation of condensation on the glass, all air conditioning units must be switched off.
Throughout the installation of the film onto the glass, it must NOT be exposed to direct sunlight.

To apply the film to the glass, remove the protective side of the film to reveal the adhesive side, place the adhesive side of the film to the glass and ensure the film is laid in a uniform way onto the glass surface to guarantee that there are NO air bubbles caught between the glass and film.
Once applied, the coating requires 48 hours to reach its high level of protection and strength.

- A roll of film to be applied on glass that is thicker than 1 cm

TMP-L14 has bullet resistance when applied to glass thicker than 1cm. It would prevent penetration of shots from a .38 caliber, a 9mm FMJ and even a .357.

Should you need a higher level of protection TMP-LX is your option: a security laminate that can be applied in many layers to resist more powerful weapons.

Attached is a spreadsheet that clarifies how many layers of TMP-LX are necessary to provide protection related to the thickness of the glass and the gunfire your client might be concerned about. We had successful demonstrations with people behind the glass being shot by weapons as AK-47, for example.

- A roll of film that is under 1 cm

If the glass has thickness under 1 cm, once again TMP-LX is your option since it can prevent penetration from bullets as thin as 6mm, including auto glass.

The first batch of our new product called TMP-SLX which with just one layer applied shows bullet resistance properties on thin glass, like an auto glass.

- How long is each roll?

TMP-L14: 30,19 m2
TMP-LX: 27.87 m2
TMP-SLX: 27.87 m2

- Can it be applied to smooth wooden wall panes? These are 8cm thick and between each pane there is a small groove measuring +/- ½ cm

We had some tests on plywood of around 1 cm (which alone would not be able to provide any protection at all) and the laminate caught the bullet: 4 TMP-LX + 1 TMP-L14 resisted a .38; 7 TMP-LX + 1 TMP-L14 resisted a 9 mm.

In the case of laminate on wood, it must be posted with screws since it will not adhere properly to wood.

TESTS:

1) Materials Tested: number 1 type bullet resistant film, 50cmx50cm, tested for its ballistic resistance properties to obtain certification as a bullet resistant agent.
2) Method of Testing: Carried out according to the technical program to verify the bullet resistant film's resistance to ballistic stress as previously mentioned.
3) Results: The tests were carried out by firing the weapons against the bullet resistant coated glass from a distance of 5 meters with a speed meter at 3 meters from the point of impact.
   The detailed results, from which we can conclude that the film is resistant to 1 bullet with a calibre of 9 and 3 bullets with a calibre of 375 M, are shown below.

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Type of material	Calibre of weapon	Angle of the shot	V3 (m/s)	Perforation of the glass (Y/N)
2 layers of bullet resistant film layered on monolithic crystal. 12mm float with a 50cmx50cm area.	9 Para	0° NATO	398.1	No
	44M		445.7	Yes
	357M		413.4	No
			442.8	
			439.3	

A portion of our third-party independent testing is listed below:

Safety Impact Testing
ANSI Z97.1
CPSC, 16 CFR, Part 1201 – Category I and II – Safety Standard for Architectural Glazing Materials

Burglary (forced impact) Testing
ULC S332-93 – Standard for Burglary Resisting Material (UL 972 equivalent)

Hurricane Resistance
Metro Dade County Test Protocol –
TAS 201-94, TAS 202-94, TAS 203-94

ASTM 1886, ASTM 1996

Bomb Blast Mitigation
GSA Level 1
GSA Level 2 (Limited)
BMAG Level 1

Bullet Resistance
UL 752-95 Level 2 - Bullet Resisting Equipment

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