MAGISTRAL
RELIABLE TRANSPARENCY

MAGISTRAL LTD
SAFETY LAMIMATED BULLET RESISTANT GLASS INSTALLATION GUIDELINES

1. General terms

a) The product should be installed with its **internal surface (with anti-splinter layer) inside the vehicle**.

b) Installation of the glass unit shall be carried out when **gun-port is in closed position** (if there is a gun-port in the unit).

c) **The external and internal surfaces of the glass unit should be covered by the protective coating. Use of the adhesive-based materials (adhesive tapes or films including masking tape) to cover internal surface of the glass unit is prohibited**. It is recommended to use **food wrap** without adhesive coating. The adhesive layer destroys metallized antiscratch coating of the antispall film; it does not change bullet resistance performance of the glass unit but deteriorates its appearance.

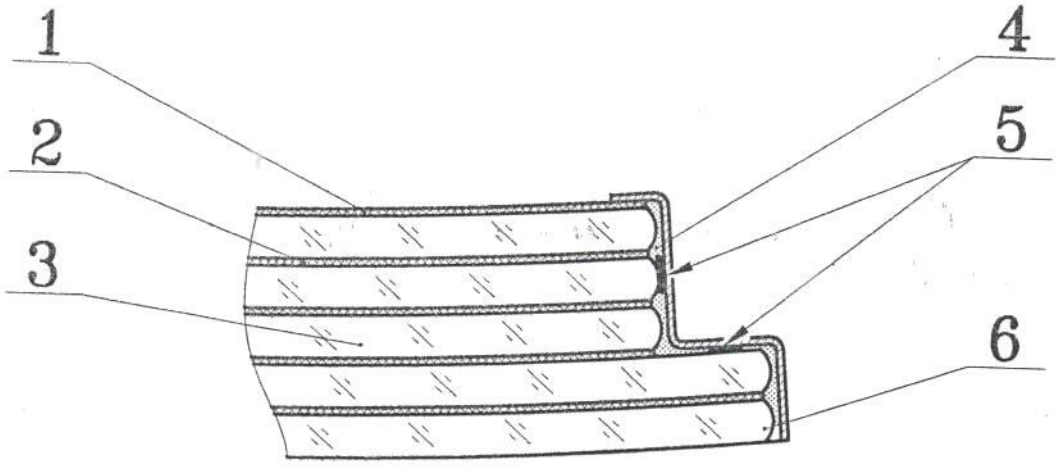
d) **Do not allow moisture to contact edge of the glass unit**, it may lead to poor adhesion between the glass and primer and/or sealant.

e) **Avoid mechanical damages of the glass.**

f) **It is prohibited to rework the glass unit (change antispall protective layer on the internal surface of the glass unit, tint the glass and other works).**

g) In order to keep the vehicle bulletproof performance and to avoid cracking of the glass unit during operation of the vehicle pay attention that the frame (including sandwich one) must overlap the antispall protective layer of the glass for 20±5 mm. In case of hidden armoring frame shall cover the whole edge of the glass unit and the installation offset.

h) Distance of at least 2-3 mm between the surfaces of the glass unit and metal parts (frame, gun-ports) shall be observed. It is recommended to use rubber gaskets with thickness equal to 2-3 mm in the compressed condition; width of the gaskets shall be less than the width of the frame for 3-4 mm.



1 – antispall protective layes
2 – sodalime glass
3 – PVB film
4 – sealant
5 – rubber gaskets
6 – frame of the vehicle

2. Equipment and materials recommended for installation

Table shows equipment and materials recommended for installation of the glass units.

No.	Material / equipment	Purpose
1	Sealant «Dinitrol-410 UV»	For tight fixing of the glass unit inside the frame
2	Sealant «Sika» (mark recommended in your country)	
3	Primer «Dinitrol-530» (primer coating)	To increase sealant adhesion
4	Primer «Sika» (primer coating)	
5	Coarse calico, GOST 29298-92	Wiping material
6	Ethyl alcohol, rectified, technical, grade 1, GOST 18300-87	To degrease surfaces
7	Armored frame	
8	Pneumatic gun	For sealant application
9	Protective coating (paper, food wrap, polyethylene)	For surface protection
10	Technical Acetone	For cleaning and degreasing of metal surfaces
11	Sandpaper	For cleaning of the metal surface
12	Rubber gaskets providing thickness of 2 mm in a compressed condition	To adjust space between the frame and the glass unit

Note: It is allowed to use the similar materials and equipment which ensure observation of the specified modes of the process.

3. Glass preparation

- Check the glass unit. Notify the person who is in charge (the supervisor, the chief of a site, etc.) if there are any defects.
- Protect external and internal surfaces of the glass unit with the protective film to avoid scratches.
- Degrease the glass surface which is in contact with the frame (side edge and perimeter) with coarse calico moistened with ethyl alcohol.
- Apply primer to the degreased surfaces. Leave it for 10-15 minutes at room temperature (20-25 ºC) for drying.

4. Frame preparation

- Check the frame. In case of any burrs found remove them and treat the metal surface with sandpaper.
- Treat the frame installation surface with acetone and dry within 10-15 minutes at room temperature.
- Degrease the frame surface which is in contact with the glass unit using a coarse calico moistened with ethyl alcohol.
- Apply primer onto the degreased frame surface. Leave it for 10-15 minutes at room temperature (20-25 °C).
- Prepare the rubber gaskets with thickness at least 3 mm and with width which is less than the width of the frame for 3-4 mm.

5. Glass unit installation

- Stick rubber gaskets to the frame surface coated with a primer with a space equal to 150 mm. Sealant shall be used.
- Apply uniform layer of sealant onto the frame surface coated with primer using a pneumatic gun. In case of uneven application of the sealant after its complete polymerization appearance of the areas with local stresses is probable; such areas may lead to cracking of the glass units during operation.
- For glass installation into the sandwich frame the sealant should be applied to the edge of the glass unit and to the internal mounting surfaces of both parts of the frame. Mounting surface is the part of the frame covering glass unit (including glass edge). Install the glass maintaining a uniform gap between the glass edge and the frame. Center the holes of the external and internal frame parts and fasten by clamping screws.
- In case of hidden armoring apply sealant onto the mounting surface of the vehicle frame, onto the edges of the small and large glass parts and glass offset. Then install the glass into the frame opening.
- During installation process ensure uniform glass clamping around the entire glass contour.
- Remove sealant residuals from the frame edges using coarse calico and ethyl alcohol and then remove the protective coating from the glass surface.
- Leave glass unit in the frame at the temperature of 25±10°C at least for 24 hours.

6. Cleaning of the glass unit

Remove sealant residuals from the frame edges using coarse calico and ethyl alcohol and then remove the protective coating from the glass surface. Wipe glass surfaces with clean coarse calico moistened with ethyl alcohol.

7. Installation quality control

Check the glass unit installed into the frame in scattered daylight or in similar artificial light (non-direct light) from the distance of 0.6 m from the glass unit. The following defects are not acceptable:

- visible damages or the unit (cracks, chips, etc.);
- visible damages of the antispall layer (scratches, cuts, bubbles, etc.);
- remains of auxiliary materials under the sealant (masking tape, food wrap, etc.);
- visible degradation of the sealant layer (cavities, voids, etc.);
- uneven sealant layer (unevenness more than 4 mm).