

# 3M™ Impact Protection Attachment Systems

## 3M Impact Protection Adhesive

3M™ Impact Protection Adhesive improves the overall performance of 3M Safety and Security Window Films. This unique window protection system combines the toughness of 3M's patented micro-layer safety film with 3M's world-class expertise in adhesives to help shield against impact from a variety of sources including bomb blasts and forced entry events. The 3M Impact Protection System also helps protect against personal injury from flying glass.

### 3M Impact Protection Adhesive Benefits:

- Greater tear strength, elongation and tensile strength than Dow Corning® 995 Silicone Structural Sealant
- Reduced cure time provides more immediate protection
- Reduced odor in your home or office compared to other sealant options

Property	Test Method Used	Units	Dow 995*	3M IPA
Curing Time (25°C (77°F), 50% RH)		days	7–14	3-7
Full Adhesion		days	14–21	7-14
Tack-Free Time (25°C (77°F), 50% RH)	ASTM D5895	minutes	65	21
Flow, Sag or Slump		inches	0.1	0
Working Time (25°C (77°F), 50% RH)		minutes	10–20	10–20
Specific Gravity		n/a	1.339	1.403
VOC content		g/L	30	16
<b>As Cured — After 21 Days at 25°C (77°F), 50% RH</b>				
Ultimate Tensile Strength	ASTM D0412	psi (Mpa)	350 (2.41)	380 (2.62)
Ultimate Elongation	ASTM D0412	%	525	640
Durometer Hardness, Shore A	ASTM D2240	points	40	38–39
Tear Strength, Die B	ASTM D0624	ppi	49	72

\*Data supplied from [www.dowcorning.com](http://www.dowcorning.com)

### Important:

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Renewable Energy Division  
St. Paul, MN 55144-1000  
1-866-499-8857

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# Specifications

## Specifications for 3M Impact Protection Adhesive

### 1.0 Scope

This specification is for a window film attachment system, or “wet glaze” to anchor the film to the frame. The attachment system helps secure filmed broken glass in the window frame, thus providing an increased level of safety and security for a broad range of applications, including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, building envelope protection, bomb blast mitigation, Smash and Grab or Break and Entry events. The wet glaze shall have low VOC content, low odor, and fast cure time. The film attachment system shall be called **3M Impact Protection Adhesive**.

### 2.0 Applicable Documents

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

The American Society for Testing and Materials (ASTM):

- x ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
- x ASTM D 2240 – Standard Test Method for Rubber Property – Durometer Hardness.
- x ASTM D 624 - Standard Test Method of Test for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- x ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
- x ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
- x ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure
- x ASTM G 26 - Standard Practice for Performing Accelerated Outdoor Weathering for Non-metallic Materials Using Concentrated Natural Sunlight.
- x ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- x ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- x ASTM F-1642 Standard Method of Test for Glazing and Glazing Systems Subject to Airblast Loadings, as adapted by the U.S. Government GSA Test Standard Protocols
- x ASTM F-2912 Standard Specification for Glazing and Glazing Systems Subjected to Airblast Loadings

GSA-TS01-2003 General Services Administration Standard Test for Glazing and Glazing Systems Subject to Airblast Loadings

### 3.0 Impact Protection Adhesive Requirements

#### 3.1 Color (select one):

- a) Black
- b) White

#### 3.2 Material Properties (as supplied):

- a) Typical Cure Time: 3 – 7 days (25°C, 50% RH)
- b) Full Adhesion: 7 – 14 days
- c) Tack-Free Time (ASTM D 5895): 21 minutes (25°C, 50% RH)
- d) Flow, Sag or Slump (ASTM D 2202): 0 inches
- e) Specific Gravity: 1.4
- f) Working Time: 10 – 20 minutes (25°C, 50% RH)
- g) VOC Content: 16 g/L

#### 3.3 Material Properties (as cured – 21 days at 25 °C, 50% RH):

- a) Ultimate Tensile Strength (ASTM D412): 380 psi (2.62 MPa)
- b. Ultimate Elongation (ASTM D412): 640 psi
- c. Durometer Hardness, Shore A (ASTM D2240): 38-39 points
- d. Tear Strength, Die B (ASTM D624): 72 ppi

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3.4 **Uniformity:** Product shall have uniform consistency and appearance, with no clumping.

3.5 **Flammability:** Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.6 **Windborne Debris Protection:**

- a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Medium Large Missile C and Small Missile A impact, with subsequent pressure cycling (per ASTMs E 1996 and E 1886) at +/- 70 psf design pressure.
- b. As part of a filmed glass system, film attachment shall demonstrate ability withstand structural load requirements of ASTM E330 when tested at +/- 120 psf design pressure.

3.7 **Bomb Blast Mitigation:**

- a. GSA Rating of "2" (Minimal Hazard) with minimum blast load of 11 psi overpressure and 55 psi\*msec blast impulse
- b. GSA Rating of "3B" (Low Hazard) with minimum blast load of 10 psi overpressure and 89 psi\*msec blast impulse
- c. ASTM F1642 rating of "Low Hazard" with minimum blast load of 8 psi overpressure and 42 psi\*msec blast impulse

### 4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer to install per the Manufacturer's specifications and in accordance with specific requests as to be determined and agreed to by the customer.

4.2 Authorization of dealership may be verified through the company's 3M ID Number.

4.3 The ADA will provide a commercial building reference list of ten (10) properties where the ADA has installed window film. This list will include the following information:

- \* Name of building
- \* The name and telephone number of a management contact
- \* Type of attachment system
- \* Amount of attachment systems installed
- \* Date of completion

### 5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identifying each product unit with the product designation and run number.

5.2 Materials shall be manufactured by:

- 3M Renewable Energy Division
- 3M Center, Building 235
- St. Paul, MN 55144-1000

### 6.0 Application

6.1 **Examination:** If application of window film is (was) the responsibility of another installer, notification in writing shall be made of deviations from manufacturer's recommended installation tolerances and conditions.

- a) Filmed glass surfaces receiving new attachment should first be examined to verify that they are free from defects and imperfections, and that the film edges extend sufficiently to the frame edges.
- b) Do not proceed with installation until film and frame surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.

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c) Upon the customer's request, an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long bead, approximately 0.5 – 1 inch in width, masking one side of the frame surface underneath the strip with tape. Allow the Impact Protection Adhesive to cure for 7 days and test adhesion by pulling up on the masked end and a 90 degree angle. If cohesive failure is observed (adhesive residue left behind on the frame surface), adhesion is acceptable; if adhesive failure is observed (clean peel from the frame), adhesion is unacceptable and product is not recommended.

### 6.2 Preparation:

- a. Clean surfaces thoroughly prior to installation.
- b. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Refer to 3M publication, 70-0709-0322-7, 3M Impact Protection Adhesive Attachment System Installation Instructions.
- c. Installer shall take necessary precautions to protect interior furnishings.

**6.3 Installation:** The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator. Refer to 3M publication, 70-0709-0322-7, 3M Impact Protection Adhesive Attachment System Installation Instructions.

- a. for blast mitigation: minimum 1/2 inch bead overlap on both frame and film (excluding glazing stops or compression gaskets)
- b. for windborne debris protection: minimum 3/8 inch bead overlap on both frame and film (excluding glazing stops or compression gaskets)
- c. To ensure a straight and consistent bead width is achieved, masking tape may be applied to film and frame surfaces before application of 3M Impact Protection Adhesive.
- d. With prior approval of the building owner or property manager, existing compression gaskets may be partially removed or trimmed to allow for a thinner bead and stronger anchorage. If removing the gaskets, sections shall be trimmed approximately 3 inches in length and inserted with appropriate spacing along all sides of the window to help secure the glazing during application and curing of the Impact Protection Adhesive.
- e. The Impact Protection Adhesive shall be dispensed with a caulk gun with nozzle opening diameter sized to match the approximate size of the desired bead width.
- f. A plastic putty knife or other tool with a clean straight edge shall be used to trowel and smooth out the adhesive. The completed adhesive bead shall be relatively triangular in shape.
- g. Any masking tape used shall be carefully removed within 10 minutes after applying the wet glaze.

### 7.0 Cleaning

- a. Product shall be allowed to cure for at least 3 – 7 days.
- b. Any visibly defective sections shall be repaired prior to the substantial completion of work.
- c. Uncured or excess material on film or frame shall be removed using a cloth dampened with isopropyl alcohol.
- d. Common window cleaning solutions may be used within 30 days after installation.

### 8.0 Warranty

The application shall be warranted by the manufacturer (3M) for a period of \_\_\_\_ years from the date of installation. Warranty only applies to new 3M Safety and Security Film installations. The manufacturer warrants that the Impact Protection Adhesive will maintain its integrity and will not change color from the time of original installation. Warranty does not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, or changes in appearance due to dirt, contaminants, or tampering.

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## Installation Instructions

1. Apply a 1" (25mm) strip of 3M™ Scotch™ Safe Release™ Blue Masking Tape to the film surface 3/8" (9mm) in from the edge of the film to all four sides. Note: This dimension will depend on application—1/2" or 3/8".
2. Apply a 1" (25mm) strip of 3M Safe-Release Blue Masking Tape to the window frame 3/8" (9mm) from the edge of the trimmed gasket. Note: This dimension will depend on application—1/2" or 3/8". This will form a parallel sealant channel that will allow a uniform sealant bead to be applied to the glass/frame interface. Note: Use a clean drop cloth before proceeding to Step 3.
3. Apply a triangular bead of IPA Impact Protection Adhesive, and tool as needed to form an acceptable finish. Read and follow all product information and installation instructions provided by 3M Company. We recommend you start in a corner and apply the sealant bead out approximately 6". Then turn the gun and push the sealant bead to the next corner where the same method is repeated. Pushing the sealant bead will ensure proper penetration and minimize the chances of air gaps in the bead. Pulling the gun can also be done if confident no air gaps are formed.
4. Smooth the sealant bead with an appropriate tool, if necessary, to give a finished look. Tooling should be completed in one continuous stroke immediately after adhesive application and before a skin forms.
5. Carefully remove the two masking strips from the glass/frame immediately after tooling. Do not allow the excess adhesive to contact the film, frame or flooring surfaces. A light colored drop cloth is needed to protect the work area. Be careful not to step on adhesive and transfer it to surrounding surfaces.

Note: Should you get some of the adhesive on the surrounding surfaces, an application and gentle wipe with a 3M Citrus Based Cleaner is recommended.

Curing time for the IPA will vary depending on temperature and relative humidity. It is not recommended to clean the film/IPA system for at least 36 hours following the installation. Full curing/adhesion can take up to 7 days, depending on conditions.

Property	Test Method Used	Units	3M IPA
Curing Time (25°C (77°F), 50% RH)	Days		3-7
Full Adhesion	Days		7-14
Tack-Free Time (25°C (77°F), 50% RH)	ASTM D5895	minutes	21
Flow, Sag or Slump	Inches		0
Working Time (25°C (77°F), 50% RH)	Minutes		10-20
Specific Gravity	n/a		1.403
VOC content	g/L		16
<b>As Cured — After 21 Days at 25°C (77°F), 50% RH</b>			
Ultimate Tensile Strength	ASTM D0412	psi (Mpa)	380 (2.62)
Ultimate Elongation	ASTM D0412	%	640
Durometer Hardness, Shore A	ASTM D2240	points	38-39
Tear Strength, Die B	ASTM D0624	ppi	72

Bomb Blast and Windstorm Testing results available upon request.

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