

SAFETY AND SECURITY FILM SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes film products applied to glass surfaces with a nano-technology fluid and edge anchor system to impart safety and security characteristics **in accordance with the Underwriters Laboratories (U/L) 972 standard for Forced Entry protection.**
- B. Locations: As indicated on Drawings

1.2 DEFINITIONS

- A. Emissivity: The ability of a surface to absorb far-infrared heat and to reflect it. The lower the emissivity, the lower the far-infrared heat absorption and the greater the far-infrared heat reflectance.
- B. Far-Infrared Heat: Heat radiated from objects at temperatures below 1300 deg F such as heat radiated from: room objects, objects heated by the sun, or a home heating system. Far-infrared heat is different from near-infrared heat that is heat radiated from objects at highly elevated temperatures such as the sun.
- C. Low Emissivity (Low-E) Films: Films with improved far-infrared heat reflection, with the ability to reduce winter heat loss through windows. The reflection of far-infrared heat also reduces the need for summer cooling by reducing the transmission of far-infrared heat from outdoor objects through windows into the interior of a home or building.
- D. Low Reflectance Films: Films whose visible light reflectance values are very close to that of ordinary glass.
- E. Luminous Efficacy: Ratio of visible light transmission to shading coefficient for a glazing system.
- F. Neutral Solar Films: Films that allow visible light to pass without distortion of color and that have equal visible light transmission properties at all wavelengths in the visible range from 380 to 780 nanometers.
- G. Light to Solar Heat Gain Ratio: Ratio of visible light transmission to Solar Heat Gain Coefficient (SHGC) for a glazing system.
- H. Solar Heat Gain Coefficient (SHGC): The fraction of incident solar radiation that actually passes through that window, including solar energy that is both directly transmitted and that which is absorbed and subsequently released inwardly by re-radiation and conduction. SHGC is expressed as a number between 0 and 1. The lower a window's solar heat gain coefficient, the less solar heat it transmits. This number is the mathematical complement of the TSER value: The sum of the Total Solar Energy Rejection (TSER), in decimal form of a glazing system and its SHGC value is 1; therefore, $1 - \text{TSER} = \text{SHGC}$.

SAFETY AND SECURITY FILM SYSTEM (continued)

- I. Spectrally Selective Solar Films: Films that reduce solar heat gain mainly by reducing the transmission of near-infrared solar radiation with minimal reduction of visible light transmission. Films with a Light to Solar Heat Gain Ratio of above 1.00 are spectrally selective.

1.3 REFERENCES

A. The following standards are referenced in this Section:

1. ANSI Z97.1, "Safety Glazing Materials Used in Buildings—Safety Performance Specifications and Methods of Test."
2. ASTM E-84, "Test Method for Surface Burning Characteristics of Building Materials".
3. ASTM C-1499-09, Monotonic Equibiaxial Flexural Strength of Glass (Double Ring Test).
4. ASTM D 882, "Standard Test Method for Tensile Properties of Thin Plastic Sheeting."
5. ASTM E 903, "Test Method for Solar Absorbance, Reflectance, and Transmittance of Materials Using Integrating Spheres"
6. ASTM D 1044, "Test Method for Resistance of Transparent Plastics to Surface Abrasion."
7. ASTM D 3330, "Standard Test Methods for Peel-Adhesion at 180 Degree Angle".
8. Consumer Product Safety Commission (CPSC) 16 CFR 1201, "Safety Standard for Architectural Glazing Materials."
9. National Institute of Justice standard, NIJ-STD-0108.01.

1.4 ACTION SUBMITTALS

A. Product Data (on 1/4" (6mm) annealed clear or tempered glass): For each film product indicated.

1.5 INFORMATION SUBMITTALS

A. Qualification Data: For firms and persons specified under "Quality Assurance" Article 1.7, demonstrating their capabilities and experience by including a list of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

SAFETY AND SECURITY FILM SYSTEM (continued)

- A. Confirmation Data: Written confirmation from the curtain wall manufacturer that the warranty will not be affected by the security and safety film, the nano-technology fluid and the attachment system to the glazing members.

1.6 CLOSEOUT SUBMITTALS

- A. Closeout Submittals: Upon completion of the Work, submit the following;
 - 1. Executed warranty.
 - 2. Maintenance (cleaning) and replacement instructions.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing systems similar to those indicated for this Project and meeting the standards of the International Standards Organization (ISO), ISO 9001 Quality Assurance in Production and Installation.
- B. Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by film manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements.
- C. Mockups: Apply glazing films in locations as directed to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Obtain approval of field samples before continuing with remainder of installation.
 - 2. Maintain field samples during remainder of installation in an undisturbed condition as a standard for judging the completed Work.
 - 3. Approved field samples may become part of the completed Work.
- D. Pre-installation Conference: Before installing glazing films, conduct conference at Project site. Conduct pre-installation conference in conjunction with installation of mockup.
 - 1. Meet with Owner, Architect, glazing film Installer and glazing film manufacturer's representative.
 - 2. Review methods and procedures related to installation, including manufacturer's written instructions.
 - 3. Examine substrate conditions for compliance with requirements.
 - 4. Review temporary protection measures required during and after installation.

SAFETY AND SECURITY FILM SYSTEM (continued)

5. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing films according to manufacturer's written instructions and as needed to prevent damage condensation, temperature changes, direct exposure to sun, or other causes.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with film installation when ambient and substrate temperature conditions are outside limits permitted by manufacturer and when glass substrates are wet from frost, condensation, or other causes.

1.10 WARRANTY

- A. Manufacturer's standard warranty agreeing to replace films that fail within 10 years from date of original installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS / PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include but are not limited to those indicated as Basis of Design.
- B. Basis of Design: Subject to compliance with requirements, provide the following safety and security films:
 1. **C-Bond Systems, LLC**; Safety and Security Films
6035 South Loop East
Houston, TX 77033
Phone: (832) 649-5658
Fax: (713) 513-5880
www.cbondsystems.com
info@cbondsystems.com
- C. Product Description – Forced Entry – In accordance with the Underwriters Laboratories (U/L) 972 standard. (Per the attached report from Underwriters Laboratories, Inc.) Minimum thickness of glass to be 1/4" inch (6 mm) annealed monolithic, tempered, or insulated units and any manufacturers approved forced entry rated film product applied with the C-Bond technology, a patented nanotechnology glass strengthening window film application solution.
- D. Color: Clear

SAFETY AND SECURITY FILM SYSTEM (continued)

2.2 PERFORMANCE REQUIREMENTS

- A. Thermal and Optical Performance Properties: Provide glazing films that will not affect the thermal and optical performance characteristics as established by the glass components scheduled for curtain wall, storefront and entrance glazing.
- B. Flexural Glass Strength: When tested in accordance with ASTM C-1499-09, Monotonic Equibiaxial Flexural Strength of Glass (Double Ring Test), the application of the mounting fluid/alone shall strengthen the glass to percentages up to and over 250 percent, and improve the flexure properties of the glass to percentages up to and over 130 percent.

2.3 GLAZING FILM ACCESSORIES

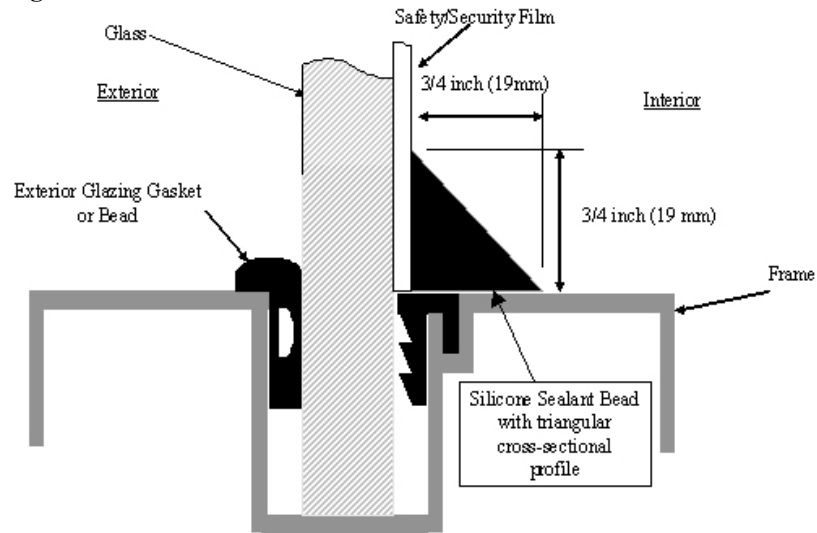
- A. General: Provide products complying with requirements of glazing film manufacturer for application indicated and with a proven record of compatibility with surfaces contacted in installation.
- C. Adhesive: Types recommended by glazing film manufacturer and nano-technology fluid manufacturer.
- D. Cleaners, Primers, and Sealers: Types recommended by glazing film manufacturer.

2.4 ANCHOR SYSTEM

- A. Provide transfer adhesive and mechanical anchor at edges of film to secure film, as recommended by the nano-technology fluid manufacturer.
 - 1. Dow 995 Structural Silicone adhesive (or approved alternative such as structural tape or mechanical anchor) to be used for all anchoring of film to window frame/glazing system.
 - a. Dow Corning® 995 Silicone Structural Glazing Sealant is a one-component neutral-curing silicone sealant designed specifically for structural bonding applications of glass and metal in factory or field situations.
 - b. See the attached Dow Corning® 995 Silicone Structural Glazing Sealant Product Information Sheet.
 - c. A minimum bead of 1/2" (.50") overlapping the exposed edge of the security film, and 1/2" (.50") overlapping the window frame/glazing system shall be used on all installations. Silicone bead installation may vary based on glazing system. **See Figure A below.**
 - d. Structural adhesive color to be black, white, or grey. As allowed by availability from structural sealant or tape manufacturer. Color matched is described as matching the color of the existing glazing bead/gasket wherever possible.

SAFETY AND SECURITY FILM SYSTEM (continued)

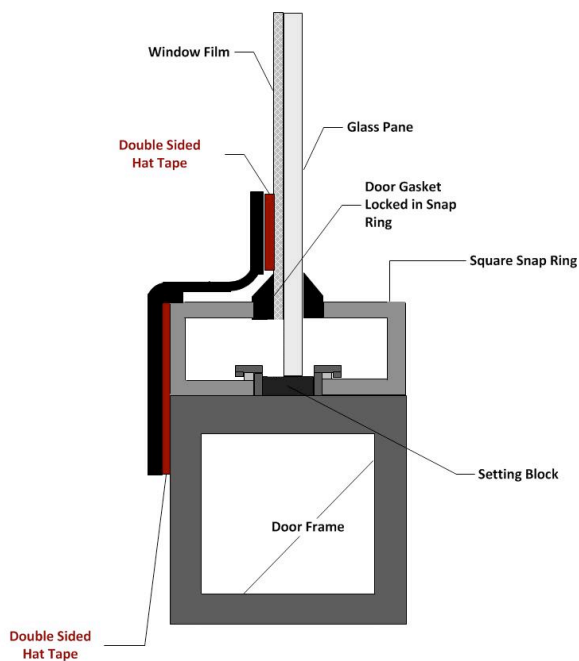
Figure A



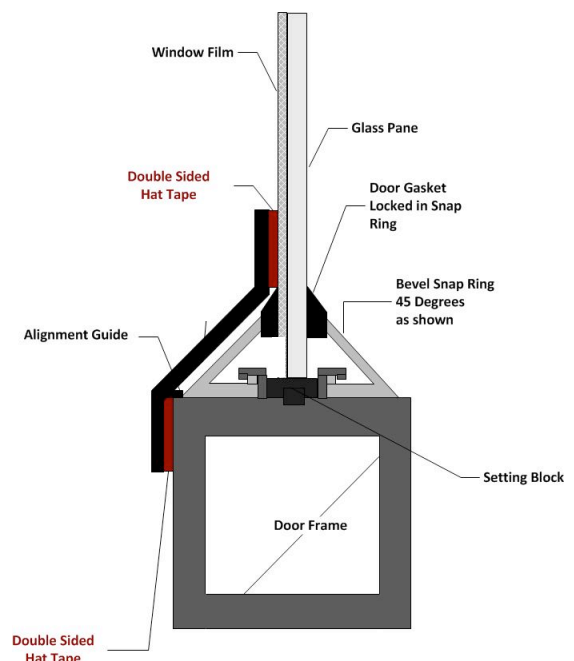
2. A Mechanical Anchor (such as structural tape) may be needed to secure doors or windows with unique glazing angles or with narrow exposed glazing ledges.

See examples A & B below.

Example A



Example B



PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine glass and surrounding adjacent surfaces for conditions affecting installation.
 - 1. Report conditions that may adversely effect installation. In report, include description of any glass that is broken, chipped, cracked, abraded, or damaged in any way.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Beginning of installation means acceptance of conditions.
- D. Ensure mechanical attachment to curtain wall system is acceptable.

3.2 PREPARATION

- A. Comply with manufacturers written instructions for surface preparation.
- B. Immediately before beginning installation of films, clean glass surfaces of substances that could impair glazing film's bond, including mold, mildew, oil, grease, dirt, and other foreign materials.
- C. Protect window frames and surrounding conditions from damage during installation.

3.3 INSTALLATION

- A. General: Comply with glazing film manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 1. Clean glass surface with any typical household glass cleaner to remove debris such as; excess paint, sheetrock mud, dirt, lint, etc.... and dry with a paper towel. Apply alcohol on the glass surface to remove any moisture and remove with a squeegee and/or paper towel.
 - 2. Use **dedicated** spray bottle or pressurized tank to apply the nano-technology mounting fluid.
 - 3. If the nano-technology fluid sits idle more than 60 (sixty) minutes, slightly agitate it by rocking the spray bottle or pressurized tank from side to side for +/- 5 (five) seconds.
 - 4. Apply nano-technology mounting fluid as follows:
 - a. Hold spray bottle or pressurized tank nozzle approximately 8-10 inches from the glass surface.

SAFETY AND SECURITY FILM SYSTEM (continued)

- b. Apply the nano-technology fluid to equally cover the entire glass surface area.
5. Install film continuously, but not necessarily in one continuous length. Install with no gaps.
 - a. If seamed, install with no gaps. Horizontal seams are allowed. No vertical seams. Install seams horizontally, plumb and as high as possible.
6. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
7. Install film using a nano-technology mounting fluid and custom cut to the glass with neat, square corners and edges to within 1/8 inch of the window frame.
8. Install film absent of bubbles, wrinkles, blisters, edge lifting and blemishes (within the installing technician's control).
- B. After installation, view film from a distance of 10 feet against a bright uniform sky or background. Film shall appear uniform in appearance with no visible streaks, banding, thin spots or pinholes.
 1. If installed film does not meet this criteria, remove and replace with new film.
- C. Spandrels: Remove insulation for reuse. After installation of the safety film system and anchors, reinstall insulation to comply with curtain wall requirements.

3.4 CARE & CLEANING INSTRUCTIONS

- A. Remove excess mounting fluid at finished seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended by glazing film manufacturer.
- C. Replace films that cannot be cleaned.
- D. Clean installed film with approved cleaners only. Contact nano-technology manufacturer for approved cleaning fluids.
- E. See the attached C-Bond Systems Care & Cleaning Instructions.

END OF SECTION 08 85 53

Dow Corning® 995 Silicone Structural Adhesive



1. PRODUCT NAME

Dow Corning® 995 Silicone Structural Adhesive

2. MANUFACTURER

Dow Corning Corporation
Midland, MI 48686-0994
Phone: (517) 496-6000
FAX: (517) 496-4586

3. PRODUCT DESCRIPTION

Dow Corning 995 Silicone Structural Adhesive is a one-component, self-priming, shelf-stable, neutral-cure, elastomeric adhesive specifically formulated for silicone structural glazing, exhibiting the following unique features:

- Excellent unprimed adhesion to most common building substrates, including glass, reflective glass, anodized aluminum, granite and paints, including most fluoropolymer-based paints.
- Excellent shelf life and "Use By" dating
- Noncorrosive by-products
- 20-year performance warranty available
- Cures to extremely tough elastomeric rubber

Structural applications require prior testing and written print review by Dow Corning.

Basic Uses: Dow Corning 995 Silicone Structural Adhesive is designed for use in structural applications such as factory or field glazing of glass and metal.

Once cured, this adhesive forms a durable, flexible, watertight bond that can be warranted for 20 years.

The performance of sealant in a structural joint may be simulated using the ASTM C 1135 test procedure. The stress-strain relationship for Dow Corning 995 Silicone Structural Adhesive is illustrated in Figure 1.

Limitations: Dow Corning 995 Silicone Structural Adhesive should not be applied:

- To building materials that bleed oils, plasticizers or solvents – materials such as impregnated wood, oil-based caulks, green or partially vulcanized rubber gaskets or tapes
- In totally confined spaces (the sealant requires atmospheric moisture for cure)
- When surface temperatures exceed 60°C (140°F)
- Where painting of the sealant is required, as the paint film may crack and peel
- To surfaces in contact with food – this sealant does not comply with

Federal Food and Drug Administration food-additive regulations

- In below-grade applications
- For use as an interior penetration firestop sealing system
- In horizontal floor joints where abrasion and physical abuse are likely to be encountered
- To frost-laden or damp surfaces
- For continuous immersion in water

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Composition and Materials: Dow Corning 995 Silicone Structural Adhesive is a one-part, ready-to-use material that has the consistency of toothpaste. This consistency remains

TYPICAL PROPERTIES

These values are not intended for use in preparing specifications.

As Supplied	
MIL-S-8802	Color Black
	Tack-Free Time, 50% RH, hours 1.5
	Curing Time, 50% RH, at 25°C (77°F), days 7-14
	Full Adhesion, days 14-21
	Flow, Sag or Slump, inches <0.1
	Working Time, minutes 10-20
As Cured – After 7 days at 25°C (77°F), 50% RH	
ASTM D 2240	Durometer Hardness, Shore A, points 40
ASTM D 412	Ultimate Tensile, psi 350
	Ultimate Elongation, % 525
ASTM D 624	Tear Strength, die B, ppi 49
ASTM C 794	Peel Strength, ppi 40
As Cured – After 21 days at 25°C (77°F), 50% RH	
ASTM C 1135	Tensile at 25%, psi 48
	Tensile at 50%, psi 75
ASTM C 719	Joint Movement Capability, % ±50
As Cured – After 21 days at 25°C (77°F), 50% RH and Subjected to 4,500 hours QUV ASTM G-53	
ASTM C 1135	Tensile at 25%, psi 50
	Tensile at 50%, psi 78
Specification Writers: Please obtain a copy of the Dow Corning Sales Specification for this product, and use it as a basis for your specifications. It may be obtained from any Dow Corning Sales Office, or from Dow Corning Customer Service in Midland, MI. Call 1-800-322-8723.	



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Ms. Maryam Neshasteriz
C-Bond Systems
410 Pierce St.
Houston, TX 77002

E-mail: mneshasteriz@cbondsystems.com

Reference: File: BP20898 Project: 4786991748

Subject: Research Testing in Accordance With UL972, Burglary Resisting Glazing Material,
Indoor Use Material

Dear Ms. Neshasteriz,

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Per your request, project 4786991748 was opened, in order to conduct impact testing of 10 glass samples in accordance with the applicable requirements of UL972, Burglary Resisting Glazing Material, 6th Edition, for Indoor Use Material. Complete results of testing and test data are included as an Appendix.

UL LLC did not select the samples, determine whether the samples were representative of production samples or witness the production of the test samples, nor were we provided with information relative to the formulation or identification of component materials used in the test samples. The test results apply only to the actual samples tested.

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This letter will serve to report that all tests on the subject product have been completed.

07/31/2015
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Thank you for the opportunity to provide your company with these services. Please do not hesitate to contact us if you should have any questions or comments.

Sincerely,
Cyndi Prosser

Cyndi Prosser
Staff Engineering Associate
Department: 3017ANBK
E-mail: cyndi.a.prosser@us.ul.com

Reviewed by:
Steve Sein

Steve Sein
Staff Engineer

TEST APPENDIX

SAMPLES

10 samples as follows were provided for testing: 1/4 in. (6 mm) thick tempered glass with film applied to the protected surface. All samples were overall 24 by 24 in.

Research testing was conducted in accordance with the applicable requirements of UL972, Burglary Resisting Glazing Material, 6th Edition, for Indoor Use Material.

MULTIPLE IMPACT TEST: INDOOR USE CONDITIONING

METHOD

The glazing material was subjected to five successive 40 ft-lb impacts produced by dropping a 5 lb., 3-1/4 inch steel ball through a distance of 8 feet. The test was conducted on three samples of the glazing material maintained at room temperature (21-27°C); three samples of the glazing material at a temperature of 55°C and three samples of the glazing material while at a temperature of 35°C. The samples were maintained at the required temperature for at least 4 hours prior to testing.

Sample Construction: 6 mm (1/4 in.) tempered glass with film applied to protected side.

RESULTS

SAMPLE #	Condition Exposure	IN Date/Time	OUT Date/Time	OBSERVATIONS (A;B)
1	21-27°C	2015/07/28 @ 1:30 PM	2015/07/28 @ 2:30 PM	A / Broke on Impact #1
2	21-27°C	2015/07/28 @ 1:30 PM	2015/07/28 @ 2:30 PM	A / Broke on Impact #3
3	21-27°C	2015/07/28 @ 1:30 PM	2015/07/28 @ 2:30 PM	A / After 5 impacts the glass did not break
4	55°C	2015/07/29 @ 9:00 AM	2015/07/29 @ 1:00 PM	A / Broke on Impact #4
5	55°C	2015/07/29 @ 9:00 AM	2015/07/29 @ 1:00 PM	A / Broke on Impact #1
6	55°C	2015/07/29 @ 9:00 AM	2015/07/29 @ 1:00 PM	A / Broke on Impact #5
7	35°C	2015/07/30 @ 9:00 AM	2015/07/30 @ 1:00 PM	A / After 5 impacts the glass did not break
8	35°C	2015/07/30 @ 9:00 AM	2015/07/30 @ 1:00 PM	A / Broke on Impact #3
9	35°C	2015/07/30 @ 9:00 AM	2015/07/30 @ 1:00 PM	A / Broke on Impact #2

- A.** The ball did not penetrate completely through the glazing material. (INDICATE NUMBER OF IMPACT THAT CAUSED INITIAL BREAK).
- B.** The ball penetrated completely through the glazing material. (INDICATE NUMBER OF IMPACT THAT CAUSED PENETRATION).

HIGH ENERGY IMPACT TEST:

METHOD

The glazing material was subjected to a 200 ft-lb impact produced by dropping a 5 lb., 3-1/4 inch steel ball through a vertical distance of 40 feet. The test was conducted on one sample of the glazing material maintained at room temperature (21-27°C).

RESULTS

The ball penetrated completely through the glazing material.

END OF REPORT



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Ms. Maryam Neshasteriz
C-Bond Systems
410 Pierce St.
Houston, TX 77002

E-mail: mneshasteriz@cbondsystems.com

Reference: File: BP20898 Project: 4787037743

Subject: Research Testing in Accordance With UL972, Burglary Resisting Glazing Material, Indoor Use Material, 2-Constructions

Dear Ms. Neshasteriz,

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Per your request, project 4787037743 was opened, in order to conduct impact testing of 20 glass samples (2 constructions) in accordance with the applicable requirements of UL972, Burglary Resisting Glazing Material, 6th Edition, for Indoor Use Material. Complete results of testing and test data are included as an Appendix.

UL LLC did not select the samples, determine whether the samples were representative of production samples or witness the production of the test samples, nor were we provided with information relative to the formulation or identification of component materials used in the test samples. The test results apply only to the actual samples tested.

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This letter will serve to report that all tests on the subject product have been completed.

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Thank you for the opportunity to provide your company with these services. Please do not hesitate to contact us if you should have any questions or comments.

Sincerely,
Cyndi Prosser

Cyndi Prosser
Staff Engineering Associate
Department: 3017ANBK
E-mail: cyndi.a.prosser@us.ul.com

Reviewed by:
Steve Sein

Steve Sein
Staff Engineer

TEST APPENDIX

SAMPLES

20 samples as follows were provided for testing:

Mad15: 1/4 in. (6 mm) thick tempered glass with 15 mil Madico film applied to the protected surface.

LL15: 1/4 in. (6 mm) thick tempered glass with 15 mil Llummar film applied to the protected surface.

All samples were overall 24 by 24 in.

Research testing was conducted in accordance with the applicable requirements of UL972, Burglary Resisting Glazing Material, 6th Edition, for Indoor Use Material.

Mad 15 MATERIAL
MULTIPLE IMPACT TEST: INDOOR USE CONDITIONING

METHOD

The glazing material was subjected to five successive 50 ft-lb impacts produced by dropping a 5 lb., 3-1/4 inch steel ball through a distance of 10 feet. The test was conducted on three samples of the glazing material maintained at room temperature (21-27°C); three samples of the glazing material at a temperature of 13°C and three samples of the glazing material while at a temperature of 35°C. The samples were maintained at the required temperature for at least 4 hours prior to testing.

Sample Construction: 6 mm (1/4 in.) tempered glass with film applied to protected side.

RESULTS

SAMPLE #	Condition Exposure	IN Date/Time	OUT Date/Time	OBSERVATIONS (A;B)
1	21-27°C	2015/09/02 @ 9:00 AM	2015/09/01 @ 11:00 AM	A
2	21-27°C	2015/09/02 @ 9:00 AM	2015/09/01 @ 11:07 AM	A
3	21-27°C	2015/09/02 @ 9:00 AM	2015/09/01 @ 11:20 AM	A
4	13°C	2015/09/03 @ 10:00 AM	2015/09/03 @ 2:05 PM	A
5	13°C	2015/09/03 @ 10:00 AM	2015/09/03 @ 2:15 PM	A
6	13°C	2015/09/03 @ 10:00 AM	2015/09/03 @ 2:25 PM	A
7	35°C	2015/09/02 @ 10:00 AM	2015/09/01 @ 2:03 PM	A
8	35°C	2015/09/02 @ 10:00 AM	2015/09/01 @ 2:10 PM	A
9	35°C	2015/09/02 @ 10:00 AM	2015/09/01 @ 2:17 PM	A

- A.** The ball did not penetrate completely through the glazing material. (INDICATE NUMBER OF IMPACT THAT CAUSED INITIAL BREAK).
- B.** The ball penetrated completely through the glazing material. (INDICATE NUMBER OF IMPACT THAT CAUSED PENETRATION).

Mad15 MATERIAL
HIGH ENERGY IMPACT TEST:

METHOD

The glazing material was subjected to a 200 ft-lb impact produced by dropping a 5 lb., 3-1/4 inch steel ball through a vertical distance of 40 feet. The test was conducted on one sample of the glazing material maintained at room temperature (21-27°C).

RESULTS

The ball did not penetrate completely through the glazing material.

LL15 MATERIAL
MULTIPLE IMPACT TEST: INDOOR USE CONDITIONING

METHOD

The glazing material was subjected to five successive 50 ft-lb impacts produced by dropping a 5 lb., 3-1/4 inch steel ball through a distance of 10 feet. The test was conducted on three samples of the glazing material maintained at room temperature (21-27°C); three samples of the glazing material at a temperature of 13°C and three samples of the glazing material while at a temperature of 35°C. The samples were maintained at the required temperature for at least 4 hours prior to testing.

Sample Construction: 6 mm (1/4 in.) tempered glass with film applied to protected side.

RESULTS

SAMPLE #	Condition Exposure	IN Date/Time	OUT Date/Time	OBSERVATIONS (A;B)
1.1	21-27°C	2015/09/02 @ 9:00 AM	2015/09/01 @ 10:45 AM	A
2.1	21-27°C	2015/09/02 @ 9:00 AM	2015/09/01 @ 10:50 AM	A
3.1	21-27°C	2015/09/02 @ 9:00 AM	2015/09/01 @ 10:55 AM	A
4.1	13°C	2015/09/03 @ 10:00 AM	2015/09/03 @ 2:30 PM	A
5.1	13°C	2015/09/03 @ 10:00 AM	2015/09/03 @ 2:37 PM	A
6.1	13°C	2015/09/03 @ 10:00 AM	2015/09/03 @ 2:45 PM	A
7.1	35°C	2015/09/02 @ 10:00 AM	2015/09/01 @ 2:23 PM	A
8.1	35°C	2015/09/02 @ 10:00 AM	2015/09/01 @ 2:28 PM	A
9.1	35°C	2015/09/02 @ 10:00 AM	2015/09/01 @ 2:34 PM	A

- A.** The ball did not penetrate completely through the glazing material. (INDICATE NUMBER OF IMPACT THAT CAUSED INITIAL BREAK).
- B.** The ball penetrated completely through the glazing material. (INDICATE NUMBER OF IMPACT THAT CAUSED PENETRATION).

LL15 MATERIAL
HIGH ENERGY IMPACT TEST:

METHOD

The glazing material was subjected to a 200 ft-lb impact produced by dropping a 5 lb., 3-1/4 inch steel ball through a vertical distance of 40 feet. The test was conducted on one sample of the glazing material maintained at room temperature (21-27°C).

RESULTS

The ball penetrated completely through the glazing material.

END OF REPORT



CLEANING AND GENERAL CARE INSTRUCTIONS FOR C-BOND SYSTEMS

C-Bond is a robust, durable product installed by trained professionals. You may observe some changes in the appearance of your window over the first 2 weeks; this is a normal part of the bonding process. Please note the following:

1. Do not clean the glass during the drying period.

The sun acts as a catalyst, ensuring that the adhesive thoroughly bonds the film to the glass. Window surfaces with a northern exposure or are internal glass may require longer drying times.

2. Any large moisture bubbles will disappear.

A few small particles or “points” may remain. These light reflections are inherent to film adhesives, and are usually visible only from the outside.

3. A slightly hazy or milky appearance.

This is caused by moisture between the film and the glass at the outset sometimes appears. Don't be concerned, it will disappear during the drying period.

4. Cleaning Instructions:

Do not use brushes, pure ammonia, industrial strength cleaners, or solutions that contain abrasive materials. Do not clean film for 10 days after installation. Never use cleaners that contain strong chemicals, especially ammonia. Harsh chemical can react to the window film, causing it to blotch, fade or peel from the glass. Regular dishwasher soap mixed with soft water is the best window cleaning solution that you can use. Only use soft window cleaning towels. Never use newspaper, white or brown paper towels, scrub pads or a window scraper.

***Windex is a registered trademark of SC Johnson**

Do not clean film for 5 days after installation.

If your C-Bond film product receives deep scratches or cuts, contact your dealer immediately for replacement. These scratches or cuts can render the system ineffective.

