STATE OF NEW JERSEY

BUSINESS REGISTRATION CERTIFICATE

DEPARTMENT OF TREASURY/
DIVISION OF REVENUE
PO BOX 252
TRENTON, N J 08646-0252

TAXPAYER NAME:

WINDOW FILM DEPOT INC

ADDRESS:

4939 LOWER ROSWELL RD
MARIETTA GA 30068

EFFECTIVE DATE:

04/10/13

TRADE NAME:

SEQUENCE NUMBER:

1787196

ISSUANCE DATE:

04/10/13

James J. Fusaro

Director
New Jersey Division of Revenue

FORM BRC
(04-08), D205846V

This Certificate is NOT assignable or transferable. It must be conspicuously displayed at above address.

0000060
State of New Jersey
Department of The Treasury
Division of Revenue
PO Box 252
Trenton NJ 08646-0252

FIRST-CLASS MAIL
U S POSTAGE
PAID
TRENTON, NJ
Permit No. 21

WINDOW FILM DEPOT INC
4939 LOWER ROSWELL RD
MARIETTA GA 30068

Certification 53319

CERTIFICATE OF EMPLOYEE INFORMATION REPORT

INITIAL

This is to certify that the contractor listed below has submitted an Employee Information Report pursuant to N.J.A.C. 17:27-1.1 et. seq. and the State Treasurer has approved said report. This approval will remain in effect for the period of 15-SEP-2014 to 15-SEP-2021

WINDOW FILM DEPOT INC.
4939 LOWER ROSWELL ROAD
MARIETTA GA 30068

Andrew P. Sidamon-Eristoff
State Treasurer

To be completed and signed below. ***Return with Bid***

(REVISED 4/10)

EXHIBIT A

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)
N.J.A.C. 17:27
GOODS, PROFESSIONAL SERVICE AND GENERAL SERVICE CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union of the contractor's commitments under this chapter and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to meet targeted county employment goals established in accordance with N.J.A.C. 17:27-5.2.

The contractor or subcontractor agrees to inform in writing its appropriate recruitment agencies including, but not limited to, employment agencies, placement bureaus, colleges, universities, and labor unions, that it does not discriminate on the basis of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personnel testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.

In conforming with the targeted employment goals, the contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

Letter of Federal Affirmative Action Plan Approval

Certificate of Employee Information Report

Employee Information Report Form AA302 (electronically provided by the Division and distributed to the public agency through the Division's website at www.state.nj.us/treasury/contract_compliance)

The contractor and its subcontractors shall furnish such reports or other documents to the Division of Purchase & Property, CCAU.EEO Monitoring Program as may be requested by the office from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Purchase & Property, CCAU, EEO Monitoring Program for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code at N.J.A.C. 17:27**.

Signature JF

Name Jeff Franson

Title President / CEO

Company Name: Window Film Depot, Inc.

Date: 1/10/19

NJ State Approved Cooperative Pricing System #65MCESCCPS

Educational Services Commission of New Jersey
Business Office
1660 Stelton Road – Second Floor
Piscataway, New Jersey 08854

Chapter 271
Political Contribution Disclosure Form
(Contracts that Exceed $17,500.00)
Ref. N.J.S.A. 52:34-25

The undersigned, being authorized and knowledgeable of the circumstances, does hereby certify that _____(Business Entity) has made the following **reportable** political contributions to any elected official, political candidate or any political committee as defined in N.J.S.A. 19:44-20.26 during the twelve (12) months preceding this award of contract:

Reportable Contributions

Date of Contribution	Amount of Contribution	Name of Recipient Elected Official/ Committee/Candidate	Name of Contributor

The Business Entity may attach additional pages if needed.

☑ **No Reportable Contributions** (Please check (✓) if applicable.)

I certify that Window Film Depot, Inc (Business Entity) made no reportable contributions to any elected official, political candidate or any political committee as defined in N.J.S.A. 19:44-20.26.

Certification

I certify, that the information provided above is in full compliance with Public law 2005 – Chapter 271.

Name of Authorized Agent Jeff Franson

Signature _____ Title President/CEO

Business Entity Window Film Depot, Inc.

To be completed and signed below. **Return with bid.**

STATEMENT OF OWNERSHIP DISCLOSURE

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

Name of Organization: Window Film Depot, Inc
Organization Address: 4939 Lower Roswell Rd, Bldg B, Suite 100
City, State, ZIP: Marietta, GA 30068

Part I Check the box that represents the type of business organization:

☐ Sole Proprietorship (skip Parts II and III, execute certification in Part IV)

☐ Non-Profit Corporation (skip Parts II and III, execute certification in Part IV)

☑ For-Profit Corporation (any type) ☐ Limited Liability Company (LLC)

☐ Partnership ☐ Limited Partnership ☐ Limited Liability Partnership (LLP)

☐ Other (be specific): _____

Part II Check the appropriate box

☑ The list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. (**COMPLETE THE LIST BELOW IN THIS SECTION**)

OR

☐ No one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be. (**SKIP TO PART IV**)

(Please attach additional sheets if more space is needed):

Name of Individual or Business Entity	Home Address (for Individuals) or Business Address
Jeff Franson	3765 Clubland Trail Marietta, GA 30068
Chris Sullivan	334 Ogle St., Unit C Costa Mesa, CA 92627

Part III DISCLOSURE OF 10% OR GREATER OWNERSHIP IN THE STOCKHOLDERS, PARTNERS OR LLC MEMBERS LISTED IN PART II

If a bidder has a direct or indirect parent entity which is publicly traded, and any person holds a 10 percent or greater beneficial interest in the publicly traded parent entity as of the last annual federal Security and Exchange Commission (SEC) or foreign equivalent filing, ownership disclosure can be met by providing links to the website(s) containing the last annual filing(s) with the federal Securities and Exchange Commission (or foreign equivalent) that contain the name and address of each person holding a 10% or greater beneficial interest in the publicly traded parent entity, along with the relevant page numbers of the filing(s) that contain the information on each such person. **Attach additional sheets if more space is needed**.

Website (URL) containing the last annual SEC (or foreign equivalent) filing	Page #'s

Please list the names and addresses of each stockholder, partner or member owning a 10 percent or greater interest in any corresponding corporation, partnership and/or limited liability company (LLC) listed in Part II **other than for any publicly traded parent entities referenced above**. The disclosure shall be continued until names and addresses of every non-corporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established pursuant to N.J.S.A. 52:25-24.2 has been listed. **Attach additional sheets if more space is needed.**

Stockholder/Partner/Member and Corresponding Entity Listed in Part II	Home Address (for Individuals) or Business Address

Part IV Certification

I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder/proposer; that the ***ESCNJ*** is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with the ***ESCNJ*** to notify the ***ESCNJ*** in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the, permitting the ***ESCNJ*** to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):	Jeff Franson	Title:	President/CEO
Signature:	JF	Date:	11/10/19

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

Form **W-9**
(Rev. October 2018)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

▶ **Go to *www.irs.gov/FormW9* for instructions and the latest information.**

Give Form to the requester. Do not send to the IRS.

Print or type. See **Specific Instructions** on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.
WINDOW FILM DEPOT, INC

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☑ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.
4939 LOWER ROSWELL ROAD - SUITE 100

Requester's name and address (optional)

6 City, state, and ZIP code
MARIETTA, GA 30068

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number
			–			–				

or

Employer identification number
2	0	–	0	4	6	1	5	0	1

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here **Signature of U.S. person ▶** _____ **Date ▶** 1-3-2019

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to *www.irs.gov/FormW9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, *later.*

To be completed and signed below. ***Return with Bid***

Educational Services Commission of New Jersey
DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN
PART 1: CERTIFICATION
BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

FAILURE TO CHECK EITHER BOX WILL RENDER THE PROPOSAL NON-RESPONSIVE.

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf. Bidders **must** review this list prior to completing the below certification. **Failure to complete the certification will render a bidder's proposal non-responsive**. If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party.
PLEASE CHECK EITHER BOX:

☑ **I certify, pursuant to Public Law 2012, c. 25, that neither the person/entity listed above nor any of the entity's parents, subsidiaries, or affiliates is listed** on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf.

I will skip Part 2 and sign and complete the Certification

OR

☐ **I am unable to certify as above because I or the bidding entity and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below**. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

Part 2
PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN
You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes below.
PROVIDE INFORMATION RELATIVE TO THE ABOVE QUESTIONS. PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION. IF YOU NEED TO MAKE ADDITIONAL ENTRIES, USE ADDITIONAL PAGES

Name:_____ Relationship to Bidder/Vendor:_____

Description of Activities:

_____

Duration of Engagement:_____ Anticipated Cessation Date_____

Bidder/Vendor_____

Contact Name:_____ Contact Phone Number:_____

Certification: I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the below-referenced person or entity. I acknowledge that the Educational Services Commission of New Jersey is relying on the information contained herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of contracts with the Educational Services Commission of New Jersey to notify the Educational Services Commission of New Jersey in writing of any changes to the answers of information contained herein. I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreements(s) with the Educational Services Commission of New Jersey and that the Educational Services Commission of New Jersey at its option may declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): Jeff Franson Signature:_____

Title: President / CEO Date: 1/10/19

Bidder/Vendor: Window Film Depot, Inc.

Educational Services Commission of New Jersey
DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN
PART 1: CERTIFICATION
BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

Part 1

FAILURE TO CHECK EITHER BOX WILL RENDER THE PROPOSAL NON-RESPONSIVE.

Pursuant to Public Law 2012, c. 25, any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must complete the certification below to attest, under penalty of perjury, that neither the person or entity, nor any of its parents, subsidiaries, or affiliates, is identified on the Department of Treasury's Chapter 25 list as a person or entity engaging in investment activities in Iran. The Chapter 25 list is found on the Division's website at http://www.state.nj.us/treasury/purchase/pdf/Chapter25List.pdf. Bidders **must** review this list prior to completing the below certification. **Failure to complete the certification will render a bidder's proposal non-responsive**. If the Director finds a person or entity to be in violation of law, s/he shall take action as may be appropriate and provided by law, rule or contract, including but not limited to, imposing sanctions, seeking compliance, recovering damages, declaring the party in default and seeking debarment or suspension of the party.

PLEASE CHECK EITHER BOX:

☒ **I certify, pursuant to Public Law 2012, c. 25, that neither the person/entity listed above nor any of the entity's parents, subsidiaries, or affiliates is listed** on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. **I will skip Part 2 and sign and complete the Certification**

OR

☐ **I am unable to certify as above because I or the bidding entity and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below**. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

Part 2

PLEASE PROVIDE FURTHER INFORMATION RELATED TO INVESTMENT ACTIVITIES IN IRAN

You must provide a detailed, accurate and precise description of the activities of the bidding person/entity, or one of its parents, subsidiaries or affiliates, engaging in the investment activities in Iran outlined above by completing the boxes below.

PROVIDE INFORMATION RELATIVE TO THE ABOVE QUESTIONS. PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION. IF YOU NEED TO MAKE ADDITIONAL ENTRIES, USE ADDITIONAL PAGES

Name:_____ Relationship to Bidder/Vendor:_____

Description of Activities: None

_____

_____

Duration of Engagement:_____ Anticipated Cessation Date_____

Bidder/Vendor_____

Contact Name:_____ Contact Phone Number:_____

Certification: I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the below-referenced person or entity. I acknowledge that the Educational Services Commission of New Jersey is relying on the information contained herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of contracts with the Educational Services Commission of New Jersey to notify the Educational Services Commission of New Jersey in writing of any changes to the answers of information contained herein. I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreements(s) with the Educational Services Commission of New Jersey and that the Educational Services Commission of Ne Jersey at its option may declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): Jeff Hagen Signature: _____

Title: President Date: 1/2/21

Bidder/Vendor: Window Film Depot

Educational Services Commission of New Jersey
DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN
PART 1: CERTIFICATION
BIDDERS MUST COMPLETE PART 1 BY CHECKING EITHER BOX.

Part 1

FAILURE TO CHECK EITHER BOX WILL RENDER THE PROPOSAL NON-RESPONSIVE.

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PLEASE CHECK EITHER BOX:

[X] **I certify, pursuant to Public Law 2012, c. 25, that neither the person/entity listed above nor any of the entity's parents, subsidiaries, or affiliates is listed** on the N.J. Department of the Treasury's list of entities determined to be engaged in prohibited activities in Iran pursuant to P.L. 2012, c. 25 ("Chapter 25 List"). I further certify that I am the person listed above, or I am an officer or representative of the entity listed above and am authorized to make this certification on its behalf. **I will skip Part 2 and sign and complete the Certification**

OR

[ ] **I am unable to certify as above because I or the bidding entity and/or one or more of its parents, subsidiaries, or affiliates is listed on the Department's Chapter 25 list. I will provide a detailed, accurate and precise description of the activities in Part 2 below and sign and complete the Certification below**. Failure to provide such will result in the proposal being rendered as non-responsive and appropriate penalties, fines and/or sanctions will be assessed as provided by law.

Part 2

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PROVIDE INFORMATION RELATIVE TO THE ABOVE QUESTIONS. PLEASE PROVIDE THOROUGH ANSWERS TO EACH QUESTION. IF YOU NEED TO MAKE ADDITIONAL ENTRIES, USE ADDITIONAL PAGES

Name:_____ Relationship to Bidder/Vendor:_____

Description of Activities:

_____

_____

Duration of Engagement:_____ Anticipated Cessation Date_____

Bidder/Vendor_____

Contact Name:_____ Contact Phone Number:_____

Certification: I, being duly sworn upon my oath, hereby represent and state that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I attest that I am authorized to execute this certification on behalf of the below-referenced person or entity. I acknowledge that the Educational Services Commission of New Jersey is relying on the information contained herein and thereby acknowledge that I am under a continuing obligation from the date of this certification through the completion of contracts with the Educational Services Commission of New Jersey to notify the Educational Services Commission of New Jersey in writing of any changes to the answers of information contained herein. I acknowledge that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I recognize that I am subject to criminal prosecution under the law and that it will also constitute a material breach of my agreements(s) with the Educational Services Commission of New Jersey and that the Educational Services Commission of Ne Jersey at its option may declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print): Kristina Mosby Signature: Krissy Mosby

Title: President Date: 11/29/2022

Bidder/Vendor: Window Film Depot, Inc

To be completed and signed below. ***Return with Bid***

APPENDIX A

AMERICANS WITH DISABILITIES ACT OF 1990

Equal Opportunity for Individuals with Disability

The contractor and the Educational Services Commission of New Jersey (hereafter "owner") do hereby agree that the provisions of Title 11 of the Americans With Disabilities Act of 1990 (the "Act") (42 U.S.C. S121 01 et seq.), which prohibits discrimination on the basis of disability by public entities in all services, programs, and activities provided or made available by public entities, and the rules and regulations promulgated pursuant there unto, are made a part of this contract. In providing any aid, benefit, or service on behalf of the owner pursuant to this contract, the contractor agrees that the performance shall be in strict compliance with the Act. In the event that the contractor, its agents, servants, employees, or subcontractors violate or are alleged to have violated the Act during the performance of this contract, the contractor shall defend the owner in any action or administrative proceeding commenced pursuant to this Act. The contractor shall indemnify, protect, and save harmless the owner, its agents, servants, and employees from and against any and all suits, claims, losses, demands, or damages, of whatever kind or nature arising out of or claimed to arise out of the alleged violation. The contractor shall, at its own expense, appear, defend, and pay any and all charges for legal services and any and all costs and other expenses arising from such action or administrative proceeding or incurred in connection therewith. In any and all complaints brought pursuant to the owner's grievance procedure, the contractor agrees to abide by any decision of the owner which is rendered pursuant to said grievance procedure. If any action or administrative proceeding results in an award of damages against the owner, or if the owner incurs any expense to cure a violation of the ADA which has been brought pursuant to its grievance procedure, the contractor shall satisfy and discharge the same at its own expense.

The owner shall, as soon as practicable after a claim has been made against it, give written notice thereof to the contractor along with full and complete particulars of the claim, If any action or administrative proceeding is brought against the owner or any of its agents, servants, and employees, the *owner shall* expeditiously forward or have forwarded to the contractor every demand, complaint, notice, summons, pleading, or other process received by the owner or its representatives.

It is expressly agreed and understood that any approval by the owner of the services provided by the contractor pursuant to this contract will not relieve the contractor of the obligation to comply with the Act and to defend, indemnify, protect, and save harmless the owner pursuant to this paragraph.

It is further agreed and understood that the owner assumes no obligation to indemnify or save harmless the contractor, its agents, servants, employees and subcontractors for any claim which may arise out of their performance of this Agreement. Furthermore, the contractor expressly understands and agrees that the provisions of this indemnification clause shall in no way limit the contractor's obligations assumed in this Agreement, nor shall they be construed to relieve the contractor from any liability, nor preclude the owner from taking any other actions available to it under any other provisions of the Agreement or otherwise at law.

Signature _____

Name Jeff Franson

Title President / CEO

Company Name: Window Film Depot, Inc

Date: 1/10/19

WINDFIL-01 LMITCHELL

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 1/10/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Sutter, McLellan, and Gilbreath, Inc. 1424 North Brown Rd. Suite 300 Lawrenceville, GA 30043	CONTACT NAME: PHONE (A/C, No, Ext): (770) 246-8300 FAX (A/C, No): (678) 802-3971 E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Utica Mutual Insurance Company	25976
INSURER B : Utica National Assurance Company	10687
INSURER C : Graphic Arts Mutual Ins Co	25984
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Window Film Depot, Inc.
4939 Lower Roswell Road
Suite 100
Marietta, GA 30068

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC OTHER:			4704136	10/25/2018	10/25/2019	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY			4697541	10/25/2018	10/25/2019	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
C	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $ 10,000			4704137	10/25/2018	10/25/2019	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		4697543	10/25/2018	10/25/2019	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
A	Installation Floater			4704136	10/25/2018	10/25/2019		50,000
A	Leased/Rented Equip			4704136	10/25/2018	10/25/2019		25,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Policy #5201278 CA General Liability only dates/limits above
Policy #5050924 NJ Workers Compensation dates/limit above
Policy #5135558 FL HI MI UT WV Workers Compensation dates/limits above
Cancellation clause cannot be amended.

SEE ATTACHED ACORD 101

CERTIFICATE HOLDER

Educational Services Commission of New Jersey
1660 STELTON ROAD
PISCATAWAY, NEW JERSEY 08854

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Andy Shaw

Certificate Number
700127

Registration Date: 05/22/2018
Expiration Date: 05/21/2019

State of New Jersey

Department of Labor and Workforce Development
Division of Wage and Hour Compliance

Public Works Contractor Registration Act

Pursuant to N.J.S.A. 34:11-56.48, et seq. of the Public Works Contractor Registration Act, this certificate of registration is issued for purposes of bidding on any contract for public work or for engaging in the performance of any public work to:

Window Film Depot, Inc.

2018

Responsible Representative(s):
Jeffrey Franson, President

Robert Asaro-Angelo, Commissioner
Department of Labor and Workforce Development

NON TRANSFERABLE

This certificate may not be transferred or assigned and may be revoked for cause by the Commissioner of Labor and Workforce Development.

To be completed and signed below. ***Return with Bid***

Acceptance of Bid and Contract Award

Bid #ESCNJ 18/19-28 – Safety and Security Window Film & Door Shielding Protection Products

ACCEPTANCE OF BID
And
CONTRACT AWARD

TO BE COMPLETED BY RESPONDENT AND SUBMITTED WITH RESPONSE

In compliance with the Request for Bid, the undersigned warrants that I/we have examined the Instructions to Respondents, and, being familiar with all of the conditions surrounding the proposed projects, hereby offer and agree to furnish all labor, materials, and supplies incurred in compliance with all terms, conditions, specifications and amendments in the Request for Bid and any written exceptions to the bid. Signature also certifies understanding and compliance with the certification requirements of the ESCNJ's Terms and Conditions and any special Terms and Conditions if applicable. The undersigned understands that his/her competence and responsibility and that of any proposed subcontractors, time of completion, as well as other factors of interest to the ESCNJ as stated in the evaluation section will be a consideration in making the award.

Your bid for contracting services is hereby accepted. As contractor, you are now bound to sell the materials and services listed by the attached bid based upon the solicitation, including all terms, conditions, specifications, amendments as set forth in the Request for Bid. As contractor you are hereby cautioned not to commence any billable work or provide any material or service under this contract until contractor receives an executed purchase order from a Co-op Member.

The parties intend this contract to constitute the final and complete agreement between the ESCNJ and contractor, and no other agreements, oral or otherwise, regarding the subject matter of this contract, shall bind any of the parties hereto. No change or modification of this contract shall be valid unless it shall be in writing and signed by both parties to this contract. If any provision of this contract is deemed invalid or illegal by any appropriate court of law, the remainder of this contract shall not be affected thereby.

The term of the agreement shall commence on award and continue for up to 24 months unless terminated, canceled or extended by mutual written agreement in accordance with N.J.A.C. 18A:18A-1 et. seq.

Company Name Window Film Depot, Inc. Date 1/10/19

Company Address 4939 Lower Roswell Rd City Marietta State GA Zip 30068

Contact Person Jeff Franson Title President/CEO

Authorized Signature (ink only) _____ Title President

ACCEPTANCE OF BID AND CONTRACT AWARD TO BE COMPLETED ONLY BY ESCNJ

Awarding Agency: Educational Services Commission of New Jersey

Agency Executive: _____
Patrick M. Moran, SBA/BS

Awarded this 22nd day of FEBRUARY 2019 Contract Number **ESCNJ 18/19-28**

3M ™ Safety & Security Window Film Warranty

US Commercial Limited 15 Year Product Warranty Warranty ID#

Product Warranty, Limited Remedy and Disclaimer:
3M Company and the 3M Authorized Window Film Dealer (collectively referred to as "Seller") warrant for Fifteen (15) Years from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the 3M Safety & Security Window Film will:

- Maintain **Solar Reflective Properties** without cracking, crazing, or peeling
- Maintain **Adhesion Properties** without blistering, bubbling, or delaminating from the glass
- Maintain **Appearance** without discoloration
- Maintain **Strength, Tear, and Penetration Resistant Properties** as defined in product literature.

Warranty Applicable with additional purchase & installation of 3M™ Impact Protection System Adhesive or Profile:
The 3M Impact Protection System Adhesive or Profile warranty applies to new 3M Safety & Security Window Film installations. The adhesive or profile Product will meet 3M Product specifications in effect at time of installation. The warranty period is Fifteen (15) years from the date of installation. This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminates, tampering or other modifications applied after installation. Film warranty is void if the 3M attachment system is removed for reasons other than to replace product found defective under this warranty. **Application of NON-3M wet glaze attachment system voids 3M Safety & Security Film Warranty**

If the 3M product does not conform to this warranty, the sole and exclusive remedy is:

- Replacement of the **Quantity of Film** proved to be defective; and
- Provide **Removal and Reapplication Labor of like quality Product free of charge**

Seller also warrants against **glass failure** due to thermal shock fracture, (maximum value of $500 per window) caused only as a direct result of the application of 3M Safety & Security Window Film provided the film is applied to recommended types of glass and the glass failure is reported to the Seller within the specified time (listed below) from the start of the installation.

- Sixty (60) months coverage against thermal shock fracture
- Any glass failure covered by this warranty must be reviewed by Seller prior to repair, and only covers film and glass replacement.

This warranty is only to the original purchaser of the Product(s) from Seller, is not transferable and is further subject to the terms and conditions set forth herein. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.
The Product Warranty applies only when Product is maintained in accordance with Window Care Instructions, when the Product is properly installed. This Product Warranty does not cover misuse, abuse or acts of God. **This Product Warranty covers U.S. Installations only.**

Claims Process:
To obtain warranty service, please contact your 3M Authorized Window Film Dealer at:
Important Notice: Window Care Instructions
3M Safety & Security Window Films may be washed with common washing solutions, including ammonia-based products, **thirty (30) days after installation**. Abrasive type cleaning agents and bristle brushes which would scratch the film must not be used. Synthetic sponges, squeegees, or soft cloths are recommended to be used with the cleaning solution. **To maintain your warranty, do not use tape or other adhesive products on the film.**

Important Notice: Temporary Appearance:
After installation, there may be a hazy appearance on your windows. This condition is temporary and is caused by the moisture that is present when applying the film. This hazy appearance will disappear after the film dries which may take up to thirty (30) days for the film to completely dry. Cold weather conditions may require additional time.

Product Number: **Run Number:** **Sq. Ft. of Glass Covered:**

3M ™ Safety & Security Window Film Warranty

US Commercial Limited 15 Year Product Warranty Warranty ID#

Product Warranty, Limited Remedy and Disclaimer:
3M Company and the 3M Authorized Window Film Dealer (collectively referred to as "Seller") warrant for Fifteen (15) Years from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the 3M Safety & Security Window Film will:

- Maintain **Solar Reflective Properties** without cracking, crazing, or peeling
- Maintain **Adhesion Properties** without blistering, bubbling, or delaminating from the glass
- Maintain **Appearance** without discoloration
- Maintain **Strength, Tear, and Penetration Resistant Properties** as defined in product literature.

Warranty Applicable with additional purchase & installation of 3M™ Impact Protection System Adhesive or Profile:
The 3M Impact Protection System Adhesive or Profile warranty applies to new 3M Safety & Security Window Film installations. The adhesive or profile Product will meet 3M Product specifications in effect at time of installation. The warranty period is Fifteen (15) years from the date of installation. This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminates, tampering or other modifications applied after installation. Film warranty is void if the 3M attachment system is removed for reasons other than to replace product found defective under this warranty. **Application of NON-3M wet glaze attachment system voids 3M Safety & Security Film Warranty**

If the 3M product does not conform to this warranty, the sole and exclusive remedy is:

- Replacement of the **Quantity of Film** proved to be defective; and
- Provide **Removal and Reapplication Labor of like quality Product free of charge**

Seller also warrants against **glass failure** due to thermal shock fracture, (maximum value of $500 per window) caused only as a direct result of the application of 3M Safety & Security Window Film provided the film is applied to recommended types of glass and the glass failure is reported to the Seller within the specified time (listed below) from the start of the installation.

- Sixty (60) months coverage against thermal shock fracture
- Any glass failure covered by this warranty must be reviewed by Seller prior to repair, and only covers film and glass replacement.

This warranty is only to the original purchaser of the Product(s) from Seller, is not transferable and is further subject to the terms and conditions set forth herein. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.
The Product Warranty applies only when Product is maintained in accordance with Window Care Instructions, when the Product is properly installed. This Product Warranty does not cover misuse, abuse or acts of God. **This Product Warranty covers U.S. Installations only.**

Claims Process:
To obtain warranty service, please contact your 3M Authorized Window Film Dealer at:
Important Notice: Window Care Instructions
3M Safety & Security Window Films may be washed with common washing solutions, including ammonia-based products, **thirty (30) days after installation**. Abrasive type cleaning agents and bristle brushes which would scratch the film must not be used. Synthetic sponges, squeegees, or soft cloths are recommended to be used with the cleaning solution. **To maintain your warranty, do not use tape or other adhesive products on the film.**

Important Notice: Temporary Appearance:
After installation, there may be a hazy appearance on your windows. This condition is temporary and is caused by the moisture that is present when applying the film. This hazy appearance will disappear after the film dries which may take up to thirty (30) days for the film to completely dry. Cold weather conditions may require additional time.

Product Number: **Run Number:** **Sq. Ft. of Glass Covered:**

3M ™ Safety & Security Window Film Warranty

US Commercial Limited 12 Year Product Warranty

Warranty ID#

Product Warranty, Limited Remedy and Disclaimer:
3M Company and the 3M Authorized Window Film Dealer (collectively referred to as "Seller") warrant for Twelve (12) Years from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the 3M Safety & Security Window Film will:

- Maintain **Solar Reflective Properties** without cracking, crazing, or peeling
- Maintain **Adhesion Properties** without blistering, bubbling, or delaminating from the glass
- Maintain **Appearance** without discoloration
- Maintain **Strength, Tear, and Penetration Resistant Properties** as defined in product literature.

Warranty Applicable with additional purchase & installation of 3M™ Impact Protection System Adhesive or Profile:
With the purchase of 3M Impact Protection Profile or 3M Impact Protection Adhesive on all four (4) sides of the window, for the entire project, 3M Company and the 3M Authorized Window Film Dealer agree to extend the terms of this warranty an additional two (2) years, for a total of a fourteen (14) year warranty. This includes the film, attachment system, and labor. No changes are made to the glass breakage warranty.
The 3M Impact Protection System Adhesive or Profile warranty applies to new 3M Safety & Security Window Film installations. The adhesive or profile Product will meet 3M Product specifications in effect at time of installation. The warranty period is twelve (12) years from the date of installation for a two sided application, and fourteen (14) years for a 4 sided application. This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminates, tampering or other modifications applied after installation. Film warranty is void if the 3M attachment system is removed for reasons other than to replace product found defective under this warranty. **Application of NON-3M wet glaze attachment system voids 3M Safety & Security Film Warranty**
If the 3M product does not conform to this warranty, the sole and exclusive remedy is:

- Replacement of the **Quantity of Film** proved to be defective; and
- Provide **Removal and Reapplication Labor of like quality Product free of charge**

Seller also warrants against **glass failure** due to thermal shock fracture, (maximum value of $500 per window) caused only as a direct result of the application of 3M Safety & Security Window Film provided the film is applied to recommended types of glass and the glass failure is reported to the Seller within the specified time (listed below) from the start of the installation. Glass breakage coverage is only valid for 3M Solar & Safety & Security Window Films.

- Sixty (60) months coverage against thermal shock fracture
- Any glass failure covered by this warranty must be reviewed by Seller prior to repair, and only covers film and glass replacement.

This warranty is only to the original purchaser of the Product(s) from Seller, is not transferable and is further subject to the terms and conditions set forth herein. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.
The Product Warranty applies only when Product is maintained in accordance with Window Care Instructions, when the Product is properly installed. This Product Warranty does not cover misuse, abuse or acts of God. **This Product Warranty covers U.S. Installations only.**

Claims Process:
To obtain warranty service, please contact your 3M Authorized Window Film Dealer at:
Important Notice: Window Care Instructions
3M Safety & Security Window Films may be washed with common washing solutions, including ammonia-based products, **thirty (30) days after installation**. Abrasive type cleaning agents and bristle brushes which would scratch the film must not be used. Synthetic sponges, squeegees, or soft cloths are recommended to be used with the cleaning solution. **To maintain your warranty, do not use tape or other adhesive products on the film.**
Important Notice: Temporary Appearance:
After installation, there may be a hazy appearance on your windows. This condition is temporary and is caused by the moisture that is present when applying the film. This hazy appearance will disappear after the film dries which may take up to thirty (30) days for the film to completely dry. Cold weather conditions may require additional time.

3M ™ Safety & Security Window Film Warranty

US Commercial Limited 10 Year Product Warranty

Warranty ID#

Product Warranty, Limited Remedy and Disclaimer:
3M Company and the 3M Authorized Window Film Dealer (collectively referred to as "Seller") warrant for Ten (10) Years from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the 3M Safety & Security Window Film will:

- Maintain **Solar Reflective Properties** without cracking, crazing, or peeling
- Maintain **Adhesion Properties** without blistering, bubbling, or delaminating from the glass
- Maintain **Appearance** without discoloration
- Maintain **Strength, Tear, and Penetration Resistant Properties** as defined in product literature.

Warranty Applicable with additional purchase & installation of 3M™ Impact Protection System Adhesive or Profile:
With the purchase of 3M Impact Protection Profile or 3M Impact Protection Adhesive on all four (4) sides of the window, for the entire project, 3M Company and the 3M Authorized Window Film Dealer agree to extend the terms of this warranty an additional two (2) years, for a total of a twelve (12) year warranty. This includes the film, attachment system, and labor. No changes are made to the glass breakage warranty.
The 3M Impact Protection System Adhesive or Profile warranty applies to new 3M Safety & Security Window Film installations. The adhesive or profile Product will meet 3M Product specifications in effect at time of installation. The warranty period is ten (10) years from the date of installation for a two sided application, and twelve (12) years for a 4 sided application. This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminates, tampering or other modifications applied after installation. Film warranty is void if the 3M attachment system is removed for reasons other than to replace product found defective under this warranty. **Application of NON-3M wet glaze attachment system voids 3M Safety & Security Film Warranty**
If the 3M product does not conform to this warranty, the sole and exclusive remedy is:

- Replacement of the **Quantity of Film** proved to be defective; and
- Provide **Removal and Reapplication Labor of like quality Product free of charge**

Seller also warrants against **glass failure** due to thermal shock fracture, (maximum value of $500 per window) caused only as a direct result of the application of 3M Safety & Security Window Film provided the film is applied to recommended types of glass and the glass failure is reported to the Seller within the specified time (listed below) from the start of the installation. Glass breakage coverage is only valid for 3M Solar & Safety & Security Window Films.

- Sixty (60) months coverage against thermal shock fracture
- Any glass failure covered by this warranty must be reviewed by Seller prior to repair, and only covers film and glass replacement.

This warranty is only to the original purchaser of the Product(s) from Seller, is not transferable and is further subject to the terms and conditions set forth herein. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.
The Product Warranty applies only when Product is maintained in accordance with Window Care Instructions, when the Product is properly installed. This Product Warranty does not cover misuse, abuse or acts of God. **This Product Warranty covers U.S. Installations only.**
Claims Process:
To obtain warranty service, please contact your 3M Authorized Window Film Dealer at:

Important Notice: Window Care Instructions
3M Safety & Security Window Films may be washed with common washing solutions, including ammonia-based products, **thirty (30) days after installation**. Abrasive type cleaning agents and bristle brushes which would scratch the film must not be used. Synthetic sponges, squeegees, or soft cloths are recommended to be used with the cleaning solution. **To maintain your warranty, do not use tape or other adhesive products on the film.**
Important Notice: Temporary Appearance:
After installation, there may be a hazy appearance on your windows. This condition is temporary and is caused by the moisture that is present when applying the film. This hazy appearance will disappear after the film dries which may take up to thirty (30) days for the film to completely dry. Cold weather conditions may require additional time.

Product Number: **Run Number:** **Sq. Ft. of Glass Covered:**

3M™ Safety and Security Window Film Warranty- Exterior Series

US Commercial & Residential Limited 7 Year Product Warranty **Warranty ID#**

Product Warranty, Limited Remedy and Disclaimer:
3M Company and 3M Authorized Window Film Dealer (collectively referred to as "seller") warrant for Seven (7) Years (Five (5) Years for sloped glazing) from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the 3M Safety and Security Exterior Series Window Film will:

- Maintain **Adhesion Properties** without blistering, bubbling, or delaminating from the glass
- Maintain **Appearance** without discoloration
- Maintain **Strength, Tear, and Penetration Resistant Properties** as defined in product literature.

Warranty Applicable with additional purchase & installation of 3M™ Impact Protection System Adhesive:
The 3M Impact Protection Adhesive warranty applies to new 3M Safety & Security Window Film installations. The adhesive Product will meet 3M Product specifications in effect at time of installation. The warranty period is seven (7) years from the date of installation, (Five (5) years for sloped glazing). This shall not cover failure due to disintegration of the underlying substrate, movement of the structure exceeding specification for elongation and/or compression, changes in appearance of the adhesive due to dirt or other contaminates, tampering or other modifications applied after installation. Film warranty is void if the 3M attachment system is removed for reasons other than to replace product found defective under this warranty. **Application of NON-3M wet glaze attachment system voids 3M Safety & Security Film Warranty**

If the 3M Product does not conform to this warranty, the sole and exclusive remedy is

- Replacement of the quantity of film proved to be defective; and
- For up to one (1) year of the date of installation, providing removal and reapplication labor of like quality Product free of charge.

Note: After one (1) year, Seller's obligation is limited to furnishing replacement film. Seller will not be liable for installation costs of replacement film for any claim filed later than one (1) year after installation.

This warranty is only to the original purchaser of the Product(s) from Seller, is not transferable and is further subject to the terms and conditions set forth below. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.
This Product Warranty applies only when Product is maintained in accordance with Window Care Instructions, when the Product is properly installed. This Product Warranty does not cover misuse, abuse or acts of God. **This Product Warranty covers U.S. installations only.**

Claims Process:
To obtain warranty service, please contact your 3M Authorized Window Film Dealer at:
Important Notice: Window Care Instructions
3M Safety and Security Window Film may be washed with common washing solutions, including ammonia-based products, thirty (30) days after installation. Abrasive type cleaning agents and bristle brushes which would scratch the film must not be used. Synthetic sponges, squeegees, or soft cloths are recommended to be used with the cleaning solution. **To maintain your warranty, do not use tape or other adhesive products on the film.**
Important Notice: Temporary Appearance
After installation, there may be a hazy appearance on your windows. This condition is temporary and is caused by the moisture that is present when applying the film. This hazy appearance will disappear after the film dries, which may take up to thirty (30) days for the film to dry completely. Cold weather conditions may require additional time.

Product Number: **Run Number:** **Sq. Ft. of Glass Covered:**

3M Window Film Warranty

Anti-Graffiti Window Film Warranty ID#

US Commercial Limited 1 Year Product Warranty

Product Warranty, Limited Remedy and Disclaimer:
3M Company and the 3M Authorized Window Film Dealer (collectively referred to as "Seller") warrant for 1 year from installation, and provided that the product is maintained in accordance with the Window Care Instructions below, that the 3M Anti-Graffiti Window Film will:

- Maintain **Solar Reflective Properties** without cracking, crazing, or peeling
- Maintain **Adhesion Properties** without blistering, bubbling, or delaminating from the glass

If the 3M product does not conform to this warranty, the sole and exclusive remedy is:

- Replacement of the **Quantity of Film** proved to be defective; and
- Provide **Removal and Reapplication Labor of like quality Product free of charge**

This warranty is only to the original purchaser of the Product(s) from Seller, is not transferable and is further subject to the terms and conditions set forth herein. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

The Product Warranty applies only when Product is maintained in accordance with Window Care Instructions, when the Product is properly installed. This Product Warranty does not cover misuse, abuse or acts of God. **This Product Warranty covers U.S. Installations only.**

Claims Process:
To obtain warranty service, please contact your 3M Authorized Dealer as listed on the next page. If you have additional questions, you can also contact 3M at 1-866-499-8857.

Important Notice: Window Care Instructions
3M Anti-Graffiti Window Films may be washed with common washing solutions, including ammonia-based products, **thirty (30) days after installation**. Abrasive type cleaning agents and bristle brushes which would scratch the film must not be used. Synthetic sponges, squeegees, or soft cloths are recommended to be used with the cleaning solution. **To maintain your warranty, do not use tape or other adhesive products on the film.**

Important Notice: Temporary Appearance:
After installation, there may be a hazy appearance on your windows. This condition is temporary and is caused by the moisture that is present when applying the film. This hazy appearance will disappear after the film dries which may take up to thirty (30) days for the film to completely dry. Cold weather conditions may require additional time.

DEFENSELITE™ Warranty:

Impact Security LLC, offers its DefenseLIte™ and Bullet Shield™ systems with the terms, conditions and notices as follows:

Terms of use: This product is offered to you conditional upon your acceptance without modification of the terms, conditions, and notices contained.

Exclusive Obligation: Impact Security products have been generally designed for a variety of uses, including, but not limited to the protection of glazed openings. It has been lab tested, the results of which are published on its web site at www.defenselite.com The tests are in the public domain and focus generally on intrusion attempts which might be made against buildings. Some typical situations are used for testing as shown, but because events of this type may be violent in nature and because the implements used to attack the building can vary widely, including, explosives, military hardware, and vehicles,

it is not possible for Impact Security LLC to test the veracity of DefenseLIte™ against all potential threats. It is for the purchaser to make his/her own determination as to the suitability of Impact Security's products for the intended use and purpose. These tests are not intended as a claim by any party but is a demonstration of how DefenseLIte™ or BulletShield™ performed under the lab conditions to which it was submitted. BulletShield uses a "Proof of Concept" program to verify performance. The client signs off on the results.

Terms and conditions of its use: The purchaser agrees to hold Impact Security LLC, its staff, associates, and assigns harmless from any loss, failure, or other claim regardless of its nature. Once installed our products cannot be altered in any way.

Warranty: Impact Security's products are warranted against any manufactured defect for a period of 7 (seven) years from the date of purchase to the original purchaser. Impact Security LLC's sole responsibility will be replacement of the panel(s) to the purchaser, after it has been determined that it is indeed in Impact Security LLC's sole estimation a manufacturing defect. In no event shall Impact Security LLC be liable for any direct, indirect, punitive, incidental, or consequential damages, whatsoever arising out of, or connected with the use or misuse of its product.

Other Statements: Impact Security LLC's employees or representatives, ORAL OR OTHER WRITTEN STATEMENTS, DO NOT CONSTITUTE WARRANTIES, shall not be relied upon by buyer, and is not part of the contract for sale or this Limited warranty.

Entire Obligation: This TERM OF USE, WARRANTY AND DISCLAIMER document states the entire obligation of Impact Security LLC with respect to the products. If any part of this disclaimer is determined to be void, invalid, unenforceable or illegal, including, but not limited to the warranty disclaimers and liability disclaimers and liability limitations set forth above, then the invalid or unenforceable provision will be deemed superseded by a valid, enforceable provision that most closely matches the intent of the original provision and the remainder of the agreement shall remain in full force and effect.

General: This disclaimer statement is governed by the laws of the State of Florida, USA. You hereby consent to the exclusive jurisdiction and venue of the Courts of competent jurisdiction, USA, in all disputes arising out of or relating to the use of this product. Use of this product is unauthorized in any jurisdiction that does not give effect to all provisions of these terms and conditions, including without limitation this paragraph.

3M™ Scotchshield™ Safety & Security Window Film

Ultra S600

Technical Data

Product Features & Benefits

- Micro-layered film designed for tear resistance
- Optically clear
- Applies to interior glass surfaces
- Helps protect from broken glass hazards
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Safety Glazing
- Helping to Deter Break & Entry
- Building Envelope Protection
- Spontaneous Glass Breakage
- Seismic Preparedness

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing				
16 CFR 1201	¼" & 1/8" annealed	--	Category 2, 400 ft-lbs	
ANSI Z97.1			Class A (Unlimited), 400 ft-lbs	
Impact Resistance				
ASTMs E1886 / E1996	3/16" tempered	IPA	Missile Level A, +/- 80 psf	
ASTM E330			+/- 100 psf	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" annealed	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
		IPP	6 psi, 42 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
	¼" tempered	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
		IPP	6 psi, 42 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
	1" double pane (annealed)	IPA	9 psi, 60 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
		IPP	8 psi, 60 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"

* Glazing systems vary. Contact 3M for more information.

Film Properties (nominal)

Film Thickness	6 mils
Film Construction	Micro-layered
Tensile Properties (ASTM D882)	
Tensile Strength	32,000 psi
Break Strength	210 lbs/in
Elongation at Break	115%
Yield Strength	15,000 psi
Elongation at Yield	9%
Modulus	443 kpsi

Graves Area Tear Resistance (ASTM D1004)	1,000 lbs%
Puncture-Propagation-Tear Resistance (ASTM D2582)	6 lbf
Puncture Strength (ASTM D4830)	140 lbf
Abrasion Resistance (ASTM D1044)	3% Δ haze
Peel Strength (ASTM D3330)	8 lb/in
Flammability (ASTM E84)	Class A
Solar Properties – *film applied to ¼" clear glass*	
Visible Light Transmitted	87%
UV Light Rejected	99.9%

IMPORTANT NOTICE:

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M™ Scotchshield™ Safety and Security Window Film, Ultra S600

1.0 Scope

This specification is for an optically clear glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together and reduce the ultra-violet light that normally would enter through the window. This is an easily applied, tear-resistant safety and security window film designed to provide an increased measure of protection in a broad range of uses including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, safety glazing, bomb blast mitigation, Smash and Grab or Break and Entry events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M™ Scotchshield™ Safety and Security Window Film, Ultra S600.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).
ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-2582 Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- ASTM D-1004 Standard Method of Test for Resistance of Transparent Plastics to Tearing (Graves Tear Test)
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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
- ASTM F-2912 Standard Specification for Glazing and Glazing Systems Subjected to Airblast Loadings

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film, consisting of co-extruded micro-layers, with a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film color is clear and will not contain dyed polyester. The film shall have a nominal thickness of 6 mils (0.006 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications
Ultra S600

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882):
Base Film: 32,000 psi (MD) / 32,000 psi (TD)
Coated Film: 32,000 psi (MD) / 32,000 psi (TD)

b) Break Strength (ASTM D882):
Base Film: 190 lb/in (MD) / 190 lb/in (TD)
Coated Film: 210 lb/in (MD) / 210 lb/in (TD)

c) Percent Elongation at Break (ASTM D882):
Base Film: 110 % (MD) / 100% (TD)
Coated Film: 137 % (MD) / 115% (TD)

d) Yield Strength at 3% Elongation:
Base Film: 12,000 psi (MD)
Coated Film: 15,000 psi (MD)

e) Percent Elongation at Yield (ASTM D882):
Base Film: 7% (MD)
Coated Film: 9% (MD)

f) Modulus (ASTM D882):
Base Film: 550 kpsi (MD) / 600 kpsi (TD)
Coated Film: 430 kpsi (MD) / 456 kpsi (TD)

g) Graves Tear Resistance (ASTM D1004):
Maximum Force (lbs):
Base Film: 28 (MD) / 28 (TD)
Coated Film: 28 (MD) / 28 (TD)
Maximum Extension (in):
Base Film: 0.45 (MD) / 0.65 (TD)
Coated Film: 0.55 (MD) / 0.55 (TD)
Graves Area Tear Resistance (lbs%):
Base Film: 900 (MD) / 1,200 (TD)
Coated Film: 900 (MD) / 1,100 (TD)

h) Puncture Propagation Tear Resistance (ASTM D2582):
Coated Film: 6 lbf (MD) / 7 lbf (TD)

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 88%
b) Visible Reflection: not more than 9%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.79

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84.

a) Flame Spread Index (FDI): 0
b) Smoke Developed Index (SDI): 15

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

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Specifications
Ultra S600

3.6 Adhesion to Glass: The Manufacturer shall provide independent test data showing that the film shall have a 180-degree peel strength (adhesion to glass) according to ASTM D-1044 of at least 8 lbs/in.

3.7 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.8 Impact Resistance for Safety Glazing: The Manufacturer shall provide independent test data showing that the film, when applied to either side of the window glass, shall meet the 400 ft-lb impact requirements of 16 CFR 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited). Testing shall be done with film applied both on 1/8" and ¼" annealed glass.

3.9 Impact Protection: The Manufacturer shall provide independent test data showing the following:

a. [reserved]
b. Film shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/- 80 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
c. Film shall pass ASTM E330 at a design pressure of 150 psf with 3M Impact Protection Adhesive attachment system

3.10 Bomb Blast Mitigation: The Manufacturer shall provide independent test data showing the following:

a. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 44 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Profile Attachment system
b. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 42 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Profile Attachment system
c. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 42 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Adhesive Attachment system
d. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 42 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Adhesive Attachment system
e. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 8 psi and 60 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Profile Attachment system
f. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 8 psi and 60 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Adhesive Attachment system

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is authorized by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

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Specifications
Ultra S600

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.

b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.

b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.

c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.

d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.

e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.

f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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1-866-499-8857
www.3M.com/windowfilm

3M™ Scotchshield™ Safety and Security Window Film

Ultra S800

Technical Data

Product Features & Benefits

- Micro-layered film designed for tear resistance
- Optically clear
- Applies to interior glass surfaces
- Helps protect from broken glass hazards
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Safety Glazing
- Helping to Deter Break & Entry
- Building Envelope Protection
- Spontaneous Glass Breakage
- Seismic Preparedness

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing				
16 CFR 1201	¼" & 1/8" annealed	--	Category 2, 400 ft-lbs	
ANSI Z97.1			Class A (Unlimited), 400 ft-lbs	
Impact Resistance				
ASTMs E1886 / E1996	¼" tempered	IPA	Large Missile C, +/- 75 psf	
ASTM E330	3/16" tempered		+/- 100 psf	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" annealed	IPA	9 psi, 60 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
		IPP	7 psi, 42 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
	¼" tempered	IPA	9 psi, 60 psi*msec	GSA Level 2 / ASTM "No Hazard"
		IPP	7 psi, 42 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
	1" double pane (annealed)	IPA	10 psi, 80 psi*msec	GSA Level 2 / ASTM "No Hazard"
		IPP	9 psi, 60 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"

*Glazing systems vary. Contact 3M for more information.

Film Properties (nominal)

Film Thickness	8 mils
Film Construction	Micro-layered
Tensile Properties (ASTM D882)	
Tensile Strength	32,000 psi
Break Strength	255 lbs/in
Elongation at Break	130%
Yield Strength	15,000 psi
Elongation at Yield	9%
Modulus	473 kpsi

Graves Area Tear Resistance (ASTM D1004)	1,200 lbs%
Puncture-Propagation-Tear Resistance (ASTM D2582)	9.5 lbf
Puncture Strength (ASTM D4830)	185 lbf
Abrasion Resistance (ASTM D1044)	3% Δ haze
Peel Strength (ASTM D3330)	6 lb/in
Flammability (ASTM E84)	Class A
Solar Properties – *film applied to ¼" clear glass*	
Visible Light Transmitted	87%
UV Light Rejected	99.9%

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Specifications

Specifications for 3M™ Scotchshield™ Safety and Security Window Film, Ultra S800

1.0 Scope

This specification is for an optically clear glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together and reduce the ultra-violet light that normally would enter through the window. This is an easily applied, tear-resistant safety and security window film designed to provide an increased measure of protection in a broad range of uses including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, safety glazing, bomb blast mitigation, Smash and Grab or Break and Entry events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M™ Scotchshield™ Safety and Security Window Film, Ultra S800.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

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ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
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- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- ASTM D-1004 Standard Method of Test for Resistance of Transparent Plastics to Tearing (Graves Tear Test)
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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
- ASTM F-2912 Standard Specification for Glazing and Glazing Systems Subjected to Airblast Loadings

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications
Ultra S800

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film, consisting of co-extruded micro-layers, with a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film color is clear and will not contain dyed polyester. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882):
Base Film: 32,000 psi (MD) / 32,000 psi (TD)
Coated Film: 32,000 psi (MD) / 32,000 psi (TD)

b) Break Strength (ASTM D882):
Base Film: 250 lb/in (MD) / 250 lb/in (TD)
Coated Film: 245 lb/in (MD) / 265 lb/in (TD)

c) Percent Elongation at Break (ASTM D882):
Base Film: 115 % (MD) / 115% (TD)
Coated Film: 132 % (MD) / 130% (TD)

d) Yield Strength at 3% Elongation:
Base Film: 12,000 psi (MD)
Coated Film: 15,000 psi (MD)

e) Percent Elongation at Yield (ASTM D882):
Base Film: 7% (MD)
Coated Film: 9% (MD)

f) Modulus (ASTM D882):
Base Film: 550 kpsi (MD) / 600 kpsi (TD)
Coated Film: 460 kpsi (MD) / 486 kpsi (TD)

g) Graves Tear Resistance (ASTM D1004):
Maximum Force (lbs):
Base Film: 40 (MD) / 40 (TD)
Coated Film: 40 (MD) / 40 (TD)
Maximum Extension (in):
Base Film: 0.45 (MD) / 0.65 (TD)
Coated Film: 0.50 (MD) / 0.57 (TD)
Graves Area Tear Resistance (lbs%):
Base Film: 1,100 (MD) / 1,300 (TD)
Coated Film: 1,100 (MD) / 1,300 (TD)

h) Puncture Propagation Tear Resistance (ASTM D2582):
Coated Film: 9 lbf (MD) / 10 lbf (TD)

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 88%
b) Visible Reflection: not more than 9%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.79

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Specifications
Ultra S800

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84.

a) Flame Spread Index (FDI): 5
b) Smoke Developed Index (SDI): 25

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesion to Glass: The Manufacturer shall provide independent test data showing that the film shall have a 180-degree peel strength (adhesion to glass) according to ASTM D-1044 of at least 6 lbs/in.

3.7 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.8 Impact Resistance for Safety Glazing: The Manufacturer shall provide independent test data showing that the film, when applied to either side of the window glass, shall meet the 400 ft-lb impact requirements of 16 CFR 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited). Testing shall be done with film applied both on 1/8" and ¼" annealed glass.

3.9 Impact Protection: The Manufacturer shall provide independent test data showing the following:

a. Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/- 75 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
b. Film shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/- 75 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.
c. Film shall pass ASTM E330 at a design pressure of 100 psf with 3M Impact Protection Adhesive attachment system

3.10 Bomb Blast Mitigation: The Manufacturer shall provide independent test data showing the following:

a. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 44 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Profile Attachment system
b. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 7 psi and 43 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Profile Attachment system
c. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 9 psi and 60 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Adhesive Attachment system
d. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "No Hazard" with blast pressure of 9 psi and 60 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Adhesive Attachment system
e. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 9 psi and 60 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Profile Attachment system
f. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 10 psi and 89 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Adhesive Attachment system

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Specifications
Ultra S800

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is authorized by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film 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 identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

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Specifications
Ultra S800

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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3M™ Scotchshield™ Safety and Security Window Film

Ultra Prestige S70

Technical Data

Product Features & Benefits

- Combination safety / solar control window film
- Micro-layered film designed for tear resistance
- Virtually clear film with heat rejection properties
- Helps protect from broken glass hazards
- Increase comfort and help reduce air conditioning costs
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Building Envelope Protection
- Helping to Deter Break & Entry
- Safety Glazing
- Seismic Preparedness
- Spontaneous Glass Breakage

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing / Impact Rating				
16 CFR 1201	¼" annealed	--	Category 2, 400 ft-lbs	
Impact Resistance				
ASTMs E1886 / E1996	1/4" tempered	IPA	Missile Level C	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" tempered	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	1" double pane (tempered)	IPA	8 psi, 60 psi*msec	GSA Level 2 / ASTM "No Hazard"

* Glazing systems vary. Contact 3M for more information.

Film Properties (nominal, not for specification purposes)

Film Thickness	8 mils
Film Construction	Micro-layered Laminated
Tensile Strength	27,000 psi
Break Strength	215 lbs/in
Elongation at Break	95%
Yield Strength	15,000 psi
Elongation at Yield	8%
Modulus	600 kpsi
Abrasion Resistance (ASTM D1044)	3% Δ Haze
Peel Strength (ASTM D3330)	4.5 lb/in
Flammability (ASTM E84)	Class A
Graves Area Tear Resistance (ASTM D1004)	1,100 lbs%
Puncture-Propagation-Tear (ASTM D2582)	10 lbf
Puncture Strength (ASTM D4830)	185 lbf

Solar Properties – *film applied to ¼" glass*				
	¼" Clear	¼" Tint	Dual Clear	Dual Tint
VLT	68%	41%	61%	37%
VLR-Int	9%	8%	13%	12%
VLR-Ext	10%	6%	16%	9%
SHGC	0.51	0.44	0.56	0.42
TSER	50%	56%	44%	58%
UV Block	99.9%	99.9%	99.9%	99.9%
Glare ↓	23%	23%	23%	23%
U-Value	1.02	1.02	0.47	0.47
Solar Heat ↓	38%	30%	20%	17%

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Specifications

Specifications for 3M™ Scotchshield™ Safety and Security Window Film, Ultra Prestige S70

1.0 Scope

This specification is for a combination safety and security window film with sun control. The film is designed to provide glass shatter resistance that when applied to the interior window surface, will help hold broken glass together, reduce the ultra-violet light transmission, and reduce the solar heat gain of solar energy through the window. The film shall contain no metals. This is a virtually clear, low reflectivity, tear-resistant safety and security window film with sun control properties for helping to reduce hot spots in a building and helping to improve tenant comfort. The film is useful for helping to provide an increased measure of protection in a broad range of applications including basic glass fragment retention, spontaneous glass breakage, helping to deter break and entry, seismic preparedness, safety glazing applications and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M™ Scotchshield™ Safety and Security Window Film, Ultra Prestige S70.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).
ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-2582 Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- ASTM D-1004 Standard Method of Test for Resistance of Transparent Plastics to Tearing (Graves Tear Test)
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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Specifications
3M Ultra Prestige S70 Safety and Security Window Film

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film, consisting of co-extruded microlayers, laminated to a multilayered polyester film comprised of at least 220 layers for added color and sun control performance. The film has a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall contain no metals or dyed polyester. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties, with coatings (nominal):

a) Tensile Strength (ASTM D882): 27,000 psi
b) Break Strength (ASTM D882): 215 lbs/in
c) Percent Elongation at Break (ASTM D882): 125%
d) Percent Elongation at Yield (ASTM D882): 95%
e) Yield Strength at 3% Elongation: 15,000 psi
f) Graves Area Tear Resistance (ASTM D1004): 1,100 lbs%
g) Puncture Propagation Tear Resistance (ASTM D2582): 10 lbf
h) Modulus (ASTM D882): 600 kpsi

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 68%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.51
e) Total Solar Energy Rejected: 50%

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84.

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2).

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Specifications
3M Ultra Prestige S70 Safety and Security Window Film

3.8 Impact Protection: per ASTMs E1886 / E1996
a. Film shall pass the impact requirements of Medium Large Missile "C" (per ASTMs E 1996 and E 1886) with use of 3M Impact Protection Adhesive attachment system.

3.9 Bomb Blast Mitigation:
a. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Adhesive Attachment system
b. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 8 psi and 60 psi*msec blast impulse, on 1" tempered double pane glass and 3M Impact Protection Adhesive Attachment system

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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

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Specifications
3M Ultra Prestige S70 Safety and Security Window Film

6.0 Application

6.1 Examination: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.

b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.

b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.

c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.

d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.

e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.

f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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3M™ Scotchshield™ Safety and Security Window Film

Ultra Prestige S50

Technical Data

Product Features & Benefits

- Combination safety / solar control window film
- Micro-layered film designed for tear resistance
- Lightly tinted film with heat rejection properties
- Helps protect from broken glass hazards
- Increase comfort and help reduce air conditioning costs
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Building Envelope Protection
- Helping to Deter Break & Entry
- Safety Glazing
- Seismic Preparedness
- Spontaneous Glass Breakage

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing / Impact Rating				
16 CFR 1201	¼" annealed	--	Category 2, 400 ft-lbs	
Impact Resistance				
ASTMs E1886 / E1996	1/4" tempered	IPA	Missile Level C	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" tempered	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	1" double pane (tempered)	IPA	8 psi, 60 psi*msec	GSA Level 2 / ASTM "No Hazard"

* Glazing systems vary. Contact 3M for more information.

Film Properties (nominal, not for specification purposes)

Film Thickness	8 mils
Film Construction	Micro-layered Laminated
Tensile Strength	27,000 psi
Break Strength	215 lbs/in
Elongation at Break	95%
Yield Strength	15,000 psi
Elongation at Yield	8%
Modulus	600 kpsi
Abrasion Resistance (ASTM D1044)	3% Δ Haze
Peel Strength (ASTM D3330)	4.5 lb/in
Flammability (ASTM E84)	Class A
Graves Area Tear Resistance (ASTM D1004)	1,100 lbs%
Puncture-Propagation-Tear (ASTM D2582)	10 lbf
Puncture Strength (ASTM D4830)	185 lbf

Solar Properties – *film applied to ¼" glass*				
	¼" Clear	¼" Tint	Dual Clear	Dual Tint
VLT	48%	29%	43%	26%
VLR-Int	7%	7%	9%	9%
VLR-Ext	9%	6%	15%	9%
SHGC	0.44	0.40	0.53	0.40
TSER	56%	60%	47%	60%
UV Block	99.9%	99.9%	99.9%	99.9%
Glare ↓	46%	45%	46%	46%
U-Value	1.02	1.02	0.47	0.47
Solar **Heat** ↓	46%	37%	25%	21%

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M™ Scotchshield™ Safety and Security Window Film, Ultra Prestige S50

1.0 Scope

This specification is for a combination safety and security window film with sun control. The film is designed to provide glass shatter resistance that when applied to the interior window surface, will help hold broken glass together, reduce the ultra-violet light transmission, and reduce the solar heat gain of solar energy through the window. The film shall contain no metals. This is a lightly tinted, low reflectivity, tear-resistant safety and security window film with sun control properties for helping to reduce hot spots in a building and helping to improve tenant comfort. The film is useful for helping to provide an increased measure of protection in a broad range of applications including basic glass fragment retention, spontaneous glass breakage, helping to deter break and entry, seismic preparedness, safety glazing applications and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M™ Scotchshield™ Safety and Security Window Film, Ultra Prestige S50.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-2582 Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- ASTM D-1004 Standard Method of Test for Resistance of Transparent Plastics to Tearing (Graves Tear Test)
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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1-866-499-8857
www.3M.com/windowfilm

Specifications
3M Ultra Prestige S50 Safety and Security Window Film

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film, consisting of co-extruded microlayers, laminated to a multilayered polyester film comprised of at least 220 layers for added color and sun control performance. The film has a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall contain no metals or dyed polyester. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 27,000 psi
b) Break Strength (ASTM D882): 215 lbs/in
c) Percent Elongation at Break (ASTM D882): 125%
d) Percent Elongation at Yield (ASTM D882): 95%
e) Yield Strength at 3% Elongation: 15,000 psi
f) Graves Area Tear Resistance (ASTM D1004): 1,100 lbs%
g) Puncture Propagation Tear Resistance (ASTM D2582): 10 lbf
h) Modulus (ASTM D882): 600 kpsi

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 48%
b) Visible Reflection: 7% (interior) / 9% (exterior)
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.44
e) Total Solar Energy Rejected: 56%

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

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Specifications
3M Ultra Prestige S50 Safety and Security Window Film

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2).

3.8 Impact Protection: per ASTMs E1886 / E1996

a. Film shall pass the impact requirements of Medium Large Missile "C" (per ASTMs E 1996 and E 1886) with use of 3M Impact Protection Adhesive attachment system.

3.9 Bomb Blast Mitigation:

a. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Adhesive Attachment system

b. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 8 psi and 60 psi*msec blast impulse, on 1" tempered double pane glass and 3M Impact Protection Adhesive Attachment system

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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

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Specifications
3M Ultra Prestige S50 Safety and Security Window Film

6.0 Application

6.1 Examination: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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3M™ Scotchshield™ Safety and Security Window Film

Ultra Night Vision S25

Technical Data

Product Features & Benefits

- Combination safety / solar control window film
- Micro-layered film designed for tear resistance
- Moderately tinted for privacy with low interior reflectivity
- Helps protect from broken glass hazards
- Increase comfort and help reduce air conditioning costs
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Building Envelope Protection
- Helping to Deter Break & Entry
- Safety Glazing
- Seismic Preparedness
- Spontaneous Glass Breakage

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing / Impact Rating				
16 CFR 1201	¼" annealed	--	Category 2, 400 ft-lbs	
ANSI Z97.1			Class A (Unlimited), 400 ft-lbs	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" annealed	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	1" double pane (annealed)	IPP	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	¼" tempered	IPP	4 psi, 28 psi*msec	GSA Level 3B / ASTM "Minimal Hazard"
	1" double pane (tempered)	IPA	8 psi, 60 psi*msec	GSA Level 2 / ASTM "No Hazard"

* Glazing systems vary. Contact 3M for more information.

Film Properties (nominal, not for specification purposes)

Film Thickness	8 mils
Film Construction	Micro-layered Laminated
Tensile Strength	27,000 psi
Break Strength	215 lbs/in
Elongation at Break	95%
Yield Strength	15,000 psi
Elongation at Yield	8%
Modulus	600 kpsi
Abrasion Resistance (ASTM D1044)	3% Δ Haze
Peel Strength (ASTM D3330)	4.5 lb/in
Flammability (ASTM E84)	Class A
Graves Area Tear Resistance (ASTM D1004)	1,100 lbs%
Puncture-Propagation-Tear (ASTM D2582)	10 lbf
Puncture Strength (ASTM D4830)	140 lbf

Solar Properties – *film applied to ¼" glass*				
	¼" Clear	¼" Tint	Dual Clear	Dual Tint
VLT	24%	15%	22%	13%
VLR-Int	7%	7%	8%	8%
VLR-Ext	19%	10%	24%	11%
SHGC	0.40	0.38	0.50	0.38
TSER	60%	62%	50%	62%
UV Block	99.9%	99.9%	99.9%	99.9%
Glare ↓	73%	73%	73%	73%
U-Value	1.02	1.02	0.47	0.47
Solar **Heat** ↓	51%	40%	28%	24%

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1-866-499-8857
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Specifications

Specifications for 3M™ Scotchshield™ Safety and Security Window Film, Ultra Night Vision S25

1.0 Scope

This specification is for a combination safety and security window film with sun control: a glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together, reduce the ultra-violet light transmission, and reduce the solar heat gain of solar energy through the window. This is an easily applied tear-resistant safety and security window film with sun control, exhibiting low internal reflectivity, which is useful for increased measure of protection in a broad range of applications, including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, and safety glazing applications, and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Scotchshield Safety and Security Window Film, Ultra Night Vision S25.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-2582 Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- ASTM D-1004 Standard Method of Test for Resistance of Transparent Plastics to Tearing (Graves Tear Test)
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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
- ASTM F-2912 Standard Specification for Glazing and Glazing Systems Subjected to Airblast Loadings

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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Specifications
Ultra Night Vision S25 Safety and Security Window Film

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film, consisting of co-extruded microlayers, laminated to a multilayered metalized polyester film for added color and sun control performance. The film has a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall contain no dyed polyester. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 27,000 psi
b) Break Strength (ASTM D882): 215 lbs / in
c) Percent Elongation at Break (ASTM D882): 95%
d) Percent Elongation at Yield (ASTM D882): 8%
e) Yield Strength (ASTM D882): 15,000 psi
f) Graves Area Tear Resistance (ASTM D1004): 1,100 lbs%
g) Puncture Propagation Tear Resistance (ASTM D2582): 10 lbf
h) Modulus (ASTM D882): 600 kpsi

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 24%
b) Visible Reflection: 7% (interior) / 19% (exterior)
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.40
e) Total Solar Energy Rejected: 60%

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited).

IMPORTANT NOTICE:
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Specifications

3M Ultra Night Vision S25 Safety and Security Window Film

3.8 Impact Protection: per ASTMs E1886 / E1996

a. [reserved]

b. The safety film component of the window film construction shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTMs E 1996 and E 1886) at 80 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.

3.9 Bomb Blast Mitigation:

a. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Adhesive Attachment system

b. GSA Rating of "3B" / ASTM F1642 "Minimal Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Profile Attachment system

c. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Profile Attachment system

d. GSA Rating of "2" / ASTM F1642 "No Hazard" with blast pressure of 8 psi and 60 psi*msec blast impulse, on 1" tempered double pane glass and 3M Impact Protection Adhesive Attachment system

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

3M Ultra Night Vision S25 Safety and Security Window Film

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.
b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

IMPORTANT NOTICE:
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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

3M™ Safety & Security Window Film

Safety S40 (SH4CLARL)

Technical Data

Product Features & Benefits

- Optically clear, 4-mil (0.10 mm) thick film for application to interior glass surface
- Provides shatter resistance to help protect from broken glass hazards caused by seismic activity, spontaneous glass breakage, and other low force impact events
- Protective hardcoat provides scratch resistance and durability
- Helps protect from the harmful effects of UV light and reduces fading of interior furnishings
- Can be combined with 3M Impact Protection Attachment systems for additional safety and security

Product Performance & Technical Data

Safety S40								
	Single Pane		**Tinted**		**Double Pane**		**Double tinted**	
Film	1/4" Clear	Safety S40	1/4" tint	Safety S40	Dual 1/4" Clear	Safety S40	Dual 1/4" tint	Safety S40
Solar Heat Gain Coefficient	0.82	0.82	0.62	0.59	0.70	0.68	0.51	0.50
Visible Light Transmitted	89%	87%	53%	53%	79%	77%	47%	47%
Visible Light Reflected Interior	9%	8%	6%	6%	15%	15%	13%	14%
Visible Light Reflected Exterior	8%	8%	6%	6%	15%	15%	8%	9%
U Value	1.03	1.03	1.02	1.03	0.47	0.47	0.47	0.48
UV Block	38%	99%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	19%	37%	38%	30%	32%	49%	50%
Glare Reduction	NA	2%	NA	1%	NA	3%	NA	2%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	0%	NA	1%	NA	3%	NA	1%

Film Properties (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Abrasion Resistance
Safety S40	0.004”	Single	25,000 psi	100 lbs/in	>125 %	< 5% haze increase

IMPORTANT NOTICE:
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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film

Specifications for 3M Safety S40

1.0 Scope

This specification is for an optically clear glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together and reduce the ultra-violet light that normally would enter through the window. This is a basic safety and security window film that may be useful as an increased measure of protection against low force impact situations, general glass fragment retention, spontaneous glass breakage, seismic events, and limited safety glazing situations. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety S40 Safety and Security Window Film.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S40

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film with a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 4 mils (0.004 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 25,000 psi (100 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): >125%
d) Percent Elongation at Yield (ASTM D882): greater than 100%

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 87%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.82

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 150 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 1) and ANSI Z97.1 (Class B).

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1-866-499-8857
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Specifications - Safety and Security Window Film
Specifications for 3M Safety S40

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S40

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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1-866-499-8857
www.3M.com/windowfilm

3M™ Safety & Security Window Film

Safety S70 (SH7CLARL)

Technical Data

Product Features & Benefits

- Optically clear, 7-mil (0.18 mm) thick film for application to interior glass surface
- Provides shatter resistance to help protect from broken glass hazards caused by seismic activity, spontaneous glass breakage, and other impact events
- Typical applications include bomb blast mitigation and safety glazing
- Protective hardcoat provides scratch resistance and durability
- Helps protect from the harmful effects of UV light and reduces fading of interior furnishings
- Can be combined with 3M Impact Protection Attachment systems for additional safety and security

Product Performance & Technical Data

Safety S70								
	Single Pane		**Tinted**		**Double Pane**		**Double tinted**	
Film	1/4" Clear	Safety S70	1/4" tint	Safety S70	Dual 1/4" Clear	Safety S70	Dual 1/4" tint	Safety S70
Solar Heat Gain Coefficient	0.82	0.79	0.63	0.62	0.70	0.68	0.51	0.50
Visible Light Transmitted	89%	87%	53%	53%	79%	77%	47%	47%
Visible Light Reflected Interior	9%	8%	6%	6%	15%	16%	13%	14%
Visible Light Reflected Exterior	8%	8%	6%	6%	15%	16%	8%	9%
U Value	1.03	1.03	1.03	1.03	0.47	0.47	0.47	0.48
UV Block	38%	98%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	19%	37%	38%	30%	32%	49%	50%
Glare Reduction	NA	2%	NA	1%	NA	3%	NA	2%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	3%	NA	1%	NA	3%	NA	1%

Film Properties (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Abrasion Resistance
Safety S70	0.007"	Single	25,000 psi	175 lbs/in	>125 %	< 5% haze increase

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film

Specifications for 3M Safety S70

1.0 Scope

This specification is for an optically clear glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together and reduce the ultra-violet light that normally would enter through the window. This film is useful as an increased measure of protection for a variety of applications including general glass fragment retention, spontaneous glass breakage, seismic preparedness, and safety glazing applications, and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety S70 Safety and Security Window Film.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- 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

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S70

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film with a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 7 mils (0.007 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 25,000 psi (175 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): >125%
d) Percent Elongation at Yield (ASTM D882): greater than 100%

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 86%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.79

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2) – 1/8" glass.

3.8 Bomb Blast Mitigation:

a. GSA Rating of "3B" (Low Hazard) with minimum blast load of 10 psi overpressure and 89 psi*msec blast impulse

IMPORTANT NOTICE:
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Specifications - Safety and Security Window Film
Specifications for 3M Safety S70

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

IMPORTANT NOTICE:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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Specifications - Safety and Security Window Film
Specifications for 3M Safety S70

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

IMPORTANT NOTICE:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

3M™ Safety & Security Window Film

Safety S80 (SH8CLARL)

Technical Data

Product Features & Benefits

- Optically clear, 8-mil (0.20 mm) thick film for application to interior glass surface
- Provides shatter resistance to help protect from broken glass hazards
- Typical applications include bomb blast mitigation and safety glazing
- Protective hardcoat provides scratch resistance and durability
- Helps protect from the harmful effects of UV light and reduces fading of interior furnishings
- Can be combined with 3M Impact Protection Attachment systems for additional safety and security

Product Performance & Technical Data

Safety S80								
	Single Pane		**Tinted**		**Double Pane**		**Double tinted**	
Film	1/4" Clear	Safety S80	1/4" tint	Safety S80	Dual 1/4" Clear	Safety S80	Dual 1/4" tint	Safety S80
Solar Heat Gain Coefficient	0.82	0.79	0.63	0.62	0.70	0.68	0.51	0.50
Visible Light Transmitted	89%	87%	53%	52%	79%	77%	47%	46%
Visible Light Reflected Interior	9%	9%	6%	7%	15%	16%	13%	14%
Visible Light Reflected Exterior	8%	9%	6%	6%	15%	16%	8%	9%
U Value	1.03	1.03	1.03	1.02	0.47	0.47	0.47	0.48
UV Block	38%	99%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	21%	37%	38%	30%	32%	49%	50%
Glare Reduction	NA	2%	NA	1%	NA	3%	NA	2%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	3%	NA	2%	NA	3%	NA	1%

Film Properties (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Abrasion Resistance
Safety S80	0.008”	Multi (2)	25,000 psi	200 lbs/in	>125 %	< 5% haze increase

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Specifications - Safety and Security Window Film

Specifications for 3M Safety S80

1.0 Scope

This specification is for an optically clear glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together and reduce the ultra-violet light that normally would enter through the window. This film is useful as an increased measure of protection for a variety of applications including general glass fragment retention, spontaneous glass breakage, seismic preparedness, and safety glazing applications, and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety S80 Safety and Security Window Film.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- 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
- ASTM F-2912 Standard Specification for Glazing and Glazing Systems Subjected to Airblast Loadings

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

IMPORTANT NOTICE:
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1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S80

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of two laminated film layers of optically clear polyester and contain a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 8 mils (0.008 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 25,000 psi (200 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): >125%
d) Percent Elongation at Yield (ASTM D882): greater than 100%

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 86%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.79

3.4 Flammability: The Manufacturer shall provide independent test data showing a Flame Spread Index of 30 and a Smoked Development Index of 195 per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited).

3.8 Bomb Blast Mitigation:

a. GSA Rating of "2" (Minimal Hazard) with minimum blast load of 11 psi overpressure and 55 psi*msec blast impulse

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Specifications - Safety and Security Window Film
Specifications for 3M Safety S80

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

IMPORTANT NOTICE:
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1-866-499-8857
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Specifications - Safety and Security Window Film
Specifications for 3M Safety S80

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 45 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

IMPORTANT NOTICE:
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3M™ Safety & Security Window Film

Safety S140 (SH14CLARL)

Technical Data

Product Features & Benefits

- Optically clear, 14-mil (0.36 mm) thick film for application to interior glass surface
- High thickness security film to help deter break and entry attempts
- Provides shatter resistance to help protect from broken glass hazards
- Typically used for helping to deter Break and Entry (Smash and Grab)
- Protective hardcoat provides scratch resistance and durability
- Helps protect from the harmful effects of UV light and reduces fading of interior furnishings
- Can be combined with 3M Impact Protection Attachment systems for additional safety and security

Product Performance & Technical Data

Safety S140								
	Single Pane		**Tinted**		**Double Pane**		**Double tinted**	
Film	1/4" Clear	Safety S140	1/4" tint	Safety S140	Dual 1/4" Clear	Safety S140	Dual 1/4" tint	Safety S140
Solar Heat Gain Coefficient	0.82	0.78	0.63	0.62	0.70	0.68	0.51	0.50
Visible Light Transmitted	89%	85%	53%	52%	79%	72%	47%	46%
Visible Light Reflected Interior	9%	10%	6%	7%	15%	16%	13%	14%
Visible Light Reflected Exterior	8%	10%	6%	6%	15%	16%	8%	9%
U Value	1.03	1.03	1.03	1.02	0.47	0.47	0.47	0.48
UV Block	38%	99%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	22%	37%	38%	30%	32%	49%	50%
Glare Reduction	NA	4%	NA	1%	NA	9%	NA	2%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	4%	NA	2%	NA	3%	NA	1%

Film Properties (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Abrasion Resistance
Safety S140	0.014”	Multi (3)	25,000 psi	350 lbs/in	>125 %	< 5% haze increase

IMPORTANT NOTICE:
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3M
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St. Paul, MN 55144-1000
1-866-499-8857
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Specifications - Safety and Security Window Film

Specifications for 3M Safety S140

1.0 Scope

This specification is for an optically clear glass shatter resistant and abrasion resistant window film which, when applied to the interior window surface, will help hold broken glass together and reduce the ultra-violet light that normally would enter through the window. This film is useful as a deterrent against Smash and Grab and Break and Entry events, and bomb blast mitigation. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety S140 Safety and Security Window Film.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film

Specifications for 3M Safety S140

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of three laminated film layers of optically clear polyester and contain a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 14 mils (0.014 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 25,000 psi (350 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): >125%
d) Percent Elongation at Yield (ASTM D882): greater than 100%

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 85%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.78

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 400 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited).

3.8 Impact Protection: per ASTMs E1886 / E1996

a. Film shall pass impact of Medium Large Missile "C" and withstand subsequent pressure cycling (per ASTMs E 1996 and E 1886) at 50 psf Design pressure with use of 3M Impact Protection Adhesive attachment system.

3.9 Bomb Blast Mitigation:

a. GSA Rating of "3B" (Low Hazard) with minimum blast load of 10 psi overpressure and 89 psi*msec blast impulse

3.10 Burglary Resistant Glazing: Independent lab testing according to UL 972

a. Multiple Impact Test on ¼" annealed glass – PASS
b. Multiple Impact Test on ¼" tempered glass -- PASS

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www.3M.com/windowfilm

Specifications - Safety and Security Window Film

Specifications for 3M Safety S140

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

4.4 Upon request, the ADA will provide a Glass Stress Analysis of the existing glass and proposed glass/film combination as recommended by the film Manufacturer.

4.5 Upon request, the ADA will provide an application analysis to determine available energy cost reduction and savings.

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

IMPORTANT NOTICE:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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www.3M.com/windowfilm

Specifications - Safety and Security Window Film

Specifications for 3M Safety S140

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 60 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

IMPORTANT NOTICE:

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

3M™ Safety & Security Window Film

Safety Neutral S35

Technical Data

Product Features & Benefits

- Combination safety / solar control window film
- Help protect from broken glass hazards
- Increase privacy, reduce glare and eye discomfort
- Increase comfort and reduce air conditioning costs
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Building Envelope Protection
- Helping to Deter Break & Entry
- Safety Glazing
- Spontaneous Glass Breakage
- Seismic Preparedness

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing / Impact Resistance				
16 CFR 1201	¼" annealed	--	Category 2, 400 ft-lbs	
ANSI Z97.1			Class A (Unlimited), 400 ft-lbs	
Impact and Pressure Cycling				
ASTMs E1886 / E1996	1/4" tempered	IPA	Missile Level C, +/- 60 psf	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" annealed	IPP	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"
	¼" tempered	IPA	4 psi, 28 psi*msec	GSA Level 2 / ASTM "No Hazard"
	1" double pane (annealed)	IPA	4 psi, 28 psi*msec	GSA Level 2 / ASTM "No Hazard"

Glazing systems vary. Contact 3M for more information.

Film Properties (nominal, not for specification purposes)

Film Thickness	8 mils
Film Construction	Laminated conventional PET
Tensile Properties (ASTM D882)	
Tensile Strength	28,000 psi
Break Strength	225 lbs/in
Elongation at Break	90%
Yield Strength	22,000 psi
Elongation at Yield	80%
Modulus	600 kpsi
Abrasion Resistance (ASTM D1044)	+3% Δ Haze
Peel Strength	4.5 lb/in
Flammability (ASTM E84)	Class A

Solar Properties – *film applied to ¼" glass*				
	¼" Clear	¼" Tint	Dual Clear	Dual Tint
VLT	39%	23%	35%	21%
VLR-Int	13%	8%	14%	14%
VLR-Ext	23%	22%	27%	13%
SHGC	0.43	0.36	0.49	0.38
TSER	57%	64%	51%	62%
UV Block	99%	99%	99%	99%
Glare ↓	56%	56%	55%	56%
U-Value	1.02	1.02	0.47	0.47
Solar Heat ↓	47%	42%	30%	25%

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3M
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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M™ Safety and Security Window Film, Safety Neutral S35

1.0 Scope

This specification is for a combination safety window film with sun control which, when applied to the interior window surface, will help hold broken glass together and reduce the sunlight that normally would enter through the window. It provides an increased measure of protection in a broad range of uses including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, safety glazing, bomb blast mitigation, Smash and Grab or Break and Entry events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M™ Safety and Security Window Film, Safety Neutral S35.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

IMPORTANT NOTICE:
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Specifications
3M Safety Neutral S35 Safety and Security Window Film

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film laminated to a metalized polyester film for added color and sun control performance, with a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882):
Coated Film: 23,000 psi (MD) / 33,000 psi (TD)

b) Break Strength (ASTM D882):
Coated Film: 170 lb/in (MD) / 280 lb/in (TD)

c) Percent Elongation at Break (ASTM D882):
Coated Film: 100 % (MD) / 80% (TD)

d) Yield Strength (ASTM D882):
Coated Film: > 12,000 psi (MD)

e) Percent Elongation at Yield (ASTM D882):
Coated Film: > 3% (MD)

f) Modulus (ASTM D882):
Coated Film: 580 kpsi (MD) / 615 kpsi (TD)

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 39%
b) Visible Reflection: 23% exterior / 13% interior
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.43

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84.

a) Flame Spread Index (FDI): 0
b) Smoke Developed Index (SDI): 15

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesion to Glass: The Manufacturer shall provide test data showing that the film has a 90-degree peel strength (adhesion to glass) according to ASTM D-1044 of at least 3 lbs/in.

IMPORTANT NOTICE:
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Specifications
3M Safety Neutral S35 Safety and Security Window Film

3.7 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.8 Impact Resistance for Safety Glazing: The Manufacturer shall provide independent test data showing that the film, when applied to either side of the window glass, shall meet the 400 ft-lb impact requirements of 16 CFR 1201 (Category 2) and ANSI Z97.1 (Class A, Unlimited). Testing shall be done with film applied on ¼" annealed glass.

3.9 Impact Protection: The Manufacturer shall provide independent test data showing the following:

a. Film shall pass impact of Large Missile "C" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/- 60 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.

3.10 Bomb Blast Mitigation: The Manufacturer shall provide independent test data showing the following:

a. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Profile Attachment system

b. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "No Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Adhesive Attachment system

c. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "No Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on 1" annealed double pane glass and 3M Impact Protection Adhesive Attachment system

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

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Specifications
3M Safety Neutral S35 Safety and Security Window Film

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.
b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

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1-866-499-8857
www.3M.com/windowfilm

3M™ Safety and Security Window Film

Safety Silver S20

Technical Data

Product Features & Benefits

- Combination safety / solar control window film
- Help protect from broken glass hazards
- Increase privacy, reduce glare and eye discomfort
- Increase comfort and reduce air conditioning costs
- Helps extend the life of furnishings by significantly reducing harmful UV rays

Applications

- Bomb Blast Mitigation
- Building Envelope Protection
- Helping to Deter Break and Entry
- Safety Glazing
- Seismic Preparedness
- Spontaneous Glass Breakage

Performance Testing*

Method	Glass Substrate	Film Attachment	Rating	
Safety Glazing / Impact Resistance				
16 CFR 1201	¼" annealed	--	Category 2, 400 ft-lbs	
ANSI Z97.1			Class A (Unlimited), 400 ft-lbs	
Impact and Pressure Cycling				
ASTMs E1886 / E1996	1/4" tempered	IPA	Missile Level A, +/- 60 psf	
Blast Mitigation			**Blast Load**	**Rating**
GSA TS01-2003 / ASTM F1642	¼" annealed	IPP	4 psi, 28 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
		IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "Minimal Hazard"
	¼" tempered	IPA	4 psi, 28 psi*msec	GSA Level 2 / ASTM "No Hazard"
	1" double pane (tempered)	IPA	6 psi, 42 psi*msec	GSA Level 2 / ASTM "No Hazard"

*Glazing systems vary. Contact 3M for more information.

Film Properties (nominal, not for specification purposes)

Film Thickness	8 mils
Film Construction	Laminated conventional PET
Tensile Properties (ASTM D882)	
Tensile Strength	25,000 psi
Break Strength	200 lbs/in
Elongation at Break	85%
Yield Strength	15,000 psi
Elongation at Yield	7%
Modulus	607 kpsi
Abrasion Resistance (ASTM D1044)	+3% Δ Haze
Peel Strength	4.5 lb/in
Flammability (ASTM E84)	Class A

Solar Properties – *film applied to ¼" glass*				
	¼" Clear	¼" Tint	Dual Clear	Dual Tint
VLT	18%	11%	17%	10%
VLR-Int	62%	62%	62%	62%
VLR-Ext	61%	25%	59%	24%
SHGC	0.25	0.30	0.33	0.28
TSER	76%	71%	67%	72%
UV Block	99%	99%	99%	99%
Glare ↓	80%	80%	79%	79%
U-Value	1.02	1.02	0.47	0.47
Solar Heat ↓	70%	53%	53%	45%

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1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M™ Safety Silver S20 Safety and Security Window Film

1.0 Scope

This specification is for a combination safety window film with sun control which, when applied to the interior window surface, will help hold broken glass together and reduce the sunlight that normally would enter through the window. It provides an increased measure of protection in a broad range of uses including basic glass fragment retention, spontaneous glass breakage, seismic preparedness, safety glazing, bomb blast mitigation, Smash and Grab or Break and Entry events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M™ Safety and Security Window Film, Safety Silver S20.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials
- 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
- ASTM E-1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- 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

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

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

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

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www.3M.com/windowfilm

Specifications
3M™ Safety Silver S20 Safety and Security Window Film

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film laminated to a metalized polyester film for added color and sun control performance, with a durable acrylic abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film color is derived from the metal coatings and will not contain dyed polyester. The film shall have a nominal thickness of 8 mils (0.008 inches). There shall be no evidence of coating voids. The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882):
   Coated Film: 22,000 psi (MD) / 30,000 psi (TD)
b) Break Strength (ASTM D882):
   Coated Film: 159 lb/in (MD) / 247 lb/in (TD)
c) Percent Elongation at Break (ASTM D882):
   Coated Film: 95 % (MD) / 76% (TD)
d) Yield Strength (ASTM D882):
   Coated Film: > 12,000 psi (MD)
e) Percent Elongation at Yield (ASTM D882):
   Coated Film: > 3% (MD)
f) Modulus (ASTM D882):
   Coated Film: 560 kpsi (MD) / 650 kpsi (TD)

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 15%
b) Visible Reflection: 63% exterior / 68% interior
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.23

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84.

a) Flame Spread Index (FDI): 0
b) Smoke Developed Index (SDI): 15

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesion to Glass: The Manufacturer shall provide independent test data showing that the film shall have a 90-degree peel strength (adhesion to glass) according to ASTM D-1044 of at least 3 lbs/in.

3.7 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

Important:
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Specifications
3M™ Safety Silver S20 Safety and Security Window Film

3.8 Impact Resistance for Safety Glazing: The Manufacturer shall provide independent test data showing that the film, when applied to either side of the window glass, shall meet the 400 ft-lb impact requirements of 16 CFR 1201 (Category 2). Testing shall be done with film applied on ¼" annealed glass.

3.9 Impact Protection: The Manufacturer shall provide independent test data showing the following:

a. Film shall pass impact of Small Missile "A" and withstand subsequent pressure cycling (per ASTMs E1996 and E1886) at +/- 60 psf Design Pressure with use of 3M Impact Protection Adhesive attachment system.

3.10 Bomb Blast Mitigation: The Manufacturer shall provide independent test data showing the following:

a. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Profile Attachment system

b. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "Minimal Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on ¼" annealed single pane glass and 3M Impact Protection Adhesive Attachment system

c. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "No Hazard" with blast pressure of 4 psi and 28 psi*msec blast impulse, on ¼" tempered single pane glass and 3M Impact Protection Adhesive Attachment system

d. GSA Rating of "2" (Minimal Hazard) / ASTM F1642 "No Hazard" with blast pressure of 6 psi and 42 psi*msec blast impulse, on 1" tempered double pane glass and 3M Impact Protection Adhesive Attachment system

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film 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 identify and label each film core 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

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications
3M™ Safety Silver S20 Safety and Security Window Film

6.0 Application

6.1 Examination: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

g. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
h. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
i. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
j. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
k. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
l. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.
b) 8.2 The film manufacturer (3M) also warrants against glass failure due to thermal shock fracture of the glass window unit (maximum value $500 per window) provided the film is applied to recommended types of glass and the failure occurs within sixty (60) months from the start of application. Any glass failure must be reviewed by the film manufacturer (3M) prior to replacement.

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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3M
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St. Paul, MN 55144-1000
1-866-499-8857
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3M™ Safety & Security Window Film

Safety S20 Exterior

Technical Data

Product Features & Benefits

- Dual purpose Exterior / Interior film
- Outstanding exterior weatherability
- Optically clear, 2 mil (50 μm) thick film
- Suitable for basic glass fragment retention upon spontaneous breakage of tempered glass
- Provides shatter resistance to help protect against broken glass hazards caused by seismic activity, and other low force impact events
- Suggested uses: to help secure exterior facing glass such as balcony glass, balustrades, skylights, outer pane of multiple glazed units, curtain walls
- Use with 3M Impact Protection Attachment Systems to enhance glass retention

Product Performance & Technical Data

Safety S20 Exterior								
	Single Pane		Tinted		Double Pane		Double tinted	
Film	1/4" Clear	Safety S20 Exterior	1/4" tint	Safety S20 Exterior	Dual 1/4" clear	Safety S20 Exterior	Dual 1/4" tint	Safety S20 Exterior
Solar Heat Gain Coefficient	0.81	0.80	0.63	0.62	0.70	0.69	0.51	0.50
Visible Light Transmitted	89%	88%	53%	53%	79%	79%	47%	47%
Visible Light Reflected Interior	9%	9%	6%	6%	15%	15%	13%	8%
Visible Light Reflected Exterior	8%	9%	6%	6%	15%	15%	9%	13%
U Value	1.03	1.02	1.03	1.02	0.47	0.47	0.47	0.47
UV Block	38%	99.9%	NA	99.9%	NA	99.9%	NA	99.9%
Total Solar Energy Rejected	19%	20%	37%	38%	30%	31%	49%	50%
Glare Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Heat Loss Reduction	NA	1%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	2%	NA	1%	NA	2%	NA	2%

Film Properties* (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Peel Strength	Abrasion Resistance
Safety S20 Exterior	2 mil (50 micron)	Single	25,000 psi	50 lbs/in	100 %	4 lbs/in	~ 5% haze increase

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

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Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
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Specifications - Safety and Security Window Film

Specifications for 3M Safety S20 Exterior

1.0 Scope

This specification is for an optically clear glass shatter resistant window film that will help hold broken glass together. The film exhibits excellent longevity and durability when applied on the exterior surface of a window, but may also be used as an interior film. The film blocks over 99% of the ultra-violet that would normally radiate through a window The film is useful for glass shatter protection and general glass fragment retention against low force impact situations, such as spontaneous glass breakage and seismic events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety and Security Window Film, Safety S20 Exterior.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

European Norm, EN-12600

Japan Industrial Standard, JIS A5759

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film with a durable abrasion resistant coating over one surface, and a pressure sensitive adhesive on the other. The film shall have a nominal thickness of 2 mils (0.002 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

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1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S20 Exterior

3.2 Film Properties (nominal):
a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 25,000 psi (50 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): 100%
d) Percent Elongation at Yield (ASTM D882): 6%
e) Peel Strength: 4 lbs/in

3.3 Solar Performance Properties: film applied to ¼" thick clear glass, towards light source
a) Visible Light Transmission: 88%
b) Visible Reflection (Interior): not more than 9%
c) Visible Reflection (Exterior): not more than 9%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)

3.4 Flammability: The Manufacturer shall provide independent test data showing a Flame Spread Index of 35 and a Smoked Development Index of 70 per ASTM E-84.

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:
a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 100 ft-lb impact when tested according to JIS A5759, including glass fragment retention requirements per the Interlayer Displacement test.

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

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Specifications - Safety and Security Window Film
Specifications for 3M Safety S20 Exterior

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The exterior surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years (Interior) / _____ years (Exterior) in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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1-866-499-8857
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3M™ Safety & Security Window Film

Safety S40 Exterior

Technical Data

Product Features & Benefits

- Dual purpose Exterior / Interior film
- Outstanding exterior weatherability
- Optically clear, 4 mil (100 μm) thick film
- Suitable for enhanced protection upon spontaneous glass breakage of tempered glass
- Provides shatter resistance to help protect against broken glass hazards caused by seismic activity, and other low force impact events
- Suggested uses: to help secure exterior facing glass such as balcony glass, balustrades, skylights, outer pane of multiple glazed units, curtain walls
- Use with 3M Impact Protection Attachment Systems to enhance glass retention

Product Performance & Technical Data

Safety S40 Exterior	 Single Pane		 Tinted		 Double Pane		 Double tinted	
Film	1/4" Clear	Safety S40 Exterior	1/4" tint	Safety S40 Exterior	Dual 1/4" clear	Safety S40 Exterior	Dual 1/4" tint	Safety S40 Exterior
Solar Heat Gain Coefficient	0.82	0.80	0.63	0.62	0.70	0.68	0.51	0.50
Visible Light Transmitted	89%	89%	53%	53%	79%	79%	47%	47%
Visible Light Reflected Interior	9%	8%	6%	6%	15%	15%	13%	13%
Visible Light Reflected Exterior	8%	8%	6%	6%	15%	15%	9%	8%
U Value	1.03	1.02	1.03	1.02	0.47	0.47	0.47	0.47
UV Block	38%	99.9%	NA	99.9%	NA	99.9%	NA	99.9%
Total Solar Energy Rejected	19%	20%	37%	38%	30%	32%	49%	50%
Glare Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	2%	NA	1%	NA	3%	NA	2%

Film Properties (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Peel Strength	Abrasion Resistance
Safety S40 Exterior	4 mil (100 micron)	Single	25,000 psi	100 lbs/in	> 115 %	5 lbs/in	< 5% haze increase

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film

Specifications for 3M Safety S40 Exterior

1.0 Scope

This specification is for an optically clear glass shatter resistant window film that will help hold broken glass together. The film exhibits excellent longevity and durability when applied on the exterior surface of a window, but may also be used as an interior film. The film blocks over 99% of the ultra-violet that would normally radiate through a window The film is useful for glass shatter protection and general glass fragment retention against low force impact situations, such as spontaneous glass breakage and seismic events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety and Security Window Film, Safety S40 Exterior.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

European Norm, EN-12600

Japan Industrial Standard, JIS A5759

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film with a durable abrasion resistant coating over one surface, and a pressure sensitive adhesive on the other. The film shall have a nominal thickness of 4 mils (0.004 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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Specifications - Safety and Security Window Film
Specifications for 3M Safety S40 Exterior

3.2 Film Properties (nominal):
a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 25,000 psi (100 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): 116%
d) Percent Elongation at Yield (ASTM D882): 116%
e) Peel Strength: 5 lbs/in

3.3 Solar Performance Properties: film applied to ¼" thick clear glass, towards light source
a) Visible Light Transmission: 89%
b) Visible Reflection (Interior): not more than 8%
c) Visible Reflection (Exterior): not more than 8%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:
a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 150 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 1) and ANSI Z97.1 (Class B).

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

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Specifications - Safety and Security Window Film
Specifications for 3M Safety S40 Exterior

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The exterior surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years (Interior) / _____ years (Exterior) in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

3M™ Safety & Security Window Film

Safety S70 Exterior

Technical Data

Product Features & Benefits

- Dual purpose Exterior / Interior film
- Outstanding exterior weatherability
- Optically clear, 7 mil (180 μm) thick film
- Suitable for enhanced protection upon spontaneous glass breakage of tempered glass
- Provides shatter resistance to help protect against broken glass hazards caused by seismic activity, and other moderate force impact events
- Suggested uses: to help secure exterior facing glass such as balcony glass, balustrades, skylights, outer pane of multiple glazed units, curtain walls, oversized glass panes
- Use with 3M Impact Protection Attachment Systems to enhance glass retention

Product Performance & Technical Data

Safety S70 Exterior								
	Single Pane		Tinted		Double Pane		Double tinted	
Film	1/4" Clear	Safety S70 Exterior	1/4" tint	Safety S70 Exterior	Dual 1/4" clear	Safety S70 Exterior	Dual 1/4" tint	Safety S70 Exterior
Solar Heat Gain Coefficient	0.82	0.79	0.63	0.62	0.70	0.68	0.51	0.50
Visible Light Transmitted	89%	88%	53%	53%	79%	79%	47%	47%
Visible Light Reflected Interior	9%	8%	6%	6%	15%	15%	13%	13%
Visible Light Reflected Exterior	8%	8%	6%	6%	15%	15%	9%	8%
U Value	1.03	1.02	1.03	1.02	0.47	0.47	0.47	0.47
UV Block	38%	99.9%	NA	99.9%	NA	99.9%	NA	99.9%
Total Solar Energy Rejected	19%	21%	37%	38%	30%	32%	49%	51%
Glare Reduction	NA	0%	NA	0%	NA	0%	NA	1%
Heat Loss Reduction	NA	1%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	2%	NA	2%	NA	3%	NA	2%

Film Properties (nominal)

Product	Film Thickness	Single or Multi-ply	Tensile Strength	Break Strength	Elongation at Break	Peel Strength	Abrasion Resistance
Safety S70 Exterior	7 mil (180 micron)	Single	25,000 psi	178 lbs/in	> 150 %	5 lbs/in	5% haze increase

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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Specifications - Safety and Security Window Film

Specifications for 3M Safety S70 Exterior

1.0 Scope

This specification is for an optically clear glass shatter resistant window film that will help hold broken glass together. The film exhibits excellent longevity and durability when applied on the exterior surface of a window, but may also be used as an interior film. The film blocks over 99% of the ultra-violet that would normally radiate through a window The film is useful for glass shatter protection and general glass fragment retention against moderate force impact situations, such as spontaneous glass breakage and seismic events. Certain applications may require the film be used in conjunction with a film attachment system. The film shall be called 3M Safety and Security Window Film, S70 Exterior.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

The Consumer Products Safety Commission (CPSC) 16 CFR, Part 1201, Safety Standard for Architectural Glazing Material

European Norm, EN-12600

Japan Industrial Standard, JIS A5759

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester film with a durable abrasion resistant coating over one surface, and a pressure sensitive adhesive on the other. The film shall have a nominal thickness of 7 mils (0.007 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S70 Exterior

3.2 Film Properties (nominal):
a) Tensile Strength (ASTM D882): 23,000 psi (MD) / 28,000 psi (TD)
b) Break Strength (ASTM D882): (178 lbs per inch width)
c) Percent Elongation at Break (ASTM D882): 154%
d) Percent Elongation at Yield (ASTM D882): > 5%
e) Peel Strength (ASTM D3330, Method A): 5 lbs/in

3.3 Solar Performance Properties: film applied to ¼" thick clear glass, towards light source
a) Visible Light Transmission: 88%
b) Visible Reflection (Interior): not more than 8%
c) Visible Reflection (Exterior): not more than 8%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, a nominal 5% increase of transmitted light haze will result in accordance with ASTM D-1044 using 50 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be pressure sensitive (not water activated) and physically bond (not chemically bond) to the glass. The adhesive shall be essentially optically flat and shall meet the following criteria:
a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

3.7 Impact Resistance for Safety Glazing: The film, when applied to either side of the window glass, shall pass a 150 ft-lb impact when tested according to 16 CFR CPSC Part 1201 (Category 1) and ANSI Z97.1 (Class B, Unlimited)

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film installed
* Date of completion

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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1-866-499-8857
www.3M.com/windowfilm

Specifications - Safety and Security Window Film
Specifications for 3M Safety S70 Exterior

5.0 Requirements of the Manufacturer

5.1 The Manufacturer will ensure proper quality control during production, shipping and inventory, clearly identify and label each film core 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: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The exterior surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 30 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of _____ years (Interior) / _____ years (Exterior) in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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3M Safety & Security Window Film

Anti Graffiti 4 (AG-4)

Technical Data

Product Features & Benefits

- Optically clear, 4-mil (0.10 mm) thick film to protect glass from scratches, abrasion and acid etching
- Will not form chemical bond to glass, enabling easy film removal should replacement be required due to vandalism
- Glass fragment retention properties to provide basic shatter resistance
- Helps reduce the chance of injury from flying glass.
- Helps protect from the harmful effects of UV light and reduces fading of interior furnishings
- Class A rated interior use for Flame Spread Index and Smoke Development values per ASTM E-84.

Product Performance & Technical Data

Anti Graffiti 4 (AG-4)								
	Single Pane		**Tinted**		**Double Pane**		**Double tinted**	
Film	1/4" Clear	AG-4	1/4" tint	AG-4	Dual 1/4" Clear	AG-4	Dual 1/4" tint	AG-4
Solar Heat Gain Coefficient	0.82	0.82	0.63	0.59	0.70	0.68	0.51	0.46
Visible Light Transmitted	89%	87%	53%	47%	79%	77%	47%	45%
Visible Light Reflected Interior	9%	8%	9%	6%	15%	15%	13%	14%
Visible Light Reflected Exterior	8%	8%	13%	6%	15%	15%	8%	14%
U Value	1.03	1.03	1.03	1.03	0.47	0.47	0.47	0.47
UV Block	38%	99%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	19%	37%	41%	30%	32%	49%	54%
Glare Reduction	NA	2%	NA	11%	NA	3%	NA	5%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	0%	NA	6%	NA	3%	NA	9%

Film Properties* (nominal)

Product	Film Thickness	Tensile Strength	Break Strength	Elongation at Break	Peel Strength	Puncture Strength	Abrasion Resistance
AG-4	0.004”	25,000 psi	136 lbs/in	>100 %	1 lb/in	90 lbf	< 2% increase in haze

*not for specification purposes

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M Anti-Graffiti Film AG4

1.0 Scope

This specification is for an optically clear abrasion resistant window film which, when applied to glass, will help protect the surface from vandalism. This film is intended to be a sacrificial layer to help protect against damage from graffiti, glass etching, and other commonly used methods to mark glass. The film does not chemically bond to glass and is easily removed when replacement is required. The film shall be called 3M Anti-Graffiti Film AG4.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of an optically clear polyester and contain a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 4 mils (0.004 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 100 lbs/in
c) Percent Elongation at Break (ASTM D882): >100%
d) Puncture Strength (ASTM D4830): 90 lbs
e) Abrasion Resistance (ASTM D1044): < 2% increase in haze
f) Peel Strength: 1 lb/in

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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1-866-499-8857
www.3M.com/windowfilm

Specifications
Specifications for 3M Anti-Graffiti Film AG4

3.3 Solar Performance Properties: film applied to ¼" thick clear glass
a) Visible Light Transmission: 86%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.81

3.4 Flammability: The Manufacturer shall provide independent test data showing a Flame Spread Index of 5 and Smoke Developed Index of 10 per ASTM E-84.

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 2% increase of transmitted light haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be essentially optically flat and shall meet the following criteria:
a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film 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 identify and label each film core 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

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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Specifications
Specifications for 3M Anti-Graffiti Film AG4

6.0 Application

6.1 Examination: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 60 calendar days when viewed under normal viewing conditions.
f. After installation, any leftover material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of ____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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St. Paul, MN 55144-1000
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www.3M.com/windowfilm

3M Safety & Security Window Film

Anti Graffiti 6 (AG-6)

Technical Data

Product Features & Benefits

- Optically clear, 6-mil (0.15 mm) thick film to protect glass from scratches, abrasion and acid etching
- Increased film thickness for more protection to underlying glass surface
- Will not form chemical bond to glass, enabling easy film removal should replacement be required due to vandalism
- Glass fragment retention properties to provide basic shatter resistance
- Helps reduce the chance of injury from flying glass.
- Helps protect from the harmful effects of UV light and reduces fading of interior furnishings
- Class A rated interior use for Flame Spread Index and Smoke Development values per ASTM E-84.

Product Performance & Technical Data

Anti Graffiti 6 (AG-6)								
	Single Pane		**Tinted**		**Double Pane**		**Double tinted**	
Film	1/4" Clear	AG-6	1/4" tint	AG-6	Dual 1/4" Clear	AG-6	Dual 1/4" tint	AG-6
Solar Heat Gain Coefficient	0.82	0.82	0.63	0.59	0.70	0.68	0.51	0.46
Visible Light Transmitted	89%	87%	53%	47%	79%	77%	47%	45%
Visible Light Reflected Interior	10%	8%	10%	6%	15%	15%	13%	14%
Visible Light Reflected Exterior	10%	8%	13%	6%	15%	15%	8%	14%
U Value	1.03	1.03	1.03	1.03	0.47	0.47	0.47	0.47
UV Block	38%	99%	NA	99%	NA	99%	NA	99%
Total Solar Energy Rejected	19%	19%	37%	41%	30%	32%	49%	54%
Glare Reduction	NA	2%	NA	11%	NA	3%	NA	5%
Heat Loss Reduction	NA	0%	NA	0%	NA	0%	NA	0%
Solar Heat Reduction	NA	0%	NA	6%	NA	3%	NA	9%

Film Properties* (nominal)

Product	Film Thickness	Tensile Strength	Break Strength	Elongation at Break	Peel Strength	Puncture Strength	Abrasion Resistance
AG-6	0.006”	25,000 psi	150 lbs/in	>100 %	1 lb/in	125 lbs	< 2% increase in haze

*not for specification purposes

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M Anti-Graffiti Film AG6

1.0 Scope

This specification is for an optically clear abrasion resistant window film which, when applied to glass, will help protect the surface from vandalism. This film is intended to be a sacrificial layer to help protect against damage from graffiti, glass etching, and other commonly used methods to mark glass. The film does not chemically bond to glass and is easily removed when replacement is required. The film shall be called 3M Anti-Graffiti Film AG6.

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 1985 American Society for Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals.

The American National Standards Institute (ANSI).

ANSI Z97.1 Specification for Safety Glazing Material used in Buildings

The American Society for Testing and Materials (ASTM):

- ASTM E-308 Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System
- ASTM E-903 Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres
- ASTM D-882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
- ASTM D-1044 Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test)
- ASTM D-2582 Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting
- ASTM D-4830 Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.
- ASTM G-90 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM G 26 Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight
- ASTM E-84 Standard Method of Test for Surface Burning Characteristics of Building Materials

Window. A Computer Tool for Analyzing Window Thermal Performance, Lawrence Berkeley Laboratory

3.0 Requirements of the Film

3.1 Film Material: The film material shall consist of two laminated optically clear polyester layers, and contain a durable abrasion resistant coating over one surface, and a UV stabilized pressure sensitive adhesive on the other. The film shall have a nominal thickness of 6 mils (0.006 inches). The film shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Film Properties (nominal):

a) Tensile Strength (ASTM D882): 25,000 psi
b) Break Strength (ASTM D882): 150 lbs / inch
c) Percent Elongation at Break (ASTM D882): >100%
d) Puncture Strength (ASTM D4830): 125 lbs
e) Abrasion Resistance (ASTM D1044): < 2% increase in haze
f) Peel Strength: 1 lb/in

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M Anti-Graffiti Film AG6

3.3 Solar Performance Properties: film applied to ¼" thick clear glass

a) Visible Light Transmission: 86%
b) Visible Reflection: not more than 10%
c) Ultraviolet Transmission: less than 1% (300 – 380 nm)
d) Solar Heat Gain Coefficient: 0.81

3.4 Flammability: The Manufacturer shall provide independent test data showing that the window film shall meet the requirements of a Class A Interior Finish for Building Materials for both Flame Spread Index and Smoked Development Values per ASTM E-84

3.5 Abrasion Resistance: The Manufacturer shall provide independent test data showing that the film shall have a surface coating that is resistant to abrasion such that, less than 2% increase of transmitted light haze will result in accordance with ASTM D-1044 using 100 cycles, 500 grams weight, and the CS10F Calibrase Wheel.

3.6 Adhesive System: The film shall be supplied with a high mass pressure sensitive weatherable acrylate adhesive applied uniformly over the surface opposite the abrasion resistant coated surface. The adhesive shall be essentially optically flat and shall meet the following criteria:

a. Viewing the film from a distance of ten feet at angles up to 45 degrees from either side of the glass, the film itself shall not appear distorted.
b. It shall not be necessary to seal around the edges of the applied film system with a lacquer or other substance in order to prevent moisture or free water from penetrating under the film system.

4.0 Requirements of the Authorized Dealer/Applicator (ADA)

4.1 The ADA shall provide documentation that the ADA is certified by the Manufacturer of the window film to install said window film as 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 glass
* Type of film
* Amount of film 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 identify and label each film core 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

Important:
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Specifications
Specifications for 3M Anti-Graffiti Film AG6

6.0 Application

6.1 Examination: Examine glass surfaces to receive new film and verify that they are free from defects and imperfections, which will affect the final appearance. Correct all such deficiencies before starting film application.

6.2 Preparation:

a. The window and window framing will be cleaned thoroughly with a neutral cleaning solution. The inside surface of the window glass shall be scraped with stainless steel razor blades with clean, sharp edges to ensure the removal of any foreign contaminants without damages the glass surface.
b. Drop cloths or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

6.3 Installation: The film shall be applied as to the specifications of the Manufacturer by an ADA.

a. Materials will be delivered to the job site with the manufacturer's labels intact and legible.
b. To minimize waste, the film will be cut to specification utilizing a vertical dispenser designed for that purpose. Film edges shall be cut neatly and square at a uniform distance of 1/8" (3 mm) to 1/16" (1.6 mm) of the window-sealing device.
c. Film shall be wet-applied using clean water and slip solution to facilitate positioning of the film onto glass.
d. To ensure efficient removal of excess water from the underside of the film and to maximize bonding of the pressure sensitive adhesive, polyplastic bladed squeegees shall be used.
e. Upon completion, the film may have a dimpled appearance from residual moisture. Said moisture shall, under reasonable weather conditions, dry flat with no moisture dimples within a period of 60 calendar days when viewed under normal viewing conditions.
f. After installation, any left over material will be removed and the work area will be returned to original condition. Use all necessary means to protect the film before, during and after the installation.

7.0 Cleaning

The film may be washed using common window cleaning solutions, including ammonia solutions, 30 days after application. Abrasive type cleaning agents and bristle brushes, which could scratch the film, must not be used. Synthetic sponges or soft cloths are recommended.

8.0 Warranty

a) The application shall be warranted by the film manufacturer (3M) for a period of ____ years in that the film will maintain solar reflective properties without cracking, crazing, delaminating, peeling, or discoloration. In the event that the product is found to be defective under warranty, the film manufacturer (3M) will replace such quantity of the film proved to be defective, and will additionally provide the removal and reapplication labor free of charge.

Important:
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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
As Cured — After 21 Days at 25°C (77°F), 50% RH				
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

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3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

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):

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

GSA-TS01-2003 General Services Adminstration 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

Important:
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Specifications

Specifications for 3M Impact Protection Adhesive

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.

Important:
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Specifications

Specifications for 3M Impact Protection Adhesive

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 throroughly 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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1-866-499-8857
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3M Impact Protection Adhesive

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
As Cured — After 21 Days at 25°C (77°F), 50% RH			
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.

Important:
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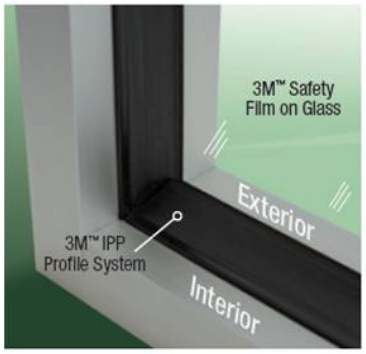
3M™ Impact Protection Attachment Systems

3M Impact Protection Profile

3M™ Impact Protection Profile 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 and a high strength, flexible polymer attachment 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 Profile Benefits:

- No cure time provides more immediate protection
- Reduced odor in your home or office compared to sealant options

Property	Test Method Used	Units	Value
Full Adhesion		days	1*
Working Time (25°C (77°F), 50% RH)		minutes	unlimited
VOC content		g/L	
Ultimate Tensile Strength	ASTM D0412	PLI (Mpa)	>142
Ultimate Elongation	ASTM D0412	%	400%
Durometer Hardness, Shore A	ASTM D2240	Points	70
Break Strength, Die B	ASTM D0624	ppi	>71

*Temperature depicted above 60°F

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St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M Impact Protection Profile, BP700

1.0 Scope

This specification is for a window film "flexible-mechanical" attachment system to anchor safety and security window film to a commercial style window 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 attachment system has a consistent appearance, is odorless, and exhibits a fast cure time. The film attachment system shall be called BP700 3M Impact Protection Profile.

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):

- ASTM D 412 - Standard Test Methods for Vulcanized Rubber ad Thermoplastic Elastomers – Tension.
- ASTM D 2240 – Standard Test Method for Rubber Property – Durometer Hardness.
- ASTM D 624 - Standard Test Method of Test for Tear Strength of Conventional Vulcanized Rubber ad Thermoplastic Elastomers.
- ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
- ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
- ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure
- ASTM G 26 - Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight.
- 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.
- ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- 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
- 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 Profile Requirements

3.1 Material: The Impact Protection Profile shall consist of extruded EPDM rubber strip, approximately 1.125 inches wide, with two separate flanges each approximately ½ inches wide. Each flange shall contain 3M VHB foam tape, bonded to the EPDM rubber through heat activation and covered with a silicone release liner. The liner side of the VHB foam tape shall contain a pressure sensitive adhesive for bonding the profile to the filmed glass and frame surfaces. The profile shall be black in color. The profile attachment system shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Material Properties:

a) Full Adhesion: 1 - 2 days (25°C, 50% RH)
b) Ultimate Tensile Strength (ASTM D412): > 20,500 psi
c) Ultimate Elongation (ASTM D412): 400%
d) Break Strength, Die B (ASTM D624): > 71 ppi
e) Durometer Hardness, Shore A: (ASTM D2240): 70 pts

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

The information provided in this report is believed to be reliable; however, due to the wide variety of intervening factors, 3M does not warrant that the results will necessarily be obtained. All details concerning product specifications and terms of sale are available from 3M.

3M
Renewable Energy Division
St. Paul, MN 55144-1000
1-866-499-8857
www.3M.com/windowfilm

Specifications

Specifications for 3M Impact Protection Profile, BP700

3.3 Uniformity: Product shall have uniform consistency and appearance.

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

3.6 Impact Protection:

a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Small Missile A impact, with subsequent pressure cycling (per ASTMs E 1996 and E 1886) at +/- 50 psf design pressure.

3.7 Bomb Blast Mitigation:

a. GSA Rating of "2" (Minimal Hazard) with minimum blast load of 4 psi overpressure and 28 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 4 psi overpressure and 28 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) Windows and frames must be examined to ensure that they are fit to receive BP700 Impact Protection Profile in a manner such that the two profile adhesive strips will be perpendicularly opposed to each other and that they will not contact glazing stops or frame gaskets without stretching the profile.
b) 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.
c) 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.

Important:
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Specifications
Specifications for 3M Impact Protection Profile, BP700

d) Upon the customer's request, an adhesion test to the frame surface may be conducted by applying a 4 - 6 inch long strip on the frame surface, using the sufficient pressure to adhesive good adhesive wet-out. Allow the Impact Protection Profile to cure for 1-2 days and test adhesion by removing the test strip. 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 either not recommended, or an adhesion promoter, such as 3M Primer 94, must be used.

6.2 Preparation:

a. Clean surfaces thoroughly prior to installation.
b. Surfaces must be completely dry prior to application to achieve full adhesion
c. 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, 70-0709-0323-5, 3M Impact Protection Profile Attachment System Installation Instructions.

6.3 Installation: The film attachment system shall be applied according to the specifications of the Manufacturer by an Authorized Dealer/Applicator certified to install 3M Impact Protection Profile. Refer to 3M publication, 70-0709-0323-5, 3M Impact Protection Profile Attachment System Installation Instructions.

a. Each profile piece must span continuously to both sides of the window, within 1/8 inch to the frame edge. Splicing the profile between frame edges is prohibited.
b. Profile must be aligned and applied by 3M recommended or approved methods and tools to ensure a quality installation.
c. Corner joints must be fabricated by 3M recommended and approved methods. No part of the profile adhesive shall make contact with an adjacent profile.
d. Sufficient pressure must be evenly applied along the entire length of the profile to ensure full adhesion from both adhesive strips. A roller tool is required to minimize entrapment of air in the adhesive.

7.0 Cleaning

a. Product shall be allowed to cure for at least 1 - 2 days.
b. Any visibly defective sections shall be repaired prior to the substantial completion of work..
c. 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 Profile will maintain its physical 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 surface appearance due to dirt, contaminants, tampering, or adhesive failure caused by improper installation methods.

Important:
This product is not approved in the State of Florida for use as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm. In compliance with Florida Statute 553.842, this product may not be advertised, sold, offered, provided, distributed, or marketed in the State of Florida as hurricane, windstorm, or impact protection from wind-borne debris from a hurricane or windstorm.

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Specifications

Specifications for 3M Impact Protection Profile, BP950

1.0 Scope

This specification is for a window film “flexible-mechanical” attachment system to anchor safety and security window film to a commercial style window 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 attachment system has a consistent appearance, is odorless, and exhibits a fast cure time. The film attachment system shall be called BP950 3M Impact Protection Profile.

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):

- ASTM D 412 - Standard Test Methods for Vulcanized Rubber ad Thermoplastic Elastomers – Tension.
- ASTM D 2240 – Standard Test Method for Rubber Property – Durometer Hardness.
- ASTM D 624 - Standard Test Method of Test for Tear Strength of Conventional Vulcanized Rubber ad Thermoplastic Elastomers.
- ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.
- ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
- ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure
- ASTM G 26 - Standard Practice for Performing Accelerated Outdoor Weatherizing for Non-metallic Materials Using Concentrated Natural Sunlight.
- 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.
- ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
- 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
- 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 Profile Requirements

3.1 Material: The Impact Protection Profile shall consist of extruded EPDM rubber strip, approximately 1.375 inches wide, with two separate flanges each approximately 0.625 inches wide. Each flange shall contain 3M VHB foam tape, bonded to the EPDM rubber through heat activation and covered with a silicone release liner. The liner side of the VHB foam tape shall contain a pressure sensitive adhesive for bonding the profile to the filmed glass and frame surfaces. The profile shall be black in color. The profile attachment system shall be identified as to Manufacturer of Origin (hereafter to be called Manufacturer).

3.2 Material Properties:

a) Full Adhesion: 1 - 2 days (25°C, 50% RH)
b) Ultimate Tensile Strength (ASTM D412): > 20,500 psi
c) Ultimate Elongation (ASTM D412): 400%
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Specifications

Specifications for 3M Impact Protection Profile, BP950

3.3 Uniformity: Product shall have uniform consistency and appearance.

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

3.6 Impact Protection:

a. As part of a filmed glass system, film attachment shall demonstrate ability to withstand Small Missile A and Medium Large Missile C impact, with subsequent pressure cycling (per ASTMs E 1996 and E 1886) at +/- 50 psf design pressure.

3.7 Bomb Blast Mitigation:

a. GSA Rating of "2" (Minimal Hazard) with minimum blast load of 4 psi overpressure and 28 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
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6.2 Preparation:

a. Clean surfaces thoroughly prior to installation.
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7.0 Cleaning

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Anatomy of the DefenseLite™ System:

1. **Proprietary DefenseLite extrusion attaches to the existing glazing frame and separates clear shield from primary glass**

2. **‘Unbreakable’ clear shield is affixed to the DefenseLite extrusion**

3. **DefenseLite ‘Super Bond’ secures the system to the existing glazing**

4. **Customized edge banding and powder coating makes system virtually invisible upon installation**

Notes: *Each DefenseLite system is custom fabricated based on existing glazing conditions and installed by certified installers.*
Systems may utilize exotic plastics, polycarbonates and glass-clad shields depending on threat conditions and budgets.
All-weather adhesives, high-performance films, mechanical anchors and other materials may be used.
DefenseLite installs on the exterior or interior of existing windows and doors.
DefenseLite systems have been independently tested to meet forced entry and UL752 ballistic standards.

DEFENSELITE™ Basic Sheet

Basic Sheet

DefenseLite™ basic sheet is a polished surface, UV stabilized, transparent security shield. It features outstanding impact strength, superior dimensional stability, high temperature resistance, and high clarity. This lightweight thermoformable sheet is also easy to fabricate and decorate. DefenseLite™ is offered with a two (2) year Parts & Labor Warranty. The terms of the warranty are available upon request.

Applications

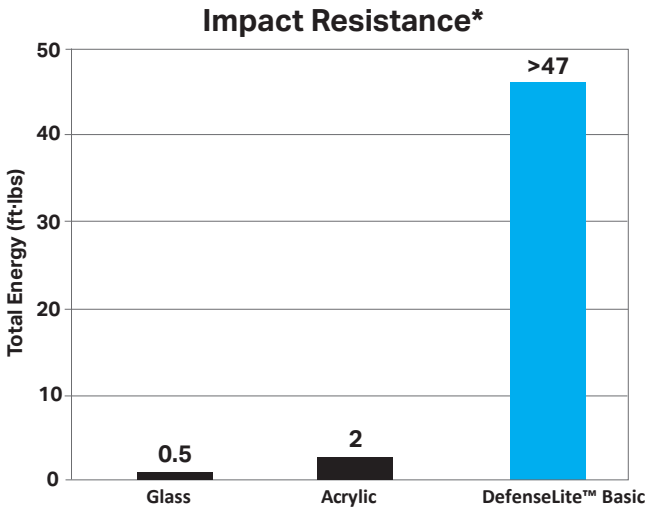
Industrial glazing, machine guards, structural parts, thermoformed and fabricated components

Typical Properties*

Property	Test Method	Units	Values
PHYSICAL			
Specific Gravity	ASTM D 792	–	1.2
Refractive Index	ASTM D 542	–	1.586
Light Transmission, Clear @ 0.118″	ASTM D 1003	%	86
Light Transmission, I30 Gray @ 0.118″	ASTM D 1003	%	50
Light Transmission, K09 Bronze @ 0.118″	ASTM D 1003	%	50
Light Transmission, I35 Dark Gray @ 0.118″	ASTM D 1003	%	18
Water Absorption, 24 hours	ASTM D 570	%	0.15
Poisson's Ratio	ASTM E 132	–	0.38
MECHANICAL**			
Tensile Strength, Ultimate	ASTM D 638	psi	9,500
Tensile Strength, Yield	ASTM D 638	psi	9,000
Tensile Modulus	ASTM D 638	psi	340,000
Elongation	ASTM D 638	%	110
Flexural Strength	ASTM D 790	psi	13,500
Flexural Modulus	ASTM D 790	psi	345,000
Compressive Strength	ASTM D 695	psi	12,500
Compressive Modulus	ASTM D 695	psi	345,000
Izod Impact Strength, Notched @ 0.125″	ASTM D 256	ft·lbs/in	18
Izod Impact Strength, Unnotched @ 0.125″	ASTM D 256	ft·lbs/in	60 (no failure)
Instrumented Impact @ 0.125″	ASTM D 3763	ft·lbs	>47
Shear Strength, Ultimate	ASTM D 732	psi	10,000
Shear Strength, Yield	ASTM D 732	psi	6,000
Shear Modulus	ASTM D 732	psi	114,000
Rockwell Hardness	ASTM D 785	–	M70 / R118
THERMAL			
Coefficient of Thermal Expansion	ASTM D 696	in/in/°F	3.75×10^{-5}
Coefficient of Thermal Conductivity	ASTM C 177	BTU·in/hr·ft²·°F	1.35
Heat Deflection Temperature @ 264 psi	ASTM D 648	°F	270
Heat Deflection Temperature @ 66 psi	ASTM D 648	°F	280
Brittleness Temperature	ASTM D 746	°F	-200
Shading Coefficient, clear @ 0.236″	NFRC 100-2010	–	0.97
Shading Coefficient, Gray or Bronze @ 0.236″	NFRC 100-2010	–	0.77
U factor @ 0.236″ (summer, winter)	NFRC 100-2010	BTU/hr·ft²·°F	0.85, 0.92
U factor @ 0.375″ (summer, winter)	NFRC 100-2010	BTU/hr·ft²·°F	0.78, 0.85
ELECTRICAL			
Dielectric Constant @ 10 Hz	ASTM D 150	–	2.96
Dielectric Constant @ 60 Hz	ASTM D 150	–	3.17
Volume Resistivity	ASTM D 257	Ohm·cm	8.2×10^{16}
Dissipation Factor @ 60 Hz	ASTM D 150	–	0.0009
Arc Resistance			
Stainless Steel Strip electrode	ASTM D 495	Seconds	10
Tungsten Electrodes	ASTM D 495	Seconds	120
Dielectric Strength, in air @ 0.125″	ASTM D 149	V/mil	380
FLAMMABILITY			
Horizontal Burn, AEB	ASTM D 635	in	<1
Ignition Temperature, Self	ASTM D 1929	°F	1022
Ignition Temperature, Flash	ASTM D 1929	°F	824
Flame Class @ 0.060″	UL 94	–	HB
@ 0.394″	UL 94	–	V-0

*Typical properties are not intended for specification purposes.
**Some properties characterized using non-textured sheet.

DEFENSELITE™ Basic Sheet



*Instrumented Impact per ASTM D 3763, sample thickness 0.125˝ nominal

Standard Products Comparison

Property		DefenseLite™	Acrylic	Glass
Impact Resistance	Drop Ball Test, 0.5 lb	No Break	1.75 ft·lbs	0.7 ft·lbs
Cold Bend	Bend Radius	100x material thickness	180x material thickness	Not possible
Sheet Weight	0.125˝	0.78 lb/ft^2	0.75 lb/ft^2	1.60 lbs/ft^2
Thermal Expansion Rate	–	3.75 x 10^{-5} in/in/ºF	4.10 x 10^{-5} in/in/ºF	5.0 x 10^{-6} in/in/ºF
Shading Coefficient	0.236˝ clear sheet	0.97	1.01	1.03
U Factor – Summer U Factor – Winter	0.236˝	0.85 BTU/hr·ft^2·ºF 0.92 BTU/hr·ft^2·ºF	0.83 BTU/hr·ft^2·ºF 0.91 BTU/hr·ft^2·ºF	0.92 BTU/hr·ft^2·ºF 1.02 BTU/hr·ft^2·ºF
Sound Transmission Class	0.236˝	29	30	27

Regulatory code compliance and certifications

ANSI Z97.1-2009: American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test, Class A, Unlimited

CPSC 16 CFR 1201 Category I and Category II: Safety Standard for Architectural Glazing Materials

Florida Building Code 2014
High Velocity Hurricane Zone Classified
Miami-Dade County NOA #15-1014.01

ICC-ES Evaluation Report ESR-2728

UL 94: Flammability File #E351891

UL 972: Burglary Resistant Glazing Materials, UL File #BP2126

UL 746C: Suitability for Outdoor Use, UL File #351891*

DEFENSELITE™

DefenseLite **Cleaning Instructions**

Periodic cleaning of *DefenseLite* panels, using correct procedures with compatible household cleaners, is recommended to prolong the service life of your material. All *DefenseLite* panels contain an abrasion/mar resistant surface layer that offers a higher degree of scratch resistance and surface hardness.These products provide superior protection against unintentional chemical attack. However, the use ofabrasive, gritty cleaners and/or hard cleaning implements (e.g. hard brushes, scrapers, squeegees)
should be avoided to eliminate the possibility of scratching the surface coating.

The following cleaning techniques are based on standard industry practices.

General Cleaning:

1) Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
2) Using a soft microfiber cloth or moist non-abrasive sponge, gently wash with a mild diluted soap or detergent.
3) Rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Removing Heavy Oils and Tars:

1) Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
2) With a 50/50 isopropyl alcohol-water mixture, gently rub the area with a soft non-abrasive cloth.
3) Immediately rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Removing Graffiti, Paint, Marker, Inks and Glazing Compounds:

1) Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
2) Using Naphtha VM&P grade, Isopropyl Alcohol or Butyl Cellosolve, gently rub the area with a soft non-abrasive cloth. Do not apply solvent cleaners under direct sunlight or during high temperatures.
3) Immediately rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Removing Adhesive backed Labels:

1) Isopropyl Alcohol, Naphtha VM&P grade or Kerosene will help lift stickers and adhesives.
2) Immediately rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Compatible Cleaners

The following cleaning agents are compatible with *DefenseLite* panels when used according to the manufacturer's recommendations:

- Top Job, Joy®
- Palmolive Liquid®
- Windex® Ammonia free

[Top Job and Joy are registered trademarks of Proctor & Gamble, Palmolive is a registered trademark of Colgate Palmolive, Windex is a registered trademark of Drackett Products Company]

Points to Remember

Do not use abrasive cleaners.
Do not use high alkaline cleaners (high pH or ammoniated).
Do not leave cleaners sitting on *DefenseLite* panels for periods of time; wash off immediately.
Do not apply cleaners under direct sunlight or at elevated temperatures.
Do not clean your glazing with any unapproved cleaners. When in doubt, seek guidance.
Using scrapers, squeegees, razors or other sharp instruments may permanently scratch your *DefenseLite* panels.
Always avoid dry rubbing/cleaning your panels, as sand and dust particles clinging to the exterior of the glazing may scratch its surface.
An Anti-Static Canned-Air Ionizer can reduce electrostatic charge buildup on *DefenseLite* panels, consequently reducing dirt and dust buildup that would hinder cleaning.

Special Note:

The edges of your *DefenseLite* panels are not protected with an abrasion and chemical resistance hard coating. Do not allow cleaning solutions and solvents to pool along the edges for any length of time. Always rinse edges thoroughly with generous amounts of lukewarm clean water.

DEFENSELITE™

SHIELD SPECS

- **CG500 – .500” thick, stops (3) rounds of .38 special – HP White TP 0500.03, Level A**
- **BR750 - .750” thick, stops (3) rounds of 9mm – UL 752, Level 1**
- **BR1000 – 1.000” thick, stops (3) rounds of .357 magnum – UL 752, Level 2**
- **BR1250 – 1.250” thick, stops (3) rounds of .44 magnum – UL 752, Level 3**
- **MS1250 – 1.250” thick TS*, BR750 - .750” thick NTS**; stops (1) round of 30 caliber (30.06) – UL 752, Level 4**
- **MS1250 – 1.250” thick TS*, BR1000 – 1.000” thick NTS**; stops (1) round of .308 caliber, 7.62 x 51mm) – UL 752, Level 5**
- **MS1250 – 1.250” thick, stops (5) rounds of 9mm (Uzi attack) – UL 752, Level 6**
- **MS1250 – 1.250” thick TS*, BR1000 – 1.000” thick NTS**; stops (5) rounds of 5.56mm - UL 752, Level 7**

***Threat Side**
****Non Threat Side**

BULLETSHIELD™ 1/2" sheet

DEFENSELITE™

Containment grade

BulletShield™ 1/2" containment grade sheet is a 0.500″, 3-ply polycarbonate laminate that meets ASTM F 1233-08 Class 1.4 for contraband passage and Class 2.8 for body passage. BulletShield™ 1/2" also meets HP White TP 0500 Level A (.38 Special) and ASTM F1233-08, Level HG1 (.38 Special) for ballistics. Unlike glass-clad products, this all-polycarbonate laminate resists spalling and white-out after repeated high force and ballistic impacts, an advantage in maintaining visibility of a threat during an attack. All BulletShield™ 1/2" products incorporate DefenseLite™ polycarbonate sheet produced for high optical quality in security glazing laminates. Exterior surfaces have a proprietary DefenseLite™ AR hardcoat that facilitates cleaning and resists marring, chemical, and graffiti attack. BulletShield™ 1/2" sheet has a seven (7) year Limited Product Warranty against coating failure, yellowing, and hazing. The terms of the warranty are available upon request.

Applications

Jails, detention centers, psychiatric hospitals, reception areas, convenience stores, check cashing facilities, safe rooms, government buildings, and executive offices.

Typical Properties*

Property	Values
Gauge / Tolerance	0.522 in ± 5%
Weight	3.3 lbs / sq ft
Shading Coefficient	0.90
U-Value	0.74
Light Transmission	83%

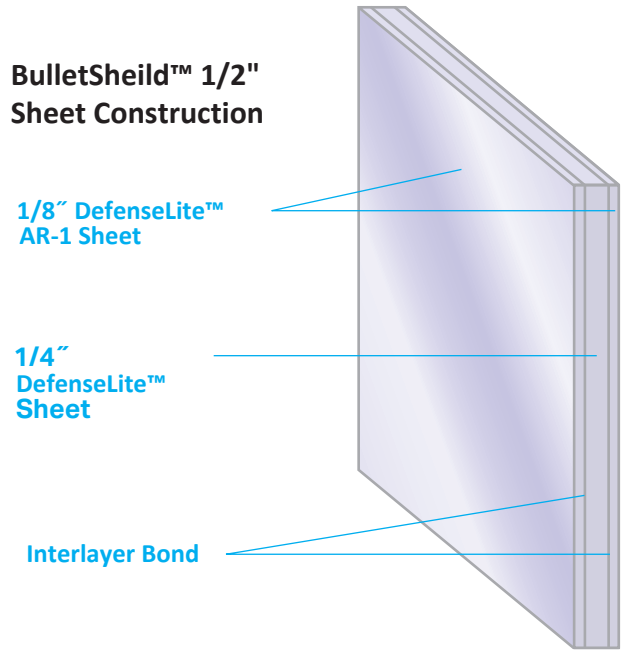
*Typical properties are not intended for specification purposes

Product Performance Ratings

BALLISTIC
H.P. White TP 0500.03, Level A
ASTM F 1233-08, Level HG1

FORCED ENTRY & CONTAINMENT
ASTM F 1233.08 Class 1.4 (contraband passage) and Class 2.8 (body passage)
ASTM F 1915.03 Grade 1
H.P. White TP 0500.03 Level 1 Sequence 15

AGENCY INFORMATION
Combustibility Class CC1
Miami-Dade NOA #15-1014.01
Florida Building Code 2014



BULLETSHIELD™ 1/2" sheet

Glazing recommendations

- Structural security framing systems with equal or greater forced entry and/or ballistics ratings as the selected BulletShield™ laminate are recommended
- BulletShield™ laminate should be cut to allow for a minimum of one (1") inch edge engagement in the frame,with sufficient rabbet depth for material expansion
  (approx. 1/16″/ft.)
- Use wet or dry sealants/gaskets that are compatible with polycarbonate
- Remove protective masking after glazing operations are completed and before prolonged exposure to direct sunlight, moisture, or high temperature

Standard sheet size

38″ x 96″, 48″ x 96″, 60″ x 96″

Product specification

BulletShield™ 1/2" polycarbonate laminate:

- Three-ply, clear DefenseLite™ polycarbonate sheet constructed as follows:
  - 1/8″ DefenseLite™ AR-1 abrasion resistant surface
  - Polyurethane bonding interlayer
  - 1/4″ DefenseLite™ polycarbonate sheet
  - Polyurethane bonding interlayer
  - 1/8″ DefenseLite™ AR-1 abrasion resistant surface

DEFENSELITE™

DEFENSELITE™

BULLETSHIELD™ 3/4" sheet

Ballistic glazing - Level 1

BulletShield™ 3/4" ballistic grade sheet is a 0.750″, 3-ply polycarbonate and acrylic laminate that meets the UL 752 Level 1 rating for 9 mm ballistic attack. All BulletShield™ 3/4" products incorporate DefenseLite™ polycarbonate sheet produced for high optical quality in security glazing laminates. Exterior surfaces have a proprietary DefenseLite™ AR hardcoat that facilitates cleaning and resists marring, chemical, and graffiti attack. BulletShield™ 3/4" sheet has a seven (7) year Limited Product Warranty against coating failure, yellowing, and hazing. The terms of the warranty are available upon request.

Applications

Government and detention facilities, banks, specialty retailers, 24 hour convenience stores, cash transaction windows, check cashing facilities, safe rooms, and executive offices.

Typical Properties*

Property	Values
Gauge / Tolerance	0.780 in ± 5%
Weight	5.1 lbs / sq ft
Shading Coefficient	0.89
U-Value	0.65
Light Transmission	88%

*Typical properties are not intended for specification purposes

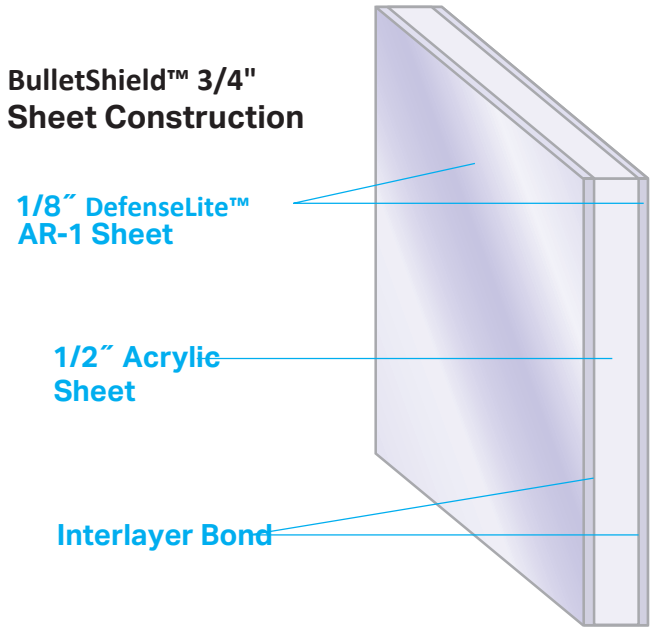
Product Performance Ratings

BALLISTIC

UL 752 Level 1 (9mm Full Metal Copper Jacket with Lead Core, 3 rounds)

AGENCY INFORMATION

UL File: BP6864
Combustibility Class CC2
Miami-Dade NOA #15-1014.01
Florida Building Code 2014



BULLETSHIELD™ 3/4" sheet

Glazing recommendations

- Structural security framing systems with equal or greater forced entry and/or ballistics ratings as the selected BulletSheild™ laminate are recommended
- BulletShield™ laminate should be cut to allow for a minimum of one (1) inch edge engagement in the frame, with sufficient rabbet depth for material expansion (approx. 1/16″/ft.)
- Use wet or dry sealants/gaskets that are compatible with polycarbonate
- Remove protective masking after glazing operations are completed and before prolonged exposure to direct sunlight, moisture, or high temperature

Standard sheet size

48″ x 60″, 48″ x 72″, 38″ x 78″, 38″ x 96″, 48″ x 96″, 60″ x 72″, 60″ x 96″

Product Specifications

BulletShield™ 3/4" polycarbonate and acrylic laminate:

- Three-ply, clear DefenseLite™ polycarbonate sheet constructed as follows:
  - 1/8″ DefenseLite™ AR-1 abrasion resistant surface
  - Polyurethane bonding interlayer
  - 1/2″ acrylic sheet
  - Polyurethane bonding interlayer
  - 1/8″ DefenseLite™ AR-1 abrasion resistant surface

DEFENSELITE™

BULLETSHIELD™ 1" sheet

DEFENSELITE™

Ballistic glazing - Level 2

BulletShield™ 1" ballistic grade sheet is a 1.000˝, 4-ply polycarbonate laminate that meets the UL 752 Level 2 rating for .357 Magnum ballistic attack and HP White TP 0500 Level IV. Unlike glass-clad products, this all-polycarbonate laminate resists spalling and white-out after repeated high force and ballistic impacts, an advantage in maintaining visibility of a threat during anattack. All BulletShield™ 1" products incorporate DefenseLite™ polycarbonate sheet produced for high optical quality in security glazing laminates. Exterior surfaces have a proprietary DefenseLite™ AR hardcoat that facilitates cleaning and resists marring, chemical attack, and graffiti. BulletShield™ 1" sheet has a seven (7) year Limited Product Warranty against coating failure, yellowing, and hazing. The terms of the warranty are available upon request.

Typical Properties*

Property	Values
Gauge / Tolerance	1.05 in ± 5%
Weight	6.5 lbs / sq ft
Shading Coefficient	0.85
U-Value	0.60
Light Transmission	72%

*Typical properties are not intended for specification purposes

Product Performance Ratings

BALLISTIC
UL 752 Level 2 (.357 Magnum Jacketed Lead Soft Point, 3 rounds)

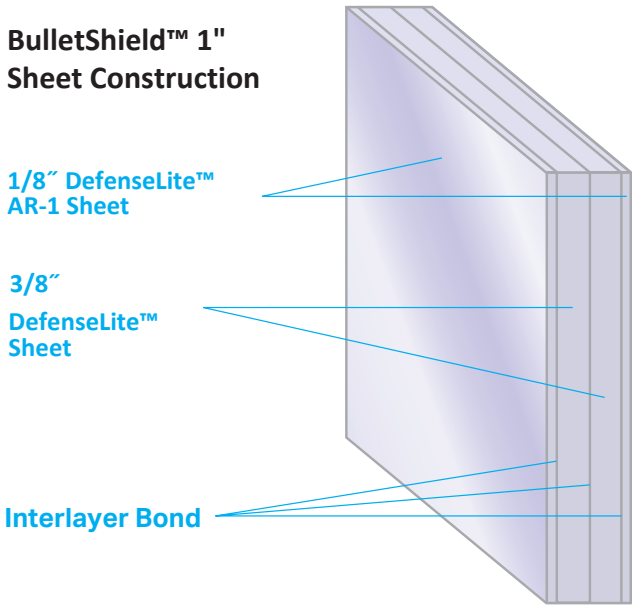
FORCED ENTRY & CONTAINMENT
ASTM F 1233.08 Class 5 Body Passage
ASTM F 1233.08 Class 2.4 Contraband Passage
ASTM F 1915.03 Grade 1
H.P. White TP 0500.03 Level IV Sequence 43

AGENCY INFORMATION
UL File: BP6864
Combustibility Class CC1
Miami-Dade NOA 12-0605.05

Applications

Government and detention facilities, banks, heavy equipment glazing, specialty retailers, 24 hour convenience stores, cashtransaction windows, hospitals, safe rooms, and executive offices.

BulletShield™ 1" Sheet Construction



BULLETSHIELD™ 1" sheet

Glazing recommendations

- Structural security framing systems with equal or greater forced entry and/or ballistics ratings as the selected BulletShield™ laminate are recommended
- BulletShield™ laminate should be cut to allow for a minimum of one (1") inch edge engagement in the frame,with sufficient rabbet depth for material expansion (approx. 1/16″/ft.)
- Use wet or dry sealants/gaskets that are compatible with polycarbonate
- Remove protective masking after glazing operations are completed and before prolonged exposure to direct sunlight, moisture, or high temperature

Standard sheet size

48″ x 60″, 48″ x 72″, 38″ x 78″, 38″ x 96″, 48″ x 96″, 60″ x 72″, 60″ x 96″

Product specification

BulletShield™ 1" polycarbonate laminate:

- Four-ply, clear DefenseLite™ polycarbonate sheet constructed as follows:

  1/8″ DefenseLite™ AR-1 abrasion resistant surface

  Polyurethane bonding interlayer

  3/8″ DefenseLite™ polycarbonate sheet

  Polyurethane bonding interlayer

  3/8″ DefenseLite™ polycarbonate sheet

  Polyurethane bonding interlayer

  1/8″ DefenseLite™ AR-1 abrasion resistant surface

DEFENSELITE™

BULLETSHIELD™ 1-1/4" sheet

DEFENSELITE™

Ballistic glazing - Level 3

BulletShield™ 1-1/4" ballistic grade sheet is a 1.250˝, 4-ply polycarbonate laminate that meets UL 752 Level 3 rating for .44 Magnum ballistic attack, HP White TP 0500 Level lV,and ASTM F 1233 Class 5. Unlike glass-clad products, this all-polycarbonate laminate resists spalling and white-out after repeated high force and ballistic impacts, an advantage in maintaining visibility of a threat during an attack. All BulletShield™ 1-1/4" products incorporate DefenseLite™ polycarbonatesheet produced for high optical quality insecurity glazing laminates. Exterior surfaceshave a proprietary DefenseLite™ ARhardcoat that facilitates cleaning and resistsmarring, chemical, and graffiti attack.Applications include security doors, windows,and other areas that require these specificlevels of protection. BulletShield™ 1-1/4"sheet has a seven (7) year Limited ProductWarranty against coating failure, yellowing,and hazing. The terms of the warranty are available upon request.

Typical Properties*

Property	Values
Gauge / Tolerance	1.30 in ± 5%
Weight	8.1 lbs / sq ft
Shading Coefficient	0.81
U-Value	0.51
Light Transmission	72%

*Typical properties are not intended for specification purposes

Product Performance Ratings

BALLISTIC

UL 752 Level 3 (.44 Magnum Lead Semi-Wadcutter Gas Checked, 3 rounds)

NIJ Level II, Level IIIA

FORCED ENTRY & CONTAINMENT

ASTM F 1233.08 Class 5 Body Passage
ASTM F 1233.08 Class 2.5 Contraband Passage
ASTM F 1915.03 Grade 1
H.P. White TP 0500.03 Level IV Sequence 43-44

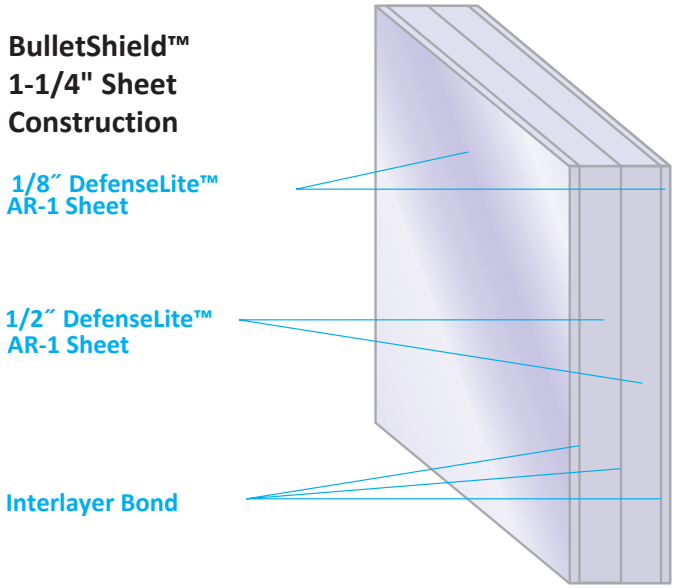
AGENCY INFORMATION

UL File: BP6864
Combustibility Class CC1
Miami-Dade NOA #15-1014.01
Florida Building Code 2014
ICC-ES ESR-2728

Applications

Government and detention facilities, banks, specialty retailers, 24 hour convenience stores, cash transaction windows, safe rooms, and executive offices.

BulletShield™ 1-1/4" Sheet Construction



BULLETSHIELD™ 1-1/4" sheet

Glazing recommendations

- Structural security framing systems with equal or greater forced entry and/or ballistics ratings as the selected BulletShield™ laminate are recommended
- BulletShield™ laminate should be cut to allow for a minimum of one (1) inch edge engagement in the frame, with sufficient rabbet depth for material expansion (approx. 1/16″/ft.)
- Use wet or dry sealants/gaskets that are compatible with polycarbonate
- Remove protective masking after glazing operations are completed and before prolonged exposure to direct sunlight, moisture, or high temperature

Standard sheet size

48″ x 60″, 48″ x 72″, 38″ x 78″, 38″ x 96″, 48″ x 96″, 60″ x 72″, 60″ x 96″

Product specification

BulletShield™ 1-1/4" polycarbonate laminate:

- Four-ply, clear DefenseLite™ polycarbonate sheet constructed as follows:
  - 1/8″ DefenseLite™ AR-1 abrasion resistant surface
  - Polyurethane bonding interlayer
  - 1/2″ DefenseLite™ polycarbonate sheet
  - Polyurethane bonding interlayer
  - 1/2″ DefenseLite™ polycarbonate sheet
  - Polyurethane bonding interlayer
  - 1/8″ DefenseLite™ AR-1 abrasion resistant surface

DEFENSELITE™

BULLETSHIELD™ 1-1/4" sheet

DEFENSELITE™

Multi shot protection

BulletShield™ 1-1/4" ballistic grade sheet is a 1.250″, 4-ply acrylic and polycarbonate laminate that meets UL 752 Level 6 rating for high speed multi-shot 9 mm (Uzi) ballistic attack. All BulletShield™ 1-1/4" products incorporate DefenseLite™ polycarbonate sheet produced for high optical quality in security glazing laminates. Exterior surfaces have a proprietary DefenseLite™ AR hardcoat that facilitates cleaning and resists marring, chemical, and graffiti attack. BulletShield™ 1-1/4" sheet has a seven (7) year Limited Product Warranty against coating failure, yellowing, and hazing. The terms of the warranty are available upon request.

Applications

Government and detention facilities, banks, specialty retailers, 24 hour convenience stores, and cash transaction windows.

Typical Properties*

Property	Values
Gauge / Tolerance	1.30 in
Weight	8.1 lbs / sq ft
Shading Coefficient	0.98
U-Value	0.56
Light Transmission	78%

*Typical properties are not intended for specification purposes

Product Performance Ratings

BALLISTIC

UL 752 Level 6 (9mm Full Metal Copper Jacket with Lead Core, 5 rounds)

Supplementary Shotgun - A supplementary UL test using rifled lead slug with a muzzle energy of 2438-2950 ft·lbs (3306-4000 J) and 00 lead buckshot with a muzzle energy of 2078-2415 ft·lbs (2818-3275 J) fired from a 12-gauge shotgun

AGENCY INFORMATION

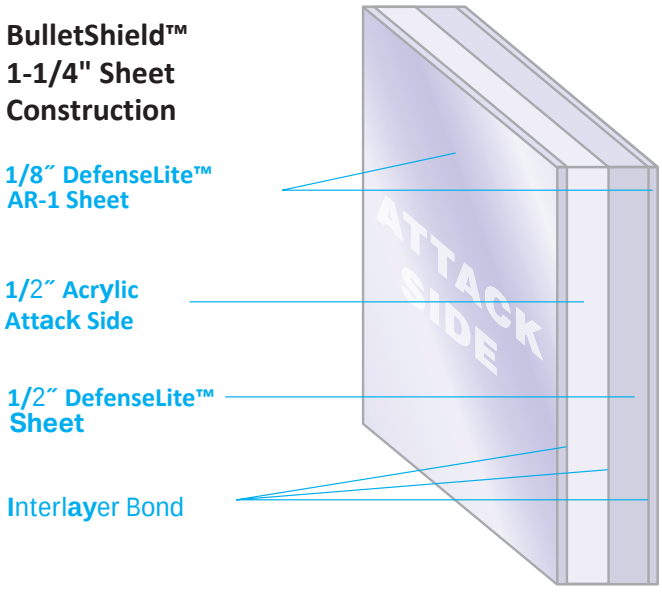
UL File: BP6864

Combustibility Class CC2

Miami-Dade NOA #15-1014.01

Florida Building Code 2014

BulletShield™ 1-1/4" Sheet Construction



BULLETSHIELD™ 1-1/4" sheet

Glazing recommendations

- Structural security framing systems with equal or greater forced entry and/or ballistics ratings as the selected BulletShield™ laminate are recommended
- BulletShield™ 1-1/4" must be installed with acrylic ply facing the ballistic attack side
- BulletShield™ laminate should be cut to allow for a minimum of one (1) inch edge engagement in the frame, with sufficient rabbet depth for material expansion (approx. 1/16″/ft.)
- Use wet or dry sealants/gaskets that are compatible with polycarbonate
- Remove protective masking after glazing operations are completed and before prolonged exposure to direct sunlight, moisture, or high temperature

Standard sheet size

48″ x 96″

Product specification

BulletShield™ 1-1/4" polycarbonate and acrylic laminate:

- Four-ply, clear BulletShield™ polycarbonate sheet

constructed as follows:

1/8″ DefenseLite™ AR-1 abrasion resistant surface

Polyurethane bonding interlayer

1/2″ DefenseLite™ polycarbonate sheet

Polyurethane bonding interlayer

1/2″ acrylic sheet

Polyurethane bonding interlayer

1/8″ DefenseLite™ AR-1 abrasion resistant surface

DEFENSELITE™

BULLETSHIELD™ *for Optimal "Clear" Ballistic Protection*

BulletShield **Cleaning Instructions**

Periodic cleaning of *BulletShield* panels, using correct procedures with compatible household cleaners, is recommended to prolong the service life of your material. All *BulletShield* panels are hard coated, abrasion/mar resistant products that offer a higher degree of scratch resistance and surface hardness. These products provide superior protection against unintentional chemical attack. However, the use of abrasive, gritty cleaners and/or hard cleaning implements (e.g. hard brushes, scrapers, squeegees) should be avoided to eliminate the possibility of scratching the surface coating.

The following cleaning techniques are based on standard industry practices.

General Cleaning:

1) Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
2) Using a soft microfiber cloth or moist non-abrasive sponge, gently wash with a mild diluted soap or detergent.
3) Rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Removing Heavy Oils and Tars:

1) Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
2) With a 50/50 isopropyl alcohol-water mixture, gently rub the area with a soft non-abrasive cloth.
3) Immediately rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Removing Graffiti, Paint, Marker, Inks and Glazing Compounds:

1) Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
2) Using Naphtha VM&P grade, Isopropyl Alcohol or Butyl Cellosolve, gently rub the area with a soft non-abrasive cloth. Do not apply solvent cleaners under direct sunlight or during high temperatures.
3) Immediately rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Removing Adhesive backed Labels:

1) Isopropyl Alcohol, Naphtha VM&P grade or Kerosene will help lift stickers and adhesives.
2) Immediately rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

Compatible Cleaners

The following cleaning agents are compatible with *BulletShield* panels when used according to the manufacturer's recommendations:

- Top Job, Joy®
- Palmolive Liquid®
- Windex® Ammonia free

[Top Job and Joy are registered trademarks of Proctor & Gamble, Palmolive is a registered trademark of Colgate Palmolive, Windex is a registered trademark of Drackett Products Company]

Points to Remember

Do not use abrasive cleaners.
Do not use high alkaline cleaners (high pH or ammoniated).
Do not leave cleaners sitting on *BulletShield* panels for periods of time; wash off immediately.
Do not apply cleaners under direct sunlight or at elevated temperatures.
Do not clean your glazing with any unapproved cleaners. When in doubt, seek guidance.
Using scrapers, squeegees, razors or other sharp instruments may permanently scratch your *BulletShield* panels.
Always avoid dry rubbing/cleaning your panels, as sand and dust particles clinging to the exterior of the glazing may scratch its surface.
An Anti-Static Canned-Air Ionizer can reduce electrostatic charge buildup on *BulletShield* panels, consequently reducing dirt and dust buildup that would hinder cleaning.

Special Note:

The edges of your *BulletShield* panel are not protected with an abrasion and chemical resistance hard coating. Do not allow cleaning solutions and solvents to pool along the edges for any length of time. Always rinse edges thoroughly with generous amounts of lukewarm clean water.

BULLETSHIELD™