

Solar Control Window Film & Glass

Selecting The Right Film



Consumer Guide To Thermal Shock Fracture & Insulated Glass Unit Seal Failure

Introduction

This booklet was created to help you understand the criteria for determining which Global window film is right for each application and situation. Your Global dealer wants you to know exactly how window film works and what it can, and cannot, do so that you can make the best choice.

As part of the selection process, your independent Global window film dealer will perform a thorough assessment of your installation environment, whether a home or business. Then, together you can select the appropriate Global window film for your application from the wide range of professional grade Global products.

Global dealers are committed to installing only the right film for your particular needs to ensure your complete satisfaction. The more you know about window film, the better Global looks.



Global window film dealers are independent professionals who will help you select the perfect window film to be installed.



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	Page
Introduction	1
Solar Energy & Its Effect On Glass	3
Glass Without Window Film	4
Glass With Window Film - A Dramatic Transformation	4
Heat Absorption, TSF & IGU Seal Failure	5
Selecting The Right Film	6
Installation Proposal Form	6
Assessing Installation Characteristics	7
Flaws & Imperfections In Glass	7
Tightness Of Glass Framing & Damaged Molding	7
Rapid Temperature Changes & Shading	7
Environmental Conditions	8
Film-To-Glass Installation Guidance	8
Glass With Low-E Coating	9
Installations Larger Than 2,500 Square Feet	9
Product Failure Warranty Coverage	10
TSF IGU Seal Failure Warranty Coverage	10
TSF IGU Seal Failure Warranty Application Procedures	11
How To Calculate TSF IGU Warranty Fees	12
Film-To-Glass Installation Guidance Chart	12
Film-To-Glass Installation Cautions	13

Solar Energy & Its Effect On Glass

As solar control window film continues to grow in popularity, it's more important than ever to understand exactly how the installation of film impacts flat glass. When the proper window film is installed on undamaged glass, there are seldom any problems. However, under certain circumstances the installation of an improperly selected window film can contribute to thermal stress fracture (TSF) and even lead to insulated glass unit (IGU) seal failure.

Circumstances that may promote TSF and/or IGU seal failure include:

- **Improper film choice**
- Pre-existing flaws or imperfections in the glass
- Tightness of glass framing or fitting
- Rapid temperature changes & shading
- Environmental conditions



BEFORE: Without Global window film harsh sunlight and glare interfere with clear visibility inside and out.



AFTER: Installing Global window film greatly improves interior clarity and enhances the exterior view by reducing glare.

Glass Without Window Film

To help you select the correct window film you need to understand what happens when solar energy strikes a pane of glass. In untreated glass, most of the solar energy is transmitted. Only a small amount is reflected and absorbed as shown in illustration #1.

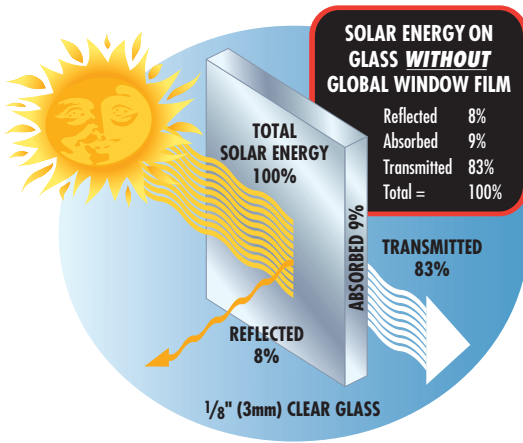


Illustration #1

Untreated glass allows most of the solar energy to transmit causing hot spots and fading of valuable furnishings. Select Global window films can reject up to 78% of total solar energy and almost 100% of harmful and damaging ultraviolet.

Glass With Window Film - A Dramatic Transformation

Installing window film on a pane of glass can dramatically change how it reflects, transmits and absorbs solar energy. The degree of that change is determined by the construction characteristics of the window film you select. Illustration #2 shows how window film can significantly reduce solar energy transmission by increasing reflection and absorption.

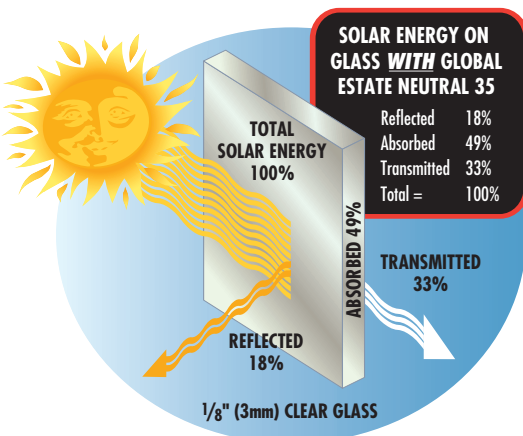


Illustration #2

Global architectural window films effectively reduce the amount of solar energy transmitted through the glass and many versions are almost undetectable once installed.

Heat Absorption, TSF & IGU Seal Failure

Once installed, almost all window films will cause increased heat absorption in the glass pane treated with film. It is this heating of the glass that results in thermal expansion, which on certain installations, can increase the risk of thermal stress fracture (TSF) and/or insulated glass unit (IGU) seal failure.

When thermal expansion occurs in a single pane, the result can be glass breakage—typically a small crack. When thermal expansion occurs in an insulated glass unit (IGU) the inside pane treated with window film can expand more than the untreated outside pane. This causes a disparity in thermal expansion between the two panes of glass, which may result in thermal stress fracture or IGU seal failure, allowing moisture to get in between the panes.

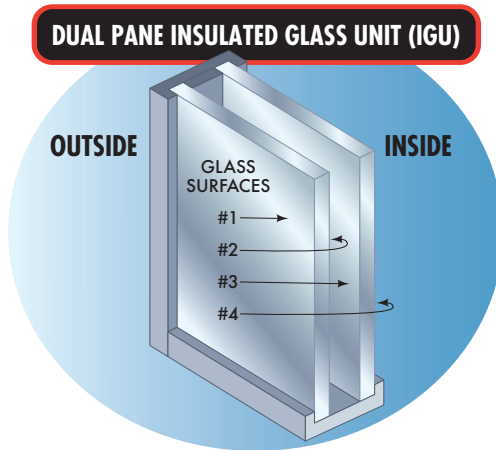


Illustration #3

Window film is installed to the inside pane (glass surface #4) of a dual pane IGU. Selecting an improper film for this application can cause the glass pane treated with window film to experience excessive thermal expansion at a higher rate than the untreated outside pane, threatening the IGU seal and/or causing thermal shock fracture.

Many Global window films are safe for IGU applications—ask your Global dealer for details.

Assessing Installation Characteristics

In an effort to help you select the best possible film for your application, your dealer will inspect the characteristics of the entire installation noting items such as improper framing as well as pre-existing imperfections that can increase the risk of glass breakage or IGU seal failure. Here are some of the problematic items your dealer will look for and note on your installation proposal if applicable.

Flaws & Imperfections In Glass

Sometimes tiny chips or cracks may exist at the edges of the glass pane which are often not easily detectable because they can be hidden by the window frame. In these instances, installing even an approved film can lead to possible problems. That's why your dealer will inspect every glass pane thoroughly in order to provide you with the best possible installation proposal.

Tightness Of Glass Framing & Damaged Molding

Glass naturally expands when heated and contracts when cooled. If a glass pane is fitted too tightly in its frame there may not be much room for it to expand. When window film is installed, even window film with an approved installation rating, thermal expansion can become problematic. Glass in an overly tight frame or a frame with damaged or dried out molding, has a higher probability of TSF or IGU seal failure.

Rapid Temperature Changes & Shading

Thermal stress can also be caused by uneven heat absorption on the surface of the glass. This can occur when glass is partially shaded by trees or buildings. Often this shading is enough to cause an extreme difference in glass surface temperatures. Another cause of TSF is a dramatic and rapid change in temperature, such as the kind of changes that often occur from night to day in mountainous areas or in the desert. When glass does not have time to cool or heat slowly, its surface temperature may be uneven, leading to a higher risk of TSF or IGU seal failure.

Environmental Conditions

Even with the best location and proper film selection, it's possible for glass to suffer TSF or IGU seal failure if the immediate environment around the window does not have appropriate air circulation. Heat can become trapped against the glass if there is not enough space between blinds or other window treatments and the pane. If heat becomes trapped, it can lead to excessive thermal absorption increasing the risk of glass breakage or IGU seal failure.

Film-To-Glass Installation Guidance

The best way to minimize the probability of TSF and IGU seal failure is to choose a proper film. To accomplish this, your dealer will do a thorough assessment of the glass and related installation characteristics. Using the film-to-glass installation guidance chart (GWF catalog #4050) your dealer will help you select a professional quality Global window film that's right for your application. The chart displays TSF IGU warranty coverage availability based on one of three numerical ratings which are as follows:

Rating #1 = Automatically Approved

Rating #2 = Written Approval Required*

Rating #3 = Not Available*

The most current version of the film-to-glass installation guidance chart (GWF catalog #4050) may be viewed in the Warranties section at GlobalWindowFilms.com.

*The unavailability of TSF IGU warranty coverage does not certify or indicate that TSF and/or IGU seal failure will occur—it only means Global manufacturer backed TSF IGU warranty coverage is not available.

Glass With Low-E Coating

Insulated glass units with the low-e feature are becoming increasingly popular because they help retain inside room heat. Some film-to-glass installations on glass with the low-e feature may produce an increased risk of TSF and IGU seal failure.

There is a separate rating column on the film-to-glass installation guidance chart that applies to glass with low-e. Adhere to this rating when applying Global window film to glass with the low-e feature.



Installations Larger Than 2,500 Square Feet

Regardless of a film-to-glass installation rating, any job over 2,500 square feet will require a TSF IGU warranty application and written approval to ensure TSF and IGU seal failure warranty coverage.



How To Calculate TSF IGU Warranty Fees

There is a small fee required to obtain TSF IGU warranty coverage for any #2 ratings that received written approval via the application process. Fees for TSF IGU warranty coverage can be calculated using the following schedule:

TSF IGU Warranty Fee Schedule		Warranty Fee Example	
Square Feet Calculation	\$50 Minimum	Job Size - Square Feet	425
1 to 2,500	.14 Per Sq. Ft.	Warranty Cost Per Sq. Ft.	x .14
2,501 to 5,000	.12 Per Sq. Ft.	TSF IGU Warranty Fee	\$59.50
5,001 to 7,500	.10 Per Sq. Ft.		
over 7,500	Quote		

Film-To-Glass Installation Guidance Chart

The most up to date version of the GWF film-to-glass installation guidance chart (GWF catalog #4050) may be viewed in the Warranties section at GlobalWindowFilms.com.

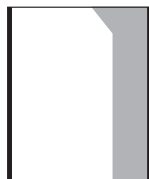
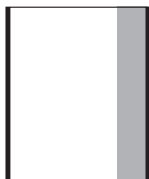
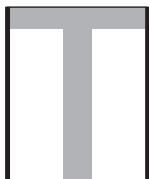
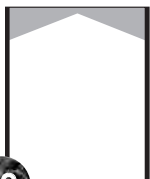


With Global window film installed, you can enjoy your home all day without bothersome glare or discomfort. Global window film also reduces your cooling costs and protects valuable furnishings.

Film-To-Glass Installation Cautions

Regardless of the installation rating displayed on the film-to-glass installation guidance chart, (GWF catalog #4050) TSF IGU warranty coverage is **NOT AVAILABLE** if any of the following conditions exist:

- 1) Any building with a history of glass breakage and/or IGU seal failure;
- 2) Any chipped, cracked, scratched or otherwise damaged glass prior to installation;
- 3) Any IGU with seal failure prior to installation;
- 4) Any IGU greater than 40 square feet;
- 5) Any triple or quadruple pane IGU;
- 6) Any single glass pane totaling more than 60 square feet;
- 7) Any single glass pane with glass edge dimension greater than 10 feet;
- 8) Any single clear glass 3/8 inch or thicker;
- 9) Any single tinted glass 1/4 inch or thicker;
- 10) Any glass where the film is not installed edge to edge;
- 11) Any glass with more than one window film installed on top of another;
- 12) Any glass experiencing up to 25% outside shading, including more than 25% of the glass parameter; (*See harmful shading examples below)
- 13) Any plastic, polycarbonate or non-glass surface;
- 14) **Arched glass is approved**, although any laminated, textured, round, bent, patterned, wired or skylight glass is not;
- 15) Any glass with paint, lettering and/or vinyl graphics;
- 16) Any framing system of concrete or solid aluminum or solid steel;
- 17) Any framing sealants, glazing compound, and/or gaskets that are no longer resilient;
- 18) Any film-to-glass installation guidance chart rating #2 unless written approval has been obtained; (See GWF catalog #4060 – TSF IGU Warranty Application Form)
- 19) Any film-to-glass installation chart rating #3;
- 20) Any film-to-glass installation over 2,500 square feet in size, unless written approval has been obtained. (See GWF catalog #4060 – TSF IGU Warranty Application Form)



**Harmful Shading
Examples Specific
To Item #12*



Invisible and indispensable – that's Global window film. It provides unsurpassed comfort and protection to make every day life a pleasure for you and your family, yet you'll never even know it's there.





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