FILM INSTALLATION GUIDELINES

ARCHITECTURAL EXTERIOR WINDOW FILMS

Note: Reference Installation Guidelines - Definition for detailed explanation of the following calculation table

Primary Stress

	Clear Single Pane			Clear Dual Pane			Clear Triple Pane			Tinted Single Pane			Tinted Dual Pane			Low-E Dual Pane		
	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"
Ultra-Vision																		
ULV EXT 50	6	6	7	6	6	7	8	8	9	6	6	7	6	6	7	8	8	9
Infinity																		
IXT 35	6	6	7	6	6	7	8	8	9	6	6	7	6	6	7	8	8	9
IXT 20	4	4	5	5	5	6	6	6	7	4	4	5	5	5	6	6	6	7
Silver																		
SXT 50	3	3	4	4	4	5	5	5	6	3	3	4	4	4	5	5	5	6
SXT 35	3	3	4	4	4	5	5	5	6	3	3	4	4	4	5	5	5	6
SXT 20	3	3	4	4	4	5	5	5	6	3	3	4	4	4	5	5	5	6

SunTek's Exterior Series of window film products are designed for installation on the exterior surface of annealed, heat strengthened, or tempered glass.
Please refer to "SunTek Window Films/Residential and Commercial Exterior Films Limited Warranty/Glass Breakage and Seal Failure Limited Warranty" for details of the warranty coverage.

Additional Stress

Summer Temperature		**Defective Glass**		**Pane Size**		**Frame Condition**		**Shading**	
109° to 115° (43° C)	1	badly scratched	2	40 to 50 sq ft	1	steel or concrete frame	1	straight shadow	
over 115°	2	chipped edges	NR	51 to 100 sq ft	2	deteriorated rubber gasket	1	"L" shaped shadow	1
				Over 100 sq ft	NR	no rubber gasket	2	"T" or "V" shaped shadow	2
									3
Altitude		**Window Treatment Distance**							
2000 to 5000 ft	1	less than 5 inches (50mm - 150mm)	1						
5000 ft and above	2								

Add: "Primary Stress" _____ + "Additional Stress" _____ = Total Stress Factors for Installation _____

10 or less = any glass | 14 or less = heat strengthened glass | 18 or less = tempered glass | 19 or higher = not recommended (NR)

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Note: Reference Installation Guidelines - Definition for detailed explanation of the following calculation table

Primary Stress

	HP Low-E Dual Pane			Clear Single Pane Laminated			Clear Dual Pane Laminated			Tinted Single Pane Laminated			Tinted Dual Pane Laminated		
	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"	1/8"	1/4"	3/8"
Ultra-Vision															
ULV EXT 50	8	8	9	6	6	7	6	6	7	6	6	7	6	6	7
Infinity															
IXT 35	8	8	9	6	6	7	6	6	7	6	6	7	6	6	7
IXT 20	6	6	7	4	4	5	5	5	6	4	4	5	5	5	6
Silver															
SXT 50	5	5	6	3	3	4	4	4	5	3	3	4	4	4	5
SXT 35	5	5	6	3	3	4	4	4	5	3	3	4	4	4	5
SXT 20	5	5	6	3	3	4	4	4	5	3	3	4	4	4	5

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Please refer to "SunTek Window Films/Residential and Commercial Exterior Films Limited Warranty/Glass Breakage and Seal Failure Limited Warranty" for details of the warranty coverage.

Additional Stress

Summer Temperature		**Defective Glass**		**Pane Size**		**Frame Condition**		**Shading**	
109° to 115° (43° C)	1	badly scratched	2	40 to 50 sq ft	1	steel or concrete frame	1	straight shadow	
over 115°	2	chipped edges	NR	51 to 100 sq ft	2	deteriorated rubber gasket	1	"L" shaped shadow	1
				Over 100 sq ft	NR	no rubber gasket	2	"T" or "V" shaped shadow	2
									3
Altitude		**Window Treatment Distance**							
2000 to 5000 ft	1	less than 5 inches (50mm - 150mm)	1						
5000 ft and above	2								

Add: "Primary Stress" _____ + "Additional Stress" _____ = Total Stress Factors for Installation _____

10 or less = any glass

14 or less = heat strengthened glass

18 or less = tempered glass

19 or higher = not recommended (NR)

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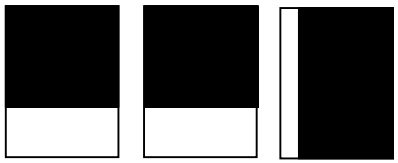
Definitions:

Thermal Stress Fracture – Solar control films help reduce heat gains by absorbing and rejecting solar energy, thus allowing less heat to enter through the glazing unit. Improper selection and use of solar control films can cause extreme thermal expansion and stress to the glazing unit resulting in possible glass breakage and/or seal failure to insulated glass. It is important to know how each film and glazing unit combinations will react when installed. For assistance, SunTek® Window Films has prepared guidelines for safe film to glass installations (refer to Installation Guidelines-Calculations report).

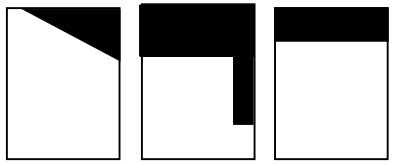
Calculating the Stress Factors – There are two stress factors that must be calculated to help prevent glass breakage and/or seal failure to insulated glass, the **Primary Stress** and **Additional Stress**. First, using the Primary Stress Factors (under the Installation Guidelines-Calculations report) choose the film and size and type of glazing unit that will have film installed. The numbers displayed represent the combination of the film and glazing unit temperature, with the higher the number the greater the absorption. Next, add up all of the **Additional Stress.** These numbers will include variables such as Summer Temperature, Shading, Frame Conditions, Altitude, Pane Size and Window Treatments. For instance, if the condition of the glazing unit in question has a "L" shaped shadow, add 2; if pane size is over 100 square feet, add 2, if glazing unit has chipped edges, add 3; giving a total of 7 for Additional Stress Factors. Finally, add the **Primary Stress** to the **Additional Stress** to get the **Total Stress** for the chosen film applied to the glazing unit. Tempered glazing units always have a symbol, so if there is no symbols in one of the corners then presume glazing unit is annealed. For the examples stated, add 5 (SYDS 50 on 3/8" clear single pane) plus 7 ("L" shaped shadow, pane size over 100 sq ft, and chipped edges) equals a total of 12 for Total Stress Factor. This example shows that the SYDS 50 can be applied to heat strengthen or tempered glazing units.

*There is no warranty on glazing units that are 1/2" thick or thicker, wired glass or triple pane glass.
*Any questions concerning film to glass installation guidelines call the manufacturer toll free at 888-321-5111.

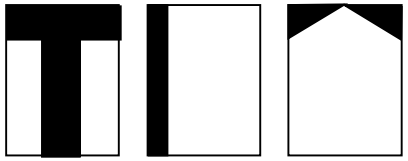
Descriptions of Additional Stress
Summer Temperature is normal summer air temperature.
Window Treatments such as blinds and dark drapes cause more heat to be trapped around the window causing additional stress.
Frame Conditions will affect how much expansion there is to glass. Rigid frames, deteriorated gaskets, direct metal to glass contact, no gaskets or sealant increase additional stress to glazing unit's pane as it swells.
Defective glass is hard to find unless there is visible cracks and chips. Most flaws are hidden inside the pane where the glazing unit has chipped edges. Curved windows are almost always chipped or have ragged edges causing them to be a weaker glazing unit than straight edges.
Altitude high above sea level can cause additional stress because morning sunlight will heat up glazing units faster than normal.
Pane Size becomes larger, additional stress increases.
Shading causes disproportionate heating. This influences certain geographical areas more than others. There are three different types of shading that can be combined together (vertical, horizontal, or diagonal).



"Straight shadow" category



"L shaped shadow" category



"T or V shaped shadow" category

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