

**LG Hausys sign & graphic materials**

**Product Warranty and Installation Bulletin for LC5540  
Calendered Window Decoration Film**

**Product Description**

LC5540 is a 5.1 mil calendered graphic film for windows. It prevents exposure from ultraviolet light, and various embossed patterns & excellent printability provide you beautiful visual effect on your windows.

**Physical Properties**

Outdoor Durability	Up to 3 years with proper printing, lamination, and application	
Application Surface	Flat surfaces	
Tensile Strength	≥ 1.8kg/ cm <sup>2</sup>	ASTM D882
Elongation	≥ 100%	ASTM D882
Peel Adhesion	≥ 1,000g/in	180 Peeling PSTC-1
Application Temp	≥ 10 °C	18 to 25 °C optimum, on clean substrate
Service Temp Range	-45 °C ~ 82 °C	Film applied Al panels 24hrs prior test
Shelf Life	1 year	Free from excessive moisture, direct sunlight

**Areas of use**

Outdoor or Indoor window

**Durability:**

Durability is based on field experience and exposure tests in South Korea. Outdoor durability is 3 years when properly processed and applied (In case of vertical exposure). Indoor durability is 5 years when properly processed and applied (In case of No Direct UV Light).

**Fabrication**

**Application**

No heat is required. It can be used most squeeze. Keep the film flat during application.

In case of Wet method, Make sure that the water is completely squeezed out from between

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the surface and the adhesive. Remained water trapped can cause white spot.

### Cutting and Weeding

Conventional Cut vinyl thickness is around 90~110 $\mu$ m. But the Thickness of LC5540 is around 155 $\mu$ m including adhesive. You should test proper knife pressure and height before cutting the material. Moreover, embossed surface make it hard to cut the vinyl. Always be sure to pre-test the product before You apply the product.

Weeding should be performed within 60 minutes after cutting. If do not so, the cohesive strength of the adhesive builds with time and weeding becomes more hard to do.

The release value of LC5540 is easy level because most of the customer use this product with window application (wide area). Do not confuse the weeding property of this product with cut vinyl. According to your need, partially cut and weed the product.

### Printing

LC5540 can be printed by using solvent-based printing or UV printing. After printing, allow the ink to properly dry at least 24 hours to 48 hours before cutting, or applying the graphic. Most of case, the customer do not use laminating film on printed side of LC5540 because they want the embossed effect of this product. Before printing, Always contact your local ink manufacturer about the durability of the ink. LG Hausys can't guarantee the function of the ink. Also, The UV-printing process may generate high temperatures. It is therefore essential to conduct tests prior to a UV production run.

### Surface Preparation

1. The surface must be cleaned thoroughly before applying the product. Clean the glass surface thoroughly with a neutral cleaning agent which does not contain any wax. Spray the glass surface completely with a soap solution.
2. Clean the surface thoroughly with a glass scraper to remove any dirt. Remove any dirt by rubbing the pane with a rubber squeegee and speed up the drying process in the edges by using a lint-free cloth or paper towels which will not leave any lint or dust behind on the surface.

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3. Spray the pane again until wet.

### Application Temperature and Environment

1. Application must be administered indoors where temperature and humidity can be controlled.
2. The optimal air and application surface temperature for film application is 18 °C ~ 24 °C. If the air and/or application substrate temperature during application is excessively high, the initial adhesion may be too strong and can result in problems where the film may over-stretch, and trapped air may not successfully release.

### Application Techniques

1. LG Hausys recommends to use only material with the same LOT number for the same color. Principally there are two main application techniques: dry and wet application. Wet application should only be done when the outside temperature is above 20°C.
2. Spray the exposed adhesive side with low-surface-detergent and lay it upon the application surface. One of the benefits of wet application is the easy way of precise positioning.
3. Press the Vinyl onto the surface with a felt wiper, make sure that the water is completely removed with a small amount of pressure and that there is no water between the vinyl and the surface.
4. In case of applications across overlapping rubber seals or expansion joints, use knife to separate the vinyl
5. Soak up excess water on the edges with a dry cloth or rag.
6. Hold up the graphic on one side first and remove only half of the release paper. Then, place the graphic on the substrate and stretch it over the areas to be covered. Repeat above installation procedures for remaining portion of graphic.
7. Apply film using a felt-tip squeegee. For application on curved areas, soften the film before application by using a heat gun to heat up the surrounding areas of curvature and the film to the temperature of approximately 80°C. Continuous use of the heat gun in the same spot may cause damage to the film; therefore, position of heating must be constantly changed.
8. When application is completed, cut off the edges after film has sufficiently cooled down. If the film is cut along the edges of the vehicle, the cut edges may become loosened or the film can shrink when washing the surface afterwards. Therefore, the edges must be cut with some reserves left and tucked inside.
9. If air bubbles remain after application, use an air release tool to remove only the large bubbles, as smaller bubbles disappear within several days when exposed to sunlight.
10. The above instructions must be complied with to reduce the possibility of application failure or film

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memory problems.

### Removal

1. To remove film after use, temperature of both air and surface must be above 10°C. Removal at lower temperatures may be more difficult as the film can become brittle and/or leave adhesive residue traces.
2. Using a heat gun, etc., heat up the part of film to be removed to a temperature of approximately 70°C. Lift up the edges of the film and remove it, maintaining a 90° angle between the film and vinyl surface.
3. Application of film to a surface where the coating has not been sufficiently hardened may cause damage to the surface. If vinyl applied in Unsound painted area or Repainted surface, it can damage the painted surface.
4. Residue remaining after removal of film can be cleaned by using solvent or a designated remover. Always test the chemical compatibility first.
5. Defects will only be recognized as a defect only on products sold as “removable” and then, when the residue remaining is more than 30%. This warranty will only apply to LG Hausys’s recommended removal methods. LG Hausys should be notified of warranty claims no later than seven (7) business days after the attempted removal.

### Not to do list

1. Don't apply on the PC (polycarbonate) surface. The adhesive reacts with PC then emit gas called Bisphenol-A. This phenomena make the bubbles, and the vinyl is unusable.  
Additionally the shrinkage rate of PC is more than PVC film which results in deformation Of PVC Vinyl.
2. When applying on Wood Products  
: Wood absorbs moisture. it must have a thick, smooth coating of high-quality on both sides and all edges. General Wood surface (not treated with coating) can not cover moisture then drop down the adhesion level.  
This cause Edge lifting & Adhesion Failure.

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< Bubble from Polycarbonate >



< Wood surface Failure >

### Limitation on the Warranty

This warranty does not cover damage caused by (a) failure to follow LG Hausys's recommendations or product data bulletins (available at [www.lghausys.com](http://www.lghausys.com)) and/or (b) manufacturing, installation or removal by untrained or unqualified manufacturers, installers or technicians and/or (c) misuse, abuse, accident, vandalism, neglect or mishandling by end user or any other person and/or (d) act of god, such as earthquake, fire, flood and/or (e) war, government action and any other situation that is beyond LG Hausys's control.

This warranty does not cover damage caused by (a) failure to follow LG Hausys's recommendations, (b) mishandling by the end user, or natural disaster.

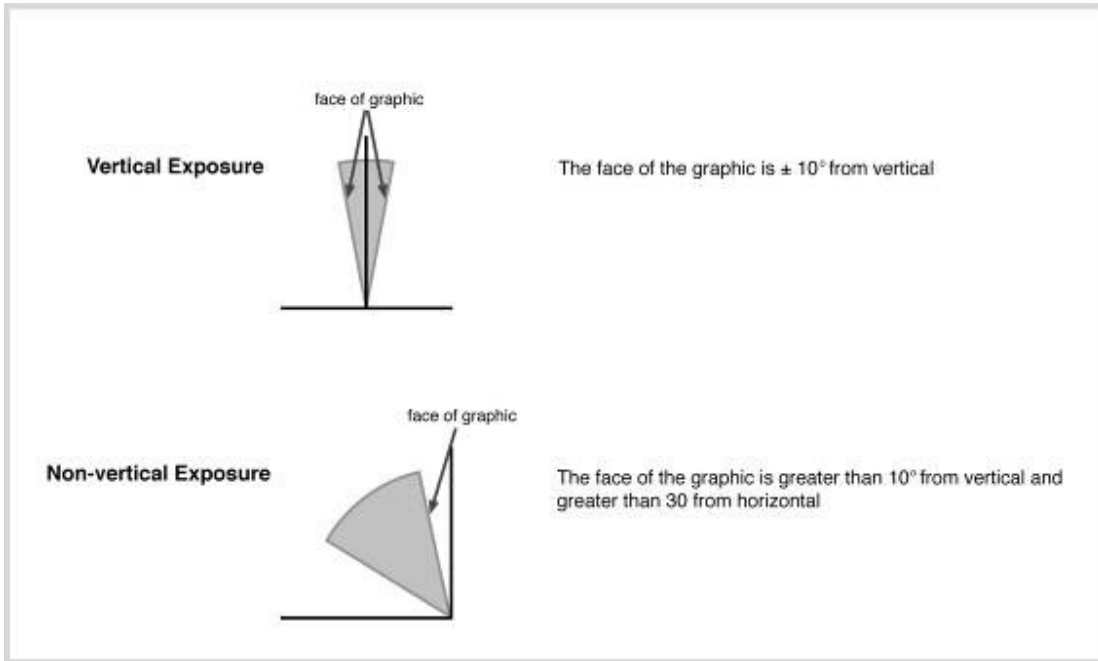
### Warranty of durability

The non vertical reduction of 20% is calculated first (Refer to the "Vertical/ Non-Vertical Exposure Conditions" below), then appropriate reduction of certain rate of reduction (Refer to the Table A.) according to the Area where the products are used (Refer to the Table B. below).

#### - Vertical/ Non-vertical Exposure Conditions :

The Durability of Non-vertical Exposure application will be 20% less than published durability in the product Bulletin.

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\* If the face of the graphic is less than  $30^\circ$  from horizontal, We generally do not guarantee the durability in any condition. Also, We doesn't guarantee the durability of solvents' ink.

■ **Table A :**

■ Warranty & Compensation Table ( N = durability of the film, W-O-M )						
	Area	A1		A2		A3
Warranty	P.O.U	N Years		0.8N Years		0.6N Years
Compensation Rate (%)	Up to 5yr	100(1-4/N)%				
	Up to 4yr	100(1-3/N)%	4	100(1-3.75N)%		
	Up to 3yr	100(1-2/N)%	3	100(1-2.5N)%	3	100(1-3.3N)%
	Up to 2yr	100(1-1/N)%	2	100(1-1.25N)%	2	100(1-1.65N)%
	Up to 1yr	100%	1	100%	1	100%

\* P.O.U (Period of use) \* compensation is only confined to Durability

\* If the logic shows (-) value, it indicates no compensation for application.

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■ Table B :

Area	Countries
Area 1	Austria, Belarus, Belgium, Bosnia & Herzegovina, Canada, Denmark, Ecuador Estonia, Finland, France, Georgia, Germany, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Sweden, Switzerland, Ukraine, United Kingdom, United States of America(Except desert areas), Uzbekistan, Vatican City
Area 2	Albania, Algeria, Angola, Argentina, Armenia, Australia, Azerbaijan, Bangladesh, Brazil, Central African Rep., Chile, China, Colombia, Congo, Costa Rica, Cyprus, ,Dominica, Dominican Republic, El Salvador, Gabon, Gambia, Greece, Guatemala, Haiti, Honduras, India, Indonesia, Ivory Coast, Jamaica, Japan, Kazakhstan, Kenya, Korea (South), Kyrgyzstan, Liberia, Malaysia, Maldives, Mali, Malta, Mozambique, Myanmar(Birma), Namibia, Nepal, New Zealand, Nicaragua, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Senegal, Singapore, South Africa, Spain, Sri Lanka, Suriname, Taiwan, Tanzania, Thailand, Togo, Trinidad & Tobago, Turkey, Turkmenistan, Uganda, Ukraine, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe
Area 3	Exposed at all sites above altitudes of 1,000 meters; Australia above line Perth/Brisbane, Bahrain, Chad, Egypt, Ethiopia, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates, Yemen

### Remedies and Limitation of Liability

For any product that does not meet the above warranty conditions, upon timely notification, LG Hausys's sole responsibility shall be, at LG Hausys's sole discretion, that LG Hausys will (a) refund the full purchase price of all LG Hausys materials used to produce the graphic, or (b) replace all LG Hausys materials consumed in the manufacture of the graphics.

The replacement graphic or materials will carry only the remaining term of the original graphic or material's warranty period.

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EXCEPT AS SPECIFICALLY STATED IN THIS WARRANTY, LG HAUSYS SHALL NOT BE LIABLE FOR ANY OTHER COST, LOSS OR LIABILITY IN ANY WAY RELATED TO THE PERFORMANCE, USE OR INABILITY TO USE ANY OF THE PRODUCTS. LG HAUSYS SHALL NOT BE LIABLE FOR ANY DIRECT OR INDIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT, REVENUE OR LOSS OF BUSINESS CHANCE RESULTING FROM THE PRODUCT OR SERVICE OF LG HAUSYS.

### **Claim Procedure**

End users may contact the distributor or graphic manufacturer who may submit a claim on your behalf. Distributors or Graphic manufacturers are required to submit claims by filing such on-line at [www.lghausys.com](http://www.lghausys.com), describing the claim in detail. If you do not have internet access, call our regional Office.