

LG Hausys sign & graphic materials

**Product Warranty and Installation Bulletin for LD393TG,
Calendered Print Vinyl with AiRFREE™ Technology**

Product Description

LD393TG is a 3.2 mil calendered print vinyl supplied with repositionable pressure sensitive adhesive. It's designed for solvent-based inkjet printing and guarantees up to 5-years of outdoor durability. The product includes an air egress technology for easy installations with grey, solvent-based adhesive.

Physical Properties

Outdoor Durability	Up to 5 years with proper printing, lamination, and application	
Application Surface	Smooth, flat and simple curved surfaces*	
	* refer to Picture 1 on page 3	
Tensile Strength	≥ 1.8kg/ cm ²	ASTM 882
Elongation	≥ 100%	ASTM 882
Peel Adhesion	≥ 1,400g/in	180 Peeling PSTC-1
Opacity	Tt ≤ 10	Haze Meter (Tt: Transmission)
Gloss product	60 ↑	@ 60°, in machine direction
Matte product	10 ↓	@ 60°, in machine direction
Shelf Life	1 year	Free from excessive moisture, direct sunlight

Fabrication and Printing

Printing, Drying and Laminate

Use solvent-based printing for optimal print quality. Recommended printer settings and ICC profiles are available for download at www.lghausys.com. After printing, allow the ink to properly dry at least 24 hours to 48 hours before laminating, cutting, or applying the graphic. Digital image with Saturated color (like Black, Brown etc) need to have enough time to drying before laminating.

In this case, Full drying is needed for solvents in the ink have a chance to evaporate. This process is absolutely needed which can prevent shrinkage & tunneling problems after application. Laminate with LG Hausys laminating film (ex. LP3912) to prevent vinyl and/or print damage from scratches, smoke, fumes, etc.

Warranty will be applied to Finished graphic appearance defects such as excessive fading, discoloration

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(including that due to mildewing or wicking on flexible substrates), peeling, gloss changes, excessive dimensional change or loss of adhesion that makes the graphic virtually unsuitable for its intended purpose.

Surface Preparation

1. Surface must be completely cleaned 1 day prior to product application.

Thoroughly clean vehicle by using neutral detergent with no wax content. Automatic washing is not recommended as it may prevent good film adhesion. If the surface of the vehicle has been painted, wait at least 3 weeks for paint to dry before applying the film.

2. After cleaning, completely dry off the vehicle surface to remove all moisture. To speed up drying, use lint-free cloth or paper towels that leave the surface lint and dust-free.

3. After drying, check for any remaining wax, polish, or grease residue on the surface and corner areas of the vehicle. In particular, check whether any road tar or insect remains have been completely removed. If the vehicle has not been thoroughly cleaned, use a solvent cleaner to remove road tar. Always test vehicle finish for solvent, cleaner, or chemical compatibility first. After using a solvent cleaner, vehicle surface must again be completely dried before product application.

Application Temperature and Environment

1. Application must be administered indoors where temperature and humidity can be controlled.

2. The optimal air and vehicle surface temperature for film application is 65°F ~ 75°F. If the air and vehicle surface is lower than the recommended temperature, sufficient stretching may not be obtained and the initial adhesion of film may not be strong enough to last permanently because of the rapid drop of the film temperature. If the air and/or vehicle surface 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.

3. In order to achieve sufficient bond between the film and vehicle, the vehicle must not be exposed to cold or wet climate for 24 hours after film application.

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4. The above instructions must be complied with to prevent the film from developing shrinkage or film memory problems.

Application Techniques

1. Secure film to the required position by using masking tape. Make sure to position the film with at least 2-inches from the edges of the area for application.

2. Hold up the graphic on one side first and remove only half of the release paper. Then, place the graphic on the vehicle surface and stretch it over the areas to be covered. Repeat above installation procedures for remaining portion of graphic.

3. Apply film using a felt-tip squeegee. For application on slightly 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 176°F (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.

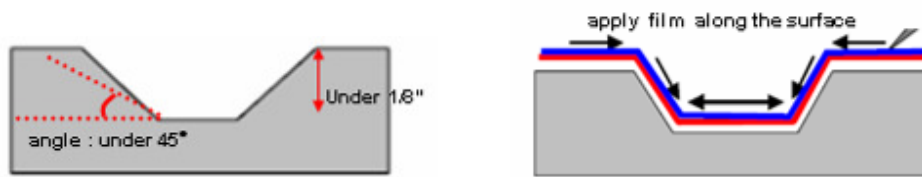
4. When application is completed, cut off the edges after film has sufficiently cooled down. If the film is cut along the edges of the vehicle, the cut edges may become loosened or the film can shrink when washing the vehicle afterwards. Therefore, the edges must be cut with some reserves left and tucked inside.

5. For areas with severe curvatures, sufficiently stretch and soften the film with a heat gun before application. The application surface should be simply curved (depth & Angle limitation, Picture 1). On areas with protrusions and indentations, apply film along the surface without stretching or forcing into position. Finish up the corner areas by pressing down on the film using the round tip of a squeegee.

Picture 1) angle & depth limitation

Picture 2) application method

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6. 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.

7. The above instructions must be complied with to reduce the possibility of application failure or film memory problems.

After Application

1. Wait three days after graphics application to wash vehicle. Wait three weeks after application before polishing or waxing vehicle.
2. When washing the vehicle, do not use high-pressure cleaners or corrosive chemicals.

Removal

1. To remove film after use, temperature of both air and vehicle surface must be above 50°F. 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 158°F (70°C). Lift up the edges of the film and remove it, maintaining a 90° angle between the film and vehicle 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

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test vehicle finish for solvent, cleaner, or 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.



< Bubble from Polycarbonate>



< Wood surface Failure>

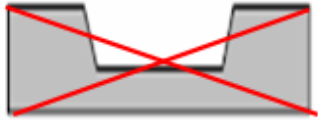
3. LSE Surface

: Adhesion to plastics such as ABS, PP or rubber is always difficult. Do not decorate surfaces of this kind if you require long-life decoration. Use LD3870 for this application.

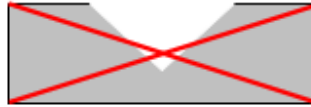
4. Deep drawing, curvature application

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: Drawing angle is more than 45°C & Drawing Depth should be under 1/8",
If this is not the case, Vinyl can be lifted from surface after application.



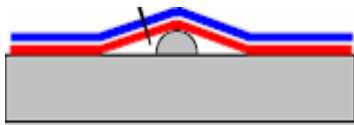
< Failure of deep drawing >



< Failure of V drawing >

5. Rivet application

: Do not apply on the Rivet side. Film must be stretched then it can be damaged by outside impact.



< detachment from rivet >



< Failure of Rivet >

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) 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.

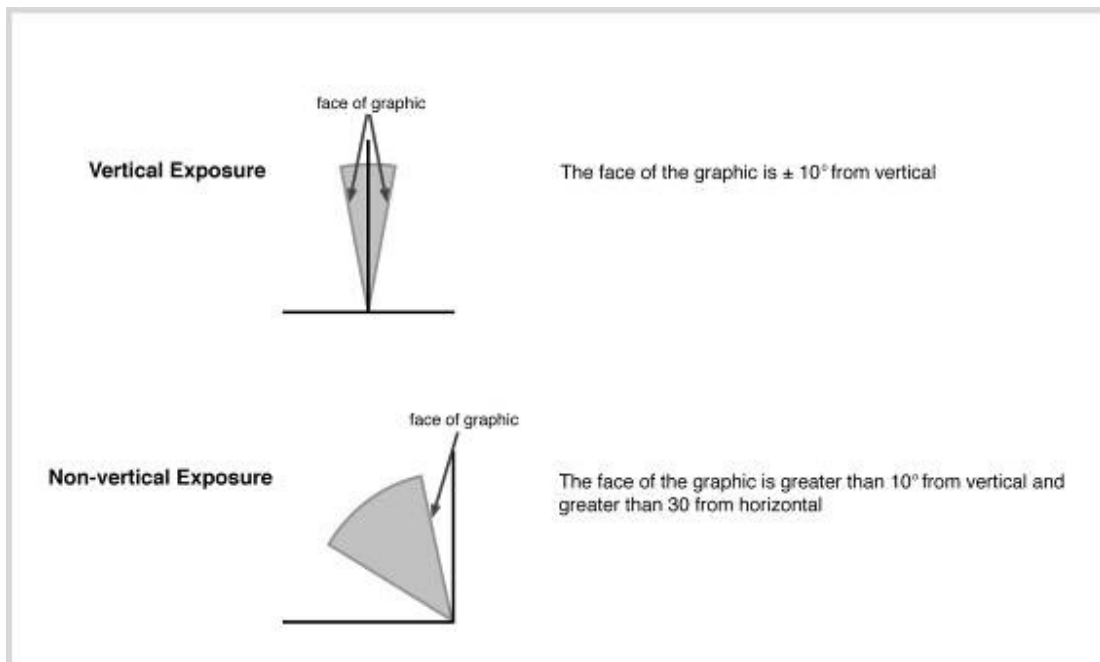
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Warranty of durability

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.



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

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■ **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.

■ **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

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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.

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, describing the claim in detail. If you do not have internet access, call our regional Office.