

# PRODUCT DATA BULLETIN

**Avery Dennison® Integrated Digital Printing Materials Package: LD-1500 & LP-0500  
For License Plate Applications  
Dated: 7/03/03**

**Description:**

Avery Dennison® L-Series integrated digital printing materials package consists of a premium quality enclosed lens retroreflective material and a UV stabilized cast vinyl overlay. This integrated material package is designed specifically for the production of convertor printed flat license plates.

The reflective portion of the materials package is suitable for digital thermal transfer printing.\*\*

The overlay provides UV and abrasion resistance and has a pressure sensitive adhesive for lamination to the printed reflective sheeting.

\*\* requires the use of an Avery certified thermal transfer ribbons

**Construction:**

<b>BASE MATERIAL</b>	LD-1500
Face Film:	High gloss retroreflective polymer
Adhesive	Permanent acrylic pressure sensitive
Liner:	Two side polyethylene coated paper
<b>PROTECTIVE OVERLAY</b>	LP-0500
Face Film:	High gloss optically clear cast vinyl
Adhesive:	Permanent acrylic pressure sensitive
Liner:	Two side polyethylene coated paper

**Physical Properties:**

The following information on physical and chemical characteristics is based upon tests believed to be reliable. The values are intended only as a source of information. They are given without guarantee and do not constitute a warranty. The purchaser should independently determine, prior to use, the suitability of this material for his/her specific purpose. (Data represents averages and is not intended for use as a specification).

<b>Outdoor Durability</b>	5 years when properly processed and applied (vertical exposure, unprinted or Avery supplied preprinted sheeting).
<b>Minimum Surface/Ambient Air Application Temperature</b>	50°F (5°C) when applied with a squeeze roll applicator
<b>Application Surface</b>	Flat, aluminum
<b>Service Temperature Range</b>	-40°F to 180°F (-40°C to 82°C)
<b>Custom Converting</b>	Avery Dennison does not warranty any printing or converting operations applied to the sheeting without a prior written agreement from Avery Dennison. Always check with your Sales representative
<b>Optical Properties</b>	Meets LS-300C Table IV, Ref. 3 (Class 1)



<b>Minimum Adhesion Values</b>	<b>180° Peel</b>
	<b>Substrate</b> <span style="float: right;"><b>15 min</b></span>
	<b>Anodized Aluminum</b> <span style="float: right;">2.5 lb./in (438 N/m)</span>
	NOTE: Tested per ASTM D1000. Always pre-test your specific substrate prior to actual application.
<b>Shelf Life</b>	One year when stored at the following temperatures and humidity conditions 68°-77° F (20° - 25° C) and 50±5% R. H.
<b>Dimensional Stability</b>	Less than 0.03 inches (0.8 mm) shrinkage after 1000 hours Atlas Twin Carbon Arc Weatherometer

**Photometric Performance:**

<b>Color</b>	<b>Minimum Reflectivity Level*</b>
White	50

\*CPL at 0.2° observation angle and -4° entrance angle

**Colors & Specification Limits (Daytime):**

Color	1		2		3		4		Luminance (Y%)	
	x	y	x	y	x	y	x	y	Min	Max
White	0.305	0.315	0.335	0.345	0.325	0.355	0.295	0.325	35	--

*The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 Standard Colorimetric System measured with Standard Illuminant D65 (geometry 45/0°).*

**Solvent Resistance:**

When properly processed and applied, the film is resistant to most common solvents. When tested according to LS-300C, Section 3.6.2, immersion in the following solvents for the specified length of time the film shows no deterioration:

Solvent	Time	Solvent	Time
Kerosene	10 minutes	Xylene	1 minute
Turpentine	10 minutes	Methyl Alcohol	1 minute
Toluene	1 minute		

**Approved Thermal Transfer Ribbon:**

Ink Supplier*	Ink Series	Ink System
Iimak	DC305	Thermal transfer

**Converting Information:**

1. The face of LD-1500 is designed for thermal transfer printing of graphics and indicia prior to lamination with LP-0500.
2. Laminating configurations differ. Always pre-test Avery LD-1500 Series with your specific system prior to application, or contact your Sales representative for assistance.
3. Remove liner from LP-0500 and laminate to printed LD-1500. Tension & pressure during lamination should be adequate to produce a solid bond with LP-0500.
4. After lamination, construction should be stored for a minimum of 48 hours (minimum temperature 60°F/ 16°C) to ensure a proper bond build-up, prior to embossing.

**Additional Information:**

<b>Watermark/Security Mark:</b>	L-Series license plate sheeting can be manufactured with with Avery SecureMark™ for security purposes.
<b>Converting Information:</b>	<ul style="list-style-type: none"> <li>• For best results, aluminum substrate should be heated prior to lamination to 70-90°F (21-32° C)</li> <li>• Tension on the sheeting during the lamination process needs to be kept at a minimum to avoid overstretching the material. The sheeting will not perform properly when the stretch exceeds 3%.</li> <li>• After lamination, allow a minimum of a 24 hour dwell at 50°F (10°C) before embossing.</li> <li>• Embossing configurations differ, Pre-test Avery L-Series with your specific system prior to full production.</li> <li>• Maximum embossing depth of L-Series is 0.085” (2.1mm)</li> </ul>

- Allow license plates to cool to room temperature prior to stacking and packaging the plates

*warranty. All Avery Dennison products are sold with the understanding that Purchaser has independently determined the suitability of such products for its purposes. Avery Dennison products are warranted to be free from defects in material and workmanship for either one year (or the period stated on the specific product information literature in effect at time of delivery, if longer) from date of shipment if said product is properly stored and applied. It is expressly agreed and understood that Avery Dennison's sole obligation and Purchaser's exclusive remedy under this warranty, under any other warranty, express or implied, or otherwise, shall be limited to repair or replacement of defective product without charge at Avery Dennison's plant or at the location of product (at Avery Dennison's election), or in the event replacement or repairs is not commercially practical, to Avery Dennison's issuing Purchaser a credit reasonable in light of the defect in the product.*

*Avery Dennison's liability for defective products shall not exceed the purchase price paid therefore by Purchaser and in no event shall Avery Dennison be responsible for any incidental or consequential damages whether foreseeable or not, caused by defects in such product, whether such damage occurs or is discovered before or after replacement or credit, and whether or not such damage is caused by Avery Dennison's negligence.*

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