

# Avery Dennison® HV1200 High Visibility Series

## Permanent Staflat™

(formerly: A7, NV1300 series StaFlat™)

Revision: 7 Dated: 11/15/13

### Uses:

Avery Dennison™ HV1200 Reflective high performance vinyl films are premium quality, enclosed lens, retro-reflective films which meet or exceed the applicable requirements ASTM® D-4956 for reflectivity. Specifically designed for screen printing as well as use on computer sign cutting equipment, Avery Dennison™ HV 1200 Reflective films provide excellent cutting, weeding, transferring, and conforming characteristics.



**Face:** 4.5 mil (112 microns) high gloss cast film (+/-10%)



**Adhesive:** Permanent Clear Acrylic



**Liner:** 90# StaFlat™



**Durability:** Up to 7 years Vertical exposure ONLY

**Application Surfaces:**

Flat, Simple Curves, Flat with Rivets, Rivets & Corrugations.

### Features:

- Long-Term durability and outdoor performance
- Dimensionally stable liner for easy converting
- High gloss finish
- Excellent conversion on CAD plotters
- Screen Printable
- Easy cutting & weeding
- Good dimensional stability
- Good UV, temperature, humidity, and salt-spray resistance
- Meets ASTM® D4956, Type I (see approved colors below)

### Conversion:

- Thermal Die-Cutting
- Flat Bed Sign-Cut
- Drum Roller Sign-Cut
- Steel Rule Die-Cutting
- Thermal Transfer
- Screen Printing

### Common Applications: (vertical only)

- Fleet
- Vehicle
- Marine/ Watercraft
- Railroad Cars
- Bus Graphics
- Indoor Signage
- Outdoor Signage
- Striping

Use of liquid clear coats (UV, solvent) or protective laminates may extend the performance of reflective films in non-vertical applications, but does not change the warranty of the product.

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### Physical Characteristics:

Property	Value
Caliper, face	4.5 mil (112 microns)
Caliper, adhesive	1.3 mil (32 µm)
Dimensional stability	Less than 0.03 in. (0.76 mm) shrinkage. (1000 hours Atlas Twin Arc Weatherometer, EH)
Tensile at Yield	4.0 -8.0 lb/in (0.7 – 1.5 kg/cm)
Elongation	70% min.
Gloss	90% ± 10
Adhesion:	
15 min.	3.0 lbs/in (525 N/m)
24 hr.	3.5 lbs/in (770 N/m)
Flammability	Self Extinguishing
Shelf-Life	2 years from date on label (up to 2 years unprocessed, OR process within one year and apply within 1 year of processing)
Durability	Vertical Exposure Only
	Up to 7 years (Some color fade may occur in severe environmental areas. Reference IB #1.30 for durability guidelines.
Min. Application Temperature	50° F (10° C) for flat surfaces 55° F (13° C) for flat with rivets, rivets, corrugations, curved surfaces.
Service Temperature	-40° to +180° F (-40° to +82° C) (Reasonable range of temperatures which would be expected under normal environmental conditions, with intermittent exposure to temps over 150° F (65° C))
Chemical resistance	Resistant to most mild acids, alkalis, and salt solutions.

#### Important:

Information on physical and chemical characteristics are based on tests believed to be reliable. The values are intended only as a source of information. This information is given without guaranty and do not constitute a warranty. The purchaser should independently determine, prior to use, the suitability of any material for their specific purpose. (Data represents average values where applicable, and is not intended for specification purposes)

#### Warranty:

All statements, technical information and recommendations about Avery Dennison products are based upon tests believed to be reliable but do not constitute a guarantee or 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 *two years* (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.

NO EXPRESS WARRANTIES AND NO IMPLIED WARRANTIES, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE, OR OTHERWISE (EXCEPT AS TO TITLE), OTHER THAN THOSE EXPRESSLY SET FORTH ABOVE WHICH ARE MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, SHALL APPLY TO PRODUCTS SOLD BY AVERY DENNISON. AVERY DENNISON SPECIFICALLY DISCLAIMS AND EXCLUDES ALL OTHER SUCH WARRANTIES. NO WAIVER, ALTERATION, ADDITION OR MODIFICATION OF THE FOREGOING CONDITIONS SHALL BE VALID UNLESS MADE IN WRITING AND MANUALLY SIGNED BY AN OFFICER OF AVERY DENNISON.

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### Limitation of End Uses:

Certain applications are not recommended or warranted by Avery Dennison®. Unsuitable applications or exposure conditions include:

- Stainless Steel
- Wood (painted or unpainted)
- Urethane substrates
- Walls
- Compound curves
- Flexible substrates
- Low surface energy substrates (i.e. Tedlar® coatings)
- Unclean or textured surfaces
- Wet method of application not recommended on HV Reflective Series reflective films. Use of wet method of application invalidates standard warranty on this product
- Graphics for automotive OEM applications
- Continual exposure to temperatures greater than 150° F (65° C)
- Non-Vertical applications (durability is for vertical exposure ONLY, defined as ±10° from vertical)
- Material may tent when applied over rivets.

### Colors: Cross Reference

REFLECTIVE A7 SERIES - PERM 90#	AVERY DENNISON® 1200 HIGH VISIBILITY PERMANENT STAFLAT™	REFLECTIVE A7 SERIES - PERM 90#	AVERY DENNISON® 1200 HIGH VISIBILITY PERMANENT STAFLAT™
A7801-R/NV1300 White	HV 1200-101-R White	A7818-R/NV1308 Dark Red	HV 1200-450-R Dark Red Δ
A7805-R/ NV1306 Black	HV 1200-190-R Black Δ	A7819-R Burgundy	HV 1200-470-R Burgundy Δ
A7806-R Brown	HV 1200-995-R Brown Δ	A7820-R Light Blue	HV 1200-640-R Light Blue Δ
A7807-R/NV1303 Gold	HV 1200-215-R Gold Δ	A7821-R Olympic Blue	HV 1200-630-R Olympic Blue Δ
A7810-R/NV1313 New Gold	HV 1200-212-R New Gold Δ	A7822-R Blue	HV 1200-688-R Blue
A7812-R/NV1301 Yellow	HV 1200-235-R Yellow	A7823-R Purple	HV 1200-565-R Purple Δ
A7815-R/NV1304 Orange	HV 1200-360-R Orange	A7824-R Green	HV 1200-778-R Green
A7816-R Red	HV 1200-440-R Red	A7825-R Kelly Green	HV 1200-770-R Kelly Green Δ
A7817-R Tomato Red	HV 1200-425-R Tomato Red Δ		

Δ - colors not used by government institutions, do not have ASTM® reflectivity minimums.

### Typical Coefficient of Retro-Reflectivity:

White *	100	Brown *	18
Gold	80		
Orange *	25	Tomato Red	10
Blue *	6	Olympic Blue	37
Red*	15	Purple	10
Black	16	Kelly Green	34
Green *	19	Light Blue	13
Dark Red	12	Yellow *	70
New Gold	75	Burgundy	4

COMMENTS: (based on averages of production runs, NOT for specification purposes)

(Tested per ASTM® E810 at -4° EA/0.2° OA)

- \* These products meet the requirements for color and reflectivity of ASTM® D4956, Type I; The coefficient of retroreflection as defined is measured at a -4° entrance angle, and a 0.2° observation angle. It is expressed in candlepower per foot-candle per square foot (candela/lux/square meter).

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- The entrance angle is formed by a beam of light striking the surface at a point and a line drawn perpendicular to the surface of that point.
- The observation angle is formed by the beam of light bouncing off the reflective surface and returning to the viewer. From 800 feet (249 m) an observer usually views the material at a 0.2° angle.
- All other colors are tested per ASTM® E810 methods, but are not approved colors under ASTM® D4956.

### NFPA® 1901: Standard for Automotive Fire Apparatus 2009 Edition)

Based on section 15.9.3.3 of the NFPA® Standard 1901, retro-reflective films required by sections 15.9.3.1 and 15.9.3.2 shall meet the minimum reflectivity requirements of ASTM® D4956, Type I. If a color is not listed in the ASTM® D4956 standard, then reflectivity must have a minimum value of 10, when measured at an observation angle of 0.2 and an entrance angle of -4°.

Colors meeting the NFPA® Standard 1901 Section 15.9.3.1 (Front & Sides)

REFLECTIVE A7 SERIES - PERM 90#	AVERY DENNISON® 1200 HIGH VISIBILITY PERMANENT STAFLAT™	REFLECTIVE A7 SERIES - PERM 90#	AVERY DENNISON® 1200 HIGH VISIBILITY PERMANENT STAFLAT™
A7801-R/NV1300 White	HV 1200-101-R White	A7818-R/NV1308 Dark Red	HV 1200-450-R Dark Red Δ
A7805-R/ NV1306 Black	HV 1200-190-R Black Δ	A7820-R Light Blue	HV 1200-640-R Light Blue Δ
A7806-R Brown	HV 1200-995-R Brown Δ	A7821-R Olympic Blue	HV 1200-630-R Olympic Blue Δ
A7807-R/NV1303 Gold	HV 1200-215-R Gold Δ	A7823-R Purple	HV 1200-565-R Purple Δ
A7810-R/NV1313 New Gold	HV 1200-212-R New Gold Δ	A7824-R Green	HV 1200-778-R Green
A7812-R/NV1301 Yellow	HV 1200-235-R Yellow	A7825-R Kelly Green	HV 1200-770-R Kelly Green Δ
A7815-R/NV1304 Orange	HV 1200-360-R Orange		
A7816-R Red	HV 1200-440-R Red		
A7817-R Tomato Red	HV 1200-425-R Tomato Red Δ		

Colors meeting the NFPA® Standard 1901 Section 15.9.3.2 (Chevrons)

REFLECTIVE A7 SERIES - PERM 90#	AVERY DENNISON® 1200 HIGH VISIBILITY PERMANENT STAFLAT™	REFLECTIVE A7 SERIES - PERM 90#	AVERY DENNISON® 1200 HIGH VISIBILITY PERMANENT STAFLAT™
A7812-R/NV1301 Yellow	HV 1200-235-R Yellow	A7818-R/NV1308 Dark Red	HV 1200-450-R Dark Red Δ
A7816-R Red	HV 1200-440-R Red		

### Defects Coverage:

- **Manufacturing & Workmanship Defects.** A failure of the Product to materially conform to the written specifications for the Product as described in the applicable Avery Dennison™ Product Data Sheet.
- **Printing and Ink Defects.** Artifacts or misprints that occur when printing on specified Avery Dennison™ Product using ICS Qualified Processing Materials, due solely to a defect in the Product in manufacturing or workmanship.

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- **Cutting Defects.** A failure of clean cutting and weeding characteristics when cut as recommended in the applicable Avery Dennison™ Product Data Sheet and Instructional Bulletins, due solely to a defect in the Product in manufacturing or workmanship.
- **Finished Graphic Appearance Defects.** Defects, not including those attributed to the ink, such as excessive fading, discoloration, cracking, crazing, blistering, gloss changes, excessive dimensional change or loss of adhesion or reflectivity (for retro-reflective films) that makes the graphic visually unsuitable for its intended purpose when viewed with the intended lighting, angle and distance for such a graphic, as determined by customary industry standards.

### Warranty Limitations:

This product is covered under the Avery ICS Warranty Program for fleet applications. Certification may be required. Please contact your Avery Dennison™ sales representative for details. The Product must be properly stored and applied within the shelf-life as stated in the applicable Avery Dennison™ Product Data Sheet. All ICS Qualified Processing Materials must be properly stored and applied in accordance with OEM instructions.

- **Unintended Use.** This warranty only applies to Product that is used by professional converters for the defined end uses and in the combinations described in the applicable Avery Dennison™ Product Data Sheets, Instructional Bulletins and ICS Performance Guarantee Durability Bulletin. For any other use, the user is responsible for determining the suitability of the Product, and for any and all risk or liability associated with that use or application, and the user agrees to indemnify, defend and hold harmless Avery Dennison™ for any claims, losses, damages, judgments, expenses and/or expenses, including attorneys fees, resulting from such use or application. This warranty is expressly conditioned on the Product being processed by professional converters using only ICS Qualified Processing Materials in accordance with the OEM and Avery Dennison™ recommended written processing instructions, and being applied to properly prepared surfaces and cleaned and maintained in accordance with recommended OEM and Avery Dennison™ procedures. It is the converters or other users responsibility to perform incoming raw material quality inspections, to assure proper surface preparation and that approved application procedures are followed, to retain converted samples, and to immediately cease using and notify Avery Dennison™ and/or its authorized agent or distributor of any Product, ICS Qualified Processing Materials and/or finished graphic discovered to be (or reasonably capable of being discovered to be) defective.
- **Misuse and Force Majeure.** Avery Dennison™ has no obligations or liability under this warranty with respect to Product that has been altered, modified, damaged, misused, abused, subject to accident, neglected or otherwise mishandled or improperly processed. Product is not warranted against premature failure caused by chemical, environmental or mechanical means such as, but not limited to, vandalism, cleaning solutions, paints, solvents, moisture, temperature, mechanical washing equipment, engine fuel spills, engine exhaust, steam, organic solvents or other spilled chemicals. Damage from fire, structural failure, lightning, and other force majeure events are not covered by this warranty.
- **Weathering Effects.** Some degradation of materials and graphics over time is considered normal wear. Slight color fading, chalking, edge lifting, "tenting" around rivets, or slight or gradual reduction in gloss (for cast and calendered films) or reflectivity (for retro-reflective films), and other natural weathering, environmental or other conditions or damage caused by tornadoes, hurricanes, wind or other acts of God, do not constitute a breach of warranty.
- **Printing, Curing and Ink Defects.** Ink contaminations, failures or other defects, or other failures due to improper printing conditions or settings including, but not limited to, unsuitable color calibration, incorrect ICC color profile or incompatible printing, do not constitute a breach of warranty. Product failure caused by ink over-saturation, excessive or under curing, or other treatment or processing errors are not warranted.
- **Adhesion to Application Surfaces.** This warranty does not cover the Product if the application surface is not properly prepared; nor does the warranty cover the Product or damage to the substrate because the layers of the substrate separate due to a lower bond between those layers than the bond between the Product and the top layer of the substrate, or surfaces which subsequently crack, peel, outgas, or become damaged beneath the Product.
- **Glass Breakage.** This warranty does not cover glass breakage. Glass is prone to break under the stresses caused by temperature changes across the surface, which could be amplified by the application of vinyl film.

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### Definitions:

- **“Adhesion”** (FTM-1, FINAT) is measured by peeling a specimen at a 180° angle from a stainless steel panel, 24 hours after the specimen has been applied under standardized conditions. Initial adhesion is measured 15 minutes after application of the specimen.
- **“Flammability”** A specimen applied to aluminum is subjected to the flame of a gas burner for 15 seconds. The film should stop burning within 15 seconds after removal from the flame.
- **“Temperature range”** A specimen applied to stainless steel is exposed at high and low temperatures and brought back to room temperature. 1 hour after exposure the specimen is examined for any deterioration. Note: Prolonged exposure to high and low temperatures in the presence of chemicals such as solvents, acids, dyes, etc. may eventually cause deterioration.
- **“Chemical Resistance”** All chemical tests are conducted with test panels to which a specimen has been applied. 72 hours after application the panels are immersed in the test fluid for the given test period. 1 hour after removing the panel from the fluid, the specimen is examined for any deterioration.
- **“Outdoor Durability”** means that the Product in a finished graphic situated outdoors, subject to the limitations herein and Avery Dennison™ Product Data Sheets and Instructional Bulletins, and applied to recommended surfaces, will not deteriorate excessively such that the finished graphic is ineffective for its advertising or identification purpose(s) when viewed under normal conditions from the intended viewing distance, due solely to a defect in the Product in manufacturing or workmanship. Outdoor Durability is based on normal middle European and central North American outdoor exposure conditions and application to recommended surfaces. Actual performance life will depend on a variety of factors, including but not limited to substrate preparation, exposure conditions and maintenance of the Product and finished graphic. In case of finished graphics in areas of high temperatures or humidity, in industrially polluted areas or other areas with air laden particulate matter, and/or in high altitudes, Outdoor Durability will be reduced and the warranty period will be decreased accordingly. Avery Dennison™ [Instructional Bulletin #1.30](#) Durability of Avery Dennison® Films sets forth the durability period in the regional service area of your graphics.
- **“Indoor Durability”** means that the Product in a finished graphic situated within the interior of a building without direct exposure to sunlight and applied to recommended surfaces, will not deteriorate excessively such that the finished graphic is ineffective for its advertising or identification purpose(s) when viewed under normal conditions from the intended viewing distance, due solely to a defect in the Product in manufacturing or workmanship. The warranty does not extend to the use of the Product or finished graphic as wood or fabric replacement films or safety and security window films.
- **“Vehicle Graphics”** means finished graphics applied to new OEM finished recommended surfaces road and rail vehicles, both commercial and personal, including straight trucks and trailers, and passenger vehicles.
- **“Marine Graphics”** means finished graphics applied to water going vessels, both commercial and recreational, above the static waterline. All edges and seams (overlaps) must be sealed. The warranty does not extend to Product or finished graphic that may routinely be submerged in water.
- **“Vertical Exposure”** means that the face of the finished graphic is  $\pm 10^\circ$  from vertical. Please consult the Avery Dennison™ [Instructional Bulletin #1.30](#) Durability of Avery Dennison™ Films for full details.
- **“Non-Vertical Exposure”** means that the face of the finished graphic is greater than  $10^\circ$  from vertical and greater than  $5^\circ$  from horizontal. **Reflective films are not warranted for this exposure.**
- **“Horizontal Exposure”** means the face of the finished graphic is  $85^\circ$  to  $90^\circ$  from vertical. **Reflective films are not warranted for this exposure.**
- **“Removable Adhesive”** means an Avery Dennison™ adhesive that can be removed without heat or chemicals within the period stated on the respective Product Data Sheet and might leave twenty percent (20%) or less adhesive residue.
- **“Flat surfaces”** means a two dimensional flat surface without protruding objects.
- **“Simple curves”** means surfaces that include a third dimension which does not require stretching of the film (for example, a cylinder).
- **“Rivets”** mean surfaces with protruding rivet heads. “Tenting” or film lifting around rivets does not constitute a breach of warranty. Film will bridge between closely spaced rivets. Tenting or bridging does not constitute a failure.
- **“Compound Curves”** a surface that includes both, or either, concave or convex curves. It does not include surfaces with hard angles or corrugations that would require extensive stretching of the Product or finished graphic.

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- “Corrugations” means corrugated or recessed areas that require stretching of the Product or finished graphic (for example, a false window recess on a commercial van).

## Related Literature:

SUBJECT	NUMBER
Substrate Cleaning and Preparation	IB 1.10
Storage, Maintenance and Cleaning of PVC Films	IB 1.20
Durability of Films	IB 1.30
Converting Tips for Sign Films	IB 2.10
Ink recommendations for Cast, Reflective, Calendered, and Specialty Products	IB 3.00
Sericol TMI II Screen Inks: Metallics	IB 3.20
Sericol TMI II Screen Inks: Four Color Process	IB 3.21
Sericol TMI Screen Inks: Opaques, Translucents, and Transparents	IB 3.22
Sericol UTMI II Overprint Clear Coat	IB 3.23
Sericol TMI II 1000 Overprint Clear Coat	IB 3.24
Nazdar 3500 UV Fleet	IB 3.30
Application Instructions for Avery Dennison® Films	IB 4.00
Removal Instructions for Avery Dennison™ Cast, Calendered, Reflective, and Polyester Films	IB 4.10
Thermal Transfer Printing, Converting, Operating, and Product Instructions	IB 5.10
Tips for Overlaminating, Premasking & Packaging Graphics	IB 5.50
Reflective Films on Stainless Steel	IB 6.11

*Revisions are italicized*

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