

# Avery Dennison® HV1200 High Visibility Series

## Permanent Staflat™

(formerly: A7, NV1300 series StaFlat™ )

Revision: 9 Dated: 04/06/17

### 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 HV1200 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
- 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.

## Product Data Sheet

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### Physical Characteristics:

Property	Typical Values
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 of manufacture when stored at the following temperatures and humidity conditions 68°-77° F (20° - 25° C) and 50±5% R. H.
Durability	Reference color and warranty charts in this data sheet.
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.

Data represents average values where applicable, and is not intended for specification purposes.

#### Warranty:

This Warranty applies to the Product listed in this Data Sheet. All statements, technical information (including physical and chemical characteristics) 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 subject to the Purchaser's assent and agreement that Purchaser is responsible for, and has independently determined, the suitability of such products for its purposes or its customer's purposes. Avery Dennison graphics products are warranted to be free from defects in material and workmanship for two years from the date of manufacture. When the product is properly applied, the warranty period is as stated in the product's specific Product Data Sheet in effect at the time of shipment to Avery Dennison's customer.

Such time periods are subject in either case to the proper storing and application of said product, and the failure to properly store or apply the product, including without limitation the failure to follow any applicable Instructional Bulletin, negates any warranty. 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 exclusively to: (a) repair or replacement of defective product without charge at Avery Dennison's plant or at the location of the product (at Avery Dennison's election), or (b) in the event repair or replacement are not commercially practical, a credit amount up to the price of the product taking into account the defect in the product in Avery Dennison's sole discretion.

THE WARRANTY EXPRESSLY SET FORTH ABOVE IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR USE AND/OR NON-INFRINGEMENT. SELLER 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.

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.

All sales and contracts for sale of Products are subject to Purchaser's assent and agreement to this Warranty. Avery Dennison hereby objects to any terms or conditions contained in any purchase order or other communication of any kind from the Purchaser that is conflicting, inconsistent or additional to this Agreement.

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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:

HV1200 Series Name	Item #'s	Vertical Durability Zone 1 Years
HV1200-101-R White Perm SF	7801R	7
HV1200-190-R Black Perm SF Δ	7805R	7
HV1200-215-R Gold Perm SF Δ	7807R	7
HV1200-235-R Yellow Perm SF	7812R	7
HV1200-360-R Orange Perm SF	7815R	7
HV1200-440-R Red Perm SF	7816R	7

HV1200 Series Name	Item #'s	Vertical Durability Zone 1 Years
HV1200-450-R Dark Red Perm SF Δ	7818R	7
HV 1200-630-R Olympic Blue Perm SF Δ	7821R	7
HV 1200-640-R Light Blue Perm SF Δ	7820R	7
HV 1200-688-R Blue Perm SF	7822R	7
HV 1200-778-R Green Perm SF	7824R	7

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

### Discontinued Colors as of 01/01/16:

HV1200 Series Name	Item #'s	Vertical Durability Zone 1 Years
HV1200-212-R New Gold Perm SF Δ	7810R	7
HV1200-425-R Tomato Red Perm SF Δ	7817R	7
HV1200-470-R Burgundy Perm SF Δ	7819R	7

HV1200 Series Name	Item #'s	Vertical Durability Zone 1 Years
HV 1200-565-R Purple Perm SF Δ	7823R	7
HV 1200-770-R Kelly Green Perm SF Δ	7825R	7
HV 1200-995-R Brown Δ	7806R	7

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

### Typical Coefficient of Retro-Reflectivity:

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

COMMENTS: (based on averages of production runs, NOT for specification purposes)  
(Tested per ASTM® E810 at -4° EA/0.2° OA)

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- \*These products meet the requirements for color and reflectivity of ASTM® D4956, Type I; The coefficient of retro-reflection 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).
- 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)

HV1200 Series Name	HV1200 Series Name
HV1200-101-R White Perm SF	HV1200-450-R Dark Red Perm SF
HV1200-190-R Black Perm SF	HV 1200-630-R Olympic Blue Perm SF
HV1200-215-R Gold Perm SF	HV 1200-640-R Light Blue Perm SF
HV1200-235-R Yellow Perm SF	HV 1200-688-R Blue Perm SF
HV1200-360-R Orange Perm SF	HV 1200-778-R Green Perm SF
HV1200-440-R Red Perm SF	

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

HV1200 Series Name
HV1200-235-R Yellow Perm SF
HV1200-440-R Red Perm SF
HV1200-450-R Dark Red Perm SF Δ

### 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, Transluents, 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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