

Avery Dennison UVTS Ultraviolet Curable Printing Inks

Instructional Bulletin # 8.33

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General Processing Guidelines

Substrate/Ink Compatibility

Avery Dennison UVTS Ink is a one-component, UV curable ink system. Only Avery Dennison Reflective sheeting, manufactured by Avery Dennison Corporation and approved for use in the traffic signage market is warranted for use with Avery Dennison UVTS inks.

Substrate Conditioning

For best results, sheet stock should be allowed to stabilize under shop humidity and temperature conditions for 24 hours before a run is started. Refer to IB#8.00 for more information.

Ink Preparation

All ink is provided ready-to-use. All ink must be mixed with a high-speed mixer for 10 minutes before use.

Since this ink contains no solvents, there will be no evaporation during the course of the day or prematurely drying in the screen. The use of thinner / retarder is not required in this ink system.

Use only dark polyethylene plastic containers for mixing and storing. Keep containers tightly closed when not in use. Allow at least 10% airspace between the surface of the ink and the container lid. This air pocket extends the shelf life of the ink.

The UVTS warranty provides for five (5) years of outdoor durability when creating custom blends using standard traffic colors and mixing colors is. Custom color matches made with additional components (other than standard traffic or mixing colors) are not warranted.

Mesh Recommendations

Avery Dennison UVTS inks offer a full range of traffic colors. Each pigment has been carefully selected to provide brilliantly clean transparent traffic colors with outstanding reflectivity when printed on Avery Dennison Reflective sheeting. UVTS ink formulations have been matched to meet ASTM D 9456-94 color and reflectivity requirements when printed through a 390 twill mesh screen (34 μ thread diameter) with 18-24 N/cm mesh tension.

Squeegee Selection

A medium/hard/medium (70/90/70) durometer 'Serilor 3' squeegee blade is recommended. A sharp squeegee with the proper amount of pressure is required for optimum print resolution on all applications. Slight imperfections in the squeegee will be readily visible in the quality of the print. Thus, the condition of the squeegee and proper squeegee maintenance are a must. The squeegee blade must also be positioned at the correct angle to assure proper ink transfer.

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Press Selection

To ensure consistent, reproducible color and reflectivity throughout the entire printing run, a fully or semi-automatic press is recommended. Care must be taken to ensure other printing variables, such as screen tension, mesh selection, etc., are consistent with the recommendations presented in this process guide.

Squeegee Technique

Most squeegee related problems are created by applying too much squeegee pressure. Any time the squeegee has enough pressure applied to bend the blade or severely change the angle, the proper “cutting edge” of the blade will be lost.

The lower the durometer of the squeegee, the more prone it will be to distortion from excess pressure. To mitigate this issue, a 70/90/70 durometer squeegee is recommended. The 70/90/70 durometer surface will contact the ink and screen to allow proper ink deposition and reduce screen wear from excessive abrasion.

Caution should also be exercised to ensure the screen frame is sufficiently larger than the print area. If the squeegee edge is too close to the frame, the screen will not stretch properly and uniformly during printing. This will cause the outside edges of the squeegee to bend with the pressure required to maintain substrate contact. The end result will be poor print quality.

Use of a Flood Stroke

Most screen printing mechanics require the use of a flood coat prior to the print (squeegee) stroke to assure consistency in color development and print resolution. At the proper printing viscosity's, Avery Dennison UVTS inks will have excellent flow characteristics; therefore, a heavy flood will significantly add to the amount of ink deposited resulting in poor reflectivity and color). **To prevent excess ink deposit, a tight, or minimal, ink flood is recommended with little or no time between flood and print strokes. For an automatic or semi-automatic press, the flood / print mode is recommended.** Too much flood will smear small printed copy. A heavy flood coat will result in printing up to 50% more ink through the mesh, which will adversely affect color and reflectivity.

Curing

Assuming proper printed ink film thickness, Avery Dennison UVTS inks require 250-260 mJ/cm² of UV energy transmitted from a curing unit to the ink surface for effective cure. Typically, 250-260 mJ/cm² can be obtained using 300-watt mercury vapor bulbs at line speeds of 40 to 50 fpm. If the required level of energy output is not attainable at the stated conditions, it is recommended that the unit is inspected and the UV bulbs are cleaned to maximize energy output. If problems persist, please contact the equipment manufacturer.

It is important to keep the surface temperature of the sheeting under 110°F when curing UV inks. The routine use of some type of temperature indicator placed directly on the surface of the sheeting will allow you to properly check actual temperatures reached in the curing cycle.

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The easiest and quickest way to test for UV ink cure can be accomplished with your fingers. Place your thumb on the ink and twist. If the ink can be separated from the substrate, the ink is not cured. Another method is to scratch the ink with the edge of a coin or your fingernail. Again, if the ink can be scratched easily or removed from the substrate, the ink is not properly cured.

A more standard, reproducible method to check for ink cure is to use a scratch tester and Scotch 610 tape. The scratch tester will score eight parallel lines in the ink. Two sets of intersecting scratches should be scored into the printed surface at a 90° angle. Next, apply the Scotch 610 tape over the intersection area, rub the tape onto the surface and wait for 1 minute. Quickly pull the tape from the ink surface and examine the tape. Excellent adhesion is defined as none of the ink being removed.

Clear Coating

For 7-year and 10 year outdoor durability of the ink, clear coating is required.

Additionally, OL-1000, when laminated over standard UVTS traffic colors, will extend the outdoor durability to 7 and 10 years.

Ink Clean-up

Screens and other printing equipment should be cleaned immediately with Avery Dennison UVTS Screen Wash or as soon as possible after use. Though UV inks will not cure in the screen like solvent inks, they would be susceptible to premature cure if exposed to ambient UV light, such as direct sunlight. Exposure to less UV intensive light sources, such as interior lighting, should not be a problem provided the screen is not left unattended for a prolonged period. The ink can be left in the screen for short periods of time, such as a lunch break, without causing cleaning problems provided the screen is not exposed to direct sunlight.

Screens used to print Avery Dennison UVTS inks are cleaned like screens used for standard solvent inks. The ink should be removed from the print screen using UVTS Screen Wash and clean-up rags. Do not re-use ink that is removed from the screen.

Caution: Wearing gloves, safety glasses and other safety equipment is required when working with solvent inks and cleaning solvents.

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