

3500 Series UV Screen Ink has been formulated for use on premium pressure sensitive vinyl films intended for exterior applications. It exhibits superior flexibility and elongation, allowing for stretching the printed vinyl film over rivets for fleet graphic applications. The 3500 Series has excellent weatherability and chemical resistance, and may be used on decals that will be thermal diecut and pre-masked.

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Substrates

- Premium Pressure Sensitive Cast Vinyl's

Substrate recommendations are based on commonly available materials intended for the ink's specific market when the inks are processed according to this technical data. While technical information and advice on the use of this product is provided in good faith, the User bears sole responsibility for selecting the appropriate product for their end-use requirements. Reference the 'Quality Statement' at the end of this document.

User Information

Mesh

355-390 tpi (140-153 tpcm) monofilament polyester with a mesh opening of 22-38 um for most applications.

305-355 tpi (120-140 tpcm) monofilament polyester mesh can be used for specialty applications with the mesh opening appropriate to the effect (*i.e. pearlescents, aluminums, etc.*).

Coarser mesh counts and/or twill weave result in heavier ink deposit and may require additional cure output.

Stencil

Use direct emulsions and capillary films which are solvent resistant and UV compatible.

Squeegee

70-90 durometer polyurethane squeegee.

Coverage

Estimated 2,500 - 3,500 square feet (232 - 325 square meters) per gallon depending upon ink deposit. Reference www.nazdar.com for examples of coverage calculations.

Printing

3500 UV Durable Graphic Screen Ink is formulated to be press ready. Thoroughly mix the ink prior to printing. Improper mixing can lead to inconsistent color and ink performance.

Maintain ink temperature at 65°-90°F (18°-32°C) for optimum print and cure performance. Lower temperatures increase the ink viscosity, impairing flow and increasing film thickness. Elevated temperatures lower the ink viscosity, reducing print definition and film thickness.

Pretest to determine optimum printing parameters for a particular set of ink, substrate, screen, press, and curing variables/conditions.

The ink can be affected by stray UV light. Be aware of skylights, windows and overhead lights curing the ink in the screen; light filters are recommended. Leaving a container uncovered may result in the ink's surface forming a "skin", caused by reaction with ambient lighting. Keep containers covered.

Nazdar does not recommend inter-mixing of 3500 with any other inks.

Cure Parameters

3500 UV Durable Graphic Screen Ink cures when exposed to a single medium pressure mercury vapor lamp emitting output millijoules (mJ) and milliwatts (mW) of:

225-300 mJ/cm² @ 600+ mW/cm²
for most colors

275-350 mJ/cm² @ 600+ mW/cm² for the
3529 and 3539 Overprint Clears

These guidelines are intended only as a starting point for determining cure parameters, which must be determined under actual production conditions. "Undercuring" the ink may result in poor adhesion, lower block resistance, reduced durability, and higher residual odor. "Overcuring" the ink may reduce the flexibility of the printed part and adhesion of subsequent ink layers.

To increase mJ levels, slow down the belt speed or scan speed. To increase mW levels, increase the wattage setting of the UV reactor. To optimize mJ and mW output, perform regular maintenance

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on the bulb and reflector, and ensure proper focus to the substrate.

These guidelines are representative of measurements taken using an EIT® UVICURE® Plus radiometer measuring the UVA bandwidth (320-390 nm). To obtain accurate mW readings with the UVICURE® Plus, reduce the belt speed to less than 40 ft/min.

Clears / Varnishes

Mixing Clear: Use 3536 Mixing Clear to reduce the density of colors or as a clear base for specialty additives such as metallic powders.

Overprint Clear: Use 3529 Overprint Clear to provide surface protection and outdoor durability.

Premium Overprint Clear: Use 3539 Premium Overprint Clear for Maximum outdoor durability.

Note: An overprint clear is required with the 3500 Series for any outdoor or chemical resistant applications.

Common Performance Additives

The market specific performance properties of the 3500 UV Durable Graphic Screen Ink should be acceptable for most applications without the need for additives. When required, any additives should be thoroughly mixed before each use. Prior to production, test any additive adjustment to the ink. Inks containing additives should not be mixed with other inks.

Example for additives: Ink at 100g with 8% of an additive is calculated as:

$$100\text{g ink} + 8\text{g additive} = 108\text{g total}$$

Reducer: Use RE305 UV Reducer to reduce the viscosity of these inks. Add up to 10% by weight. Over reduction can reduce print definition, film thickness and adversely affect cure.

Cleanup

Screen Wash (Prior to Reclaim): Use IMS201 Premium Graphic Screen Wash, IMS203 Economy Graphic Screen Wash, or IMS206 Graphic Auto Screen Wash.

Press Wash (On Press): Use IMS301 Premium Graphic Press Wash.

Storage

Store closed containers at temperatures between 65°-78°F (18°-25°C). Ink taken from the press should not be returned to the original container; store separately to avoid contaminating unused ink.

General Information

Ink Handling

Wear gloves and barrier cream to prevent direct skin contact. Safety glasses are suggested in areas where ink may be splashed. If ink does come in contact with skin, wipe ink off with a clean, dry cloth (do not use solvent or reducer). Wash the affected area with soap and water. Consult the applicable [Safety Data Sheet](#) (SDS / MSDS) for further instructions and warnings.

This ink series is a one-part, 100% solids UV-curable screen printing ink and does not contain N-vinyl-2-pyrrolidone (trade name V-Pyrol®).

For assistance on a wide range of important regulatory issues, consult the following Regulatory Compliance Department link at <http://www.nazdar.com> or contact Nazdar Ink Technologies - World Headquarters (see contact listing at the end of this document).

Adhesion Testing

Even when recommended UV energy output levels are achieved, it is imperative to check the degree of cure on a **cooled down** print:

1. Touch of ink surface – the ink surface should be smooth.
2. Thumb twist – the ink surface should not mar or smudge.
3. Scratch surface – the ink surface should resist scratching.
4. Cross hatch tape test – per the ASTM D-3359 method, use a cross hatch tool or a sharp knife to cut through ink film only; then apply 3M #600 clear tape on cut area, rub down, and rip off at a 180 degree angle. Ink should only come off in actual cut areas.

Finishing: To assure optimum performance with relation to die cutting, pre-masking or chemical resistance, allow 4 – 8 hours for the ink and substrate to stabilize after curing.

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Pre-masking: It is important to evaluate the ink with specific pre-masks as well as application methods prior to using in production. The use of a medium to high tack adhesive is recommended for most application methods.

Weathering / Outdoor Durability

3500 UV Durable Graphic Screen Ink colors must be printed at full strength onto cast vinyl materials and overprinted with 3529 Durable Overprint Clear to provide 5 years outdoor durability when mounted vertically in the Central U.S.A.

Using 3539 Premium Overprint Clear in place of 3529 will provide 8 years outdoor durability when mounted vertically in the Central U.S.A. 3539 demonstrates improvements for outdoor durability, gloss and elongation.

Outdoor durability projections only apply to 3500 colors listed in this technical data sheet when overprinted with 3529 Durable Overprint Clear or 3539 Premium Overprint Clear.

All 3500 colors and overprint clears must be properly cured, see Adhesion Testing section.

Outdoor durability applies only to 3500 colors listed in this technical data sheet overprinted with 3529 Durable Overprint Clear or 3539 Premium Overprint Clear. 3500 Overprint Clears do not have recommendations over digital inks for adhesion or outdoor durability, individual testing must be performed.

Exceptions on special effect color matches:

Special mixed metallic colors using Nazdar approved aluminum metallic pigments and 3529 Overprint Clear have a projected 3 year outdoor durability. The use of 3539 Premium Overprint Clear increases metallic durability to 3 ½ years. *Note: See Special Effect Pigment section for a list of Nazdar approved metallic pigments.*

Special mixed pearlescent colors using Nazdar approved pearl pigments and 3529 Overprint Clear have a projected 5 year outdoor durability. The use of 3539 Premium Overprint Clear increases the pearlescent durability to 7 years. *Note: See Special Effect Pigment section for a list of Nazdar approved Pearl pigments.*

All metallic and pearlescent colors **must** be properly cured and overprinted with 3529 or 3539 to achieve the stated durability.

Outdoor durability cannot be specified exactly. Slight color change and loss of gloss should be expected. Variables affecting durability include:

- Ink film thickness and degree of curing
- Color formulation:
 - Large amounts of mixing clear or white
 - Small amounts of any single color (See Matching Off Whites & Pastel section)
- Substrate type and age
- Mounting angle and directional orientation
- Geographical location
- Degree of air pollution
- Excessive abrasion

Chemical Resistance

3500 UV Durable Graphic Screen Ink colors must be printed onto cast vinyl materials rated for chemical resistance and overprinted with 3529 Durable Overprint Clear or 3539 Premium Overprint Clear to pass commercially accepted standards for Gasoline, Ethanol, Diesel Fuel, and Isopropyl Alcohol. As industry and company specific test standards and methods can vary widely, individual testing must be performed.

All 3500 colors and overprint clears must be properly cured, see Adhesion Testing section.

Manufacturer's Product Offering

Based on information from our raw material suppliers, these ink products are formulated to contain less than 0.06% lead. If exact heavy metal content is required, independent lab analysis is recommended.

Halftone Colors

Halftone Extender Base is used to reduce the density of the halftone colors.

Standard Halftone Colors are formulated with hues and densities common to the graphic industry.

Standard Printing Colors

Standard Printing Colors have excellent opacity and flow characteristics.

Blending Toners

Blending Toners can be used as supplied, in color matches, or let down with clear.

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Matching Off White or Pastel Colors

The matching of durable pastel colors in the red or yellow shades requires the specific use of very lightfast pigmented inks: it is recommended that 35161 Primrose, 3533 Permanent Yellow (RS) and 3543 Permanent Red be used when small quantities of red and yellow are required for tinting white into off-white or pastel colors.

Special Effect Pigments

When inks are to be printed with a special effect color, all ink layers must be evaluated for intercoat adhesion before proceeding with the production run. To maximize intercoat adhesion, specialty colors should be printed as late as possible in the print sequence.

Pigments may settle in the container; prior to printing, thoroughly mix the ink.

The following special effect pigments may be added to 3500 UV Durable Graphic Screen Ink. Contact Nazdar for the item number(s) and availability of special effect products. Technical Data Sheets for each of the following special effect pigments can be found at www.nazdar.com.

Metallic Silver (aluminum): Add up to 15% by weight. Approved metallic pigments are available in one pound containers. Approved pigments are:

SIPM571 – 313 Aluminum Paste (Large Flake)
 SIPM606 – Aluminum 6600 (Medium Flake)
 SIPM573 – 2871 Aluminum Pigment (Fine Flake)

See weathering section for durability

Metallic Gold (bronze): Gold and bronze powders are not recommended due to poor exterior durability. To achieve gold and bronze colors use aluminum or pearlescent pigments.

Using the above recommended aluminums with 3536 metallic mixing clear, will result in a minimum of 6 month shelf life. Using any other metallic pigments may cause the mixed ink to have a shorter shelf life and may affect exterior durability.

It is important to check adhesion of the overprint clears on any metallic and pearl pigments.

Pearlescent / Interference: Add a maximum of 20% by weight. Nazdar approved Pearls:

SIP1519 – 9307 SW Gold Automotive Grade
 SIP1520 – 9520 SW Bronze Automotive Grade

SIP1536 - BN001 Card Silver Automotive Grade

See weathering section for durability

Formulas for PMS 871C to 876C Pearl Gold and 877C Pearl Silver are available upon request.

Multi-Chromatic: Add up to 10% by weight.

Mixing aluminums and pearlescent with colors will lower the allowable concentration in a formulation. The allowable concentration will depend on ink deposit and curing parameters. Care should be taken to ensure proper cure and adhesion. Exceeding the recommended percentages above may lead to degradation of the ink's overall performance, including flexibility, adhesion, intercoat adhesion and exterior durability.

Color Card Materials

The following is a list of available screen printed sample literature representing 3500 UV Durable Graphic Screen Ink.

CARD35 (Version 2) : shows the standard printing colors, blending toners, and halftone colors on Avery 900 Supercast Opaque Vinyl.

Special Effects Color Card (CARDSPL): shows various special effect pigments mixed with clear.

Non-Metallic Pantone Simulations sheet (LITO121): shows the 871c to 877c Pantone metallic color matches using pearlescent pigments.

Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

Standard Ink Items

Standard ink items listed below are inventoried in gallon containers.

Standard Halftone Colors

| Item Number | Color |
|-------------|------------------------|
| 35HTEX | Halftone Extender Base |
| 35HTC | Halftone Cyan |
| 35HTM | Halftone Magenta |
| 35HTY | Halftone Yellow |
| 35HTBK | Halftone Black |

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Standard Printing Colors

| Item Number | Color |
|-------------|-------------------------|
| 3529 | Overprint Clear |
| 3539 | Premium Overprint Clear |
| 3567 | Reflex Blue |
| 3568 | Process Blue |
| 35176 | Super Opaque White |
| 35177 | Super Opaque Black |
| 35178 | High Intensity White |
| 35179 | High Intensity Black |

Standard Blending Toners

| Item Number | Color |
|-------------|-----------------------|
| 35159 | Transparent Orange |
| 35160 | Transparent YS Red |
| 35161 | Primrose |
| 35162 | Yellow (GS) |
| 35163 | Yellow (RS) |
| 35164 | Medium Yellow |
| 35165 | Permanent Orange |
| 35166 | Red (YS) |
| 35167 | Deep Red |
| 35168 | Carmine |
| 35169 | Magenta |
| 35170 | Maroon |
| 35171 | Violet |
| 35172 | Green (YS) |
| 35173 | Green (BS) |
| 35174 | Blue (GS) |
| 35175 | Blue (RS) |
| 3558 | Tinting White |
| 3559 | Tinting Black |
| 3536 | Metallic Mixing Clear |
| 3533 | Permanent Yellow (RS) |
| 3543 | Permanent Red |

Non-Standard Ink Items

Non-Standard ink items listed below are special order, non-inventoried colors which may require additional lead time. These items are available in gallon containers.

| Item Number | Color |
|-------------|---------------------|
| 66492135 | PMS 871C Pearl Gold |
| 66493135 | PMS 872C Pearl Gold |
| 66493235 | PMS 873C Pearl Gold |
| 66493335 | PMS 874C Pearl Gold |
| 66493435 | PMS 875C Pearl Gold |

| 66493535 | PMS 876C Pearl Gold |
|-------------|-------------------------------|
| 67052535 | PMS 877C Pearl Silver |
| Item Number | Color |
| 6003247435 | SPL 3500 Flat<10 OP Clear |
| 6003247635 | SPL 3500 Matte 10-25 OP Clear |
| 6003247735 | SPL 3500 Satin 25-50 OP Clear |

Additives / Reducers

| Item Number | Item Description |
|-------------|------------------|
| RE305 | UV Reducer |

Cleaners / Clean Up

| Item Number | Item Description |
|-------------|-----------------------------|
| IMS201 | Premium Graphic Screen Wash |
| IMS203 | Economy Graphic Screen Wash |
| IMS206 | Graphic Auto Screen Wash |
| IMS301 | Premium Graphic Press Wash |

Nazdar Quality Statement

Nazdar® stands behind the quality of this product. Nazdar® cannot, however, guarantee the finished results because Nazdar® exercises no control over individual operating conditions and production procedures. While technical information and advice on the use of this product is provided in good faith, the User bears sole responsibility for selecting the appropriate product for their end-use requirements. Users are also responsible for testing to determine that our product will perform as expected during the printed item's entire life-cycle from printing, post-print processing, and shipment to end-use. This product has been specially formulated for screen printing, and it has not been tested for application by any other method. Any liability associated with the use of this product is limited to the value of the product purchased from Nazdar®.

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