

Nazdar 3500 UV Durable Graphic Screen Ink

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.

Substrates

Pressure sensitive cast vinyl (PVC)

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.

Mesh

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

305-355 tpi (120-140 tpcm) with a mesh opening of 50 um or more monofilament polyester can be used for specialty applications (i.e. pearlescents, aluminums, etc.).

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

Stencil

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

Squeegee

70-90 durometer polyurethane squeegee.

Coverage

Depending upon ink deposit, the estimated coverage per gallon: 2,500 – 3,500 square feet (232 - 325 square meters)
www.nazdar.com for examples of coverage calculations.

Screen Printing

Standard items are 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 this ink series with other inks or series.

Cure Parameters

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.

Mercury Vapor UV Curing: Standard 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

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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, maintain 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.

Processing

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

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.

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.

Adhesion Testing

When recommended UV energy output levels are achieved, checking the degree of cure on a **cooled down** print is imperative:

- Touch of ink surface – the ink surface should be smooth.
- Thumb twist – the ink surface should not mar or smudge.
- Scratch surface – the ink surface should resist scratching.
- 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.

Cleanup

For screen cleaning, similar products to those listed below may be used.

Screen Wash (Prior to Reclaim): Use IMS201 Premium Graphic Screen Wash or IMS203 Economy Graphic Screen Wash

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

Ink Modifications

Clears / Varnishes

Mixing Clear: use to reduce the density of colors.

Metallic Mixing Clear: use for specialty additives such as Metallic and Pearlescent effects.

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

Additives

The market specific performance properties of this ink series / ink item 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.

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Example for additives: Ink at 100g with 8% of an additive is calculated as: 100g ink + 8g additive = 108g total

Reducer / Thinner

Use the following item(s) to reduce the viscosity of these inks. Over reduction can reduce print definition, film thickness and adversely affect cure.

RE305 UV Reducer to reduce the viscosity of these inks. Add up to 10%.

General Information

Handling

Refer to the SDS for recommendations on handling.

Wear gloves and barrier cream to prevent direct skin contact. Safety glasses are suggested in areas where ink may be splashed. If product 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.

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®).

Consult the applicable Safety Data Sheet (SDS / MSDS) for further instructions and warnings.

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).

Weathering / Outdoor Durability

3500 UV Durable Graphic Screen Ink colors must be printed at full strength onto premium cast vinyl materials and overprinted with 3529 Durable Overprint Clear to achieve stated Outdoor Durability.

At full strength and properly cured, the outdoor durability when mounted vertically in the Central U.S.A: **5 years**

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.

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 Variables

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

- Ink film thickness and degree of curing
- Color formulation: large amounts of mixing clear or white, mixing several colors into one match, and/or mixing a small quantity of any single color
- Substrate type and age
- Mounting angle and directional orientation
- Geographical location
- Degree of air pollution
- Excessive abrasion
- Non-clear coated prints exhibit more color change and loss of gloss.

Storage / Shelf Life

Store closed containers at temperatures between 65°-78°F (18°-25°C). Storing products outside of these recommendations may shorten their shelf life.

Standard items supplied in 1-gallon (4/5 kilo) containers or smaller. Useable for a period of at least **24 months** from the date of manufacture.

Standard items supplied in 2 to 5-gallon (6-20 kilo) containers: Useable for a period of at least **6 months** from the date of manufacture.

Shelf life above applies to the standard ink items listed on this TDS. To obtain the shelf life for special inks and additives, contact

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Nazdar Customer Service or Nazdar Technical Service. See contact listing at the end of this document.

Standard Color Range

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 any 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. These colors are intended to work as supplied.

Standard Colors Product Specific

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.

Toners

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

Pantone 871c-877c Metallic

Pantone® 871c to 877c colors have been matched using pearlescent pigments. When printed on a white background, a gold or silver metallic effect is achieved. A 305 tpi (120 tpcm) mesh with a mesh opening of 50 um or more is recommended.

Special Effect Pigments Product Specific

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.

Aluminum Pigment Load: The maximum recommended aluminum load is 15% in the Metallic Mixing Clear for this series.

SIPM571 313 Aluminum Paste (Coarse Aluminum)

SIPM606 Aluminum 6600 (Medium Aluminum)

SIPM573 2871 Aluminum Pigment (Fine Aluminum)

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

Mixing aluminum with colors will lower the allowable concentration of metallic 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 these recommendations may lead to degradation of the ink's overall performance, including flexibility, adhesion, intercoat adhesion and exterior durability.

The following special effect pigments may be added to this ink series. 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.

Pearlescent / Interference: Using Automotive Grade Pearlescent Pigments or Interference Pigments, add up to 20%.

SIPI519 9307 SW Gold Auto Grade

SIPI520 9520 SW Bronze Auto Grade

SIPI536 Card Silver BN001

Pantone® 871c to 877c can be matched in this ink series using Automotive Grade Pearlescent Pigments. To achieve extended durability, overprint these special colors with Durable Overprint Clear. Starting formulas are available through contacting Technical Service.

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Multi-Chromatic: Using Multi-Chromatic Pigments add up to 10% by weight.

Note: Pearlescent, Interference and Multi-Chromatic Pigments shift in shade and color with outdoor exposure.

Color Card Materials

The following is a list of available literature representing this ink series.

- 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

Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

Item Type	Item Number	Item (or Color) Description
Halftone Colors	35HTEX	Halftone Extender Base
Halftone Colors	35HTC	Halftone Cyan
Halftone Colors	35HTM	Halftone Magenta
Halftone Colors	35HTY	Halftone Yellow
Halftone Colors	35HTBK	Halftone Black
Standard Colors	3519	Fire Red
Clears / Varnishes	3526	Mixing Clear
Clears / Varnishes	3529	Durable Overprint Clear
Clears / Varnishes	3539	Premium Overprint Clear
Standard Colors	3567	Reflex Blue
Standard Colors	3568	Process Blue
Standard Colors	35176	Super Opaque White
Standard Colors	35177	Super Opaque Black
Standard Colors	35178	High Intensity White
Standard Colors	35179	High Intensity Black
Blending Toners / Toners	35159	Transparent Orange
Blending Toners / Toners	35160	Transparent YS Red
Blending Toners / Toners	35161	Primrose Yellow
Blending Toners / Toners	35162	Yellow Toner (GS)
Blending Toners / Toners	35163	Yellow Toner (RS)
Blending Toners / Toners	35164	Medium Yellow
Blending Toners / Toners	35165	Permanent Orange
Blending Toners / Toners	35166	Red (YS)
Blending Toners / Toners	35167	Deep Red Toner
Blending Toners / Toners	35168	Carmine Toner
Blending Toners / Toners	35169	Magenta Toner
Blending Toners / Toners	35170	Maroon Toner
Blending Toners / Toners	35171	Violet Toner
Blending Toners / Toners	35172	Green Toner (YS)
Blending Toners / Toners	35173	Green Toner (BS)
Blending Toners / Toners	35174	Blue Toner (GS)
Blending Toners / Toners	35175	Blue Toner (RS)
Mixing Colors	3558	Tinting White
Mixing Colors	3559	Tinting Black
Clears / Varnishes	3536	Metallic Mixing Clear
Mixing Colors	3533	Permanent Yellow (RS)
Mixing Colors	3543	Permanent Red
Clears / Varnishes	6003247435	SPL 3500 Flat<10 OP Clear
Clears / Varnishes	6003247635	SPL 3500 Matte 10-25 OP Clear
Clears / Varnishes	6003247735	SPL 3500 Satin 25-50 OP Clear

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Pantone 871c-877c Metallic	66492135	PMS 871C Pearl Gold
Pantone 871c-877c Metallic	66493135	PMS 872C Pearl Gold
Pantone 871c-877c Metallic	66493235	PMS 873C Pearl Gold
Pantone 871c-877c Metallic	66493335	PMS 874C Pearl Gold
Pantone 871c-877c Metallic	66493435	PMS 875C Pearl Gold
Pantone 871c-877c Metallic	66493535	PMS 876C Pearl Gold
Pantone 871c-877c Metallic	67052535	PMS 877C Pearl Silver
Additives	RE305	UV Reducer
Cleaners	IMS201	Premium Graphic Screen Wash
Cleaners	IMS203	Economy Graphic Screen Wash
Cleaners	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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