

Nazdar 3400 UV Screen Ink

Membrane Overlay / Nameplate / In Mold Decorating

3400 Series UV Screen Ink has been formulated to meet the processing requirements of the membrane overlay market; including compatibility with most standard transfer adhesives, flexibility, opacity, ink to ink adhesion, and speed of cure. The 3400 Series is designed for second surface printing on polycarbonate and polyester used as membrane overlays where the lamination of pressure sensitive adhesive directly to the ink film may be necessary. 3400 Series with the addition of 5% by weight NB80 UV Adhesion Promoter may also be printed over HP Indigo[®] digital offset prints.

Substrates

- Polycarbonate
- Some top coated polyester
(*UV ink receptive primer*)
- HP Indigo[®] digital offset prints
(*Addition of 5% NB80, see additives section*)

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

355-420 tpi (140-165 tpcm) with a mesh opening of 22-38 um monofilament polyester mesh for most applications.

305-355 tpi (120-140 tpcm) 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

Estimated 2,500 – 3,800 square feet (232 - 353 square meters) per gallon depending upon ink deposit. Reference www.nazdar.com for examples of coverage calculations.

Printing

3400 Series 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 3400 Series with other inks besides the 3400 Series.

Cure Parameters

3400 Series cures when exposed to a single medium pressure mercury vapor lamp emitting output millijoules (mJ) and milliwatts (mW) of:

200+ mJ/cm² @ 800+ mW/cm²
for most colors

300+ mJ/cm² @ 800+ mW/cm²
for opaque whites and blacks

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 resistance to adhesives, and higher residual odor.

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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.

Clears / Varnishes

Mixing Clear / Metallic Mixing Clear: Use 3426 Mixing Clear to reduce the density of colors.

Common Performance Additives

The market specific performance properties of the 3400 Series 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.

Reducer: Use RE304 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.

Adhesion Promoter: Use NB80 UV Adhesion Promoter to enhance adhesion. Add up to 5% by weight. Improved adhesion will be demonstrated within 24 hours, with full cross linking in 3-7 days. Ink mixed with NB80 UV Adhesion Promoter has a 4-8 hour pot life.

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 / 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. Ink taken from the press should not be

returned to the original container; store separately to avoid contaminating unused ink.

Standard 3400 Series items supplied 1 gallon (4/5 kilo) containers or smaller are useable for a period of at least 24 months from the date of manufacture. Inks packaged in 5 gallon or greater (20 kilo or greater) containers may have a significantly reduced shelf life. To obtain the official shelf life letter, Contact Nazdar Technical Service at InkAnswers@nazdar.com or see contact listing at the end of this document.

Processing

Die Cutting, Embossing, and Forming: Allow the thoroughly cured ink film at least a 24 hour post cure.

Adhesive Lamination: With proper cure (see Adhesion Testing section), laminating adhesive can be used with the 3400 Series. It is recommended to wait 24 hours after printing, but it is possible that a shorter post print time would be acceptable to achieve required function. A printer should pre-test before production.

In-Mold Decorating: The 3400 Series may be used in in-mold decorating applications where a deep draw is not required. A tie coat is necessary for printing over the cured ink film for maximum adhesion to the mold resin. The purpose of the tie coat is to create an adhesive layer between the cured ink film and the mold resin.

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

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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.

With aggressive gouging of the surface, the ink should not scratch away to the substrate surface. This level of scratch resistance indicates a cure level appropriate for use with laminating adhesive.

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.

Full adhesion characteristics at proper cure levels are demonstrated within 24 hours.

Weathering / Outdoor Durability

The 3400 Series was formulated for second surface printing on membrane overlays for the appliance, automotive and other applications. The inks are not recommended for long-term outdoor exposure. If the inks are to be used in any type of outdoor application, whether printed first or second surface, the printer has the responsibility to test the inks and substrate to the end use specifications.

Physical Properties Test Results

Except for the Weather Resistance test, the 'Physical Properties' results were obtained by laboratory testing of 3496 Jet Black on polycarbonate using 355 threads per inch (140 threads per centimeter) plain weave. The ink was cured with one medium pressure mercury bulb at 300 watts per inch and conveyor speed of 40 feet per minute, producing 350 millijoules per square centimeter and 1000 milliwatts per square centimeter.

*3400 Series inks were formulated with durable pigments. Weather resistance depends on substrate and climate conditions. The 3400 inks were tested for weather resistance as second surface prints on polycarbonate film and placed in a QUV weatherometer for 1000 hours. QUV settings for this testing were: UVA-340 lamps, 8 hours UV at 60°C and 4 hours condensation at 50°C.

This information is provided as a general indication of the ink performance, not as a specification or a guarantee.

Adhesion

Test: Cross-hatch tape (ASTM D3359)
Result: Pass

Gloss

Test: 60° meter >70
Result: Pass

Hardness

Test: Gardco/Wolff Wilborn Pencil Hardness Tester
Result: 4H

Adhesives Resistance

Test: 3M 468MP adhesive, 24 hours at 60°C
Result: Pass

Chemical Resistance

Test: Isopropyl Alcohol >100 double rubs
Result: Pass

Flexibility

Test: 180° bend
Result: Pass

Weather Resistance

Test: Second Surface, 3 years exterior*
Result: Pass

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.

Standard Printing Colors

Standard Printing Colors have excellent opacity and flow characteristics. These colors are intended to work as supplied.

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34PB24 Deadfront Black appears as an opaque black lighted 1st surface and transparent when lighted 2nd surface.

Pantone Matching System[®] Base Colors

Pantone Matching System Base Colors are used to simulate the Pantone[®] Formulation Guide. These inks are press ready, can be used in matches to achieve Pantone color simulations, or let down with mixing clear. ColorStar[®] Color Management System software uses Pantone Matching System Base Colors to match Pantone colors. Blend formulations are also available at www.nazdar.com using ColorStar On-Line.

60 Series Colors: 3461-3469 colors have a high pigment concentration. These colors are formulated to have some white pigment or opaque pigment to increase opacity.

Halftone Colors

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

Dense Halftone Colors are formulated with increased densities and are designed for printers who want to have the latitude to adjust the density levels.

Toners

Toners produce clean and vibrant colors. Toners can be used as supplied, in color matches or let down with mixing clear.

Halogen-Free Colors

The halogen-free colors are press ready and may also be used to match special colors. These colors are free of the halogens Chlorine and Bromine based on supplier information and in compliance with the electronics industry standard, IEC 61249-2-21 (<http://www.iec.ch/>).

Textured and Lens Clears

Various first surface UV Texture Clears and Lens Clears are used for the membrane overlay market for selective printing. These products should be used independently of the 3400 Series inks, which would be used for the second surface printing.

Nazdar's range of UV Texture Clears and Lens Clears are listed in the 'Packaging / Availability' section. Reference the specific product's

Technical Data Sheet at www.nazdar.com for processing information.

NSC UV Crystal Clear Transparent Inks

NSC UV Crystal Clear Transparent Screen inks exhibit excellent clarity with very little haze, making them ideal for use as transparent window colors. NSC UV Crystal Clear Transparent inks may be printed top or sub surface

Nazdar's range of NSC UV Crystal Clear Transparent colors are listed in the 'Packaging / Availability' section. Reference the specific product's Technical Data Sheet at www.nazdar.com for processing information.

Pantone 871c-877c Metallic Simulated Colors

Pantone[®] 871c to 877c colors have been matched in 3400 Series ink using pearlescent pigments. When printed on a white background, a gold or silver metallic effect is achieved. A 305 tpi (120 tpcm) monofilament polyester mesh is recommended.

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 3400 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.

Metallic Silver (aluminum): Add up to 8% by weight.

Metallic Gold (bronze): Add up to 15% by weight. Chemical reactions in metallic inks may result in viscosity, color and printability changes over time; due to this, mix only enough metallic ink to be used the same day.

Pearlescent / Interference: Add up to 20% by weight.

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

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Color Card Materials

The following is a list of available screen printed sample literature representing 3400 Series and supporting inks.

3400 Series UV Screen Ink Color Card (CARD34): shows all standard 3400 colors.

Halogen-Free Color Presenter (CARDHF): shows all the halogen-free colors.

NSC UV Air Texture Clears (LIT0217): shows the standard UV air texture clears.

NSC UV Crystal Clear Transparent Ink Color Card (CARDSS2): shows standard high density crystal clear transparent colors designed to print on windows.

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

Non-Metallic Pantone Simulations sheet (LIT0121): shows the 871c to 877c Pantone metallic color matches using pearlescent pigments.

Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

*These colors are not recommended in applications that require high heat during processing.

** Refer to the individual product's Technical Data Sheet for detailed information on processing.

Standard Ink Items

Standard ink items listed below are inventoried in gallon containers, unless indicated.

Standard Printing Colors

Item Number	Color
3411*	Lemon Yellow
3419*	Fire Red
3426	Mixing Clear
3477	Super Opaque Black
3478	High Intensity White
3479	High Intensity Black
3498	Bright White
34PB24	Deadfront Black <i>(in kilograms only)</i>

Pantone Matching System® Base Colors

Item Number	Color
3458	Tinting White
3459	Tinting Black
3461	Yellow
3462*	Warm Red
3463	Rubine Red
3464	Rhodamine Red
3465	Purple
3466	Violet
3467	Reflex Blue
3468	Process Blue
3469	Green

Toners

(in kilograms only)

Item Number	Color
3480	Yellow Toner (GS)
3481	Orange Toner
3482	Carmine Toner
3483	Magenta Toner
3484	Maroon Toner
3485	Green Toner
3486	Blue Toner (GS)
3487	Blue Toner (RS)
3488	Violet Toner
3489	Red Toner
34PB12	Trans Medium Yellow (RS)
34PB18	Trans Red (BS)
34PB60	Trans Red (YS)

Halftone Colors

Item Number	Color
3490	Halftone Extender Base
34101	Halftone Cyan Dense
34102	Halftone Magenta Dense
34103	Halftone Yellow Dense
34104	Halftone Black Dense

NSC Lens Clear

Item Number	Color
NSC43**	Lens Clear

Clears for Selective Texturing

Item Number	Color
NSC40**	UV Air Texture Clear Fine
NSC41**	UV Air Texture Clear
NSC47**	UV Air Texture Very Fine

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NSC48**	UV Air Texture Medium
NSC49**	UV Air Texture Coarse
NSC50**	UV Air Texture Very Coarse
NSC51**	UV Air Texture Clear
NSC52**	UV Air Texture Clear
PSPC27**	Very Coarse Nitrogen TC
PSPC27H**	Very Fine Nitrogen TC
PSPC27T**	Fine Nitrogen TC
PSPC27Y**	Fine Nitrogen TC

NSC Crystal Clear Transparent Colors
(in kilograms only)

Item Number	Color
NSC29**	UV Crystal Mixing Clear
NSC30**	UV Crystal Clear Yellow (GS)
NSC31**	UV Crystal Clear Yellow (RS)
NSC32**	UV Crystal Clear Red (BS)
NSC33**	UV Crystal Clear Red (YS)
NSC34**	UV Crystal Clear Magenta
NSC35**	UV Crystal Clear Violet
NSC36**	UV Crystal Clear Blue (GS)
NSC37**	UV Crystal Clear Blue (RS)
NSC38**	UV Crystal Clear Green
NSC39**	UV Crystal Clear Black

Non-Standard Ink Items

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

Printing Colors

Item Number	Color
3420*	Orange
3496	Jet Black
3499	Black Concentrate

Clears for Selective Texturing

Item Number	Color
NSC42C**	Nitrogen TC Coarse
NSC42F**	Nitrogen TC Fine

Halogen-Free Colors
(only in kilograms)

Item Number	Color
34200	Halogen-Free Mixing Clear
34201	Halogen-Free Tinting Black
34202	Halogen-Free Tinting White
34205	Halogen-Free Super Opaque Black
34206	Halogen-Free Super Opaque White
34210	Halogen-Free Yellow
34211	Halogen-Free Orange
34212	Halogen-Free Red
34213	Halogen-Free Carmine
34214	Halogen-Free Magenta
34215	Halogen-Free Maroon
34216	Halogen-Free Violet
34217	Halogen-Free Blue RS
34218	Halogen-Free Blue GS
34219	Halogen-Free Green

Pantone 871c-877c Metallic Simulated Colors

Item Number	Color
67327234	SPL 34 871C Pearl Gold
67327334	SPL 34 872C Pearl Gold
67327434	SPL 34 873C Pearl Gold
67327534	SPL 34 874C Pearl Gold
67327634	SPL 34 875C Pearl Gold
67327734	SPL 34 876C Pearl Gold
67327834	SPL 34 877C Pearl Silver

Additives / Reducers

Additives/Reducers listed below are inventoried and available in quart/liter and gallon containers.

Item Number	Item Description
RE304	UV Reducer
NB80	UV Adhesion Promoter

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

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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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