Nazdar 4000 UV / LED Screen Ink Series

4000 Series UV/LED Screen Ink is a unique multi-purpose graphic screen printing ink formulated to adhere to a wide range of substrates and provide the flexibility to be suitable for heat-bending, router cutting, and low draw thermoforming for the sign and graphics markets.

Substrates

Rigid vinyl (PVC)
Polyethylene Terephthalate Glycol (PETG)
Treated polypropylene (PP)
Treated fluted/corrugated polypropylene (PP)
Treated Polyethylene (Flatstock HDPE)
Styrene / Polystyrene (PS)
Acrylonitrile-Butadiene-Styrene (ABS)
Acrylics

Substrate Material(s) listed below may be Limited in Adhesion *(testing highly recommended for each print run)*
Coated paper / Coated cardstock
Static Cling / Window Cling (PVC)
Flexible vinyl (PVC)

Notes & Cautions

The surface tension for polyethylene and polypropylene substrates should be at or above 44 dynes/cm.

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) monofilament polyester mesh with a mesh opening of 22-38 um for most applications.

305-355 tpi (120-140 tpcm) monofilament polyester mesh with a mesh opening of 50 um or more 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: 3,200 – 4,200 square feet (295 - 390 square meters)
Reference www.nazdar.com/en-us/ColorStar 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.

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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.

Pad Printing

When pad printing with a UV ink on a 3D image, care must be taken to assure the correct amount of UV light output reaches the entire ink surface. Cure units that rotate the printed part in front of the cure lamp are the best solution for UV pad printing.
These UV inks can be pad printed. The use of thinners may be required to achieve the correct transfer. Please follow the printing and curing guidelines.

Use a silicone pad with good chemical resistance for printing. Clean equipment using the chemicals listed in the Cleanup section.

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:

100-180 mJ/cm² @ 600+ mW/cm² for most colors
180+ mJ/cm² @ 600+ mW/cm² for 4078, 4079, 4050, 4099, 40156

When 2 lamps are used for curing a color, the first lamp should provide the required level of output. Additional output may be required when printing over a dark or colored background.

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.

UV-LED Curing: cures when exposed to a Phoseon FireLine 4-8 watt, 385-405 nm lamp at a distance of .15 to .25 inches (4 to 6 mm) for most colors. Lamps of similar performance are expected to provide the necessary output to effectively cure the ink.

The following standard colors and color matches using these items require 8-12 watt LED lamp output to cure: 4010, 4020, 4027, 4052, 4079, and 40143.
The following standard colors and color matches containing these items have not shown to cure using a 20 watt or lower LED lamp output: 4050, 4099, 40153, 40154, and 40156.

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.

Processing

These inks have been formulated to provide a mar resistant ink surface after UV curing. Exposure to additional high heat levels increases the level of gouging or scratch resistance.
Finishing: Pre-qualify any finishing processes before full scale production.
Stacking: suitable for immediate stacking ink to substrate. Block resistance is influenced by the degree of cure, the weight of the substrates when stacked, and the heat and humidity of the printing environment. Although surface hardness of the cured ink film has been optimized for handling, the printer must assume responsibility for pre-testing and qualifying the parameters for stacking prints prior to each production run.
Cutting: suitable for router cutting, guillotine cutting, and die cutting.
Heat Bending: suitable for heat bending at a 180° angle, inward and outward. Areas exposed to high heat may exhibit a harder ink surface.
Thermoforming / Drape Forming: suitable for 3-4" (8-10 cm) thermoforming draw and drape forming.
Use with pre-mask: not suitable for most applications. The printer is responsible to pre-test prior to full production printing.
Use with adhesives: not recommended for use with most adhesives. Some non-aggressive screen printable adhesives have shown to be compatible in limited applications. The printer is responsible to pre-test prior to full production printing.

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Adhesion Testing
When recommended UV energy output levels are achieved, checking the degree of cure on a **cooled down** print is imperative:
- 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.
Overprint Clear: use to provide added surface protection and increase durability.
Premium Overprint Clear: use to provide added maximum outdoor durability.

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.

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.
RE315 UV Reducer: add up to 10%.

UV Hardener
Use the following product(s) to reduce the viscosity and increase the surface hardness of these inks.
CARE58 Fast Rigid Thinner: 5%, Addition of Care58 may reduce the formability and flexibility of the printed ink.

Adhesion Promoter
Use the following item(s) to enhance adhesion.
NB80 UV Adhesion Promoter: add up to: 5%. Improved adhesion will be demonstrated within 8-24 hours, with full crosslinking in 4-7 days. Ink mixed with NB80 UV Adhesion Promoter has a 4-8 hour pot life. NB80 is sensitive to humidity and moisture; clean the lid and container thoroughly after each use to prevent fusing of the container. Addition of NB80 may reduce the flexibility of the printed ink.

Gloss / Flattening Powders / Improved Slip
Use the following product(s) to reduce the viscosity and increase the surface hardness of these inks.
CARE63 Anti Blocking Additive: add up to 5%. Addition of Care63 may reduce the formability and flexibility of the printed ink. Addition of Care63 will lower the gloss level of these inks.

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.

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

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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).

Weathering / Outdoor Durability

At full strength and properly cured, the outdoor durability when mounted vertically in the Central U.S.A: **2-3 years**
Outdoor durability can be increased by applying an overprint clear.
Use 4027 Overprint Clear to extend the outdoor durability approximately **6-12 months**. Use 4029 Premium Overprint Clear to extend the outdoor durability approximately 18-24 months.

Outdoor Durability Exceptions

White, grey or beige colors tend to chalk in approximately **2 years**, it is always recommended to use an overprint clear such as 4027 or 4029 when printing these colors for outdoor durability.Overprint Clear.

4019 Fire Red, 4020 Brilliant Orange, and 40362 Warm Red have an estimated **2 years** outdoor durability without an overprint clear and **3 years** using 4029 Premium Overprint Clear.

Special mixed metallic silver colors using Nazdar approved aluminum or pearlescent pigments and overprinted with 4029 Premium Overprint Clear have a projected **3-4 year** outdoor durability.

Special mixed metallic colors using gold or bronze metallic pigments are not recommended for outdoor durability as these powders tarnish within **6 months**, even when overprinted with a clear. To achieve more durable gold and bronze colors use aluminum or pearlescent pigments in blends overprinted with 4029 Premium Overprint Clear.

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.

Ink taken from the press should not be returned to the original container; store separately to avoid contaminating unused ink. 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 kg) containers or smaller. Useable for a period of at least **24 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 Nazdar Customer Service or Nazdar Technical Service. See contact listing at the end of this document.

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.

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

High Intensity Halftone Black has been developed to function as a dense halftone and line color in a single pass.

Medium Tack Rheology (MTR) Halftones can achieve processing speeds for flatbed, clam shell and most in-line presses while maintaining dot quality.

Halftone Colors Product Specific
Backlit Halftones: Backlit Halftones have been specially formulated with high color saturation to provide intense color when finished prints are backlit. Backlit Halftones require a higher level of UV output to cure properly.

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

Pantone Base Colors
Pantone Matching System Base Colors are used to simulate the Pantone® Formulation Guide when printed on a white substrate. 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.

360 Series Colors: These colors are formulated to have no white or opaque pigments. This allows the colors to be more vibrant and allows for a better match of intense and darker colors.

Series Specific
4050 Barrier White and 4099 Barrier Black provide the highest level of opacity of any of the 4000 Series black or white items. These colors are intended to work as supplied.

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 the ink. Contact Nazdar for the item number(s) and availability of special effect products or they can be found at www.nazdar.com.

Metallic Silver (aluminum), add up to: 8%
Metallic Gold (bronze), add up to: 15%
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%
Multi-Chromatic, add up to: 10%
Phosphorescent , add up to: 30%

Fluorescents, add up to: 30%
Fluorescent colors fade quickly with exposure to ultraviolet light. This includes outdoor exposure as well as UV reactor exposure.

Color Card Materials
The following is a list of available literature representing this ink series.
- UV Color Card (CARDUV): shows the Standard Printing Colors, Pantone Matching System Base Colors, and Halftone Colors
- Special Effects Color Card (CARDSPL): shows various special effect pigments mixed with clear

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Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

Item Type	Item Number	Item (or Color) Description
MTR Halftone Colors	40140	Halftone Extender Base
MTR Halftone Colors	40141	Halftone Cyan
MTR Halftone Colors	40142	Halftone Magenta
MTR Halftone Colors	40143	Halftone Yellow
MTR Halftone Colors	40144	Halftone Black
MTR Halftone Colors	40151	Halftone Cyan Dense
MTR Halftone Colors	40152	Halftone Magenta Dense
MTR Halftone Colors	40153	Halftone Yellow Dense
MTR Halftone Colors	40154	Halftone Black Dense
MTR Halftone Colors	40156	High Intensity Halftone Black
Standard Colors	4010	Primrose Yellow
Standard Colors	4011	Lemon Yellow
Standard Colors	4012	Medium Yellow
Standard Colors	4013	Emerald Green
Standard Colors	4019	Fire Red
Standard Colors	4020	Brilliant Orange
Clears / Varnishes	4026	Mixing Clear
Clears / Varnishes	4027	Overprint Clear
Clears / Varnishes	G4027	Glossy Overprint Clear
Clears / Varnishes	M4027	Matte Overprint Clear
Clears / Varnishes	4029	Premium Overprint Clear
Standard Colors	4050	Barrier White
Standard Colors	4052	Super Opaque Black
Standard Colors	4067	Reflex Blue
Standard Colors	4068	Process Blue
Standard Colors	4075	Super Opaque White
Standard Colors	4078	High Intensity White
Standard Colors	4079	High Intensity Black
Standard Colors	4099	Barrier Black
Pantone Base Colors	40358	Tinting White
Pantone Base Colors	40359	Tinting Black
Pantone Base Colors	40360	Orange
Pantone Base Colors	40361	Yellow
Pantone Base Colors	40362	Warm Red
Pantone Base Colors	40363	Rubine Red
Pantone Base Colors	40364	Rhodamine Red
Pantone Base Colors	40365	Purple
Pantone Base Colors	40366	Violet
Pantone Base Colors	40367	Reflex Blue
Pantone Base Colors	40368	Process Blue
Pantone Base Colors	40369	Green
Additives	CARE58	Rigid Fast Thinner
Additives	CARE63	Anti-Blocking Additive
Additives	NB80	UV Adhesion Promoter
Additives	RE315	UV Reducer
Cleaners	IMS201	Premium Graphic Screen Wash
Cleaners	IMS203	Economy Graphic Screen Wash

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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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