Nazdar 1600 UV Screen Ink Series

The multi-purpose PowerPrint® 1600 UV Screen Ink Series meets the increased processing speeds of modern printing equipment, curing at lower levels of ultraviolet energy, thereby reducing energy costs and substrate heat exposure. PowerPrint® 1600 Series cures to a tough finish that is highly block resistant. It is engineered to be cost effective for indoor and outdoor retail displays. PowerPrint® 1600 Series includes both gloss and matte colors.

Substrates

Coated paper / Coated cardstock
Styrene (PS)
Rigid vinyl (PVC)
Pressure sensitive calendered vinyl (PVC)
Polycarbonate (PC)
Treated fluted/corrugated polypropylene (PP) with catalyst, see Additives section

Substrate Material(s) listed below may be Limited in Adhesion (testing highly recommended for each print run)
Acrylics (PMMA)

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) 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: 3,200 – 4,200 square feet (295 - 390 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.

Note: Thin gauge vinyl or styrene substrate may become more brittle after printing, especially with higher heat output from the UV cure reactor and/or with 2-sided printing. Thorough print, finishing, shipping, and display testing should be conducted prior to full production.

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
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.
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.

Use a silicone pad with good chemical resistance for printing. Clean equipment using the chemicals listed below 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:

80-100 mJ/cm² @ 600+ mW/cm² for most colors
100-130 mJ/cm² @ 600+ mW/cm² for opaque white and black colors

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.

Note: *Porous substrates allow ink to dive below the surface requiring a more thorough cure to overcome the added ink thickness.*

Processing
The excellent adhesion and hard surface finish of the PowerPrint® 1600 Series allows for the stacking of printed sheets ink to ink without blocking problems on coated paper, coated board, rigid styrene, rigid vinyl and rigid plastic substrates.

Inter-Printable
When these inks are to be inter-printed with the following ink(s), all ink layers must be evaluated for inter-coat adhesion before proceeding with the production run.

PowerPrint® 32500's® Series inks

Refer to the inter-printed ink's Technical Data Sheet for processing recommendations.

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.

Full adhesion characteristics at proper cure levels are demonstrated within: 4 hours

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 to provide added surface protection and increase durability.
Matte Overprint Clear: use to reduce the gloss level of the print.

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.
RE301 UV Reducer: add up to 10%

Flexibilizer
Use the following item(s) to increase the flexibility of these inks. The addition of flexibilizer could show a decrease in block resistance.
RE308 UV Reducer: add up to: 10%

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.

Gloss / Flattening Powders / Improved Slip
Use to reduce gloss and improve slip.
CARE118 UV Satin Paste add up to 20%, power mix into the ink.
CARE63 Anti Blocking Additive: add up to: 10%, power mix into the ink.

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.
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).

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®).

Weathering / Outdoor Durability
At full strength and properly cured, the outdoor durability when mounted vertically in the Central U.S.A: **2 years**
Outdoor durability can be increased by applying an overprint clear.

Outdoor Durability Exceptions
1600 Matte Colors and 1600 EC (Economy) Halftones have a projected **6 months** outdoor 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.

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 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 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.

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.

Yellow Dense (RS) Halftone is intended to better facilitate matching redder shades without blending Halftone Magenta into the Halftone Yellow.

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

Low Tack Rheology (LTR) Halftones can achieve the fastest processing speeds on newer in-line presses and cylinder presses while maintaining dot quality with very minimum dot pile.

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

Economy (EC) Magenta & Economy (EC) Yellow Halftones are formulated to provide a cost effective alternative to the more durable Halftone Magenta and Yellow. Economy Halftone Colors are indoor/short-term outdoor colors.

Matte Halftones are formulated with hues and densities similar to the standard halftones and exhibit a flat finish.

T7 Halftones are designed to print to the targeted values of the seven colors (CMYK & RGB) as stated in ISO 12647-2 specification for process color reproduction. These inks can meet the ISO targeted numbers and achieve a neutral 100x3 black when printed on a substrate with a white value similar to a #1 Grade Coated Paper. Best results are achieved when printing these inks at the following solid ink density values and printing sequence: Cyan 1.45 – 1.50, Yellow 0.95 – 1.00, Magenta 1.25 – 1.30.

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

Matte Standard Printing Colors
Matte Standard Printing Colors: are supplied in a limited range. These colors are intended to work as supplied and exhibit a matte finish.

Pantone 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.

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.

Matte 360 Series Colors: 360-369 colors are used in the same manner as the Pantone Matching System Base Colors but exhibit a flat finish.

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
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

Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

Item Type	Item Number	Item (or Color) Description
LTR T7 Halftone Colors	16120	Halftone Extender Base
LTR T7 Halftone Colors	16121	Halftone Cyan
LTR T7 Halftone Colors	16124	Halftone Black
LTR T7 Halftone Colors	16126	Halftone Magenta
LTR T7 Halftone Colors	16127	Halftone Yellow
LTR T7 Halftone Colors	16131	Halftone Cyan Dense
LTR T7 Halftone Colors	16134	Halftone Black Dense
LTR T7 Halftone Colors	16137	Halftone Yellow Dense
LTR Halftone Colors	16EC137	Economy Halftone Yellow Dense
LTR Halftone Colors	16138	Halftone Magenta Dense
LTR Halftone Colors	16128	Halftone Magenta
LTR Halftone Colors	16EC138	Economy Halftone Magenta Dense
MTR T7 Halftone Colors	16140	Halftone Extender Base
MTR T7 Halftone Colors	16141	Halftone Cyan
MTR T7 Halftone Colors	16144	Halftone Black
MTR T7 Halftone Colors	16146	Halftone Magenta
MTR T7 Halftone Colors	16147	Halftone Yellow
MTR T7 Halftone Colors	16151	Halftone Cyan Dense
MTR T7 Halftone Colors	16154	Halftone Black Dense
MTR T7 Halftone Colors	16157	Halftone Yellow Dense
MTR Halftone Colors	16EC147	Economy Halftone Yellow
MTR Halftone Colors	16148	Halftone Magenta
MTR Halftone Colors	16EC148	Economy Halftone Magenta
MTR Halftone Colors	16155	Halftone Yellow Dense RS
MTR Halftone Colors	16156	High Intensity Halftone Black
MTR Halftone Colors	16EC157	Economy Halftone Yellow Dense
MTR Halftone Colors	16158	Halftone Magenta Dense
MTR Halftone Colors	16EC158	Economy Halftone Magenta Dense
Matte Halftone Colors	M1690	Matte Halftone Extender Base
Matte Halftone Colors	M1691	Matte Halftone Cyan
Matte Halftone Colors	M1692	Matte Halftone Magenta
Matte Halftone Colors	M1693	Matte Halftone Yellow
Matte Halftone Colors	M1694	Matte Halftone Black
Standard Colors	1610	Primrose Yellow
Standard Colors	1611	Lemon Yellow
Standard Colors	1612	Medium Yellow
Standard Colors	1613	Emerald Green
Standard Colors	1619	Fire Red
Standard Colors	1620	Brilliant Orange
Standard Colors	1626	Mixing Clear
Standard Colors	1627	Overprint Clear
Standard Colors	1636	Metallic Mixing Clear
Standard Colors	1652	Super Opaque Black
Standard Colors	1667	Reflex Blue
Standard Colors	1668	Process Blue
Standard Colors	1675	Super Opaque White
Standard Colors	1678	High Intensity White
Standard Colors	1679	High Intensity Black
Standard Colors	1698	Bright White
Standard Matte Colors	M1626	Matte Mixing Clear
Standard Matte Colors	M1627	Matte Overprint Clear

Standard Matte Colors	M1652	Matte Super Opaque Black
Standard Matte Colors	M1675	Matte Super Opaque White
Standard Matte Colors	M1679	Matte High Intensity Black
Pantone Base Colors	16358	Tinting White
Pantone Base Colors	16359	Tinting Black
Pantone Base Colors	16360	Orange
Pantone Base Colors	16361	Yellow
Pantone Base Colors	16362	Warm Red
Pantone Base Colors	16363	Rubine Red
Pantone Base Colors	16364	Rhodamine Red
Pantone Base Colors	16365	Purple
Pantone Base Colors	16366	Violet
Pantone Base Colors	16367	Reflex Blue
Pantone Base Colors	16368	Process Blue
Pantone Base Colors	16369	Green
Matte Mixing Colors	M16358	Matte Tinting White
Matte Mixing Colors	M16359	Matte Tinting Black
Matte Mixing Colors	M16360	Matte Orange
Matte Mixing Colors	M16361	Matte Yellow
Matte Mixing Colors	M16362	Matte Warm Red
Matte Mixing Colors	M16363	Matte Rubine Red
Matte Mixing Colors	M16364	Matte Rhodamine Red
Matte Mixing Colors	M16365	Matte Purple
Matte Mixing Colors	M16366	Matte Violet
Matte Mixing Colors	M16367	Matte Reflex Blue
Matte Mixing Colors	M16368	Matte Process Blue
Matte Mixing Colors	M16369	Matte Green
Pantone 871c-877c Metallic	67324916	SPL 16 871C Pearl Gold
Pantone 871c-877c Metallic	67324316	SPL 16 872C Pearl Gold
Pantone 871c-877c Metallic	67324416	SPL 16 873C Pearl Gold
Pantone 871c-877c Metallic	67324516	SPL 16 874C Pearl Gold
Pantone 871c-877c Metallic	67324616	SPL 16 875C Pearl Gold
Pantone 871c-877c Metallic	67324716	SPL 16 876C Pearl Gold
Pantone 871c-877c Metallic	67324816	SPL 16 877C Pearl Silver
Additives	RE301	UV Reducer
Additives	RE308	UV Reducer
Additives	CARE118	UV Satin Paste
Additives	CARE63	Anti-Blocking Additive
Additives	NB80	UV Adhesion Promoter
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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