Technical Data Sheet

Nazdar 4200 UV Screen Ink Series

v 4 EN

Ref: v 3 EN

Nazdar's 4200 Series UV Screen Ink incorporates the newest formulation technology to optimize cure speed, adhesion range, ink film flexibility, print speed, and image quality. 4200 Series represents a breakthrough in providing a competitive, high quality ink that withstands some of the toughest finishing and shipping requirements in the graphics market. Nazdar's 4200 Series UV Screen Ink has been formulated for indoor and short-term outdoor performance on a wide range of substrates including styrene, coated paper and corrugated polypropylene substrates.

Substrates

- Coated Cardstock / Coated Paper
- Styrene
- Ridged Vinyl
- Top Coated Polyester
- Pressure Sensitive Vinyl
- Treated Polyethylene Banner
- Some High Density Polyethylene Sheeting
- Treated Corrugated polypropylene

(Note: 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) with a mesh opening of 22-38 um monofilament polyester mesh 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 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 – 3,500 square feet (232 - 325 square meters) per gallon depending upon ink deposit. Reference www.nazdar.com for examples of coverage calculations.

Printing

4200 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 4200 Series with other inks besides the 4200 Series.

Cure Parameters

4200 Series cures when exposed to a single medium pressure mercury vapor lamp emitting output millijoules (mJ) and milliwatts (mW) of:

100-150 mJ/cm² @ 600+ mW/cm²

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.

UV Screen Ink

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 can allow ink to dive below the surface requiring a more thorough cure to overcome the added ink thickness. 4200 Series ink is not recommended for porous substrates.

Clears / Varnishes

Mixing Clear: Use 4226 Mixing Clear to reduce the density of colors.

Overprint Clear: Use 4227 Overprint Clear to provide added surface protection and increase durability.

Common Performance Additives

The market specific performance properties of the 4200 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 RE312 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 4-7 days. Ink mixed with # 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 4200 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

Cutting: suitable for router cutting, guillotine cutting, and die cutting.

Heat Bending: suitable for limited heat bending applications. Any heat bending applications should be qualified prior to full production printing.

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 Material Safety Data Sheet (MSDS) for further instructions and warnings.

4200 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 www.nazdar.com/health_safety.asp 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. Thumb twist – the ink surface should not mar or smudge.
2. Scratch surface – the ink surface should resist scratching. Some cardstocks scratch easily, so use magnification to determine if scratches are ink only or ink and top layer of substrate.
3. 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.

Weathering / Outdoor Durability

At full strength and properly cured, 4200 Series colors are formulated to provide 1 year outdoor durability when mounted vertically in the Central U.S.A. The use of 4227 Overprint Clear increases outdoor durability.

Exceptions: 4219, 4220, 42EC360, 42EC362, 42EC142, 42EC143, 42EC152, 42EC153, 42EC122, 42EC123, 42EC132, and 42EC133 have a projected 6 months outdoor durability.

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
  - 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

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.

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.

360 Series Colors: 42360-42369 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.

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.

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

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

Pantone 871c-877c Metallic Simulated Colors

Pantone® 871c to 877c colors have been matched in 4200 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 4200 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.

Phosphorescent: Add up to 50% by weight.

Fluorescents: Add up to 30% by weight. 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 screen printed sample literature representing 4200 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.

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.

Standard Ink Items

Standard ink items listed below are inventoried in gallon containers.

MTR T7 Standard / Dense Halftone Colors
(Medium Tack Rheology)

Item Number	Color
42140	Halftone Extender Base
42141	Halftone Cyan
42EC143	Halftone Yellow
42146	Halftone Magenta
42144	Halftone Black
42151	Halftone Cyan Dense
42EC153	Halftone Yellow Dense
42154	Halftone Black Dense

MTR Standard / Dense Halftone Colors
(Medium Tack Rheology)

Item Number	Color
42EC142	Economy Halftone Magenta
42EC152	Economy Halftone Magenta Dense

Nazdar 4200 UV Screen Ink Series

Standard Printing Colors

Item Number	Color
4211	Lemon Yellow
4212	Medium Yellow
4219	Fire Red
4221	Peacock Blue
4226	Mixing Clear
4227	Overprint Clear
4252	Super Opaque Black
4267	Reflex Blue
4268	Process Blue
4275	Super Opaque White
4278	High Intensity White
4279	High Intensity Black

Pantone Matching System® Base Colors

Item Number	Color
42358	Tinting White
42359	Tinting Black
42360	Orange
42361	Yellow
42362	Warm Red
42363	Rubine Red
42364	Rhodamine Red
42365	Purple
42366	Violet
42367	Reflex Blue
42368	Process Blue
42369	Green

Economy Mixing Colors

Item Number	Color
42EC360	Economy Orange
42EC362	Economy Warm Red

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
4210	Primrose Yellow
4213	Emerald Green
4220	Brilliant Orange

MTR Standard / Dense Halftone Colors
(Medium Tack Rheology)

Item Number	Color
42142	Halftone Magenta
42143	Halftone Yellow
42152	Halftone Magenta Dense
42153	Halftone Yellow Dense

LTR Standard / Dense Halftone Colors
(Low Tack Rheology)

Item Number	Color
42120	Halftone Extender Base
42121	Halftone Cyan
42122	Halftone Magenta
42EC122	Economy Halftone Magenta
42123	Halftone Yellow
42EC123	Economy Halftone Yellow
42124	Halftone Black
42131	Halftone Cyan Dense
42132	Halftone Magenta Dense
42EC132	Economy Halftone Magenta Dense
42133	Halftone Yellow Dense
42EC133	Economy Halftone Yellow Dense
42134	Halftone Black Dense

Pantone 871c-877c Metallic Simulated Colors

Item Number	Color
6002751942	SPL 42 871C Pearl Gold
6002752042	SPL 42 872C Pearl Gold
6002752142	SPL 42 873C Pearl Gold
6002752242	SPL 42 874C Pearl Gold
6002752342	SPL 42 875C Pearl Gold
6002752442	SPL 42 876C Pearl Gold
6002752542	SPL 42 877C Pearl Silver

Additives / Reducers

Item Number	Item Description
RE312	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

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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