The 2300 Series UV / UV-LED Screen Ink is tailored to meet the needs of the container market for printing on various glass and plastic bottles used in the packaging of cosmetics, household chemicals and other similar applications. 2300 Series is a multi-cure ink system and formulated to cure with UV-LED with peak wavelength emission of 385-405 nanometers and traditional UV mercury vapor curing system. The ink has been formulated to meet the processing requirements of the container printing industry, such as adhesion to commonly used plastics, opacity, resistance to commonly used chemicals, and speed of cure.

**Primary Substrates**

**Core Substrates**
- Glass
- Polyethylene terephthalate (PET)

**Additional Substrates**
- Treated high density polyethylene (HDPE)
- Treated low density polyethylene (LDPE)
- Treated polypropylene (PP)

*The surface tension 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 tpi (120 tpcm) monofilament polyester mesh for NSC231 Frost Clear MD and other special effect pigments.

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 3,200 – 4,200 square feet (295 - 390 square meters) per gallon depending upon ink deposit.

**Printing**
2300 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 2300 Series with other inks besides the 2300 Series.

**Pad Printing**
2300 Series can be pad printed. 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 scuff resistance, reduced durability, and higher residual odor. “Overcuring” the ink may reduce the flexibility of the printed part and adhesion of subsequent ink layers.

To increase mW levels, increase the wattage setting of the UV reactor.

Mercury Vapor UV Curing: 2300 Series has been optimized for 395nm LED curing; however, most 2300 Ink Series colors cure when exposed to a single medium pressure mercury vapor lamp emitting output millijoules (mJ) and milliwatts (mW) of:

120+ mJ/cm² @ 600+ mW/cm² for most colors

Note: 2378 High Intensity White, 2376 HB High Intensity White, and 2398 Bright White may exhibit poor scratch resistance at full cure with the use of mercury vapor curing and require an additive to increase adhesion.

UV-LED Curing: 2300 Ink Series cures when exposed to a Phoseon FireLine 4+ watt, 385-405 nm lamp at a distance of .15 to .25 inches (4 to 6 mm). Lamps of similar performance are expected to provide the necessary output to effectively cure the ink.

Clears / Varnishes
Mixing Clear: Use 2326 Mixing Clear to reduce the density of colors.

Overprint Clear: Use 2327 Overprint Clear to provide added surface protection and increase durability.

Common Performance Additives
The market specific performance properties of the 2300 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.

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

Reducer: Use RE310 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.

Increase Viscosity: Use SIPH414 Thickener to increase the viscosity of the ink. Add up to 1% by weight. This is expected to also lower the gloss level of the ink.

UV Hardener: Use CARE69 UV Hardener to improve chemical resistance and to minimize scuffing especially on prints immediately out of the curing unit. CARE69 will not affect the shelf stability and viscosity of the ink mixture.

However, the addition of CARE69 will make the cured ink film less flexible and may affect ink to ink or inter-coat adhesion. Test thoroughly before any production as to suitability for the printing and end use requirements.

Add up to 5% by weight for plastic containers.
Add up to 10% by weight for glass containers.

Adhesion Promoter:
Use only one type of adhesion promoter / catalyst in an ink at a time. Mixing multiple reactive additives together in an ink can cause undesirable results.

Use NB23 Catalyst to enhance adhesion and chemical resistance, especially on glass. Add up to 3% by weight. Ink will be soft with initial curing, but will exhibit improved adhesion and chemical resistance within 24 hours. Most colors mixed with NB23 Catalyst have a 3-5 hour pot life; colors containing black have a 30-60 minute pot life.

Use CARE106 UV Catalyst / Charger to increase scuff resistance, chemical resistance and water resistance, especially for plastic applications. Add up to 10% by weight. Improved adhesion and water resistance will be demonstrated within 24 hours. Ink mixed with CARE106 has an 8-12 hour pot life with performance properties slowly declining with time.

Use NB26 Glass Catalyst to enhance the adhesion to Glass. 5% addition by weight of NB26 is sufficient in most cases, however, 10% can be added. Do not exceed 10%. Full adhesion and
water resistance will be demonstrated within 24 hours. Inks mixed with NB26 will have a 4-6 hour pot life.

Use NB27 Glass Catalyst to enhance the adhesion to Glass. 5% addition by weight of NB27 is sufficient in most cases, however, 10% can be added. Do not exceed 10%. Full adhesion and water resistance will be demonstrated after 24 hours. Inks mixed with NB27 will have a 8-10 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.


**Storage**

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 2300 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. For more detail pertaining to the shelf life of Nazdar’s ink products, contact Nazdar Technical Service at InkAnswers@nazdar.com or see contact listing at the end of this document.

**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 https://www.nazdar.com 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. Touch of ink surface – the ink surface should be smooth.
2. Thumb twist – the ink surface should not mar or smudge. Some additives may show marring and require 24 hours for post cure.
3. Scratch surface – the ink surface should resist scratching. Some additives may show marring and require 24 hours for post cure.
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.

**Weathering / Outdoor Durability**

The 2300 Series was formulated for printing on containers for packaging applications. These inks are not recommended for long-term outdoor exposure. If the inks are to be used in any type of outdoor application, the printer and/or the end user has the responsibility to test the inks and substrate to the end use specifications.

**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.

360 Series Colors: 23360-23369 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.

Frost Textured Effect Clear
NSC231 UV / UV-LED Frost Clear MD Screen Ink has been formulated to provide a frosted look and medium textured feel. Finer and coarser textures are be available upon request.

Tinting: Use 23358 Tinting White, 2378 High Intensity White, or 2376 HB High Intensity White to increase the opacity of the NSC231. Other 2300 series colors can be used to tint the NSC231. Large additions of tinting ink decrease the textured feel of the frost effect and can adversely affect curing.

Use 2327 Overprint Clear to increase the clarity of the frosted effect. This decreases the textured feel of the ink.

Special Effect Pigments

When inks are to be printed with a special effect pigment, 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 2300 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 30% by weight.

Fluorescent: 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 samples of the 2300 Series.


Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

Standard Ink Items

HB = heavy body

Standard Printing Colors

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<thead>
<tr>
<th>Item Number</th>
<th>Color</th>
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</thead>
<tbody>
<tr>
<td>2310</td>
<td>Primrose Yellow</td>
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<tr>
<td>2312</td>
<td>Medium Yellow</td>
</tr>
<tr>
<td>2319</td>
<td>Fire Red</td>
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<tr>
<td>2326</td>
<td>Mixing Clear</td>
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<tr>
<td>2327</td>
<td>Overprint Clear</td>
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<tr>
<td>2378</td>
<td>High Intensity White</td>
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<tr>
<td>2379</td>
<td>High Intensity Black</td>
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<td>2377</td>
<td>HB High Intensity Black</td>
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<tr>
<td>2398</td>
<td>Bright White</td>
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Pantone Matching System® Base Colors

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<tr>
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<tr>
<td>23358</td>
<td>Tinting White</td>
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<td>23359</td>
<td>Tinting Black</td>
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Nazdar 2300 UV / UV-LED Screen Ink Series

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<tbody>
<tr>
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<td>23361</td>
<td>Yellow</td>
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<tr>
<td>23362</td>
<td>Warm Red</td>
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<tr>
<td>23363</td>
<td>Rubine Red</td>
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<tr>
<td>23364</td>
<td>Rhodamine Red</td>
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<tr>
<td>23365</td>
<td>Purple</td>
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<tr>
<td>23366</td>
<td>Violet</td>
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<tr>
<td>23367</td>
<td>Reflex Blue</td>
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<td>23368</td>
<td>Process Blue</td>
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<td>23369</td>
<td>Green</td>
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Halftone Colors

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<td>Halftone Cyan</td>
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<td>Halftone Magenta</td>
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<td>2393</td>
<td>Halftone Yellow</td>
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<td>Halftone Black</td>
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Additives / Reducers

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<tr>
<td>CARE69</td>
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<td>CARE106</td>
<td>UV Catalyst / Charger</td>
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<td>NB23</td>
<td>Catalyst</td>
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<td>RE310</td>
<td>UV Reducer</td>
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<td>SIPI414</td>
<td>Thickener</td>
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<td>NB26</td>
<td>Glass Catalyst</td>
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<td>NB27</td>
<td>Glass Catalyst</td>
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Cleaners / Clean Up

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<td>IMS206</td>
<td>Auto Graphic Screen Wash</td>
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<tr>
<td>IMS301</td>
<td>Premium Graphic Press Wash</td>
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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®.
UV Screen Ink