Technical Sheet Data

2300 UV / UV-LED Screen Ink Series

Container

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.

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.

HMD 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 SIPI414 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 for glass applications. Add up to 3% by weight. Ink will be soft with initial curing, but will exhibit improved adhesion and chemical resistance within 24 hours. Ink mixed with NB23 UV Adhesion Promoter has a 3-5 hour 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.

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.

Container

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.

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.
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®).

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.

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Color Card Materials

The following is a list of available screen printed samples of the 2300 Series.

UV Color Card (CARDUV): shows the Standard Printing Colors, Pantone Matching System Base Colors.

Packaging / Availability

Contact your Nazdar distributor for product availability and offering.

Standard Ink Items

Standard ink items listed below are inventoried in gallon and 1 kilo containers. HB = heavy body

Standard Printing Colors

Item Number	Color
2310	Primrose Yellow
2312	Medium Yellow
2319	Fire Red
2326	Mixing Clear
2327	Overprint Clear
2378	High Intensity White
2379	High Intensity Black
2376	HB High Intensity White
2377	HB High Intensity Black
2398	Bright White

Pantone Matching System® Base Colors

Item Number	Color
23358	Tinting White
23359	Tinting Black
23360	Orange
23361	Yellow
23362	Warm Red
23363	Rubine Red
23364	Rhodamine Red
23365	Purple
23366	Violet
23367	Reflex Blue
23368	Process Blue
23369	Green

Non-Standard Ink Items

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

Item Number	Color
2390	Halftone Extender Base
2391	Halftone Cyan
2392	Halftone Magenta
2393	Halftone Yellow
2394	Halftone Black

Additives / Reducers

Item Number	Color
CARE69	UV Hardener
CARE106	UV Catalyst / Charger
NB23	Catalyst
RE310	UV Reducer
SIPI414	Thickener

Cleaners / Clean Up

Item Number	Color
IMS203	Economy Graphic Screen Wash
IMS206	Auto Graphic Screen Wash
IMS301	Premium Graphic Press Wash