

The multi-purpose PowerPrint® 1600 Series UV Screen Ink has been formulated to meet 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 low odor, tough finish that is highly block resistant. It is engineered to be cost effective for indoor and outdoor retail displays. PowerPrint® 1600 Series is inter-printable with the 3200 Series. PowerPrint® 1600 Series includes both gloss and matte colors.

**SUBSTRATES** Styrenes, rigid vinyls, pressure sensitive vinyls, polycarbonates, some acrylics, coated papers, coated cardstocks and treated fluted polypropylenes (see Additives section)

## USER INFORMATION

*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. See full disclaimer at the end of the document.*

**MESH** 355-420 tpi (140-165 tpcm) monofilament polyester mesh for most applications

**STENCIL** Solvent resistant, UV ink compatible direct emulsions and capillary films

**SQUEEGEE** 70-90 durometer polyurethane squeegee

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

**PRINTING** PowerPrint® 1600 Series ink is formulated to be press ready. Thoroughly mix the ink prior to printing.

Maintain ink temperature at 65°-90°F (18°-32°C) for optimum print and cure performance. Lower temperatures increase the ink viscosity, impairing both flow and cure. Elevated temperatures lower the ink viscosity, reducing print definition, film thickness and opacity.

Pretest to determine optimum printing performance 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. Leaving a container uncovered may result in the ink's surface forming a "skin," caused by reaction with ambient lighting. Keep containers covered. Light filters are recommended.

### CURE PARAMETERS

PowerPrint® 1600 Series ink cures when exposed to a medium pressure mercury vapor lamp set at 200 watts per inch with millijoules (mJ) and milliwatts (mW) of:

80-100 mJ/cm<sup>2</sup> @ 600+ mW/cm<sup>2</sup> for most colors

100-130 mJ/cm<sup>2</sup> @ 600+ mW/cm<sup>2</sup> for 1678, 1679, 16136, 16156, 1698

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, poor block resistance, and higher residual odor. “Overcuring” the ink may reduce the flexibility of the printed part, and adhesion of subsequent ink layers.

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 condition and 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 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.

### CLEAR / VARNISHES

Mixing Clear: Use 1626 Mixing Clear or M1626 Matte Mixing Clear to reduce the density of colors.

Metallic Mixing Clear: Use 1636 Metallic Mixing Clear as a clear base for specialty additives such as Metallics and Pearlescents.

Overprint Clear: Use 1627 Overprint Clear to provide added surface protection and extend the outdoor durability to colors. Use M1627 Matte Overprint Clear to reduce the gloss level of the print.

### ADDITIVES

All additives should be thoroughly mixed before each use. Prior to production, test any additive adjustment to the ink.

Reducer: Use RE301 UV Reducer to reduce the viscosity of these inks. Add up to 5% by weight.

Flexibilizer: Use RE308 UV Reducer to increase the flexibility of these inks. Add up to 10% by weight. The addition of RE308 UV Reducer could show a decrease in block resistance.

Adhesion Promoter: Use NB80 UV Adhesion Promoter to enhance adhesion on treated fluted-polypropylenes and some acrylics. Add up to 5% by weight. Improved adhesion will not be demonstrated for 24 hours, with full cross linking in 4-7 days. Ink mixed with NB80 UV Adhesion Promoter has a 4-8 hour pot life.

Gloss / Flattening Powders / Improved Slip: Use CARE59 UV Satin Paste to reduce gloss and improve slip. Add up to 20%. Use CARE63 Anti-Blocking Additive to reduce the potential for blocking, reduce gloss, and improve slip. Add up to 10%. CARE59 UV Satin Paste and CARE63 Anti-Blocking Additive should be power mixed into the ink.

### CLEAN UP

Screen Wash (Prior to Reclaim): Use IMS203 Economy Graphic Screen Wash or IMS207C Graphic Recirculating Wash.

Press Wash (On Press): Use IMS301 Premium Graphics Press Wash.

### STORAGE

Store tightly covered at temperatures between 65°-90°F (18°-32°C). Ink taken from the press should not be returned to the original container; store separately to avoid contaminating unused ink.

**PROCESSING**

The excellent adhesion and hard surface finish of the PowerPrint® 1600 Series allow 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.

See notes outlined under the sections: 'Printing' and 'Cure Parameters'.

**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 1600 Material Safety Data Sheet for further instructions and warnings.

PowerPrint® 1600 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 adhesion on a **cooled down** print:

1. Touch of ink surface – the ink surface will be smooth and slick.
2. Thumb twist – the ink surface will not mar or smudge.
3. Scratch surface – the ink surface will resist scratching. Some vinyls and cardstocks scratch easily, so use magnification to determine if scratches are ink only or ink and top layer of substrate.
4. Cross hatch tape test – 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, wait for 1 minute and rip off at a 180 degree angle. Ink should only come off in actual cut areas.

Full adhesion characteristics are demonstrated within 4 hours after cure.

**WEATHERING / OUTDOOR DURABILITY**

At full strength and properly cured, PowerPrint® 1600 colors are formulated to provide 2 years outdoor durability when mounted vertically in the Central U.S.A. The use of 1627 Overprint Clear increases 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:
  - Adding large amounts of mixing clear or white to any color
  - Mixing several colors to achieve a specific color
  - Mixing a small quantity of any single color with any other color
- Substrate type and age
- Mounting angle or directional orientation
- Geographical location
- Air pollution
- Exposure to excessive abrasion (for example, brush car washes)
- Non-clear coated prints exhibit more color change and loss of gloss

Exceptions: 1600 Matte Colors and 1600 EC (Economy) Halftones have a projected 6 months outdoor durability. For batches produced earlier than 6703####, 1620 Brilliant Orange has a projected 6 to 12 months outdoor durability. For batches produced earlier than 6703####, 1619 Fire Red has a projected 1 to 2 years outdoor durability.

**PRODUCT OFFERING**

**STANDARD PRINTING COLORS**

Standard Printing Colors have excellent opacity and flow characteristics. These colors are intended to work well from the container and exhibit a gloss finish.

**MATTE STANDARD PRINTING COLORS**

A limited range of Matte Standard Printing Colors are available. These colors are intended to work well from the container and exhibit a flat finish.

**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 blend and match Pantone colors. These blend formulations are also available at [www.nazdar.com](http://www.nazdar.com).

360 Series Colors: 16360-16369 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. All white needed to match a color is added as the 16358 Tinting White. These colors exhibit a gloss finish.

**MATTE PANTONE MATCHING SYSTEM® BASE COLORS**

Matte Pantone Matching System® Base Colors are used in the same manner as the Pantone Matching System® Base Colors but exhibit a flat finish.

**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 matched to the high end of the SWOP standards.

Dense Halftone Colors are formulated with increased densities over the Standard Halftone densities and are designed for printers that want to have the latitude to adjust the density levels of their halftone inks.

Yellow (RS) Halftone Colors are 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-lines 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 with reduced dot pile.

Economy (EC) Magenta & Economy Yellow Colors: are formulated to provide a cost effective alternative to the more durable Magenta and Yellow Halftones. The Economy Halftone Colors have a limited outdoor weatherability.

EC (Economy) Halftones are indoor/short-term outdoor colors closely matching the long-term, durable counterpart.

### MATTE HALFTONE COLORS

Matte Halftone Colors are formulated with hues and densities matched to the high end of SWOP standards and exhibit a flat finish.

### PANTONE® 871c - 877c METALLIC COLORS

Pantone® 871c to 877c colors have been matched in PowerPrint® 1600 Series ink using the Pearlescent Pigments. When printed on a white background, a gold or silver metallic effect is achieved. A 305 tpi (120 tpcm) monofilament polyester mesh for may need to be used for printing these colors.

These colors are Special Order items.

### SPECIAL ADDITIVES

When inks are to be printed over a special effect color, the overprinting ink(s) 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 PowerPrint® 1600 Series. These pigments are available in 1-pound containers. Contact Nazdar for the item number(s) and availability of special effect products. Technical Data Sheets for each of the following special effects can be found at [www.nazdar.com](http://www.nazdar.com) for detailed information.

Metallics: Silver (aluminum) add up to 8% by weight, Gold (bronze) add up to 15% by weight. Mix only enough metallic ink to be used the same day. Chemical reactions in metallic inks may result in viscosity, color and printability changes over time.

Pearlescents / Interference / Multi-Chromatic: Pearlescent and Interference pigments add up to 20% by weight, Multi-Chromatic pigments add up to 10% by weight.

Phosphorescents: 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 screen printed samples available.

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

Special Effects Color Card (CARDSPL): shows Metallic, Pearlescent, Interference, and Multi-Chromatic effects mixed with clear

Non-Metallic Pantone® Simulations sheet (LIT0121): shows representations of the 871c to 877c Pantone® metallic color matches using pearlescent pigments

**PACKAGING / AVAILABILITY**

All items listed below are inventoried items and available in gallon containers.

| Stock Number | Standard Printing Colors | Stock Number | Standard Printing Colors |
|--------------|--------------------------|--------------|--------------------------|
| 1610         | Primrose Yellow          | 1636         | Metallic Mixing Clear    |
| 1611         | Lemon Yellow             | 1652         | Super Opaque Black       |
| 1612         | Medium Yellow            | 1667         | Reflex Blue              |
| 1613         | Emerald Green            | 1668         | Process Blue             |
| 1619         | Fire Red                 | 1675         | Super Opaque White       |
| 1620         | Brilliant Orange         | 1678         | High Intensity White     |
| 1626         | Mixing Clear             | 1679         | High Intensity Black     |
| 1627         | Overprint Clear          | 1698         | Bright White             |

| Stock Number | Matte Standard Printing Colors<br><small>(ref: weatherability)</small> | Stock Number | Matte Halftone Colors<br><small>(ref: weatherability)</small> |
|--------------|--|--------------|---|
| M1626        | Matte Mixing Clear   | M1690        | Matte Halftone Extender Base                                  |
| M1627        | Matte Overprint Clear  | M1691        | Matte Halftone Cyan   |
| M1652        | Matte Opaque Black   | M1692        | Matte Halftone Magenta  |
| M1675        | Matte Opaque White   | M1693        | Matte Halftone Yellow   |
| M1679        | Matte High Intensity Black   | M1694        | Matte Halftone Black  |

| Stock Number | Pantone Matching System® Base Colors | Stock Number | Matte Pantone Matching System® Base Colors<br><small>(ref: weatherability)</small> |
|--------------|--------------------------------------|--------------|--|
| 16358        | Tinting White                        | M16358       | Matte Tinting White  |
| 16359        | Tinting Black                        | M16359       | Matte Tinting Black  |
| 16360        | Orange                               | M16360       | Matte Orange   |
| 16361        | Yellow                               | M16361       | Matte Yellow   |
| 16362        | Warm Red                             | M16362       | Matte Warm Red   |
| 16363        | Rubine Red                           | M16363       | Matte Rubine   |
| 16364        | Rhodamine Red                        | M16364       | Matte Rhodamine  |
| 16365        | Purple                               | M16365       | Matte Purple   |
| 16366        | Violet                               | M16366       | Matte Violet   |
| 16367        | Reflex Blue                          | M16367       | Matte Reflex Blue  |
| 16368        | Process Blue                         | M16368       | Matte Process Blue   |
| 16369        | Green                                | M16369       | Matte Green  |

| Stock Number | LTR Standard/Dense Halftone Colors (Low Tack Rheology) | Stock Number | MTR Standard/Dense Halftone Colors (Medium Tack Rheology) |
|--------------|--|--------------|---|
| 16120        | Halftone Extender Base (LTR)                           | 16140        | Halftone Extender Base (MTR)                              |
| 16121        | Halftone Cyan (LTR)                                    | 16141        | Halftone Cyan (MTR)                                       |
| 16124        | Halftone Black (LTR)                                   | 16144        | Halftone Black (MTR)                                      |
| 16127        | Halftone Yellow (LTR)                                  | 16147        | Halftone Yellow (MTR)                                     |
| 16EC127      | <i>Economy</i> Halftone Yellow (LTR)                   | 16EC147      | <i>Economy</i> Halftone Yellow (MTR)                      |
| 16128        | Halftone Magenta (LTR)                                 | 16148        | Halftone Magenta (MTR)                                    |
| 16EC128      | <i>Economy</i> Halftone Magenta (LTR)                  | 16EC148      | <i>Economy</i> Halftone Magenta (MTR)                     |
| 16131        | Halftone Cyan Dense (LTR)                              | 16151        | Halftone Cyan Dense (MTR)                                 |
| 16134        | Halftone Black Dense (LTR)                             | 16154        | Halftone Black Dense (MTR)                                |
| 16135        | Halftone Yellow Dense RS (LTR)                         | 16155        | Halftone Yellow Dense RS (MTR)                            |
| 16136        | High Intensity Halftone Black (LTR)                    | 16156        | High Intensity Halftone Black (MTR)                       |
| 16137        | Halftone Yellow Dense (LTR)                            | 16157        | Halftone Yellow Dense (MTR)                               |
| 16EC137      | <i>Economy</i> Halftone Yellow Dense (LTR)             | 16EC157      | <i>Economy</i> Halftone Yellow Dense (MTR)                |
| 16138        | Halftone Magenta Dense (LTR)                           | 16158        | Halftone Magenta Dense (MTR)                              |
| 16EC138      | <i>Economy</i> Halftone Magenta Dense (LTR)            | 16EC158      | <i>Economy</i> Halftone Magenta Dense (MTR)               |

**PACKAGING / AVAILABILITY**

Special order colors: all items listed below are non-inventoried items and may include additional lead time to provide products. These items are available in gallon containers.

| Item Number | Pantone® 871c - 877c Metallic Colors | Item Number | Pantone® 871c - 877c Metallic Colors |
|-------------|--------------------------------------|-------------|--------------------------------------|
| 67324916    | SPL 16 871C Pearl Gold               | 67324616    | SPL 16 875C Pearl Gold               |
| 67324316    | SPL 16 872C Pearl Gold               | 67324716    | SPL 16 876C Pearl Gold               |
| 67324416    | SPL 16 873C Pearl Gold               | 67324816    | SPL 16 877C Pearl Silver             |
| 67324516    | SPL 16 874C Pearl Gold               |             |                                      |

**PACKAGING / AVAILABILITY**

All items listed below are inventoried items. Additives/Reducers are available in quart and gallon containers. Cleaners are available in gallon, 5 gallon, and 55 gallon containers.

| Stock Number | Additives/Reducers                 | Stock Number | Clean Up                    |
|--------------|------------------------------------|--------------|-----------------------------|
| RE301        | UV Reducer                         | IMS203       | Economy Graphic Screen Wash |
| RE308        | UV Reducer                         | IMS207C      | Graphic Recirculating Wash  |
| CARE59       | UV Satin Paste                     | IMS301       | Premium Graphic Press Wash  |
| CARE63       | Anti-Blocking Additive             |              |                             |
| NB80         | UV Adhesion Promoter (quarts only) |              |                             |

*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®.*

Based on information from our raw material suppliers, these products are formulated to contain less than 0.06% lead. If exact heavy metal content is required, independent lab analysis is recommended.

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