PowerPrint® Plus 1800 Series UV Screen Ink

Code Ref: 465

technical information and application instructions

Substrates

Many substrates used for Point-Of-Purchase printing, including: corona treated corrugated plastics (minimum recommended level 44 dynes), ABS, styrene, cardstock, coated paper, matte vinyl, rigid vinyl, polyester top coated and pressure sensitive vinyl.

Not recommended for highly plasticized vinyl materials such as vinyl banner and static cling, also not recommended for container or nameplate applications.

The surface tension (Dyne level) for polyethylene & polypropylene must be at or above 44 Dynes/cm.

End Uses

Point-Of-Purchase applications on a wide range of substrates for indoor and outdoor advertising.

Product Information

The PowerPrint® Plus 1800 Series UV Screen Ink has been formulated to meet the processing speeds of the most modern printing equipment including in-line presses for a wide range of substrates. PowerPrint® Plus 1800 features include: curing at lower UV output, low odour, hard ink surface, and high block resistance.

The PowerPrint® Plus 1800 is a one-part, 100% solids UV-curable screen printing ink.

PowerPrint® Plus 1800 Series does **NOT** contain N-vinyl-2-pyrrolidone (trade name V-Pyrol®).

Application 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 end of document.

Mesh

140-150T Monofilament polyester mesh is recommended for most applications.

120-165T Monofilament polyester can be used for specialty applications.

Stencil

Direct emulsions and thin capillary films that are solvent resistant, UV ink compatible, and yield a thin ink deposit will work best.

Squeegee

Sharp 70-90 single durometer polyurethane blades as well as multi-durometer blades that produce an even, thin ink deposit will work best.

Coverage

60-100 Square meters/kilo depending upon ink deposit

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Reducer D564-S082 UV Reducer is to be used to reduce the viscosity of these inks by adding no more than 5% by weight. It is recommended that these inks be thoroughly mixed, and acclimatised to a 18°C - 30°C environment prior to reducing.

Mixing Clear Mixing Clear is used to reduce the density of colours – this will increase cure speed, or as a clear base for metallic powders (refer to Metallic Colours mixing Guidelines later in this TDS). Use Process Medium in process colours when necessary to maintain structure.

Clean Up Use Special UV Screen Wash - D574-S016

Storage These inks are reactive to light and temperature extremes. Store in a clean area below 35°C sealed tightly in dark plastic containers out of direct sunlight. For maximum shelf life, store ink in ambient temperatures of 15°C to 30°C. Ink taken from the press should not be returned to the original container; store separately to avoid contaminating unused ink.

Shelf life is 2 years from date of manufacture.

General Guidelines

Ink Handling Direct contact with the skin is the primary route of exposure and irritation with UV inks. Therefore, it is recommended that all personnel mixing and handling these products 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 absorbent cloth or rag (**DO NOT USE SOLVENT OR REDUCER**). Proceed to wash and rinse the affected area with soap and water. Consult the 1800 MSDS for further instructions and warnings.

Printing PowerPrint® Plus 1800 Series UV Screen Ink are formulated to print from the container with excellent flow characteristics. If the need arises to reduce the viscosity, add 2-5% of D564-S082 UV Reducer. The use of a mixer is recommended to thoroughly mix inks prior to printing.

Inks will maintain optimum print and cure performance when the ink temperature is 18°C - 30°C. Temperatures below 18°C will increase the ink viscosity, impairing both flow and cure. Elevated temperatures will lower the ink viscosity, reducing print definition, film thickness and opacity. When the ink is cold, it is best to mix the ink with a high-speed mixer until it returns to the proper temperature, 18°C - 30°C. Add reducer at this point if necessary.

Due to variations in substrates, **block resistance should be thoroughly tested**. The performance of multi-purpose inks can be influenced by substrate selection, processing conditions, extreme heat and humidity; it may be required to slip sheet the PowerPrint® Plus 1800 Series prints when stacking ink-to-ink.

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Cure Parameters

The PowerPrint® Plus 1800 Series Inks are formulated to cure when exposed to a medium pressure mercury vapour lamp set at 200 watts per inch with millijoules and milliwatts of:

80-100mJ/cm² @ 600mW/cm² for most 1800 Series Colours

100-130 mJ/cm² @ 600mW/cm² for high density Blacks, White and other very dense colours

These guidelines are intended only as a starting point for determining cure parameters. In order to account for differences that affect curing of the inks, cure parameters must be determined under actual production conditions. The values mentioned above are representative of measurements taken using an EIT UVICURE Plus radiometer measuring the UVA bandwidth (320-390nm). When measuring the peak irradiance using the UVICURE Plus, it is recommended that a belt speed less than 12 meters per minute be used in order to obtain accurate readings.

The inks can be affected by stray UV light in and around a printing facility resulting in the appearance of an ink drying in the screen during the course of a long run. Be aware of skylights, windows and overhead lights possibly curing the ink in the screen. Precautions include the use of light filters that block out the damaging wavelengths.

If ink is left on the screen while not being printed (e.g. lunch break) it is advisable to cover with black plastic.

Adhesion Testing

Even when recommended UV energy output levels are achieved, it is imperative to check adhesion on a cooled down print by checking:

1. **Touch of ink surface** – The 1800 ink will be smooth and slick.
2. **Thumb twist** – The ink surface will not mar or smudge.
3. **Scratch surface** – The 1800 ink will resist scratching after allowing to cool. Some vinyl's 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 a cut area, rub down and rip off, Ink should only come off in actual cut areas.

Full adhesion characteristics will be demonstrated within 4 hours after cure.

Warning: Multilayer Printing

UV ink by its nature becomes brittle and inflexible when printed in multiple layers, and after multiple and repeated exposure to curing lamps. This will manifest itself most noticeably when printing onto flexible substrate, where more than 2 to 3 layers of ink are printed on top of each other.

This problem is also more frequently found on highly plasticized substrates where it is possible that some plasticizer has migrated to the surface and this can give a weak ink bond. Unfortunately this failure of adhesion may only become apparent several days after printing.

We have seen instances where thin gauge Vinyl and Styrene may become brittle after printing.

We must therefore emphasise the importance of testing both a new print construction and new supplies of substrate.

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Colour Availability

For the US market NAZDAR has a range of PMS matching colours available, as well as a selection of popular spot colours, 2 or more ranges of Process Colours and a range of single pigment toners.

The demands of the SA market are very different and at GL we hold stocks of the Process Colours and a small selection of popular corporate colours. All other colours are quickly blended in our factories to customer specific requirements.

Weatherability

All colours are formulated with pigments chosen for maximum durability. When 1800 colours are at full strength and have been properly processed and cured, a projected 2 year outdoor durability can be expected for prints mounted vertically. An overprint of 1827 Overprint Clear can be expected to increase longevity. Weathering results will vary based on regional conditions.

Fluorescent Colours

Fluorescent colours are available – These colours require special consideration due to their high pigment content. Best results are obtained when printing through a mesh, 120-140 that offers more open area. These inks will have a tendency to settle, so high speed mixing is required prior to printing. The cured ink will have a satin finish. Fluorescent colours will fade on exposure to ultraviolet light – this includes UV reactor exposure as well as outdoor exposure. It is recommended to adjust the art-work so that these colours are the last printed on the image.

Metallic Colours

Recommended mesh for printing metallics is 120T plain weave monofilament polyester. Mix only enough metallic ink to be used the same day – Chemical reactions in metallic inks may result in viscosity, colour and printability changes over time. Check curing – Metallic colours are possibly more difficult to cure.

When inks are to be printed over a metallic colour, the overprinting ink(s) must be evaluated for intercoat adhesion over the metallic colour before proceeding with the production run. To maximize intercoat adhesion over metallic colours, we recommend that the metallic be printed as late as possible in the print sequence.

Recommended ratios: Metallic Powders

Silvers (aluminium)	8% by weight –	80gms powder to 1kg Clear
Gold (bronze)	15% by weight –	150grms powder to 1kg Clear

Additives

Add N690 S463 NB80 at a level of 2% - 5% by weight to further enhance adhesion on treated fluted polypropylenes and some acrylics. Improved adhesion will not be demonstrated for 24 hours, with full cross linking in 4-7 days. Ink mixed with NB80 has a 4-8 hour pot life.

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Substrates

1. **Styrene** – On light gauge styrene multiple passes under the UV Curing Unit can cause embrittlement of the substrate and cracking. If this occurs, reducing the curing time for all except the last colour (faster belt speed) can overcome the problem.
2. **Paper and Card stocks** – Coated grades are recommended. Avoid the use of uncoated stock, as it may allow the ink to penetrate too deeply into the substrate – This results in poor curing and high odour levels. Consider also 1600/1610 Series as these are more economical.
3. **For maximum outdoor durability**, it is recommended that the inks be over varnished.
4. **Chromadek** - PowerPrint® Plus 1800 Series has been found to have good adhesion on many samples tested, however, due to the wide range of coatings it is absolutely essential to pre-test.

Troubleshooting Guide

Ink Not Curing

Check for proper mesh count.

Check squeegee pressure, angle and sharpness.

Too much pressure or a dull edge blade will significantly affect ink film thickness and cure.

Check UV unit for effective millijoules and milliwatts (UV output).

Ensure reflectors are clean & shiny bright silver.

Colour may be too opaque for UV light to penetrate. This can occur when a colour match requires the use of opaque white or black. Reduce the opaque colour with the addition of Mixing Clear until effective cure is obtained.

Poor Adhesion

Excess ink deposit resulting in poor through-cure.

Surface contamination on substrate. Wipe a section of the substrate with isopropyl alcohol prior to print, and check adhesion.

Try another type or batch of substrate.

Insufficient cure. Check UV unit for effective millijoules and milliwatts (UV output).

Ensure reflectors are clean & shiny bright silver

Blocking

Under-curing will leave a soft ink film which will be liable to block especially on double-side prints. Under curing also gives a tendency to high odour.

Note

The PowerPrint® Plus 1800 Series has been formulated to render exceptional performance on a wide variety of substrates; however, due to variables in the chemical make-up of some substrates from batch to batch, a thorough test relative to all performance characteristics should be conducted prior to production printing. For further assistance please call GL SPECIALIZED INKS: +27 (0)31-700-6455

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caution

Please proof this ink, reduced to the consistency you wish to adopt, on a sample of the ACTUAL SUBSTRATE you will be printing BEFORE starting a production run.

Give the proof 4 hours to post cure then check for: Abrasion resistance, adhesion, print appearance and correctness of colour. The adequacy of this ink in these properties cannot be fully established on laboratory equipment on a small scale.

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.

GL stands behind the quality of this product. GL cannot, however, guarantee the finished results because GL 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 GL.

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Last date amended: 10th July 2014