

3100 Series UV Polyethylene Container Screen Ink

Code Ref: D492

technical information and application instructions

Substrates	Properly treated polyethylene containers.
End Uses	Cosmetic, hair products, chemical, and specialty product container packaging.

Product Information

The 3100 Series is a 100% solids UV-curable screen printing ink designed for high-speed printing of polyethylene bottles which must be treated to a minimum of 46 Dynes/cm. Properly cured, these inks will exhibit excellent adhesion, as well as superior resistance to solvents, chemicals, and other products typically packaged in polyethylene containers.

The 3100 Series screen printing ink exhibits a high gloss finish in all colours. This ink is intended to work well straight from the container on a wide range of printing equipment.

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 metres/kilo depending upon ink deposit.
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, or as a clear base for metallic powders (refer to Metallic Colours mixing Guidelines later in this TDS). In Process Colours use Process Medium to maintain structure.
Clean Up	Use Special UV Screen Wash D574-S016

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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 3100 SDS for further instructions and warnings.

Printing 3100 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.

3100 Series Inks are very hard and not highly flexible. On bottles subject to repeated flexing, some cracking may occur. In this event evaluation of 3800 or MCP Series is suggested.

Cure Parameters The 3100 Series Inks are formulated to cure at production speeds of 60-80 bottles per minute with properly maintained automatic equipment. These guidelines are intended only as a starting point for determining the cure parameters, which must be determined under production conditions.

Millijoules: radiometer readings in millijoules represent the total amount of UV energy arriving on the surface. In container printing, the total amount of energy the ink and the container is exposed to depends on the number of bottle rotations under the curing unit. A minimum of 300 millijoules may be necessary to cure certain colours.

Milliwatts; radiometer readings in milliwatts represent the penetrating power of the UV energy arriving at the surface. A minimum of 600 milliwatts may be necessary for through cure.

Due to the fast cure speeds of the 3100 Series, care should be taken during printing to minimize unwanted ultraviolet light exposure to the screen. 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 printing (lunch breaks etc.) it is advisable to cover the screen with black plastic sheeting.

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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 3100 Series UV ink will be smooth and slick.
2. **Thumb twist** – The ink surface will not mar or smudge.
3. **Scratch surface** – The 3100 inks will resist scratching when cool.
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, wait for 1 minute and rip off at 180° angle. Ink should only come off in actual cut areas.

Full adhesion characteristics will be demonstrated within 24 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.

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.

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Metallic Colours

Recommended mesh for printing metallics is 120-140T 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

Silver (Aluminium)	8% by weight	80gms powder to 1kg Clear
Gold (Bronze)	15% by weight	150gms powder to 1kg Clear

Additives

N690-S463 - NB80 Adhesion Promoter at a level of 2 – 5% may be added to the 3100 Series to further enhance adhesion and water resistance. Improved adhesion will not be demonstrated for 24 hours, with full cross linking in 4-7 days. Catalysed Ink will have a 6-8 hour pot life.

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 causing 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 the reflectors are clean & shiny bright silver.

For PP & HDPE check Dyne level minimum 46 dynes, maximum 60 dynes. Ensure flame treatment equipment is operating correctly.

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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 24 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: 6 February 2023