

Fast Cure Overprint UV Varnish

Code Ref: D493-A142

technical information and application instructions

Substrates	Coated paper and card stocks.
End Uses	Sealing varnish for scratch-off inks as used for lottery tickets, phone and cell phone cards, and game cards.

Product Information

D493-A142 is specifically formulated as a very hard, fast curing varnish to be applied to plain or printed areas of scratch-off cards to prevent the scratch-off ink keying to the base stock.

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 the end of the document.

Mesh	140T Monofilament polyester mesh is recommended.
Stencil	All direct photo emulsions, photo stencil films and hand cut stencil films that are solvent resistant.
Squeegee	70-80 durometer polyurethane blades as well as triple durometer blades that produce an even ink deposit.
Coverage	70 - 90 square meters / kilo.
Printing	<p>D493-A142 is formulated to print from the container. This varnish will maintain optimum print and cure performance when the varnish temperature is in the range of 21° - 32°C. Temperatures below 21°C will increase the varnish viscosity, impairing both flow and cure.</p> <p>If the container is taken from a cold storage area it is best to mix on a high speed mixer until it returns to proper temperature, if this is not possible allow to acclimatize in a warm area before use. Elevated temperatures will lower the ink viscosity thereby reducing the applied film weight which may impair scratch-off characteristics. Always mix well prior to each use.</p>

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Curing D493-A142 is formulated to cure when exposed to a medium pressure mercury vapour lamp set at 200 watts/inch at a belt speed of 25 – 30 meters/min.

Beware of stray UV light in and around the printing facility, this can result in the appearance of drying (curing) in the screen during a long run. Be aware of skylights, windows and overhead lights possibly causing curing in the screen. Precautions include the use of light filters that block out damaging wavelengths.

If varnish is left on the screen while not printing (lunch breaks etc.) it is advisable to cover the screen with black plastic sheeting.

Clean Up Use Special UV Screen Wash D574-S016.

Precautions It is vital that the coating on the card is firmly anchored to the base stock; “loose” coatings can bond more strongly to the UV varnish than the base board and can cause scratch-off failure as the varnish, under heavy scratching, will break up and remove the loose coating.

General Guidelines

Storage Store in a cool dry place. Ensure all partially used buckets are properly resealed. Only use black buckets for storage to prevent premature curing due to light permeating the container.

Shelf life is 2 years from date of manufacture.

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 Overprint Varnish SDS for further instructions and warnings.

Printing The Overprint Varnish is 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.

Cure Parameters **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.

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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 MCP 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.

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 Overprint Varnish will be smooth and slick.
2. **Thumb twist** – The ink surface will not mar or smudge.
3. **Scratch surface** – The Overprint Varnish 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 a 180 degree angle. 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 must therefore emphasise the importance of testing both a new print construction and new supplies of substrate.

Colour Availability

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.

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.

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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

Finishing

N690-S463 - NB80 Adhesion Promoter at a level of 2 – 5% may be added to the MCP 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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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: 6 February 2023