

# Special UV Inks, Additives and Trouble Shooting Guide

## PRODUCT INFORMATION

**Products detailed in this information sheet are intended for use in achieving special effects, or in the modification of the print properties of UV inks.**

### Special UV Inks

**UU023 Opaque Barrier White** is a highly opaque white ink developed for use in decoration of plastic substrates such as PVC. It has good adhesion and flexibility and can be used to overprint inks such as Multiflash UZ for backlight purposes.

UU023 has good resistance to blocking. Always test suitability for individual applications.

Recommended Mesh:	150.34
Cure Speed (2x80 w/cm):	20 m/min
Coverage m <sup>2</sup> /kg:	40-45 m <sup>2</sup> /kg
Thinner:	ZE834
Stencil:	Dirasol 915,916,917
Pack Size:	5 kg

**UU382 Metallic Ink Medium** is a clear base into which metallic or pearlescent powders can be added to achieve special effects on paper, board and PVC.

Most powders and pastes can be added by weight up to 10%. The mix will have a shelf-life of approximately 2 days.

The following print recommendations apply to a 90:10 mix of UU382:MP461 Rich Pale Gold Powder.

Recommended Mesh:	140.34
Cure Speed (2x80 w/cm):	20 m/min
Coverage m <sup>2</sup> /kg:	45 m <sup>2</sup> /kg
Thinner:	ZE813 – <b>Do not use ZE807</b>
Stencil:	Dirasol 915,916,917
Pack Size:	5 kg

**UV399 UV Floor Graphics Varnish** is a screen printable overprint varnish developed to provide a slip resistant surface to screen or digitally printed floor decals.

Recommended Mesh:	49
Cure Speed (2x80 w/cm):	20 m/min
Coverage m <sup>2</sup> /kg:	35-40 m <sup>2</sup> /kg
Thinner:	No additives should be used in UV399
Stencil:	Dirasol 915,916,Zenith
Pack Size:	5 kg

UV399 has been developed with high light reactivity to provide fast cure speeds at high film weights. It is therefore recommended that exposure to sunlight is minimised during printing.

#### Slip Resistance Rating

UV399 UV Floor Graphics Varnish will provide slip resistance performance in accordance with DIN51130 to a level of R12 for a period of up to 3 months.

Please Note – DIN Slip Resistance ratings are assessed by independent testing companies only, and cannot be tested or guaranteed by Fujifilm.

Floor graphics produced using UV399 UV Floor Graphics Varnish are not suitable for wet barefoot environments such as swimming pools.

The slip characteristics of UV399 can vary depending on the film weight/print setup used for a given floor graphic. It is the responsibility of the printer to fully assess the suitability of substrate, ink, decal application, cleaning products and the proposed site for any graphic produced.

#### UU461 UV Metallic Gold and UU475 UV Metallic

**Silver** are single pack inks for use on paper, board and PVC for display materials. Can be tinted with up to 5% CU concentrate to give coloured metallic effects.

Metallic inks tinted with line colours, will have a shelf-life of 8 hours.

UU461 and UU475 have a shelf-life of approximately 9 months when stored in a cool place.

Stir well before every use and always test application fully before beginning a production run. Due to this type of product having a high lustre metallic effect some rub can be expected from the cured ink.

Recommended Mesh:	140.34
Cure Speed (2x80 w/cm):	25 m/min
Coverage m <sup>2</sup> /kg:	45 m <sup>2</sup> /kg
Thinner:	ZE813
Stencil:	Dirasol 915,916,917
Pack Size:	5 kg

**UU481 UVFoil Metallic Silver** is a single pack ink for use on paper, board and PVC for display materials.

It is not recommended to intermix UU481 with any other ink or colour concentrate as this will adversely affect designed performance.

Intercoat adhesion of overprint colours must be evaluated under production conditions before commencing a production run.

UU481 has a shelf life of approximately 6 months when stored in a cool place.

Stir well before every use and always test application fully before beginning a production run. Due to this type of product having a high lustre metallic effect some rub can be expected from the cured ink.

Recommended Mesh:	140.34
Cure Speed (2x80 w/cm):	25 m/min
Coverage m <sup>2</sup> /kg:	65 m <sup>2</sup> /kg
Thinner:	No additives should be used in UU481
Stencil:	Dirasol 915,916,917
Pack Size:	2 kg

## Thinners & Additives for conventional UV graphic inks

### ZE637 – Thinner

General thinner for all UV graphic inks. Used to reduce viscosity without any significant change to the final physical properties of the ink film.

Recommended addition level of 5% - 10 %.

Available in 5 ltr units.

### ZE807 – Thinner

Used to quickly reduce viscosity and improve adhesion to PVC substrates.

Recommended addition level of 5% - 10%.

**DO NOT use in metallic inks or water-based UV products as it will reduce in-can stability.**

Available in 5 ltr units.

### ZE808 – Gel Additive

Used to increase gel in UV and water-based UV inks.

Recommended addition level of 5% - 10%. Can go to 20% but colour density is reduced and may cause substrate embrittlement.

Available in 5 ltr units.

### ZE813 – Fast Thinner

Used to reduce viscosity and boost cure at the same time.

Recommended addition level of 5% - 10%.

Available in 5 ltr units.

### ZE816 – Matting Base

Used to reduce gloss level in UV and water-based UV inks. Effect is to subtly reduce finish. Due to relatively low addition levels this additive will not make high gloss systems matt.

Recommended addition level 20% maximum.

Available in 5 ltr units.

### ZE817 – Adhesion Promoter

Reactive additive that increases scratch/abrasion resistance without reducing viscosity. Increases through cure. See also ZE828 and ZE850.

Recommended addition level of 5% - 10%.

Always use sparingly as ZE817 may reduce flexibility of the final print.

Available in 5 ltr units.

### ZE818 – Thinner

A thinner with excellent viscosity reduction properties, ZE818 will improve the adhesion of inks to more difficult surfaces, particularly gloss PVC of higher thicknesses.

Recommended addition level of 5% - 10%.

Care must be taken on thinner materials as this thinner can increase embrittlement.

Available in 5 ltr units.

### ZE824 – Flash Cure Additive

A blend of photoinitiators designed specifically for the flash cure process, ZE824 can be added to most UV graphic inks to improve UV cure response. See also ZE833.

Recommended addition level of 1% - 3%.

**DO NOT add more than the recommended level as cure problems may result.**

Available in 1 kg units.

### ZE828 – Special UV Cure Additive

An additive to improve through cure and general film hardness, especially effective in blacks and dark colours where other additives may be less effective.

Recommended addition level of 5% - 10%.

Always check flexibility of prints before commencing production run as this additive will reduce flexibility. See also ZE817 and ZE850.

Available in 1 kg units.

### ZE832 – UvXtra Adhesion Promoter

Commonly referred to as a catalyst, ZE832 will act to harden the ink film and improve adhesion over a period of 24 hours. Initial improvements to film hardness and adhesion may be seen after 1-2 hours. Because the hardening process is relatively slow, the resulting ink films will be less prone to embrittlement than with other adhesion promoters. However, care must still be taken

with regard to flexibility. Pot life of the 'catalysed' ink is of the order of 3-4 days.

Recommended addition level of 1% - 3%.

Available in 1 ltr units.

#### **ZE833 – Flash Cure Additive**

Reactive additive to increase cure for dark line colours. However, can cause yellowing if used in light/transparent colours.

Recommended addition level of 1% - 3%.

Available in 1 kg units.

#### **ZE850 – UV Hardener and Adhesion Promoter**

ZE850 will rapidly improve film hardness and therefore make a cured ink more difficult to scratch. It is especially useful in inks being cured under conditions of low UV output. Always check embrittlement properties as this additive will reduce flexibility through increasing cross-link density. See also ZE817 and ZE828.

Recommended addition level of 5% - 10%.

Available in 5 ltr units.

#### **ZEA09 – Special Ink Flow Agent**

Used in situations where flow defects appear in the ink film eg, pinholing, orange peel etc. Can also be used to improve passage of ink through a mesh, particularly when dribble patterns appear. In this situation it is used in conjunction with the appropriate thinner for the system. Excessive additions will lead to poor flow and surface bloom/smearing.

Recommended addition level of 1% - 2%.

Available in 1 ltr units.

#### **ZEA11 – UV Flexibility Additive**

This additive may be used where flexibility of the ink films is borderline only. It will not make a hard, highly brittle ink perform on flexible materials.

Recommended addition level 5% maximum.

**This additive will reduce cure response so MUST NOT be used at levels greater than 5%.**

Available in 5 ltr units.

#### **Fujifilm Speciality Ink Systems Limited:**

- Has certification to the International Environmental Standard, ISO 14001.
- Has certification to the Quality Management Standard, ISO 9001.
- Has certification to the Occupational Health and

Safety Standard, OHSAS 18001.

- Is committed to minimising the risk to users of our products, and also to minimising the impact of our activities on the environment, from formulation through to production and supply.
- Research and development team, work to an in house Health, Safety and Environmental policy, termed 'Design for Health, Safety and Environment', with the aim of proactively developing products with the least impact on health, safety and the environment.
- Regularly review and monitor our impacts and activities, setting objectives and targets as part of a continual improvement process.
- Is committed to reducing waste through better use of raw materials, energy, water, re-use and recycling.

#### **Safety and Handling**

##### **Special UV Inks and Additives:**

- Have a flashpoint greater than 60°C and are therefore not classified as 'dangerous substance' under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).
- For optimum shelf life, all products should be stored at moderate temperatures, between 5°C and 30°C. Storage outside of these temperatures may lead to deterioration in the performance of the product.

Comprehensive information on the safety and handling of Fujifilm products is given in the appropriate Safety Data Sheets.

#### **Environmental Information**

##### **Special UV Inks and Additives:**

- Do not contain ozone depleting chemicals as described in the Montreal Convention.
- Are free of any volatile solvent and can therefore be considered to have less impact on the environment, when compared with solvent-based products.
- Are formulated not to contain heavy metals and therefore should comply with the requirements of The Packaging (Essential Requirements) Regulations 1998: S1 1165 (Article 11 of EC Directive 94/62/EC).

*For Safety and Handling and Environmental information on Dirasol emulsions refer to their respective Product Information sheets.*

## Troubleshooting Guide

### Thinners & Additives for Conventional UV and Water-based UV Graphic Inks

**Please note:** Thinners may be required to facilitate the flow of a product through the mesh in order to increase production speeds. Please adhere to the guidelines for their use as stipulated in the appropriate product information sheet. Where thinners and additives may be required for other reasons, every effort should be made to rectify these performance issues by adjustment of the printing/curing parameters and checking the substrate before resorting to their use as the ink is formulated to give optimum performance characteristics as supplied.

Symptoms	Causes	Possible Solutions
Ink is easily removed from the substrate	Incorrect ink selection OR Insufficient cure	Check suitability of ink for substrate. Increase UV output. Fast thinner or adhesion promoter may also be added.  **Try – ZE813,ZE817,ZE824,ZE828 (dark colours), ZE833,ZE850  ZE832 may also be used where a slower more gradual improvement is more appropriate eg on difficult substrates where film shrinkage will impair adhesion.
Surface of ink film is tacky and therefore a risk of blocking/offsetting exists	Insufficient cure	If giving print additional cure improves matters, a fast thinner or adhesion promoter may be appropriate. These additives improve through cure, surface cure or both simultaneously.  **Try – ZE813, ZE817, ZE824, ZE828 (dark colours), ZE833, ZE850.
Under-surface of ink is completely uncured (wet) and cured surface is wrinkled and uneven	Ink too opaque for UV to penetrate through ink film	If lower ink deposit does not improve cure, try:  **Basing down ink with appropriate extender base, ZE828 (dark colours), ZE813, ZE833, ZE850. Recommended thinner + 2% ZE824.
Substrate is brittle and printed material is cracking	Incorrect ink selection OR Substrate borderline for ink selected/image printed	If flexibility of the ink/substrate combination is borderline acceptable, then the addition of up to 5% ZEA11 to some or all of the inks used will increase flexibility.  No more than 5% ZEA11 should be used as the ink will cease to cure. Add in increments of 1% to determine optimum level if possible.  Note: Where flexibility of ink is poor, ZEA11 will be relatively ineffective.
Ink film appears to pinhole or show orange peel effect	Ink / substrate beneath is incompatible. OR Ink was not properly stirred when originally used	This is generally caused by an insufficient level of flow aid in the printed ink for the situation in which it is being used.  The addition of 1% - 2% ZEA09 should normally rectify such flow defects. If it does not, do not make further additions as this will be detrimental to the performance of the ink (eg smearing, surface bloom, intercoat adhesion).
Ink is spreading when printed causing problems with definition	Ink too thin for the print conditions	Add 5% - 10% ZE808 gel additive. Do not exceed 20% addition level.
Poor flow through mesh/patchiness of block areas	Viscosity of the ink is unsuitable for mesh/substrate combination or press used	Generally thinning with the recommended level of the appropriate thinner will be sufficient to alleviate such a problem.  However, addition of 1% - 2% ZEA09 flow additive on top of the thinner addition will often improve the flow of the ink through the mesh.
Ink trails appear in the image	Ink dribbles from squeegee/coater	Most inks dribble from the squeegee/coater. However, some do not flow through the mesh as well as others and in this case, ink trails appear.  Add ZE808 gel additive to help prevent the ink from dribbling. OR Add thinner & flow additive ZEA09 to improve flow of ink through the mesh and thus cover the trail marks.
Print too glossy	Ink selected for the material not of appropriate finish	Add up to 20% ZE816.  Do not exceed this level as this will lead to basing of the colour and possible reduction in adhesion

Symptoms	Causes	Possible Solutions
Ink is not product resistant	Ink not designed to be resistant to product in question	Improve cure / cross-link density by using a surface hardener or adhesion promoter.  **Try ZE817, ZE828 (darker colours), ZE833, ZE850 or ZE832.
Poor resistance to scuff	Matt finish	Poor scuff or marr resistance is invariably a property of matt or matt/satin inks. The only solution to this is to add a glossy ink of the same colour to raise the finish. OR  **Add up to 10% of a surface hardening additive such as ZE828 (darker colours) or ZE817 or possibly ZE850. These will also raise the finish of the ink film.
Poor 'hold-out' of ink film leading to a mottled ink film when cured	Porosity of substrate	There are generally two possible solutions to this problem. These are: Increase the viscosity of the ink using ZE808 Gel Additive.  OR  **Raise the surface cure, and hence finish, of the the ink so that the mottled effect commonly seen as a symptom of poor hold out is evened out and therefore disguised. This can be done by addition of ZE828 (darker colours) or ZE817.

**\*\* Please note, where additives have been used to improve ink film hardness, care must be taken to ensure that print flexibility/embrittlement properties have not been compromised.**

The information and recommendations contained in this Product Information sheet, as well as technical advice otherwise given by representatives of Fujifilm Speciality Ink Systems Limited and its associated companies, whether verbally or in writing, are based on our present knowledge and believed to be accurate. However, no guarantee regarding their accuracy is given as we cannot cover or anticipate every possible application of our products and because manufacturing methods, printing stocks and other materials vary. For the same reason our products are sold without warranty and on condition that users shall make their own tests to satisfy themselves that they will meet fully their particular requirements. Our policy of continuous product improvement might make some of the information contained in this Product Information sheet out of date and users are requested to ensure that they follow current recommendations.

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