High performance UV LED curing offset inks for compliant food packaging

SunWave® FSP

1. Description

SunWave® FSP is a range of high performance, UV-LED low energy curable, lithographic offset inks designed for printing non-food contact surfaces of compliant food packaging, using the latest generation of state of the art 'low energy' UV-LED curing lamp technologies with emission in the range 385-395 nm. **SunWave® FSP** inks are also suitable for the printing of pharmaceutical and other sensitive goods' packaging markets, where a risk of ink component migration has been identified.

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2. Product features

- Curable under UV-LED lamps emitting in the 385-395nm range
- Sheet fed or web offset printable with excellent lithographic performance
- PSO process colours conform to ISO2846-1, which then allows compliance to ISO12647-2 when used with appropriate substrates and reprographics etc.
- Excellent taint & odour properties
- Suitable for in-line or off-line coating, and foil stamping and lamination processes (subject to test)
- Manufactured according to Good Manufacturing Practice requirements
- Certified as deinkable
- Formulated without VOC's, photoinitiators with a propensity to migrate or materials based on Bisphenol A.
- Formulated with materials in accordance with the Swiss Ordinance** and German Ink Ordinance***
- Designed to meet the requirements of the Nestlé Standard****

3. Product Suitability

3.1 Applications

SunWave® FSP inks are intended for use in the following areas:

- Primary food packaging
- Primary packaging for pharmaceutical and other sensitive applications, including tobacco packaging
- Appropriately selected grades of paper and board, metallised board, corona treated PE coated board and carefully selected impervious substrates
- Can be in-line or off-line coated to improve gloss, physical and chemical resistance properties
- Microwave (no susceptor)† applications below 150˚C, subject to compliance testing

SunWave® FSP inks are **not** suitable for use in the following areas:

- Direct food contact
- Microwave (no susceptor) † and ovenable applications above 150˚C, without application-specific compliance testing

† Compliance testing is recommended for all specific microwaveable or ovenable applications although temperatures up to 150˚C are generally found to be acceptable. Temperatures above 150˚C are not recommended but may be acceptable based on application-specific compliance testing

*** Ordinance of the Federal Department of the Interior (DFI) on materials and articles intended to come into contact with food (RO 2020) Section 12 Printing Inks (Annex 10 edition 2.1)*
**** German Ink Ordinance – 21st Ordinance amending the Consumer Goods Ordinance*
***** Nestlé - The latest version of "Printing Inks For Food Packaging" – April 2024*

Printers should assure themselves that the use of these products on food packaging has been fully assessed for risk and the packaging produced meets regulatory requirements for its intended end use. Whilst **SunWave® FSP** inks are versatile in performance, they may not be suitable if used outside the applications described above. If in doubt, please check with your local Sun Chemical representative.

3.2 Substrates

SunWave® FSP inks are suitable for use on a wide range of carton board, metallised board, PE coated board and appropriately selected plastic or impervious substrates. Corona discharge treatment is recommended for PE coated boards and plastics to ensure an optimum treatment level of 38-44 mN/m. Note: there is significant variation between different grades of substrates. Printers should follow specific advice from their substrate manufacturer and make any tests necessary to prove performance under realistic conditions before commencing with commercial printing.

3.3 Print Finishing

SunWave® FSP inks may not resist all post-print conditions encountered and can be coated to improve gloss, physical and chemical resistance properties. A range of low migration coatings is available for use with these inks. Please contact your local Sun Chemical representative for specific recommendations. **SunWave® FSP** printed material can be successfully laminated in-line or off-line using solventless adhesives and using standard converting processes, subject to test prior to bulk production.

4. Safety, Health and Environment

4.1 Product Handling

SunWave® FSP inks should be used in accordance with normal standards of industrial hygiene and good working practice. Please refer to the **SunWave® FSP** Product Safety Data Sheet for specific information.

4.2 Manufacturing and Materials

SunWave® FSP inks are produced using Good Manufacturing Practice and in accordance with the latest EuPIA Guidelines on Printing Inks Applied to the Non-Food Contact Surface of Food Packaging Materials and Articles. (See www.eupia.org for details).

4.3 Storage

SunWave® FSP inks are supplied in 3 kg black plastic buckets. Shelf life is one year from date of manufacture, when stored in original unopened containers between 5° and 25°C and protected from direct sunlight. The inks may remain useable for longer periods than one year, but once they have reached this age, should be checked before use. If in doubt, please contact your Sun Chemical representative for advice. Inks returned from press that have not been contaminated in any way should be re-used within three months.

4.4 Waste Disposal

Printing inks, coatings and printing residues should be disposed of in accordance with Local, EU and National regulations. Please refer to the product Safety Data Sheet for additional information.

5. Printing Conditions

5.1 Printing Conditions

SunWave® FSP inks are supplied press-ready and should not need adjusting under normal printing conditions. Where possible, the use of press-side additives should be avoided or cure properties may be compromised. The press and roller system should be thoroughly cleaned to avoid cross-contamination of these inks by products previously used.

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5.2 Additives

A number of low migration press-side additives are available for adjusting properties in non-standard conditions or applications, where press adjustment has not achieved a satisfactory result. As a general principle, use of additives should be a last resort, when process adjustment has not solved particular application issues. Further, the maximum addition level should be respected, to avoid the potential creation of other issues.

5.3 Wash Up

A variety of proprietary wash-up solutions are available which are suitable for use with UV inks and press components, including rollers, blankets and plates.

5.4 Fountain Solution

Depending on press type and substrate, a number **of SunFount®** fountain solution additives are available from Sun Chemical for use with these inks, to provide optimum emulsification and printing properties. These inks are usually run with low or no alcohol founts and **SunFount® HP480** and **HP500** are proven products for most applications.

Please contact your Sun Chemical representative for consumables advice and recommendations.

6. End-Use Safety / Assumptions

Acceptable technical performance of **SunWave® FSP** inks are dependent on:

- The application of Good Manufacturing Practice
- The press being fitted for UV printing, including suitable rollers, blankets and plates
- The press and associated equipment, being free from contamination from previously used products
- Inks not being mixed or contaminated with other products which may compromise migration performance, cure and other properties
- Control of film weight and print density
- Adequate curing capacity on-press to ensure that the print is fully cured before conversion. UV-LED 385/395nm dose levels of >150mJ/cm²* per lamp is normally recommended.
- UV-LED lamp system maintenance and output monitoring.
- Appropriate packaging design and structure

* UV dose measured with Fujifilm UVScale M film. Dose is total of UVA, UVB, UVC and UVV - Test method available on request. The wide range of substrates, print combinations and ink and coating products with different UV responses can significantly affect the way UV curing products cure. Target UV dose should be determined by experimentation to achieve the required physical performance of the cured ink film for each print structure. The target figure provided is only for starting guidance.

Choice and control of film weight, curing and substrate are printer technical requirements for which Sun Chemical cannot accept responsibility. Depending on measuring equipment the process inks are designed to be printed at the following typical print density values. It is strongly recommended these are not exceeded as cure may be impacted and print handling properties compromised.

	ANSI T FILTER	DIN 16536
Yellow	0.90-1.10	1.25-1.35
Magenta	1.35-1.45	1.35-1.45
Cyan	1.35-1.45	1.35-1.45
Black	1.70-1.80	1.70-1.80

Excessive film weights may lead to poor cure, marking during subsequent handling and set-off in the stack. In particular, print density of black should be closely monitored and controlled during printing. High colour build by excessive trapping of these inks may also result in poor cure and reprographic adjustments are recommended to minimise un-necessary trapping.

To fulfil its responsibility within the supply chain, Sun Chemical will provide, upon request and under non-disclosure agreement, information regarding potential migratable components, where present in these inks that are intended for food packaging applications.

For further information on low migration printing, please refer to Sun Chemical's Best Practice Guide: **Designing Packaging with Certainty – A Best Practice Guide.**

7. SunWave® FSP – Product Information

	Product Code	Product	Lightfastness # Full Strength	Alcohol #	Alkali #
PROCESS COLOURS	WVSP26	Process Yellow	5	+	+
	WVSP27	Process Magenta	5	+	-
	WVSP25	Process Cyan	7	+	+
	WVSP46	PSO Process Black	7	+	+

Test methods are available on request. Note, resistance properties refer to the characteristics of the pigments used in the inks, NOT the resistance properties of the cured film.

Lightfastness is measured according to the Blue Wool Scale. Under wet conditions such as during external exposure lightfastness is significantly worse for certain colours. Please consult our technical services for recommendation on alternative shades or blend formulations.

Please see www.sunchemical.com for further information on Sun Chemical products and services.