SunPak® DirectFood Plus

DFC

1. Description

SunPak DirectFood Plus is a series of sheetfed offset inks for inside printing of food packaging where direct contact is an option.

2. Product features

SunPak DirectFood Plus inks:

- support the production of food contact materials which comply with all relevant EU regulations. Other regulations can be checked on request.
- allow the production of food packaging with very good organoleptic (low odour*, taint*) properties as well as safe migration* levels.
- contain 79-88% of renewable materials determined by an independent institute by the so called C14 method
- are vegetable based, mineral oil free and do not contain Bisphenol A.
- are available as a range of various colours
- do not dry by oxidation and therefore do not contain drying catalysts, based on heavy metals such as cobalt, manganese, etc.

*See glossary at the end of this document

3. Product Suitability

3.1 Applications

The main application of SunPak DirectFood Plus inks is printing of the inner side of low odour and low migration packaging (folding cartons, wrappers, etc.) for the food and related industries where direct food contact is an option. SunPak DirectFood Plus should be coated by 2 layers of a suitable waterbased OPV.

Preferred press configurations are straight sheetfed offset presses of all makes and sizes with two units for aqueous coatings. Presses equipped to produce energy curing inks or combi production are not an option.

SunPak DirectFood Plus inks should not be used in the following areas:

- Where the application of the appropriate coating is not an option.
- Printing on non-absorbent substrates (films, foils, metal plates, metallised paper, PE layer of laminated boards, etc.)
- Skin-or Blister packaging
- Oven- or microwave packaging

3.2 Substrate

SunPak DirectFood Plus inks are suitable for the following substrates:

- Single- or double side coated carton board
- Single- or double side coated paper

Please make sure that these substrates comply with the end use requirements (organoleptics, migration) for direct food contact.

3.3 Varnishability

Inline overprinting with an appropriate coating is mandatory. Please make sure that these coatings comply with the end use requirements (direct food contact, organoleptic, migration).

3.4 Interaction with plastic films

In some cases printed material is wrapped with plastic films (e.g. tobacco or confectionary packaging). Some polymers (like Polyethylene or Polypropylene) tend to absorb (liquid) ink components resulting in a cloudy appearance of the film or a dimension change, often described as "swelling".

The potential of solvent migration of SunPak DirectFood Plus is reduced to a minimum, however a test under industrial condition is advised if film swelling could be an issue.

3.5 Hot Foil stamping

SunPak DirectFood Plus is not suitable for hot foil stamping

4. Colour Range

Due to the specific requirement only special pigments are available. A 4 colour process ink set as specified in ISO2846-1 is not available. Printing in accordance to ISO12647-2 is not possible.

INK RANGE PIGMENT BASED	PROD. CODE	LIGHT FASTNESS ISO 12040	ALCOHOL ISO 2836	SOLVENT MIXTURE ISO 2836	ALKALI ISO 2836
SUNPAK DIRECTFOOD PLUS Black	**DFP546**	8	+	+	+
SUNPAK DIRECTFOOD PLUS Blue	**DFP525**	8	+	+	+
SUNPAK DIRECTFOOD PLUS Blue G/S	**DFP507**	8	+	+	+
SUNPAK DIRECTFOOD PLUS PINK	**DFP527**	6	+	+	+
SUNPAK DIRECTFOOD PLUS Yellow	**DFP541**	6	+	-	-
SUNPAK DIRECTFOOD PLUS Yellow G/S	**DFP501**	7	+	+	+
SUNPAK DIRECTFOOD PLUS VIOLET	**DFP553**	7	+	+	+
SUNPAK DIRECTFOOD PLUS RED	**DFP536**	6	+	+	+
SUNPAK DIRECTFOOD PLUS ORANGE	**DFP521**	5	+	+	+
BLENDING MEDIUM					
SUNPAK ORGANIC DFC TRANSPARENT WHITE	**DFP548**				

5. General Handling

5.1 Storage

SunPak DirectFood Plus inks should be stored at ambient temperature between 5°C and 35°C. Under these conditions the inks have a shelf life of at least 12 months in an unopened vacuum-packed tin.

5.2 Waste disposal

SunPak DirectFood Plus ink waste can be handled as any other sheetfed ink waste. This should be carried out in accordance with good industrial practice, observing all the appropriate local, national and regional regulations and guidance.

6. Printing Conditions and press room consumables

All press room consumables could have a negative influence on the organoleptic properties and could be potential migrants. Therefore, a careful selection considering these impacts needs to be carried out.

The printer must make sure that press, press room conditions and work procedures meet the requirements of the nature of direct food packaging.

6.1 Fount Solution

Fountain solution additives are available for all water qualities, press types and IPA (alcohol) levels. For achieving best values regarding odour and taint as well as migration the selection of the right fountain solution additive is vital. With regard to fountain solution related press performance other parameters such as water quality and press conditions have to be considered.

6.2 Printing Ink auxiliaries

Printing auxiliaries shall not be used under any circumstances.

6.3 Printing Plates

SunPak DirectFood Plus can be run with any type of aluminium based printing plates (CtP plates, conventional positive or negative plates).

6.4 Water based direct food contact coatings

To achieve the best possible results Sun Chemical recommends the use of the following direct food contact water based barrier coatings.

SunStar SPEF053 Premium water and grease resistant overprint varnish, from frozen to hot food application

SunStar SPEF1055 Value grease and rub resistant overprint varnish from frozen to ambient food application

7. End-use safety / Regulations

The SunPak DirectFood Plus ink range is designed for use on the food and non-food-contact side of food packaging provided that the inks are applied under the relevant Good Manufacturing Practices (GMP) and according to the recommendations of this Technical Data Sheet. The printer, converter and the packer/filler have the legal responsibility to ensure that the finished article is fit for the intended purpose and that the ink and coating components do not migrate into the food at levels that exceed legal and industry requirements as outlined in the EU Framework Regulation (EC) No 1935/2004, the GMP Regulation (EC) No 2023/2006, Swiss Ordinance on Materials and Articles in Contact with Food (SR 817.023.21). We recommend that the finished packaging is tested under appropriate representative conditions of use.

All Sun Chemical Europe printing inks and related materials are formulated in accordance with the CEPE/EuPIA Exclusion Policy. This excludes from use all materials classified according to the CLP Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures as carcinogenic, mutagenic or toxic for reproduction in categories 1A or 1B with hazard statements H340, H350 or H360, in addition to toxic or highly toxic materials with hazard statements H300, H301, H310, H311, H330, H331, H370 or H372. None of the raw materials used in inks supplied intentionally contain the heavy metals Antimony, Arsenic, Cadmium, Chromium (VI), Lead, Mercury, Selenium. A copy of the document is available on the EuPIA website: http://www.eupia.org

SunPak DirectFood Plus also complies with the EuPIA “Guideline on Printing Inks applied to food Contact Materials” and the EuPIA “Good Manufacturing Practices – Printing inks for food contact materials” which is in compliance with the European Regulation (EC) No 2023/2006. Copies of these documents are available on the EuPIA website: http://www.eupia.org.

All components of SunPak DirectFood Plus are listed in Annex 10 of the Swiss Ordinance on Materials and Articles in Contact with Food (SR 817.023.21).

A regulatory statement detailing suitability for direct food contact is available on request.

All necessary information is available on request for testing institutes to assist risk assessment calculations.

SunPak DirectFood Plus inks fulfil the demands on heavy metals of the Packaging and Packaging Waste Directive (94/62/EC), the CONEG heavy metal limits and EN71-3 (European toy standard).

8. Technical Glossary

Aldehydes are a family of chemical compounds, as pentanal, hexanal*, heptanal and octanal. They can easily be quantified by means of analytical chemistry such as gas chromatography (GC*).

GC separates mixtures of chemical compounds and indicates their concentration. Subsequent in-line analysis, e.g. mass spectrometry (MS), identifies every compound. There is no international standard for the determination of aldehydes in prints. Laboratories who wish to compare their results with other partners have to agree on specific details of the test procedure.

Hexanal is an odorous compound which is created by oxidative decomposition of vegetable oils, common in conventional sheetfed offset inks. SunPak DirectFood Plus inks do not undergo such a chemical reaction with oxygen.

Migration is the (unwanted) transfer of substances from the packaging or its components (printing ink, substrate, varnish etc.) into the packaged product (e.g. foodstuff). Solvents used in standard (oxidative drying) sheetfed offset inks may show a significant migration potential. Migration is assessed by appropriate test methods and can occur whilst the organoleptic properties maintain unaffected.

Odour/taint can be assessed in organoleptic tests, as EN 1230-1 (odour) and EN 1230-2 (taint).

High temperature applications

Sun Chemical strongly recommend that the food is removed from the printed packaging before heating. As we are not able to test printed packaging under all kinds of conditions at elevated temperatures the performance and the suitability of the final packaging must be checked under the intended conditions of use.
If fiber-based ovenable packaging shall be produced, SunPak DFP inks are the safest choice, also for outside printing.
The use of printing inks and coatings for domestic oven applications is critical for several reasons:

1. Chemical compounds may decompose under the influence of heat. This is obvious when the substrate or the printing ink begin to discolour, which is standard under oven temperature. Further to this, decomposition may happen without being visually noticed. It is therefore important to check not only the migration of the substances originally present in the dried ink film but in addition the decomposition products that may have formed during the heating process.

2. Printed carton board packaging exposed to heat releases volatile compounds which are constitutional parts of the substrate, the printing ink or the overprint varnish. SunPak DFP is not based on volatile chemicals. For conventional sheetfed applications it represents a technically viable solution regarding migration even under elevated temperature conditions.

3. The surface of inks and coatings will soften at oven temperatures. This may result in set-off when being touched by the consumer. Although this is not likely to be harmful, it might be negatively recognised.

4. Sun Chemical do not design inks for use at domestic oven temperatures (>180C). At these temperatures decomposition of substances within the printing ink is possible. The decomposition may be dependent on a range of factors including the pack geometry, the packaged food type and the available levels of oxygen. The decomposition may result in the formation of a large number of additional Non-Intentionally-Added-Substances for which compliance assessments would need to be done. Customers are therefore strongly encouraged to do their own compliance assessment. Analytical results from Sun Chemical may give an indication of expected outcomes but should not be used by customers in their final compliance assessments.

Caution should be used when creating print designs containing bigger areas of carbon black for applications where microwave heating is used. There have been a small number of reported instances of a potential fire hazard when packaging printed with a printing ink based on carbon black pigment were heated in a microwave oven. These incidents appear to be rare and specific to design and pack geometry. Consequently, Sun Chemical advises that products printed with carbon black containing DFP546, intended for microwave applications, be assessed under appropriate conditions to ensure they are fit for that purpose. If necessary, a polychromatic black blend can be used in place of the carbon black based ink.

Further information is available in the EuPIA Information Note “Inks and coatings for High Temperature Applications” which you can find on the EuPIA website: http://www.eupia.org .

Oxidation is a chemical reaction with oxygen, often initiated by a drying catalyst. By-products of this chemical reaction are aldehydes and other odorous compounds. Unlike oxidative drying sheetfed offset inks, SunPak DirectFood Plus inks do not contain oxidative drying materials or a drying catalyst.

9. Technical Assistance / Contacts

For further information, please contact sheetfed@sunchemical.com

All aspects of safe food packaging printing are compiled in a Best Practice Guide for Food Packaging printing.

SunPak is a registered trademark of Sun Chemical Corporation in the United States and other countries.

10. Disclaimer

This list of applications, substrates and processes provided in this document is not exhaustive. Please contact your local Sun Chemical representative for full technical evaluation of your application or process.

The performance of the product and its suitability for the customers' purpose depend on the particular conditions of use and materials being printed. Therefore, any statement provided in this document should not be construed as providing a guarantee of performance in a specific application area. Sun Chemical always recommends that customers carry out a full evaluation of performance and safety-in-use prior to using our products in commercial applications.

Our Products are intended for sale to professional users. The information herein is general information designed to assist customers in determining the suitability of our products for their applications. All recommendations are made without guarantee, since the application and conditions of use are beyond our control. We recommend that customers satisfy themselves that each product meets their requirements in all respects before commencing a print run. There is no implied warranty of merchantability or fitness for purpose of the product or products described herein. In no event shall Sun Chemical be liable for damages of any nature arising out of the use or reliance upon this information. Modifications of the product for reasons of improvements might be made without further notice.

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