

Selection of UV Curable Inks and Coatings for Microwave & Ovenable Packaging

Background

A key packaging design trend emerging in recent years has been the development of convenience packaging. “Ready meals” that are microwaved or oven cooked in their original store packaging, retail and home use of “cook-in-the-tray” bakery items and even the development of heated airline meals is growing in popularity. An increasing proportion of this packaging is now printed in some way and there are growing concerns about the design of such packaging and the risk of potential impact of the packaging materials, on the foodstuffs contained, during the cooking process.

Currently, as a result of a number of product withdrawals caused by migration of components from packaging into food, there is understandable interest in the market place, media and in the packaging supply chain about migration from packaging.

Designing Packaging With Certainty

It is always a minimum and mandatory requirement to ensure consumer safety when selecting materials for packaging. An additional cooking process being included in a pack design adds to that demand. A careful approach, based on risk assessment, is therefore required with respect to choice of materials, to avoid problems in the intended pack's use.

Foodstuffs packaged in boxes or trays, that are to be cooked by microwaving or in an oven, can be assumed to be subject to a number of conditions, including

- Close proximity of print to foodstuff
- Long-term storage (extended shelf-life products)
- A wide variety of (uncontrollable) cooking times and temperatures
- Exposure to temperatures in excess of 200 °C when cooked in an oven (Note also, the potential effect of air circulation in a fan oven)
- Localised heating in a microwave oven, especially if the packaging includes a susceptor (Note, printing of packaging should be avoided if the construction includes a susceptor as excessive localised heating can lead to breakdown of materials used in the packaging, with currently unknown consequences)

Under these conditions, careful attention must be given to packaging design and selection of materials, since there is increased potential for migration from the packaging due to the high temperatures which can be attained during microwave and oven cooking.

What can migrate and what can I do about it?

Potential migrants include thermal breakdown products from pigments, volatile components from the ink and coating vehicle systems, low molecular weight components of inks, coatings, adhesives and the substrate and by-products from the UV curing process. To minimise risk, carefully selected low migration inks and coatings are recommended for these applications and, whilst they are more expensive than their standard product counterparts, risk/benefit analysis indicates the additional cost is justified in terms of packaging safety. Further, minimising the amount of print on the carton will also help to limit any risk.

working for you.



So what Low Migration products might be suitable for high temperature applications?

Subject to conditions of use, UV curable inks suitable for microwave and ovenable packaging are available from within the SunCure® ULM product range. Note that not all colours in the range are acceptable and only those based on heat stable pigments are recommended. Even then, exposure to temperatures above 200 °C for periods in excess of 30 minutes should be avoided. A range of Low Migration coatings is also available for use with these inks to provide controlled gloss and slip properties and print protection. In some cases, a cross-linkable water-based coating may be used, but standard water-based coatings should be avoided as they can both melt and break down in elevated temperature conditions.

The colours available do not constitute a classic set of process or blend colours and it may be necessary to review colour separation and repro in order to produce an acceptable graphic result.

The following inks can be used:

- ULM29	Yellow	- ULM27	Magenta
- ULM25	Cyan	- ULM46	Black**
- ULM42	Rubine	- ULM48	Transparent White
- ULM53	Violet	- ULM56	Pink
- ULM71	Green	- ULM84	Opaque White

These inks are intended for use in the printing of primary or primary outer wrap (also known as secondary or indirect) packaging. They are not intended for direct food contact.

Please refer to the specific product Technical Data Sheet for more information and the Safety Data Sheet for information on handling and disposal. Alternatively please contact your local Sun Chemical representative for advice and assistance.

Packaging Safety Responsibilities

Knowledge regarding the performance of different types of printed material in elevated temperature applications is far from complete, so it is always recommended that packaging produced with these products is tested to ensure that it complies with legal requirements.

It is the printer/converter and packaging distributors responsibility to ensure the packaging has been fully assessed for risk and the packaging produced meets regulatory requirements for its end use. Therefore, migration testing under appropriate conditions of use is strongly recommended before proceeding with commercial printing.

Please contact your Sun Chemical representative if you have any questions or need additional information.

** There have been a small number of reported instances of a potential fire hazard when containers printed with a printing ink based on carbon black pigment are heated in a microwave oven. Although these incidents appear to be rare, they have not been the subject of definitive technical evaluation. Consequently, Sun Chemical advises that products printed with carbon black containing inks intended for microwave applications be assessed under appropriate conditions to ensure they are fit for that purpose. If necessary a trichromatic black blend can be used in place of a carbon black based ink.

The information contained herein is based on data believed to be up-to-date and correct at the time writing. It is provided to our customers in order that they are able to comply with all applicable health and safety laws, regulations, and orders. In particular, customers are under an obligation to carry out a risk assessment under relevant Good Manufacturing Practices (GMP) in line with EU food contact legislation and as a result take adequate measures to protect food consumers.

SunChemical®

a member of the DIC group



Sun Chemical Europe
Wexham Springs
Framewood Road
Slough, SL3 6PJ
United Kingdom
Tel +44 (0)203 139 0000
Fax +44 (0)203 139 0001
www.sunchemical.com

English Version 1
August 2010
Page 2/2

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.