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UV INKS, FOOD PACKAGING AND LOW MIGRATION: WHAT'S THE SCOOP?

Often, there is much confusion about what inks are suitable for use in printing food packaging. The assumption is frequently made that all one needs to do is use an ink touted as "low migration" or "Nestle-compliant", and the problem is solved. The situation is not that simple, unfortunately. Here are some things you need to know to keep your head above water when printing food packaging.

Many printers call us with questions about UV inks in food packaging applications. Often, the question posed to us is: "Can you supply us with an FDA-approved ink for printing food packaging?"

First of all, note that there is no such thing as an "FDA approved ink". This term has no meaning, since the FDA does not approve or regulate inks or coatings. Rather, the FDA regulates *substances* that are intentional or unintentional additives to the food itself. An unintentional additive is something that is not directly put into the food to affect its properties, but instead migrates from the packaging or inks. If a component of the ink does migrate into the food, it had better be a material that is approved by the FDA as a *food additive*, or there will be liability issues to confront.

At present, UV inks are not suitable for use in *direct* food contact applications, since most of the pigments and oligomers that are used in UV inks are not approved by the FDA as food additives (and may likely migrate into the food if the ink and food are put in extended direct contact with one another!).

However, many printers use UV inks in indirect food contact applications, where the ink is printed on the outside of food packaging, and the packaging itself acts as a functional barrier. The role of the functional barrier is to keep the ink and the food contents separate, and prevent any migration of ink components into the food. It is the responsibility of the printer to ascertain whether the packaging acts as a proper functional barrier, and testing can be done to assist in making this determination.

Another important issue at play when considering the proximity of UV ink to food is proper curing. In theory, if 100% curing could be achieved with UV ink, there would be no materials in that ink which could migrate into the food. However, in practice, curing is always something that is less than perfect and hard to fully quantify. It depends to a great degree on the ink formulation itself, the substrate being printed, press speed, type and number of lamps used, condition of the lamps and reflectors on press, and ink film thickness.

The better the degree of cure, the lower will be the probability that any ink components capable of migration into the food will do so.

Note that migration can be more of a problem on porous stocks, as ink components can selectively absorb into the substrate and not crosslink as fully.

Also, in considering migratable components – don't forget to take a hard look at the fountain solution. Small amounts of fountain solution do become emulsified into the ink and do not crosslink with the ink film. These entrapped materials can potentially diffuse out of the ink and into food.

Another very important concept is: "Low migration" is a discipline, not a type of ink, per se. When folks ask for low migration inks, this begs the questions: *What is low?.....or….Lower than what? And under what specific conditions of use?* It is not enough for a printer to merely put an ink touted as "low migration" on press and assume that now he/she is in the business of food package printing. Every aspect of the printing and converting process must be analyzed and managed to ensure that food contamination is avoided. The most any ink supplier can do is formulate the ink from components that are known to have less of a tendency to migrate. If said inks are not properly cured during printing, even these will test poorly in subsequent migration evaluations.

Detailed specifications are important. One excellent set of specifications has been developed by Nestle, in response to a food contamination incident in 2005. The reknown and quality of these specifications has encouraged some printers to require their food packaging to be "Nestle-compliant", whether or not they are actually printing for Nestle!

The specifications consist of a Guidance Document that lists ingredients that must be excluded from use in inks used for food packaging. In the case of UV inks, the document also requires that photoinitiators used in the inks must be on the approved list as noted in the document. A final requirement sets migration limits for the cured ink as printed on the finished product.

Note that on request, we supply inks that are Nestle-compliant insofar as the ingredients used are allowable per the current guidance document. The final determination of migration, however, depends on the product as printed (press conditions, substrate, curing conditions, fountain solutions used, etc.) and, as such, is not entirely within our control. However, we are interested in working with you to assure that our ink, as printed on your substrate – will comply with migration limits. It requires a joint effort between the ink supplier and the printer to achieve this goal.

If you have any further questions about these topics, please contact our regulatory manager:

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