

Labeling & Packaging of Food & Beverage Products
VersaPass® DN Inks



memjet®

Beautiful Precision, Simplicity, and Affordability.

We Are R&D

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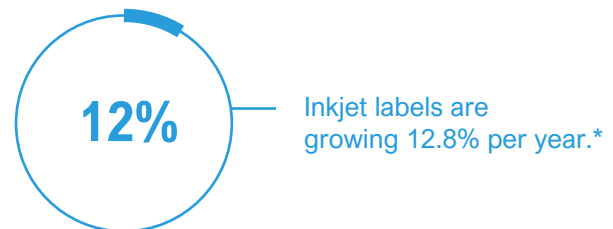
Part 1

FOOD LABELING TRENDS

Food labels are generally printed on paper or film-based substrates and affixed to a container or product. They are used to communicate nutritional and other product information as well as for branding purposes.

With a shift in the food experience happening, so too is the label experience.

** Smithers PIRA 2017 and The State of the Specialty Food Industry Report 2017*



Clean Labels

With food label scrutiny at an all-time high, customers only want to see ingredients they can read and understand. Claims of “healthy” and “nutritious” need to be backed up by the ingredients listed on the label.

Storage is Out

In a market where product ingredients, regulations, or brand messages can change at any moment, pre-printing and storing labels is a thing of the past. Small batches of short-run labels, as well as faster turnaround times, are what’s needed now.

Safety of Food Labels

As print providers and food manufacturers strive to ensure the safety of food labels, demand is growing for water-based low migration inkjet solutions that minimize the impact on food and human health.

Growing SKUS

As brands look for ways to make labeling feel more custom for a personal brand experience, SKU counts continue to grow for many food manufacturers. Label printers need to be more nimble than ever before, adapting to short runs with minimal transition time and set-up costs.

Home Delivery is In

As e-commerce makes food pickup, catering and grocery and meal delivery services more common, consumers are trading shopping carts and their squeaky wheels for the convenience of online ordering and healthy meals. And with it comes an increased need for personalized short-run labels that can be customized with expiration dates, localized marketing messages and brand personalization.

QR Codes and Technology Provide Transparency

Smart labels enable brands to share more in-depth details about food safety, food sources and freshness as well as connect customers to more of the brand story.

The Changing Print Market

Label printing has been transitioning from analog to digital for a number of years. Today, you can find inkjet label printers as roll-fed benchtop printers for small volumes all the way up to higher-volume label presses with integrated finishing equipment.

This changing market points to one thing: the need for affordable digital print solutions that can accommodate short runs, variable data elements and quick changes in label requirements without the setup costs or long timelines associated with traditional off-set technology.

“**Food accounts for approximately 50 percent of consumer packaging** and is growing thanks to increased demand for convenience.”



Refrigerated Entree

Refrigerated and prepared entrees, salads, appetizers, sandwiches, burritos and sushi.



Frozen Desserts

Gourmet ice creams (organic and non-organic), gelatos, Italian ices, and high-end (super-premium) specialty frozen desserts.



Refrigerated Juices

Super-premium fresh juices, as well as enhanced, functional drinks.



Frozen Meat, Poultry, Seafood

Organic and premium natural brands.

7 out of the 10 fastest growing food labeling categories are refrigerated and frozen foods.*

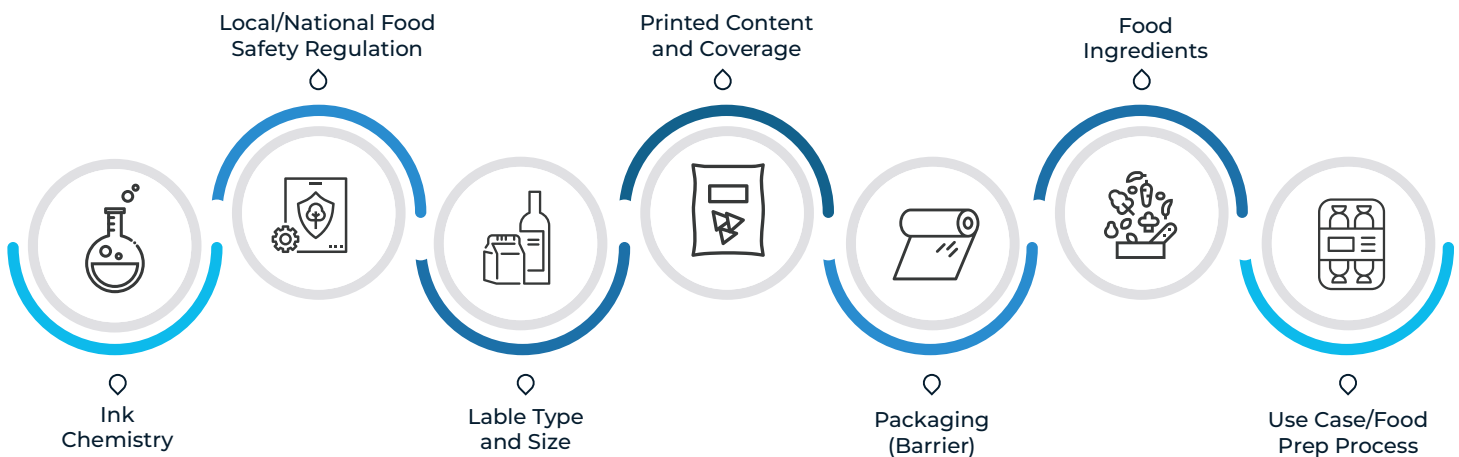
* *Smithers PIRA 2017 and The State of the Specialty Food Industry Report 2017.*

Part 2

Food Contact Materials

Most labels produced today are for food and beverage products. It's a big market, but anyone thinking of producing labels for food and beverage products needs to understand how the label and food interact.

* *Smithers PIRA 2017 and The State of the Specialty Food Industry Report 2017.*



Migration from label to food can happen both from the ink and label substrate as well as the adhesive used in packaging. So even though labels used in food packaging are not intended to be in contact with food, the potential for indirect contact is enough for it to be subject to migration limit testing because it is part of the food packaging.

Many variables determine if the ink you use is safe for food products: the packaging type, the food type, the way the food will be stored, how long it will be stored, whether the food will be cooked in the packaging, and the way the food will be transported all determine to what extent the ink on the label might migrate from the label to the food inside the package.

The entire supply chain from manufacturer to customer must be understood:

Will the product be put in a refrigerated case and then consumed; will the product go from a freezer into a microwave; or will the consumer just open a cardboard box and consume it?

Safety Regulations

In the absence of ink specific regulations for Food Contact Materials, companies look to other safety regulations for compliance:

- EC 1935/2004 “The Framework Regulation”
- European Chemical Association (ECHA) SVHC Candidate List
- EU and China RoHS
- Swiss Ordinance
- Japan Printing Ink Makers (JPIMA), Negative List
- California Prop 65
- US CONEG

Food Packaging Safety Checklist

✓ Check the Supply Chain

- Are your packaging materials manufactured according to Good Manufacturing Practices (GMP) principles?
- Is this the only material in the final packaging solution?
- Are your packaging materials a food contact material?

✓ Check the Regulations

- Are there local or national regulations relevant to your final packaging solution? Does your packaging comply?

✓ Check Your Claims

- Do you have data to support your Food Contact Materials (FCM) claims?



Part 3

Verify the Safety of Your Food Packaging

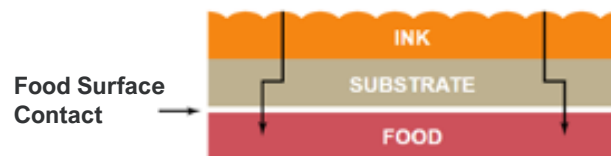
Ink Migration

Ink migration is the transfer of ink components from or through the packaging/label that the ink is printed on to the food. The base assumption is that any material used in food contact applications, including the printing inks, will become part of the food unless documented testing proves otherwise.

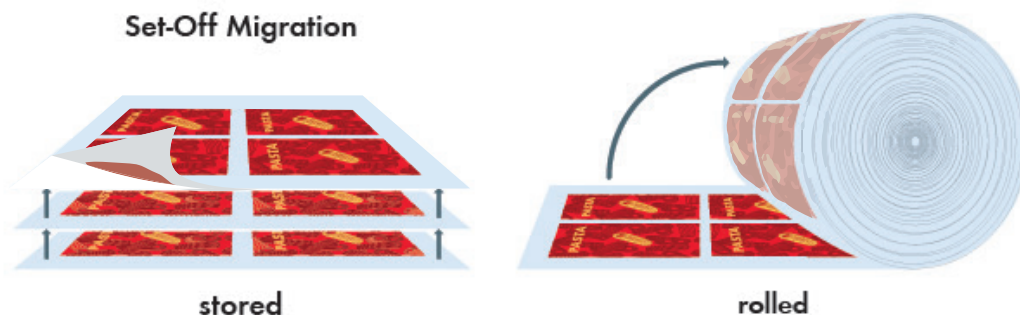
Migration from label to food can happen both from the ink and label substrate as well as the adhesive used in packaging. FDA Regulations apply to the substrate and adhesives used in labels on food packaging.

There Are Two Kinds of Physical Migration:

Penetration Migration is the migration of a substance from the printed side through the substrate onto the unprinted side.



Contact Migration or **set-off migration** occurs when a substance from the printed side migrates to the non-printed surface during manufacture or storage of the printed item in a stack or roll.



One way to help limit set-off ink migration is with the use of a laminate or varnish to protect what's printed on the label from potentially coming in contact with food. However, laminates and varnishes must be verified as suitable for use in food packaging.

Foods stored in the refrigerator/freezer and/or used in the microwave will experience greater condensation or evaporation and therefore may require more substantial media, barrier and/or overcoat solutions.

Barriers

The best way to ensure no ink migrates from packaging to food is to use a barrier between the food and the printed label or package. A functional barrier is any material or combination of materials that prevents the migration of chemicals from the printed label or package onto the food beyond any threshold limits (SML- Specific Migration Limit/OML- Overall Migration Limit).

As a rule, thicker packaging materials will perform better as functional barriers to ink migration, but testing will be required for verification. For example, cardboard and plastic may allow different levels of ink migration, but different types of plastic may also allow different levels of ink migration.

Be advised that barrier effectiveness can be impacted by things like the packaging media type, the type of food in the packaging, the print coverage of the packaging, the temperature where the printed package is stored and used, and how the packaging is to be used (e.g. microwaved, frozen, boiled).

Absolute vs. Functional Barriers

Glass and certain metals (e.g. aluminum > 8-micron thickness)

These are **absolute barriers** that ensure the complete blockage of chemicals migrating from the printed food package onto the food.

Plastics

Many plastic materials are partial or **functional barriers** for food packaging which still need to be tested for verification.

Barrier examples:

- Virgin PET $\geq 25 \mu\text{m}$ is considered a functional barrier by the FDA for room temperature applications; bag in a box (e.g. common cereal packaging) or rigid jars like peanut butter, nuts, chocolates, etc.
- Polymer laminates containing an inner layer of EVOH $\geq 3 \mu\text{m}$ where the absence of swelling (for example by water) can be guaranteed, can be used for indefinite frozen and ambient temperature storage for all food types.
- PET $\geq 12 \mu\text{m}$, example packages are take-out containers that are semi rigid such as grab & go lunch plastics boxes or sushi boxes.
- Polyamide $\geq 15 \mu\text{m}$ use examples include vacuum packaging such as that used for cheese, bacon, fresh and processed meats and frozen foods.

Part 4

Why Memjet's VersaPass DN inks for food labeling?

With so many variables at play, print providers and manufacturers should start with the safest ink possible: water-based inks. These inks contain less harmful chemicals, are safer to use, and are more environmentally friendly than UV, solvent, or toner inks.

When a label producer chooses water-based ink, it gives them the confidence of knowing that fewer harmful chemicals might migrate and affect food and food safety or change a food's organoleptic properties (look, taste, and smell).

In addition to migration, food and beverage manufacturers who want to produce their own labels need to take a critical look at where they are producing those labels. UV and toner inks used to commercially produce labels require ventilation, proper handling, and special equipment. These requirements are usually not a problem for the commercial print provider, but these types of inks can be hazardous when used near where food products are produced.

Using water-based inks can be a solid starting point for print providers and manufacturers who want to have greater control over their processes.

These inks can be used safely in food contact materials and are easier to handle than other inks. Water-based inks also give users greater flexibility in the quantity and type of labels produced.

Good Chemistry

Developed by in-house chemists, Memjet's water-based inks dry faster, enabling high-speed and high-quality color printing that is environmentally friendly and doesn't require energy intensive drying or curing equipment. All print solutions *Powered by Memjet* include a Memjet-designed water-based ink. These inks are 100% free of reactive chemistries making them safer to use and better for the environment than analog, UV or solvent inks.

Good Chemistry

The following safety and environmental factors table shows a comparison of Memjet VersaPass DN inks versus competitive ink technologies. Assessments are based on commercially available inks in each category. Rating does not represent every ink in that class, but indicates what is known to be typical for the class.

 Best
  Average
  Worst

	Memjet VersaPass DN Inks	Typical UV Ink	Typical Solvent Ink	Liquid Electrophotographic Ink	Typical Eco-Solvent Ink
Odor					
VOCs					
Special Ventilation Required					
Ink Health Hazard					
Peripheral/Cleaning Fluids Hazard	N/A				
Transportation/Flammability					
Waste/Environmental Risk					

Worldwide Regulatory Compliance Statements

Specific to Memjet's VersaPass DN Inks

Free From

- SVHCs, heavy metals and aromatic amines
- Components on Japan Printing Ink Makers (JPIMA), Negative List, May 2017
- Phthalate esters and bisphenol-A (BPA) as well as hazardous UV ink components such as 4-methylbenzophenone or benzophenone
- Mineral oil aromatic hydrocarbons (MOSH/MOAH)
- Materials subject to California Prop 65 labeling above Safe Harbor Limits

Fully Compliant with these U.S. Standards

- US CONEG Model Toxics in Packaging Legislation
 - Memjet inks contain no: mercury, lead, cadmium or hexavalent chromium
NOTE: None of these metals are intentionally added to the ink formulations, though small amounts may exist as trace contaminants. Memjet can confirm that any incidental presence is < 10 parts per million based on our testing of the final ink formulations.
- VersaPass DN inks do not contain any Prop 65 substances above Safe Harbor Limits

Fully Compliant with these EU Standards

- European Chemical Association (ECHA) SVHC Candidate List
 - No Memjet ink components are on the SVHC Candidate List
- EU Packaging Directive 92/62/EC
- The European Union's Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC and Directive 2011/65/ EU were amended by Directive 2015/863/EU and is now known as RoHS 3
 - No RoHS 3 substances are in Memjet inks

Partial Compliant with these EU Standards

- Memjet inks are made according to Good Manufacturing Practice (GMP) principles
 - Compliance with the Annex of EU 2023/2006 (GMP) is under the packaging producer not Memjet's control

Fully Compliant with these Asian Standards

- China's revised Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products effect on July 1, 2016, commonly referred to as China RoHS 2
 - No RoHS 2 substances are in Memjet inks
- Japan Printing Ink Makers (JPIMA), Negative List, 2017
 - No JIMPA Negative List substances are in Memjet inks

Memjet VersaPass DN Ink Migration Study

When used as indicated below, VersaPass DN ink can be recommended for use in food packaging applications as they are in line with requirements defined in:

- [Regulation \(EC\) 1935/2004 \(Framework regulation on food contact materials\), especially Article 3](#)
- [Regulation \(EU\) 2023/2006 \(GMP\) regulation for food contact materials](#)

Note: Memjet inks are manufactured according to Good Manufacturing Practices, but only packaging convertors or those printing with Memjet ink can comply with the Annex.

Situation 1

Memjet ink can be safely used in food packaging applications for frozen or ambient temperature storage of all food types when printed on packaging that contains a functional barrier such as glass, aluminum, PET $\geq 12 \mu\text{m}$ or polymer laminates containing an inner layer of EVOH of $\geq 3 \mu\text{m}$ or polyamide of $\geq 15 \mu\text{m}$ (where the lack of swelling can be guaranteed).

Situation 2

VersaPass DN inks can be safely used in food packaging applications when printed on BOPP film of approx. 60 μm , coated with inkjet receptive coating.

Such packaging solutions can store:

- dry foods for indefinite storage at room temperature
- fatty foods for up to 6 months at room temperature

Valid: January 28, 2020 - December 31, 2020

[Ask for Memjet's latest FCM Statement of Compliance for VersaPass DN inks for a growing list of verified substrates.](#)