

Why AstroNova Natura ink for food labeling?

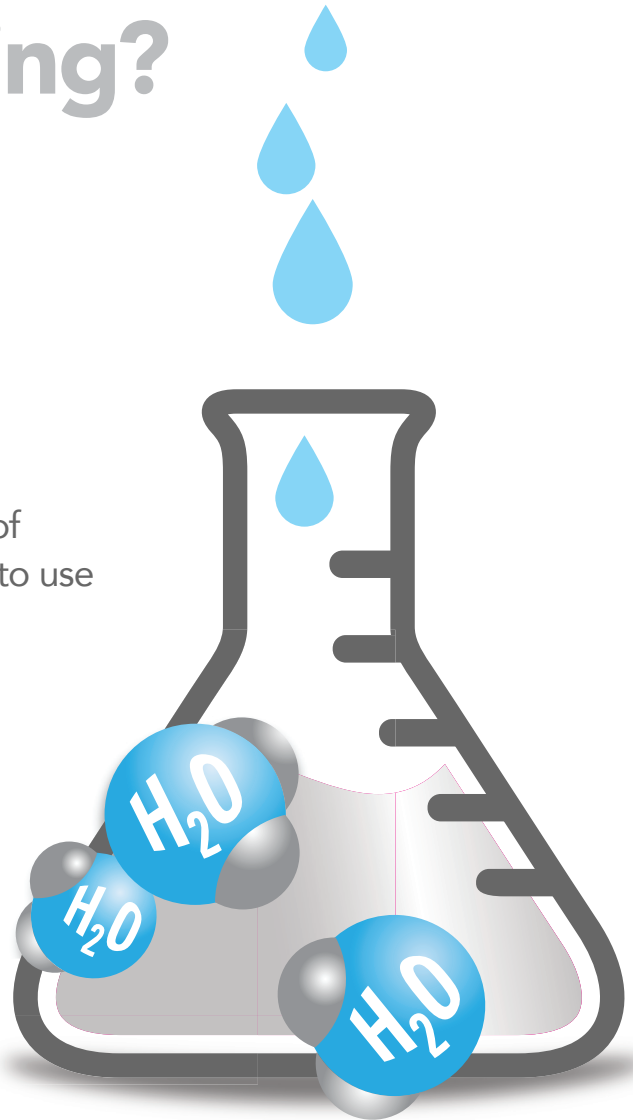
Safe. Fast. Effective

GOOD CHEMISTRY:

AstroNova Natura ink solutions use water-based inks which are 100% free of reactive chemistries making them safer to use and better for the environment.

























Smarter ink. Safer labels

Water-based AstroNova Natura 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.



Natura inks vs competitive technologies

The following safety and environmental factors table shows a comparison of AstroNova Natura inks versus competitive technologies. Assessments are based on commercially available inks in each category. The rating does not represent every ink in that class, but is expected to be typical for the class.

	Natura Inks	Typical UV Ink	Typical Solvent Ink	HP Indigo	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 statements

With a formulation comprised of ~70% water, AstroNova Natura inks are safe to use and are friendlier to the environment than UV, solvent, or liquid toner inks.

AstroNova Natura inks are 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 (North America) above Safe Harbor Limits



Ink compliance around the world



Regulatory statements are specific to Natura Inks.

FULLY COMPLIANT WITH THESE US STANDARDS:

- Model Toxics in Packaging Legislation (formerly known as US CONEG legislation)
 - US CONEG Model Toxics in Packaging Legislation
 - AstroNova Natura 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. AstroNova can confirm that any incidental presence is < 10 parts per million based on testing of the final ink formulations.
- Natura inks do not contain any Prop 65 substances above Safe Harbor Limits

FULLY COMPLIANT WITH 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 materials are in AstroNova Natura inks
- Japan Printing Ink Makers (JPIMA), Negative List

FUTURE COMPLIANCE:

Although Natura inks are currently not fully compliant with the Swiss Ordinance, they are in the process of being confirmed compliant with the Nestle Guidance Note on Packaging Inks.

FULLY COMPLIANT WITH THESE EU STANDARDS:

- European Chemical Association (ECHA) SVHC Candidate List
 - No AstroNova Natura 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 materials are in AstroNova Natura inks
- AstroNova Natura inks are made according to Good Manufacturing Practice (GMP) principles (Global)
 - Compliance with Commission Regulation (EC) No 2023/2006 of 22 December 2006 on good manufacturing practice for materials and articles intended to come into contact with food must be confirmed by final packaging converter.

ASTRONOVA Natura INKS ARE IN PARTIAL COMPLIANCE WITH THIS INDUSTRY STANDARD:

- Swiss Ordinance of the FDHA on Materials and Articles
- All of the components in Cyan, Yellow and Magenta inks are listed. One component in the black ink is not listed. In order to obtain compliance with the Swiss Ordinance, a composite black must be used.
- Partial compliance with the Swiss Ordinance means that AstroNov's black ink is not fully compliant with the current Nestle Guidance Note on Packaging Inks.



Use a functional barrier

The best way to ensure no ink migrates from packaging to food is to use a functional barrier between the food and the printed label or package. A functional barrier is any material that prevents the migration of chemicals from the printed package/label into the food beyond any threshold limits.



Be advised that barrier effectiveness can be impacted by the thickness of the barrier, food type, printed substrate, storage temperature and the intended end use of the packaging (e.g. microwaved, frozen, boiled).

Some examples of functional barriers include:

- Glass and certain metals: (e.g. aluminum > 8 micron thickness). These are absolute barriers and ensure complete blockage of the migration of chemicals in the printed food package.
- Plastics materials: most plastic materials are partial barriers and prevent some to all migration, though particular use cases must be verified. Examples include:
 - PET (12 microns) used in take-out containers that are semi rigid such as grab & go lunch plastics boxes & sushi boxes.
 - Thick plastic (e.g. virgin PET \geq 25 microns 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 or polyamide where the absence of swelling (for example by water) can be guaranteed for indefinite frozen and ambient temperature storage for all food types.
 - EVOH (3 microns) can also be used for food packaging as a gas barrier to enhance shelf life. EVOH is used in rigid and semirigid containers, including bottles, trays, bowls, flexible films and paperboard beverage cartons.
 - Polyamide (15 microns) can also be used as a laminate because it is a good barrier for moisture and oxygen, and has better tensile strength and compatibility with fats. Applications include vacuum packaging of cheese, bacon, fresh and processed meats, and frozen foods.

Note: Migration from label to food can happen both from the ink and label substrate as well as the adhesive used to affix the label to the packaging. Paper labels used on food packaging need to comply with FDA regulation 21 CFR 176.170 and/or 176.180, and label adhesive should comply with FDA regulation 21 CFR 175.105.

Natura Ink Migration Study



Complies with European food contact regulation for packaging dry and fatty foods

Regulation (EC) No 1935/2004 when used for packaging dry foods with indefinite storage at room temperature and fatty foods for up to 6 months at room temperature.

Complies with US legislation for packaging dry foods.

US legislation as migration results were below the threshold of regulation of the Federal Food, Drug, and Cosmetic Act for use on packaging intended to pack dry foods.

The migration study details:

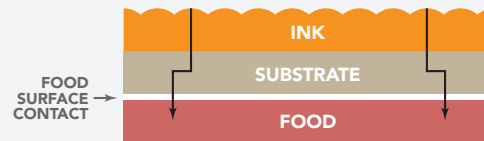
- High coverage label using AstroNova 3.5mil BOPP
- Polypropylene wrapper
- Dry food simulant (Tenax), fatty food simulant (95% ethanol)

*Please contact AstroNova for more details on this testing.
**For AstroNova's tested use case, in the US, for use on foods other than dry food in a dossier submission, a legal opinion would be required.

Migration: Insights and Recommendations

1. The base assumption is that any materials used in food contact applications, including the printing inks, will become part of the food unless documented testing proves otherwise.
2. In the US, there is no 21 CFR or regulatory guidance surrounding packaging inks; however, it still must be proven that the ink components are not migrating into the food.
3. Using inkjet-appropriate medias with fast dry time as well as high-end synthetic medias can enhance water resistance properties and protect food as well as the quality of the label.
4. While outer lamination and varnishes do not protect against potential ink migration (through the back side of label), they do help to limit set-off, therefore protecting what's printed on the label as well as the food when there is contact with the label. Assure that the varnish and/or laminate are suitable for use with food packaging applications.
5. The following are recommended starting scenarios for the use of AstroNova inks: labels that are placed on glass, tin cans, aluminum foil, or any material considered a true functional barrier. Alternatively, the inks can be used on the secondary packaging of a 'bag in box' package where it has been proven that the ink does not migrate.
6. Always examine the thickness of packaging material. Thicker packaging materials will perform better as functional barriers to ink migration, but further testing will be required for verification.
7. Remember that environmental conditions play a role in possible ink migration or set-off. Foods stored in the refrigerator/freezer and then used in the microwave will experience greater condensation and evaporation. Any conditions that are considered more 'worst case' (ie. higher temperatures; fatty foods) may require more substantial media, barrier and/or overcoat solutions.

INK MIGRATION



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