

**UNDERSTANDING**



# **INK MIGRATION**

**FOOD • PHARMACEUTICALS • HEALTH & BEAUTY**



WHAT IS

# INK MIGRATION?

- The printing on the **outside** ends up **in the product**





# What are the risks?

It puts consumer  
**health at risk**

**Changes the flavor** and **odor**  
of products

It **violates** regulations

It can **damage** the brand  
**reputation**



## BEWARE

# The Low-Migration Misconception

- Ink alone cannot be considered “low-migration” until it’s actually applied to the packaging and tested.

# TESTING CONSIDERATIONS

It's More than the Ink & Substrate

- Printing conditions - heat & humidity
- Food characteristics
- Ink coverage ratio
- Curing/drying time
- Storage and transportation conditions
- Expected shelf life
- Consumer usage

# 3

## TYPES OF INK MIGRATION

1



**SET-OFF**  
MIGRATION

2



**DIFFUSION**  
MIGRATION

3



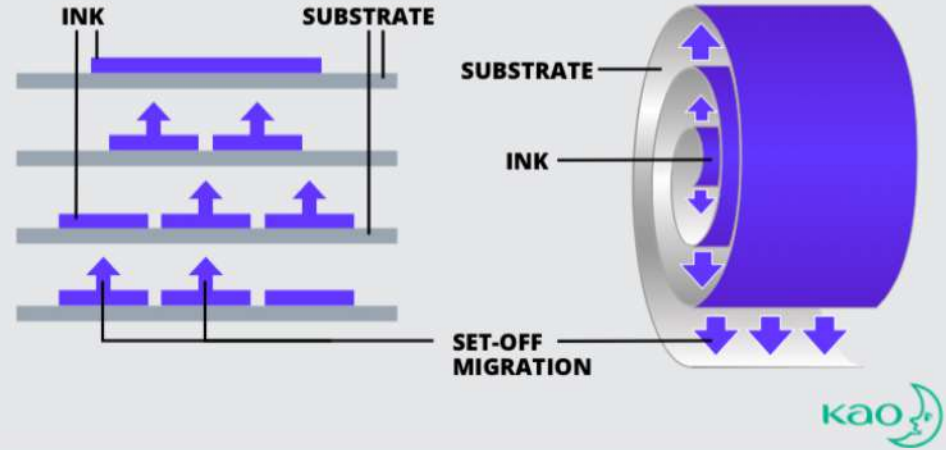
**GAS-PHASE**  
MIGRATION



# SET-OFF PHASE

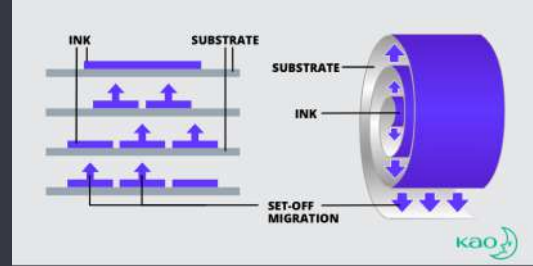
- Chemicals from the printed side of one package or label transfer to the reverse side, where it contacts the food.

## Set-off Migration





# SET-OFF MIGRATION



## CAUSES

- Re-rolling or stacking printed packaging materials
- Ink not completely cured or dried

## PREVENTION

- Ensure complete curing before stacking or re-rolling
- Keep total ink coverage below 300%
- Use inks tested for food contact materials. (Based on third-party testing)

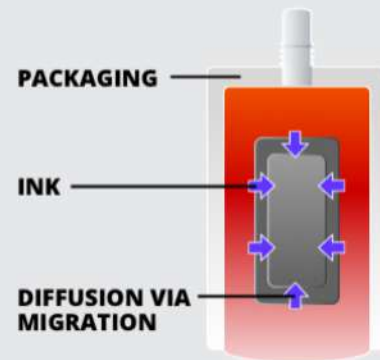
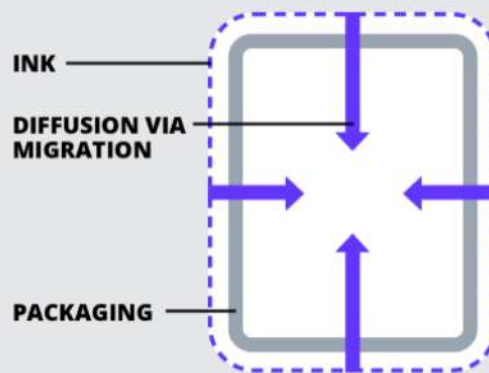




# DIFFUSION

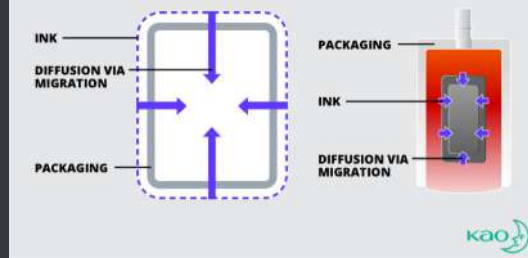
- Ink passes through the packaging substrate to contact the food, pharmaceutical, or beauty product.

## Diffusion Migration





# DIFFUSION MIGRATION



## CAUSES

- Improper curing or drying
- Inferior substrate

## PREVENTION

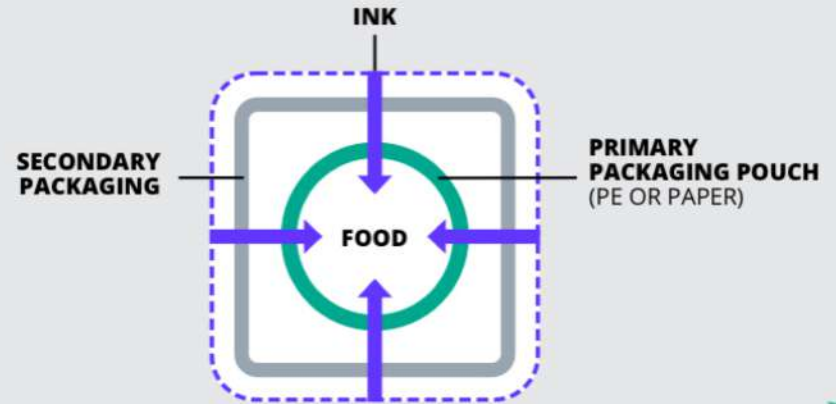
- Use absolute barrier - glass or metal
- Use inks tested for food contact materials. (Based on third-party testing.)



# GAS PHASE

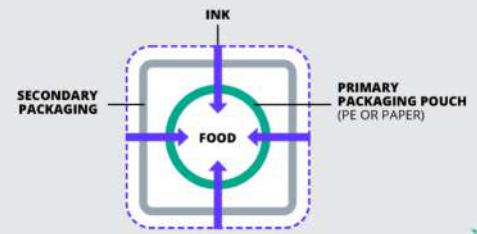
- Volatile substances transfer in the space between the packaging and the product.

## Gas Phase Migration





# GAS PHASE MIGRATION



## CAUSES

- Printing environment
- Incomplete curing
- Post-packaging environmental effects
- Using inks with VOCs

## PREVENTION

- Match inks to the primary packaging material, based on third-party testing
- Use mineral-oil-free ink for secondary packaging

## QUALITY CONTROL

# GOOD MANUFACTURING PRACTICES (GMPs)

- A system to insure products are consistently produced and controlled based on quality standards.



1

10 GMPs

QUALITY CONTROL • GMPs

# PROCEDURES

- Detailed written procedures (easily understood)
- Track performance
- Verify calculations
- Tracing and tracking systems

2

10 GMPs

QUALITY CONTROL • GMPs

# PLANT & FACILITIES

- Free from contamination risk
- Operated in a suitable location
- Built to industry standards
- Designed to minimize risk
- Easy to clean and maintain

3

10 GMPs

**QUALITY CONTROL • GMPs**

# **DOCUMENTATION & RECORD KEEPING**

- Integrity of standard operating procedures
- Design history file (DHF)
- Employee training
- Manage document changes
- Designed to minimize risk
- Easy to clean and maintain



4

10 GMPs

QUALITY CONTROL • GMPs

# PERSONNEL

- Trained upon hiring
- Qualified for specific jobs
- Understanding of GMPs
- Ongoing annual training
- Traffic patterns for guests and employees

5

10 GMPs

QUALITY CONTROL • GMPs

# SANITATION PROGRAMS

- Outline policies and processes
- Avoiding cross contamination
- Create master schedule

6

10 GMPs

QUALITY CONTROL • GMPs

# WATER POTABILITY

- Monitor sources
- Ensure proper plumbing
- Monitor ice
- Minimum annual testing

7

10 GMPs

QUALITY CONTROL • GMPs

# ALLERGEN CONTROL

- Stages of prevention
- Complete ingredient lists
- Dedicated storage/warehousing
- Dedicated equipment and utensils
- Cleaning procedures

8

10 GMPs

QUALITY CONTROL • GMPs

# EQUIPMENT, UTENSILS & MAINTENANCE

- Well-designed preventive maintenance program
- Sanitation procedures
- Investigating, documenting equipment failures
- Procedures for bringing new equipment online

**QUALITY CONTROL • GMPs****RECEIVING,  
WAREHOUSING,  
SHIPPING**

- Tracking from arrival to departure
- Storage in proper and sanitary conditions
- Map of designated storage areas
- Supplier protocols
- Acceptance and rejections criteria

10

10 GMPs

QUALITY CONTROL • GMPs

# RECALL & TRACKING SYSTEMS

- System for tracking through the supply chain
- Lot coding raw materials
- Established testing system
- Fast and efficient recall processes
- Practice mock recalls

**INKS FOR**

# **FOOD PACKAGING**

**WATER-BASED**

**LOW-MIGRATION UV/LED  
CURABLE**

**ELECTRON-BEAM CURABLE**

**BIO-INK MINERAL OIL FREE**

*\* Third-party lab testing is necessary to ensure regulatory compliance.*

Kao Collins Inc.





**INKS FOR FOOD PACKAGING**

# **WATER-BASED**

- Environmentally friendly with no or low odors
- Standard formulations available for paper and other porous materials
- Nano pigment inks for flexible packaging and thin film

*\* Third-party lab testing is necessary to ensure regulatory compliance.*

Kao Collins Inc.



## INKS FOR FOOD PACKAGING

# LOW-MIGRATION UV/LED CURABLE

- High purity of ink components
- Specially formulated photoinitiators
- High-quality results
- LED curing produces less heat

*\* Third-party lab testing is necessary to ensure regulatory compliance.*

Kao Collins Inc.



INKS FOR FOOD PACKAGING

# ELECTRON-BEAM CURABLE

- No photoinitiators used
- Low energy consumption
- No heat generated
- High visual appeal
- Instant curing

*\* Third-party lab testing is necessary to ensure regulatory compliance.*

Kao Collins Inc.



## INKS FOR FOOD PACKAGING

# BIO-INK MINERAL-OIL-FREE

- No hazardous pollutants (HAP)
- Near-zero VOCs
- Rich, deep colors for single-pass applications
- Easily scannable barcodes
- Compostable

*\* Third-party lab testing is necessary to ensure regulatory compliance.*

Kao Collins Inc.



## CONTACT

# Kao Collins Inc.

- [kaocollins.com](https://www.kaocollins.com)
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[Prevent Ink Migration](#)

[Food-Grade Ink Regulations](#)