Siegwerk offers you a full-range portfolio for Migration Optimized Inks

Siegwerk formulates ink to ensure safety of:

- Ink Maker
- Converter
- Brand Owner
- Consumer
- Environment
Ink Formulators need to know not only
- Composition and purity of Raw materials
- Chemical interactions with other materials
- Application requirements

but also **Conversion processes**
- Ink production
- Printing
- Lamination
- Packaging
- Consumer usage
- Waste cycle

to select the **right solution** for a certain application
The Formulator’s Role

Ensure exclusion of raw materials of concerns and contaminants

Designing and selection of inks with value chain processes & end use in mind
Ensure exclusion of materials of concern and contaminants

<table>
<thead>
<tr>
<th>Pigments</th>
<th>Dioxins and Furans, PAA, PCB’s, HM, TNPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resins</td>
<td>Acrylates, BPA, Residual Diisocyanate</td>
</tr>
<tr>
<td>Additives</td>
<td>Phthalates, PMH, Mineral oils, HM</td>
</tr>
<tr>
<td>Solvents</td>
<td>Toluene, Xylene, Monochlorobenzene,</td>
</tr>
<tr>
<td></td>
<td>Methylglycol, Ethylglycol</td>
</tr>
</tbody>
</table>

- Systematic and Stringent Raw Materials Introduction Process
- Prevent the use of materials of concern in inks formulations
- Ensure purity of safe materials

“One mistake can change your future”
## Case Study I – Elimination of TNPP

<table>
<thead>
<tr>
<th>Background</th>
<th>Optimizing Solution</th>
<th>Outcome</th>
</tr>
</thead>
</table>
| • ccPET/Alu/PE laminated pouch for Baby Food  
• For export to Africa  
• Customer printed with inks from alternative supplier  
• Not accepted due to presence of TNPP in the laminate | • Deep insight on source of TNPP contaminations in inks  
• TNPP not intentionally added  
• Stringent raw materials introduction process  
• Leverage global expertise  
• Siegwerk India provided TNPP free inks | • Internal and 3rd party laboratory confirmation and certification  
• Customer qualified at brand owner  
• Systematic raw materials monitoring process in place to ensure continuous compliance |
### Case Study II- Elimination of PMH & MPA

**Background**
- BOPP/CPP for cookies
- For export to Australia
- Printed with standard compliant inks but not accepted due to presence of PMH and MPA
- Country specific requirements, significant impact on organoleptic properties

**Optimizing Solution**
- Deep insight on source of PMH in inks raw materials
- Strong Analytical Setup
- Strong formulation expertise to formulate new solutions without MPA
- Siegwerk delivered solutions optimized for this unique requirement

**Outcome**
- Laminates passed brand owner analysis and testing
- Customer qualified at brand owner
The Formulator’s Role

Ensure exclusion of raw materials of concerns and contaminants

- Stringent Raw Materials Introduction Process
- Deep insight on raw materials
- Analytical Capability
- Formulation Expertise

Designing/Selecting inks with value chain processes & end use in mind
Taking a Step Further

GOING BEYOND elimination of Materials of Concern

INTEGRATED APPROACH Considering multiple touch points of the packaging value chain

Designing/Selecting inks with value chain processes & end use in mind

Technical Performances & Remaining Safe at End Use

- Chemical Reactions
- Conditions from Printing to End-use
- Packaging Structure & Design
- End-Use
### Solution example: Candy wrapper with twist lacquer

#### Packaging Structure

- Overprint varnish
- Color ink
- White ink
- Primer
- Metalized OPP

#### Solution Description

<table>
<thead>
<tr>
<th>Application</th>
<th>Filling goods</th>
<th>Key functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sweets, chocolate, candies, etc.</td>
<td>Achieve barrier against light and fats resistance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Siegwerk solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overprint varnish</td>
</tr>
<tr>
<td>Color ink</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>White ink</td>
</tr>
<tr>
<td>Primer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Migration Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Met PET: Relatively Good barrier - Lower risk of migration through substrate</td>
</tr>
<tr>
<td>Set off and diffusion (no sealing)</td>
</tr>
<tr>
<td>Sensitive filling goods – Low Solvent Retention</td>
</tr>
</tbody>
</table>
Solution example: Retortable stand-up pouch

Packaging Structure

Overprint varnish
Barrier PET
Color ink
White ink
Adhesive
PA
Adhesive
CPP

Solution Description

Application

<table>
<thead>
<tr>
<th>Filling goods</th>
<th>Ready meals, pet food, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key functionality</td>
<td>Achieve high resistance to retort conditions, hot filling and microwave</td>
</tr>
</tbody>
</table>

Siegwerk solution

<table>
<thead>
<tr>
<th>Overprint varnish</th>
<th>2K matt OPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color ink</td>
<td>PV</td>
</tr>
<tr>
<td>White ink</td>
<td>PV</td>
</tr>
</tbody>
</table>

Migration Risk

Elimination of ALU– higher risk of migration
High Retort Temperature – higher risk on chemical reactions with migrants
Inks design and selection to prevent risk of nitrosamine and PAA formation
**Siegwerk offers you a full-range portfolio Migration Optimized Inks**

<table>
<thead>
<tr>
<th>Ink Solutions: PV 700 series</th>
<th>Packaging &amp; Applications</th>
<th>Processes &amp; Substrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PV 703 PV705 PV702-4 PV707</td>
<td>• Solutions for all Packaging types (laminated bags &amp; pouches, other flexible laminates)</td>
<td>• High Speed Gravure Printing</td>
</tr>
<tr>
<td>• Swiss Ordinance Compliant Toluene Free ink</td>
<td>• Widely used in Food, Personal Care and Household products</td>
<td>• Technologies for all Substrates (OPP, PET, PA, etc.)</td>
</tr>
<tr>
<td>• Excellent Fine Dot Printability</td>
<td>• Ready meals, Snack Food, Processed Foods, Shampoo</td>
<td></td>
</tr>
<tr>
<td>• Excellent Bond Strength</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Siegwerk offers you a full-range portfolio for Migration Optimized Inks

**Ink Solutions: NC 800 series**

- NC801 NC803 NC806 NC807 NC812 NC815 etc.
- Swiss Ordinance Compliant Toluene Free ink
- Low Solvent Retention
- Good Resistance Properties including, Heat, Peroxide, Deepfreeze, Milk/Fat resistance

**Packaging & Applications**

- Solutions for all Packaging types (bags, pouches, other flexible monolayers/laminates)
- Widely used in Food and Personal Care
- Snack Food, Milk, Oil, Processed Foods, Diapers, Napkins

**Processes & Substrates**

- High Speed Gravure or Flexo Printing
- Technologies that are HD Flexo ready
- Technologies for all Substrates (PE, PET, OPP, Pearlized OPP, CPP, and Paper)
Siegwerk offers you a full-range portfolio for Migration Optimized Inks

<table>
<thead>
<tr>
<th>Ink Solutions: Specialty</th>
<th>Packaging Solutions</th>
<th>Processes &amp; Substrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NB 2K, YA 2K 7, NC 207, Specialty OPV</td>
<td>• Solutions for all packaging types (e.g. sleeves, bags, pouches, labels, blisters)</td>
<td>• For Gravure &amp; Flexo Printing</td>
</tr>
<tr>
<td>• Swiss Ordinance Compliant Toluene Free ink</td>
<td>• Widely used in Pharma, Food and Hygiene</td>
<td>• Technologies for all substrates (Aluminum, Paper, Shrink PVC, PP, PE, PET, PA, etc.)</td>
</tr>
<tr>
<td>• Full range of inks, varnishes, lacquers and primers</td>
<td>• Antifog Window, Matt/Gloss pouches, Glow in Dark, Laser sensitive for bar coding, Pharma/Blister, Release lacquer for Cold Seal Packaging (chocolates &amp; candy)</td>
<td></td>
</tr>
<tr>
<td>• Specialty inks, functional lacquers, special effects inks from tactile to metallics to security solutions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Moving Into the Future Together with Migration Optimized Solutions

- **High Product Safety Standard**: Systematic processes including stringent raw materials introduction process and monitoring system.
- **Deep Insight on Raw Materials**: Going beyond technical functionalities. Understanding raw materials processes & potential contaminants.
- **Analytical Capability**: Local and Global Analytical Team with state-of-the-art equipment and know-how.
- **Formulation Expertise**: Strong formulation know-how and application knowledge.
- **Collaboration with Value Chain Partners**: Working closely with suppliers, converters and brand owners to design inks are safe and functional.