

# SunChemical®

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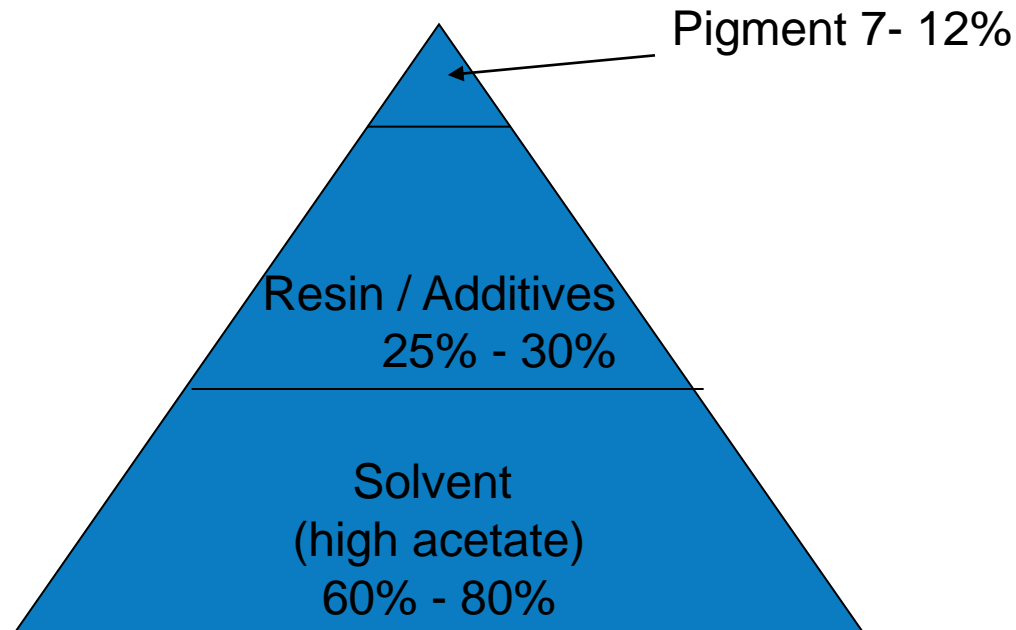
## How Controlling Ink Components, Condition and Chemistries brings Efficiencies

working for you.



# Solvent Ink – Product Design

- Basic Components – Pigment, Solvent, Resin and Additives
  - Gravure Ink – print film thickness



Gravure Ink

# Water Base Inks

- Definition
  - Water is primary diluent
  - VOC levels under ~12%
- Components
  - Pigment
  - Resin (s)
  - Water
  - Other
    - Defoamers
    - Solvents
    - Surfactants
    - pH adjusters

## Resins

➤ 95+% acrylics.  
polyesters and  
polyurethanes  
expand application  
space

## Pigment Selection

- Selecting the correct pigments is a critical part of the process of formulating an ink for successful printing and achieving the correct end use properties.

- Printability
- Fade resistance
- Opacity/transparency

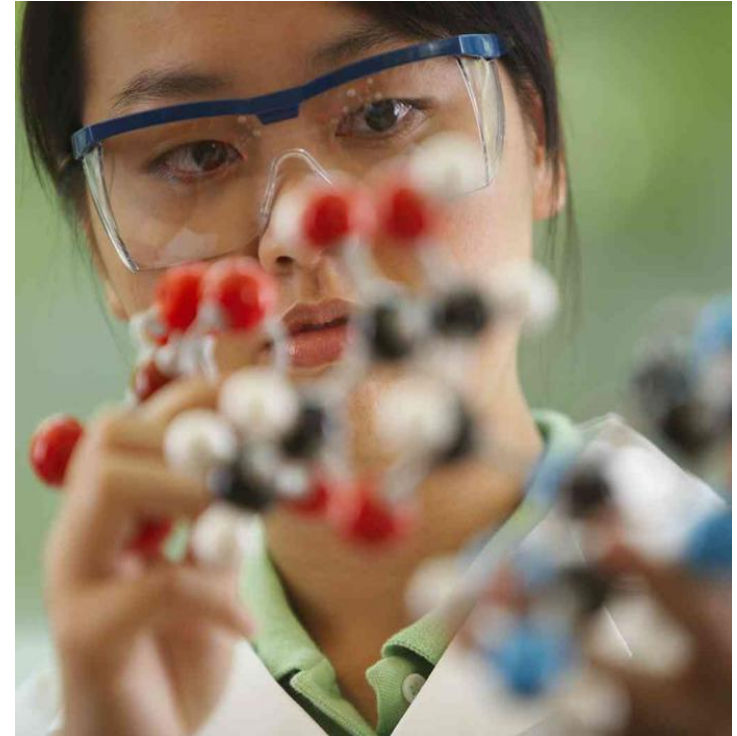


- Some end use packages will also have restrictions on the use of certain pigments based on regulatory or resistance properties.

- **Appearance**
  - Hue
  - Shade
  - Purity/Cleanliness
  - Opacity
- **Color Reproduction**
  - Product Perception
  - Product Recognition
- **Resistance Properties**
  - **Lightfastness**
    - Xenon, Carbon Arc, QUV
  - **Chemical**
- **FDA Compliant Pigments**
  - **Organic Pigments**
  - **Inorganic Pigments**
- **Cost**

Selecting the correct resin system is a key to:

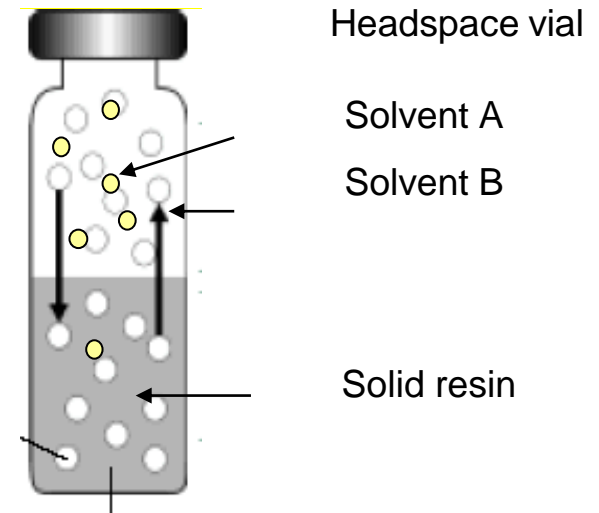
- **Package Functionality**
  - Adhesion to the Substrate
    - Paper
    - Board
    - Film
  - End use requirements
    - Surface print versus laminate
    - Resistance Properties
      - Heat, Rub,...



Resin system drives the properties and ink system physical attributes

# Resin system = lots of choices

- Differentiator for the ink is the resin system. Not only the physical properties as previously mentioned but the “run-ability” of the ink system
  - The resin needs to be soluble and “re-soluble” in the solvent system to ensure:
    - Defect free printing
    - High press speed
    - Avoid ink related down time attributes
      - dry ink in the cylinder
      - ink build-up on rollers



### Resin solvent interaction

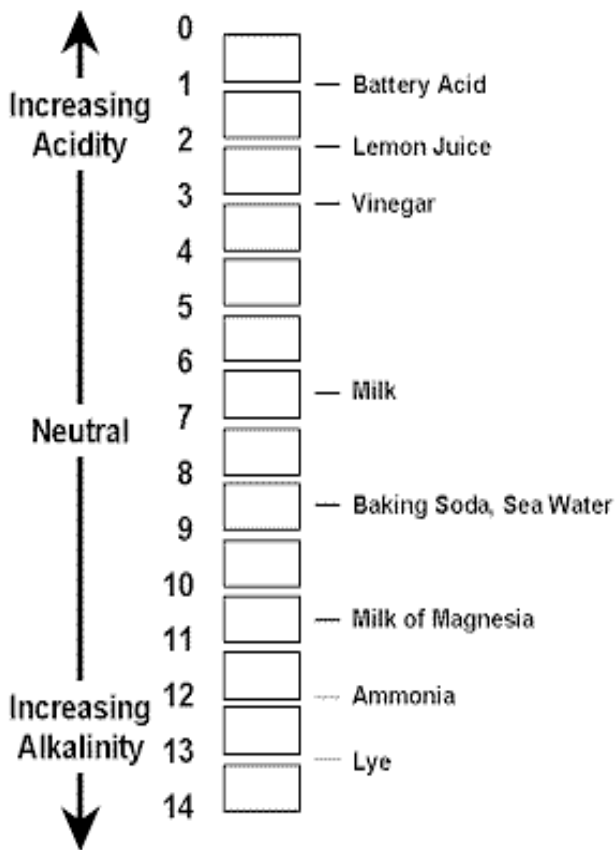
- Determine the solvent package to be used in the ink. This will be a key to successful printing and end use properties.
- End use requirements are a part of this selection, also some packages will have restrictions on the solvents allowed.
- The binder/resins selected for the ink will play a part in the solvent selection, as well as the press being used, press speeds expected, drying capabilities and solvent retention restrictions will also play a part in the selection.



# What is pH?

- pH is the degree of acidity or alkalinity of a solution - in our case water-based inks.
- pH values range from 0 to 14.
- pH values less than 7 indicate an acidic solution.
- pH values greater than 7 indicate an alkaline solution.
- Water-based inks print optimally in the pH range of 8.5 to 9.5, which is alkaline.

# pH Scale



# Some Examples of pH in Everyday Products are:



**pH 6.5 -8.0**  
**Tap**  
**Water**



**pH 2.2 - 2.4**  
**Lemon**



**pH 9.0 -11.0**  
**Ammonia**

# Importance of pH!

- pH and water-based inks go hand-in-hand.
- Because pH is based on a logarithm, one unit (1.0) is a ten-fold difference in intensity of an acid or alkaline liquid.
- For example, an ink with a pH of 9.0, is ten times more alkaline than an ink with a pH of 8.0.
- It takes a small add of an appropriate amine or ammonia to elevate the pH of a water-based ink.

# When the pH is Too Low:

- The viscosity of the ink increases and it may gel.
- The ink may dry too fast.
- The ink may dry-in.
- The printability of the ink will deteriorate.

# When the pH is too High:

- Pigments can burn out.
- Drying Speed is decreased.
- Foaminess increases.

# Gravure printing inks – additives

Certain additives are many times incorporated into an ink formulation to enhance or modify the properties of the ink.

- Waxes or silicones can be used to meet COF requirements. Some waxes can lower or raise the COF to meet the proper end use requirements.
- Waxes and silicones can also be used to meet the required rub and scuff resistance properties.
- Cross linkers can be used to harden the resins and improve adhesion and resistance properties.
- Adhesion promoters can be used to improve adhesion to certain substrates.
- Plasticizers can be used to improve the flexibility of the ink, this can also improve the flow of the ink.
- Amines to control pH of water based inks

The quality and certification of all raw materials is critical to achieving the correct properties of an ink formulation and also a consistent product ongoing.

- Raw material selection should be determined based on the physical properties of the material.
- We would also look at regulatory needs
- All raw materials should have established physical property parameters that should be certified from lot to lot.
- As needed, some raw materials may be tested internally before use.





# Gravure printing inks – laboratory testing

Prior to printing on a production press, proper laboratory testing is required to make sure the ink formulation has the correct properties for successful printing and end use. Below are some things that should be tested as needed.

- Adhesion to the proper substrate
- Rub/scuff properties
- COF
- Fade resistance
- Dry rate



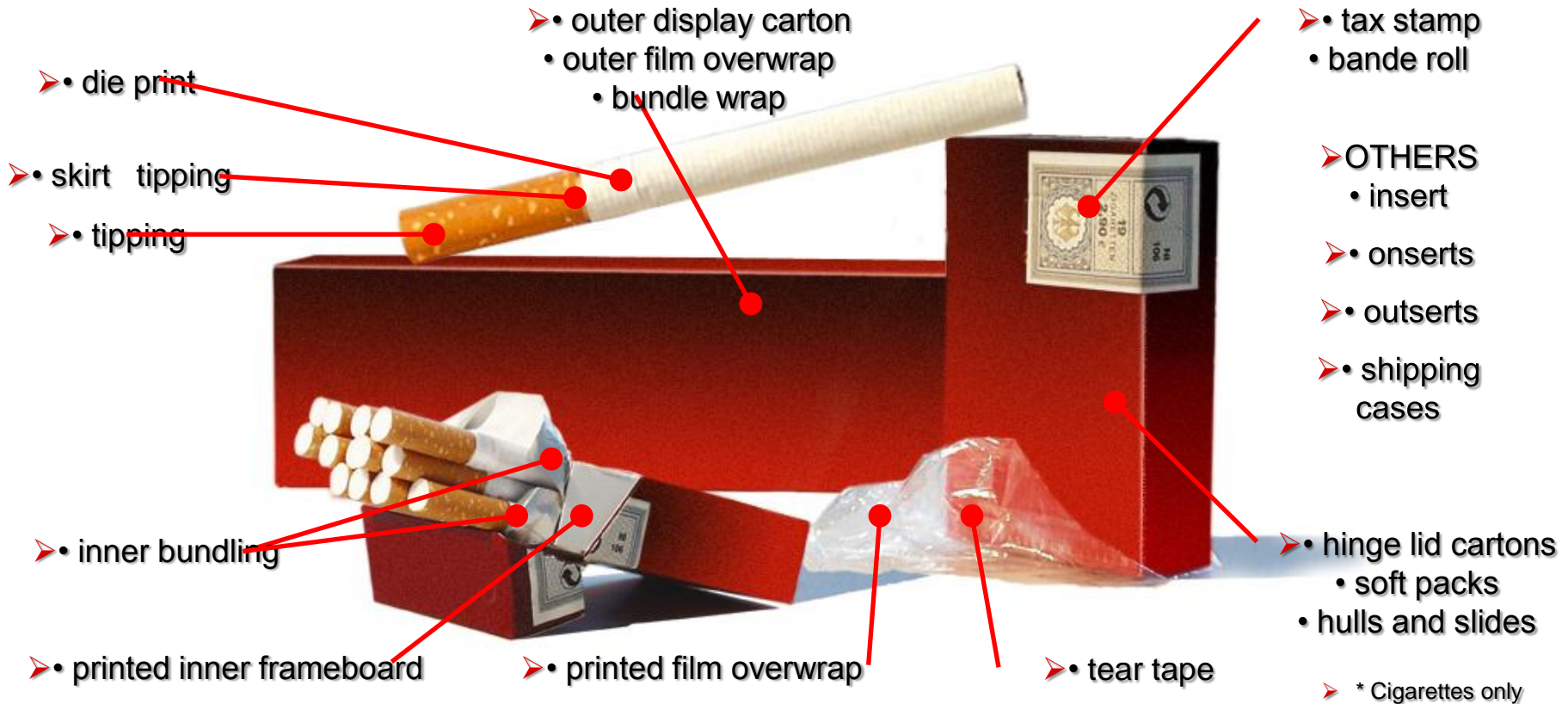
# Gravure printing inks – quality control of ink formulations

In order to deliver a consistent ink from batch to batch, proper quality control testing should be established for each ink formulation. Below are some of the tests that should be performed on each batch of ink, as needed, based on requirements.

- Viscosity
- Color strength, hue and density
- Lbs per gallon
- Adhesion to substrate
- Rub/scuff resistance
- COF
- Dry rate
- pH of water based inks



## ➤ Ink requirements (cigarettes only)



# Thank You

