

# INX R&D & LAB SERVICES

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**Recognized as a leading source of advanced technology development**, INX International together with Sakata INX has research and development centers located in North America, Europe and Asia. For every manner of packaging, commercial, and digital printing, INX R&D has the ability to develop new innovative technologies, find answers, and discover the truly amazing with state-of-the-art technology. Our scientists and technicians collaborate with customers, Brand Owners, OEMs, and equipment integrators worldwide to innovate and expand the world's largest stable of application-specific inks and coatings.





## GENERAL ANALYTICAL

### ■ Migration Testing

INX Analytical R&D works with their development chemists to develop packaging inks that are acceptable for migration levels.

### ■ General Analytical Work

- ▶ **Gas Chromatography (GC):** Retained solvents are identified and quantified using a GC. Low retained solvents show that the package is adequately dried. If the package is not properly dried the retained solvents will be high and therefore have the possibility of interfering with lamination bond strength or result in changes in characteristics of the final product.
- ▶ **Gas Chromatography / Mass Spectroscopy (GC/MS):** The GC/MS is the workhorse of the INX analytical lab. This versatile instrument analyzes inks and raw materials for volatile and semi-volatile components. The GC/MS routinely analyzes inks for the food packaging market.
- ▶ **Fourier Transform Infrared Spectroscopy (FTIR):** FTIR is routinely used to identify the non-volatile components of printing inks like resins and pigments.

## ADVANCED ANALYTICAL

### ■ DART - MS


Direct Analysis in Real Time Accurate Mass Spectroscopy. Using accurate mass spectrometry coupled with the DART source, allows for analyzing ink samples and print samples with little to no sample preparation. The ability to analyze samples with minimal preparation allows for a much greater range and numerous applications of finished inks to cured prints that can be tested. High sensitivity and accurate mass contribute to this instrument's ability to evaluate samples for contamination.

### ■ LC/MS/MS

Liquid Chromatography Triple Quadrupole Mass Spectroscopy is the gold standard for targeted analysis and quantitation. The targeted analysis of the triple quadrupole MS increases sensitivity and quantitation by selectively analyzing for known analytes. This instrument is ideal for evaluating sample extracts for known ink components and/or contaminants.

### ■ Method Development/Problem Identification

In addition to running standard routine tests, INX Analytical R&D Lab has the expertise to develop methods to aid in root cause of failures during converting.





# FADE/LIGHT FASTNESS TESTING

INX develops inks for a multitude of applications, some of which have varying levels of lightfastness requirements. INX R&D has four weatherometers that evaluate the likelihood of printing inks fading. Historically sheetfed inks are tested for 4 days (96 hours) and the pigment fade is collected after each 24 hours. More demanding applications like outdoor bags or signage require longer testing of up to 1000 hours in the weatherometer.

- ▶ **Extreme Outdoor - 1,000 hours**
- ▶ **Standard Outdoor - 500 hours**
- ▶ **Standard (Offset) - 96 hours**
- ▶ **General - 24 hours**

# INK PROPERTIES, SAMPLE EVALUATION

## ■ Strength

The color strength of the press ready inks are tested by making a tint base with bleaching white ink. The differences in strength show the relative film thickness required to reach the desired densities on press and can be related to ink mileage.

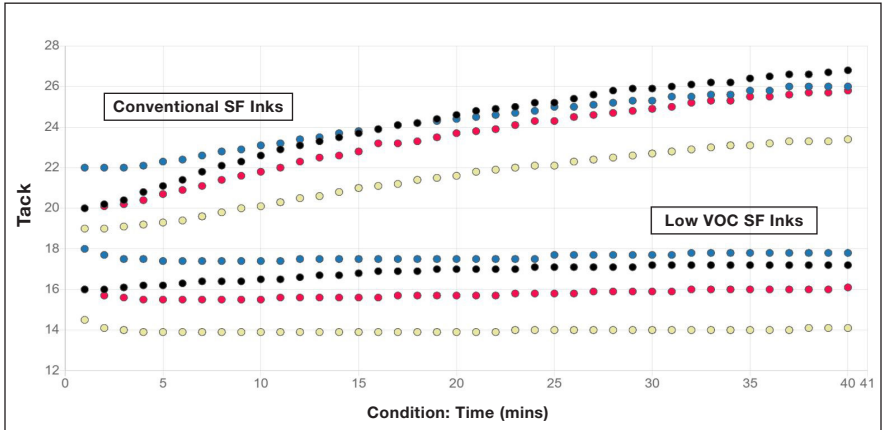
## ■ Color

Color is a comparative test identifying if the undertone or masstones are a different shade from the standard print. The transparency is also noted versus the standard print. The table below is representative of this data. Spectrophotometric data measured per the customer specifications can also be included.

Color	Undertone	Masstone	Transparency
Black	Equal	Slightly Lighter	Slightly Opaque
Cyan	Slightly Greener	Lighter	More Opaque
Magenta	Slightly Bluer	Lighter	More Opaque
Yellow	Slightly Redder	Lighter	More Opaque

## ■ Tack Stability

Tack stability measures how stable the tack of the ink is over a 40-minute period. This test shows how the tack of the ink will change over a press run. Graph of tack stability is shown below.



## ■ Misting

Misting is taken at 1200 rpm and 2000 rpm (high speed) and is rated from 1 – 20 (good to bad) scale when compared to standard misting system.

## ■ Rheology

Testing for how well an ink flows, reacts to stress and shear of a printing press, and how well it will perform under those conditions.

- ▶ Viscosity and yield are measured on the Laray Viscometer under controlled conditions. The plastic viscosity, yield value and shortness ratio are reported. Other more advanced testing equipment is available.
- ▶ Flow is measured by two experiments: Spreadometer and Flow Plate. The Spreadometer drops a glass plate on a plug of ink in order to spread the ink; the distance the ink flows is measured at specific time intervals. The Flow Plate similarly shows the distance the ink flows over time, but it is more visual, showing the results of multiple inks.





## ■ Emulsification Testing

This test will determine if an ink can run well in the presence of fountain solution and how emulsified or how much water (fountain solution) an ink can absorb until print quality fails/ink breaks down.

- ▶ **Lithotronic High Speed Emulsification Tester** measures the amount of Fountain Solution ink can absorb before breaking down. The Lithotronic graphs interaction between Ink Torque (body) as Fountain Solution is added, at a temperature of 40°C and speed of 1200 rpms. Specific fountain solutions can be used if supplied.
- ▶ **Karl Fisher Titration** measures the amount of water an ink has absorbed after emulsification on the LithoBreak Tester.

## ■ Volatile Organic Compound (VOC)

VOC's are determined by US EPA Method 24. This will determine setting speed and can be a factor in environmental focused printed pieces, basically how much solvent (carbon based) is in an ink.

## ■ Gloss

We measure Gloss using a 60° Angle Gloss Meter on prints pulled at standard SWOP densities for each color. This will determine the specular reflectance of light from a printed surface.

## ■ Rub Resistance

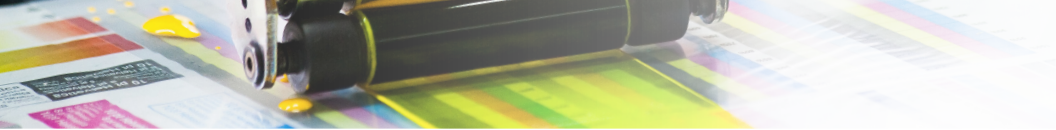
Determination of rub or scuff resistance of a printed ink film.

## ■ Set Time

Set time measures the rate of oil penetration to the substrate, the faster the penetration the faster the set time. Prints are pulled at high densities and are placed, along with a test receptor, in the Joson Set Time Recorder. Set time is recorded when ink no longer transfers from the printed sample to the test receptor.

- ▶ Initial Set Time measures the amount of ink offset (transfer) to a test receptor after specific time intervals. This test simulates the initial offsetting that can occur in the load as sheets come off press. High density prints are pulled on special slow setting stock that will show differences in offsetting.





## LAB SERVICES (PRODUCTION FACILITY)

### ■ Color Matching and Proofing

INX's production labs can perform colormatches on any supplied or directed substrate with multiple finishing options. We use the latest proofing equipment which standardizes print sample.

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