



The Chemcommunicator

Welcome to this issue of *The Chemcommunicator*, a quarterly publication of Chemsultants and ChemInstruments.

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Adding Two New Coating Lines Expands Chemsultants Pilot Coating and Product Development Capabilities

by: Tom Besselman,
Director of Operations



Chemsultants International Inc. moved to its new facility located at 9079 Tyler Blvd, Mentor, Ohio in 2006. At that time, the company was in the process of designing **two** new coating lines. Our goal was to develop two new pilot coating lines that offered significant versatility in capabilities to best meet our customers' needs.

ChemDevelopment Inc., the pilot coating and contract manufacturing business unit of Chemsultants, has over 20 years of experience in a variety of coating methods. Our two 24" wide coaters can assist customers in product scale-up or contract coating operations.

Please call to discuss your requirements and we will be happy to provide you with an outline of how our capabilities help meet your coating needs.

TPC1 Coating Line Specifications

Primary Unwind Stand, Secondary Unwind / Rewind / Face Unwind Stands –

Arbors able to accommodate 22" OD (200# Max) rolled goods.

Coating Station – Capable of running KOR, Reverse & Direct Gravure, Roll, Mayer Rod, and Pattern Bar Coating methods, Line speeds; 6 – 90 fpm.

Ovens –3 - 10ft Gas Fired Air Flootation Zones. Temps; 100 – 400°F

Laminator - Adjustable roll speeds for layout control.

TPC2 Coating Line Specifications

Unwind Stand and Rewind / Face Unwind Stand – Each consists of 3 arbors able to accommodate 22" OD (200# Max) rolled goods.

Coating Station – Capable of running KOR, Reverse & Direct Gravure, Roll, Slot Die, and Hot Melt Die coating methods. Line speeds; 1 – 40 fpm

Ovens –1 - 10ft Gas Fired Air Flootation Zone. Temp Ranges; 100 – 400°F

Laminator - Adjustable roll speeds for layout control.

Chemsultants International Receives A2LA Accreditation to Provide On-Site Calibration Services

by: Joe Mausar, Director of Marketing



Chemsultants International was recently awarded accreditation status by A2LA (the American Association for Laboratory Accreditation) to provide on-site calibration services, complying with the widely recognized ASTM E4 Standard requirements.

The company is accredited under ISO 17025 to perform force calibration and verification of load cells for a variety of the test instruments manufactured by ChemInstruments Inc. Fully accredited calibration service is available for the AR-1000 and AR-1500 Adhesion Release testers, the PA-90 and PA-180 Adhesion testers, the HSR-1000 High Speed Release tester, the LT-1000 Loop Tack tester, and the TT-1000 and TT-1100 Tensile Testers. Other test equipment manufactured by ChemInstruments, Inc. can also be calibrated to the ASTM E4 standard.



The Calibration Services Program will be available beginning September 1, 2009 through Chemsultants International's Mentor, Ohio facility. Additional information on the services available (and costs) can be obtained by contacting Joe Mausar at 1-440-974-3080 or jmausar@chemsultants.com.



Non-traditional Characterization of Materials Using the PMA-1000

by: Gary Avalon, COO

Chemsultants' R&D laboratory studies a variety of materials that exhibit adhesive properties. These may range from polymeric gap-filling materials for electronics applications, to lip gloss for cosmetics, glue sticks for consumers and even yoga mats for the physically fit among us.

The PMA – 1000 (Probe Material Analyzer) is a versatile, user-friendly, instrument that allows you to characterize various materials including viscoelastic polymers, adhesives and compounds through the insertion, dwell, and retraction of custom probe sensors. It has become a valuable tool in characterizing some unique products for tack and adhesion properties where more conventional tests are not possible or applicable.

Let's look at some of these applications to explore how this instrument can be used. For the gap-filling materials, these materials must be able to deflect at low pressures (i.e. stress) to minimize the pressure exerted on circuit boards, component leads, or solder-joints during assembly. This property is related to modulus or softness. It is equally important to learn how well these materials will stay in place and how quickly they will bond (tack and adhesion) to component parts. The PMA – 1000 is capable of producing repeatable results, which offer the user the ability to differentiate between materials.

The PMA can be set up in two ways, one using a constant force loading and one using a fixed penetration distance. By then moving the probe onto or into these materials, a response to the force can be measured during penetration. Likewise, the tack or adhesion properties are measured upon removal from the material.

For a lip gloss product, we were interested to see if the perception / experience of applying lip gloss could be assessed using the PMA. Lip gloss was coated onto stainless steel panels and the steel probe tip. Then various conditions were explored to find a balance between good contact and oozing around the probe. Various products were tested and a range of tack was measured.

The manufacturer could then conduct focus group tests to correlate these physical properties with actual consumer perception of the tackiness of the gloss while smacking their lips during application.

Similar work was done to evaluate the softness of glue sticks. In this application, actual adhesion and shear tests can be performed with more traditional tests. But the softness comes into consideration during use of the product and can be an indicator of how well the product will dispense from the container and how easily it will spread. By using the PMA to penetrate each sample, dwell for a specific time, and remove at a fixed rate, each sample can be characterized. Softer materials exhibit different results from harder ones and these differences are easily quantified with the PMA-1000.

ChemInstruments Introduces the Next Generation EZ Lab 3.0 Test Data Management Software

by: Dave Springer, ChemInstruments Sales

ChemInstruments Incorporated's new EZ-Lab version 3.0 data management software interfaces with all ChemInstruments' load cell based testing platforms. The intuitive software provides test data in a report ready format. The software is easy to use with more powerful statistical analysis and reporting capabilities.

EZ-Lab version 3.0 offers:

- Enhanced graphics for easy to read information on samples and test parameters
- One screen control of all test commands
- Automatic data graphing on test completion
- File saving on a PC, server, or network and export function to Microsoft Excel files
- Easy test review, graphing, and table creation
- Compatibility with test data generated with EZ-Lab version 2.3

EZ-Lab 3.0 is compatible with the following ChemInstruments equipment: the AR-1000, HSR-1000, PT-1000, LT-1000, PA-1000-90, PA-1000-180, PMA-1000, TT-1100, DS-1000, HSU-1000, COF-1000, and the BP-1000.

For information regarding EZ-Lab version 3.0, contact:
ChemInstruments P: 513.860.1598 F: 513.860.1597
info@cheminstruments.com



Analytical Testing of Pressure Sensitive Adhesive Constructions – What Can It Reveal?

by: Dave McCann and Dan Pogany

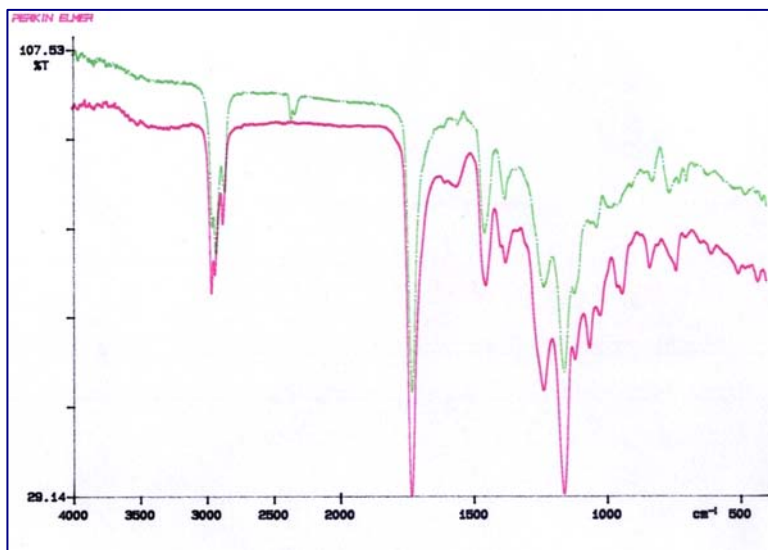
When a problem arises with a pressure sensitive adhesive (PSA) label or tape, often the first testing that is done is for physical properties, such as peel, tack, static shear and release. Depending on these results and other factors, the question that often comes up next is “Why?” This can lead to testing more chemical and structural in nature.

The most common tests that are used for an initial “chemical” look at a PSA are:

- Fourier Transform Infrared Spectroscopy (FTIR)
- Differential Scanning Calorimetry (DSC)
- Gas Chromatography (GC)
- Liquid Chromatography or High Performance Liquid Chromatography (LC or HPLC)

FTIR involves passing infrared light with a broad frequency range through a sample. Certain frequencies of the incident light are absorbed depending on the molecular functionality of the sample. A spectrum is generated showing where transmission of the incident beam was diminished (i.e. what frequencies of light were absorbed). Molecules with different functionalities (i.e. different atoms and different bonds to atoms) will possess different IR spectra. A PSA sample can be tested as-is by adhering it to an ATR plate, or it can be dissolved in a solvent to remove from a carrier, the solvent evaporated and scanned. FTIR can be used for the following:

- Identifying polymer type (acrylic, rubber, silicone)
- An approximate rubber-to-resin ratio in tackified systems
- Presence of significant amounts of contamination such as release coating, migrated components from containers, etc.
- Significant degradation of a PSA



In the scan above, PSA layers on two products were compared to see if they were the same formulation. In this case, the tests showed these to be different; the green trace being poly ethyl-hexyl acrylate based, with the red trace being poly butyl acrylate based (look at the traces between 400 and 1100 nm wave numbers).

FTIR may not see very small amounts of an additive, and may not see substances that are “masked” by other ingredients with similar absorption peaks. It also is not a strict quantitative analysis method, but can be compared to a control or reference scan to gauge differences in amounts of components.

DSC can be used for the following:

- Determine glass transition points (T_g), melt points, crystallization and other transitions
- Solvent boiling points and amount of solvent retention
- Specific heats
- Onset of curing and degree of curing in a reactive system

DSC is performed by heating a sample along with a reference material, and comparing the amount of heat needed to maintain a temperature or temperature increase related to the reference. This is usually done by increasing the temperature of the sample and reference over time, and measuring the amount of energy needed to heat the sample as a function of temperature.

GC is a separation technique that passes a vaporized test material along with a carrier gas through columns packed with liquid or liquid coated absorbent materials that selectively allow different components in a mixture to travel through the column at different rates. This gives different “elution times” to different components, and these peaks can be compared to reference materials to determine the chemical components in a material. GC can be qualitative in its results, or can be quantitative when coupled with a mass spectrometer (MS). GC can be used for the following:

- Comparison of two materials to look for different components or contamination
- Solvent retention
- Residual monomer content

GC is limited to looking at components that can be vaporized.

HPLC is similar to GC in that it is a separation technique, but it utilizes a liquid phase rather than a gas phase. A test material along with a carrier solvent is run through a packed solid column at high pressure. Components are separated in the column and are detected based on the elution time or retention time in the column. HPLC can be used to help separate components and detect amounts of components (with a reference standard or if connected to an MS unit) in a mixture that is not easily volatilized.

SUMMARY

Use of these analytical techniques along with testing peel, tack, shear and release, can often help solve problems. This testing can also be valuable during product development to make sure the product is well defined prior to launch. Chemsultants can perform these tests or work with our partner laboratories to provide results and interpretation.