

Communication and Flexibility

Top Offerings by Color and Appearance Equipment Manufacturers



The lackluster economy has affected the coatings market as it has most sectors of the chemical industry. To maintain a competitive position in the marketplace, coatings producers must find a means of differentiating their products. Color and appearance are two characteristics that coatings manufacturers can use to do so. Globalization and consolidation within the coatings industry have forced coatings manufacturers to manage with widely varying color and appearance measurement systems. Demands for more specific data management by suppliers have also placed additional stress on the systems used by coatings producers for tracking color and appearance.

Equipment manufacturers have jumped on the opportunity to help coatings manufacturers address these issues by introducing several new systems to the market. Other companies have launched portable devices that enable coatings manu-

facturers to evaluate color and appearance wherever it is needed. Some companies have also developed devices that help purchasers of coatings measure color and appearance.

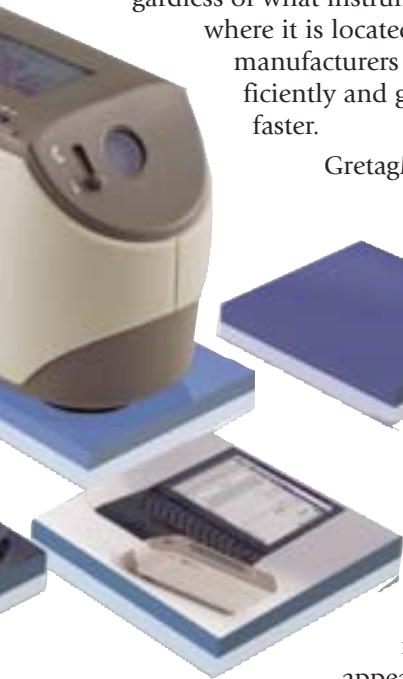
COMMUNICATION

As consolidation and globalization have occurred in the coatings industry, many companies have found themselves with numerous different color and appearance measurement instruments. Until recently, it was difficult, if not impossible, to share data between these various pieces of equipment. Additionally, older data was often not in a format accepted by newer software packages. This situation often resulted in inconsistent results for color and appearance testing. Furthermore, time and resources were required to massage data, recreate databases, and identify the sources of inconsistency.

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Above photo courtesy of Konica Minolta Photo Imaging U.S.A.

Several companies have developed both software and hardware that enable communication between different instruments. As a result, data can be shared regardless of what instrument it was generated on and where it is located. With these advances, coatings manufacturers can complete analysis more efficiently and get their products to market faster.



GretagMacbeth has focused its efforts on developing solutions for coatings manufacturers that streamline color control and ensure accurate color matching throughout the supply chain. "With these products we have moved beyond the single facility to the entire enterprise and extended enterprise or supply chain," says Richard Knapp, product marketing manager, color and appearance software. "Our goal is to enable color control on a global

scale, for as coatings manufacturers continue to consolidate and forge partnerships with other companies, accurate, efficient global color control will become even more important, especially to the bottom line."

The company is launching its Color I series of spectrophotometers and color control software as part of GretagMacbeth's Enterprise Color Management (ECM) program. The Color I5 instrument is compatible with legacy color data, enabling coatings producers to much more easily reformulate with color consistency to meet changing requirements such as lower VOCs or alternate resin systems.

Data compatibility, this time with many popular data formats, is also a key attribute of the Color IQC color control software recently introduced by GretagMacbeth. This networkable software also features a workflow based interface that follows typical coatings quality control workflows. "Our software design gives operators the flexibility to manage each job according to their preferred process without needing to search for the data that goes with the job," says Mr. Knapp.

Both the new software and instruments are Internet enabled via the company's NetProfiler application that allows remote monitoring of one or more spectrophotometers. GretagMacbeth also recently expanded NetProfiler functionality to include a variety of popular spectrophotometer brands. "All profiled instruments will read within a closer color tolerance, and coatings manufacturers can ensure color accuracy across multi-

ple facilities, with supply chain partners and with their end-user customers," says Mr. Knapp. Several coatings producers are already using the technology to improve their compliance with Six Sigma and other quality assurance systems, he adds.

Datascolor has also introduced several new products to the coatings market. Maestro, the company's latest software offering, enables users to improve inter-instrument agreement within a supply chain or distributed manufacturing organization, where numerous instruments of differing age/type are used. "Maestro provides the assurance that measurement data from various locations is in harmony by correcting the inevitable drift instruments experience due to use, environment, and age," says Les Schuman, product manager for Datacolor's core business products.

Datacolor's Colorite ImageMaster color visualization and communication software product suite allows visual color approval evaluations (standard versus batch, for instance) to be made on-screen, in seconds. The newest release of the software offers greatly improved print accuracy and can be up to within 1.5 DE of the represented object. Experience has shown that the visual approval/rejection decisions made on-screen using Colorite are the same as those made with physical samples in a light booth. The calibrated printing feature also allows the user to produce astonishingly accurate color samples using affordable, off-the-shelf desktop inkjet printers.

According to formulation systems business development manager Robert T. Marcus, version 3.2 of Datacolor's ChromaCalc 3 color formulation system contains an electronic laboratory notebook to keep track of all the job steps in a color-match. Datacolor's Pearl technology has been integrated to aid in the formulation and correction of paints containing effect pigments. The system also comes with Datacolor's ColorTools quality control software.

Two new instruments have recently been brought to the market as well. The Datacolor MultiFX10 multi-angle spectrophotometer offers accurate characterization and control of effect pigments, and is equally suited to both research and industrial quality-control laboratory environments. Six of the 10 sets of angles in the MultiFX10 were designed specifically for the measurement of the newest generation of interference-based effect pigments, while the remaining four sets of angles conform to the American Society of Testing Materials (ASTM) International and Deutsches Institut für Normung e.V. (DIN) standards for the measurements of metallic pigments.

The Spectraflash SF650X transmittance/reflectance spectrophotometer is the latest reference-grade laboratory benchtop instrument from Datacolor. The SF650X

was designed for highly-accurate transmittance and haze measurements in addition to achieving superior inter-instrument agreement in both measurement modes.

X-Rite is another company with a wide range of color control hardware and software for the coatings industry. X-Rite's new 8000 Series Benchtop Spectrophotometer possesses excellent inter-instrument agreement and repeatability. It features Spectra-Lon, a highly durable solid material used to create the inte-

grating sphere, which does not require replacement as do the traditional coatings typically found in these types of instruments. The product also features a digital camera that provides a di-

Photo courtesy of X-Rite.

rect view of the sample. A large transmission port and the ability to rotate the instrument allow for easier measurement of both transparent and opaque liquids and other materials.

All of the company's spectrophotometers interface with X-Rite's new quality control and formulation software, X-RiteColor Master 6.0. Users can manage color standards, create custom reports, and communicate color data from any location using Web Edition. X-Rite's Web Edition enables multiple users to access color data via the Internet. "Being able to access color data any time from anywhere in the world is important to the globally distributed coatings industry," says Shannon Gary, X-Rite's product marketing manager, industrial color and appearance. Web Edition also includes various permission levels and screen layouts can be personalized for each user.

Most recently X-Rite has introduced VeriColor, a color verification system that delivers a spectrophotometric level of color resolution to production environments. VeriColor is designed to eliminate color-based errors and speed production and sorting operations while increasing overall quality throughput. VeriColor comes with a hub and up to six sensor heads that can verify and store up to 50 colors at a time. "VeriColor has recently been applied in the automotive and cosmetics industries," says Ms. Gary. "We are currently working with leaders in the coatings industry and plan to introduce VeriColor to this market as early as Spring 2004."

In March, HunterLab is introducing its new UltraScan Pro spectrophotometer. According to Hal

Good, director of marketing services, the UltraScan PRO is the only instrument available that meets both the Commission Internationale de l'Eclairage (CIE) and ASTM guidelines for accurate color measurement. The instrument's 5nm optical resolution enables it to precisely measure coatings having colorants with sharp cutoff characteristics. Its D65 illumination source is calibrated in both the ultraviolet and visible regions of the spectrum for the accurate measurement of fluorescent paint. An extended measurement range into the near infrared and near ultraviolet also permits the measurement of camouflage coatings and UV absorbing products.

FLEXIBILITY

Manufacturers of color and appearance measurement equipment have also focused on developing products that make it possible to evaluate these properties in multiple locations. Several different handheld instruments have recently been introduced to the coatings market.

ElektroPhysik, which manufactures precision handheld coating thickness testing gauges and offers color and gloss measuring instruments, recently launched its ColorTest portable handheld colorimeter. The device has an external probe attached to a cable that provides great flexibility, according to Aivars U. Freidenfelds, vice president with the company.

"With this small probe, color measurements can now be taken in critical areas previously not possible," says Mr. Freidenfelds. "In addition, small parts can be measured free hand instead of requiring fixtures and special accommodations." Other features include a simple four button menu control, 45°/0° measuring geometry, nonvolatile memory for up to 1000 color readings and for 100 color readings including remission spectra. As the measurement takes place, the information is sent to the handheld instrument for processing and the color value is displayed on a large display.

The Instrument Systems Division of Konica Minolta Photo Imaging U.S.A., Inc. introduced CM-2600d, a new portable spectrophotometer based on the principles and optical design of Konica Minolta's high end bench top CM-3600d in-



strument. The portable device has the same patented technology, simultaneous SCI/SCE, and instantaneous UV adjustment as its larger cousin, and it can share data and exchange files with the CM-3600d.

According to Maria Repici, marketing manager, the CM-2600d, when interfaced to a laptop computer with Konica Minolta's color formulation software can be used on the production floor to make batch corrections. "With a portable spectrophotometer, the entire plant becomes the color laboratory," notes Ms. Repici. Numerical UV adjustment is unique to the CM-2600d, and is also the first portable spectrophotometer with simultaneous SCI (specular component included) and SCE (specular component excluded) capabilities, she adds.

Konica Minolta has also launched a second portable instrument. The CR-400 Tristimulus Colorimeter is a stand-alone hand held unit that measures paint samples, compares the results to specific targets, displays data, stores up to 1000 readings, and interfaces with a PC or Konica Minolta's DP-400 processor. Two models are available: the CR-400 with an 8-mm aperture and the CR-410 with a 50-mm aperture. The device can measure up to six user or industry-specific indices. The Minolta DP-400 Data Processor recommended for use with the Tristimulus Colorimeter was designed with a compact, "PDA style" and expands the capabilities of the tool, including more functions, more memory, and a high speed, graphics-capable printer.

"At Konica Minolta, we recognize that increasing production throughput and reducing downtime means less time spent on formula development and fewer batch adjustments for color—and that means dollar savings for the coatings companies," says Ms. Repici. The company is committed to developing new technology in the area of optics and imaging and plans to stay in the business of color control for the long term.

X-Rite now offers a line of multi-angle and sphere portable spectrophotometers designed to measure color for textured and non-textured surfaces, and metallic, pearlescent, and special effect finishes. Each portable instrument features X-Rite's Dynamic Rotational Sampling (DRS) technology, which utilizes a simple robust optical system that provides simultaneous measurement of multiple angles. The sphere (SP) series provides simultaneous measurement of both spec-

ular-induced (color) and specular-excluded (appearance) measurements for textured and gloss finishes.

For the automotive industry, BYK-Gardner has introduced the microwave-scan handheld instrument for measuring orange peel and distinctness of image (DOI) for small and curved surfaces. This portable instrument gives correlation to wave-scan DOI, the appearance standard in the automotive industry. Samples as small as 25 mm by 40 mm and with curvatures greater than 300 mm can be measured accurately with the microwave-scan. "The structure spectrum offers additional information and assists in optimizing and troubleshooting," says Melanie Cummings with Marketing Services at BYK-Gardner. Customer specific scales are also available and facilitate routine QC procedures.

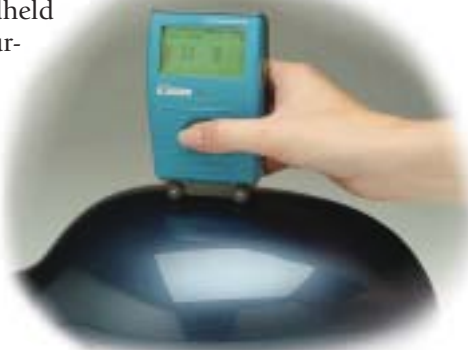


Photo courtesy of BYK-Gardner.

As a complement to its product line of color, appearance, and physical testing instrumentation, BYK-Gardner has also introduced a new series of drawdown charts called the byko-charts. "The adherence to industry color and gloss chart standards and the maintenance of chart consistency between print lots are the two main objectives for the company with the byko-charts," says Bart Hazleton, business manager, special projects with BYK-Gardner. The company has set strict color and gloss parameters, closely monitors its paper supply and packages each chart box so that it is protected from humidity fluctuations. These charts are available for applications in opacity testing, spreading rate, penopac, sag and leveling, display, scrub panels, and brushouts.

DOWNSTREAM COLOR APPLICATIONS

Some color and appearance equipment manufacturers have targeted the end user market with new product launches. Paul N. Gardner Company recently introduced the ColorQA, a small, user friendly device designed for an array of industrial and household applications. The Color QA digitally measures a sample target color and stores it as a reference standard. It then uses that reference standard and compares it against the unknown color specimen, reporting the difference numerically and as a



Photo courtesy of Paul N. Gardner Co.



Photo courtesy of ElektroPhysik.

Editor's Bookshelf

Color Space and Its Divisions

by Rolf G. Kuehni
Wiley-Interscience, Hoboken, NJ
2003. 408 pp. Hardcover.

Rolf Kuehni's book provides both a fascinating historical account of color order systems from antiquity to the present and a trenchant discussion of the problems of color measurement. He discusses the underlying psychophysics and the relationships between stimuli and experience, and provides a review and critique of the major color order systems. The discussion is focused on issues of color space viewed against a simple achromatic surround, and does not address color appearance under widely varying light and surround conditions. There is ample room within these constraints for discussion and research. As Kuehni notes in his first chapter, "three sets of extensive chroma spacing data, determined at different times, are not in good agreement, and the implicit chroma scale of the Optical Society of America Uniform Color Scales (OSA-UCS) does not agree with any of the three." Similar problems are cited for hue spacing. Throughout the book, Kuehni points to the uncertainties in the field, and in the final chapter he proposes an experimental plan to address some of the issues. In the end, though, he concludes that "the idea of a single fundamental color space is misplaced. As found in practice there are different kinds of color spaces and solids applicable with a degree of accuracy to different situations." Kuehni's book will be of interest for anyone who wants a deeper understanding of the nature of color and the uncertainties that surround its measurement.

An Introduction to Predictive Maintenance, Second Edition

by R. Keith Mobley
Butterworth-Heinemann, Amsterdam
2002. 438 pp. Hardcover.

R. Keith Mobley focuses on maintenance strategies based on monitoring the operating condition of key systems to determine, on an on-going basis, the appropriate schedule and level of maintenance activities. Techniques such as vibration monitoring, process parameter modeling, thermography, and visual inspection are among the methods emphasized in the present volume. Mobley provides an introduction to these techniques and discusses organizational strategies for implementing predictive maintenance schemes. While the book is not specifically tailored for the coatings industry, the methods the author describes are applicable to just about any manufacturing process that depends on the reliable operation of mechanical equipment. The primary audience for this book will be plant managers, process engineers, and managers of maintenance operations, but the book provides useful background information for anyone interested in the maintenance issues involved in keeping manufacturing operations running efficiently.

Publishers: if you have books that you would like considered for this column, please send review copies to the Editor, JCT COATINGS TECH, 492 Norristown Rd., Blue Bell, PA 19422-2350.



Photo courtesy of Datacolor.

percentage. The unit contains a probe with an electro-optic sensor, the probe strobes a white LED and a tri-color photo diode measures the reflectivity of the object in the red, green, and blue spectra. The ColorQA can be used on almost on any type of substrate that has a color including coatings, industrial painting, rubber, plastics, boats, etc.

"What really sets this apart from other instruments is price," says technical coordinator James Fusco. "Color matching using a spectrophotometer is typically an expensive endeavor and requires experience or time-consuming training with use of the equipment. Color matching by human eye is very subjective and can become difficult when trying to differentiate small variations in two similar colors particularly on a repetitive basis. The ColorQA can eliminate these issues, it is extremely easy to use, portable, and an excellent QC tool.

Too Shrader, product manager for Datacolor's point of sale operations says that the company's new DF110 is a small-footprint/low-cost, high-quality benchtop spectrophotometer attractively priced for applications such as in-store, paint color matching. Even so, this instrument uses Datacolor's SP2000 spectral analyzer, giving it unprecedented measurement quality and inter-instrument agreement, according to Mr. Shrader.

The new Color Coordinator point-of-sale color-matching system from Datacolor uses "True Color Scheme" technology to actually recommend color schemes for virtually any starting color based on interior design techniques. Multiple schemes are available depending on the individual consumer's desire, and each scheme comes with a description of when to use it (such as to highlight a particular architectural feature). "This product enables retailers to offer a higher and more effective level of service to the consumer while recommending accent colors to sell more paint and thereby impacting the bottom line," Mr. Shrader notes. **CT**