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THE STANDARD IN MEASURING
COLOR

ESTABLISHING A QUALITY PROCESS FOR PRODUCT COLOR CONSISTENCY
HOW ONE COMPANY STANDARDIZED THE COLOR QUALITY PROCESS TO ESTABLISH COLOR STANDARDS AND MAINTAIN COLOR CONSISTENT PRODUCTS

Color is a matter of perception and subjective interpretation. Two people looking at the same object will draw upon different references and express the exact same color in vastly different words, leading to confusion and miscommunication between company departments or manufacturer and supplier. Knowing this, PVC Tech Corp., a plastic films and polymer distributor located in Southern California, developed an efficient, standardized process from R&D to quality control to establish color standards and maintain color consistent products.

For more than 25 years, PVC Tech has been committed to their philosophy of "Quality in Products, Solutions and Service," producing high-quality plastic films and polymer substrate products to customers in the packaging, printing, bookbinding, child-use, food, and manufacturing industries. Including furniture films, dermal contact films, advertising materials, and packaging, this wide range of applications requires them to develop substrates of various finishes, textures, and embosses.

Because of this variety, PVC Tech carries a catalog of products, as well as designs custom, made to order films, for customers planning their own product development projects. Whether stock or custom, each product must be consistent with how it's displayed in the catalog or with a customer's specific aesthetic goals. For this, it's critical for color to be consistent.

Limitations of Visually Evaluating Color

The color and appearance of plastic films and substrates greatly influence how a customer perceives the quality of a product. If not consistent or up to standard, the product will be rejected. Without a standardized color formulation or inspection process, it's difficult to create a target color and efficiently reproduce it in more than one batch of materials. More time spent on trial and error not only affects the efficiency of an operation, but the amount of rework as well. Understanding this, PVC Tech focused on implementing an objective, standardized process to communicate and control plastic color – an effective method to creating color standards, minimizing trial and error, and maintaining consistency for customer satisfaction.

Visual inspections are unreliable for several reasons. The sensitivity of the human eye varies from person to person, often causing color to appear differently to each individual. In addition, color can appear brighter or darker if viewing an object from a slightly different angle or may appear to change under certain lighting. These subjectivities and variables often lead to miscommunication between departments, customers, or manufacturers and suppliers. Without being able to evaluate color objectively and express color in numerical terms, color errors and inconsistencies are at risk.

> "The resultant color of each film cannot be reliably judged through a naked eye visual inspection. There are too many possibilities for variances which may not be immediately obvious. We need actual metrics to create color targets to fulfill."
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> *-Candy Liu, Marketing & Compliance Manager at PVC Tech*

Precise Color Communication from R&D to Quality Control

To avoid the subjectivity and unreliability of visual inspections, PVC Tech worked with Konica Minolta Sensing's experts to implement a uniform, standardized color process within their R&D and quality control processes. A great fit for their wide range of plastic applications, the CM-600d Spectrophotometer and SpectraMagic NX color quality control software were integrated into their operations. This spectrophotometer is widely used because of its ability to precisely identify color inconsistencies in objects with a variety of surface conditions, display spectral data, and provide pass/fail assessments to ensure the final product meets the standard.

During PVC Tech's R&D and product development phases, color and film aesthetic are a main focus, among other critical performance targets. Most often, a currently used substrate needs to be improved or modified, requiring a color batch to be created or replicated. The precision and versatility of the CM-600d allows PVC Tech to determine the hue, lightness, translucency, and other physical attributes of their materials, and then send and record the data to color QC software. With this numerical data, a color standard and tolerance are established and, once approved internally or by the customer, they are maintained in their software's library for future productions.

In addition to R&D and product development, each substrate and plastic sample goes through stringent color quality inspections using the CM-600d Spectrophotometer. Color tolerances, or limits, established during R&D define how big the difference in color is allowed to be between a sample and the standard. These tolerance values are set to maintain consistency and accuracy from one batch of materials to the next. If within the tolerance value, the sample is approved. If the difference exceeds the tolerance value, the sample is rejected.

Color measurement instrumentation and software makes it easy to establish, record, and communicate standards in a uniform language to avoid confusion, as well as color errors, within company operations and throughout the supply chain. PVC Tech requires their manufacturing partner to be equipped with a Konica Minolta Sensing spectrophotometer to institute color control and ensure accurate communication when counter-checking sample data. Once a color standard and tolerance are recorded in their software library, PVC Tech can effectively formulate, reproduce, or modify the color. The software library is duplicated at their manufacturing partner's facility via CD. This process not only ensures color consistency from one batch of materials to the next, but improves efficiency in the manufacturing process.

"By establishing and maintaining color standards, our films are aesthetically consistent and our customers can rely on our catalogues as they plan their own product development projects. We can't foresee doing this with any fairness or consistency unless equipped with a spectrophotometer."

-Candy Liu, Marketing & Compliance Manager at PVC Tech

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