

Applications

Applications Note

Insight on Color

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Why Use an Appearance Measurement Instrument?

Measurement instruments provide managers, scientists, engineers, and technologists with quantitative, permanent data on the important appearance attributes of their products. Such measurements are necessary because the eye, though sensitive and discriminating, cannot make quantitative judgments that are reproducible and suitable for records.

HunterLab appearance measurement instruments rapidly generate precise, quantitative, and reproducible results. Important attributes such as color, gloss, opacity, haze, whiteness, and yellowness can be controlled for optimum product appearance.

Appearance measurements offer all industries the ability to communicate about appearance, establish permanent records, improve product quality, and reduce costs. HunterLab customers and clients are found in all segments of industry and science. Their needs and interests differ, but they have one thing in common — they all care about the way their products look. They have taken advantage of HunterLab as the Color Management Company.

HunterLab manufactures a complete line of instruments for the measurement of appearance, including colorimeters and spectrophotometers for the physical analysis of color and various types of on-line continuous monitors. In addition, HunterLab provides technical advice through its help desk and can measure samples through its Technical Services Department using its color testing laboratory.

Case studies from several major industries are provided below to illustrate the usefulness of color testing equipment.

Coatings

An appliance manufacturer was informed by his customer, a major retailer, that a shipment of color-coordinated appliances did not match visually. HunterLab was asked by the manufacturer to determine the accuracy of the color match of the appliances to the color standard.

HunterLab's investigation revealed that both the manufacturer and the retailer were making visual matches to a specified color standard. Since their visual assessments were subjective and could not be easily resolved, HunterLab obtained spectral reflectance curves of the product standard and a sample using a spectrophotometer. It was found that the product sample was actually within the specified tolerances when measured under the illuminant that simulates northern daylight (Illuminant C). However, the manufacturer was viewing the product under incandescent lighting (illuminant A) and the retailer was viewing it under fluorescent lighting (Illuminant F), so a difference was observed due to a

phenomenon known as metamerism. That is, two colors which match under one light source may not match under another light source.

A HunterLab spectrophotometer is now employed by the manufacturer so that they may precisely measure color difference and detect metamerism in samples of paint before it is applied to the final product. In fact, HunterLab provides many spectrophotometers to the “coil coating” and paint industries.

Liquids

A major producer of quality wines found through market testing that the clarity, or absence of haze, of wines was directly related to brand preference and that, in many cases, the slightest suggestion of haze, even though unrelated to taste or color, was unacceptable to consumers.

It was further found that the degree of haze was difficult to determine visually, yet strict specifications were to be enforced on haze tolerances. HunterLab was asked to study the feasibility of measuring both haze and color with a single instrument. After consultation, a benchtop sphere instrument replaced visual evaluations for both color and relative haze. The ColorQuest Sphere-series and UltraScan-series spectrophotometers were designed so that liquids, films, and any other products which transmit light can be feasibly measured.

The producer now maintains strict adherence to haze tolerances even though color may vary slightly from one bottling to the next. Now the instrument is also being used to measure the many varieties of grapes for blending purposes.

Paper

A paper mill adjusted its production run of a high-gloss paper intended for the printing of half-tone photographs. However, the gloss then decreased and the color began to change. Since these problems were not detected immediately, much of the paper had to be recycled at great cost.

A HunterLab colorimeter to measure color and a glossmeter to measure gloss were placed in operation. The mill now consistently produces the desired quality paper. Thus, the instruments directly helped to increase profits. Variations of these instrument systems have also proven to be valuable in the coatings and plastics industries.

Plastics

A large plastics company makes white, opaque plastic pellets. On occasion, they must switch the production line from making the opaque pellets to making the clear plastic product. To determine if the opacifier had been sufficiently purged from the product, they would press a plaque from the pellets and determine opacity visually. Meanwhile, the production line was still turning out pellets that had to be recycled while they were making the plaque and the visual assessment.

The manufacturer purchased a HunterLab spectrophotometer, and now they quickly measure the L* value of raw pellets to determine whether the opacifier has been sufficiently removed. The quicker decision means that less product must be recycled.

Textiles

A major garment manufacturer discovered that pieces of cloth cut from different bolts, but from the same lot, did not appear to match when the pieces were sewn together to make suits. The textile mill was informed of the problem and had to accept the material returned by the clothing manufacturer.

The mill purchased a HunterLab spectrophotometer and software system that has the capability of rapidly accepting, memorizing, comparing, and arranging thousands of bits of data to define the shade of

a specimen. The mill was then able to determine which of the various shades within certain tolerances could be sewn together without noticeable differences.

Thus, color shade groups, determined directly, improved product quality, diminished the number of rejects, decreased product costs, and reduced customer complaints. HunterLab sells portable, laboratory, and on-line spectrophotometers that are capable of shade sorting.

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