

Artists in ancient times created their masterpieces by mixing and creating their own painting mediums. Quality and consistency in developing pigment color was an art in itself and nearly as important as the finished product. The paints and supplies that artists use today are virtually all created by art supply companies and manufacturers. With thousands of choices and a limitless selection, today's artists demand pigment color that meets quality standards to ensure that their artwork will stand the test of time.

Quality control and standardization

[Pigment color analysis](#) has become a well-defined science, and [advancements in light technology](#) have led to stringent testing and quality control methods for manufactured paints and art supplies. Prior to the 20th century, the only method for determining paint quality was the artists themselves. By 1942, an alliance of art professionals and consumers developed a voluntary specification of standards¹ to judge the quality of art mediums and painting supplies. The progression of these standards eventually led to the development of the American Society for Testing and Materials (ASTM)², which monitors the testing and grading of manufactured paints, coatings, and other art mediums for pigment quality, consistency, and colorfastness. Most paint supplies on the market today are rated by performance and quality based on the ASTM standardization system.

These standards rely on the evaluation of both the chemical and physical properties of the product. Many methods of evaluation rely on spectral technology for the ability to monitor both the physical and chemical properties of samples using only one form of instrumentation. These analytical methods can be used to determine a variety of properties essential to developing quality art supplies, including:

- Exterior expose quality on various materials (ASTM D1006, D1006M-13, D1014-09)
- Water resistance and humidity testing (ASTM D2247-11)
- Chronic health hazard analysis (ASTM D4236 – 94(2011))
- Lightfastness (ASTM D4303 – 10)
- Tinting strength (ASTM D4838 – 88(2010))
- Pigment color standard specifications for various paint mediums (ASTM D4302 – 14, D5067 – 05(2010), D5098 – 05a(2010), D5724 – 06(2010))

Spectrophotometers offer the ability to measure and monitor the various features of art supplies by eliminating visual discrimination and human error, and quantifying specific elements of the sample materials. This information can then be used to analyze pigment colors for consistency, repeatability, strength, lightfastness, and durability. Instrumental analysis provides specific data on each of these elements that can then be used for grading calculations.

Pigment analysis and grading

Art paints and supplies are typically sold as either artist quality or student quality grade. Student quality painting supplies are of lower quality and have a lower concentration of pigment color. These products typically use fillers, which weaken color strength and durability over time. Artist quality paints (also referred to as “professional paints”) have a high concentration of ground pigment color, increasing the pigment load and performance rating of these products.

The grading system for professional quality paints and art supplies typically follows a number or letter rating system³. [ASTM sets quality parameters based on a numerical pigment color permanence standard](#):

- ASTM I = Excellent Lightfastness
- ASTM II = Very Good Lightfastness
- ASTM III –Not Sufficiently Lightfastness

Comparable manufacturer standards include:

- **** or AA = Extremely permanent colors
- *** or A = Durable colors.
- ** or B = Moderately durable colors.
- * or C = Fugitive Colors

Spectral technologies in art

Determining quality and grading standards requires the use of analytical instrumentation to accurately evaluate pigment color and stability. Spectrophotometers are a preferred choice for many of the quality testing procedures and offer the ability to quantify various elements of a sample and are adaptable to variations in viscosity and translucency. Spectral analysis also allows for repeated measurements on multiple samples for developing product consistency and quality control. The ability to quantify pigment color load and monitor changes over time is necessary for proper labeling and to meet standardization requirements.

Full article with photos available here:

<https://www.hunterlab.com/blog/color-measurement-2/pigment-color-analysis-preserving-art-for-generations/>