

## **A Narrative Summary of ASTM International Standards Pertaining to Artists' Coloring Materials**

### **PURPOSE OF ASTM D01.57**

ASTM D01.57, the Subcommittee on Artists' Materials, helps artists and consumers recognize product quality and safety when manufacturers' products conform to its Standards.

D01.57 has about 60 members representing consumers and manufacturers of artists' materials. Members of the Subcommittee include artists, educators, conservators, medical doctors, chemists and other materials scientists, and representatives from art materials manufacturers, artists' groups, manufacturers of testing equipment, and regulatory agencies. Its meetings, held twice a year, are open to anyone who wishes to attend - but those who wish to vote during the standards-writing process must be members of ASTM. For more information on ASTM membership visit <http://www.astm.org/MEMBERSHIP/index.html> to become a member.

ASTM D01.57 has developed and published a number of standards covering such topics as testing of pigments for lightfastness, labeling content, paint performance criteria, and the health hazard labeling of art materials. Members research and compile data and learn about this unique process of creating standards through guidance provided by the ASTM's website. You can review these guidelines at <http://www.astm.org/MEMBERSHIP/newmembership.html> to obtain more information.

Many new standards are currently under development in the subcommittee. ASTM D01.57's mission also includes the education of artists through the dissemination of information about the Standards.

### **The Standards**

#### **ASTM D 4303, "Standard Test Methods for Lightfastness of Colorants Used in Artists' Coloring Materials"**

This is the technical method that describes the ways in which colorants (pigments, dyes, lakes, and so on) used in most single-colorant artists' paints can be tested for their lightfastness. It describes two types of light exposures used in the method, how to prepare samples for testing, the conditions of the exposures, the instruments used for measuring the light intensity during exposures, the instruments that can be used to accelerate exposures, the specifics of the languages used to characterize color and the instruments that can measure color using the color languages specified, how to measure the colors, and how to interpret the results.

Sample preparation for testing is derived from an observation of artist's working methods as well as works of art in gallery and museum settings. Many artists use at least some white paint in their mixtures – or paint thinly on white

surfaces. ASTM D01.57 therefore specified that single-colorant paints would be made with the colorant mixed with a standard white for testing purposes. Further, an underlying hypothesis of this standard is that accelerated testing is an indication of the passage of real time and reflects a reasonably accurate picture of what might happen if 20 – 100 years of real time exposure would reveal from a test sample. Coloring materials tested with this method receive a “Lightfastness Rating” of I, II, III, IV, or V, depending on the results. Only Lightfastness Ratings of I and II are good enough for artists’ materials.

### **ASTM D 4302, “Standard Specification for Artists’ Oil, Resin-Oil, and Alkyd Paints”**

This specification describes the conditions under which the colorants used in these types of paints should be tested for lightfastness. Since the colorants must be mixed with a standard white paint as described in ASTM D 4303, it is the colorant itself that is being tested; brands of paint are not tested. The lightfastness rating of the colorants in the oil, resin-oil, or alkyd vehicle is reported.

This specification also describes the labeling, composition, physical properties, and performance requirements for these types of artists’ paints.

There is a table in the standard that can be of interest to artists that lists all the colorants that have been subjected to the tests, their Color Index Names and Numbers, their chemical names, and their common names. Many manufacturers now list a Color Index Name on a label (i.e., “PY 42”) for the colorants used in paints. Listing the Color Index Name is not an indication of full conformance with the standard.

### **ASTM D 4236, “Standard Practice for Labeling Art Materials for Chronic Health Hazards”**

This method describes a procedure for developing cautionary labeling for art materials and provides hazard and precautionary statements to be used on labels, based on knowledge that exists in the scientific and medical communities. A 1988 amendment to the Federal Hazardous Substances Act called the Labeling of Hazardous Art Materials Act (LHAMA) requires the use of this standard in art materials labeling for a broad interpretation of all artists’ materials manufactured for any kind of artist, including children, and sold in the United States.

### **ASTM D 5067, “Standard Specification for Artists’ Watercolor Paints”**

This specification is nearly the same as ASTM D 4302, but applies only to transparent watercolors. There are testing, performance and physical property requirements for these paints that make them different from those covered by D 4302. For instance, transparent watercolor colorants are not required to be mixed with a standard white paint but instead are made into transparent samples on a specified pH neutral paper.

Since the transparent watercolor paints are considerably more sensitive to color changes than oil paints, the table indicating pigments tested for this

standard is a great deal shorter.

### **ASTM D 5098, “Standard Specification for Artists’ Acrylic Dispersion Paints”**

The same as ASTM D 4302 but applies only to water-thinned acrylic paints. There are performance and physical property requirements for these paints that make them different from those covered by D 4302.

Acrylic dispersion paints were formerly referred to as “acrylic emulsion” paints, but more recent clarification has revealed that these are not strictly emulsions in the classical sense; hence the change in terminology to the term “dispersion.”

Since the acrylic dispersion paints are considerably more alkaline than oil paints, fewer pigments were listed in the table that outlines the pigments in this standard.

### **ASTM D 4838, “Standard Test Method for Determining the Relative Tinting Strength of Chromatic Paints”**

This is a technical test method that produces instrumentally readable results—far more sophisticated than the traditional, and more subjective, method of reducing a color with a standard white.

Note that no manufacturer that the subcommittee members know currently uses ASTM D 4838 because the mathematics involved in this standard appear daunting. Most artists and manufacturers employ a traditional method of mixing a measured amount of a colored paint with 10 or 20 times that amount of a white paint of the same type. This provides generally useable results.

### **ASTM D 4941, “Standard Practice for Preparing Drawdowns of Artists’ Paste Paints”**

This technical method describes how to prepare samples for testing for lightfastness. A “drawdown” is a method of depositing a uniformly thin film of a liquid or paste on a surface. It is a straightforward and easy-to-follow method.

### **ASTM D 5383, “Standard Practice for the Visual Determination of the Lightfastness of Art Materials by Art Technologists”**

A method for testing the lightfastness of art materials not covered by specifications D 4302, D 5067, D 5098, D 5724, D 6901 (markers, inks, pastels, and so on). The method uses the Blue Wool textile fading cards (BS 1006) and does not require sophisticated instrumentation (as in D 4303) to measure the results. Results can be communicated among other users of the standard with some degree of confidence that they have validity, but without the degree of confidence that instrumental evaluation provides.

### **ASTM D 5398, “Standard Practice for the Visual Evaluation of the Lightfastness of Art Materials by the User”**

A simplified version of D 5383 intended for individual artists to use to evaluate their own non-traditional materials for lightfastness.

**ASTM D 5517 “Standard Test Method for Determining Extractability of Metals from Art Materials”**

This is a technical method to be used by toxicologists in the evaluation of art materials for determining labeling according to ASTM D 4236.

**ASTM D 5724, “Standard Specification for Artists’ Gouache Paints”**

The same as D 4302 but applies only to gouache paints. There are performance and property requirements for these paints that make them different from those covered by D 4302.

Since the gouache paints are considerably different from oil paints, the table defining pigments for this standard is a great deal shorter than other media. The table does contain colorants with Lightfastness Ratings of III, IV and V, which are not acceptable for artists’ materials.

**ASTM D 6801 “Standard Test Method for Measuring Maximum Spontaneous Heating Temperature of Art and Other Materials”**

Rags soaked in linseed oil and stored in a confined space where oxygen is available may spontaneously heat up to the point where they ignite. This is a test method that was developed to address the legislative actions of one state that demanded labeling on consumer products that dealt with the potential for the spontaneous combustion of oil-based materials such as linseed and other oils used in art materials.

**ASTM D 6901, “Standard Specification for Artists’ Colored Pencils”**

This standard is a departure from ASTM D 4302, and applies only to colored pencils.

The difference here is that artists’ colored pencils are mixed-colorant products. Therefore, these materials require product-based testing. The actual finished product (a colored pencil) is tested by the manufacturer of the colored pencil. This is very different from the methods of ASTM D 4303 that involve testing the coloring materials used in the products. The principles of ASTM D 4303 apply, but the sample preparation and test methods are slightly different. There are performance and property requirements for these materials that make them different from those covered by D 4302.

This standard is a significant departure from ASTM D01.57’s traditional testing scheme, and therefore will be used in the development and writing of other, future, standards that require product-based testing.

**ASTM D 7355, “Standard Guide for Artists’ Paint Waste Disposal in Smaller Commercial or Educational Settings”**

This standard provides guidelines for an environmentally friendly method of segregating paint waste in a small artists group or an educational environment and provides a way to concentrate and dispose of these materials. This standard does not apply to individual artists. Those guidelines are covered in a separate standard. This standard deals with higher volumes of waste paint products and

guides the user to handling this waste in a way that is compatible for disposal as hazardous household waste in most municipal settings.

### **Definition of Terms**

The terms below are useful in understanding the work of the subcommittee.

**Artists' Material** (*n.*) In the context of ASTM, an artists' material is one manufactured for, and used by, artists who expect long-term stability and durability from both their materials and their products (art). That is, these materials are not secondary, "student grade," "sketching," "economy" or children's' materials.

**ASTM International** (*n.*) – Formerly known as the American Society for Testing and Materials (ASTM), this is one of the world's largest voluntary standards-writing organizations. ASTM publishes voluntary standards\*: standards that are complied with by the users, and written by volunteers who donate their time and expertise. ASTM Standards are consensus standards, which means that the purposes, significance, and content are agreed upon among all the parties.

ASTM membership is open, with several voting classifications determined by the chair of a subcommittee in consultation with ASTM's administrators: Producer, User, Consumer, and General Interest. Producers are also Users, in that they use the standards; artists are Users and Consumers. ASTM requires there to be a balance of representation in the subcommittee voting membership, so that Producers do not have more votes than User/Consumers. In addition, ASTM prefers to have a User/Consumer chair the subcommittees, so Producers cannot exert undue influence.

There are no requirements to join ASTM beyond an interest in the work. There is no requirement that members attend meetings. Non-members may attend meetings and participate in discussions. The advantage of being a member is that members can vote – non-members may not vote.

ASTM work is divided among Main Committees designated by a letter and a number. For instance, the ASTM Committee that oversees paints is Committee D01. Main Committees are further divided into Subcommittees: ASTM D01.57 is the Subcommittee called "Artists' Materials." Subcommittees are subdivided into Task Groups, as in ASTM D01.57.10, Consumers. ASTM D01.57 has over 20 Task Groups, and the hard work of ASTM D01.57 takes place in its Task Groups.

The ASTM standard development process is hierarchical. Once a new document has been produced to the satisfaction of D01.57, it must be voted upon by the membership; approximately 50% of the membership is present at meetings, so this rule allows those who cannot attend to have a look at the document and have a say. If the document passes the D01.57 vote, the D01

Main Committee and the entire Society vote on it. A single negative vote at any level stops the process; negative voters are required to present material which justifies their vote, and subcommittees are required to hear the evidence and vote on whether they find the negative persuasive or not. Persuasive negatives require revision of the proposed standard. Negative votes can be ruled “non-persuasive” by a vote of 60% of the membership, which vote must be approved by the D01 Executive Committee (chairs of all the D01 Committees); a “non-persuasive” negative allows the standard to move to the next level of voting -- a simultaneous vote of D01 and the Society. That is, the entire membership of ASTM International votes on a Subcommittee’s single proposed standard.

ASTM publishes standards that pass all levels of voting after negatives and comments are resolved. The process does not end there, however, because by ASTM rule each standard must be re-approved every five years – that is, reviewed and voted upon – or it risks withdrawal by the Society. ASTM D01.57 has never had a standard withdrawn.

\*Some ASTM Standards are codified into law. *c.f.* ASTM D 4236.

**ASTM Standard** (*n.*) – ASTM Standards are technical standards for materials, products, systems, or services. They can take the form of a specification, a practice, a test method, or other form as deemed necessary. For more information about ASTM International, see <http://www.astm.org/FAQ>.

**Narrative Summary** (*n.*) – The purpose of this document is to explain in plain language the meaning of ASTM Standards for artists. The authors have therefore endeavored to avoid technical jargon, although the use of some scientific language is necessary.

**Lightfastness** (*n.*) – A measure of a material’s resistance to change when exposed to a measurable and specified light source and other environmental conditions for a measurable and specified period of time. A material that is resistant to change can be called “lightfast.”

Lightfastness is a relative matter – that is, something is lightfast in comparison with (relative to) something that is not lightfast.