Designation: D 4303 – 03

Standard Test Methods for Lightfastness of Colorants Used in Artists' Materials[1]

This standard is issued under the fixed designation D 4303; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 Four test methods to accelerate the effects of long term indoor illumination on artists' paints are described as follows:

1.1.1 *Test Method A*—Exposure to natural daylight filtered through glass,

1.1.2 *Test Method B*—Exposure to irradiance from daylight fluorescent lamps,

1.1.3 *Test Method C*—Exposure in xenon-arc irradiance simulating daylight filtered through glass, and

1.1.4 *Test Method D*—Exposure to irradiance from cool white fluorescent lamps and soda-lime glass filtered fluorescent UV sunlamps.

1.2 These test methods are used to approximate the color change that can be expected over time in pigments used in artists' paints in normal indoor exposure.

NOTE 1—The color changes that result from accelerated exposure may not duplicate the results of normal indoor exposure in a home or gallery. The relative resistance to change, however, can be established so pigments can be assigned to categories of relative lightfastness.

1.3 Lightfastness categories are established to which pigments are assigned based on the color difference between specimens before and after exposure.

1.4 Color difference units are calculated by the CIE 1976 L*a*b* color difference equation.

1.5 These test methods apply to artists' oil, resin-oil, acrylic emulsion, alkyd, watercolor paints, and gouache paints.

1.6 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.7 *This standard does not purport to address the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates[2]

D 4302 Specification for Artists' Oil, Resin–Oil, and Alkyd Paints[3]

D 4674 Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environment[4]

D 5067 Specification for Artists' Watercolor Paints[3]

D 5098 Specification for Artists' Acrylic Emulsion Paints[3]

D 5724 Specification for Gouache Paints[3]

E 284 Terminology of Appearance[2]

E 1347 Test Method for Color and Color–Difference Measurement by Tristimulus (Filter) Colorimetry[2]

E 1348 Test Method for Transmittance and Color by Spectrophotometry Using Hemispherical Geometry[2]

E 1349 Test Method for Reflectance Factor and Color by Spectrophotometry Using Bidirectional Geometry[2]

G 24 Practice for Conducting Exposures to Daylight Filtered Through Glass[5]

G 113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials[5]

G 151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources[5]

G 155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-metallic Materials[5]

3. Terminology

3.1 *Definitions*—Appearance terms used in these test methods are defined in Definitions E 284. Terms relating to natural and artificial lightfastness tests are defined in Definitions G 113.

3.1.1 *glass*—as used in these test methods, glass refers to single-strength window glass.

4. Summary of Test Methods

4.1 Color measurements are made on specimens that have been prepared as directed in Specification D 4302, D 5067, D 5098 or D 5724 depending on the vehicle. The measurements are recorded for comparison with readings made after the specimens have been exposed.

[1] These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.57 on Artist Paints and Related Materials.

Current edition approved May 10, 2003. Published June 2003. Originally approved in 1983. Last previous edition approved in 1999 as D 4303 – 99.

[2] *Annual Book of ASTM Standards*, Vol 06.01.

[3] *Annual Book of ASTM Standards*, Vol 06.02.

[4] *Annual Book of ASTM Standards*, Vol 08.03.

[5] *Annual Book of ASTM Standards*, Vol 14.04.

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