



Standard Test Method for Identifying Fluorescence in Object-Color Specimens by Spectrophotometry¹

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1. Scope

1.1 This test method provides spectrophotometric methods for identifying the presence of fluorescence in object-color specimens.

1.2 This test method requires the use of a spectrophotometer in which the spectral distribution of illumination on the specimen can be altered as desired.

1.3 Within the above limitations, this test method is general in scope rather than specific as to instrument or material.

1.4 *This standard does not purport to address all of 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:

E 284 Terminology of Appearance²

E 991 Practice for Color Measurement of Fluorescent Specimens²

E 1164 Practice for Obtaining Spectrophotometric Data for Object-Color Evaluation²

E 1331 Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry²

E 1348 Test Method for Transmittance and Color by Spectrophotometry Using Hemispherical Geometry²

E 1349 Test Method for Reflectance Factor and Color by Spectrophotometry Using Bidirectional Geometry²

3. Terminology

3.1 The definitions in Terminology E 284 and Practice E 991 are applicable to this test method.

4. Significance and Use

4.1 Several standards, including Practices E 991, E 1164, and Test Methods E 1331, E 1348 and E 1349, require either the presence or absence of significant amounts of fluorescence exhibited by the specimen for correct application. This test

method provides spectrophotometric procedures for identifying the presence of such fluorescence.

4.2 This test method is applicable to all object-color specimens, whether opaque, translucent, or transparent, meeting the requirements for specimens in the appropriate standards listed in 2.1. Translucent specimens should be measured by reflectance, with a standard nonfluorescent backing material, usually but not necessarily black, placed behind the specimen during measurement.

4.3 This test method requires the use of a spectrophotometer in which the spectral distribution of the illumination on the specimen can be altered in one of two ways. In one, an optical filter is inserted between the illuminating source and the specimen, without interfering with the detection of the radiation from the specimen. In the other, the illuminating and detecting systems of the instrument are interchanged, thus applying the so-called two-mode method.³

4.4 Either bidirectional or hemispherical instrument geometry may be used in this test method, but the instrument must be capable of providing polychromatic irradiation on the specimen.

5. Procedure

5.1 Filter Method:

5.1.1 Calibrate the instrument as required by the manufacturer. (See Practice E 1164 and the appropriate test method for the instrument geometry.)

5.1.2 Measure the specimen, obtaining either a table or a graph of spectral transmittance or reflectance factor versus wavelength.

5.1.3 Insert a short-wavelength cutoff filter between the illuminating source and the specimen. Select the cutoff wavelength of the filter according to the color of the specimen, by reference to Table 1.

5.1.3.1 For spectrophotometers equipped for polychromatic illumination by means of an integrating sphere, the filter must be placed between the illuminating source and the illumination entrance port of the sphere for reflectance measurement. For transmittance measurement, the filter must be placed between the illuminating source and the specimen.

5.1.3.2 For spectrophotometers equipped for polychromatic

¹ This test method is under the jurisdiction of ASTM Committee E 12 on Color and Appearance and is the direct responsibility of Subcommittee E12.05 on Fluorescence.

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

³ Grum, F., "Colorimetry of Fluorescent Materials," *Color Measurement*, Academic Press, New York, Chapter 6, 1980.