



Designation: F 1946 – 98

Standard Practice for Determining the Lightfastness of Ink Jet Prints Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight¹

This standard is issued under the fixed designation F 1946; 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 This practice covers an accelerated procedure intended to determine the lightfastness of ink jet prints in office environments where overhead fluorescent light and window-filtered daylight is used for illumination.

1.2 *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.* Specific precautionary statements are given in Section 8.

2. Referenced Documents

2.1 ASTM Standards:

- D 1729 Practice for Visual Evaluation of Color Differences of Opaque Materials²
- D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates²
- D 3424 Test Methods for Evaluating the Lightfastness and Weatherability of Printed Matter³
- D 4674 Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight⁴

2.2 ANSI Standard:

- ANSI/NAPM IT9.9-1996 Stability of Color Photographic Images—Methods of Measuring⁵

3. Terminology

3.1 Definitions:

3.1.1 *ink jet media*—recording elements used by ink jet printers to receive inks. The substrate may be paper, plastic, canvas, fabric, or other ink receptive material. The substrate may, or may not be, coated with one or more ink receptive layers.

4. Summary of Practice

4.1 Printed ink jet media are exposed to radiant energy from an array of 11 very high output (VHO) cool, white fluorescent lamps and, simultaneously, to intermittent energy from two soda-lime glass-filtered fluorescent UV lamps. The extent of UV irradiance (nominal UV actinic exposure or UVAE) from both sources is determined separately as the product of UV irradiance at the start of the test and exposure time, in Watt-hours/m² (W-h/m²).

NOTE 1—The relative spectral power distribution for cool white fluorescent lamps may be found in ANSI/NAPM IT9.9-1996, Table 5.

4.1.1 The contribution of the sunlamp irradiance to the total UV actinic exposure is maintained constant by adjusting the on/off cycle time of the sun lamps.

4.1.2 The average nominal sunlamp UV actinic exposure is set at 12 % of the value of for the VHO lamps.

NOTE 2—Most UV exposure results from fluorescent lighting, although some is due to sunlight. The 12 % is an estimate of a representative office environment.

4.2 The duration of the exposure may vary widely depending on the lightfastness of the ink/media.

4.3 During the course of the exposure, the color changes in the printed samples are periodically evaluated either visually or instrumentally. Results are compared to an exposed reference standard, an unexposed control, or the same specimen prior to exposure. The color change shall be measured as percent retained density and color difference, *E.

4.4 The exposure may be continued for a specific duration of time, or until a predetermined color change has been achieved.

5. Significance and Use

5.1 Lightfastness of printed ink jet media for specified periods of time is pertinent to the end use of these materials. Since the ability of an ink jet print to withstand color changes is a function of the spectral power distribution of the light source to which it is exposed, it is important that lightfastness be assessed under the conditions appropriate to the end use application. While ink jet prints may be handled and displayed under a variety of conditions, this practice is intended to produce the color changes that may occur in ink jet prints upon

¹ This practice is under the jurisdiction of ASTM Committee F-5 on Business Imaging Products and is the direct responsibility of Subcommittee F05.07 on Ink Jet Imaging Products.

Current edition approved Dec. 10, 1998. Published March 1999.

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 American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.