Designation: D1684 – 07

Standard Practice for
Lighting Cotton Classing Rooms for Color Grading[1]

INTRODUCTION

Until 1940, practically all cotton classing was done in daylight, much of it in specially skylighted rooms designed to provide sufficient and uniform lighting on the classing tables. Cotton classification or classing is the art and science of describing the quality of cotton according to the official standards of the United States. Grade is divided into two categories—color grade and leaf grade. Because color grade is an important quality factor in establishing the price and use of cotton, the color quality of lighting is important. The cotton classer attempts to class cotton on the basis of the color the sample and the standard would have in daylight. In classing rapidly he refers to physical standards only occasionally each day; therefore it is most important that the lighting in a classing room shall not only provide a constant color but that it shall make the color of cotton appear as nearly as possible as it would in daylight so that he can take full advantage of training and memory.

In the USA, daylight at about 7500 K is what the cotton classer (**1,2,3**),[2] (as well as color matchers in other industries (**4,5,6**)) has found in practice to be the minimum color temperature of preferred daylight.

1. Scope

1.1 This practice covers practices in general use in the United States for lighting cotton classing rooms, provides general background information regarding the development and establishment of these practices, and prescribes a test method for appraising the color quality of lamps procured for this purpose.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]
D123 Terminology Relating to Textiles

D7139 Terminology for Cotton Fibers

3. Terminology

3.1 For all terminology relating to D13.11, Cotton and Fibers, refer to Terminology D7139.

3.1.1 The following terms are relevant to this standard: color grading, illumination, kelvin.

3.2 For all other terminology relating to textiles, refer to Terminology D123.

4. Summary of Practice

4.1 Artificial lighting is used in cotton classing rooms to simulate ideal daylight conditions in north latitudes with a moderately overcast sky. The quality and quantity of illumination, the geometry of illumination, the type of lighting unit and pattern for installation, the color of surroundings, and maintenance of lighting equipment are specified in this practice.

5. Significance and Use

5.1 This practice is useful for establishing and maintaining standard lighting conditions in cotton classing rooms. This permits the classer to make a valid assessment of the color grade of cotton. The cotton classer attempts to classify cotton on the basis of the color the sample and the standard would have in daylight. It is essential that the lighting in a classing

room is constant and that it makes the color of cotton appear as nearly as possible as it would in natural daylight.

5.2 Uniform lighting conditions permit classers to go from one classing room to another without having to make adjustments for wide differences in the amount and quality of lighting.

6. Quality of Illumination

6.1 The standard for color quality of illumination is the color and spectral quality of daylight of a moderately overcast northern sky, as represented by the curve and data in Fig. 1 for typical daylight at 7500 K (7,8).

6.2 Tolerances for meeting this standard for color quality are ±200 K correlated color temperature of color, and for spectral quality the spectral distribution shall be as close as possible to that shown in Fig. 1; in no case shall the color rendering index be lower than 92, as determined by the General Color Rendering Index recommended in 1965 by the International Commission on Illumination (CIE) described in References (9) and (10).

7. Quantity of Illumination

7.1 At the present time, the optimum amount of illumination for cotton classing is not known. For light sources that include
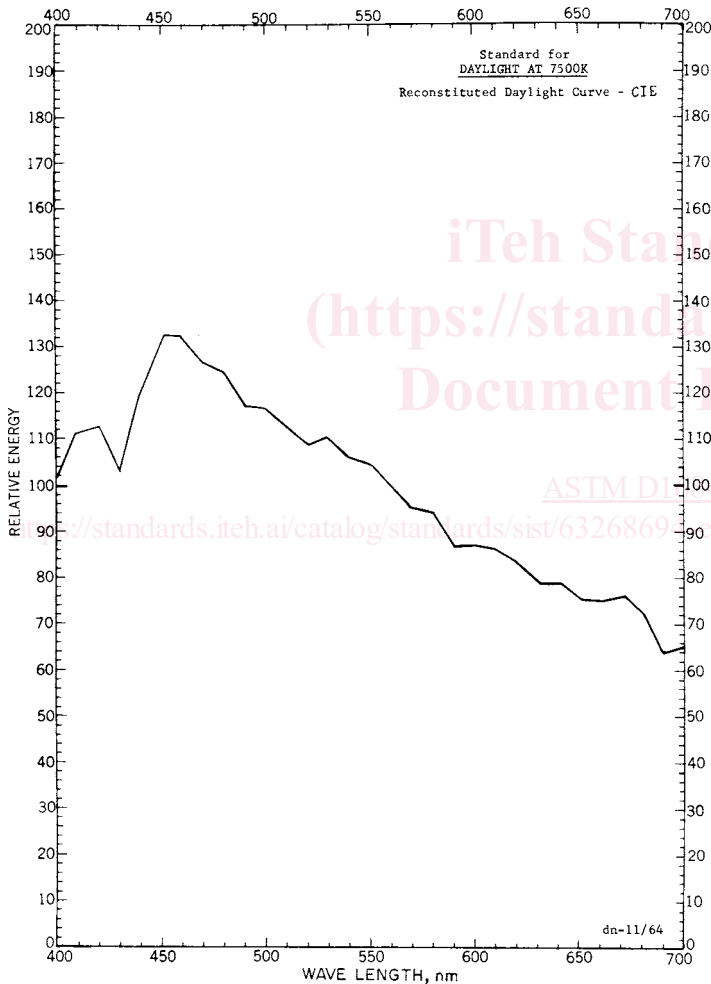
Wave-length, nm[A]	CIE Standard for Daylight at 7500 K[B] (Relative Energy)
400	101.9
10	111.9
20	112.8
30	103.1
40	121.2
450	133.0
60	132.4
70	127.3
80	126.8
90	117.8
500	116.6
10	113.7
20	108.7
30	110.4
40	106.3
550	104.9
60	100.0
70	95.6
80	94.2
90	87.0
600	87.2
10	86.1
20	83.6
30	78.7
40	78.4
650	74.8
60	74.3
70	75.4
80	71.6
90	63.9
700	65.1

[A] nm is the abbreviation for nanometre, which is a metre $\times 10^{-9}$ = mµ = millimicron.
[B] The data for 400 to 700 nm are based on Table III of August, 1965, recommendations of the CIE colorimetry committee (E-1.3.1) for an international standard to represent typical daylight (300 to 830 nm) of correlated color temperature 7500 K (7,8).

FIG. 1 Standard for Color Quality of Illumination for Color Grading Problems in Which the Equivalent of Light from a "Covered Sky" is Required or Preferred. In North Latitudes this is a sky that is moderately overcast from the north.