

ASTM D1729-96 VIEWING STANDARD FOR VISUAL APPRAISAL OF COLORS AND COLOR DIFFERENCES OF DIFFUSELY ILLUMINATED OPAQUE MATERIALS

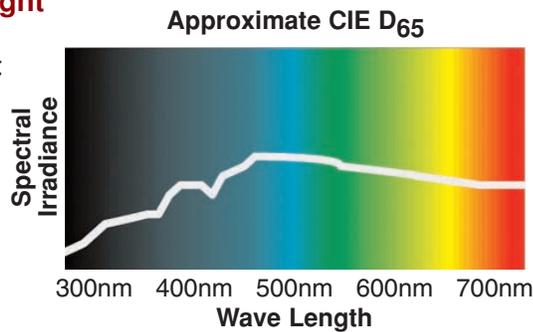
The color and appearance of materials is dependent on the geometry, quantity and spectral nature of the illumination as well as the surround conditions/viewing environment. The ASTM D1729-96 Viewing Standard specifies the conditions for the critical visual color appraisal for color matching. The use of spectrally dissimilar illumination sources allows effective detection of a “conditional” or metameric color match (a good color match under one light source but a color mismatch under a different light source). An equally important function of the Standard is to allow effective communication of color between parties working together on color critical projects.

QUALITY OF SIMULATED DAYLIGHT

Spectral Power Distribution: Daylight

CIE D₆₅ - Average North Sky Daylight

The Standard specifies this source for color matching applications. Prior to the 1990's, D75 was specified as the standard source in the USA. In the graphic arts and photography industries, D50 is the standardized source and is referenced in ISO 3664.



The spectral power distribution is the true “fingerprint” of a light source and it is the key factor in how a light source renders color. CRI and CIE 51 tests are used to ensure that your light source closely approximates D₆₅.

Chromaticity

Chromaticity is the apparent color of a light source. Each daylight source has an aimpoint and circular tolerance specified in CIE color space (UCS 1976), as illustrated at right.

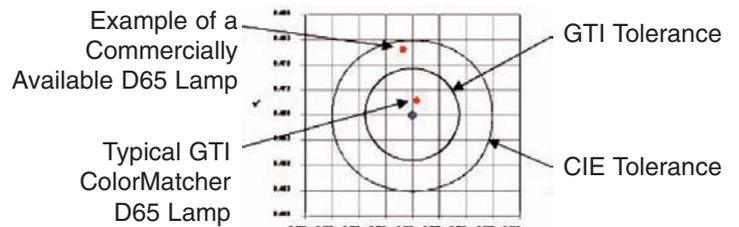
CIE Publication 51 Rating (BC)

This rating specifies how well a light source simulates daylight. The minimum rating is “BC” where the first letter represents the visual portion of the light source and the second letter represents its ultraviolet portion.

Color Temperature (6500K/D65)

Correlated color temperature is the correlation between the color emitted by a black body radiator when heated to a specific temperature. It is measured in the Kelvin temperature scale.

Color Quality
CIE 1976 UCS Chromaticity Diagram



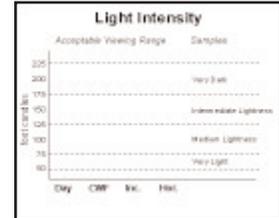
ADDITIONAL LIGHT SOURCES (METAMERISM)

Various light sources are described in the ASTM D1729-96 Viewing Standard, including: artificial daylight (D50, D65 and D75); incandescent (specifically illuminant A and a light source at 2300K); cool white fluorescent (CWF); other sources as required, which include various types of fluorescent lamps available to the industry. GTI® offers each of the standard sources as well as most of the fluorescent sources. A combination of the sources (specifically D65, CWF or TL84, and illuminant A) are ideal for detection of metamerism.

LIGHT INTENSITY

Consistent light intensity is critical to consistent color evaluation. The Standard provides a target intensity range designed to allow full tonal visibility of dark samples without overilluminating light samples.

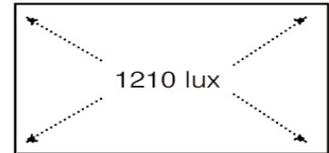
*Very light materials, as low as 540 lux (50 foot candles)
Medium lightness, 1080-1340 lux (100-125 foot candles)
Very dark materials, as high as 2150 lux (200 foot candles)*



LIGHT EVENNESS

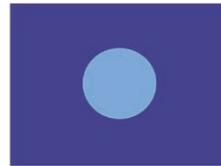
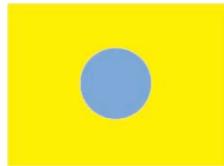
Even light intensity across the sample assures correct interpretation of color quality.

At least 968 lux (20% of 1210) and not more than 1462 lux intensity at all points on the viewing surface



SURROUND

Surround color and reflectance affect color and appearance. The two blue dots at the right are the same color but appear different in both hue and intensity due to the differences in the background field. In order to assure consistent color perception and tonal range, the surround condition is inspected.



Simultaneous color and brightness contrast

Neutral and matte surround with luminous reflectance of between 30 and 43% (43% reflectance is comparable to existing viewing systems using Munsell N7/ grey)

GEOMETRY



*Improper geometry:
excessive glare*



*Proper geometry:
minimal glare*

The presence of excessive glare can be distracting to observers attempting to make critical color judgments. Glare can influence color perception and result in very costly errors. Likewise, the effects of geometric metamerism, if not taken into account in evaluation observations, will result in color mismatches.

The light source, image and observer's eyes are positioned such that specular reflectance (glare) is minimized but sufficiently directional so that physical appearance aspects of the sample can be detected.

We offer a complete selection of equipment for color comparison and evaluation purposes that complies with the ASTM D1729-96 Standard, including: CMB color matching booths, the MM series of small matching booths, the PDV-2e/M portable booth, large format viewing stations and overhead luminaires.

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