What is the viewing standard?

ISO 3664:2009

Viewing Conditions - for Graphic Technology and Photography

The standard is a technical document which is written with engineers and lighting design companies in mind. It is not a road map for users who wish to build or set up their own viewing area, rather it is a highly technical set of specifications which enables lighting manufacturers to design, test, and certify color viewing systems. The standard specifies a set of five conditions which ALL must be present in order to assure the benefits of the standard. The five conditions include:

Color Quality

chromaticity

Chromaticity aimpoint u'_{10} = .2102, v'_{10} = .4889

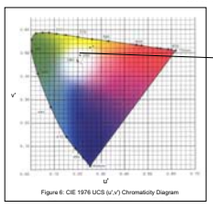
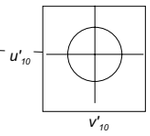


Figure 6: CIE 1976 UCS (u',v') Chromaticity Diagram



Tolerance of .005 radius around aimpoint

The apparent color of a light source is specified by its chromaticity coordinates. The aimpoint and tolerance are specified in CIE color space. When two viewing systems are plotted, the closer the plot, the greater the visual agreement between the viewers' color appearance.

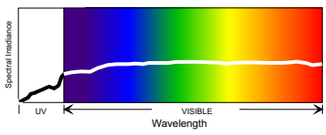
*color temperature**

5000K

* 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 Kelvins.

spectral power distribution

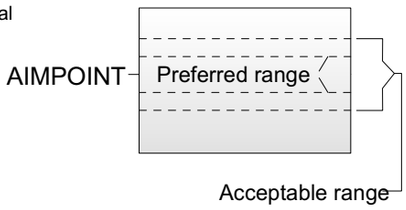
approximate CIE D_{50}



The true "fingerprint" of a light source. The spectral power distribution is the key factor in how a light source renders colors. The closer a light source's spectral power distribution is to D_{50} the more consistent and accurate it is. CRI and CIE51 tests are used to insure that your light source closely approximates D_{50}. New in 2009 is a tighter match in the UV region.

Light Intensity

Consistent light intensity is critical to consistent image rendition. The standard provides a target intensity designed to allow full tonal visibility of shadow detail without washing out highlights. Part 2 "practical appraisal" specifies a lower light intensity (500 lux) for tone reproduction evaluation.



prints & proofs

2000 lux

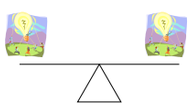
preferred (should be) tolerance
+/- 250 lux
required (shall be) tolerance
+/-500 lux

transparencies

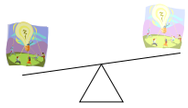
1270 cd/m²

preferred (should be) tolerance
+/- 160 cd/m2
required (shall be) tolerance
+/- 320 cd/m2

Evenness



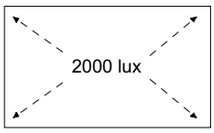
Even light intensity across image assures correct interpretation of print / reproduction quality.



Intensity differences across image cause incorrect interpretation of print / reproduction quality.

prints & proofs

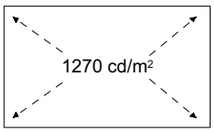
within 60% of nominal



at least 1200 lux (60% of 2000) intensity at all points on viewing surface

transparencies

within 75% of nominal

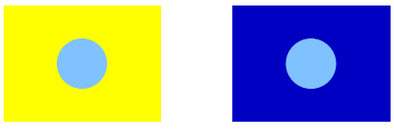


at least 953 cd/m² (75% of 1270) intensity at all points on viewing surface

Surround

prints & proofs

simultaneous color and brightness contrast



neutral and matte surround with luminous reflectance of between 10% and 60%.

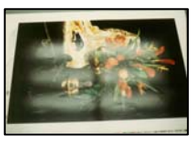
note: 60% reflectance is comparable to existing viewing systems using Munsell N8/ gray.

transparencies

5%-10% luminance level 50 mm on all sides

Surround color and reflectance affect color appearance. The two light blue dots above left appear different in both hue and brightness due to the differences in the background field. In order to assure consistent color appearance and tonal range, the surround condition is specified.

Geometry

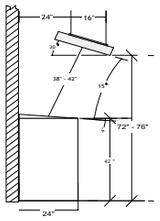


Improper geometry
excessive glare

Proper geometry
minimal glare

Light source, image, and observer's eyes positioned such that specular reflectance (glare) is minimized.

The presence of excessive glare can be very distracting to press operators, QC personnel, and others attempting to make critical color judgements. As illustrated by the images to the left, glare can hide reproduction detail and potentially cause very costly errors. While the standard does not explicitly specify lighting geometry, GTI has tested nearly all techniques and found that there is an optimal geometry for each installation (see example to right).



A *system* of elements designed to increase your bottom line.

Have more questions?
Ask GTI, it's our favorite subject.

WARNING: the graphic arts industry has PROVEN that consistent color appearance & effective color communication depend on YOUR lighting / viewing environment! Only by meeting all of the above elements will your viewing system provide maximum benefits.

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