# VIEWING STANDARD FOR GRAPHICS AND PHOTOGRAPHY
## ISO 3664:2009

The standard is a technical document which is written with engineers and lighting design companies in mind. It is not designed 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 Aim Point  $u'_{10}$ = .2102; $v'_{10}$ = .4889



$u'_{10}$

$v'_{10}$

Tolerance of .005 radius around aimpoint
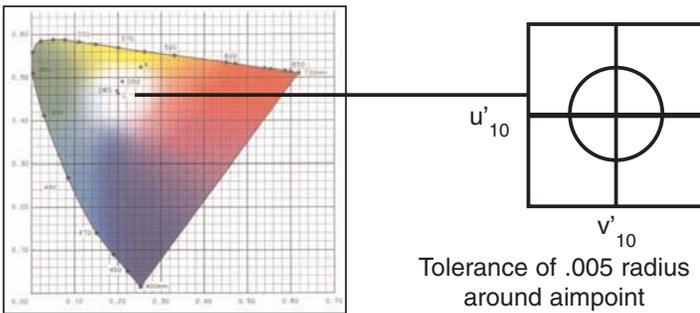
The apparent color of a light source is specified by Its chromaticity coordinates. The aimpoint and tolerance are specified in CIE color space. When two viewing systems are plotted, the closer the plot, the greater the visual color agreement between the viewing systems.

### Color Temperature

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

5000K

### Spectral Power Distribution

Approximate CIE$_{D50}$



SPECTRAL IRRADIANCE

UV          VISIBLE WAVELENGTH
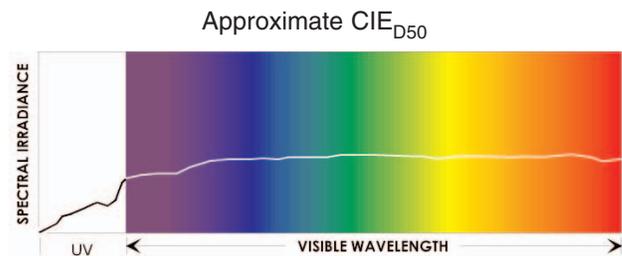
The true "fingerprint" of a light source, spectral power distribution is the key factor in how a light source renders colors. The closer a light source's spectral power distribution is to D50 the more accurate it is. CRI and CIE51 tests are used to insure that your light source closely approximates D50.

## LIGHT INTENSITY



Aimpoint

Preferred Range

Acceptable Range

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. The second part (Practical Appraisal) specifies a lower light intensity (500 lux) for tone reproduction evaluation.
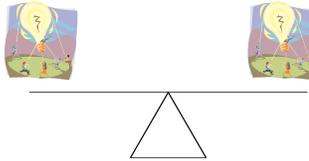
**Prints and Proofs**

2000 lux
Preferred (should be) tolerance +/- 250 lux
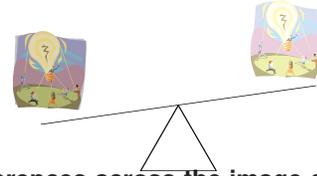Required (shall be) tolerance +/-500 lux

**Transparencies**

1270cd/m$^2$
Preferred (should be) tolerance +/- 160cd/m$^2$
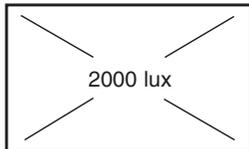Required (shall be) tolerance +/- 320cd/m$^2$

**Even light intensity across the image assures correct interpretation of print and reproduction quality**

**Intensity differences across the image cause incorrect interpretation of print and reproduction quality**
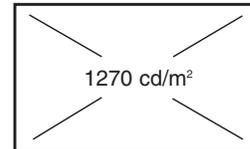
### Prints and Proofs
within 60% of nominal

2000 lux

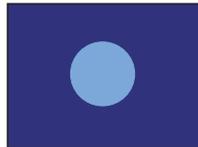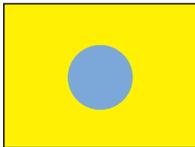**At least 1200 lux (60% of 2000) intensity at all points on the viewing surface**

### Transparencies
within 75% of nominal

1270 cd/m$^2$

**At least 953cd/m$^2$ (75% of 1270) intensity at all points on the viewing surface**

## SURROUND



**Simultaneous Color and Brightness Contrast**

Surround color and reflectance affect color appearance. The two light blue dots above 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.

**Prints and Proofs**
**Neutral and matte surround**
**with luminous reflectance of 10-60%**
**(60% reflectance is comparable to existing viewing systems using Munsell N8/ gray)**

**Transparencies**

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

## GEOMETRY



**Improper Geometry - excessive glare**



**Proper Geometry - minimal glare**

Light source, image and observers' 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 judgments. 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 the right).
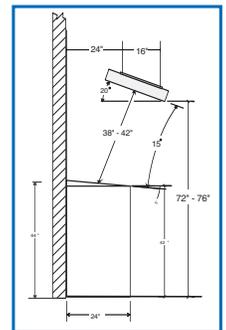


## We offer color viewing products that meet the five conditions of the ISO 3664:2009 standard

Economical Desktop Viewers • Color Viewing Stations in a Selection of Sizes
Color Viewing Stations for Digital Presses • Remote Proofing Color Viewing Stations
Custom-Made Press Consoles • Color Matching Booths with a Selection of Light Sources