



Technical & Applications Information on the  
Products of GTI Graphic Technology, Inc.

| technote |

## “GENERIC” 5000 KELVIN REPLACEMENT LAMPS

### Are All “5000 Kelvin” Lamps Interchangeable?

There are at least seven different brands of “5000 Kelvin” fluorescent lamps in the graphic arts/photographic marketplace. Some of those lamps are dedicated to a specific viewer or viewing system, others are promoted as suitable replacement lamps for any 5000K system or application. Are such “generic” lamps interchangeable with original equipment 5000 Kelvin lamps used in existing Standard color viewing facilities? Can such substitute lamps, as advertised, provide industry Standard viewing conditions when they are installed in non-Standard general lighting fixtures?

### Industry Standard Viewing Conditions

The graphic arts/photographic industries have established a lighting and viewing standard for critical color evaluation and communication between the advertising agency, photographer, service bureau, digital imaging studio, color printer, print buyer, and anyone else in the color reproduction “network”. The Standard, **ISO 3664:2009**, is entitled “Viewing Conditions - Graphic Technology and Photography”. This international technical Standard does not specify any lamp, viewer, or fixture. **The Standard specifies a precise quality of illumination and specific viewing conditions on the copy being evaluated** (at the surface of viewing). Essentially, the Standard specifies five elements: light quality, light intensity, light evenness, illuminating/viewing geometry, and environmental conditions. In short, the Standard specifies a **total lighting/viewing environment**.

### The Lamps Must Be Matched To The Viewing System!

There is no fluorescent lamp, including GTI’s proprietary Graphiclite® Color Viewing Lamp, that can, by itself, provide that environment or those conditions. Standard viewing conditions must be designed and produced as a complete, balanced system, of which the lamps are only one component. As part of that system, however, the lamps must be matched or “tailored” to the reflectance, transmission, and operating characteristics of other system components.

### 5000 Kelvin “In” - Doesn’t Mean 5000 Kelvin “Out”

Graphiclite Color Viewing Lamps, in fact, have a correlated color temperature rating slightly higher than 5100 Kelvins - rather than 5000 Kelvins - because they are a designed component of the Graphiclite system, which effectively reduces the correlated color temperature from 5100+ Kelvins to 5000 Kelvins. **Therefore, if “generic” substitute lamps, with a nominal CCT of 5000 Kelvins, are installed in Graphiclite viewers or luminaires, they will produce an output light quality lower than 5000 Kelvins....as low as 4850 Kelvins, in fact.**

### Spectral Power Distribution Curve - The Lamp’s “Fingerprint”

The Correlated Color Temperature, or CCT rating of such light sources does not specifically describe the color appearance of such light sources. For that reason, the viewing Standard specifies not only the CCT, but the Spectral Power Distribution (SPD) as well. In fact, several different brands of fluorescent lamps can measure 5000 Kelvins, yet their colors can differ significantly because the relative proportions of their component spectral colors, which determine the lamp’s color appearance, are different. Additionally, lamps of differing brands, that appear to match each other, will probably not “render” all spectrum colors with equal intensity because their CRI, or Color Rendering Index, is not the same. Fluorescent lamp manufacturers tend to make extravagant claims about the color quality and CRI of their lamps, however, they cannot guarantee that those lamps will maintain those specifications in every lighting/viewing system.

### **Generics OK For Non-Critical Viewing Applications**

This is not to rule out the use of such “generic” or nonspecified 5000 Kelvin lamps for non-critical illuminating applications. For example, they may be used to provide compatible, low-contrast general illumination adjacent to critical color viewing facilities, such as in a hallway leading into a color viewing room.

### **A Small Price Savings - But A Color Difference, Too!**

The substitution of low-priced, generic 5000 Kelvin lamps for original equipment, color balanced lamps will result in very costly “savings”, because proofs, prints, or transparencies viewed under the substitute lamps will have a different color appearance than they did under the manufacturer-specified lamps. This results in color miscommunications between users, clients, or vendors - a very expensive way to save a few dollars on lamps.