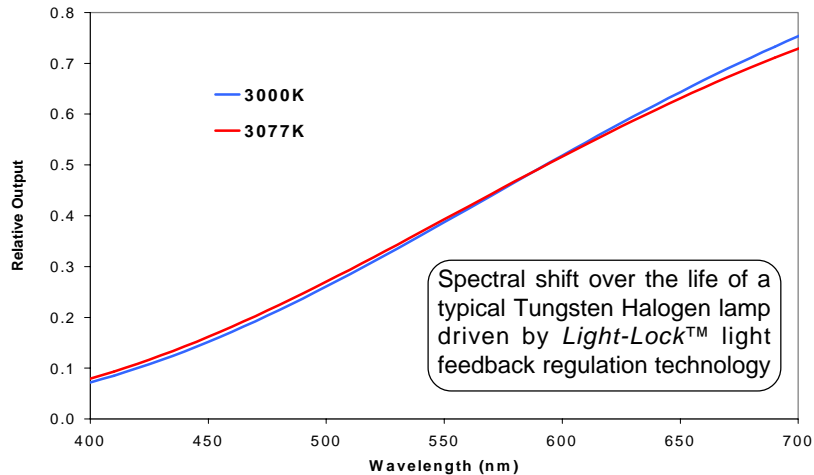


# Technical Note: 122

**Question:** Do the spectral properties of a Tungsten Halogen lamp change as *Light-Lock™* compensates the lamp to keep the output within the 1% intensity specification?



**Answer:** Yes, the color temperature of the lamp does change as *Light-Lock™* adjusts the lamp voltage to compensate for the long-term intensity degradation of the lamp. However, the change is quite small compared to what might be assumed at first glance. The reason for this stems from the basic physics of blackbody emitters, and from proprietary sampling techniques inherent in the *Light-Lock™* technology.

For these lamps, the output intensity scales at about the cube of the drive voltage, while color temperature varies at near the cubed root of the voltage. The resulting formula for the relationship between color temperature and output intensity is:

$$C_T = C_0 * (I / I_0)^{0.116}$$

where  $C_T$  is the existing color temperature,  $C_0$  is the starting color temperature,  $I$  is the existing intensity, and  $I_0$  is the starting intensity. As can be seen, the color temperature is an extremely slowly varying function of intensity. During *Light-Lock™* regulation, the color temperature change is quite small for the lamp voltage adjustment required to compensate for the typical 20% intensity degradation standard lamps exhibit over their lifetime. Substituting into the formula above reveals a shift in color temperature of only 2.5%, or only about 77°K over the life of the typical lamp.

**FYI:**

In hundreds of real world applications, *Light-Lock™* has demonstrated extremely high spectral stability for a variety of highly sensitive color applications. The technology has been demonstrated to be the most stable choice for color temperature sensitive applications - over some of the most expensive NIST traceable constant current power supplies on the market today. Because of the physics and technology involved, this is almost a case where you can eat your cake, and have it too.

**Illumination Technologies, Inc.**

5 Adler Drive, East Syracuse, NY 13057 USA  
 TEL: 315-463-4673 FAX: 315-463-1401  
[www.illuminationtech.com](http://www.illuminationtech.com)