

Email received on October 27, 2010 from Steve Hayes.

ENERGY STAR Luminaires Second Draft Comments

Colour temperatures CCT are limited to 2700K minimum Human circadian rhythms are disturbed by light at night. This disturbance may have serious health effects, including cancer, diabetes, obesity in addition to sleep disruption (many many references exist for this, eg ref 1). This disturbance is nearly eliminated if the CCT is below 2000K (ref 2). It should be permissible to offer a lamp with a CCT of about 1800K.

Colour temperatures CCT are limited to 4100K maximum (5000K commercial). Since 2001 it has been known that human circadian rhythms are particularly sensitive to blue light with a peak at around 465nm (ref 3). Lamps specially made to take advantage of this are in broad circulation, Philips 17000K, Osram 8000K etc etc. There is evidence that these successfully stimulate the human endocrine system to regulate or adjust the circadian rhythm without requiring high light levels (ie without excessive energy consumption). In the body it is suggested that manufacturers would make higher CCT lamps in order to meet the luminous efficacy requirements more easily. In fact at present phosphor based high colour temperature lamps tend to have a somewhat lower luminous efficacy. (ref 4) There should be no upper limit to CCT.

Whilst products with these performance characteristics are not at presently widely available the basic research is consistent in demonstrating the non-trivial health advantages of such lighting, and the EPA should not hinder the wide commercial distribution of such lamps for use in domestic and commercial applications.

ref 1 L. K. Fonken, J. L. Workman, J. C. Walton, Z. M. Weil, J. S. Morris, A. Haim, R. J. Nelson. Light at night increases body mass by shifting the time of food intake. Proceedings of the National Academy of Sciences, 2010; DOI: 10.1073/pnas.1008734107

ref 2 J.Phys.D:Appl.Phys. 43 (2010)234007(7pp)Modification of light sources for appropriate biological action Kozakov R, Schopp H, Franke St, Kunz D
doi:10.1088/0022-3727/43/23/234007

ref 3a Brainard, G.C., J.P. Hanifin, J.M. Greeson, B. Byrne, G. Glickman, E. Gerner, and M.D. Rollag. (2001) Action spectrum for melatonin regulation in humans: Evidence for a novel circadian photoreceptor. J. Neurosci. 21(16):6405-6412.
ref 3b Thapan, K., J. Arendt, and D.J. Skene. (2001) An action spectrum for melatonin suppression: evidence for a novel non-rod, non-cone photoreceptor system in humans. J.Physiol. 535:261-267.

ref 4 www.gelighting.com/eu/lighting_applications/downloads/PolyluxXLR.pdf
(typical manufacturer datasheet, 58W 6500K gives 5000lm others 5200lm)

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