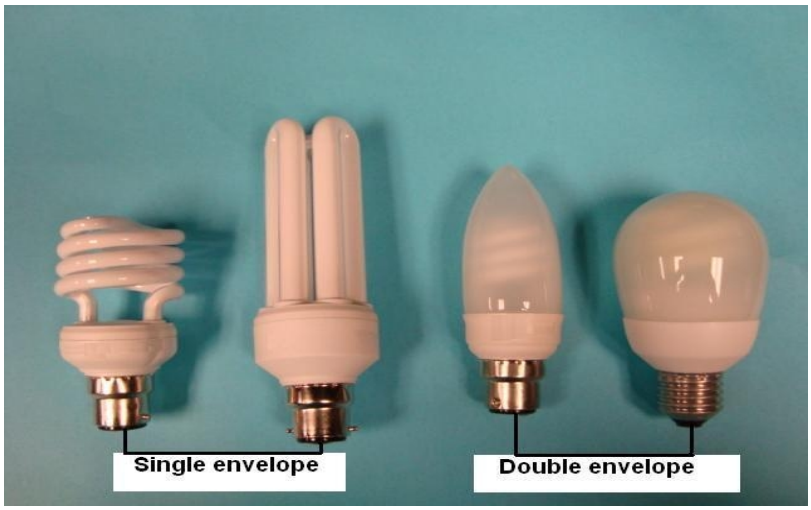
British Photodermatology Group Position Statement:

Ultraviolet (UV) emissions and Compact Fluorescent Lights

Background

Legislation in the UK, Europe and United States has led to the phasing out of incandescent light bulbs. Similar legislation has been passed in several other countries. The principal driver is to improve lighting efficiency in order to reduce carbon dioxide emissions.

Incandescent (tungsten) bulbs were originally replaced largely by compact fluorescent lamps (CFLs) and subsequently light emitting diodes (LEDs). White LEDs are beginning to, and will eventually, dominate the commercial and domestic lighting market. CFLs are an outdated technology but are important in certain specialist applications and are likely to be present in lighting for some time due to their long-life. CFLs with a bare tube are generally termed “single envelope” CFLs and those in which the tube is enclosed in a glass or polycarbonate cover are designated “double envelope” bulbs.



The UV spectrum is usually divided according to wavelength into UVA (315-400nm) which is closest to visible light, UVB (280-315nm) and UVC (100-280nm). The UV emission from each light source is very different. Although the traditional tungsten lamp emits measureable amounts of UVA, the UVB levels are extremely low and the heat from this lamp limits exposure at close distance. In contrast, the CFL emissions are widely variable, depending on the individual lamp. The single envelope CFL in particular has been shown to emit significant quantities of UVB in some cases and also measureable amounts of UVC. Light emitting diodes (LEDs) have virtually no UV emission.

There are many skin conditions caused or exacerbated by exposure to UV radiation. These include polymorphic light eruption, chronic actinic dermatitis, solar urticaria, xeroderma pigmentosum and lupus erythematosus. Investigations carried out on photosensitive patients have shown that exposure to single envelope CFL, when situated in close proximity to the skin, can induce an erythematous reaction in photosensitive individuals. The number of reactions was much reduced when

double envelope CFLs were used and, for all UV-sensitive patients, responses to exposure from the LED were negative. Currently, there is no scheme in place to indicate to photosensitive patients or to healthcare professionals which lamps are safe to use. Some patients, including those with lupus and some other connective tissue diseases, describe a variety of symptoms both in the skin and systemically. Energy efficient halogen lamps can also induce skin erythema in some light-sensitive individuals. LEDs provide a safer alternative without the UV skin risk but it should be noted that they do exhibit a strong blue/violet emission.

The exposure to UV radiation is also recognised as a risk factor for skin cancer. However, any change in personal risk as a result of exposure to UV from CFLs is considered to be very small and much less than the risk from UV exposure outdoors.

- Occupational exposure to UV radiation within the UK is subject to The Control of Artificial Optical Radiation at Work Regulations 2010, derived from the EU Artificial Optical Radiation Directive 2006, which specifies exposure limit values for workers and also obliges the employer to consider any effects concerning safety of staff belonging to particularly sensitive groups. It should also be noted that the Health Protection Agency has issued precautionary advice to the public to maintain a distance of at least 30cm from a single envelope CFL.

Recommendations

- CFLs present a low level of risk to the skin of individuals of normal sensitivity but are potentially harmful to photosensitive patients.
- Some single envelope CFLs emit detectable levels of UVA, UVB and UVC that may provoke a skin reaction in photosensitive individuals.
- Double envelope CFLs emit lower levels of UVB and UVC and are therefore a safer alternative for UV-sensitive individuals.
- LEDs have minimal UV emissions and are therefore a safer alternative to CFLs for UV-sensitive individuals.
- We advocate the introduction of a lamp classification scheme suitable for UV-sensitive individuals.

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