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FULL SPECTRUM LAMPS

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FULL SPECTRUM LAMPS

GENERAL

If you have been involved in the lighting business at any level for the last several years you have probably heard of "Full Spectrum" lighting and of the claimed advantages of this type of lighting.

DEFINITION

"Full Spectrum" Lamps are a type of fluorescent lamp whose light output is intended to be a close match to daylight.

They are marketed in Canada by Duro-Test Corporation under the name Vita Lite and by most major lamp manufacturers (General Electric, Sylvania and Philips) under the general classification of "Daylight Lamps".

CLAIMED BENEFITS

There are many claims touted for "Full Spectrum" lighting ranging from health benefits to seeing benefits. These claims derive from the presumption that the light output of these lamps is a more "Natural" light and like a lot of "Natural" things is better for us than "Artificial" light. The major claims are as follows:

HEALTH EFFECTS

The major claim is that, unlike conventional fluorescent lamps, these lamps produce significant amounts of ultraviolet light. This is claimed to benefit health through Vitamin D production via a tanning effect and through germicidal action.

The end result claims are for better calcium absorption, lower tooth decay, fewer colds and flu and more energy or greater sense of well being.

There are also claims for improved physical strength, lower eye fatigue and fewer headaches due to exposure to a more natural spectrum.

To date, none of these claims have been substantiated by good quality, repeatable research.

In fact, in the United States, Duro-Test has been prevented from advertising the health benefits of its product by the Food and Drug Administration due to the lack of demonstrable benefits.

VISION EFFECTS

The main claim is that due to the more natural spectrum, the light from these lamps make it easier to see. This is supposed to be due to better contrast, lower reflections, and better color perception produced by the light from these lamps resulting in better "seeablilty" and lower eye fatigue.

Recent research by the Illuminating Engineering Society shows that task visibility is a function of many variables of which color contrast and color rendering are not large components. Further, it has been found that the important variables such as task contrast, veiling reflections and visual comfort are properties which depend almost entirely on the geometry of the lighting system.

In addition to these parameters, viewer age and viewing time are far more important than the spectral characteristics of the source in determining visual task performance.

The term "seeability" is an undefined term which cannot be objectively tested or assessed.

Thus, claims for improved vision effects attributed to these lamps are subject to dispute and are not supported by industry research.

LIGHT OUTPUT

One important characteristic of all "full spectrum" lamps is that they produce about 30% less light than conventional lamps. This is due to the use of less efficient phosphors in the lamp in order to get the particular color properties.

This reduction in light output may be unacceptable in a large number of installations.

ALTERNATIVES

In situations where color rendering is an important factor, such as paint matching, art galleries, fabric matching etc., there are now available a new type of lamp based on the prime color principle which performs as well as these lamps.

These "tri-phosphor" lamps produce about the same amount of light as conventional lamps and cost considerably less than "full spectrum" lamps.

For color critical applications, "tri-phosphor" lamps are a better option.

COSTS

"Full Spectrum" and "Daylight" lamps cost between $8.00 and $17.00 per lamp depending on the type. Conventional lamps (cool white and warm white) cost between $1.80 and $2.00 per lamp.

Energy saving and tri-phosphor lamps cost between $5.00 and $8.00 per lamp depending on type.

Given the cost versus performance characteristics, "Full Spectrum" lamps are not cost effective.

RECOMMENDATIONS

- We recommend against the use of "Full Spectrum" and "Daylight" lamps.
- For normal office use we recommend the use of Warm White lamps due to their low cost and good rendering of skin tones.
- For storage, workshop and industrial applications, we recommend the use of Cool White lamps due to their low cost and availability.
- For areas requiring high color rendering, we recommend the use of Tri-phosphor lamps to suit the specific tasks.

If a change in lamp types from the normal cool white and warm white types is contemplated, contact the Electrical Engineering Branch for assessment and advice on which lamp best suits the application.