



Nemalux LED Lighting

LEDs – LOW VOLTAGE DEVICES OR LIGHTING PRODUCTS?

RECENT CHANGES IN THE CANADIAN ELECTRICAL CODE PROMPTS DISCUSSION

Commentary by Jode Himann, CEO, Nemalux Inc.

The recent push for more energy efficient lighting has prompted greater use of the Light Emitting Diodes (LEDs). As LED technology has evolved, concerns regarding appropriate Canadian Standards Association (CSA) guidelines have arisen. In the 2009 Canadian Electrical Code, the CSA changed the classification of LEDs from low voltage devices to lighting products.

What has prompted this change of classification?

Classifying LEDs as low voltage devices in the Canadian Electrical Code (CEC) as was the case prior to 2009 had certain advantages. An LED on the load side of an approved autonomous power supply (where the AC to DC conversion takes place) was considered an approved product. This design resulted in a wide variety of mounting options, applications and diversity in solutions to safety and lighting applications. Another benefit to this interpretation was streamlined system design and project balance when combining LED drivers, optics and types of LEDs.

However concerns have been raised about classifying LEDs as low voltage devices. End-users may be surprised by the brightness of LEDs and the sometimes unconventional appearance of a circuit board. There may be further apprehension regarding safety because of the absence of a certification label (although it does appear on the power supply).

The major concern with classifying LEDs as low voltage devices seems to be heat generation. This concern, with well designed products, is unfounded. It is true that the more electrical energy used to power an LED the more heat is generated. Even though LEDs are not 100% efficient (some electrical energy is converted to heat), they are still one of most energy efficient technologies available. Overall LEDs are a superior solution, for many conventional lighting applications, because the efficiency, brightness and lifetime. This technology is also very appropriate for industrial and hazardous locations because of the inherent benefits of solid state technology.

In the design of new-technology LED luminaries, thermal management is paramount. A properly designed LED luminary should never exceed 80 degrees Celsius as any temperature higher than this would adversely affect the longevity and brightness of the product. This maximum temperature is generally not viewed as a dangerous variable.

In addition to producing insignificant amounts of heat, LEDs are inherently low voltage. Even with the impressive technological leap in LEDs, design-wise they are still almost exact electrical replicas of the original 5mm indicator LED. Rule 16-222, in the CEC, classifying the LED as an extra low voltage device, has always been sufficient and previously there has been no need to amend it.

If, however, we accept the new classification of LEDs, that electrically, an LED is a lighting product because of its modest heat generation, then we need to know which LEDs fall under this new rule.

Does a “miscellaneous use” LED on a circuit board (e.g. camera flash bulbs are new technology LEDs) require approval as a lighting product? If your company is manufacturing a CPU circuit board with an LED (that generates some heat), does it need approval as a lighting product also?

If concern about heat generation is the main reason for the CSA’s suggested change, then we need a new definition for LEDs. Some LEDs get hot, and some do not. And if heat is the defining variable, a Zener, Barrier and Schottky diode should also be viewed as a lighting product as there can be some heat generated. Continuing with this reasoning, it is possible that the infamous 1N4007 (general purpose diode/rectifier) may need to be certified as a lighting product.

The electrical classification of LEDs across Canada is inconsistent. The Canadian Electrical Code Book provides a suggested code: the Canadian provinces may adopt this code in turn with the recommended changes or publish changes to the CEC autonomously.

The Ontario ESA has not adopted the appendix modifications for 2009. Saskatchewan has adopted the Code book and the rules are in place currently. Alberta will adopt the book without any changes in the summer of 2009 (there has not been any changes to the suggested CSA Code book in Alberta for over 10 years.)

Being attentive to new technology is important. However, the recent addition of the ambiguous definitions and rationale may create more confusion for the electrical inspectors than peace of mind for the consumers.

Whether or not it is required, Nermalux takes a position of safety and quality first (especially in hazardous locations). Nermalux supports the electrical authorities in the transition to new technology and superior lighting.