



Technical Requirements V5.1: Dimming Definition Details

As part of V5.1, all luminaires, retrofit kits, and lamps must be dimmable (with the exception of Case Lighting, Landscape/Accent Flood and Spot luminaires, Specialty: Sports Flood, Specialty: Tunnel Lighting, and all specialty primary uses intended for hazardous locations.).

Eligible dimmable products under V5.1:

The DLC defines a dimmable product as “a product that (a) includes a dimmable driver and/or is capable of being dimmed by an external control signal, and (b) is identified as dimmable on the product specification sheet.” Products that meet this definition are considered to meet the dimming capability requirement. There are two types of dimming that are acceptable under Technical Requirements V5.1:

- **Continuous Dimming:** A lighting control strategy that varies the light output of a lighting system over a continuous range from full light output to a minimum light output without flickering in imperceptible steps (per NEMA LSD-64). To meet Technical Requirements V5.1, continuous dimming must be capable of reducing the light output to *at least 20% of full light output*.
- **Stepped Dimming:** A lighting control strategy that varies the light output of a lighting system in one or more predetermined steps of greater than one percent of full output. The changes between levels are generally perceptible (per NEMA LSD-64). Under Technical Requirements V5.1, stepped dimming is acceptable only for outdoor luminaires, outdoor retrofit kits, and mogul screw-base replacements for HID lamps in outdoor applications, and must be capable of reducing the light output to *at least 70% of full light output*.

Additional guidance for dimmable products:

Products with field-adjustable light output (FALO) are not automatically considered dimmable. To comply with the V5.1 dimming requirement, products must meet the definition of dimmable above and be capable of either continuous or stepped dimming, depending on the product category. Stepped or continuous dimming category requirements are available in Table 6 (p.12) of [Technical Requirements V5.1](#).

Reviewers of product applications will rely on manufacturer claims represented directly on the product specification sheet. Documentation must clearly identify the dimming capability as required in the Controllability section (p. 17) of the [V5.1 Technical Requirements](#). As a reminder, products do not have to be tested at a dimmed state to meet Technical Requirements V5.1.

A product’s ability to dim depends on factors that cannot be verified during DLC qualification, such as the presence of compatible dimming hardware. Therefore, a product marked as

dimmable on the QPL may not be dimmable in all applications. For example, a dimmable Type A linear replacement lamp may be compatible only with certain dimmable fluorescent ballasts.

Dimming guidance for lamps:

For lamps, the V5.1 dimming requirements apply to the lamp itself without consideration of the driver/ballast used in the fixture and include UL Type A, Type B, Type C, and Dual Mode lamps. The requirements do not dictate how lamps should be used in the field or define specific electrical capabilities of the housings into which the lamps are installed.

Please see the Product Eligibility/Primary Use Designations Section on the DLC website for detailed explanations on the various types of lamps.

Lamps can use a variety of approaches to meet the V5.1 dimming requirements. Some examples are outlined below:

- **Type A Lamps**
 - Dimmable fluorescent ballast (0-10V, DALI, etc.)
 - Wireless signal from wall switch, sensor, NLC, etc.
- **Type B Lamps**
 - Phase-cut dimming signal from wall switch, sensor, NLC, etc.
 - Wireless signal from wall switch, sensor, NLC, etc.
- **Type C Lamps**
 - Dimmable LED driver (0-10V, DALI, etc.)
 - Wireless signal from wall switch, sensor, NLC, etc.

Examples of lamps that meet the V5.1 dimming requirements:

Below are some examples of lamp types and their qualification statuses. These examples are not exhaustive and are meant to demonstrate that as long as the lamp is capable of dimming (per the definition above) when produced and shipped from the factory, it will meet the V5.1 dimming requirement.

- If a Type A linear replacement lamp is dimmable via a change in output of a fluorescent dimming driver (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.), the lamp meets the dimming requirement even if it is not installed into a fixture with a fluorescent dimming driver in the field.
- If a Type B linear replacement lamp is dimmable via a phase-cut input power mechanism (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.), the lamp meets the dimming requirement even if it is not connected to a phase-cut input power scheme in the field.

- If a Type C linear replacement lamp is dimmable via a change in output of a dimming driver (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.), the lamp meets the dimming requirement even if it is not installed with a dimming driver.
- If a Dual Mode linear replacement lamp is dimmable while powered by a fluorescent driver (Type A) via a change in output of a fluorescent dimming driver (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.) **and** dimmable while powered by line-voltage (Type B) via a phase-cut input power mechanism (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.), the lamp meets the dimming requirement even if it is not installed in a dimming environment.
- If a Dual Mode linear replacement lamp is dimmable **only** while powered by a fluorescent driver (Type A) via a change in output of a fluorescent dimming driver (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.) **and not** dimmable while powered by line-voltage (Type B), the lamp meets the dimming requirement as a Type A lamp and will be listed on the QPL as a Type A lamp, **not** a Dual Mode lamp.
- If a Dual Mode linear replacement lamp is dimmable **only** while powered by line-voltage (Type B) via a phase-cut input power mechanism (or any other control protocol, i.e. Wifi, Bluetooth, Zibgee, etc.) **and not** dimmable while powered by a fluorescent driver (Type A), the lamp meets the dimming requirement as a Type B lamp and will be listed on the QPL as a Type B lamp, **not** a Dual Mode lamp.

