



WHITEPAPER

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# **CALIFORNIA ENERGY COMMISSION: TITLE 20**

Emergency Lighting Scope

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**CALIFORNIA ENERGY COMMISSION: TITLE 20 - EMERGENCY LIGHTING SCOPE**

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<b>Introduction</b> .....	<b>3</b>
<b>Title 20 Background</b> .....	<b>3</b>
Relation to Title 24 .....	<b>3</b>
Listing Requirements .....	<b>3</b>
<b>Specific Requirements of Title 20</b> .....	<b>3</b>
Exit Signs .....	<b>3</b>
Emergency Lighting .....	<b>4</b>
Emergency LED Drivers & Emergency Ballasts .....	<b>4</b>
Inverters .....	<b>4</b>
<b>Isolite’s CEC Title 20 Compliant Products</b> .....	<b>5</b>
Exit Signs & Combo Units .....	<b>5</b>
Emergency Lights .....	<b>5</b>
Emergency Drivers & Ballasts .....	<b>5</b>
Inverters (Exempted) .....	<b>5</b>

## PURPOSE OF THIS DOCUMENT

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This document will provide the reader with background on the California Energy Commission's [CEC] Title 20 energy efficiency regulations. It will also focus on the specific requirements for egress marking, emergency lighting, as well as inverters. Finally, the document will provide a list of Isolite's approved CEC Title 20 products as well as products that do not carry a Title 20 listing but are approved for use in California because they fall outside the scope of the regulations.

## TITLE 20 BACKGROUND

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In 1977 California adopted the Appliance Energy Efficiency standards. These standards apply to appliances sold in California and they govern the operating efficiency of the devices. "Appliances", in the context of the CEC regulations, is broad and could be best described as any device that uses electricity or water. As you would expect from this broad definition, the standards apply to more than the life safety devices that we're focused on in this document; HVAC systems, refrigeration systems, dishwashers, computer products, and many other device types also fall within the scope of Title 20.

### RELATION TO TITLE 24

It's important to understand that Title 20 fits within a framework of standards that govern the efficiency of the California infrastructure. One potential confusion is the inter-relation between CEC Title 20 and CEC Title 24. From the perspective of lighting devices, we often reference both standards, and it might not be clear to the reader what the difference is between these two. Put in the most basic form:

- Title 20 governs the efficiency of a device while Title 24 governs the efficiency of a system.
- Title 20 applies to the device's design and efficiency. Title 24 prescribes a method for how devices operate.

Systems that comply with Title 24 will be made up of devices that comply with Title 20. For example, a lighting control dimming to less than 10% light level in conjunction with a vacancy sensor that turns the lights off after a room becomes unoccupied is a Title 24 compliant system; the devices referenced would be listed to Title 20. Having a Title 20 device listing does not imply that a device, when installed into a system, will meet Title 24. This distinction between devices and systems does not impact the life safety industry; our devices have a well-prescribed method of operation that is not left to additional interpretation by the state of California. NFPA 101 is sufficient.

### LISTING REQUIREMENTS

Products that comply with Title 20 are required to be listed in the California Modernized Appliance Efficiency Database System [MAEDBS]. The state of California does not perform the tests on the products, rather the database is maintained through applications submitted with test data from the manufacturer. Products available for sale in California that meet Title 20 will be listed in the MAEDBS. When referencing the MAEDBS, there are certain scenarios where the Title 20 compliant device may differ from the model number being purchased. For example, a laptop power supply may be listed instead of the laptop itself. Always check the manufacturer's datasheets for guidance on Title 20/Title 24 compliance.

## SPECIFIC REQUIREMENTS OF TITLE 20

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For lighting control in general the standard has strict guidelines for the following metrics of the luminaries/service bulbs:

- CRI of 82 or higher
- Lumens per Watt [LPW] higher than 45 (General Service Bulbs) or 80 (LEDs/Luminaires)
- Power factor greater than 0.7
- Service life greater than 10,000 hours (LED Lamps) or 25,000 hours (directional lamps)
- Standby power less than 0.2 watts
- Dimmable bulbs must be capable of dimming to less than 10% light level
  - Additional requirements related to flicker and audible noise

As expected, these guidelines only partially apply to the products in the life safety lineup. For example, it's not possible to have an exit sign with a CRI of 82 or higher (it's a green/red LED, after all) so let's look at the individual product types and their requirements.

### EXIT SIGNS

Exit sign compliance is related to a single primary factor:

- Input power < 5 Watts/face

LED exit signs are low-power devices, so it is straightforward to make a compliant exit sign that's under the 5W requirement. As such, most Isolite exit signs are listed as Title 20 compliant. Exit sign and light combo units must also comply with the below emergency lighting requirements. It's also worth noting that self-luminous exit signs are exempted from the standard as they are not energy-consuming devices.

**EMERGENCY LIGHTING**

Emergency lighting is not a special category within the Title 20 guidelines, in fact Title 20 refers to “exit signs” as emergency lights, creating more confusion. As such, the standard interpretation in the industry is that the emergency lights must comply with the standard directed luminaire requirements.

The key requirements are:

- 82 CRI or greater
- 80 Lumens/Watt
- 25,000 hour service life
- Less than 0.2 watt standby power

Most of these requirements come down to the selection of the integrated LEDs in the emergency fixture – use high CRI LEDs with long life and you’re good to go. The standby power consumption, however, must be specifically designed for. Emergency lights utilize larger batteries to keep their LEDs illuminated for 90 minutes as required by NFPA. Emergency lights must always be ready to illuminate in the event of an emergency so the batteries must remain always charged. The battery charging circuits are operational when the lamps are not illuminated and must comply with the 0.2W max standby power. This is a complicated requirement for standard battery chargers as they generally keep batteries topped off to 100% constantly; with the charging circuit active, the power required by the emergency light will be above the 0.2W standby power limitations.

To make compliant emergency lights, Isolite uses “hysteretic” charging and higher energy density batteries. This allows the emergency light to charge for only brief periods of time, albeit at a high charge rate, when the battery reaches 100% charge the charging circuit disconnects from the AC mains, eliminating power draw. When averaged between these 2 states, the power consumption is well below the 0.2W standby power. This is why there are relatively few Title 20 compliant emergency lights.

**EMERGENCY LED DRIVERS & EMERGENCY BALLASTS**

Emergency LED drivers and emergency ballasts have the same standby power requirements as listed above for emergency lights. Luminaires must still comply with Title 20 in their normal operation modes, but the emergency drivers and ballasts must be listed and designed with the same “hysteretic” charging strategy. Isolite EMP drivers and select BAL products are compliant with CEC Title 20.

**INVERTERS**

Inverters don’t have a specific set of requirements set forth by Title 20, a naïve view may lump this in with the battery charger requirements, but those requirements are written to deal with chargers for laptop batteries and mobile phones. They have requirements for their standby power, but their standby power is defined as when nothing is being charged. The batteries in an inverter-based system are integral to the function of the device and are never disconnected, which means it would be very difficult to meet the requirements of standard battery chargers.





























The CEC is aware of this conflict and has advised that inverters for emergency applications are exempted from the standard since their functions of charging, storage and emergency deployment are inseparable. In a regulatory advisory published on October 31, 2018, the CEC states, “In recognition of this, Energy Commission staff will not refer [emergency lighting inverters] to the Commission’s Office of Compliance Assistance and Enforcement.”

All Isolite inverters are exempted from Title 20 standards and may be used in all applications in the state of California.

**ISOLITE'S CEC TITLE 20 COMPLIANT PRODUCTS**

\*Click the Image of the Product You Wish to View on [Isolite.com](http://Isolite.com)







**EXIT SIGNS & COMBO UNITS**

 <b>ELT</b> Elite Edge-Lit Exit Sign	 <b>EUG</b> Universal Surface Mount Edge-lit LED Exit Sign	 <b>UEL</b> Universal Recessed Edge-Lit LED Exit Sign
 <b>TL2</b> <i>All Models</i> Aluminum Thinline Die-Cast LED Exit Sign	 <b>DCL</b> Die-Cast LED Exit & Emergency Combo	 <b>EDC</b> Economical Die-Cast LED Exit Sign
 <b>LP</b> Steel LED Exit Sign	 <b>LPDC</b> <i>All Models</i> Die-Cast Aluminum LED Exit Sign	 <b>LPDC-HD</b> Aluminum Heavy Duty Die-Cast LED Exit Sign
 <b>LPX</b> Extruded Aluminum LED Exit Sign	 <b>MAX</b> Wet Location Die-Cast LED Exit Sign	 <b>MAX2.0</b> Wet Location Low Profile Die-Cast LED Exit Sign
 <b>HLX</b> NEMA 4X LED Exit Sign	 <b>CMB</b> Thermoplastic LED Exit Sign & Emergency Combo	 <b>RL</b> Reliance Series Thermoplastic LED Exit Sign
 <b>RLC-LED</b> Thermoplastic Exit & Emergency Combo	 <b>RLP</b> Damp Location Thermoplastic Pipe Exit & Emergency Combo	 <b>RWL</b> Wet Location Thermoplastic LED Exit Sign
 <b>RWL-C</b> Wet Location Thermoplastic LED Exit Sign	 <b>DTH</b> LED & Photoluminescent Hybrid Die-Cast Exit Sign	 <b>DTH2</b> Hybrid Photoluminescent / LED Thin Die-Cast Exit Sign
 <b>2040-01</b> Aluminum Frame Self-Luminous Exit Sign	 <b>2040-07</b> Aluminum Frame Self-Luminous Exit Sign	 <b>2040-70</b> Vandal Proof Institutional Self-Luminous Exit Sign
 <b>2040-80</b> Recessed Self-Luminous Exit Sign	 <b>2040-95</b> Vandal Resistant Self-Luminous Exit Sign	 <b>880</b> Thinline Aluminum Self-Luminous Exit Sign
 <b>SLX-60</b> ABS Plastic Frame Self-Luminous Exit Sign		





**EMERGENCY LIGHTS**

 <b>BUG</b> High Performance LED Emergency Light	 <b>MIGN2</b> Mini-Genie Fully Recessed Compact LED Emergency Light	 <b>RL2LED</b> Compact LED Emergency Light
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**EMERGENCY DRIVERS & BALLASTS**

 <b>EMP</b> <i>All Models</i> Emergency LED Drivers	 <b>BAL-1400-4ACTD-CEC</b> Fluorescent Emergency Ballast 1400 Lumens	 <b>BAL-1400ACTD-CEC</b> Fluorescent Emergency Ballast 1400 Lumens
 <b>BAL-1400TD-CEC</b> Fluorescent Emergency Ballast 1400 Lumens	 <b>BAL-T5-800TD-CEC</b> Fluorescent Emergency Ballast 800 Lumens	 <b>BAL700TD-CEC</b> Fluorescent Emergency Ballast 700 Lumens

**INVERTERS** *Exempted*

 <b>MPS</b> 20-50 Watt Micro Inverter	 <b>E3MINI</b> <i>All Models</i> Pure Sine Wave Mini Inverter	 <b>E3</b> <i>All Models</i> Pure Sine Wave Mini Inverter
 <b>E3MAC</b> <i>All Models</i> Modular AC Inverter		

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