

HARD-WIRED COMPACT FLUORESCENT FIXTURE STANDARDS

1. MATERIALS

- ~~Fixture ballast must be UL listed (UL 935) Class P. CFLs must be and either ENERGY STAR[®] qualified or Title 24 labeled.~~
- ~~Compact fluorescent lamp (CFL) tube glass and other housing materials must be UV resistant and heat stable.~~
- ~~Hardwired fixtures and lamps must be fully warranted for one year from date of purchase.~~
- **Title 24 Efficacy Compliance**
 - Fixture must allow for lamp replacement and utilize Title 24-compliant high efficacy (e.g., pin-based) lamps meeting the *minimum* standards shown in Table 15-1.
 - ~~40 Lumens/watt for lamps 15 watts or less.~~
 - ~~50 Lumens/watt for lamps over 15 watts to 40 watts.~~
 - ~~60 Lumens/watt for lamps over 40 watts.~~
 - *Light output shall be sufficient to maintain pre-existing light level, unless a lower level is acceptable to the customer.*
- **Warranty**
 - *Fixtures and lamps must be fully warranted for one year from date of installation.*

TABLE 15-1: TITLE 24 EFFICACY STANDARDS

<i>CFL Wattage</i>	<i>Minimum Lumens per Watt</i>
<i>15 watts or less</i>	<i>40</i>
<i>>15 watts to 40 watts</i>	<i>50</i>
<i>>40 watts</i>	<i>60</i>

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2. INSTALLATION

- All Installations

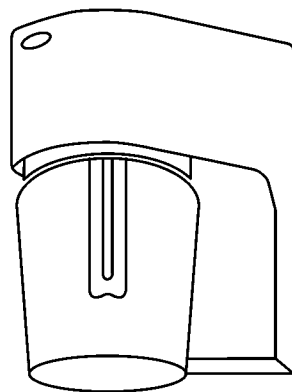
- All fixtures shall be installed in accordance with the current CEC and local code.
- *Fixtures shall replace only existing surface-mount fixtures.*
- *High-efficacy fixtures must be on a circuit separate from, and not switched with, low-efficacy fixtures.*

- Interior Locations

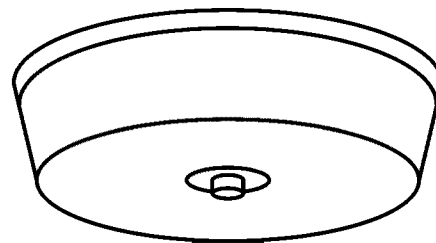
- *All wiring not inside a building cavity shall be housed in a raceway.*

- Exterior Locations

- All wiring, conduit, accessories, fasteners, and controls shall be designed for exterior use.
- *All fixtures shall be installed in a manner which prevents water from entering or accumulating in wiring compartment, lamp holder or electrical parts.*



WALL-MOUNT
FLUORESCENT FIXTURE
WITH PHOTO CELL CONTROL



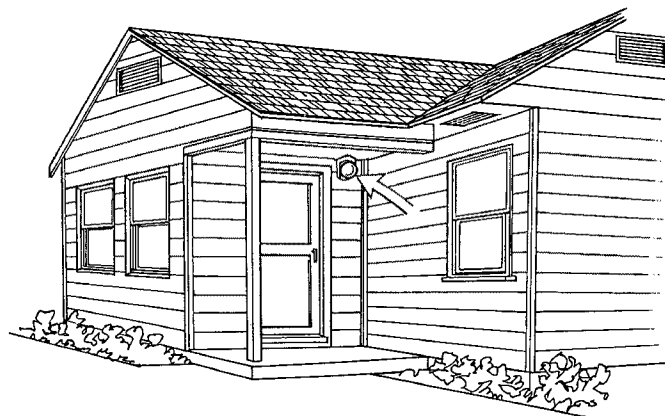
CEILING-MOUNT
COMPACT FLUORESCENT
REPLACEMENT FIXTURE

3. LOCATION

- **Fixtures marked “Suitable for Damp Locations” shall be installed:**
 - Out of direct contact with precipitation.
 - In partially protected locations (e.g., under canopies, in closed porches, and in carports).
- **Fixtures marked “Suitable for Wet Locations” may be:**
 - Installed in damp locations and in unprotected outdoor locations more than 4' above the ground.
 - Exposed to precipitation and/or sprinklers.

~~-Fixtures may not be installed in:~~

- ~~• Locations exposed to harmful gases, fumes, vapors, or other deteriorating agents unless the fixture is rated for hazardous or vaporous locations.~~



4.SUPPORT

~~-The fixture shall be:~~

- ~~• Attached to a properly installed electrical box.~~
- ~~• Secured to the box with at least two screws.~~

5.VOLTAGE REQUIREMENT

~~-Fixtures shall be installed only in 110-120 volt circuits.~~

6.GROUNDING

~~-The fixture shall be properly grounded as prescribed by manufacturer's instructions and the CEC.~~

4. ELECTRICAL REQUIREMENTS

- **Voltage Requirement***Circuit*

- Fixtures shall be installed only in 110-120 volt circuits.
- *Grounding shall be as prescribed in Item 6.*

- **Splicing Connectors**

- All connections shall be secured with properly-sized pressure splicing connectors (e.g., wire nuts).

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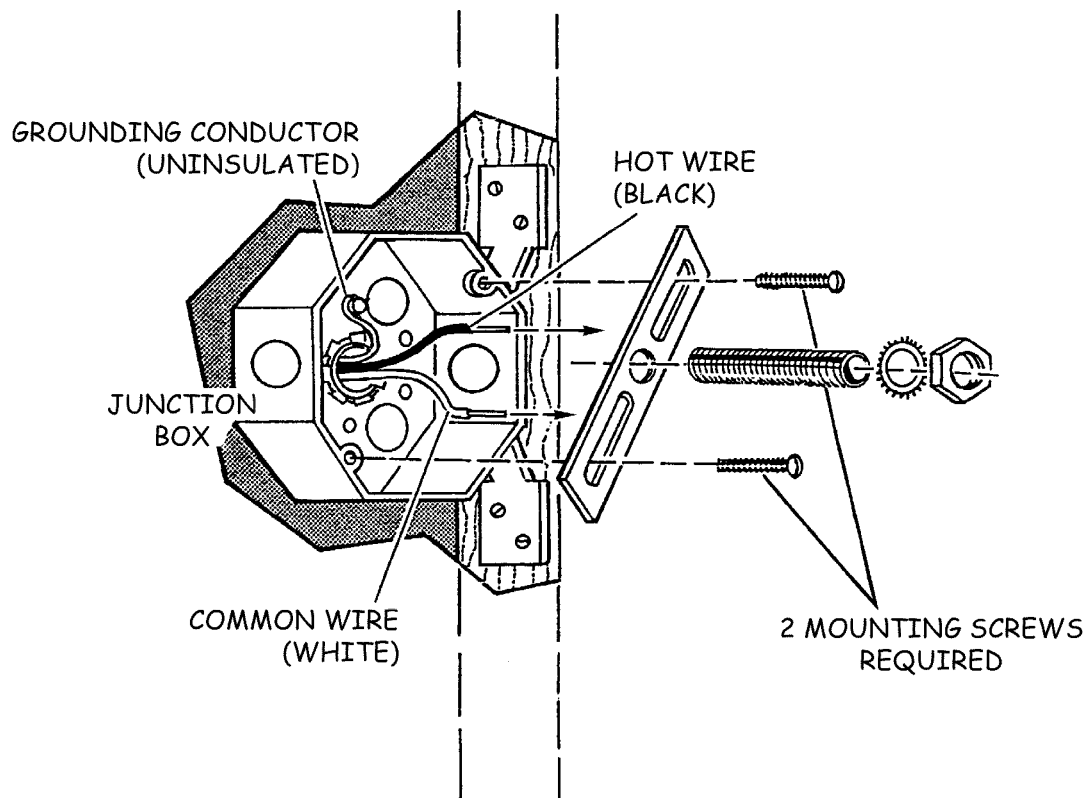
~~If Those provided with the fixture are not satisfactory, the installer shall provide the correct size.~~

- Electrical Tape

- Tape may be used only as a *supplement* to a properly-installed pressure splicing connector; however, it shall not be relied upon to secure the connection.

- Dissimilar Wires

- Aluminum and copper wires shall not be spliced together, except as prescribed in Section 110-14 of the 1998 California Electrical Code (of ~~1996 CEC~~) in accordance with manufacturer's instructions and local code.



8. SPlicing CONNECTORS

- ~~-All connections shall be secured with properly sized pressure splicing connectors (e.g., wire nuts).~~
- ~~-If those provided with the fixture are not satisfactory, the installer shall provide the correct size.~~

9. ELECTRICAL TAPE

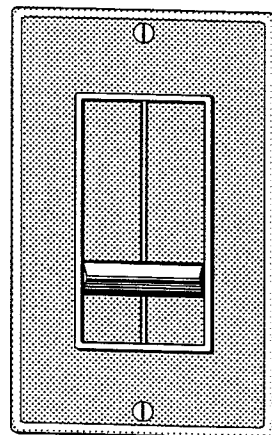
- ~~-Tape may be used only as a *supplement* to a properly installed pressure splicing connector; however, it shall not be relied upon to secure the connection.~~

10. DISSIMILAR WIRES

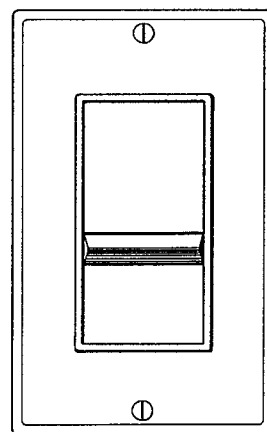
- ~~- Aluminum and copper wires shall not be spliced together, except as provided in Section 110-14 of the 1998 California Electrical Code (or 1996 CEC).~~

5. DIMMERS, PHOTOSENSORS AND OCCUPANCY SENSORS

- **All Types**
 - Only CFLs rated for use with dimmers, photosensors, and occupancy sensors shall be installed on circuits controlled by such devices.
 - ~~• Only a dimmer conforming to the specifications of the lamp manufacturer shall be used to dim a CFL fixture.~~
 - *When a dimmer or sensor is present in the light circuit:*
 - *Dimmer/sensor shall be in conformance with lamp manufacturer's specifications, or*
 - *It shall be replaced by a standard switch.*



DIMMER CONTROLS



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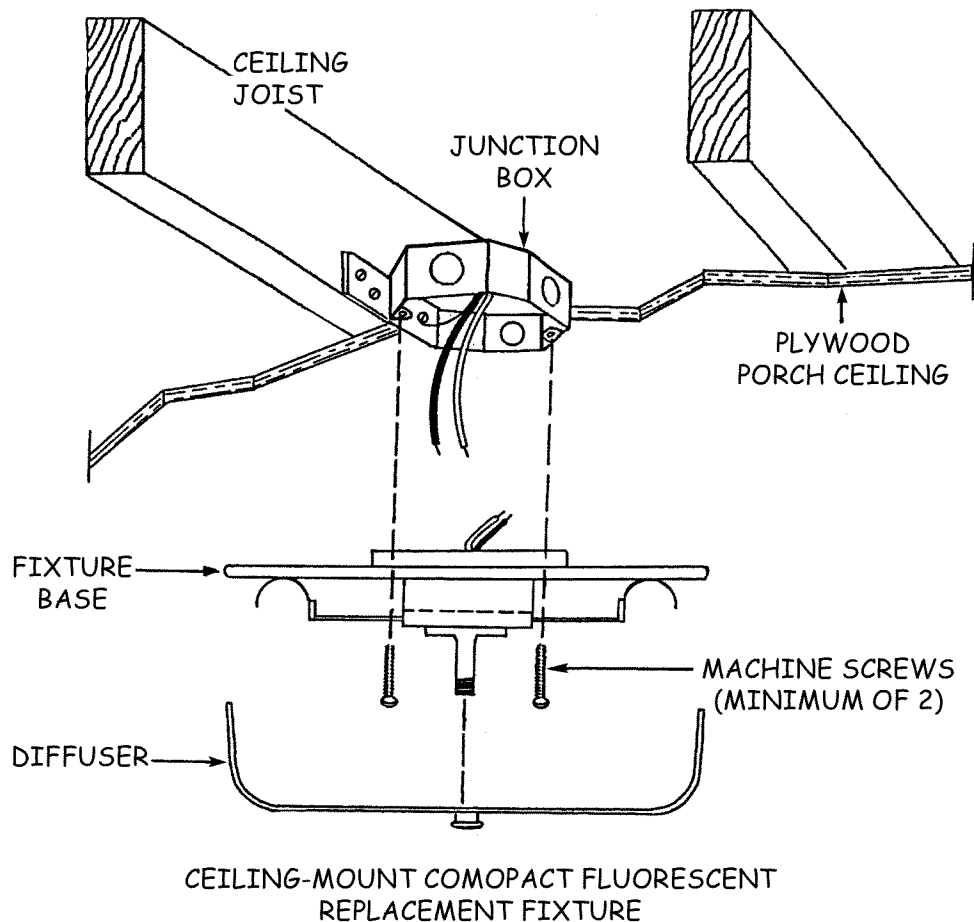
6. GENERAL INSTALLATION

- All New and Retrofit Installations

- Installations shall comply with local code and the CEC.
- *Fixture shall be secured to a plate, electrical box, or to structural members—not to interior sheathing (plaster, drywall, etc.).*
- Installation shall not damage, disable, alter, or result in the removal of any existing emergency lighting fixtures, lamps, inverters, standby generators, batteries, controls, etc.

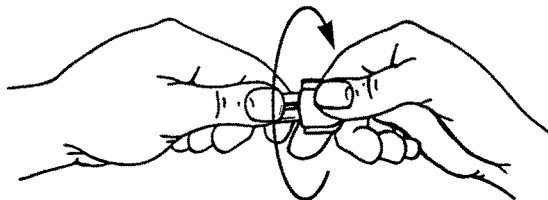
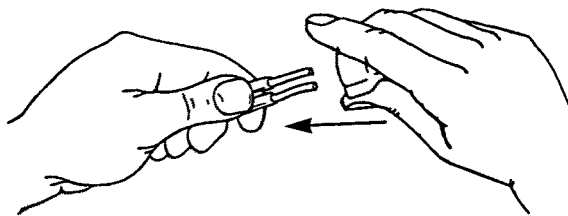
- Securing Fixtures

- Mounting plates (e.g., for threaded nipples), and fixtures attached directly to the electrical box, shall be secured with a minimum of two fasteners.
 - *Additional fasteners/screws are not required for fixtures attached by a properly-installed treaded nipple and nut.*
- *Fixtures attached to structural members shall be secured with screws that penetrate solid wood at least 3/4".*

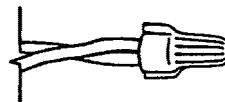


6. GENERAL INSTALLATION (cont'd)**- Fixture Wiring**

- Wiring shall not be damaged (e.g., no slices, cuts, nicks or other damage).
- Splices shall be contained within a fixture, ballast cover, junction box, etc.
- *Twist-type* Pressure Splicing Connectors (e.g., wire nuts)
 - Connectors shall be:
 - UL listed and new.
 - Properly sized (type, size and number of conductors).
 - Wire shall be stripped to length specified by connector manufacturer.
 - Pre-twisting of wires required when specified by connector manufacturer or local jurisdiction.
 - All connectors shall be firmly twisted *to hold them securely in place*.
- “Poke-in” and “stab-in” type electrical connections may be used in lieu of twist-type splicing connectors in accordance with fixture manufacturer’s instructions *and local code*.



INSULATION PROPERLY STRIPPED
AND
CONNECTOR FIRMLY TWISTED



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6. GENERAL INSTALLATION (cont'd)

- Grounding

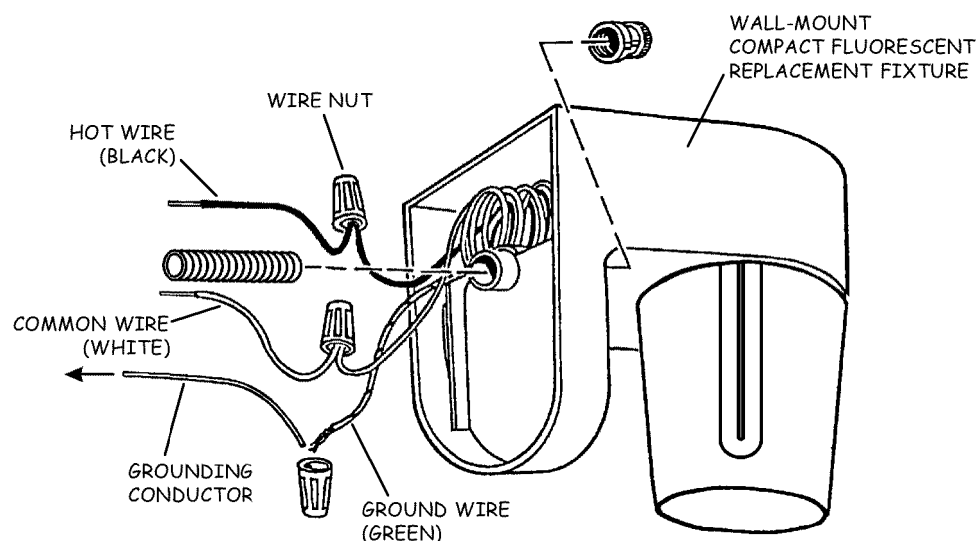
- Fixtures shall be grounded in compliance with manufacturer's specifications and ~~the CEC/local code.~~
- ~~• All metallic fixture parts shall be grounded to the building's ground system.~~
- ~~• Metal-to-metal contact shall be achieved when connecting bare ground; paint, drywall mud, etc. shall be removed from wire leads, boxes and plates as needed.~~
- ~~• Grounding conductor shall extend from fixtures to main building ground (must maintain continuity).~~

- Three-conductor Wiring Systems:

- *Fixture ground lead shall be properly connected to the system grounding conductor.*
- *When a grounding conductor is not available in the fixture box:*
 - *A plastic fixture may be installed, or*
 - *A GFCI-protected switch may be installed in lieu of grounding.*

- Two-conductor Wiring Systems:

- *Grounding the fixture is not required if not mandated by the local jurisdiction.*
- *When grounding is required, the following options may be employed, if allowed by local code:*
 - *A plastic fixture may be installed, or*
 - *A GFCI-protected switch may be installed in lieu of grounding.*



7. LEAD-SAFE AND POST-INSTALLATION REQUIREMENTS

- Lead-safe practices shall be:

- *Employed when working with pre-1978 painted materials per state codes T8 Section 1532.1 and T17 Section 36000, et seq.*
- *Applied in accordance with guidelines in Appendix E.*

MOBILE HOME CRITERIA

No additional standards for Mobile Homes.

Section 15

NONFEASIBILITY CRITERIA FOR HARD-WIRED COMPACT FLUORESCENT FIXTURES

1. Existing location of the fixture is not suitable.
2. A thread-based CFL will fit in the existing fixture.
3. Electrical box is substandard and/or cannot be properly secured.
4. Wiring is substandard, in a deteriorated condition, and/or rewiring is necessary.
5. Circuit does not operate properly (e.g., defective switch) *and correction is not feasible.*
6. Circuit is controlled by a solid-state timer.
7. Circuit is controlled by a dimmer not compatible with available hard-wired CFL fixtures, *and replacement with a standard switch is not feasible.*
8. Existing fixture is in a wet location and a grounding conductor is not available, *and alternatives (plastic fixture or GFCI-protected switch) are not feasible or not allowed by local code.*
9. Existing fixture is not on the customer's electric meter/bill.
10. Customer refuses.