



# Residential Kitchen Lighting Requirements

## (2010 California Electrical Code)

### Kitchen Lighting

- 1) High Efficacy OR At least 50% of the total wattage MUST be high efficacy

(Additional low efficacy wattage may be allowed under certain conditions) - *New in 2008 T24*

- 2) All high-efficacy lighting must be controlled separately from low-efficacy lighting.
- 3) Each & every permanently installed fixture must be included in the total wattage & must comply with the standards.
- 4) Lighting internal to cabinet is NOT considered part of the kitchen lighting for calculating the 50% high to low efficacy ratio. - *New*

### NEW in 2008 T24 Energy Code

- 1) Additional low efficacy wattage can be used in the kitchen under certain conditions:

- ✓ Up to 50 watts per dwelling unit < 2,500 ft<sup>2</sup>
- ✓ Up to 100 watts per dwelling unit ≥ 2,500 ft<sup>2</sup>

#### Conditions:

1. All low efficacy luminaires in kitchens must be controlled by a manual-on occupancy sensor, dimmer, EMCS, or multi-scene programmable control, &
2. All luminaires in garages, laundries, closets > 70 ft<sup>2</sup>, utility rooms must be high efficacy & controlled by manual-on occupancy sensors.

- 2) Lighting Installed inside cabinets only for the purpose of illuminating the inside of cabinets is NOT considered part of the kitchen lighting for calculating the 50% high to low efficacy ratio. Lighting internal to cabinets is limited to 20 watts per linear foot of cabinet.

- 3) Blank electrical boxes in kitchens shall be calculated & treated as 180 watts of low efficacy lighting.

- 4) Recessed fixtures in applications between conditioned & unconditioned spaces shall meet these requirements:
  1. Approved for IC (insulation contact) & label certifying AT (air tight) according to ASTM E283.
  2. All air leak paths through luminaire assembly or ceiling must be sealed.

### Additional Code Explanation:

- 1) 50% of permanently installed lighting in kitchens MUST be high efficacy, typically fluorescent; this can include down lights, under-cabinets, over-cabinets, pendants, wall sconces, etc.
- 2) Lighting that is part of an appliance is not regulated by 2010 California Energy Code.
- 3) The quantity of light fixtures is not regulated by the code, just the wattage.
- 4) If a fixture can accept various lamp wattages, its wattage for the sake of code compliance is the highest relamping rated wattage designated by the manufacturer on a permanent, factory installed Underwriters Laboratory (UL) label (peel-off labels are not permitted).
- 5) High-efficacy & low-efficacy light fixtures MUST be controlled separately.
- 6) Nook lighting must be on a separate switch in order to be counted as an "other space" & not part of the kitchen.
- 7) In order for an LED luminaire to be considered High-efficacy, its must be certified to the Energy Commission.
- 8) A GU-24 lamp, in order to be considered High-efficacy, MUST be rated for use only with high efficacy lamps or a high efficacy LED lighting source system. It does not contain any other type of line-voltage socket or lamp holder, & it cannot have an adaptor.



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## Kitchens: Example #1

The Information used in this example originated from the "2008 Residential Lighting Design Guide"

### Guidelines used for the lighting design shown below:

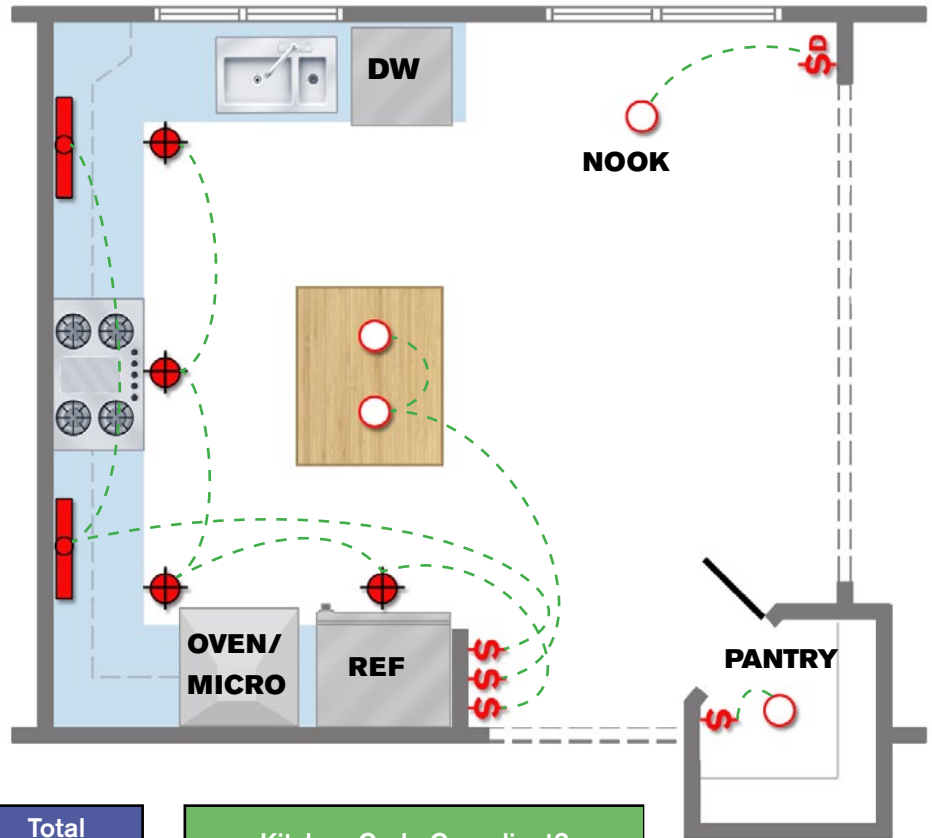
- ✓ Use 26-watt compact fluorescent recessed cans on 4' - 5' centers for even illumination.
  - ✓ Supplement recessed cans with fluorescent under-cabinet &/or over-cabinet light fixtures, on separate switches.
  - ✓ Nook lighting is on a separate switch.
- Nook lighting on its own switch does not count as kitchen wattage.*

### Further code explanation as applied to the lighting plan below:

- ✓ Fluorescent & incandescent light fixtures MUST be controlled separately.
  - ✓ The first switch no longer has to control a fluorescent light fixture.
  - ✓ Pantries less than 70 square feet have no lighting or control requirements.
- Minimize the number of fixtures that extend below the ceiling to help eliminate visual clutter.*

- 26-watt CFL recessed can with electric ballast & white or aluminum reflector & trim
- Surface- or pendant-mounted incandescent light fixture
- Switch
- Dimmer
- Fluorescent under-cabinet &/or over-cabinet light fixture with T8 or T5 lamps & electronic ballast

*Note: Application fixtures must meet 2008 Title 24 high-efficiency standards*



Kitchen Fixtures	Amount	Wattage	Total Wattage
Fluorescent downlights	5	26 Watts	130 Watts
Under-cabinet fluorescents	2	25 Watts	50 Watts
Incandescent downlights	2	60 Watts	120 Watts

Kitchen Code Compliant?
Fluorescent = 180 watts Incandescent = 120 watts
Low efficacy less than half of total wattage = Code Compliant ✓



# Residential Kitchen Lighting Requirements (2010 California Electrical Code)

## Kitchens: Example #2

Guidelines used for the lighting design shown below:

- ✓ Use 13-watt compact fluorescent recessed cans on 4' - 5' centers for even illumination..
- ✓ Space recessed cans evenly around the sink so that an additional light fixture over the sink is not needed..
- ✓ Use six 4-watt LED inside the pantry cabinet (interior cabinet lighting).

*Light the countertops more than the walkway. Place the lighting where it is needed..*

Further code explanation as applied to the lighting plan below:

- ✓ All recessed cans installed into insulated ceilings are required to be ICAT rated, i.e., rated for insulation contact (IC-rated) & airtight (AT-rated) to prevent conditioned air loss into the attic or ceiling. All air leaks must be sealed with gaskets & caulking.
- ✓ Lighting internal to cabinets is limited to 20 watts per linear foot of cabinet.

*Lighting installed inside a cabinet (pantry) is NOT considered part of the kitchen lighting for calculating 50% high to low efficacy ratio.*

13-watt recessed downlight compact fluorescent

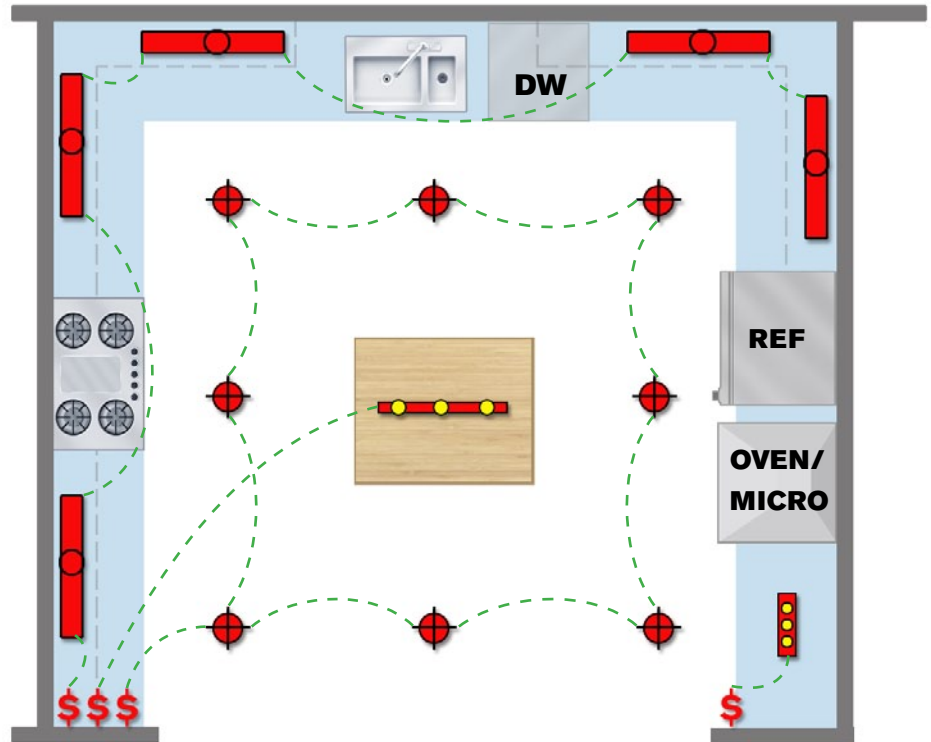
Switch

Pendant-mounted linear incandescent fixture

Interior LED (high efficacy) cabinet lighting

Fluorescent under-cabinet &/or over-cabinet light fixture with T8 or T5 lamps & electronic ballast

*Note: Application fixtures must meet 2008 Title 24 high-efficiency standards*



Kitchen Fixtures	Amount	Wattage	Total Wattage
Fluorescent downlights	8	13 Watts	104 Watts
Under-cabinet fluorescents	5	13 Watts	65 Watts
Incandescent downlights	3	40 Watts	120 Watts

Kitchen Code Compliant?
High-efcacy = 170 watts Low-efcacy = 120 watts
Low efcacy less than half of total wattage = Code Compliant ✓



## Residential Kitchen Lighting Requirements (2010 California Electrical Code)

### Kitchens Lighting: Questions & Answers

**Q:** I am designing kitchen lighting for a 2,000 ft<sup>2</sup> house. My design exceeds the 50% low/high efficacy lighting ratio. This design includes 180 watts of high efficacy lighting. If I plan to control the low efficacy lighting in the kitchen with a dimmer, and install both high efficacy lighting and vacancy sensors in the garage, laundry room, all closet greater than 70 ft<sup>2</sup>, and the utility room.

**How many watts of low efficacy lighting can I install in my kitchen?**

**A:** You are allowed an additional 50 watts of low efficacy lighting in the kitchen because the house is less than 2,500 ft<sup>2</sup>. You are also allowed 180 watts of low efficacy lighting based upon the watts of high efficacy lighting you are installing.

**Therefore, you are allowed to install up to 50 watts + 180 watts = 230 watts of low efficacy lighting in the kitchen.**

**Q:** I am using an incandescent luminaire over the kitchen sink that is capable of housing a 100W lamp. I plan to install a 26W compact fluorescent lamp in the socket.

**Does this qualify as a high efficacy luminaire?**

**What wattage should I use in determining if half the lighting power in the kitchen is high efficacy?**

**A: No**, this does not qualify as a high efficacy luminaire because it is capable of being lamped with an incandescent lamp.

**Use the maximum rated power (100 W) for determining the total wattage of low efficacy lighting.**

**Q:** I have 20 linear feet of upper kitchen cabinets and 30 ft of lower kitchen cabinets. I want to install lighting on the inside of upper cabinets, 15 feet in length and with glass doors. The upper cabinets have three shelves. I want to install light under all three shelves.

**How many watts of lighting may I install in the cabinets?**

**A:** The cabinet lighting allowance is based on the linear foot of illuminated cabinet, regardless of the number of shelves in each cabinet. Therefore, multiply 15 ft x 20W per foot = 300W.

**You are allowed to install up to 300 W of internal cabinet lighting.**

### Kitchen Definition

As defined by the California Energy Commission, a room or area used for cooking, food storage & preparation, & washing dishes, including associated countertops & cabinets, refrigerators, stoves, ovens, & floor area. Adjacent areas are considered kitchen if the lighting for the adjacent areas is on the same switches as the lighting for the kitchen.