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Residential Kitchen Lighting (2010 California Energy Code

Kitchen Lighting

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***

All high-efficacy lighting must be controlled separately from low-efficacy lighting.

Each and every permanently installed fixture must be included in the total wattage and must comply with the standards.

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

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

  Up to 50 watts per dwelling unit < 2,500 ft^2

  Up to 100 watts per dwelling unit ≥2,500 ft^2

  Conditions:

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

- 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.

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

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

Kitchen Definition

As defined by the California Energy Commission, a room or area used for cooking, food storage and preparation, and washing dishes, including associated countertops and cabinets, refrigerators, stoves, ovens, and 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.

Additional Code Explanation:

- 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.
- Lighting that is part of an appliance is not regulated by 2010 California Energy Code.
- The quantity of light fixtures is not regulated by the code, just the wattage.
- 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).
- High-efficacy and low-efficacy light fixtures MUST be controlled separately.
- Nook lighting must be on a separate switch in order to be counted as an "other space" and not part of the kitchen.
- In order for an LED luminaire to be considered High-efficacy, its must be certified to the Energy Commission.
- 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, and it cannot have an adaptor.

Kitchens: Example #1

The Information and graphics used in this example originated from the "*2005 Residential Lighting Design Guide*"

Guidelines used for the lighting design shown below:

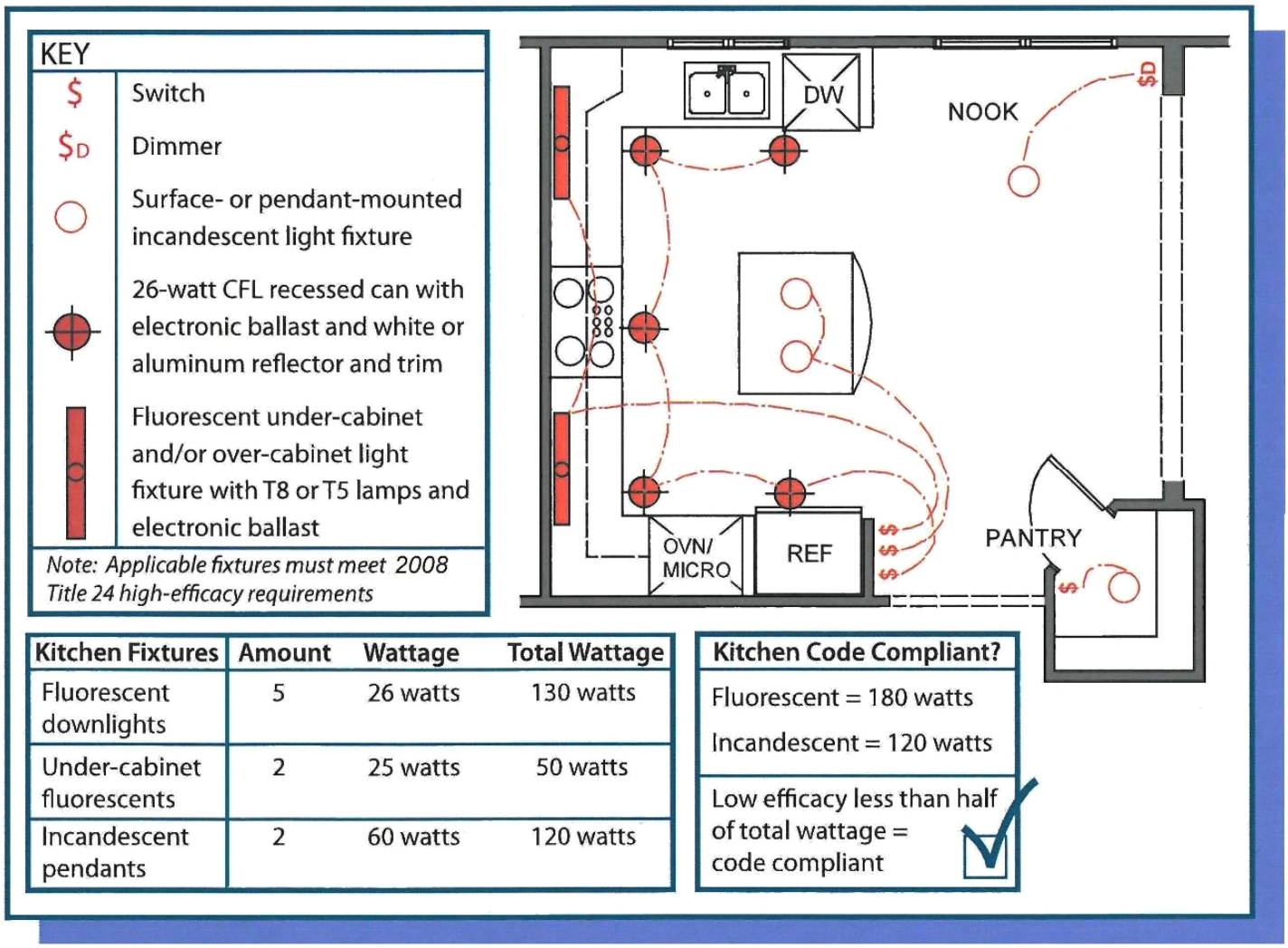
- Use 26-watt compact fluorescent recessed cans on 4' - 5' centers for even illumination.
- Supplement recessed cans with fluorescent under-cabinet and/or over-cabinet light fixtures, on separate switches.
- Nook lighting is on a separate switch.

Further code explanation as applied to the lighting plan below:

- Fluorescent and 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.

Nook lighting on its own switch does not count as kitchen wattage.

Minimize the number of fixtures that extend below the ceiling to help eliminate visual clutter.



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

Kitchen Code Compliant?

Fluorescent = 180 watts

Incandescent = 120 watts

Low efficacy less than half of total wattage = code compliant ✓

Kitchens: Example #2

Guidelines used for the lighting design shown below:

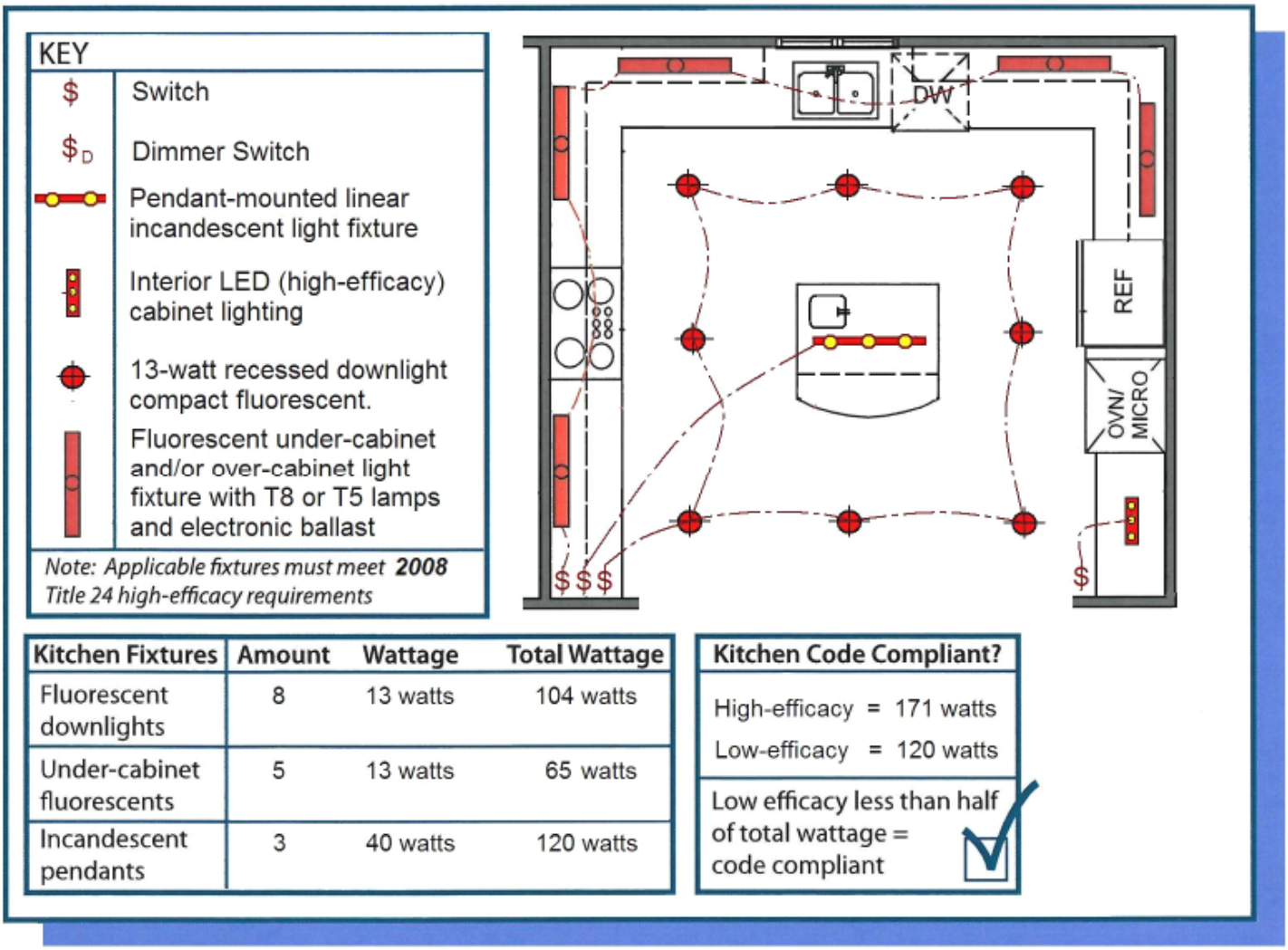
- Use 13-watt compact fluorescent recessed cans on 4' - 5' centers for even illumination.
- Space recessed cans evenly around the sink so that an additional light fixture over the sink is not needed.
- Use six 4-watt LED inside the pantry cabinet (interior cabinet lighting).

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) and airtight (AT-rated) to prevent conditioned air loss into the attic or ceiling. All air leaks must be sealed with gaskets and 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.



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

Kitchen Code Compliant?

High-efficacy = 171 watts

Low-efficacy = 120 watts

Low efficacy less than half of total wattage = code compliant ✓

Kitchens Lighting: Questions and Answers

Question 1

Question:
I am designing kitchen lighting for a 2,000 ft^2 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^2, and the utility room.

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

Answer:
You are allowed an additional **50 watts** of low efficacy lighting in the kitchen because the house is less than 2,500 ft^2.

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.

Question 2

Question:
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?

Answer:
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.

Question 3

Question:
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?

Answer:
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.