

Decorative Lighting Reduction

Modify the 2021 International Energy Conservation Code

Revise as follows:

C405.3.2.2.1 Additional interior lighting power.

Where using the Space-by-Space Method, an increase in the interior lighting power allowance is permitted for specific lighting functions. Additional power shall be permitted only where the specified lighting is installed and controlled in accordance with Section C405.2.5. This additional power shall be used only for the specified luminaires and shall not be used for any other purpose. An increase in the interior lighting power allowance is permitted in the following cases:

1. For lighting equipment to be installed in sales areas specifically to highlight merchandise, the additional lighting power shall be determined in accordance with Equation 4-11.

Additional lighting power allowance = $1000 \text{ W} + (\text{Retail Area 1} \times 0.45 \text{ W/ft}^2) + (\text{Retail Area 2} \times 0.45 \text{ W/ft}^2) + (\text{Retail Area 3} \times 1.05 \text{ W/ft}^2) + (\text{Retail Area 4} \times 1.88 \text{ W/ft}^2)$

For SI units:

Additional lighting power allowance = $1000 \text{ W} + (\text{Retail Area 1} \times 4.8 \text{ W/m}^2) + (\text{Retail Area 2} \times 4.84 \text{ W/m}^2) + (\text{Retail Area 3} \times 11.0 \text{ W/m}^2) + (\text{Retail Area 4} \times 20.0 \text{ W/m}^2)$

(Equation 4-11)

where:

Retail Area 1 = The floor area for all products not listed in Retail Area 2, 3 or 4.

Retail Area 2 = The floor area used for the sale of vehicles, sporting goods and small electronics.

Retail Area 3 = The floor area used for the sale of furniture, clothing, cosmetics and artwork.

Retail Area 4 = The floor area used for the sale of jewelry, crystal and china.

Exception: Other merchandise categories are permitted to be included in Retail Areas 2 through 4, provided that justification documenting the need for additional lighting power based on visual inspection, contrast or other critical display is approved by the code official.

2. For spaces in which lighting is specified to be installed in addition to the general lighting for the purpose of decorative appearance or for highlighting art or exhibits, provided that the additional lighting power shall be not more than ~~0.9 W/ft² (9.7 W/m²)~~ 0.66 W/ft² (7.1 W/m²) in lobbies and not more than ~~0.75 W/ft² (8.1 W/m²)~~ 0.55 W/ft² (5.9 W/m²) in other spaces.

Reason:

The decorative allowance was added in 2015 version at 1.0 W/ft². Commercial LED technology was still very new in 2015. In 2018, the values shifted to 0.9 W/ft² for lobbies and 0.75 W/ft² for all other spaces. In 2018, more commercial LED options existed, however, it was still not the dominant technology. Since 2018, LED technology has only become more prevalent.

The underlying lighting model that developed these values in 2018 relied on halogen sources. In 2021, most commercial spaces have started using high color quality LED lighting rather than halogen lighting. National Electrical Manufacturers Association (NEMA) routinely publishes lamp shipment data. Since 2017, NEMA data indicates that halogen lamp shipment reductions have reduced by 50% (<https://www.nema.org/analytics/lamp-indices>) indicating the shift away from this technology. The same NEMA data indicates that in 2021, halogen sources represent less than 25% of market penetration.

A value of 0.75 W/ft² for decorative lighting is greater than 2/3 of all of the values in the proposed LPD values. This allowance can apply to any space that is not a lobby. Since 2018, even decorative fixtures have become available in LED. In 2015, this value was 1.0 W/ft². When the 2015 version was being developed, LED technology was still nascent. In 2015, mostly halogen and some fluorescent sources would have been used for decorative fixtures. As the industry shifts to LEDs which are much more efficient than halogen and somewhat more efficient than fluorescent, the value should be reconsidered.

Cost Impact:

The code change proposal will neither increase nor decrease the cost of construction.

This section of the code is optional and is allowance if a space needs more lighting power for decorative lighting. It is not required to be used. The changes in the allowed value reflect that more efficient sources exist and that more decorative lighting fixtures are using those more efficient light sources.

Decorative lighting comes in many forms. The cost of decorative lighting will be affected by the appearance of the light fixture more than the efficiency of the light fixture.

Socket-based example

Many (not all) decorative fixtures utilize a socket. Per a national home improvement website, table below is a comparison of halogen and LED decorative lamps. The LED lamp is equal or less expensive than the halogen lamp. The LED lamp lasts longer and uses less power.

Halogen

- Lamp Shape / Size: G25
- Lumens: 550
- Input Power 40
- Lamp Life: 2,500 hours
- Cost \$2.99

LED

- Lamp shape / size: G25
- Lumens: 500
- Input Power 5.5 W
- Lamp Life: 15,000 hours
- Cost: \$2.60

Coves

Decorative lighting can involve cove lighting as well. Coves can be constructed via strip lights and drywall or cove fixtures and drywall. Using a national distributor, two types of strip lights were compared.

Fluorescent

- 2 F32T8 striplight
- Lumens: 4,800
- Input power: 56 W
- Lamp Life: 36,000 hours
- \$60.50

LED

- LED
- Lumens: 4,700
- Input Power 34 W
- Life: 50,000 hours
- \$135.16
- Simple Payback: 11 years (only using electricity and not including any benefits from the longer life source)