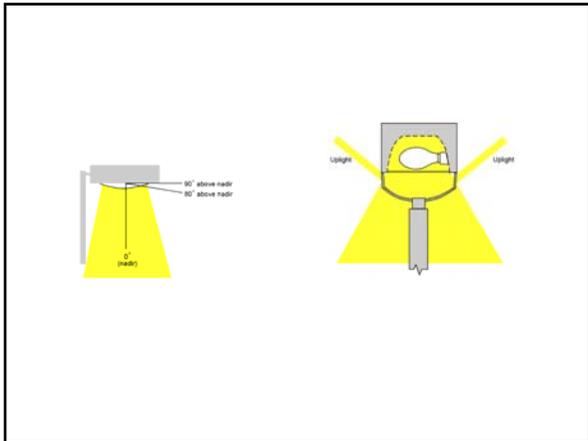


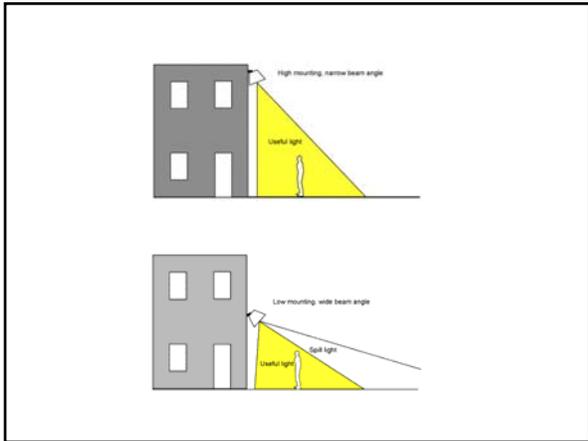
LANDSCAPE LIGHTING
and
EXTERIOR ELECTRICAL CODE
REQUIREMENTS
Based on the 2012 IECC
and the 2014 NEC

The CGS and the Energy Code



Sec. 29-256a. Revision of State Building Code. Energy efficiency. Construction standards. Verification. (a) The State Building Inspector and the Codes and Standards Committee shall revise the State Building Code to require that commercial and residential buildings and building elements be designed to provide optimum cost-effective energy efficiency over the useful life of the building and to incorporate the 2012 International Energy Conservation Code, not later than eighteen months after the publication of said code. The provisions of this section shall not be construed to impose any new requirement for any renovation or construction of a state building that is subject to the requirements of section 16a-38k, regardless of whether such building has been granted an exemption under said section.





AN OVERVIEW OF TWO CODES

2014 NEC	2012 IECC
	



**IECC 2012
Exterior Building Lighting Power**

- Lighting used for the following exterior applications are exempt from the base site allowance where equipped with a control device independent of the control of the nonexempt lighting.

**C405.6.2
Exception**

- Specialized signal, directional and marker lighting associated with transportation
- Advertising signage or directional signage
- Integral to equipment or instrumentation and is installed by its manufacturer
- Theatrical purposes, including performances, stage, film production and video production
- Athletic playing fields

C405.6.2
Exception (Continue)

- Temporary lighting
- Industrial production, material handling, transportation sites and associated storage areas
- Theme elements in theme/amusement parks
- Used to highlight features of public monuments and registered historic landmark structures or buildings

EXTERIOR RESIDENTIAL LIGHTING



COMMERCIAL LIGHTING



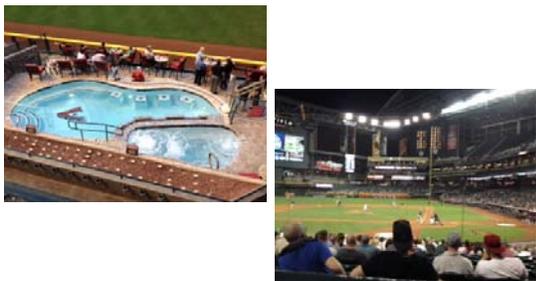
POLE LIGHTING



BASEBALL PARK LIGHTING



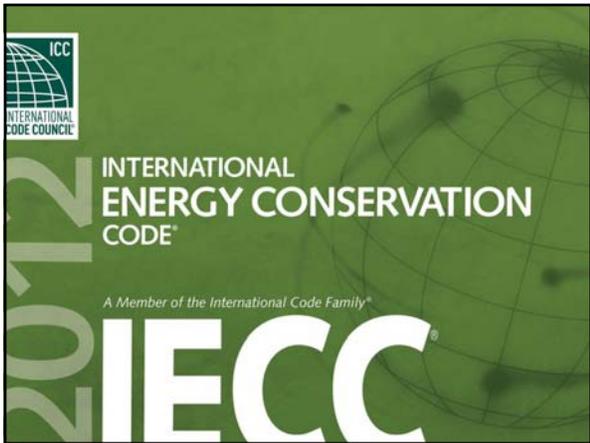
CHASE FIELD ARIZONA





MERCHANT LIGHTING





**ELECTRICAL POWER
AND
LIGHTING SYSTEMS**

What are the requirements of the 2012 IECC for the minimum percentage of high-efficacy lamps for a residential installation?

R404.1 requires a minimum of 75% of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps or a minimum of 75% of the permanently installed lighting fixtures shall contain only high-efficacy lamps.

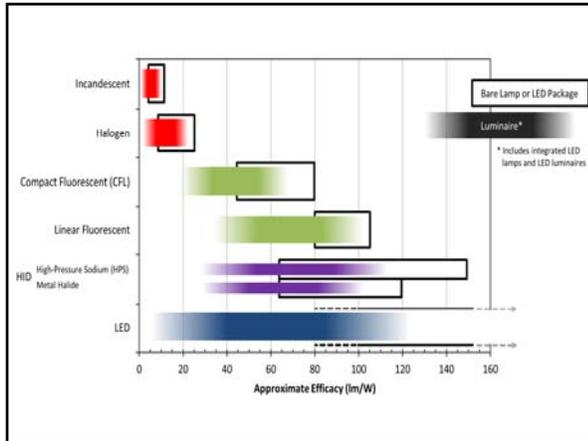
High-Efficacy Lamps

Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:

1. 60 lm/W for lamps over 40 Watts
2. 50 lm/W for lamps over 15 W to 40 W
3. 40 lm/W for lamps 15 Watts or less

**C405.1(2)
Efficacy of Standard Lamp Types**

LAMP	EFFICACY LUMENS/WATT
• Edison's first lamp	• 1.4
• Incandescent	• 10 - 40
• Halogen	• 20 - 45
• Fluorescent	• 35 - 100
• Mercury	• 50 - 60
• Metal halide	• 80 - 115
• High-pressure sodium	• 100 - 140



Energy Saver

What is meant by efficacy?

Unit: lumens per watt (lm/W)

Term used to quantify how efficiently a lamp turns electricity into light. The higher the efficacy, the more efficient the lamp.

	Incandescent Bulb	CFL Bulb	LED Bulb
Wattage	40W	9W	7W
Lumens	450 lumens	500 lumens	700 lumens
Approximate Efficacy	11 lm/W	55 lm/W	100 lm/W

What is a Lumen?

The total amount of visible light emitted by a source.

Lighting comprises about 12% of the primary residential energy, making this requirement for 75% of the lamps in permanently installed lighting fixtures to be high-efficacy is a substantial energy saver.



Commercial Exterior Lighting

All exterior lighting other than low-voltage landscape lighting shall comply with luminaires that operate at greater than 100 watts shall contain lamps having a minimum efficacy of 60 lumens per watt unless the luminaire is controlled by a motion sensor or meets one of the exceptions.

Low-Voltage Lighting

- IECC C202 General Definitions: Lighting equipment powered through a transformer such as a cable conductor, a rail conductor and track lighting.
- NEC 411 Low-Voltage Lighting Systems operating at 30 volts or less shall consist of an isolating power supply, low-voltage luminaires and associated equipment.

Commercial Exterior Building Lighting

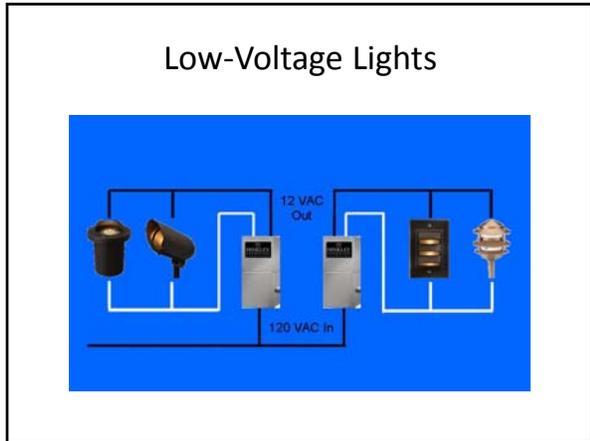




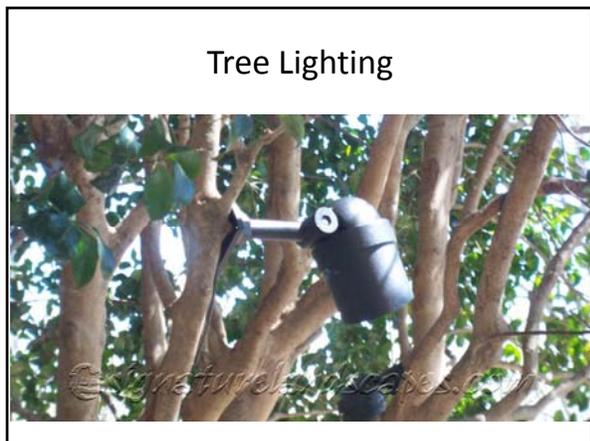
Metal or Nonmetallic Poles Supporting Luminaires

A pole shall have a handhole not less than 2 x 4 inches with a cover suitable for a wet









410.36(G) Trees as a means of Support
Outdoor luminaires and associated equipment shall be permitted to be supported by trees.





C405.6
Exterior Lighting

Where the power for exterior lighting is supplied through the energy service to the building, all exterior lighting, other than low-voltage landscape lighting that operate at greater than 100 watts shall contain lamps having a minimum efficacy of 60 lumens per watt unless the luminaire is controlled by a motion sensor or meets one of the exceptions.

C405.6.2
Exterior Building Lighting Power

The total exterior lighting power allowance for all exterior building applications is the sum of the base site allowance plus the individual allowances for areas that are illuminated and are permitted in Table C405.6.2(2) for the applicable lighting zone in Table C405.6.2(1).

Table C405.6.2(2)
Individual Lighting Power Allowances For Building Exteriors

		LIGHTING ZONES			
		Zone 1	Zone 2	Zone 3	Zone 4
Base Site Allowance (Base allowance is applicable in tradable or nontradable surfaces.)		500 W	600 W	750 W	1300 W
Uncovered Parking Areas					
Tradable Surfaces (lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas are tradable.)	Parking areas and drives	0.04 W/R ²	0.06 W/R ²	0.10 W/R ²	0.13 W/R ²
Building Grounds					
	Walkways less than 10 feet wide	0.7 W/linear foot	0.7 W/linear foot	0.8 W/linear foot	1.0 W/linear foot
	Walkways 10 feet wide or greater, plaza areas and special feature areas	0.14 W/R ²	0.14 W/R ²	0.16 W/R ²	0.2 W/R ²
	Stairways	0.75 W/R ²	1.0 W/R ²	1.0 W/R ²	1.0 W/R ²

Table C405.6.2(1) Exterior lighting Zones

LIGHTING ZONE	DESCRIPTION
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed use areas
3	All other areas
4	High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority

Calculate the total exterior lighting power allowance

What is the total exterior lighting power allowance for an open air parking lot with an area of 40,000 square feet located in an area consisting of some residential and predominantly light industrial with limited nighttime use?

See tables C405.6.2(2) & C405.6.2(1)

- Table C405.6.2(1) Zone 2 seems to fit the seanerio
- Table C405.6.2(2) The Base Site Allowance for Zone 2 is 600 Watts. The uncovered parking area is 0.06 W/sqft
- Therefore $0.06 \text{ W/sqft} \times 40,000 \text{ sqft} = 2,400\text{W}$ plus 600 W = 3000 W

Continue

- The suggested pole light is a 148 W lamp with a lumens per watt of 107
- The amount of pole lights is determind by dividing the 148 W luminaire into the 3,000 W total parking lot allowance which would equal 20.7 light poles or 20 light poles
