

Outdoor Lighting Guidance

Many municipalities and other organizations are considering outdoor lighting energy efficiency upgrades and have requested DOE assistance in evaluating outdoor luminaires (lighting fixtures). This document provides basic guidance for common outdoor lighting applications: wall-mounted area lighting, parking garage lighting, canopy lighting, and pole mounted street and area lighting. Minimum performance recommendations are provided for lifetime, warranty, energy efficiency, and light distribution.

For All Luminaires		
Life/Lumen Maintenance	Light sources used in qualified luminaires should have minimum estimated lifetimes as follows: <ul style="list-style-type: none"> For LED products, 35,000 hours. See Guide to Evaluating LED Lumen Maintenance: http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/guide_lumen_maintenance.pdf For other source types, 20,000 hours. See rated lamp life and lumen maintenance and mortality curves provided by lamp manufacturer. 	
Uplight and Glare	Should be appropriate for project Lighting Zone(s) as per the Commercial Building Energy Alliances (CBEA) LED Site Lighting Performance Specification, Tables 6-8 and Appendix B: http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/cbea_led_site_lighting_spec.pdf	
Warranty	A warranty should be provided for luminaires, covering repair or replacement of any defective parts (including light source, housings, seals, power supplies, and any ancillary components necessary for proper functioning of the luminaire) for a minimum of three (3) years from the date of purchase.	
By Luminaire Type		
	Minimum Luminaire Efficacy (lumens per watt)	Zonal Lumen Guidelines (Angles are given from nadir; 0° is straight down, 90° is horizontal, and 180° is straight up)
Outdoor Wall-mounted Area Luminaires ("Wall Packs")	52 lm/W	<ul style="list-style-type: none"> No more than 48% of total luminaire output within the forward 60-80° zone (FH). No more than 3% of total luminaire output in the forward 80-90° zone (FVH). No light at or above horizontal (90-180° zone).
Parking Structure Luminaires	70 lm/W	<ul style="list-style-type: none"> At least 30% of total output within the 60-80° zone. No more than 20% of total output above 80°.
Canopy Luminaires	70 lm/W	<ul style="list-style-type: none"> At least 30% of total output within the 40-60° zone. No more than 20% of total output above 80°.
Outdoor Pole-mounted Area and Roadway Luminaires	See guidelines below	

Guidelines for Outdoor Pole-Mounted Area and Roadway Luminaires

Fitted Target Efficacy (FTE) evaluates how efficiently a luminaire delivers light to its estimated target area. Suggested minimum requirements are given in the table below, as a function of luminaire output and house-side shielding (some pole locations may require backlight control to reduce light trespass onto neighboring properties).

Initial Luminaire Output	Shielded [uniform light pool extends less than 1.5 mounting heights (MH) behind the light pole (i.e., house-side)]			Unshielded [uniform light pool extends 1.5 mounting heights or more behind the light pole (i.e., house-side)]		
	Low Output < 7,500 lumens	Mid Output	High Output > 23,500 lumens	Low Output < 10,500 lumens	Mid Output	High Output > 33,000 lumens
Minimum Initial Fitted Target Efficacy (lm/W)	30	38	48	38	49	62

FTE is calculated using standard luminaire photometry (IES-format as per LM-63-02). DOE provides a software tool that reads the IES-format file and provides the FTE value: see http://www.eere.energy.gov/buildings/ssl/downloads/fte_calculator.exe. The tool automatically categorizes the luminaire by whether it is effectively shielded (to reduce light trespass) or not shielded, and then by light output: low, mid, or high. See http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/fte_performance_metric.pdf for additional information regarding the FTE metric and software tool.

NOTE: The above guidelines do not specify minimum light output or the horizontal distribution of light (e.g., Type II Medium). For any given product line, the appropriate lumen package and optical system must be selected by the lighting system owner to ensure light level and uniformity requirements are satisfied.

Ask manufacturer for the following information:

- Photometric data
 - For all products: photometric data in standard IES data format defined in LM-63-02
 - Additionally, for LED products, request original IES LM-79-08 report from a qualified independent laboratory
 - See http://www1.eere.energy.gov/buildings/ssl/test_labs.html
- Lifetime data
 - For LED products:
 - Documentation as recommended in the Guide to Evaluating LED Lumen Maintenance: see http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/guide_lumen_maintenance.pdf
 - For other lighting products:
 - Lamp life rating
 - Lamp lumen depreciation curve
 - Lamp mortality curve
- Written warranty