

Recommended Lighting Levels for Exterior Lighting

The Illuminating Engineering Society of North America (IESNA, or IES) gives in current IES publications quite a number of recommended illumination levels for outdoor lighting. We summarize some of these recommendations below, and in some cases the original tables have been simplified. Some of these illumination levels are currently under discussion by IES technical committees. It is important to note that these values are recommendations, not standards. Standards are set at the federal, state, county, or community level. The IES does not set standards, though IES recommendations are often used by those who set standards.

In fact, recommended illuminance levels are to some degree arbitrary. On p. 93 of the 1993 edition of the **IESNA Lighting Handbook**, it states that

It remains to be determined whether the added accuracy in predicting visual performance will be utilized in the illuminance selection procedure. A model of visual performance, no matter how accurate, is only part of illuminance selection. The cost of equipment and energy will always be an important part of the Society's decision. If electric energy prices were to double, recommended illuminance levels would certainly become lower. Further, there are other, perhaps more important, lighting design factors that the practicing illuminating engineer must consider in setting illuminance levels.

In all outdoor lighting applications, many factors come into play and should be considered: minimizing glare, mounting height and spacing, lighting system depreciation and life-cycle cost, conflict areas (such as between vehicles or between vehicles and pedestrians), access control and vandalism prevention, as well as the mix of commercial, industrial, and residential properties near the area to be illuminated. For example, in the presence of glare, one needs more illumination to try to overcome the adverse impact of the glare; without glare, lower illumination levels are possible, with an actual improvement in visibility. The key is that all outdoor lighting should be carefully done, with consideration given to all the relevant factors.

We give below a summary of the lighting illuminance levels in footcandles, as that is the most common unit used in the United States. However, lux is the preferred international unit, and the IES does officially recommend its use in the United States. A level of ten lux is about one footcandle ($10.76 \text{ lx} = 1 \text{ fc}$, exactly).

Roadway Lighting

	Average Maintained Illuminance (fc)	Uniformity (Avg/Min)
Freeway Class A	0.6 – 0.8	3/1
Freeway Class B	0.4 – 0.6	3/1
Expressway	0.6 – 1.3	3/1
Major road	0.6 – 1.6	3/1
Collector road	0.4 – 1.1	4/1
Local road	0.3 – 0.8	6/1

Parking Lots

Level of Activity:	Horizontal Illuminance (Footcandles)		Uniformity Ratio
	Avg	Min	
High	3.6	0.9	4/1
Major League Athletic Events Major Cultural or Civic Events Regional Shopping Centers Fast Food Facilities			
Medium			
Community Shopping Centers	2.4	0.6	4/1

Cultural, Civic, or Recreational Events
 Office Parking
 Airports, Commuter Lots, etc.
 Residential Complex Parking
 Hospital Parking

Low 0.8 0.2 4/1

Neighborhood Shopping
 Industrial Employee Parking
 Educational Facilities

Churches

IES also states that the "Low" values are appropriate wherever there is a requirement to maintain security at any time in areas where there is a low level of nighttime activity.

Recommendations for other outdoor lighting levels (footcandles)

Building exteriors

Entrances

Active (pedestrian and/or conveyance)	5
Inactive (normally locked, infrequently used)	1
Vital locations or structures	5
Building surrounds	1

Floodlit Buildings and Monuments	Dark surroundings	Bright surroundings
Light surfaces	5	15
Medium light surfaces	10	20
Medium dark surfaces	15	30
Dark surfaces	20	50

Loading and Unloading Platforms	20
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Service Stations

Approach	1.5	3
Driveway	1.5	5
Pump Island	20	30
Service Areas	3	7

Storage Yards

Active	20
Inactive	1

Retail Outdoor Lighting

		Illumination Level of Surrounding Area		
		High	Medium	Low
Seasonal	Circulation	10	7	5
	Marketing area	30	20	10
	Feature display	60	40	20

Auto Lots

Circulation	10	7	5
Merchandise	50	30	20
Feature display	75	50	35

IES states that the illuminance in exterior retail selling areas should not exceed 10 times that of the surrounding area. Measurements should be referenced from the roadway.