

DOCKETED

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Nonresidential Outdoor Light Sources

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Pre-Rulemaking Workshop
Imbrecht Hearing Room
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Acknowledgments

California Utilities Statewide Codes and Standards Team

and

CASE Authors

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Outdoor Lighting

All installed outdoor luminaires impacted by the proposed changes, include those:

- Installed outside buildings
- Mounted on buildings
- Mounted on grade



Image credit: PNNL





Outdoor Lighting Power

- General Hardscape Lighting allowance
 - Can apply to lighting for parking lots, sidewalks
 - Full list in Section 140.7(d)1A
- Specific Application Lighting allowance
 - Can apply to lighting for building facades, outdoor sales, outdoor dining, service stations, security lighting, building entrances
 - Full list in Table 140.7-B



Outdoor Lighting Power

- Allowance method

Outdoor Lighting Applications covered	
General Hardscape Lighting (trade-offs allowed)	Specific Applications Lighting (trade-offs not allowed)
Outdoor Lighting Applications not regulated by the Standards	
Exempted from Section 140.7	



Outdoor Lighting Power

- Allowance method
 - General Hardscape lighting power may be traded to specific outdoor lighting applications
 - Specific outdoor lighting power is “use it or lose it” and could not be traded off
 - No proposed change to allowance method



Lighting Trends

- Department of Energy has reported in 2016 that “*LED Outdoor area lights have demonstrated ability to provide suitable illuminance levels using significantly lower level of light output than the conventional lighting products ...*” (Solid State Lighting R&D Plan, 2016)



Background

- Findings from CASE Team:
 - The efficacies for outdoor LED luminaires have increased in the past 3 years
 - The cost of outdoor LED luminaires has dropped significantly
 - DOE forecasted that LEDs will represent 75 percent of all outdoor lighting sales by 2020 (Navigant Consulting 2014)



CASE Team Proposal

- Use LED luminaires in lieu of conventional technologies of HIDs and fluorescent luminaires as the baseline for both general hardscape lighting power allowance and specific application lighting power allowance
- 3000K luminaires are used for modeling/analysis



CASE Team Proposal

- Propose a new set of outdoor lighting power density values with LED lighting as the light sources for lighting design
- New values for Table 140.7-A and Table 140.7-B
 - Table 140.7-A for general hardscape
 - Table 140.7-B for specific application



CASE Team Proposal

- New values for Table 140.7-A
 - Added new columns: one for asphalt surface parking lots and another for concrete surface parking lots
 - Same number of lighting zones, LZ0 thru LZ4, in Table 140.7-A from existing Standards
 - Lighting Zones are described in Table 10-114-A
 - LZ2 is default for rural areas
 - LZ3 is default for urban areas
 - No proposed changes to Table 10-114-A



- Old Table 140.7-A

TABLE 140.7-A GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE

Type of Power Allowance	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2 ²	Lighting Zone 3 ²	Lighting Zone 4
Area Wattage Allowance (AWA)	No Allowance ¹	0.020 W/ft ²	0.030 W/ft ²	0.040 W/ft ²	0.050 W/ft ²
Linear Wattage Allowance (LWA)		0.15 W/lf	0.25 W/lf	0.35 W/lf	0.45 W/lf
Initial Wattage Allowance (IWA)		340 W	450 W	520 W	640 W

¹ Continuous lighting is explicitly prohibited in Lighting Zone 0. A single luminaire of 15 Watts or less may be installed at an entrance to a parking area, trail head, fee payment kiosk, outhouse, or toilet facility, as required to provide safe navigation of the site infrastructure. Luminaires installed in Lighting Zone 0 shall meet the maximum zonal lumen limits for Uplight and Glare specified in Table 130.2-A and 130.2-B.

² For Lighting Zone 2 and 3, where greater than 50% of the paved surface of a parking lot is finished with concrete, the AWA for that area shall be 0.035 W/ft² for Lighting Zone 2 and 0.040 W/ft² for Lighting Zone 3, and the LWA for both lighting zones shall be 0.70 W/lf. This does not extend beyond the parking lot, and does not include any other General Hardscape areas.



- New values for Table 140.7-A

Type of Power Allowance	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2		Lighting Zone 3		Lighting Zone 4
	Asphalt/Concrete	Asphalt/Concrete	Asphalt	Concrete ²	Asphalt	Concrete ²	Asphalt/Concrete
Area Wattage Allowance (AWA)	No Allowance ¹	0.018	0.023	0.025	0.025	0.030	0.030
Linear Wattage Allowance (LWA)		0.15	0.17	0.40	0.25	0.40	0.35
Initial Wattage Allowance (IWA)		180	250	250	350	350	400

¹ Continuous lighting is explicitly prohibited in Lighting Zone 0. A single luminaire of 15 Watts or less may be installed at an entrance to a parking area, trail head, fee payment kiosk, outhouse, or toilet facility, as required to provide safe navigation of the site infrastructure. Luminaires installed in Lighting Zone 0 shall meet the maximum zonal lumen limits for Uplight and Glare specified in Table 130.2-A and 130.2-B.

² Where greater than 50% of the paved surface of a parking lot is finished with concrete. This does not extend beyond the parking lot, and does not include any other General hardscape areas.



- New values for Table 140.7-B

Lighting Application	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
WATTAGE ALLOWANCE PER APPLICATION. Use all that apply as appropriate.					
Building Entrances or Exits. Allowance per door. Luminaires qualifying for this allowance shall be within 20 feet of the door.	Not Applicable	15 <u>9</u> watts	25 <u>15</u> watts	35 <u>19</u> watts	45 <u>21</u> watts
Primary Entrances to Senior Care Facilities, Police Stations, Hospitals, Fire Stations, and Emergency Vehicle Facilities. Allowance per primary entrance(s) only. Primary entrances shall provide access for the general public and shall not be used exclusively for staff or service personnel. This allowance shall be in addition to the building entrance or exit allowance above. Luminaires qualifying for this allowance shall be within 100 feet of the primary entrance.	Not Applicable	45 <u>20</u> watts	80 <u>40</u> watts	120 <u>57</u> watts	130 <u>60</u> watts
Drive Up Windows. Allowance per customer service location. Luminaires qualifying for this allowance shall be within 2 mounting heights of the sill of the window.	Not Applicable	40 <u>16</u> watts	75 <u>30</u> watts	125 <u>50</u> watts	200 <u>75</u> watts
Vehicle Service Station Uncovered Fuel Dispenser. Allowance per fueling dispenser. Luminaires qualifying for this allowance shall be within 2 mounting heights of the dispenser.	Not Applicable	120 <u>55</u> watts	175 <u>77</u> watts	185 <u>81</u> watts	330 <u>135</u> watts
ATM Machine Lighting. Allowance per ATM machine. Luminaires qualifying for this allowance shall be within 50 feet of the dispenser.	Not Applicable	250 <u>100</u> watts for first ATM machine, 70 <u>35</u> watts for each additional ATM machine			



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WATTAGE ALLOWANCE PER UNIT LENGTH (w/linear ft). May be used for one or two frontage side(s) per site.					
Outdoor Sales Frontage. Allowance for frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. Luminaires qualifying for this allowance shall be located between the principal viewing location and the frontage outdoor sales area.	Not Applicable	No Allowance	22-5-11 W/linear ft	36 19 W/linear ft	45-25 W/linear ft
WATTAGE ALLOWANCE PER HARDSCAPE AREA (W/ft²). May be used for any illuminated hardscape area on the site.					
Hardscape Ornamental Lighting. Allowance for the total site illuminated hardscape area. Luminaires qualifying for this allowance shall be rated for 100 watts or less as determined in accordance with Section 130.0(d), and shall be post-top luminaires, lanterns, pendant luminaires, or chandeliers.	Not Applicable	No Allowance	0.02 <u>0.007</u> W/ft ²	0.04 <u>0.013</u> W/ft ²	0.06 <u>0.019</u> W/ft ²
WATTAGE ALLOWANCE PER SPECIFIC AREA (W/ft²). Use as appropriate provided that none of the following specific applications shall be used for the same area.					
Building Facades. Only areas of building façade that are illuminated shall qualify for this allowance. Luminaires qualifying for this allowance shall be aimed at the façade and shall be capable of illuminating it without obstruction or interference by permanent building features or other objects.	Not Applicable	No Allowance	0.18 <u>0.100</u> W/ft ²	0.35 <u>0.170</u> W/ft ²	0.50 <u>0.225</u> W/ft ²
Outdoor Sales Lots. Allowance for uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale. Driveways, parking lots or other non-sales areas shall be considered hardscape areas even if these areas are completely surrounded by sales lot on all sides. Luminaires qualifying for this allowance shall be within 5 mounting heights of the sales lot area.	Not Applicable	0.164 <u>0.060</u> W/ft ²	0.555 <u>0.210</u> W/ft ²	0.758 <u>0.280</u> W/ft ²	1.285 <u>0.485</u> W/ft ²



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Lighting Application	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Vehicle Service Station Hardscape. Allowance for the total illuminated hardscape area less area of buildings, under canopies, off property, or obstructed by signs or structures. Luminaires qualifying for this allowance shall be illuminating the hardscape area and shall not be within a building, below a canopy, beyond property lines, or obstructed by a sign or other structure.	Not Applicable	0.014 <u>0.006</u> W/ft ²	0.155 <u>0.068</u> W/ft ²	0.308 <u>0.138</u> W/ft ²	0.485 <u>0.200</u> W/ft ²
Vehicle Service Station Canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	Not Applicable	0.514 <u>0.220</u> W/ft ²	1.005 <u>0.430</u> W/ft ²	1.300 <u>0.580</u> W/ft ²	2.200 <u>1.010</u> W/ft ²
Sales Canopies. Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	Not Applicable	No Allowance	0.655 0.470 W/ft ²	0.908 0.622 W/ft ²	1.135 0.740 W/ft ²
Non-sales Canopies and Tunnels. Allowance for the total area within the drip line of the canopy or inside the tunnel. Luminaires qualifying for this allowance shall be located under the canopy or tunnel.	Not Applicable	0.084 <u>0.057</u> W/ft ²	0.205 <u>0.137</u> W/ft ²	0.408 <u>0.270</u> W/ft ²	0.585 <u>0.370</u> W/ft ²
Guard Stations. Allowance up to 1,000 square feet per vehicle lane. Guard stations provide access to secure areas controlled by security personnel who stop and may inspect vehicles and vehicle occupants, including identification, documentation, vehicle license plates, and vehicle contents. Qualifying luminaires shall be within 2 mounting heights of a vehicle lane or the guardhouse.	Not Applicable	0.154 0.081 W/ft ²	0.355 0.176 W/ft ²	0.708 0.325 W/ft ²	0.985 0.425 W/ft ²



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<p>Student Pick-up/Drop-off zone. Allowance for the area of the student pick-up/drop-off zone, with or without canopy, for preschool through 12th grade school campuses. A student pick-up/drop-off zone is a curbside, controlled traffic area on a school campus where students are picked-up and dropped off from vehicles. The allowed area shall be the smaller of the actual width or 25 feet, times the smaller of the actual length or 250 feet. Qualifying luminaires shall be within 2 mounting heights of the student pick-up/drop-off zone.</p>	<p>Not Applicable</p>	<p>No Allowance</p>	<p>0-12 0.056 W/ft'</p>	<p>0-45 0.200 W/ft'</p>	<p>No Allowance</p>
<p>Outdoor Dining. Allowance for the total illuminated hardscape of outdoor dining. Outdoor dining areas are hardscape areas used to serve and consume food and beverages. Qualifying luminaires shall be within 2 mounting heights of the hardscape area of outdoor dining.</p>	<p>Not Applicable</p>	<p>0-014 <u>0.004</u> W/ft²</p>	<p>0-135 <u>0.030</u> W/ft²</p>	<p>0-240 <u>0.050</u> W/ft²</p>	<p>0-400 <u>0.075</u> W/ft²</p>
<p>Special Security Lighting for Retail Parking and Pedestrian Hardscape. This additional allowance is for illuminated retail parking and pedestrian hardscape identified as having special security needs. This allowance shall be in addition to the building entrance or exit allowance.</p>	<p>Not Applicable</p>	<p>0-007 0.004 W/ft²</p>	<p>0-009 0.005 W/ft²</p>	<p>0-019 0.010 W/ft²</p>	<p>No Allowance</p>



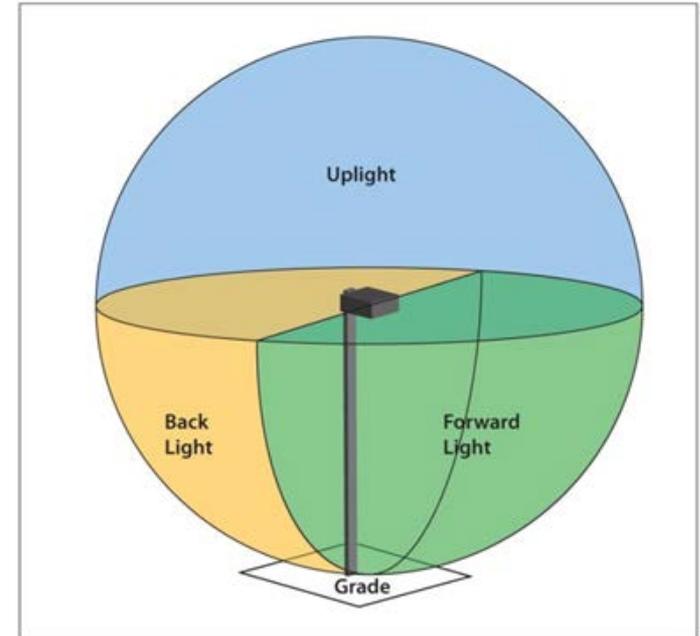
CASE Team Proposal

- Update on outdoor luminaire distribution cutoff requirements
 - To align with the proposed outdoor lighting power density values
 - Luminaires of wattage rating greater than 30 ~~150~~ watts have to meet Table 130.2-A and 130.2-B (with the maximum zonal limits for uplight and glare allowed)





- Outdoor luminaire distribution cutoff requirements
 - The outdoor luminaires must not exceed values on Table 130.2-A and 130.2-B
 - No proposed change to Table 130.2-A and 130.2-B with IES BUG rating requirements
 - (BUG stands for backlight, upright, and glare)

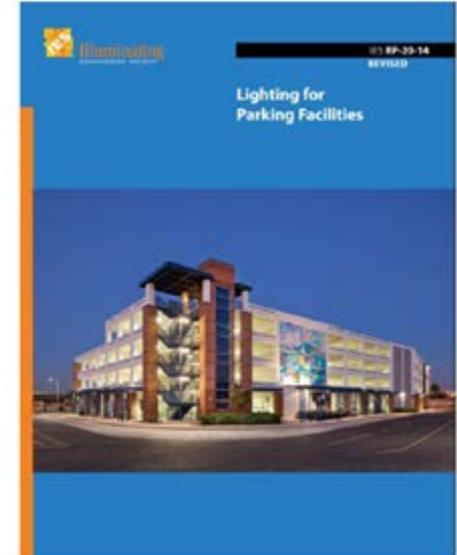


Luminaire Classification System for Outdoor Luminaires as defined in IES TM-15-11 (Illuminating Engineering Society of North America)



Industry Standards

- Possible update to values for outdoor hardscape lighting to align with the recommended illuminance values in the new edition of IES RP-20, “Lighting for Parking Facilities”
- The final CASE Report may include proposed modified values in Table 140.7-A





Future Code Cycle

Emerging lighting technologies

- Color changing fixtures in outdoor applications
- Others



Comments/Questions

- Submit written comments by July 14, 2017
 - E-file:
<https://efiling.energy.ca.gov/EComment/EComment.aspx> - Docket # 17-BSTD-01
 - E-mail: docket@energy.ca.gov – include the docket number in the subject line
- I can be contacted directly
simon.lee@energy.ca.gov or 916-651-3005