

Emigration Canyon Metro Township

DARK SKY ORDINANCE | MUNICIPAL CODE: 19.73.110 NIGHT LIGHTING

19.73.110 – Purpose.

- A. The purposes of this chapter are too.
 - 1. Encourage lighting practices that will minimize light pollution, glare, light trespass, and sky glow to curtail the degradation of the night sky visual environment.
 - 2. Encourage lighting practices that promote energy conservation.
 - 3. Maintain nighttime safety, utility, and security and prevent unnecessary or inappropriate outdoor lighting and lighting nuisances on properties.
 - 4. Maintain the rural atmosphere and community character of the Metro Township.
 - 5. Preserve and enhance views of the night sky and protections for nocturnal wildlife.

19.73.111 - Scope and Applicability.

- A. Compliance.
 - 1. Lighting installed and/or replaced after the effective date hereof in all zones in the Metro Township shall conform to the requirements established by this chapter.
- B. Nonconforming Uses.
 - 1. Lighting that does not meet the requirements of this chapter and is not exempt from the requirements of this chapter shall be considered a nonconforming use. The municipality will encourage property owners to voluntarily bring nonconforming lighting into compliance with this chapter
- C. Modifications.
 - 1. Compliance Through Building Permit Process: The Metro Township may require that lighting be brought into compliance through the building permit process. If modifications are made to any structure which require the removal of a nonconforming luminaire, the luminaire shall be replaced with a compliant luminaire. In the event a nonconforming luminaire is replaced, destroyed, damaged, or modified by fifty percent (50%) or more, the replacement shall comply with the provisions of this ordinance.
- D. Conflicts.
 - 1. In the event any federal, state, or county statute or regulation conflicts with any provision of this Chapter, the most restrictive statute, regulation, or provision shall govern unless otherwise required by law. In the event, any provision of the Metro Township’s other ordinances conflicts with the provisions of this Chapter, the provisions of this Chapter shall govern.

Commented [MS1]: We should find a diagram that demonstrates a luminaire and the components that it is made up of...

19.73.112 - Conditions and Standards.

- A. Minimum Necessary.
 - 1. Lighting shall be the minimum necessary to provide for safety and functionality. The lowest-lumen light source necessary for a lighting application shall be used.
 - a. All lighting should be purpose-driven:

- i. Useful: All light used shall have a clear purpose.
- ii. Targeted: Light shall be directed only to where needed.
- iii. Low Light Levels: Light shall be no brighter than necessary.
- iv. Controlled: Light shall be used only when it is useful.
- v. Color: Where possible, warmer color lights shall be used.

B. Allowable Applications.

1. Outdoor lighting shall only be allowed in the following applications:
 - a. To illuminate the entrances to buildings (including garage entrances).
 - b. To illuminate pathways and walkways.
 - c. To illuminate parking areas and parking area access lanes.
 - d. To illuminate gathering areas, such as patios, pool and hot tub areas, dining areas and recreation areas.
 - e. For security purposes, provided all the following conditions are met:
 - i. The lighting is activated by motion sensors and shuts off, within or before, fifteen (15) minutes after each disturbance or when the activity involved is completed.
 - ii. The lighting is placed and directed such that no direct illumination falls outside the property boundaries where the security lighting is placed.
 - f. To illuminate signage.
 - g. For Accent Lighting, provided all the following conditions are met:
 - i. The accent lighting meets the standards of this chapter.
 - ii. All accent lighting is mounted on and illuminating only building facades visible from an adjacent public right of way.
 - iii. The accent lighting is sufficiently shielded such that the light source is not visible beyond the property boundaries.
 - iv. The accent lighting is directed such that all light falls on the building facade, and not on the adjacent ground or into the night sky.
 - v. The accent lighting is not used to illuminate landscape, landscape elements, statues, or other similar features.
 - h. To illuminate outdoor water features, provided all the following conditions are met:
 - i. The lighting is angled below the horizontal plane.
 - ii. The lighting is placed underneath or behind the water such that the water diffuses the light from all points where the light is visible.

C. Total Light Output.

1. Commercial Properties - The total amount of outdoor lighting, whether shielded or unshielded, shall not exceed 2.5 footcandle per square foot of hardscape
2. Multi-Family Residential Properties - The total amount of outdoor lighting, whether shielded or unshielded, shall not exceed 2.0 footcandle per square foot of hardscape.
3. Residential Properties - The total amount of outdoor lighting, whether shielded or unshielded, shall not exceed 1.0 footcandle per square foot of hardscape.
 - a. Residential units used for overnight accommodations or commercial uses shall comply with residential standards for total light output.
4. For all Properties – Light output from indoor and outdoor sources shall not exceed 0.1 footcandles at the property line.

D. Maximum Color Temperature of All Lighting Fixtures.

1. The correlated color temperature of any outdoor lighting fixture shall not exceed three thousand degrees kelvin (3000°K).
- E. Fully Shielded Fixture Requirements.
1. Unless specifically exempted by this chapter, all outdoor lighting shall use fully shielded fixtures that are designed and constructed so that:
 - a. No light is emitted and/or reflected above the horizontal plane of the fixture.
 - b. Lighting is placed and/or directed at a location, angle, and/or height to prevent direct illumination outside the property boundaries where the light fixtures are located.
 - c. Where a light manufacturer provides a BUG rating, the upright rating (U) shall equal zero (0).
 2. Characteristics:
 - a. To qualify as a fully shielded fixture, the top and sides of a light fixture shall be made of completely opaque material, such that light only escapes through the bottom of the fixture. Fixtures with translucent or transparent sides, or sides with perforations or slits, do not qualify as fully shielded. Any glass or diffuser on the bottom of the fixture must be flush with the fixture (no drop lenses) and must not reflect light such that it returns to break the horizontal plane established at the top of the fixture. Merely placing a light fixture under an eave, canopy, patio cover or other similar cover does not qualify as fully shielded.
- F. Exemptions To Fully Shielded Fixture Requirements. All lighting identified in this section shall be excluded in the calculation of total candlefoot output allowed.
1. Spotlights:
 - a. Spotlights controlled by motion sensors having a light output less than one thousand (1000) lumens per lamp are exempt from the fully shielded requirement, provided:
 - i. The fixture is a spotlight or other type of directed light that shall be directed at a forty-five-degree (45°) angle or less, where the zero (0) angle is pointing straight down, and
 - (a) The fixture must not be placed in such a manner that results in light trespass, and
 - (b) The lighting elements controlled by motion sensors shall not be triggered by movement or activity located off the property on which it is located.
 - ii. The fixture is hooded or shielded to the extent necessary to prevent glare on adjacent properties or roadways.
 - iii. The lighting is activated by motion sensors and shuts off, within or before, fifteen (15) minutes after each disturbance or when the activity involved is completed.
 2. Pathway Lights:
 - a. Pathway lights less than eighteen inches (18") in height are exempt from the fully shielded fixture requirement if:
 - i. The total light emitted by all pathway light fixtures along the centerline of the pathway lighted does not exceed 0.5 footcandles; and
 - ii. The lights have opaque caps that direct light below the horizontal plane.
 3. Temporary Exterior Lighting:
 - a. Temporary exterior lighting intended as holiday or seasonal decorations displayed between December 1 and the following January 3, provided that individual lamps do not exceed 70 lumens and the lighting does not cause light intrusion nor interfere with the reasonable use and enjoyment of surrounding properties.
 4. Law Enforcement Lighting Traffic Control Signals and Traffic Safety Devices:

- a. Traffic control signals, traffic safety devices, and law enforcement lighting, from a governing agency, is exempt from and not governed by the provisions of this Chapter
- 5. Temporary Emergency Lighting:
 - a. Temporary emergency lighting in use by law enforcement or government agencies, or at their direction.
- 6. Pool Lighting
 - a. Underwater lighting fixtures providing illumination to all underwater areas of the pool.
- G. Restrictions On Total Amount of Unshielded Lighting.
 - 1. Outdoor lighting that is exempt from the shielding requirement in this chapter shall not contribute more than the equivalent of:
 - a. 0.25 footcandles per square foot of hardscape for commercial properties.
 - b. 0.2 footcandles per total square foot of hardscape for multi-family properties.
 - c. footcandles per square foot of hardscape for residential properties.
 - 2. All lighting fixtures shall be fully shielded when installed within twenty-five (25) feet of adjacent residential property lines.

19.73.113 - Light Curfews.

- A. Commercial Establishments.
 - 1. shall turn off all outdoor lighting, except those listed below, within one hour after closing. (For the purposes of this section, motels and hotels are considered open twenty-four (24) hours per day when they are open for the season.)
 - a. Lighting to illuminate the entrance to the commercial establishment.
 - b. Parking lot and pathway lighting required for the safety of guests.
- B. Recreational Lighting (Residential and Commercial).
 - 1. shall be turned off one hour after dusk ending the following morning at 6:00 am, except to conclude a community approved sporting event that is underway.
- C. Multi-Family Residential Properties.
 - 1. Shall be turned off one hour after dusk ending the following morning at 6:00 am, except those listed below:
 - a. Lighting to illuminate entrances.
 - b. Parking lot and pathway lighting required for the safety of guests.
 - c. Outdoor gathering and recreational spaces, when in use.
- D. Residential Properties.
 - 1. Shall be turned off one hour after dusk ending the following morning at 6:00 am, except those listed below:
 - a. Lighting to illuminate entrances.
 - b. Parking lot and pathway lighting required for the safety of guests.
 - c. Outdoor gathering and recreational spaces, when in use.

19.73.114 - Specialized Outdoor Lighting.

- A. Roadway/Streetlights.

1. Roadway and streetlights are prohibited, unless recommended by the County Engineer or required by the Utah Department of Transportation (UDOT) to provide public safety. When deemed necessary, streetlights shall utilize lamp types that are fully shielded luminaires that minimize sky glow, light trespass, and other unintended impacts of artificial lighting. All streetlights shall utilize the lowest light levels accepted by the County Engineer and/or UDOT.
- B. Parking Lots.
1. Spot or flood lighting of parking lots from a building or other structure is prohibited.
 2. The overall height of any light post used to illuminate parking lots in commercial zones shall not exceed fourteen feet (14'). All post-mounted parking lot lights shall be set back from property lines a distance equal to two and one-half (2.5) times the height of the pole, unless an internal or external shield prevents the fixture being visible from outside the property boundaries.
 3. The overall height of any light post used to illuminate parking lots in residential zones shall not exceed six feet (6').
 4. All parking lot lighting shall use fully shielded fixtures.
 5. Internal or external shields shall prevent the light source from being visible from outside the parking lots.
- C. Recreational Lighting.
1. The planning commission shall review all requests for new recreational lighting fixtures for fields or courts. The planning commission shall approve such requests only after finding:
 - a. The recreational lighting has provisions for minimizing glare, spill light, and uplight using louvers, hoods, or shielding.
 - b. The recreational lighting does not exceed illumination levels for class IV sports lighting set by the Illuminating Engineering Society of North America.
 - c. The recreational lighting only illuminates the field or court area and is shielded to prevent illumination falling outside of those areas.
 - d. The light source for the recreational light is not visible from adjacent properties.
- D. Pole mounted recreational lighting.
1. Pole mounted recreational lighting shall be limited to eighteen feet (18') in height. Pole mounted recreational lighting must be set at a distance equal or greater to the height of the pole installed from any adjacent property line.
 2. The lighting for non-field and non-court areas shall conform to all provisions of this chapter.
- E. Amphitheater Lighting.
1. Outdoor amphitheatres may use illumination to light the performance area of the amphitheater and provide public safety. The following standards apply to all amphitheater lighting:
 - a. Lighting used to illuminate the performance area must be either directed spotlighting or fully shielded lighting. If directed spotlighting, the light source must be located and designed such that it is not visible beyond the property boundaries.
 - b. Lighting used to illuminate the performance area may only be turned on during performances or rehearsals.
 - c. Lighting used to illuminate the seating areas, pathways, and other areas of the amphitheater must meet all standards of this chapter.
- F. Signs.
1. Signs may be unlighted, lighted externally, lighted internally or backlit. All sign lighting must be designed, directed, and shielded in such a manner that the light source is not visible beyond the

property boundaries where the sign is located. Lighting for signs must be directed such that only the sign face is illuminated. All lighted signs must have stationary and constant lighting.

2. Standards for Externally Illuminated Signs:
 - a. Lighting for externally illuminated signs must be aimed and shielded so that light is directed only onto the sign face and does not intrude onto adjacent streets, roads, or properties or into the night sky.
 - b. Lighting for externally illuminated signs must be mounted at the top of the sign (or within two (2) feet of the top of a building mounted sign), except for freestanding monument style signs which may be illuminated by ground mounted lighting.
3. Standards for Internally Illuminated Signs
 - a. Lighting Is Visible on Both Sides of Sign:
 - i. Only sign copy areas and logos may be illuminated on an internally illuminated sign.
 - ii. Internally illuminated signs shall use semi-opaque materials for sign copy such that the light emanating from the sign is diffused. Transparent or clear materials are not allowed for sign copy. Non-copy portions of the sign (e.g., background and graphics) shall be made of completely opaque material.
4. Standards for Backlit Signs
 - a. Only One Side of Sign Is Lit:
 - i. Backlit signs shall be designed such that the light source is not visible.
 - ii. Backlit signs shall be designed such that harsh, direct illumination does not emanate out of the sign. Rather, the backlighting shall only allow indirect illumination to emanate from the sign. For example, signs that create a "halo" effect around sign copy are allowed.
 - iii. Backlit signs shall use low lumen light sources.
5. Illuminated Window Signage:
 - a. Illuminated window signs positioned to be primarily visible outside the business structure are allowed only if there are no more than two (2) signs per business space and each sign measures less than three and one-half (3^{1/2}) square feet in area. Such signs must not be illuminated when the business is closed.

19.73.115 - Prohibited Lighting.

A. The following are prohibited.

1. Accent Lighting that is directed upward above the horizontal plane to illuminate building structures, vegetation, or for any other use, except as allowed by other provisions in this chapter.
2. Flashing, blinking, intermittent, or other lights that move or give the impression of movement, not including temporary exterior lighting that is intended to consist of or illuminate holiday or seasonal decorations from the period of between December 1 and the following January 3.
3. Floodlights or Spotlights affixed to buildings for the purpose of lighting parking lots.
4. Searchlights, laser source lights or any similar high intensity light.
5. In the case of Residential Properties, no lighting fixture shall be mounted on a structure at an elevation of more than 14 ft. above the base floor elevation identified for primary entrance to

the corresponding side of the structure. Each structure having identified a front, two sides, and a rear.

- a. For structures having sides with no entrance present. The height limitation established by the lowest base floor entrance elevation on any side of the structure shall control.

19.73.116 – Towers.

- A. All monopole, antenna, tower, or support facility lighting not required by the federal aviation administration (FAA), the Federal Communications Commission (FCC), Municipal Fire and Police, or radio towers is prohibited.
- B. When lighting is required by the FAA or the FCC, such lighting shall not exceed the minimum requirements of those agencies. Collision markers should have a dual mode for day and night to minimize impact to the night sky and migrating birds.
- C. All other lighting used on the property not regulated by the FAA or FCC shall conform to this chapter.

19.73.117 - Application and Review Procedures.

- A. Where appropriate, the Metro Township may provide information to homeowners on best practice application of the lighting principles espoused in this chapter.
- B. Lighting Plan Required.
 1. Any application for a sign permit, building permit, conditional use permit, subdivision, design/development review, and any other development application within any zoning district, including all municipal projects, requires the applicant to, as part of the application process, submit sufficient information to enable the Director or Designee to determine whether proposed lighting complies with this Chapter. All applications may be subject to review and action by the planning commission at the discretion of the Director or Designee. All applications shall include a Lighting Plan meeting the requirements articulated in (section #).
 2. Lighting Plan shall include the following:
 - a. Site Plans or drawings indicating the proposed location of lighting fixtures, both proposed and any already existing on site. Including:
 - i. height of lighting fixtures on the premises, and
 - ii. type of illumination devices, lamps, supports, shielding and reflectors used and,
 - iii. installation and electrical details,
 - b. A description of each illuminating device, fixture, lamp, support, and shield, both proposed and existing. The description shall include, but is not limited to, the manufacturer's catalog cuts and illustrations (including sections where required); lamp types, wattages, initial lumen outputs, and shielding mechanisms. A B.U.G. rating must be included if supplied for each luminaire or fixture.
 - c. A table showing the total amount of proposed exterior lights, by fixture type, lumens, and lamp type, Including a Manufacture Cut Sheet whenever possible.
 - d. Lighting plan demonstrating that no more than the allotted footcandle of light shall be utilized on the property or properties.
 - i. Commercial Properties - The total amount of outdoor lighting, whether shielded or unshielded, shall not exceed 2.5 footcandle per square foot of hardscape.
 - ii. Multi-Family Residential Properties - The total amount of outdoor lighting, whether shielded or unshielded, shall not exceed 2.0 footcandle per square foot of hardscape.

iii. Residential Properties - The total amount of outdoor lighting, whether shielded or unshielded, shall not exceed 1.0 footcandle per square foot of hardscape. Residential units used for overnight accommodations or other commercial uses shall comply with residential standards for total light output.

iv. For all Properties – Light output from indoor and outdoor sources shall not exceed 0.1 footcandles at the property line.

e. Such other information that the Director or Designee may determine is necessary to ensure compliance with this Ordinance

C. Approval Procedure.

1. An outdoor lighting plan for all new development shall be submitted for approval concurrent with the associated application process.
2. If the Director or Designee or designee determines that any proposed lighting does not comply with this code, the permit shall not be issued, nor the plan approved.

Commented [KM2]: These standards have been included elsewhere in the Chapter. You probably don't need them twice, but could include a bullet that says something like: "Lighting plan demonstrating that no more than the allotted footcandle of light shall be utilized on the property or properties, as specified in Section XX.XX.XXXX"

Commented [KM3]: See above comment - can just say Director

19.73.118 - Appeals, Violations, Enforcement, and Penalties.

A. Appeal for Exemption.

1. The Land Use Hearing Officer may approve lighting that does not conform to these standards if need is established. An applicant requesting such lighting is required to provide proof of requirements of property insurance or findings of competent research demonstrating the need for the requested lighting. The Land Use Hearing Officer may attach other conditions to the approval of such lighting that will make the lighting comply with the spirit of this chapter.

B. Violations.

1. The following constitute violations of this chapter:
 - a. The installation, maintenance, or operation of any lighting fixture not in compliance with the provisions of this chapter if such fixture is installed after the date when this chapter is formally adopted.
 - b. The alteration of outdoor lighting fixtures after a certificate of occupancy has been issued without the review and approval of the planning commission when such alteration does not conform to the provisions of this chapter.
 - c. Failure to shield, correct or remove lighting that is installed, operated, maintained, or altered in violation of this chapter.
 - d. In the event a nonconforming outdoor light fixture is destroyed, damaged, or modified by fifty percent (50%) or more, the replacement fixture shall conform with the provisions of this ordinance.
 - e. Amortization: All exterior lighting fixtures which do not conform to the standards in this Chapter shall be brought into conformance no later than 7 years from the adoption of this ordinance.

Commented [KM4]: This standard should be included earlier on in the Chapter, in the section on non-conforming uses. This gives clearer direction on when someone modifying a non-conforming light would need to convert to be compliant with this ordinance.

C. Enforcement.

1. If, after investigation, the Director or Designee finds that any provision of this chapter is being violated, the Director or Designee or designee shall give notice by hand delivery or by certified mail, return receipt requested, of such violation to the owner and/or occupant of such premises, demanding that the violation be abated within 30 days of the date of hand delivery or of the date of mailing of the notice. Planning and Development Services staff shall be available to assist

in working with the violator to correct said violation. If the violation is not abated within the 30-day period, the Director or Designee or designee may institute actions and proceedings, either legal or equitable, to enjoin, restrain or abate any violations of this chapter and to collect penalties for such violations.

2. Hillside, Ridgelines, and Special Cases

- a. In certain cases (such as, but not limited to, properties on or near ridgelines or hillsides), additional efforts may be required to mitigate the effects of light pollution, glare, light trespass, sky glow, and to curtail the degradation of the night sky visual environment.
- i. Any light source that is directly visible from outside the property boundaries on which the light source is located shall be required to demonstrate a good faith effort to redirect, shield, and/or diffuse the light source to address any unintended effect on the quality of night sky conditions within the municipality. This provision does not apply to existing lighting during which time it is subject to the amortization period identified in this section.

D. Penalties.

1. Penalties. A violation of this chapter, or any provision thereof, shall be punishable by a civil penalty of \$50.00 per day, and each day of violation after the expiration of the 30-day period shall constitute a separate offense for the purpose of calculating the civil penalty.

19.73.119 – Definitions.

For the purpose of this chapter, certain words, phrases and terms used herein shall have the meanings assigned to them by this section:

A-M

Accent Lighting: Lighting of building surfaces, landscape features, statues, and similar items for the purpose of decoration or ornamentation; or lighting that does not contribute to the safety or security of residents, guests, employees, or customers on a property.

Adaptive Controls: Devices such as motion sensors, timers, and dimmers used in concert with outdoor lighting equipment to vary the intensity or duration of operation of lighting.

Ambient light: The general overall level of lighting in an area.

Backlight: All the light emanating behind a luminaire.

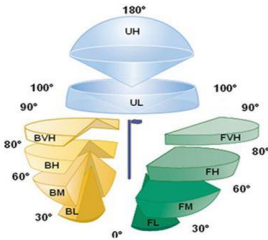
Ballast: A device used with a discharge lamp to obtain the necessary voltage, current, and/or wave form for starting and operating the lamp.

Basement: means any area of the building having its floor subgrade (below ground level) on all sides. A walkout basement that does not require a step up to grade is not considered a basement.

Brightness: Strength of the sensation that results from viewing surfaces from which the light comes to the eye.

B.U.G. Rating: A BUG Rating stands for backlight, uplight, and glare. Backlight (B) is the light directed behind the fixture, uplight (U) is any light directed upward above the horizontal plane of the luminaire, and glare (G) is the amount of light emitted from the luminaire at high angles.

ActiveLED Update



Application of BUG ratings for Dark Skies

- **Bx-U0-Gx** – Must have a “U” rating of “0” resulting in NO uplight
- The appropriate glare rating is determined by the community.

Figure XX: Explanation of BUG Ratings

Bulb or lamp: The source of electric light. To be distinguished from the whole assembly (see luminaire). Lamp often is used to denote the bulb and its housing.

Candela (cd): Unit of luminous intensity. One candela is one lumen per steradian. Formerly called the candle.

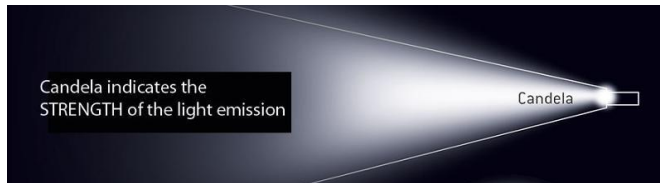
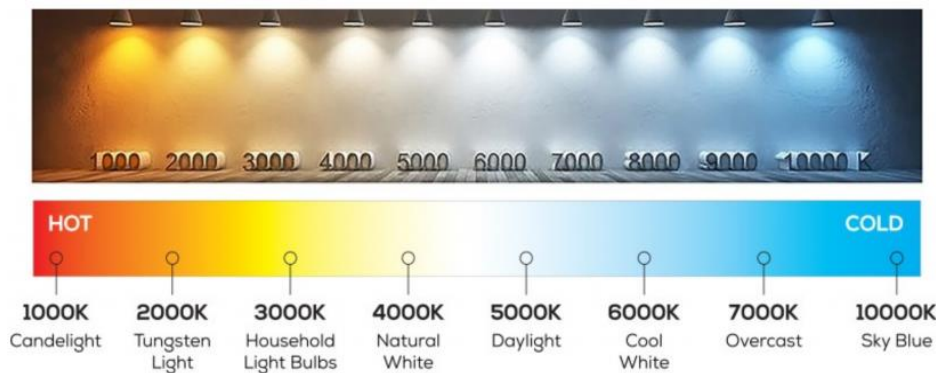


Figure XX: Candela Example

Candlepower: Luminous intensity expressed in candelas.

Correlated Color Temperature (CCT): A specification of the color appearance of the light emitted by a lamp, relating its color to the color of light from a reference source when heated to a particular temperature, measured in degrees kelvin (K).

Figure XX: Correlated Color Temperature



Cut off angle, of a luminaire: The angle, measured up from the nadir (i.e. straight down), between the vertical axis and the first line of sight at which the bare source (the bulb or lamp) is not visible.

Cutoff fixture: An IES definition "Intensity at or above 90° (horizontal) no more than 2.5% of lamp lumens, and no more than 10% of lamp lumens at or above 80°"

Diffuser: A device used to distribute light from a source.

Dimmer: Dimmers can reduce the input power requirements and the rated lumen output levels of incandescent and fluorescent lights. Fluorescent lights need special dimming ballasts. Dimming incandescent lights reduces their efficiency.

Direct Illumination: Illumination resulting from light emitted directly from a lamp, luminary, or reflector. This does not include light reflected from other surfaces, such as the ground or building faces.

Dusk: The darker part of twilight especially at night. Timetables identifying specific hour for dusk on any given day are located at: <https://www.gaisma.com/en/location/salt-lake-city-utah.html>.

Efficiency: A measure of the effective or useful output of a system compared to the input of the system.

Energy (radiant energy): Unit is erg, or joule, or kWh.

Facade lighting: The illumination of the exterior of a building. (see also Accent Lighting)

Fixture (light fixture): The assembly that holds the lamp in a lighting system. It includes the elements designed to give light output control, such as a reflector (mirror) or refractor (lens), the ballast, housing, and the attachment parts.

Fixture Lumens: A light fixture's light output after processing of emitted light by optics in that fixture.

Fixture Watts: The total power consumed by a fixture. This includes the power consumed by the lamp(s) and ballast(s).

Floodlight: A fixture designed to "flood" a well-defined area with light.

Footcandle: Illuminance produced on a surface one foot from a uniform point source of one candela.

Full-cutoff fixture: An IES definition; "Zero intensity at or above horizontal (90° above nadir) and limited to a value not exceeding 10% of lamp lumens at or above 80°".

Fully Shielded Fixture:
An outdoor light fixture constructed and mounted so that the installed fixture emits no light above the horizontal plane.

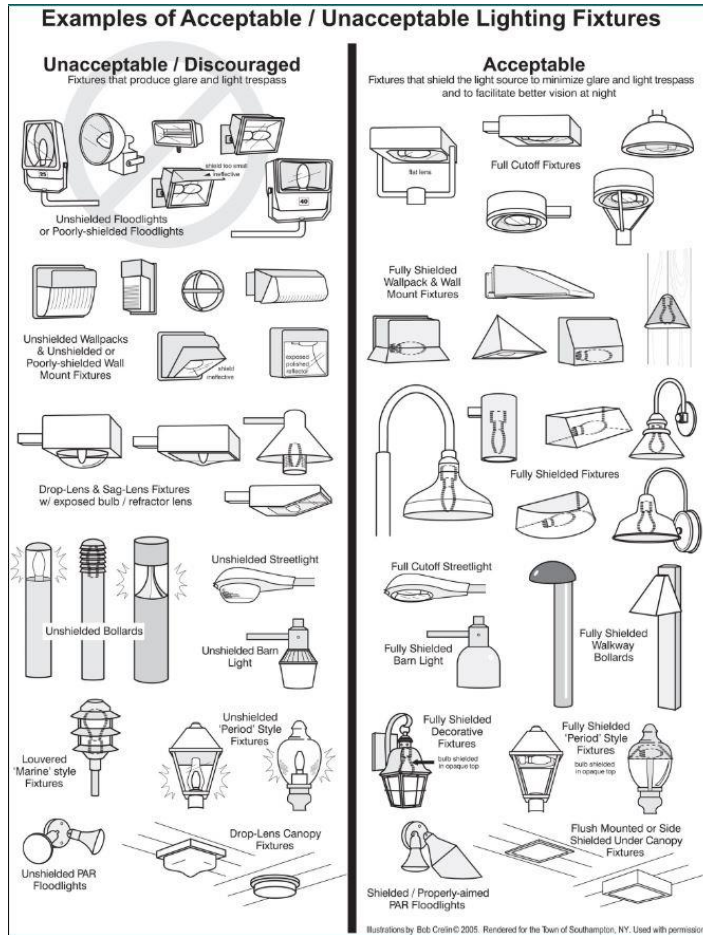
Where a light manufacturer provides a BUG rating, the uplight rating (U) must equal zero (0).

Fully shielded light fixtures must be shielded in and of themselves.

Surrounding structures, like canopies, are not to be considered when determining if the fixture is fully shielded.

Fully shielded fixtures must be appropriately mounted so that the shielding prevents light from escaping above the horizontal and all light is directed downward.

Figure XX: Types of Light Fixtures



Glare: the visual sensation caused by excessive brightness, and which causes annoyance, discomfort, or a disability loss in visual performance or visibility.

Figure XX: Unwanted Glare

Hardscape: Shall mean any non-living horizontal site element, including but not limited to patios, decks, walkways, sidewalks, driveways, and steps.

House-side Shield: Opaque material applied to a fixture to block the light from illuminating a residence or other structure being protected from light trespass.

Illuminance: Density of luminous flux incident on a surface. Unit is footcandle or lux.

Illuminating Engineering Society of North America (IES or IESNA): The professional society of lighting engineers, including those from manufacturing companies, and others professionally involved in lighting.

Incandescent lamp: Light is produced by a filament heated to a high temperature by electric current.

Indoor Lighting: Any lamp, pendant, or fixture used to illuminate the interior of any structure.

Intensity: The degree or amount of energy or light.

Internally Illuminated: As it relates to signs, any sign which has a light source entirely enclosed within the sign and not directly visible.

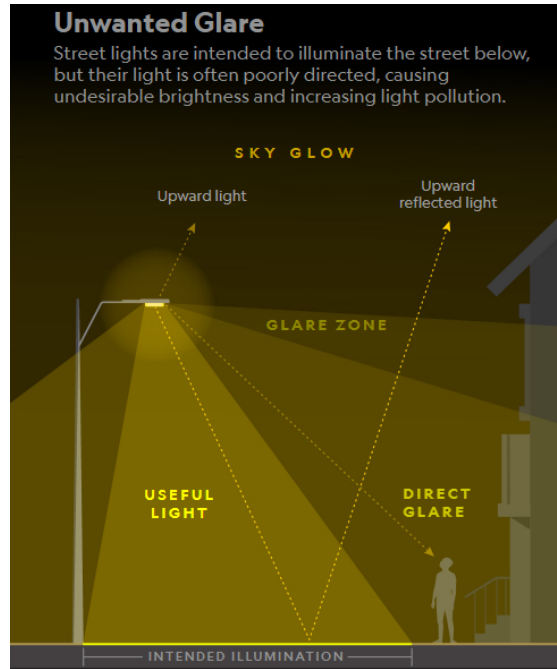
International Dark-Sky Association (IDA, Inc.): A non-profit organization whose goals are to build awareness of the value of dark skies, and of the need for quality outdoor lighting.

kWh: Kilowatt-hour: A unit of energy equal to the work done by one kilowatt (1000 watts) of power acting for one hour.

Lamp: A generic term for a manufactured source created to produce optical radiation.

Lamp Life: The average life span for a specific type of lamp. Half of lamps will perform longer than the average; the others will fail before the average.

LED: Light emitting diode.



Light Pollution: Any adverse effect of artificial light.

Figure XX: Gradient of Light Pollution in the Form of Sky Glow

Light Quality: A measurement of a person's comfort and perception based on the lighting.

Light Source: The part of a lighting fixture that produces light, e.g. the bulb, lamp, or chips on board.

Light Spill: Unwanted spillage of light onto adjacent areas and may affect sensitive receptors particularly residential properties and ecological sites.

Light Trespass: Light falling where it is not wanted or needed. Light Spill. Obtrusive light.

Figure XX: Light trespass Compared to Adequate Shielding

Lighting Controls: Devices used for either turning lights on and off or for dimming.

Photocells Sensors that turn lights on and off in response to natural light levels. Some advanced mode can slowly dim or increase the lighting. See also: Adaptive Controls.

Low-Pressure Sodium (LPS) lamp: A discharge lamp where the light is produced by radiation from sodium vapor at a relatively low partial pressure (about 0.001 torr). LPS is a "tube source". It is monochromatic light.



Lumen: A unit of luminous flux equal to the light emitted by a uniform point source of one candle intensity. Lumens refers to the amount of light emitted by a bulb (a bulb with higher lumens outputs brighter light).

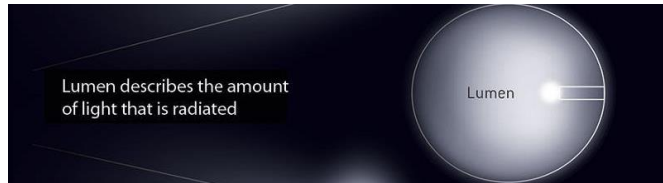


Figure XX: Lumen Example

Figure XX: Comparison of Bulbs with Light Output and Cost

LUMENS	YOU USED TO BUY		YOUR CHOICES NOW			energy use energy cost per year
	Standard Incandescents	New Halogen Incandescents	CFLs	LEDs	LEDs	
450 lumens	40 W \$5.34/yr	29 W \$3.87/yr	10 W \$1.34/yr	5 W \$0.67/yr	5 W \$0.67/yr	energy use energy cost per year
800 lumens	60 W \$8.02/yr	43 W \$5.74/yr	13 W \$1.74/yr	10 W \$1.34/yr	10 W \$1.34/yr	energy use energy cost per year
1100 lumens	75 W \$10.02/yr	53 W \$7.08/yr	16 W \$2.14/yr	15 W \$2.00/yr	15 W \$2.00/yr	energy use energy cost per year
1600 lumens	100 W \$13.36/yr	72 W \$9.62/yr	20 W \$2.67/yr	19 W \$2.54/yr (limited availability)	19 W \$2.54/yr (limited availability)	energy use energy cost per year
	TYPICAL LIFE - 1 year*	TYPICAL LIFE - 1-2 years	TYPICAL LIFE - 10 years	TYPICAL LIFE - 15-25+ years	TYPICAL LIFE - 15-25+ years	

* rated life is based on 3 hours of use per day

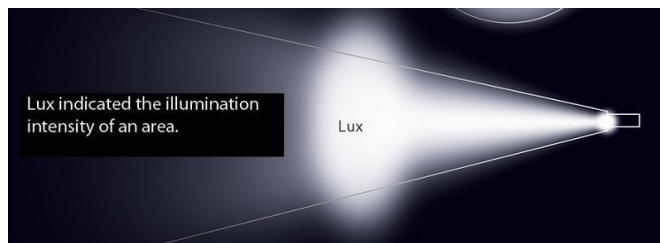
<https://georgebrazilplumbingelectrical.com/how-to-choose-the-best-light-bulb-for-your-home/>

Luminaire: A complete lighting unit that usually includes the fixture, ballasts, and lamps.

Luminance: At a point and in a given direction, the luminous intensity in the given direction produced by an element of the surface surrounding the point divided by the area of the projection of the element on a plane perpendicular to the given direction. Units: candelas per unit area.

Lux: (symbol: lx) is the unit of illuminance, or luminous flux per unit area.

Figure XX: Lux Example



Manufacturer's Catalog

Cuts: A publication or other printed material of a lamp or lighting manufacturer offering visual and technical information about a lighting fixture or lamp.

Mercury lamp: An HID lamp where the light is produced by radiation from mercury vapor.

Metal-halide lamp: An HID lamp where the light is produced by radiation from metal-halide vapors.

Mounting height: The height of the fixture or lamp above the ground.

N-Z

Optic: The components of a luminaire such as reflectors, refractors, protectors which make up the light emitting section.

Outdoor Light Fixture (Outdoor Lighting): An outdoor, electric, or solar powered, illuminating lamp or similar device used for lighting structures, parking lots, pathways, service canopies, recreational areas, signs, or other similar outdoor uses. These lighting fixtures may be attached to a building, parking structure, or sign, or may stand on their own.

Partially Shielded Light Fixture: An outdoor light fixture constructed and mounted so that the installed fixture emits most of its light below the horizontal plane. Light emitted at or above the horizontal plane (sideways or upwards) shall arise solely from incidental decorative elements or strongly colored or diffusing materials, such as colored glass or plastic. Fixtures using spot or flood lamps are considered partially shielded if the lamps are aimed no higher than forty-five (45) degrees above the vertical plane beneath the fixture.



Figure 1: Unshielded versus Shielded Light Fixtures

Pathway Lights: A luminaire, or collection of luminaires, less than eighteen inches (18") in height, lining one or both sides of a pathway which offer illumination to guide along an outdoor path or walkway.

Photometry: The quantitative measurement of light level and distribution.

Photocell: An electronic device that changes the light output of a luminaire dynamically in response to the ambient light level around the luminaire.

Pool Lighting: Underwater lighting fixtures providing illumination to all underwater areas of the pool.

Recreational Lighting: Lighting used to illuminate sports fields, ball courts, playgrounds, or similar outdoor recreational facilities.

Reflector: An optic that achieves control of light by means of reflection (using mirrors).

Refractor: An optic that achieves control of light by means of refraction (using lenses).

Security Lights: Lighting designed to illuminate a property or grounds for the purpose of visual security.

Shielding: An opaque material that blocks the transmission of light.

Skyglow: The brightening of the nighttime sky resulting from the scattering and reflection of artificial light by moisture and dust particles in the atmosphere. Skyglow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the nighttime sky (**Error! Reference source not found.**).

Spotlight: A fixture or lamp designed to light a small area very brightly. See definition of Floodlight.

Stray light: Emitted light that falls away from the area where it is needed or wanted. Light trespass.

Task Lighting: Task lighting is used to provide direct light for specific activities without illuminating the entire area.

Tower: Any monopole, antenna or the like that exceeds eighteen feet (18') in height.

Unshielded Fixture (lighting): A fixture that allows light to be emitted above the horizontal plane, either directly from the lamp or indirectly from the fixture or reflector.

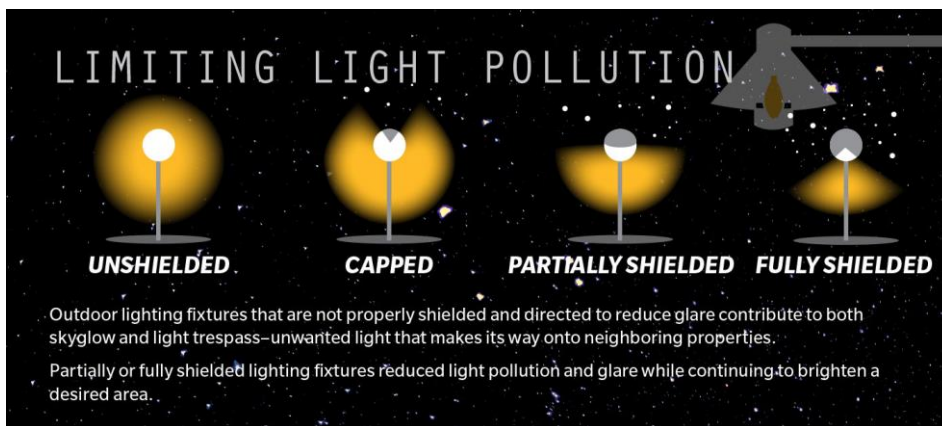


Figure XX: Unshielded, Capped, Partially Shielded, and Fully Shielded Fixtures

Vertical Illuminance: The amount of light falling on a vertical surface or plane.

Visibility: Being perceived by the eye. Seeing effectively. The goal of night lighting.

Wallpack: A luminaire, typically affixed to the side of a structure, used for area lighting.