

OUTDOOR LIGHTING GUIDELINES



McDonald Observatory is a 500-acre satellite campus of the University of Texas at Austin, located in the heart of the Davis Mountains in far West Texas. This world-class astronomical research facility is home to some of the world's largest telescopes and darkest night skies.

An ongoing initiative seeks to raise awareness in surrounding communities, including the oil and gas industry, about the value of protecting the skies for the Observatory.

Adoption of night sky friendly lighting practices has the added benefits of creating a more attractive nighttime environment, cost-efficiency, improved visibility, and increased safety and security through reduced glare.

Many existing outdoor lighting ordinances contain language that is overly technical, prompting community planners to fear the need to hire lighting engineers for any possibility of enforcement. In response to these concerns, three basic guidelines for outdoor lighting installations are being adopted by counties and municipalities surrounding McDonald Observatory that are more common sense and easier to enforce:

1) Shield and aim fixture as necessary to prevent the light source from being visible from off site or off property.

This guideline addresses the common concern of "light trespass", the unwanted spill of light originating on one property onto another (often into a neighboring bedroom window!). The goal is for everyone to keep their light on their property. Additionally, shielding a light source from view beyond the area of useful illumination dramatically reduces what is often debilitating glare.

2) Maximum color temperature of 2,700-degrees Kelvin.

This guideline stipulates the use of "warm-white" light sources, akin in appearance to traditional incandescent bulbs, prohibiting the use of blue-rich "cool-white" source such

as Mercury vapor, metal-halide, and many, but not all, LEDs. The American Medical Association has repeatedly warned of adverse effects to human health from exposure to cool-white light at night (<https://www.ama-assn.org/sites/ama-assn.org/files/corp/media-browser/public/about-ama/councils/Council%20Reports/council-on-science-public-health/a16-csaph2.pdf>).

3) No more than 100,000 lumens per net acre in any contiguous illuminated area.

This guideline, borrowed from the Flagstaff AZ outdoor lighting ordinance, seeks to prevent overly bright installations, using more light than is necessary for the application at hand. For example, many gas pump islands at service stations/convenience stores are lit far beyond illumination levels recommended by the Illuminating Engineering Society of North America (<https://www.ies.org/product/lighting-for-exterior-environments/>). After eyesight adjusts to overly bright lighting levels while pumping gas, drivers may experience impaired visibility upon driving back onto to a relatively dimly lit street or highway.

While the goal of these guidelines is to simplify the regulatory language for consumers of outdoor lighting, some may object to the use of apparently technical terms referencing the “Kelvin” scale for color temperature, or the use of “Lumens per acre” for limiting illumination levels. However, responsible lighting manufacturers provide these quantities on product packaging or spec sheets (photo #1). If these quantities are not provided, look elsewhere for a product as the seller is not providing the information for a consumer to make an informed choice.

Following these guidelines not only helps protect our view of the starry night sky, but also provides for a well lit living and working environment with reduced glare, improved visibility, and increased health, safety, and security. This is about dark skies, not dark ground.

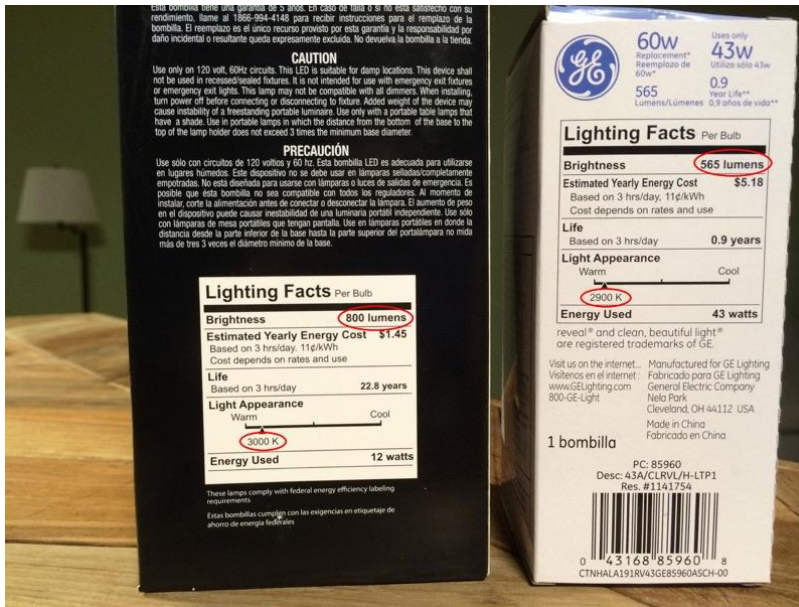


Photo #1. Lumen and Color Temperature information on light bulb packaging.

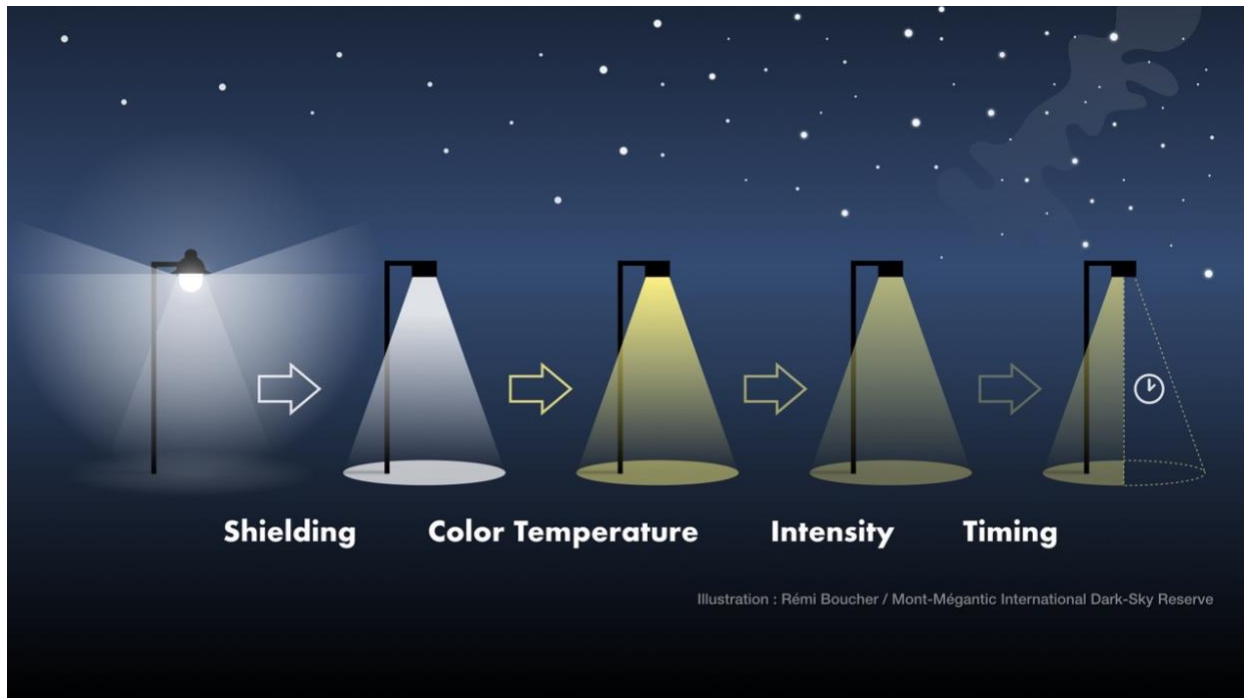


Illustration #1. The characteristics of good lighting: 1) Use shielding to reclaim wasted light and direct it to the area to be lit. 2) Lower the color temperature from “cool-white” light to “warm-white”. 3) Lower the intensity to provide as much light as is needed for the application, but no more. 4) Use adaptive controls, e.g., timers, half-night photocells, motion sensors, software, etc., to limit the hours the light is in use.



Photo #2. Lighting at the Hotel Limpia in Fort Davis, Texas. Partially shielded “cool-white” bulbs (left) replaced by fully shielded “warm-white” ones (right). Hotel maintenance staff report routinely picking up the former from the ground in the morning after guests removed them due to harsh white light shining into their rooms.



Photo #3. Apache Corporation tank battery near Balmorhea, Texas, using night sky friendly lighting. The Diamond Cryo Complex (photo #4, below) is visible on the horizon to the top, right.



Photo #4. Apache Corporation Diamond Cryo Complex near Balmorhea, Texas, using night sky friendly lighting.