

Addressing Light Pollution with the GameChanger Series

Light pollution is a broad term defined by the International Dark Sky Association as the inappropriate or excessive use of artificial light. Components of light pollution include:

Glare — excessive brightness that causes visual discomfort.

Skyglow — brightening of the night sky over inhabited areas.

Light trespass or Spill Light — light falling where it is not intended.

Clutter — bright, confusing and excessive groupings of light sources.

This document will address Glare, Skyglow and spill. Clutter is primarily the result of multiple lighting systems in urban areas or poorly designed street or walkway areas.

Qualite has been a sustaining member of the IESNA with an active member on the Sports Lighting committee for over 30 years. The IESNA is the only recognized lighting authority in the United States.

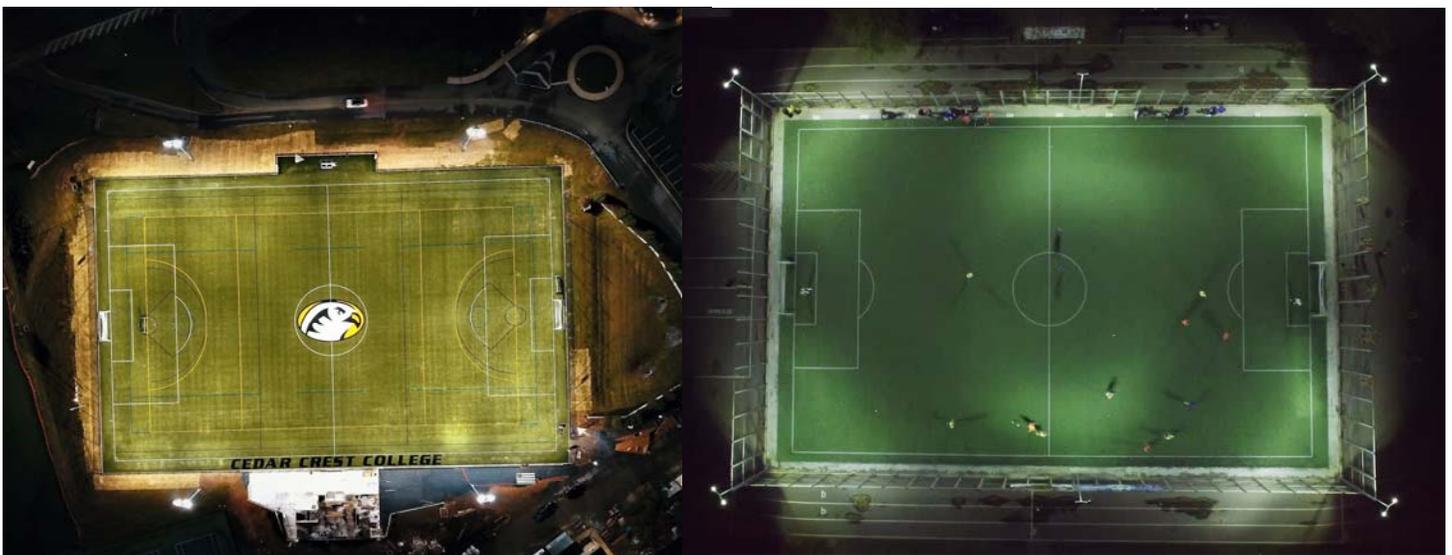
Qualite helped create and adheres to the recommendations laid out by the IESNA Sports Lighting Committee RP-6 manual. Pertaining to glare, spill and skyglow; the RP-6 provides recommendations on pole locations, mounting heights, aiming angles and other factors that may impact light pollution.

The images below show the significant difference between TIR and reflector technology in controlling spill. The TIR field has more than twice the light on the playing surface and less light outside the playing surface.

Soccer field lit to 50 footcandles

With Qualite GameChanger system

Soccer field lit to less than 20 footcandles with reflector technology.

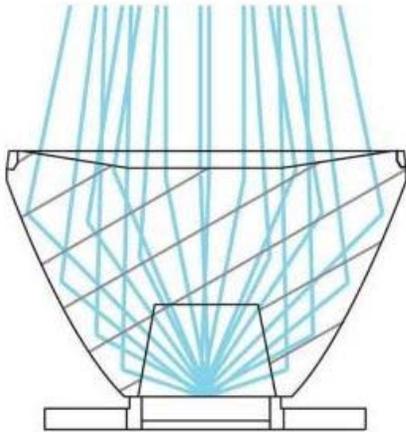


Qualite uses the most advance optical technology to control the light to reduce spill and glare and also increase the overall system efficiency. We utilize TIR lensing instead of the traditional reflector technology to significantly reduce spill, glare and skyglow.

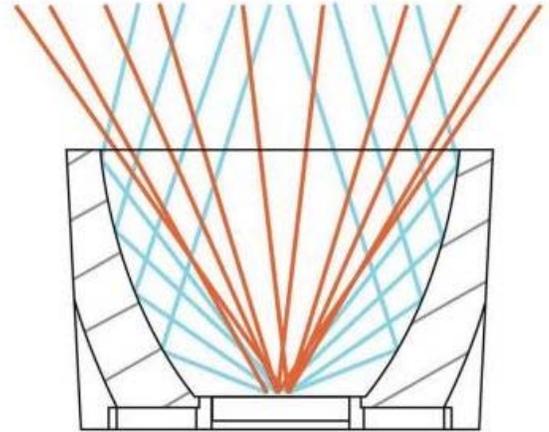
TIR Optics

Designed around the phenomenon where light traveling from one medium to another of lesser optical density hits the interface at an angle and reflects with 100 percent of the beam energy, TIR optics, or TIR lenses, consist of a refractive lens nestled inside a reflector and are typically cone-shaped with optical efficiencies as high as 92 percent. The lens directs light from the source's center to the reflector, which sends it out in a controlled beam. An additional surface over the assembly provides another opportunity to modify the light.

Total internal reflection (TIR) lens



Legacy reflector

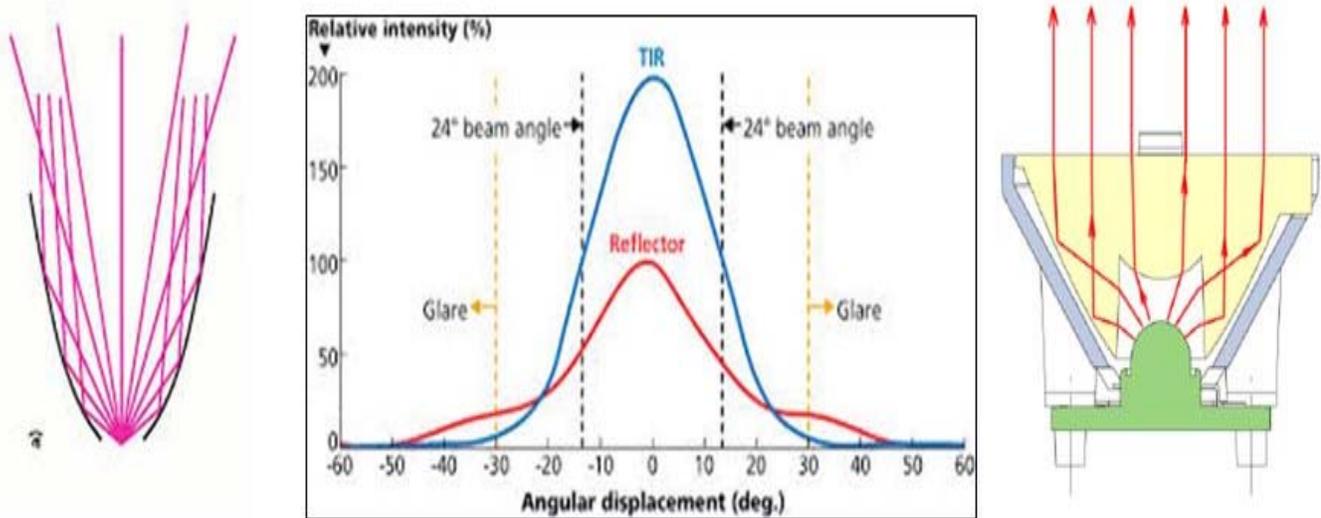


TIR optics, which consist of a refractive lens inside a reflector, capture and redirect more light emitted from an LED than a conventional optic, such as a parabolic reflector.

Qualite also offers external shielding for extreme control needs, but external shields significantly reduce efficiency and are not typically required due to the excellent control provided by our custom TIR optics.

Glare is addressed utilizing all of the previously mentioned technology and design strategy along with the proper beam types. We have developed multiple beam shapes both symmetrical and asymmetrical; in the horizontal and vertical plane, to provide our designers with the best tools to put the light where it is needed and not allow it to “spray” out in an uncontrolled manor.

The figure below shows how glare is measured and controlled with TIR lensing as opposed to reflector technology:



Any light outside of the “beam angle” (defined as 50% of the max output) is potential glare, even if the proper pole locations and mounting heights are used.

