

OPTICAL ADVANTAGES



BULLSTAR

SERIES

INTRODUCTION

Introduced in 1993, white color Light Emitting Diodes have outlined as one of the most prominent lighting solutions for the forthcoming millennium. Following the Moore's law for luminous efficiency and thanks to the appearance of the first High power LEDs by year 2000, contemporary Light emitting Diodes have reached levels of light emissions surpassing that of the most popular artificial lighting solutions.

As a long year experienced company in the application of Light Emitting Diodes for General Lighting, Octa Light has made deep analysis on the main factors affecting overall brightness of lighting fixtures based on LEDs.

Light emitted by a solid state device is characterized by three main factors:

- Overall Luminous flux exiting from the device. It is measured in radiometric power (mW) for single color sources or photometric power (Lumen) for broad light spectrum sources.
- Spectral power distribution – Characteristic defining the color of a Light Emitting diode, in which the emission power for each wavelength of visible light is defined.
- Light emission pattern – defined as the luminosity of a Light Emitting Diode depending from the angle at which a viewer perceives light



All the three factors are independent one from the other, and all of them combined characterize the quality of a Solid state light emitting device.

Independently from the different technologies used worldwide for bettering light output, most of the market available high power light emitting diodes are characterized by a typical Lambertian light emission pattern, which idea is to most closely reassemble a light source emitting at equal optical powers in all viewing directions. Based on these characteristics, most of the light emitting devices for general lighting have the need of applying secondary optics in order to concentrate light emissions in the directions suitable for the specific application.

A typical lambertian emission from most common available light emitting diodes has the following distribution:

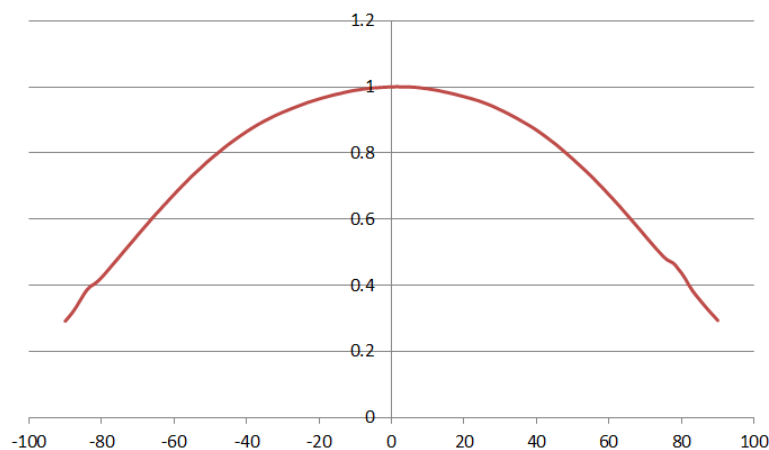


Figure 1 – Light emission versus angle normalized for top view (0 degree) of a commercially available Light Emitting diode with Lambertian emission pattern

LEDs with such pattern are nowadays mostly used for general lighting purposes. As it can be seen from Fig.1, light output gradually decreases when viewing angle from top is increased. Great part of emitted light is however emitted at large angles (side view).

When applied for general illumination – interior or exterior lighting, such illumination is proven to be partially lost – both because of luminaire design impeding side emission or because of luminaire mounting height.

An example can be given with an LED mounted in a room at a height of 2.6 meters. All light exiting at degrees above 120 from the light emitting source is lost or hits the surrounding walls, lowering this way the average illumination perceived by humans at floor level.



Additionally, for concentrating more light towards effective directions, a popular approach is to use secondary optics of collimating or reflector types. Despite correcting the emission pattern, such approaches add additional costs to lighting fixtures and lower the overall luminous output of a lighting system (average 5-15% light loss due to secondary optics materials)

To overcome all these problems, Octa Light has successfully designed and introduced in its BullStar series advanced optical features, which permit maximizing useful light output for general lighting applications.

The BullStar light pattern defined as *focused* shows a specific light distribution, which, while maintaining the $2\Theta_{1/2}$ angle at 110-115 degrees, concentrates more than 90% of the overall emitted light within the useful viewing angle for general lighting applications.

Defining the advantages of such optical characteristics, the standard available Lambertian radiation pattern can be compared to the typical Octa Light *focused* radiation pattern:

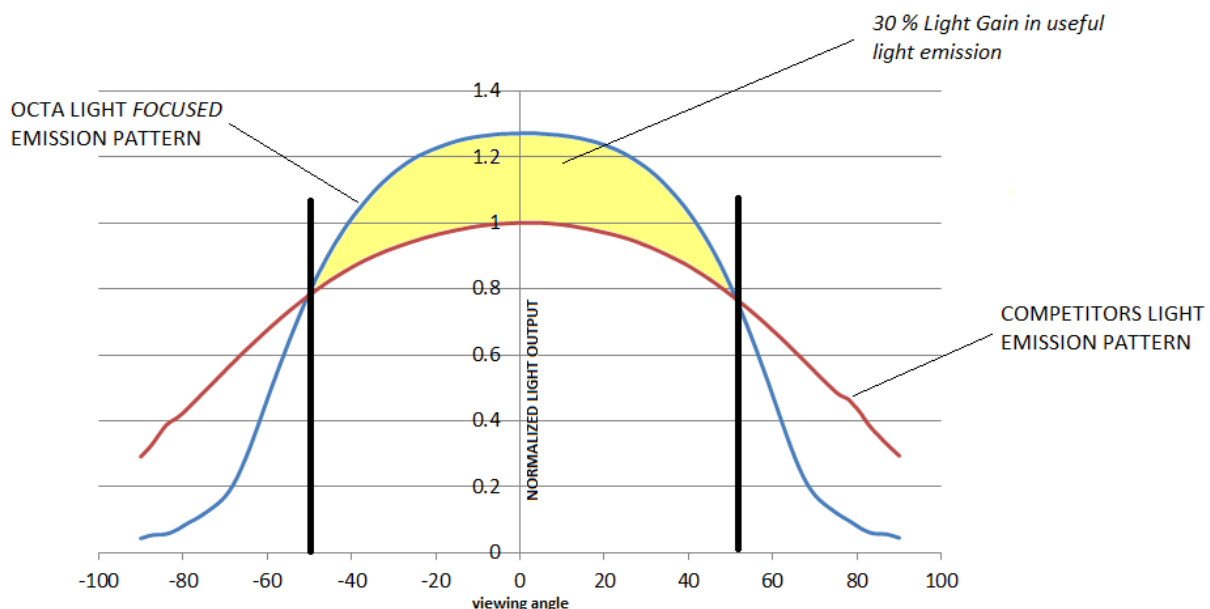


Figure. 2 – Comparison between commercially available Lambertian pattern and Octa Light Focused light distribution pattern. The graph is normalized for competitor's maximal output at 0 degree viewing angle

Figure.2 shows a direct comparison between a commercially available LED and an Octa Light Bullstar Series LED.



Both Light emitting diodes have the same overall luminous flux of 120 Lumens, but thanks to its optical pattern, the BullStar series show a 30% raise of light emission within the useful viewing angle for general illumination.

COMPANY INFORMATION

Octa Light Bulgaria Plc is the first Bulgarian Manufacturer of High Power Light Emitting Diodes for general lighting applications. The long year company experience in artificial lighting on LED basis has made possible the creation of the first European LED specially designed for reaching best performance in light output, optical efficacy and thermal management.

Octa Light Products help reduce CO₂ emissions and reduce the need for power plant expansion.

Thanks to its advanced optical properties, the BullStar series enable never before possible applications in outdoor, indoor, industrial, architectural and general lighting when pure white light is necessary. The sophisticated optical properties allow strong package light concentration suitable for most general lighting applications without the need of any secondary optics.

Octa Light is a fully integrated supplier, offering core Light emitting devices in all three base colors - red, green, blue and white, as well as exotic colors as pink, cyan, yellow, purple and other on basis of client requirements. Octa Light Bulgaria Plc is entirely based within Europe, with R&D and manufacturing centers in Bulgaria. Founded in 2010, Octa Light commits to continuously rise the lumen efficiency of its products and to bring its light emitting diodes closer to mass usage within next years.

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