

binay
Model QUADRABAY and CIRCLOBAY
PowerLED High Bay Luminaires

BINAY's QUADRABAY and CIRCLOBAY High Bay Luminaires are a one-to-one replacement for existing HID High Bay Luminaires, and offer low power consumption coupled with maintenance-free long life in an economical form factor

The BINAY PowerLED QUADRABAY/CIRCLOBAY Type High Bay Lighting Luminaires are designed particularly for replacement of conventional lamps in **indoor high bay lighting in factory sheds, industrial shop floors, warehouses, etc.** (which are normally illuminated with Metal Halide (MH), HPMV (Mercury) or HPSV (Sodium) lamps of 400W, 250W, 150W or 70W ratings).

The Luminaire utilises Power Light Emitting Diodes (LEDs) of high efficiency with a life duration of 50,000 hours and above (to 70% lumen maintenance). It can withstand a wide variation in input voltage, with minimum infrared or ultraviolet radiation content.

On account of the 180°-directivity property of LEDs, (enabling the LEDs to be directed where required in the workspace), no reflector is required in the luminaire itself. This ensures that there is no loss of luminous energy in reflection (as happens in the case of HPSV and other light sources which radiate all around, thus requiring reflection downwards, resulting in lower luminaire efficiency of less than 60%). LEDs can be provided with optics, and being point sources of light, can be directed where light is wanted, thus avoiding light pollution.

BINAY's specific expertise is in providing LED lighting having the greatest light output at the lowest power consumption, by using special Ultra High Efficiency LEDs of 200 lumens/watt rating or greater. Our abiding principle is to provide maximum light, while at the same time reducing the actual power consumed to as minimal value as possible – thus enabling much higher system efficacy than competitive products. **The user benefits from enabling operational costs on a continuous basis, year after year.**

Furthermore, apart from standard 230VAC operation LED lights, BINAY PowerLED lighting products can be used with our **optional Low-Voltage DC Bus System Technology, which eliminates the unreliable LED 'driver'.** Apart from greater reliability, this Technology also allows greater safety (fire and electrocution-safe), extended dimming capabilities, and easier control of operation.

Saves Money

- Extremely power efficient compared to conventional discharge lamps
- 10 year designed life. Eliminates annual bulb and ballast replacement costs
- Eco-friendly (no mercury, no lead). Eliminates hazardous disposal costs

Saves Energy

- Up to 75%-85% energy savings over comparable discharge lamps with ULTRA HIGH EFFICIENCY LEDs (source 200 lumens/watt)
- Also saves as compared to fluorescent, inductive, or low-pressure sodium

Better, Clearer, Spectrally Enhanced Light

- Full spectrum high Colour Rendering Index white light provides greater clarity and visual acuity
- High colour rendering improves visibility and safety
- Smooth and even light distribution

Designed for Long and Reliable System Lifetime

Primary heat dissipation is through thick aluminium heatsinking with fins on the body surface, providing full dissipation of heat from the LED junctions to the ambient air



BINAY QUADRABAY POWERLED BAY LIGHT

BINAY CIRCLOBAY POWERLED BAY LIGHT

...continued overleaf



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The BINAY PowerLED Bay Light range consists of the following general models (other models are available as per specific requirements):

BINAY Model	Approx. Source Lumens	Power Consumption (Note: All wattages are approximate)
QUADRABAY-10KL-ES/50PWC 'ENERGY SAVING' (Or CIRCLOBAY-10KL-ES/50PWC 'ENERGY SAVING')	10,000 lumens	50W
QUADRABAY-15KL-ES/75PWC 'ENERGY SAVING' (Or CIRCLOBAY-15KL-ES/75PWC 'ENERGY SAVING')	13,500 lumens	75-80W
QUADRABAY-20KL-ES/100PWC 'ENERGY SAVING' (Or CIRCLOBAY-20KL-ES/100PWC 'ENERGY SAVING')	20,000 lumens	100-110W
QUADRABAY-30KL-ES 'ENERGY SAVING' (Or CIRCLOBAY-30KL-ES 'ENERGY SAVING')	30,000 lumens	150-180W

Specific Technical Data for all models is available on request

THE PROBLEM WITH HPSV LIGHT

It has been observed at various installations that occupants find that LED lighting gives better clarity and sharper vision, even when light levels are reduced. This is a unique advantage of this product, and follows from the particular combination of the following factors – the LED emission characteristic and the Scotopic vision attributes of the human eye. These two factors allow for enhanced activation of the 'Rod' cells inside the eye, enabling greater control of the eye's pupil size. Smaller pupil size provides an improved focus, leading to sharper vision and better visual clarity, and thus allowing greater visibility even at lower light levels.

The HPSV lamp is being increasingly eliminated all over the world because of the property of the human eye in regard to night/indoor vision. The human eye has got two photoreceptors:

- (A) Cones, which are active in daylight.
- (B) Rods, which are situated at the periphery, and are active at night in ambient light which is less than 3 candela/sq. m. This region of eye sensitivity is known as the Mesopic region, and is active at night time and in indoor locations.

The sensitivity of the Cones is at a maximum at the yellow wavelength, and tapers down towards blue and red wavelengths. The sensitivity of Rods is maximised at blue wavelengths.

HPSV lamps emit their maximum energy in the yellow region, with practically negligible energy in the blue-green region (where 'Rods' are active). The blue portion of the spectrum, which is abundant in sun-, moon-, and starlight, is needed for the proper function of the human eye, and it appears that its importance to a person's visions increases as light levels decrease. **Blue-deficient light sources like HPSV do not provide the same amount of visual stimulation as sources that produce spectra rich in blue.** Consequently, in the Mesopic region (as in indoor locations), very few Rods are activated by HPSV light. As such, in HPSV, while in the Photopic vision area (which is not active in indoor locations) the efficiency is more than 100 lumens/watt, this efficiency reduces to only 22 lumens/watt in Mesopic region. This leads to the following basic disadvantages:

- Efficiency: The visual efficiency of the HPSV lamp falls by 7 times, in comparison to Scotopically enhanced white light from LEDs.
- Focus: The pupil of the eye is activated by blue wavelengths, and in its absence (as in HPSV light) the pupil is wide open. This affects the depth of focus of the eye, making it difficult to focus on precision tasks. It is estimated that productivity falls by 50%, as compared to Scotopically enhanced white LED light.
- Peripheral vision: The 'Rods', which contribute to peripheral vision, are not activated by HPSV light. Activities occurring at the periphery of vision may not register properly, resulting in an accident. As such, HPSV can be a safety hazard.
- Colour Rendering Index (CRI) of HPSV is only 22 (CRI of sunlight at noon is 100). Colours are not seen properly, creating an unpleasant visual ambience.
- High-pressure discharge lamps require time to attain full light output on restarting (after power is recycled). This can be a security hazard.

As such, HPSV lamps are a very poor source of outdoor lighting in indoor locations. On the other hand, the spectrum of the LED output is continuous and it is more prominent in the blue region. Moreover, since the LED itself (in LED-based lights) is operated on direct current, LED-based lights have no stroboscopic effect (as with HPSV and fluorescent tubes, which run on AC current).

All of the above reasons result in a radical decrease in the wattage of an LED-based High Bay Light required for equal visual performance.

THE PROBLEM WITH METAL HALIDE

While metal halide lamps have a higher visual efficiency as compared to HPSV (due to greater blue content in the 'whiter' light output of MH), they are plagued with their own problems; standard metal halide systems do not include any dimming capability, experience colour shift over time, require four minutes to start, and require about 10 minutes for re-strike after shut-off. **Most significantly, at 40% of service life, light output and efficacy experience severe degradation. A 400W metal halide lamp, for example, may produce 36,000 lumens initially; but only 25,000 at 40% of life (a 30% decline). Therefore, unless the lamps are periodically group-relamped, a large system's "average" performance over time is much lower than its initial ratings.**



THE VISUAL PERCEPTION PROBLEM: A warehouse illuminated with HPSV lighting



Same warehouse illuminated with white scotopically enhanced light



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