



P85 1

Next Generation LED Luminaire
with AeroFlow® Cooling System





P851 is a mid-power version of our successful P850 - a groundbreaking road lantern that perfectly combines innovations in heat management, optical performance and energy saving in a beautifully simple aesthetic exterior. The P851 minimises energy and operating cost by reducing overlighting; a result of very low thermal resistance LEDs that give exceptionally low lumen depreciation over life.

P851 offers the ultimate solution to replace traditional HID sources with versatility and reliability. The sleek, low profile appearance and low weight allows the P851 to be safely installed on existing column infrastructure.

Exceptional thermal management is achieved through the innovative AeroFlow® Cooling System providing a long service life.

P851 represents the state-of-the-art in the design of LED luminaires at a surprisingly affordable price.

BENEFITS

- Slim, elegant and state-of-the-art design
- Next generation high flux density and efficacy LED
- Superior luminaire efficacy up to 107 lm / W
- AeroFlow® Cooling System
- L90 > 100,000 hrs (1000mA, Ta = 15°C)
- Maximised savings on energy and maintenance costs
- Minimal Total Cost of Ownership (TCO)
- Up to ME3 and S1/P1 lighting class applications
- G6 glare rating. Dark sky friendly, no upward light
- Flexible and intelligent lighting control options
- Lightweight and low windage allowing retrofit onto most existing columns
- IP66 ingress protection
- 100% recyclable, low carbon footprint

FLEXIBLE MOUNTING OPTIONS

Universal SE/PT spigot caps to suit Ø34-42mm, Ø42-60mm and Ø76mm nominal diameter spigots providing -10°, -5°, 0°, +5° and +10° tilt in both post top and side entry arrangements with permanent indication on the luminaire.





P851 in comparison with P850

EXCEPTIONAL OPTICAL PERFORMANCE

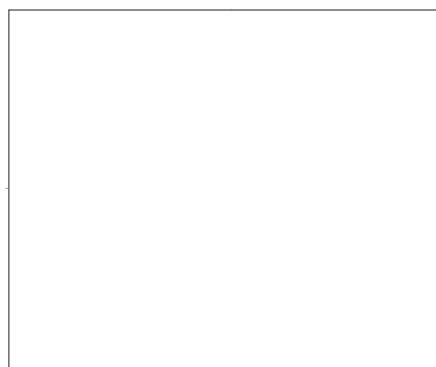
- Standard Neutral White LEDs (CCT = 4000K)
- Colour Rendering Index > 70
- Improved mesopic vision
- Exceptional uniformity
- Dark sky friendly (zero upward light)
- Minimal glare (G6)

Luminaire Luminous Flux	3320 ~ 13140 lm
Luminaire Efficacy	up to 107 lm/W

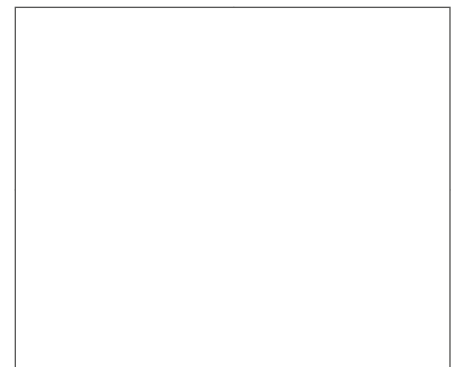
REFLECTOR TECHNOLOGY

Each luminaire uses a high purity 95% total reflectance aluminium reflector. A variety of distributions can be selected to meet a wide range of lighting tasks on both main traffic routes and subsidiary roads.

Two examples of lighting distribution



Standard



Wide

HEAT DISSIPATION RIM

- Dissipates heat evenly
- Aesthetically pleasing
- Easy handling for operatives

LUXEON® M LEDs

- Superior light output
- High flux density & efficacy
- Proven reliability
- Tight CCT control

FLAT GLASS

- Vandal resistant toughened glass
- IP66 sealed, easy cleaning
- Full cut-off distribution
- Dark sky friendly
- Low glare
- Pollution friendly

LIGHT ENGINE

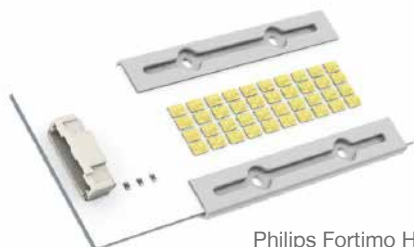
- Thermal path is designed to optimise the heat transfer away from the LEDs, for low lumen depreciation
- Metal core PCB with Luxeon® M LEDs (standard)
- Zhaga compliant light engine option
- Luxeon® M and Zhaga light engines interchangeable

INTERFACING FINs

- Dissipate driver's heat into housing
- Increase driver's life and reliability

HOUSING

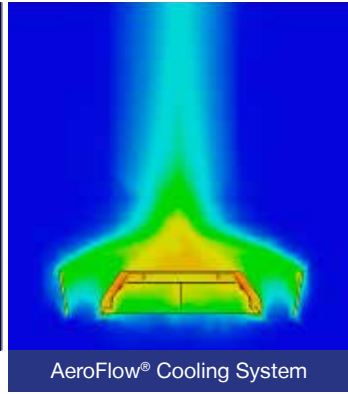
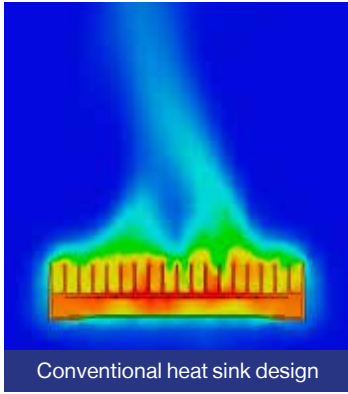
- High pressure die cast aluminium
- Unique design has capacity to spread heat uniformly
- Corrosion resistant
- Sustainable and recyclable



Philips Fortimo HBMt

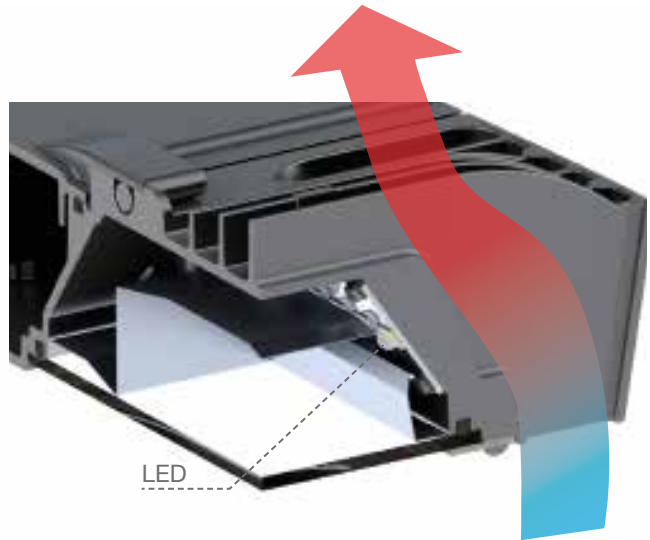
Zhaga light engines

P851 is suitable for use with a Zhaga compliant light engine. This can either be specified from new or can be a light engine replacement for the standard Luxeon® M solution at end of life.



AeroFlow® COOLING SYSTEM

Unique aerodynamic vents created by the vertical fins and the outer rim are designed to accelerate natural convection through the heatsink. Each airway is heated and the rising hot air draws cold air in from the bottom, immediately cooling the LEDs. On leaving the vents, the hot air converges smoothly into a laminar flow, quickly removing heat from the luminaire.



HIGH EFFICIENCY REFLECTORS

- >95% Total Reflectance
- Highly specular surface

THERMAL BARRIER

- Gear and optical compartments are separated for optimised thermal management

PROGRAMMABLE LED DRIVER

- Long lifetime and robust protection against temperature, moisture and vibration
- Module Temperature Protection (MTP)
- Integrated Dynadimmer, 1 - 10V or DALI dimming inputs
- Adjustable Output Current (AOC)
- Constant Light Output (CLO)

ACCESS PANEL

- Spacious and secure access area
- IP66 sealed

UNIVERSAL SPIGOT CAP

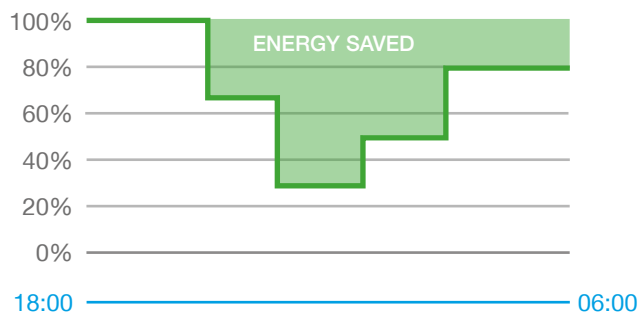


DYNADIMMER

The Philips Xitanium electronic driver incorporates the Dynadimmer feature, a programmable 5-step dimming system which will generate substantial energy savings by providing the precise amount of light at the right time.

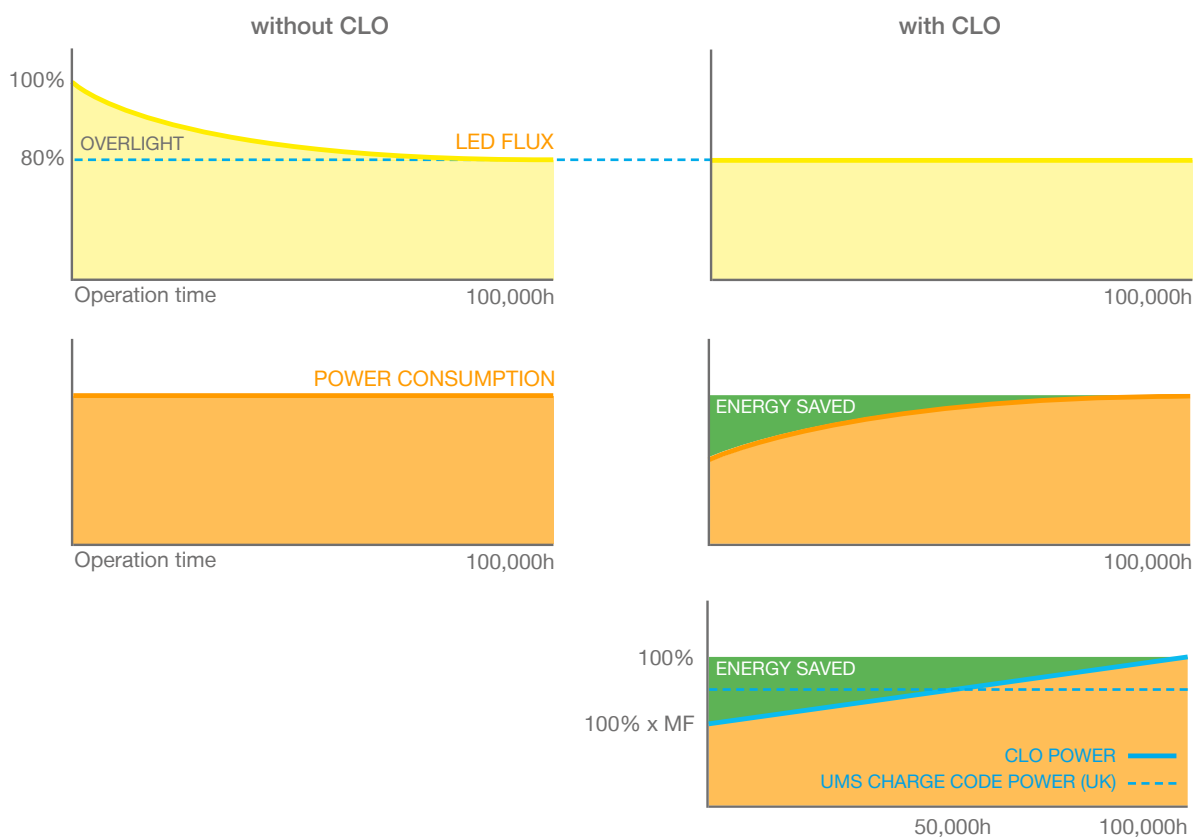
The times and light levels are fully flexible to suit the lighting profile required.

The driver is able to calculate the virtual clock time by analysing the duration of operation of the driver from the previous 3 days and sets the times of 5 light level steps accordingly.



CONSTANT LIGHT OUTPUT (CLO)

All light sources experience lumen depreciation - a reduction in light output over time, which means the system would consume more power than necessary to meet the required light levels at the end of the lamp's useful life (e.g. L80). The drivers of the P851 can be programmed to ensure that the LEDs will always deliver the necessary light level, by increasing the operating current over time to compensate for the LED lumen depreciation. Over-lighting at the beginning is taken away and this feature can produce extra energy saving and extend the lifetime of the system.



ENERGY EFFICIENCY

The exceptional thermal management in P851 together with the high performing LEDs and optics deliver a flexible range of solutions for your street lighting project. Solutions can be selected to meet the various lighting class requirements, with significant maintenance and energy savings over conventional luminaires.

							CLO ENABLED ³	
HID Lamp ¹	System Power	Luminaire Efficacy	Typical P851 replacement ²	System Power	Energy Savings	Luminaire Efficacy	System Power	Energy Savings
135W SOX	190W	82 lm/W	11650lm @ 850mA	123W	35%	95 lm/W	114W	40%
150W SON	180W	71 lm/W	11650lm @ 850mA	123W	32%	95 lm/W	114W	37%
140W CPO	153W	79 lm/W	10080lm @ 700mA	102W	33%	99 lm/W	94W	39%
90W SOX	130W	75 lm/W	6980lm @ 450mA	66W	49%	106 lm/W	63W	52%
100W SON	123W	63 lm/W	6280lm @ 400mA	59W	52%	107 lm/W	56W	54%
70W SON	90W	51 lm/W	3320lm @ 200mA	31W	66%	107 lm/W	30W	67%

¹ HID Luminaire LOR = 75%

² The P851 luminous flux is based on BSI absolute photometry test.

³ Average power consumption with CLO is based on UMS charge code power

PROGRAMMABLE LIGHTING CONTROLS

The LED driver enables CU Phosco Lighting to adjust the light level to match a specific application with optimised energy savings. The various control options offer different levels of energy savings, from simple stand-alone controls to more advanced networked Central Management Systems (CMS).

P851 is currently compatible with the following CMS:

- Ask Controls RMS
- Philips Starsense
- Harvard LeafNut
- Telensa PLANet
- Mayflower
- Zodion Vizion

CONTROL SYSTEM	BENEFITS	FUNCTIONALITY	RELATIVE SAVING	With CLO
Photocell	Standard control	Switch on/off with ambient light level	0%	up to 10%
Dynadimmer	Substantial energy saving	Programmable dimming (5 steps)	up to 20%	up to 30%
Wireless CMS	Full control and monitoring of each individual luminaire	DALI and 1-10V dimming inputs with full CMS functionality	up to 40%	up to 45%

Scotopic / Photopic (S/P) Ratio to BS 5489-1:2013

Recent scientific research shows a correlation between the spectral power distribution of a light source and the visual performance under low lighting levels associated with mesopic vision. For the lighting levels associated with lighting residential and minor roads to the S classes from BS EN 13201-2:2003 and P classes from CIE 115:2010 the target illuminance for a class can be adjusted according to the S/P ratio.

The S/P ratio of the CU Phosco Lighting neutral white LEDs is 1.64. The target illuminance for the P classes are shown here. For more information, refer to ILP Professional Lighting Guide 03: Lighting for subsidiary roads.

Lighting class	Benchmark Ra < 60		S/P ratio = 1.64 and Ra ≥ 60	
	\bar{E}	E_{min}	\bar{E}	E_{min}
P1	15.0	3.0	12.76	2.55
P2	10.0	2.0	8.06	1.61
P3	7.5	1.5	5.86	1.17
P4	5.0	1.0	3.66	0.73
P5	3.0	0.6	1.98	0.40
P6	2.0	0.4	1.20	0.40

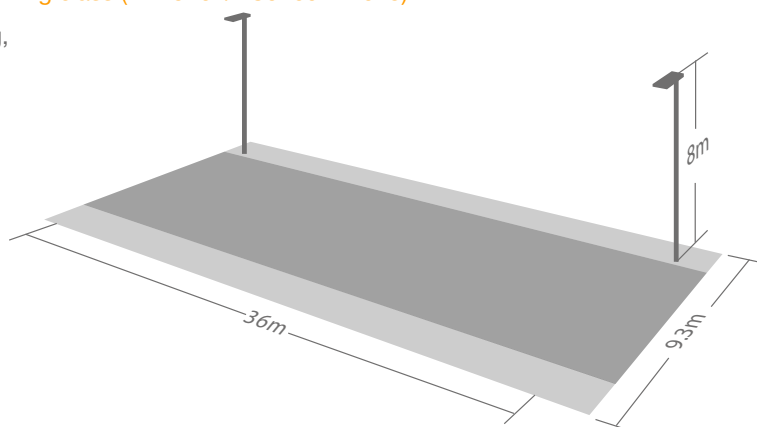
Modification of BS 5489-1:2013 Table A.7

SCHEME EXAMPLE Road refurbishment S2/P2 lighting class (EN13201/BS5489-1:2013)

Luminaire replacement with existing column at 36m spacing, 8m height and single sided arrangement.

Result:

P851 can replace a conventional 100W HPS luminaire with better performance (improved uniformity, less glare). 50% energy savings are achievable depending on column spacing, road configuration and lighting class with the added comfort of white light. Further savings can be achieved using controls like Dynadimmer or a Central Management System.

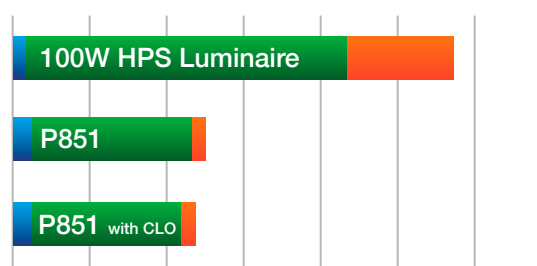


	\bar{E} (Lx)	E_{min} (Lx)	W (System)	W / km	Luminaire Efficacy	Energy Savings
Target (S2)	10.0 - 15.0	3.0				
Target (P2)	8.06 - 12.09	1.61				
100W HPS Luminaire	9.95	3.58	123	3417	63 lm/W	-
P851	8.09	2.62	59	1639	107 lm/W	52%
P851 (with CLO)	8.09	2.62	56	1556	-	54%

TOTAL COST OF OWNERSHIP

While HID technology has low initial cost, it requires frequent maintenance that results in a high total cost of ownership.

P851 with dimming and CLO options delivers an attractive total cost of ownership package making it extremely competitive for invest-to-save scenarios.

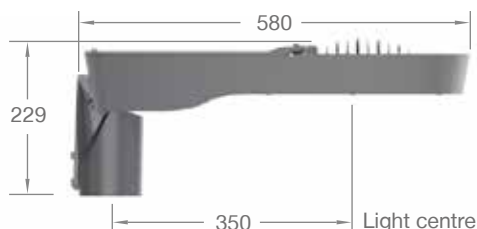
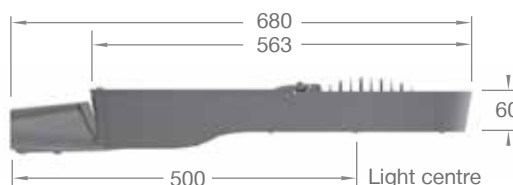


- Luminaire & Installation
- Energy consumption
- Maintenance (including HPS lamp replacement)

*Based on example above, 20 years lifetime

P851 SPECIFICATION

Light Source	Philips Lumileds LUXEON® M LEDs
Number of LEDs	12
Power Consumption	31 ~ 145W, depending on LED configuration
Correlated Colour Temperature	Neutral white, 4000K
Glare Rating	G6
Colour Rendering Index	> 70
Optical Cover	Flat Glass
Luminaire Luminous Flux	3,320 ~ 13,140 lm
Luminaire Efficacy	Up to 107 lm/W
Electrical Class	I
Control System Input	1-10V and DALI
Lumen Maintenance Output	L90 > 100,000 hours (1000mA, Ta = 15°C)
Driver Current	200mA ~ 1000mA (in 50mA steps)
Surge Protection	ANSI C62.41.2 high exposure 10kV, 10kA level
Dimming Control	Dynadimmer
Lighting Regulation	Mini Photocell • NEMA Socket • Wireless CMS options
Operating Temperature	-40°C to +30°C (1000mA) -40°C to +40°C (700mA)
Installation Height	5 ~ 12m
Installation	Ø 34-42 / Ø 42-60 / Ø 76 mm • Universal SE/PT Spigot
Post Top / Side Entry Tilt	-10°, -5°, 0°, 5°, 10°
Material	High pressure die cast aluminium (Housing)
Finish	Polyester powder coat cured under heat
Colours	Iron grey (RAL 7011), other RAL colours available on request
Ingress Protection	IP66
Wind Area (SCx)	0.036m²
Weight (Total)	9.7kg



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