

#### Application

PhotonStar were invited to supply a low energy lighting solution for a 4 story office building under construction in Wimbledon. The original specification for each floor utilized 36 52W (2 x 26W) Compact Fluorescent "PL" downlighters which would require 22.32W/m<sup>2</sup> to achieve 500lx at the work plane (desk level) to provide a well lit office, giving an efficacy figure of 4.46lm/m<sup>2</sup>/100lx. The original plan was to use occupancy sensors to further reduce electricity costs but these would not function well with slow to start CFL units, and the lifetime of the CFL lamps would be reduced with repeated switching. The building was planned with air conditioning, and the developer wished to minimize any excess heat that would add to the cost of running that system.

#### Solution

The installed solution utilised 36 Nemesis 30W luminaires requiring 12.96W/m<sup>2</sup> to achieve 500lx at the work plane (desk level), giving an efficacy figure of 2.59lm/m<sup>2</sup>/100lx. A 42% increase in efficiency.

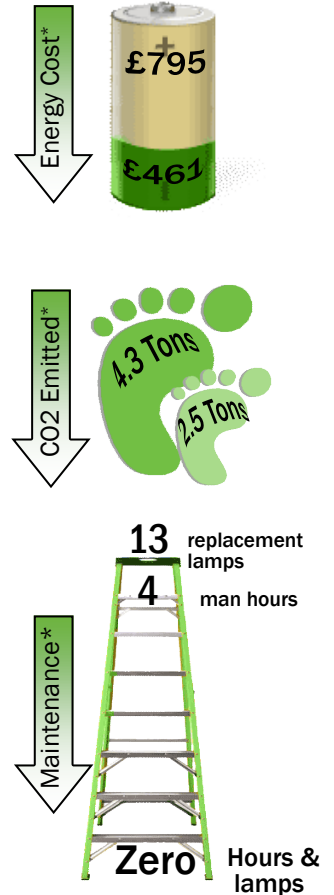
Illuminating instantly, the Nemesis worked perfectly with zoned occupancy sensors to further reduce costs. Multiple lux level sensors were added to zone fittings near windows benefitting from additional natural light when available. The Nemesis offers a unified glare rating of 19, making it applicable to high performance commercial applications and reduces glare from VDUs.

The Nemesis is cool to the touch, efficiently turning almost all of the energy into light. Excess heat is thus reduced and this results in further savings in air conditioning costs.

The Nemesis has an excellent colour rendering index of 86, and in this example emits light at 4000K. With lifetimes of 50,000hrs (L70), the impact of lamp replacement (inconvenience, health and safety, lamp replacement cost) is eliminated. Approximately 180 CFL replacement lamps would be required during this now maintenance free period.

The area required a number of emergency lights, and due to the ultra low power requirements of the Nemesis, the project was fully backed by integrated emergency packs, maintaining the design concept and providing a fully illuminated emergency solution.

Figures shown do not include additional savings from the use of occupancy and lux sensors.



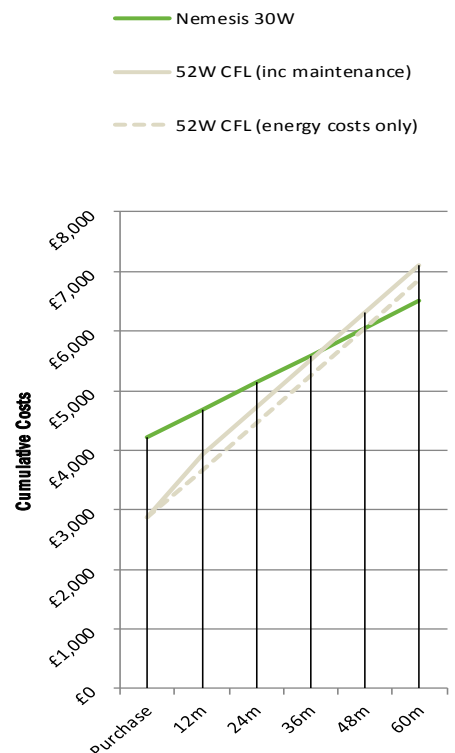
#### Key Features

- 50,000hr maintenance free lifetime
- 40% more efficient than equivalent output CFL in similar fitting.
- Excellent colour rendering (CRI 86)
- Low cost integrated NiMH emergency pack will run multiple fittings
- Project Efficacy of 2.59 W/m<sup>2</sup>/100lx saving £208 per fitting in electricity costs over the product lifetime.
- Payback in approximately 40 months
- Suitable for use with occupancy and lux sensors (instant on, not damaged by repeated switching)

\*Based on energy cost of 0.10 per kWh, 0.544Kg CO<sub>2</sub>/kWh, savings over 1 year based on 10 hours use per day.



#### Payback



# Nemesis

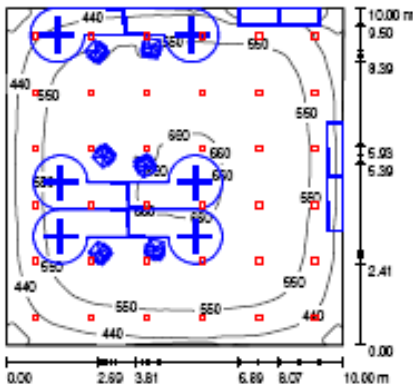
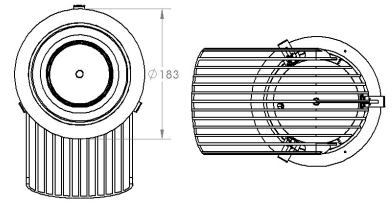
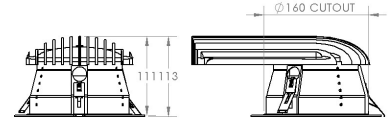
## High Power Low Glare Downlight

A high performance die-cast aluminium downlight with passive heatsink for extended lifetime.

A range of outputs up to 2900lm providing a direct replacement for 2x26W or 2x32W compact fluorescent fixtures and offering a full range of accessory, emergency and control options.

Available with high efficiency, high output or tuneable light engines

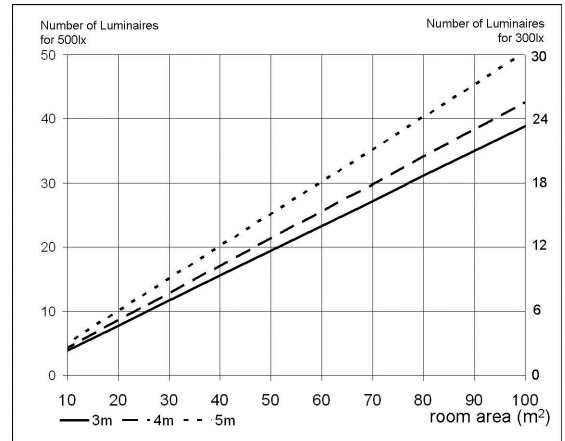
In this application using a Jupiter 2800 light engine, equivalent to 2x26W CFL consuming just 36W at 66.5lm/cW.



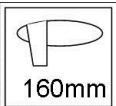
Height of Room: 3.500 m, Mounting Height: 3.500 m, Light loss factor: 0.80 Values in Lux, Scale 1:120

Surface	$\rho$ [%]	$E_w$ [lx]	$E_{min}$ [lx]	$E_{max}$ [lx]	$u0$
Workplane	/	555	124	666	0.22
Floor	68	400	19	625	0.05
Ceiling	80	240	137	313	0.55
Walls (4)	50	274	2.07	449	/

Workplane: Height: 0.760 m, Grid: 128 x 128 Points, Boundary Zone: 0.000 m, Illuminance Quotient (according to LG7): Walls / Working Plane: 0.524, Ceiling / Working Plane: 0.449.



Lamp Type (emitting equivalent output in lumens)	Number of Lamps	Power per lamp	Total Power of all Lamps	Energy Cost over 50,000hrs operation	Relative energy saving over 50,000hrs operation	Annual Energy Cost	CO2 (kg) emitted over 50,000hrs operation	Relative CO2 (Tons) saved over 50,000hrs operation
52W CFL	36	62W	2232W	£11,160	£0	£795	60710	0
Nemesis 30W	36	36W	1296W	£6,480	£4,680	£461	35251	25



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