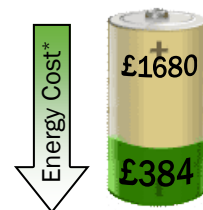


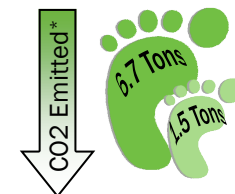
Application

PhotonStar were invited to supply an energy efficient solution to replace 6 halogen 35W MR16 downlighters in the spa changing room of St. Michaels Hotel Falmouth as part of a larger LED refurbishment project. With no natural lighting in the area, failed bulbs had been a problem, and the area needed to be brightly lit for 18hrs per day. Wet slippery floors added to the health and safety problems with maintenance. As part of the refurbishment programme, the ceiling void space was to be fully insulated for further carbon footprint reduction, requiring a product that could be safely installed with insulation directly in contact. The area is adjacent to the pool and is classed as zone 2 and also required an additional emergency light fitting.



Solution

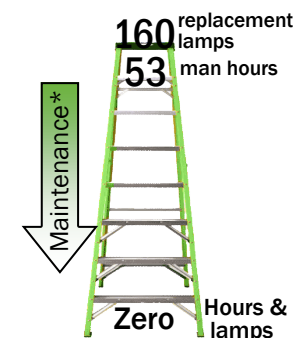
The solution was achieved using 6 CeilingStar IC LED luminaires each consuming 7W of power. Easily installed into the existing cutouts (75mm), the installation required no major refurbishment work. The new installation required 5.74W/m² to achieve the illumination levels of 240lx at floor level, an 80% efficiency saving over the previous halogen downlighters (and 40% more efficient than the alternative CFL Downlighters). Efficacy was dramatically improved from 10.45W/m²/100lx for the previous halogens to 2.39W/m²/100lx using the CS5.



The distinctive CeilingStar5-IC is suitable for use in fully insulated ceilings without a fire hood, permitting the hotel to further reduce energy costs with a fully insulated ceiling. Fitted with a glass diffuser and emitting light at 3000K it provides gentle, distinctive and effective illumination.

The CS5 IC is IP65 rated and was installed with an IP67 driver, required for the Spa changing room and pool entrance way area which is classed as Zone 2.

The LED 80,000 hr operational lifetime has eliminated maintenance for 12 years. Each unit during its lifetime will eliminate 27 lamp changes, each taking 20 minutes, saving £351 in maintenance costs. It will also eliminate the risks of working on a ladder with electricity in a wet slippery area.



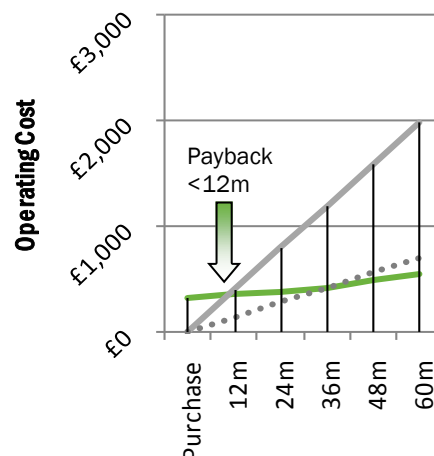
In the previous installation, a separate plastic unattractive emergency light had been installed. All PhotonStar LED luminaires are available with an integrated emergency pack, eliminating the need for a non integrated unit that would detract from the interior design.

Key Features

- IP65—Zone 2, IP67 driver
- 80,000hr maintenance free lifetime
- Shallow recess (50mm) - suitable for insulated ceilings
- 75mm cut out—no structural changes when replacing MR16 downlighters
- Wide bezel design covered damage from previous MR16 installation
- No failed lamps
- Suitable for use with insulated ceilings for further cost and CO2 reduction
- Payback period less than 12 months

Payback

- PhotonStar CS5 (all costs)
- Previous MR16s (all costs inc. Maintenance)
- Previous MR16s (energy costs only)

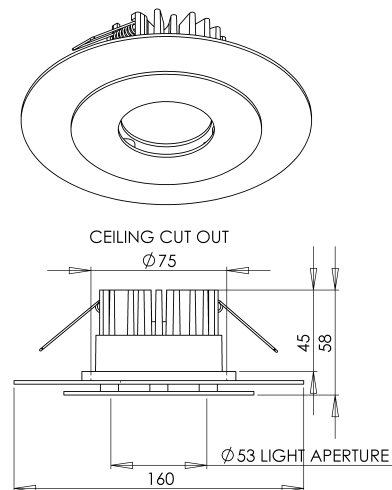


*Based on energy cost of 0.10 per kWh, 0.4Kg CO2/kWh, savings over 80,000hrs

CS5 IC

Insulated or non-insulated ceilings

The innovative CeilingStar5 (CS5) range can be used in residential and commercial new builds, refurbishments or retrofit. The CeilingStar5-NIC is an energy efficient and zero maintenance light fitting which is a superior replacement for MR16 and GU10 ceiling downlighters or incandescent downlighters. As one of its state of the art design features, all the thermal management of the LED is at the front of the product, so the fitting can be used in fully insulated ceilings. It is IP65 compliant and fire rated. These light fittings make changing light bulbs a thing of the past. The CS5 is constructed of materials that are designed for long life and is 100% recyclable. In addition it contains the most efficient, ultra bright, long life (50,000hrs) LEDs available today. The CS5 range offers equivalent illumination to 20W, 35W and 50W halogens consuming just 4W, 7W, and 10W of power. (The 7W unit is featured in this example)

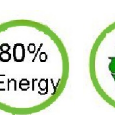
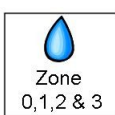
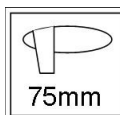
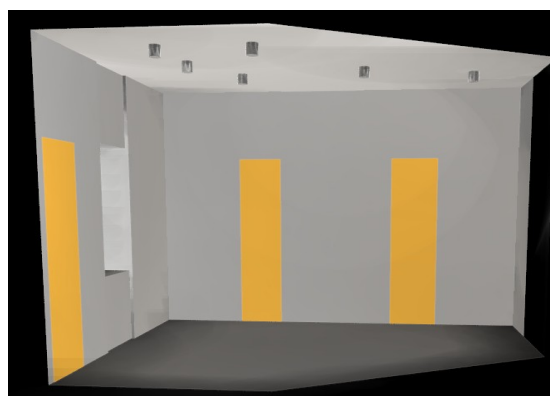
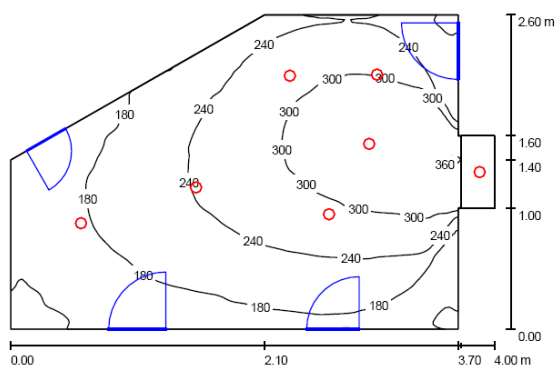


Lamp Type (emitting equivalent output in lumens)	Number of Lamps	Power per lamp	Total Power of all Lamps	Energy Cost over 80,000hrs operation	Relative energy saving over 80,000hrs operation	Annual Energy Cost	CO2 (kg) emitted over 80,000hrs operation	Relative CO2 (Tons) saved over 80,000hrs operation
65W BR30	6	65W	390W	£3120	£0	£257	12,480Kg	0 Tons
35W MR16	6	35W	210W	£1680	£1440	£138	6,720Kg	5.8 Tons
35W PAR30	6	35W	210W	£1680	£1440	£138	6,720Kg	5.8 Tons
14W CFL	6	14W	84W	£672	£2448	£55	2,688Kg	9.8 Tons
CeilingStar 5	6	8W	48W	£384	£2736	£32	1,536Kg	10.9 Tons

Height of Room: 2.800 m, Maintenance factor: 0.80

Values in Lux, Scale 1:34

Surface	ρ [%]	E_{av} [lx]	E_{min} [lx]	E_{max} [lx]	$u0$
Workplane	/	229	99	363	0.43
Floor	20	177	91	236	0.51
Ceiling	70	51	30	69	0.58
Walls (9)	50	114	4.72	2895	/



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