

Raytec White-Paper
How You Can
Replace Your
Existing 4ft Ex
Fluorescent For a
2ft Ex LED Linear...



In a previous article we identified how making the switch to an Ex LED Linear from a traditional fluorescent fitting can offer significant savings by reducing maintenance costs, providing a longer lifetime of 100,000+ hours, as well as producing a greater, more consistent performance for your application.

In this paper Raytec look at the feasibility of replacing a larger fluorescent fitting with a smaller LED fitting to enhance cost savings in switching to LED even further.

How You Can Replace Your Existing 4ft Ex Fluorescent For a 2ft Ex LED Linear...

Switching your Ex luminaire to an Ex LED Linear from a traditional fluorescent fitting can offer significant savings. LEDs reduce maintenance costs, provide a longer lifetime of 100,000+ hours, and produce a greater, more consistent performance, making the decision to switch to LED a straightforward one.

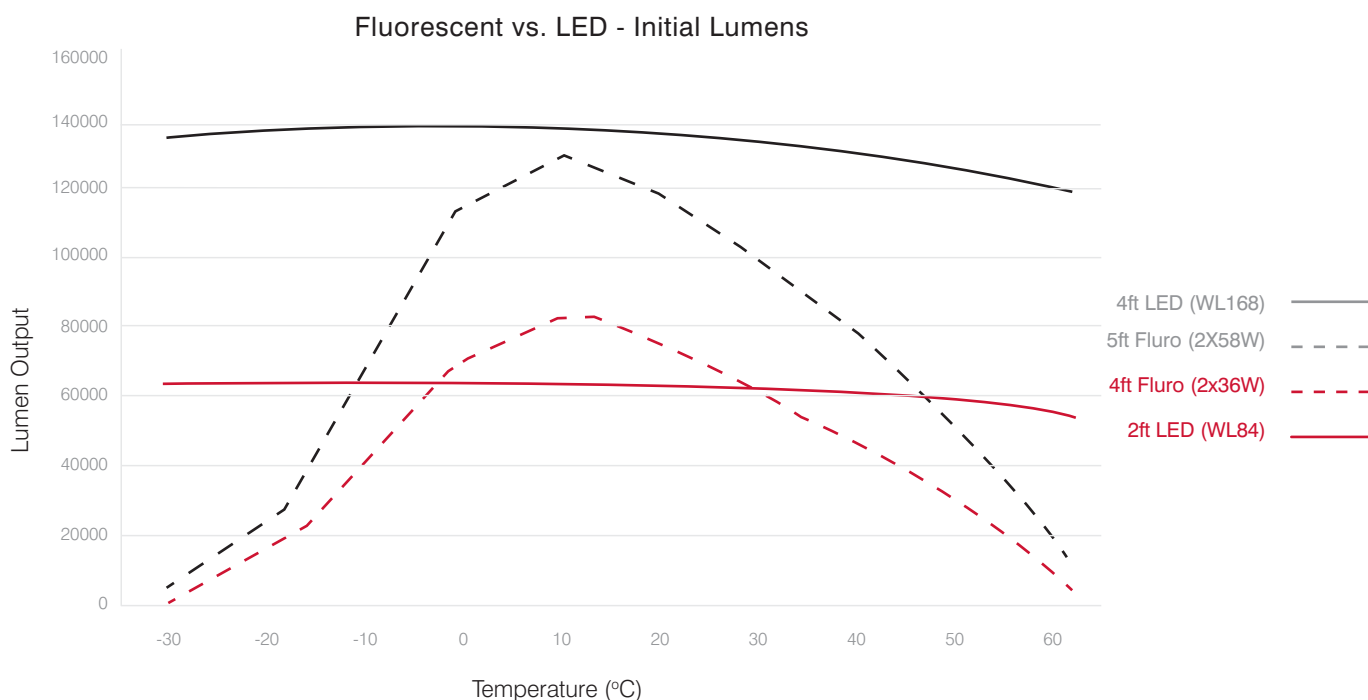
But did you know, because of the stable output of LEDs under a variety of temperature and operational conditions, you could save even more than you first thought by replacing existing fluorescent fittings with a smaller, more compact Ex LED Linear. With the light output of LED's constantly improving, Raytec have recently updated SPARTAN Linear, increasing the lumen output to such a point where a 2ft SPARTAN LED Linear can now replace a 4ft fluorescent.

In a previous article we identified that in terms of light output; you can effectively replace a 5ft (2x58W) fluorescent with a 4ft LED (SPARTAN Linear WL168) and achieve superior performance. In this article, after the performance upgrade of the SPARTAN Linear products we look at the feasibility of being able to replace a larger fluorescent fitting with a smaller SPARTAN LED in general, to enhance the cost savings in switching to LED. Specifically we will compare:

- SPARTAN WL84 (a 2ft fitting) vs traditional 2x36W fluorescent (4ft fitting)
- SPARTAN WL168 (4ft fitting) vs a traditional 2x58W fluorescent (5ft fitting)

Using data produced by OSRAM (manufacturers of both fluorescent tubes and LEDs), and based on an installation of 20 fittings, information was compiled to represent a generic style of Zone 2 fluorescent, commonly known as 'boat fittings', usually manufactured with a GRP base and a polycarbonate cover. The LED technology is represented by Raytec's SPARTAN Zone 2 Linear fitting.

1: Light Output at Time of Installation



The first performance comparison looks at the output from each luminaire at the date of installation – the first time the luminaires are turned on. The increase in lumen output from SPARTAN's Zone 2 fittings means that even from the initial installation the 4ft LED already outperforms the 5ft fluorescent across all operating temperatures, supporting the concept of replacing a larger fluorescent fitting with a smaller LED. This is an improvement from our previous findings discussed in the 'How You Can Change a 5ft Fluorescent For a 4ft LED Linear' white paper. Now the 4ft LED provides even greater energy savings, resulting in a reduction in the overall cost of an application – something that we will look at in more depth later in the paper.

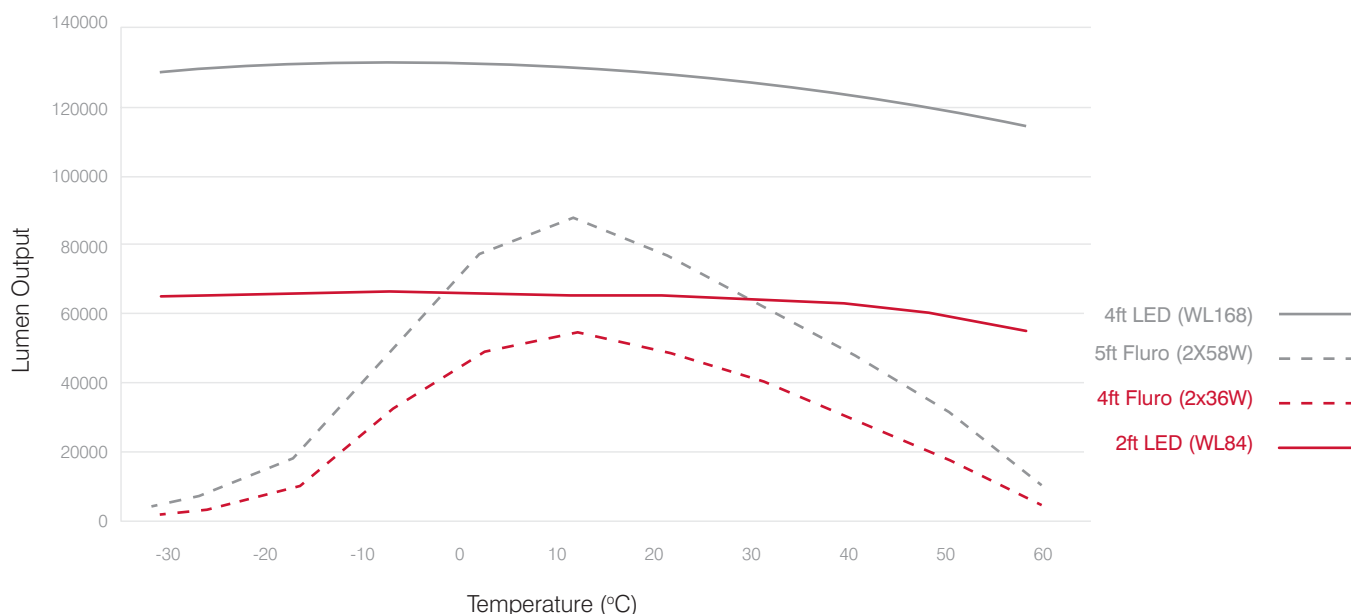
The headline statement is the performance of the 2ft LED in comparison to the 4ft fluorescent. Due to the increased light output of the SPARTAN Zone 2 Linear, in all but the most optimum operating temperatures the 2ft LED (WL84) outperforms the 4ft fluorescent fitting.

Understanding the conditions of your application should help you better identify the benefits of using an LED luminaire over a fluorescent fitting. Although the 4ft fluorescent fitting will initially perform better under a narrow range of average temperatures, if an application is exposed to more extreme temperatures, such as the North Sea or the Arabian Gulf, then the 2ft LED could provide superior performance from day one.

While this initial comparison shows light output at date of installation, the real advantages of LED will develop over a longer period of time due to the rate of degradation from a fluorescent fitting compared to an LED luminaire. This is something which we explored in our white paper. What is more important than initial light output is how the fittings perform over the duration of their life. We will look at this in more detail, examining the performance of the fittings after 12,000 hours of constant operation.

2: Light Output after 18 Months

Fluorescent vs. LED - 12,000 hours



After 12,000 hours there is a significant degradation in the performance of the fluorescent fittings. Even in the most optimum of conditions the fluorescent fittings have lost 37% of the total lumen output across the installation, compared to the LED fittings which have seen just a 6% reduction.

The 2ft LED luminaire now significantly outperforms that of the 2x36W (4ft) fluorescent, proving the viability of upgrading an existing fluorescent with a smaller LED fitting and which has a lower lumen output than would normally be expected from a standard retrofit. Not only have we proved that you can effectively downsize from a 5ft fluorescent to a 4ft LED Linear, but we can prove the feasibility of replacing a 4ft fluorescent with a 2ft LED Linear. With the level of performance after 18 months a WL84 (2ft) now provides superior light output in all conditions over a 2x36W fluorescent (4ft).



End of life fluorescent tube showing signs of degradation

Summary of data

Looking at performance over a 12,000 hour period has shown a significant degradation in output of the fluorescent fittings. In contrast the LED fittings maintain an output almost identical to the first graph thanks to a near 0% failure rate and minimal degradation.

As time progresses, the performance advantage of the LED fitting is only going to increase as the degradation of the fluorescent fitting continues. In terms of light output, this means that a 2ft LED (SPARTAN Linear WL84) can effectively replace a 4ft fluorescent (2x36W), while a 4ft LED (SPARTAN Linear WL168) can replace a 5ft (2x58W) fluorescent.

So now we know the feasibility behind it, what does that mean in actual terms?

How it can save you money...

Simply put, the ability to use a smaller LED equivalent saves costs. At the start, it provides savings on initial purchase price; and an installation of LED Linears can be cheaper than an installation of comparative fluorescent fittings, based on purchase price alone.

However, the biggest savings to be made are the savings in energy. Replacing a 4ft fluorescent (72W) with the 2ft SPARTAN Linear LED (34W) saves more than 50% on energy costs while replacing a 5ft fluorescent (116W) with the 4ft LED (68W) saves over 40%. Let's put this into context using the current energy price in the UK as an example. The current unit price in kWh is 9.397 pence. A 5ft 2x58W fluorescent will consume 116W of electricity per unit, while the 4ft SPARTAN Linear LED will consume 68W; that's a saving of 48W per fitting.

Across an installation of 20 fittings that's a saving of 9.02112 pence per hour, the equivalent of £2.17 per day, £15.19 a week, and £792.05 a year. Over 100,000 hours, which is the minimum expected life of SPARTAN luminaires, you would save an incredible £9,021 on a 20 luminaire installation.

Larger projects such as offshore drilling rigs, can experience even greater savings. For example, with an application of 500 fittings you can expect a saving of £2.26 per hour. That's an equivalent of £226,000 over the lifetime of the installation!

The switch to LED provides significant energy savings but there are also cost savings to be made with maintenance, transport and disposal – an LED fitting lasting for over 10 years without repair or replacement. Additionally, for applications relying on generators as a power source, freeing generator capacity has significant cost benefits to the end user.

To read more about the comparison of the types of technology and the advantages of LED in more depth, as well as the conditions of the data used in the analysis, download our White Paper '[LED vs. Fluorescent](#)'.

Raytec have a full range of retrofit solutions to replace 2x18W, 2x36W and 2x58W fluorescents. For enquiries or more information phone us on +44 (0) 1670 520055 or email us at hazsales@rayteclcd.com.



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