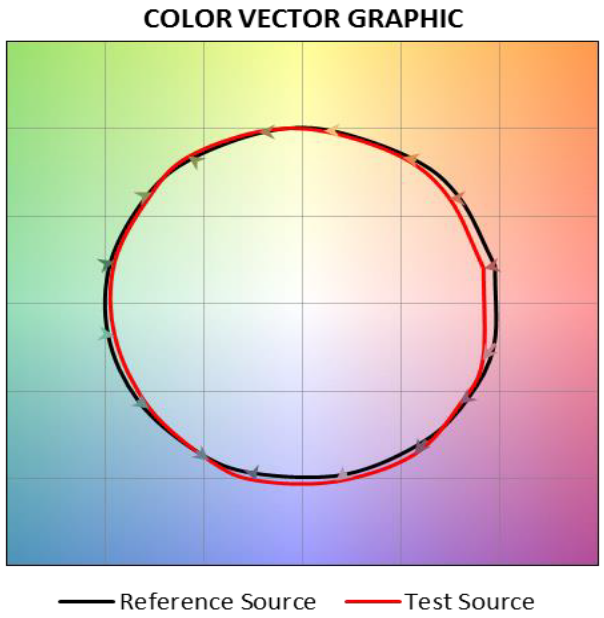
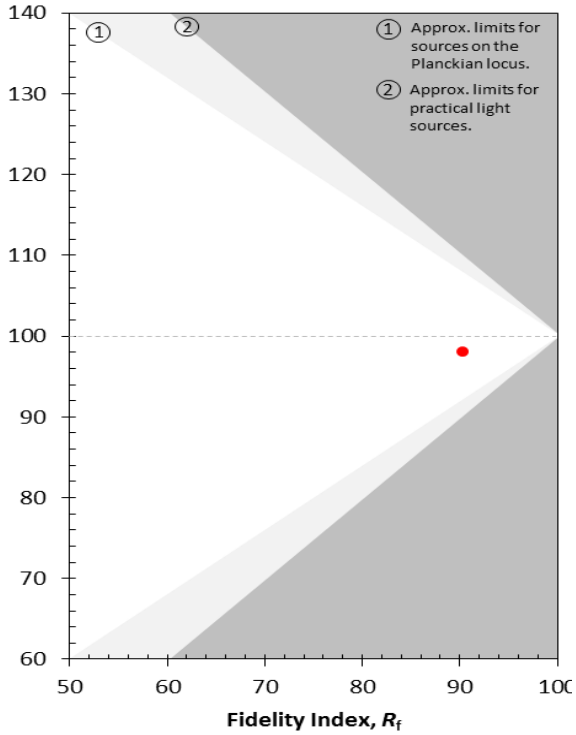
Engine Data: TM-30-15

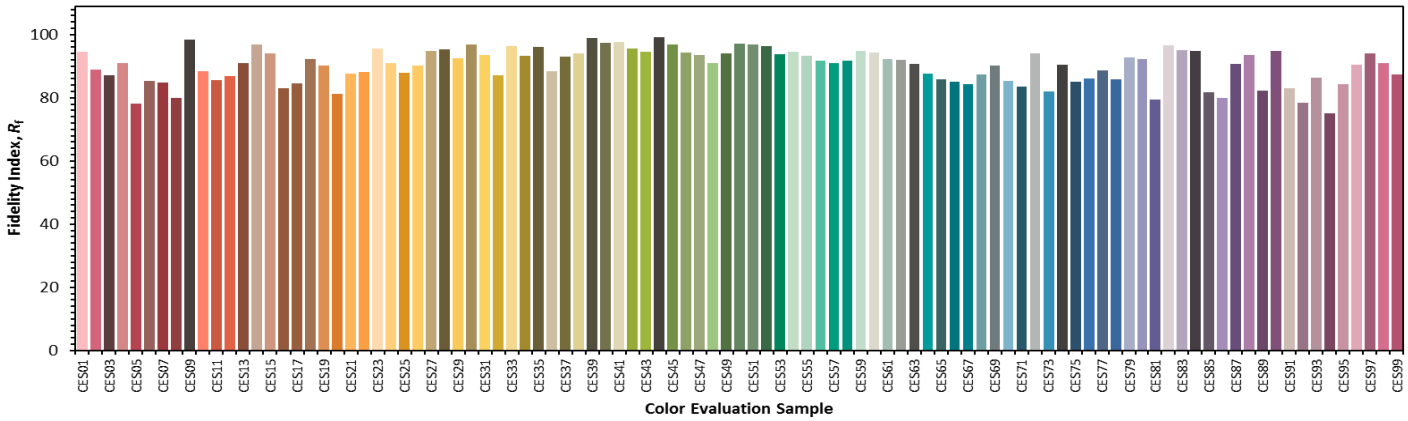
TM30 Data

Source	Fidelity Index **Rf**	Gamut Index **Rg**	Fidelity index **(Skin)**	CIE **Ra**	Distance from Black Body Locus (d'uv')	CRI	CCT
Halogen	100	100	100	100	0.0000	100	3000K
QUAD-C (95CRI)	90	98	93	95	0.0016	95	2700K



This plot shows the average chromaticity shift for the samples within each of the 16 hues bins. The values are normalised so that the reference is a circle.





This chart displays the Fidelity Index for each of the 99 CES. The CES are arranged by their hue angle under the 5000 K reference source, which was also used to determine the color of each bar. The colors are approximate and depend on proper monitor calibration. Some colors may be outside of the gamut of the monitor, and will not be displayed accurately.

TM-30-15 Explained

TM-30-15 is a new standard of colour rendering, published by the Illuminating Engineering Society (IES) that allows more accurate visual description of colour. It takes into account gamut, whilst expanding fidelity to 99 colour swatches from the eight measured for Ra. Orluna has embraced this standard as the future of colour rendering, and strives to achieve the best performance possible. Orluna 95CRI luminaires feature a fidelity of Rf90 and a gamut of Rg98.

What Does TM-30-15 Measure?

TM-30-15 measures fidelity and gamut (colour rendering) more accurately than previous methods have been able. CRI has long been used to gauge how well light sources reflect reality, and has served a purpose in the absence of a better honed method. Where before, 8 pastel swatches were used to generate the CRI fidelity value, now we have TM-30-15 which looks at 99 real-world samples including skin tones, natural colours, and vibrant hues. In addition to this, we now have a useful measure of gamut, which was not at all represented using CRI scores.

Fidelity (Rf) and Gamut (Rg) Measurements

Fidelity and gamut are two aspects of how colour reacts to light sources. Fidelity measures how accurately the colour is rendered relative to a black body radiator like the Sun, and gamut measures how saturated the colours look. A high fidelity, low gamut light source might render the colour of a specific red close to its original red, but will leave it looking desaturated. On the other hand, if the gamut is too high the red might look like a cartoon colour.

What are the Scales for Rf and Rg?

Fidelity is measured from 0 to 100 and gamut is measured from 60 to 140. A halogen light source will register scores of Rf100 and Rg100, which represents “perfect” colour rendering. Scores for other light sources should always be as close to this as possible.

Orluna’s range of luminaires scores fidelity and gamut at Rf90 and Rg98, meaning colour is rendered as close to perfect as LEDs can get, with a particularly impressive gamut score. Above Rg100, colours will begin to look unrealistic and over-saturated.

How Should the Diagrams Be Read?

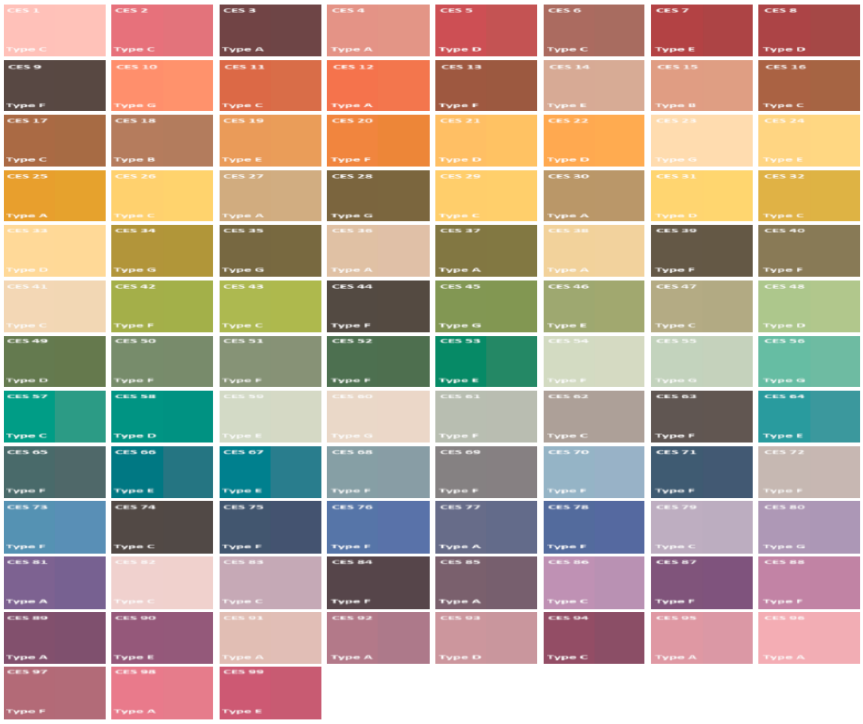
The idea behind the colour vector graphic is that it shows how close to the “perfect” source the test light is. The black circle represents the ideal score, and the red circle represents the test luminaire. A shift in or out of the circle represents over-saturation or under-saturation and a shift around the circle means that particular colour appears more like another colour (e.g. red appears green-ish). The more the circles and points overlap the better, and as you can see, Orluna’s luminaires perform exceptionally.

The triangular Source Chromacity Comparison diagram features another measure of gamut and fidelity. The closer the red point is to the horizontal dotted line, the more perfect the gamut, and the closer to the right hand side, the better the fidelity.

The Colour Evaluation Sample highlights the individual colour scores, and benefits from relative equality of colours. In our case, there is very little variance in colour performance, showing exceptional colour quality across the board.

What is D’uv’?

D’uv’ is a measure of the distance of a light source from the black body locus. A shift above the black body locus causes a slight green hue, whereas a shift below causes a red hue. The black body locus itself is line showing the colour temperature of light from a black body radiator (such as a halogen bulb) as the heat of the black body decreases. At a low heat, the black body will be a “warmer” colour temperature, such as 2500K, whereas at a greater heat the colour temperature will move towards the bluer spectrum.



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Engine Data: Light Measurement (Recessed)

TM-30-15 Rf90 Rg98

95CRI Engines

Engine	CCT	CRI	Tj[1]	Beam Angle	Peak Intensity (Cd)	Power (W)	Circuit Power (W)	Initial Lumens (lm)	Delivered Lumens (lm)[2]	Efficacy (lm/cW)[3]	Dim to Dark[4]
10DEG-C	2700K 2938K	**95**	**60°C**	10°	9556	8	8.8	765	544	**87 (62)**	**0.1% Lux**
QUAD50-C	2500K 2700K 2938K	**95**	**60°C**	20/30/46°	2953 / 1803 / 952	8.3	9.2	899	684	**98 (75)**	**0.1% Lux**
QUAD70-C	2500K 2700K 2938K	**95**	**65°C**	20/30/46°	4153 / 2812 / 1338	10.3	11.4	1157	962	**101 (84)**	**0.1% Lux**

85CRI Engines

Engine	CCT	CRI	Tj[1]	Beam Angle	Peak Intensity (Cd)	Power (W)	Circuit Power (W)	Initial Lumens (lm)	Delivered Lumens (lm)[2]	Efficacy (lm/cW)[3]	Dim to Dark[4]
10DEG	2700K 2938K	**85**	**60°C**	10°	9556	8	8.8	765	544	**87 (62)**	**0.1% Lux**
QUAD50	2500K 2700K 2938K	**85**	**60°C**	20/30/46°	3005 / 1845 / 968	8.3	9.2	885	696	**96 (76)**	**0.1% Lux**
QUAD70	2500K 2700K 2938K 4000K	**85**	**65°C**	20/30/46°	4093 / 2513 / 1319	10.3	11.4	1151	948	**101 (83)**	**0.1% Lux**
QUAD90	2500K 2700K 2938K	**85**	**65°C**	20/30/46°	5392 / 3311 / 1738	10.3	11.4	1493	1249	**131 (110)**	**0.1% Lux**

[1] Junction temperatures are measured in-house and independently.
[2] Delivered lumens is measured post-optic and certified by LUX-TSI Ltd.
[3] Two efficacy figures are provided for clarity. The first figure represents initial lumens per circuit watt, and the second represents delivered lumens per circuit watt.
[4] Dim to Dark. All of our products have been tested for light output at the lowest dim level on our LED driver rather than power output.

NOTE: Unlike most manufacturers, our engines don't vary their lumen output based on CCT. We use strict flux binning to ensure that every colour temperature provides the same lumen output. All data is certified by LUX-TSI Ltd.

DIMMING
Our expert focus also means that we have full, up-to-date dimming compatibility charts – please see **www.orluna.com/dimming**

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ORLUNA LUMINAIRES USE CREE LEDS

Engine Data: Light Measurement (Flush)

TM-30-15 Rf90 Rg98

95CRI Engines

Engine	CCT	CRI	Tj[1]	Beam Angle	Peak Intensity (Cd)	Power (W)	Circuit Power (W)	Initial Lumens (lm)	Delivered Lumens (lm)[2]	Efficacy (lm/cW)[3]	Dim to Dark[4]
10DEG-C	2700K 2938K	**95**	**60°C**	10°	9556	8	8.8	765	544	**87 (62)**	**0.1% Lux**
QUAD50-C	2500K 2700K 2938K	**95**	**60°C**	20/46/60°	2953 / 952 / 553	8.3	9.2	899	684	**98 (75)**	**0.1% Lux**
QUAD70-C	2500K 2700K 2938K	**95**	**65°C**	20/46/60°	4153 / 1338 / 778	10.3	11.4	1157	962	**101 (84)**	**0.1% Lux**

85CRI Engines

Engine	CCT	CRI	Tj[1]	Beam Angle	Peak Intensity (Cd)	Power (W)	Circuit Power (W)	Initial Lumens (lm)	Delivered Lumens (lm)[2]	Efficacy (lm/cW)[3]	Dim to Dark[4]
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QUAD50	2500K 2700K 2938K	**85**	**60°C**	20/46/60°	3005 / 968 / 563	8.3	9.2	885	696	**96 (76)**	**0.1% Lux**
QUAD70	2500K 2700K 2938K 4000K	**85**	**65°C**	20/46/60°	4093 / 1319 / 767	10.3	11.4	1151	948	**101 (83)**	**0.1% Lux**
QUAD90	2500K 2700K 2938K	**85**	**65°C**	20/46/60°	5392 / 1738 / 1010	10.3	11.4	1493	1249	**131 (110)**	**0.1% Lux**

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