LUMINO

ColorCORE®

TM30

LUMINO

ColorCORE® TM30 Report

This report details the results of tests conducted on LUMINO ColorCORE® products according to colour rendering test method TM30.

INTRODUCING TM30

The Technical Memorandum TM30 (TM-30-18) is a method of evaluating light source colour rendition published by the Illuminating Engineering Society of North America (IES).

The CIE 1995 method for measuring CRI Ra relies on just 8 colour samples to measure colour fidelity using the commonly used Ra metric. TM30 greatly improves on this method by using 99 new colour evaluation samples (CES) to measure colour fidelity using the new Rf metric with an additional Rg metric for gamut area.

TM30 describes a method for evaluating light source colour rendition, quantifying the fidelity (closeness to a reference) through a Fidelity Index (Rf) and gamut (increase or decrease in chroma) through a Gamut Index (Rg) of a light source. TM30 also generates a colour vector graphic that indicates average hue and chroma shifts, which helps with interpreting the values of Rf and Rg.

BOOK YOUR LUMINO TM30 WORKSHOP

Being the first company in the UK to test its full product range according to the TM30 method, LUMINO has developed an interactive workshop dedicated to explaining the basics of TM30 and also demonstrate its practical advantages over the CIE 1995 CRI index.

LUMINO TM30 WORKSHOPS are aimed at giving lighting professionals an understanding of the key principles and how to apply them. The workshop includes a presentation on the essence of TM30, followed by an interactive session using light sources including ColorCORE®.

To book a TM30 WORKSHOP for your team, email **info@lumino.lighting**

CCT	VECTOR CRI	TM30	
°K	Ra	R_f	R_g
4000	95	92	100
3500	95	92	100
3000	95	92	100
2700	93	92	100
2500	84	82	100
2200	84	82	100

ColorCORE®

LUMINO ColorCORE® LED technology delivers warm whites in our highest ever colour rendering. Offering optimal quality of light, scoring highly for both CRI and TM30 from 4000K to 2200K.

LUX TSI

Test data used in this report is based on data produced by independent UKAS accredited photometric laboratory LUX-TSI using calibrated goniometers and spectrometers.

Additional testing conducted using calibrated VISO LIGHTSPION test equipment.

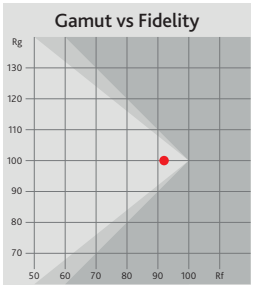
Vector data does not include OPTIC profiles. Performance data of production products can vary from the test data shown in this report due to factors such as, but not limited to temperature, batch, CCT, power and manufacturing tolerances.

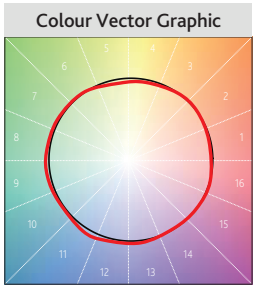
Comparing High and Low CRI

ColorCORE®

4000K

2-Step	SDCM
95Ra	CRI
92Rf	Fidelity
100Rg	Gamut





HIGH CRI

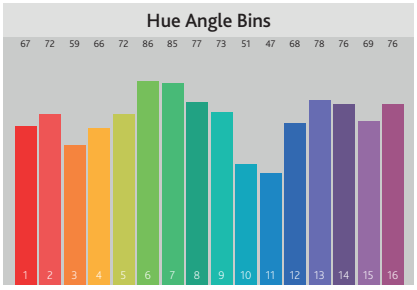
The ColorCORE 4000K example above shows the CRI metric as 95Ra out of a possible 100Ra based upon eight R1-R8 colour reference samples. The TM30 metric shows the colour Fidelity (closeness to reference) as 92Rf based upon ninety-nine colour samples (shown on page 6) and the colour Gamut (saturation) as 100Rg. These two figures are plotted on to Gamut vs Fidelity chart above.

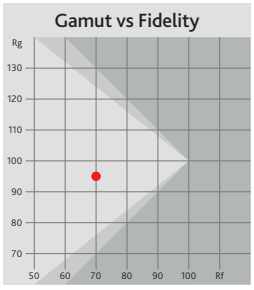
The sixteen Hue Angle Bins are indicated in the bar chart above showing all sixteen hue bins are rendered well with values typically above 87 for all Hue Bins and particularly high values for Hue Bins 1 (Red) 94, 6 (Green) 94, 10 (Blue) 95 and 14 (Violet) 94. These values are also plotted as a Colour Vector Graphic in comparison to the reference source for quick visual reference.

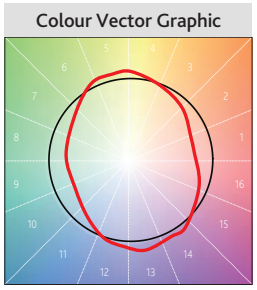
Low CRI

4000K

5-Step	SDCM
74Ra	CRI
69Rf	Fidelity
95Rg	Gamut







LOW CRI

The LOW Colour Rendering example above shows the CRI metric as 74Ra out of a possible 100Ra based upon eight R1-R8 colour reference samples. The TM30 metric shows the colour Fidelity (closeness to reference) as 69Rf based upon ninety-nine colour samples (shown on page 6) and the colour Gamut (saturation) as 95Rg. These two figures are plotted on to Gamut vs Fidelity chart above.

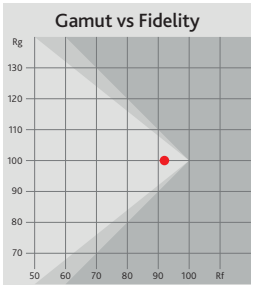
The sixteen Hue Angle Bins are indicated in the bar chart above showing all sixteen hue bins are rendered poorly with values as low as 47 for Hue Bin 11 (Blue) and 67 for Hue Bin 1 (Red). These values are also plotted as a Colour Vector Graphic in comparison to the reference source for quick visual reference.

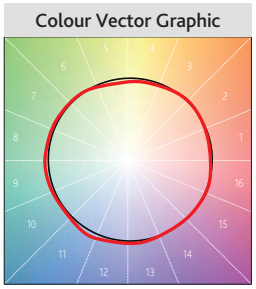
Vector Linear Profiles

ColorCORE®

4000K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut

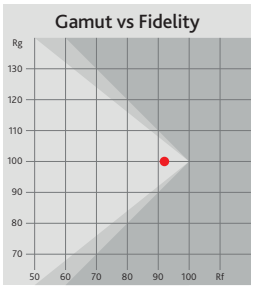


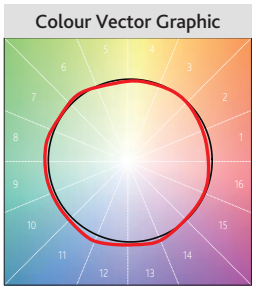


ColorCORE®

3500K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut

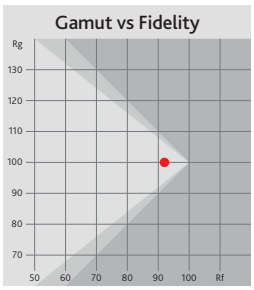


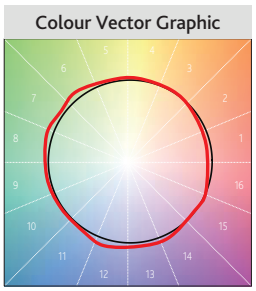


ColorCORE®

3000K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut

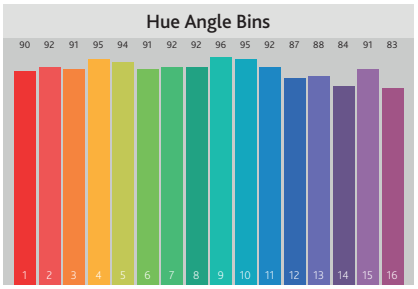


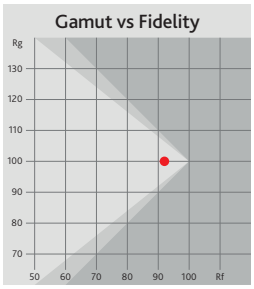


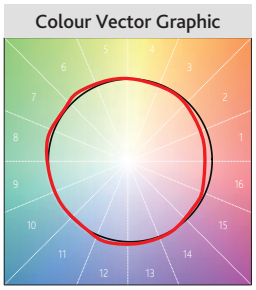
ColorCORE®

2700K

2-Step SDCM
93Ra CRI
92Rf Fidelity
100Rg Gamut



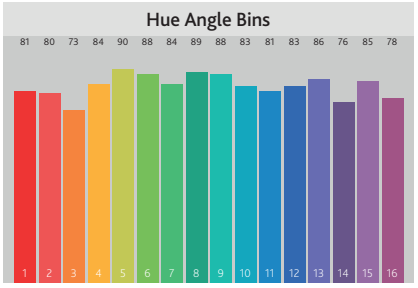


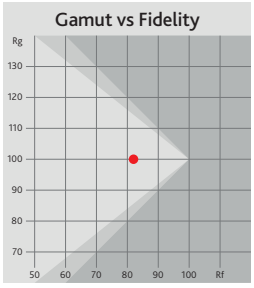


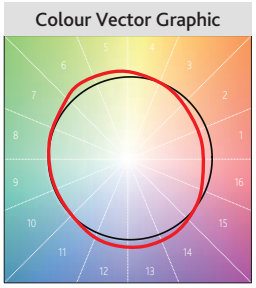
ColorCORE®

2500K

2-Step SDCM
84Ra CRI
82Rf Fidelity
100Rg Gamut



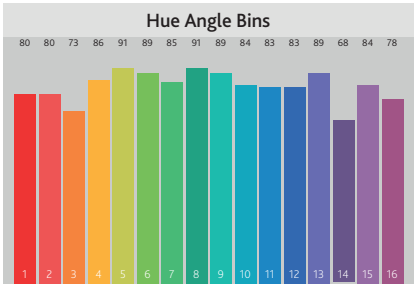


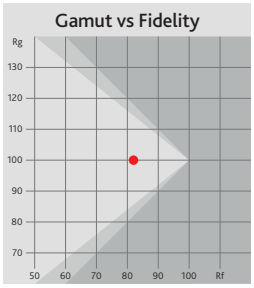


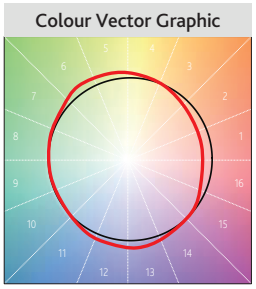
ColorCORE®

2200K

2-Step SDCM
84Ra CRI
82Rf Fidelity
100Rg Gamut





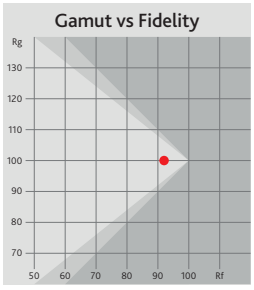


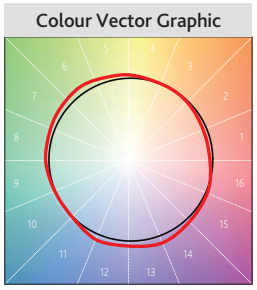
Steorra E50 Downlights

ColorCORE®

4000K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut

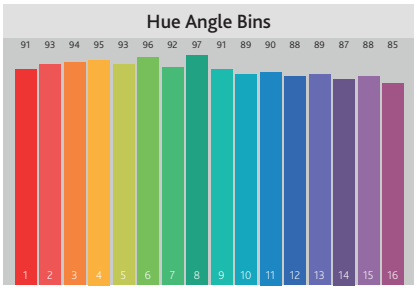


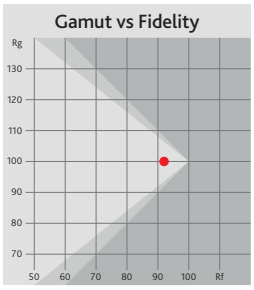


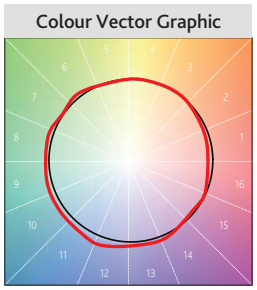
ColorCORE®

3500K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut



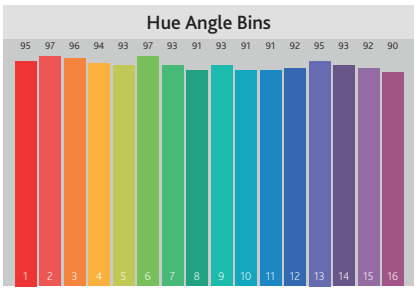


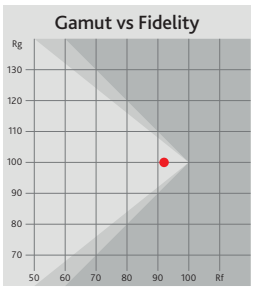


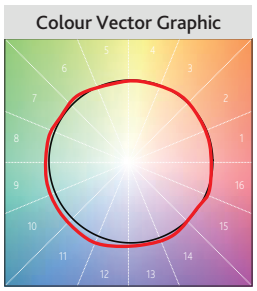
ColorCORE®

3000K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut



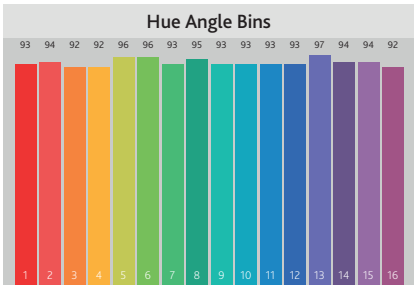


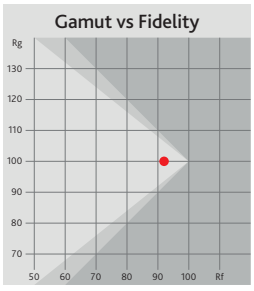


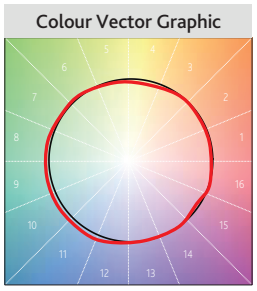
ColorCORE®

2700K

2-Step SDCM
95Ra CRI
92Rf Fidelity
100Rg Gamut



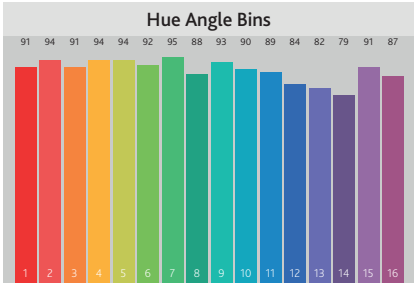


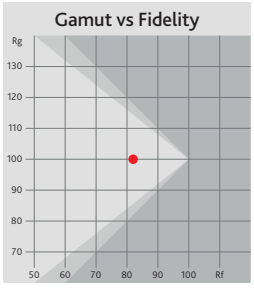


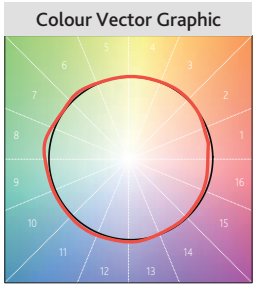
ColorCORE®

2500K

2-Step SDCM
90Ra CRI
82Rf Fidelity
100Rg Gamut



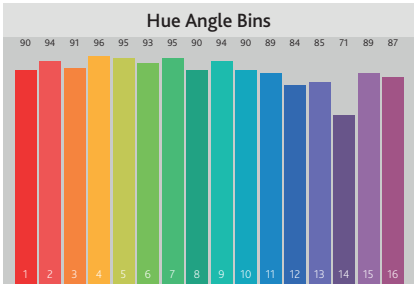


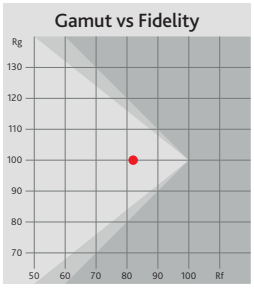


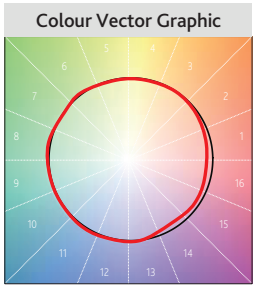
ColorCORE®

2200K

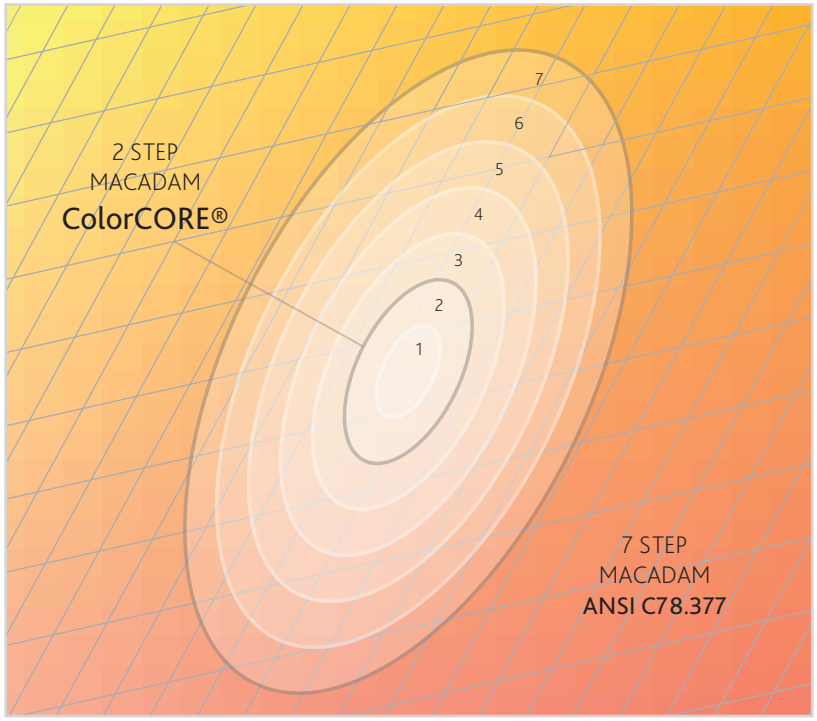
2-Step SDCM
90Ra CRI
82Rf Fidelity
100Rg Gamut







2-Step CCT Binning



ColorCORE®

ColorCORE® products are manufactured to precise colour binning specifications within a maximum 2-STEP MacAdam Ellipse area.

The ANSI C78.377 chromaticity standard defines a 7-STEP MacAdam Ellipse area. ColorCORE® binning is to 1/36th of this area.

2-STEP SDCM (Standard Deviation Colour Matching) gives you the colour matching confidence you need for your project.

2 STEP
MACADAM

Devised by Dr. David MacAdam in 1942, a MacAdam ellipse is the region on a chromaticity diagram which contains all colours indistinguishable to the average human eye from the colour at the centre of the ellipse.

The contour of the ellipse represents the just-noticeable differences of chromaticity.

Standard Deviation Colour Matching in LED lighting uses deviations relative to MacAdam ellipses to describe colour precision of a light source.

ColorCORE®

TM30-15 Colour Reference Samples

A Nature
B Skin
C Textiles
D Paints
E Plastics
F Printed Materials
G Colour Systems

LUMINO

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