CERTIFICATIONS + TESTING

Certifications

TESTING ORGANIZATION + STANDARD	CERTIFICATE SERIAL NUMBER	REPORT REFERENCE
UL 2108 Class 2	E347880	E347880-20130503

Tested to UL & CSA by Underwriters Laboratory for use in USA and Canada, complies with California Title 24 Requirements, Lighting Facts. Exceeds ANSI C78.377A, CE & RoHS Compliant.

Fixture Testing

TEST	RESULTS
OPTICAL TESTING	
Spectrum Analysis	IES LM 79 (Lumen, CCT, CRI, XY, SDCM, Wavelength)
Photometric Distribution	IES LM 73 (Lumen intensity distribution & Lux Diagram)
Lumen Maintenance & Lifetime	IES LM 84 & IES TM28
TEMPERATURE TESTING	
Normal Temperature Test	UL1598 & UL2388 & IEC60598-1 & IEC60598-2-21
Abnormal Operation Test	UL1598 & UL2388 & IEC60598-1 & IEC60598-2-21
DURABILITY TESTING	
Bending Test	Manufacturer-defined, 500 cycles
Swing Test	UL2388, >750 cycles
Tensile Test	Manufacturer-defined, > The weight of light in max. connection length 2 connectors
Twist Test	Max connection length 2 connectors Manufacturer-defined, >200 cycles
Ball Impact	UL1598 & UL2388 & IEC60598-1 & IEC60598-2-21
IK	IEC62262
ENVIRONMENTAL TESTING	
Chlorinated Water Immersion	BG9667, PH6.8-7.6, Free chlorine 0.3-0.6mg/L
Salt Water Immersion	IEC60598-1, Sailinity 4%
Salt Spray Test	IEC68-2-11
Outdoor Exposure	Manufacturer-defined
Flame Resistance	UL94
UV Exposure	ASTMG 154, ISO 4892-3, UVA @ 340nm
IPX5, IPX6, IPX7, IPX8	IEC60529 & EN 60598
Temperature Shock	Manufacturer-defined, -40°C - 60°C (typical temperature range)
Constant Temperature	Manufacturer-defined

ANSI Standard

NOMINAL CCT	TARGET CCT + TOLERANCE(K)	TARET D_{UV}	D_{UV} TOLERANCE RANGE
2200K	2238±102	0.0000	Tx: CCT OF THE SOURCE FOR Tx<2870K 0.000±0.0060 FOR Tx≥2870K Duv (Tx)±0.0060 WHERE Duv (Tx)=57700 x (1/Tx)2 -44.6 x (1/Tx) +0.00854
2500K	2460±120	0.0000	
2700K	2725±145	0.0000	
3000K	3045±175	0.0001	
3500K	3465±245	0.0005	
4000K	3985±275	0.0010	
4500K	4503±243	0.0015	
5000K	5029±283	0.0020	
5700K	5667±355	0.0025	
6500K	6532±510	0.0031	
Flexible CCT (2200-6500K)	$T_F{}^{1)}\pm\Delta T^{2)}$	$D_{UV}T_F{}^{3)}$	

Remark:

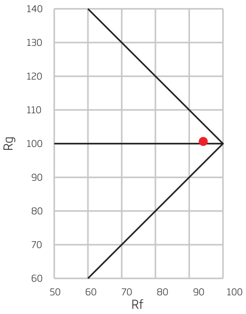
1) T_F is chosen to be at 100K steps (2300, 2400, ..., 6400K), excluding the ten nominal CCTs listed in Table 1.

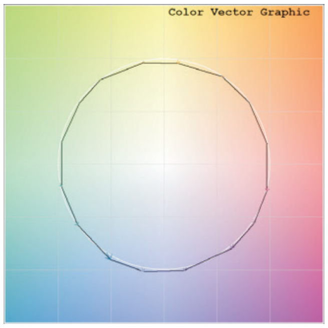
2) $\Delta T=1.1900x10^8xT^3-1.5434x10^4xT^2+0.7168xT-902.55$

3) Same as in the D_{UV} Tolerance Range

PVC 24V DC - Static

TM-30

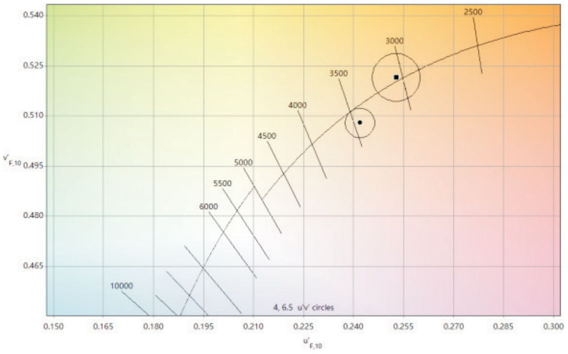




IES TM-30-15 is a new system of several related measures and graphics that can be used together to effectively evaluate and communicate a light source's color rendering properties. The development of the method involved synthesizing multiple related research efforts and combining ideas into a single, cohesive system of objective information that can be used to aid decision-making processes, such as finding the preferred light source for a given application or evaluating the tradeoffs between efficacy and color rendering.

MEASURE	ABBREVIATION	DESCRIPTION
Fidelity Index	Rf	Analogous to CIE Ra (CRI). Characterizes the average color shift of the 99 CES to characterize the overall level of similarity between the test source and reference illuminant. Values range from 0 to 100.
Gamut Index	Rg	Compares the area enclosed by the average chromaticity coordinates in each of 16 hue bins to characterize the average saturation level of the test source compared to the reference illuminate. A neutral score is 100, with values greater than 100 indicating an increase in saturation and values less than 100 indicating a decrease in saturation. The range in values grows as fidelity decreases.

Color Matching



Color temperature value stated on all GLLS's documents refers to finished products. LED's color temperature would be shifted by the light diffuser made of PVC or silicone material. GLLS calibrates color temperature and color coordinate of tailor-made LEDs with proprietary color-matching algorithms to produce a precise color temperature and color coordinate close to black body locus for finished products. All LEDs would be strictly tested and tightly controlled to ensure finished products can meet ANSI standard.

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