



**KL PAR FC - VNSP**

Photometric Test Report

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# Testing Process

## Total Lumen Measurements

Lumens are measured using a Viso Systems Lab Spion. As a goniophotometer, the Viso calculates the field lumens of the fixture by taking multiple measurements across the light beam.

Many lumens figures provided for entertainment lighting fixtures are only  $2\pi$  sphere values, some even emphasize the LED engine lumens. All Elation product photometric data is the actual light output from the fixture lens, never a theoretical value based on calculation or using the source lumens as the fixtures output. We advise to always compare total fixture lumens acquired with identical measurement systems when comparing lighting fixtures.

## Test Lab Equipment and Process

Elation operates an optical testing laboratory at its Los Angeles, CA headquarters to provide accurate photometric data for its lighting products. The testing lab is both light and climate-controlled and contains a variety of precise lighting measurement systems. Fixtures are analyzed with the sophisticated [Viso Systems Lab Spion](#) equipment, which measures all light and color parameters by panning the light beam at a precise speed and from different angles through a calibrated, laser aligned light and color sensor. Test data is collected and summarized by the Viso Light Inspector software. This type of measurement system is referred to as a Goniophotometer.

The Viso software calculates all relevant types of measurements, from beam angles, candela to center light intensity at a variety of distances to the latest color quality measurements like TM30 or CQS as well as accurate color temperature. This wealth of data is then processed by an Elation specific template which is included in the photometric test report for various fixture conditions such as zoom angles and color correction filters.

The Viso software also creates IES (Illuminating Engineering Society) files for each test report. IES is an industry standard file format created for the easy electronic transfer of photometric test data, which is widely used by lighting manufacturers for photometric data distribution.

Additionally, fixtures are periodically rechecked for accuracy using various hand-held light meters including one or more of the devices listed below. This is done to ensure the test data contained in this report is as accurate as possible.

[Asenstek Lighting Passport](#) | [Konica Minolta T-10](#) | [Sekonic C700T](#)

**Total Lumen Output: 5552 lm**

**Color Temperature: 2677 K**

**CRI: 88.2**

**TLCI: 90**

**TM30: 91.8**

**CQS: 86.6**

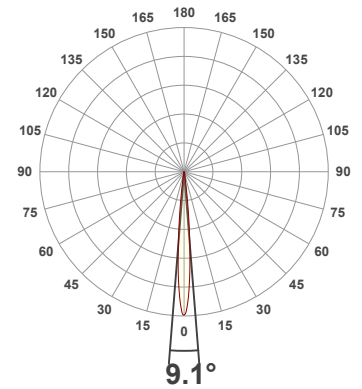
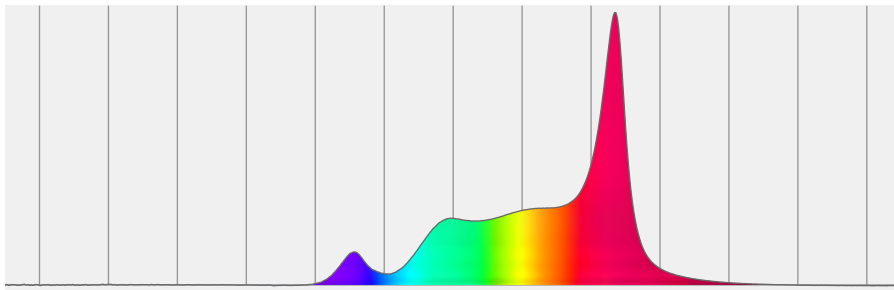
**Measurement Date: 6/30/2021**

**Voltage: 112 V, Current: 2.03 A**

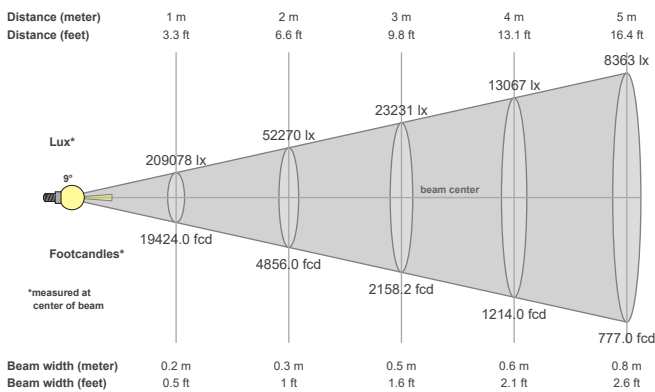
**Power: 225.4 W**

**Efficacy: 25 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 583



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.1°	15.7°	19.3°

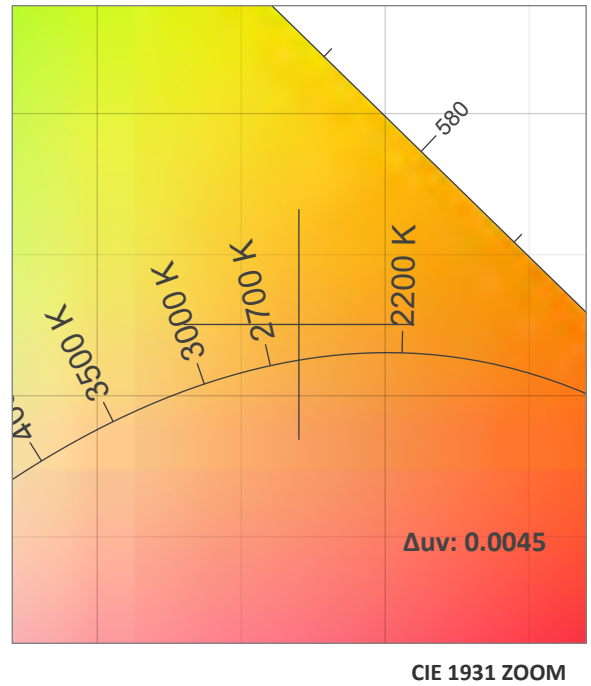
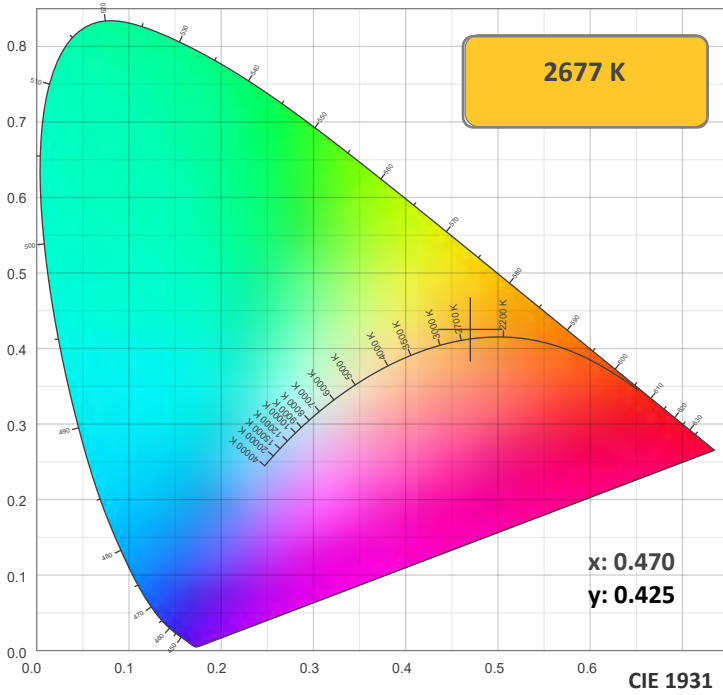
**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
209416 cd	100.0%	100.0%

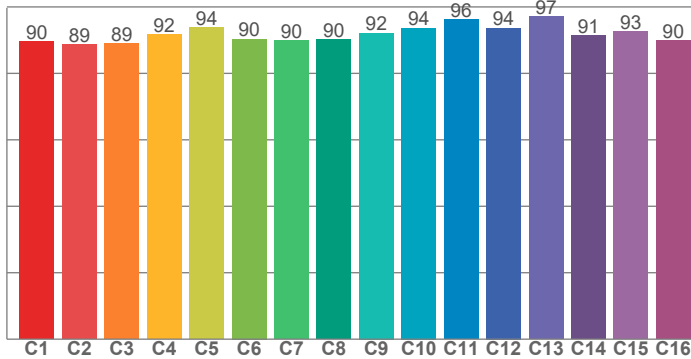
**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	209078	52270	23231	13067	8363	5808	4267	3267	2581	2091	1728	1452	1237	1067	929	817	723	645	579	523
FC	19424	4856	2158.2	1214	777	539.6	396.4	303.5	239.8	194.2	160.5	134.9	114.9	99.1	86.3	75.9	67.2	60	53.8	48.6

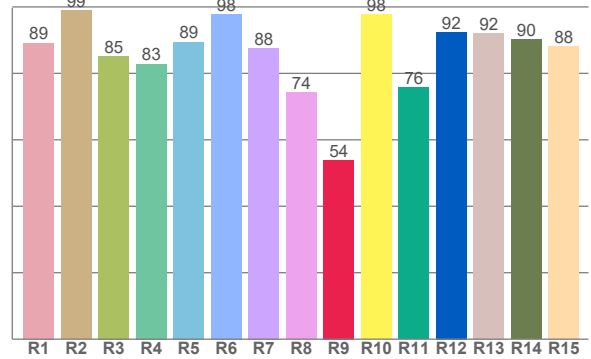
### Color Details



TM30: 91.8



CRI: 88.2 (R1-R8)



CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
89.2	99.0	85.2	82.9	89.5	97.9	87.7	74.3	53.9	97.8	75.8	92.4	92.2	90.1	88.2

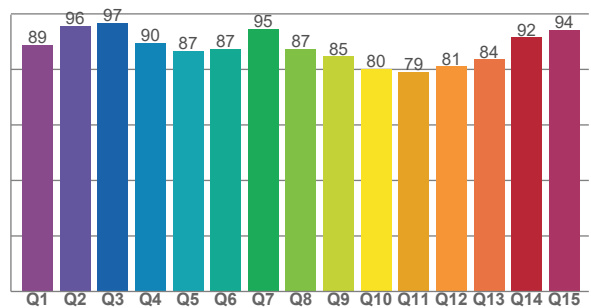
TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
89.6	88.8	88.9	91.6	93.7	90.3	89.9	90.2	92.1	93.7	96.2	93.7	97.1	91.5	92.6	89.9

CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
89.0	95.7	96.7	89.5	86.7	87.5	94.6	87.4	84.7	80.2	79.2	81.1	83.6	91.5	94.1

CQS: 86.6



### Color Parameters

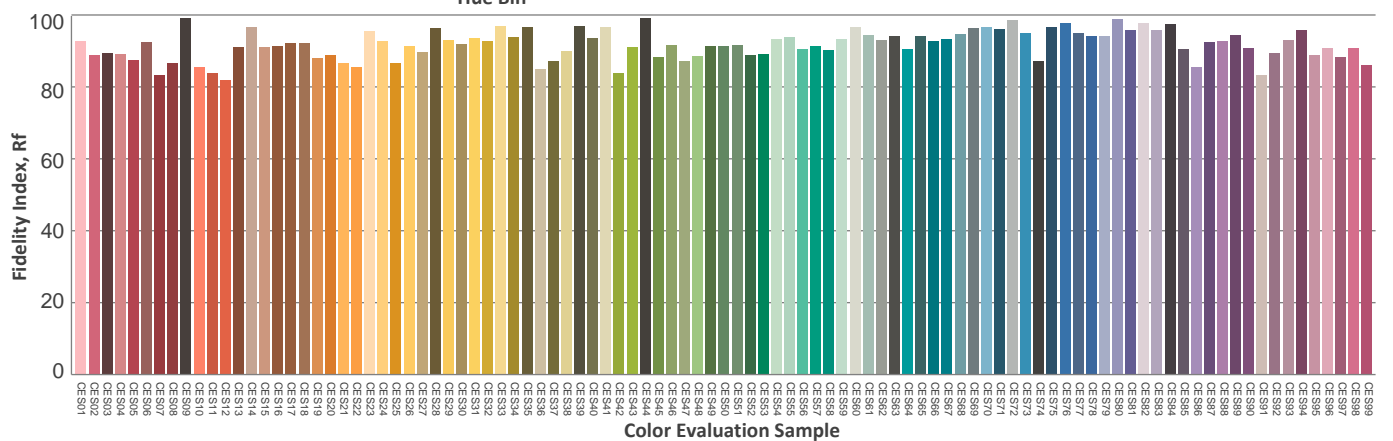
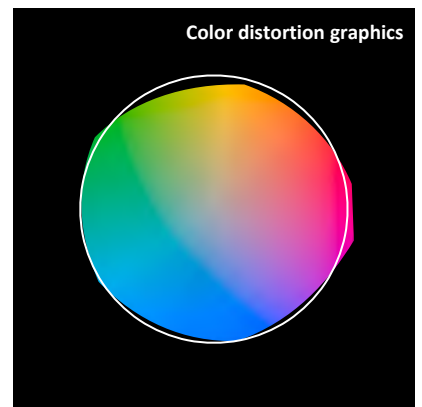
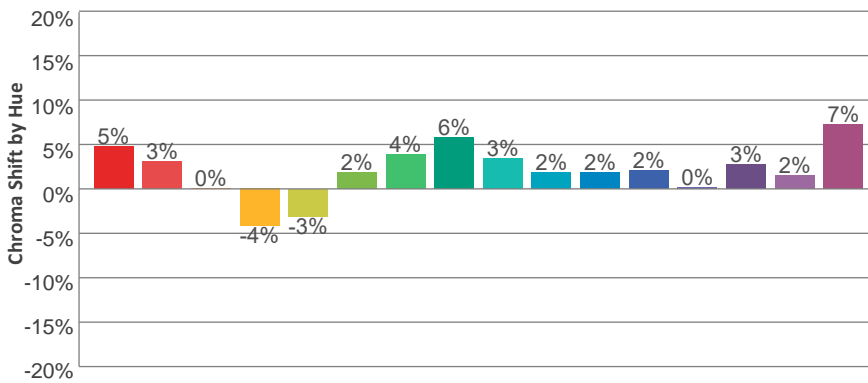
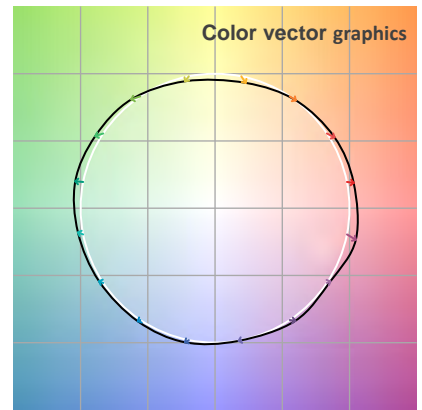
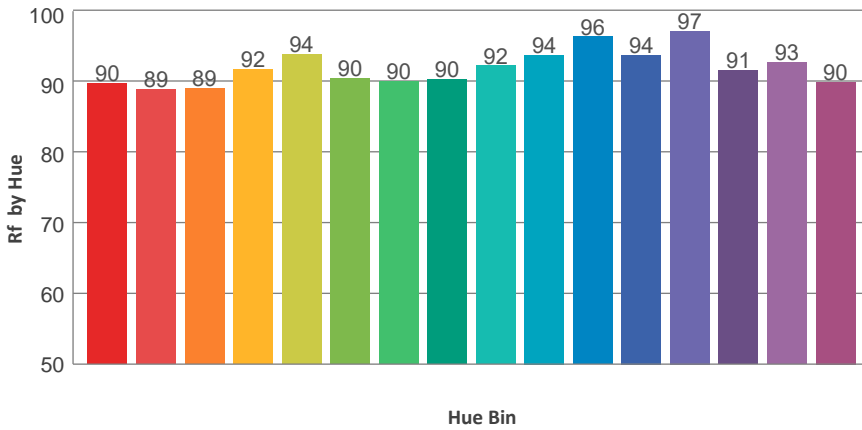
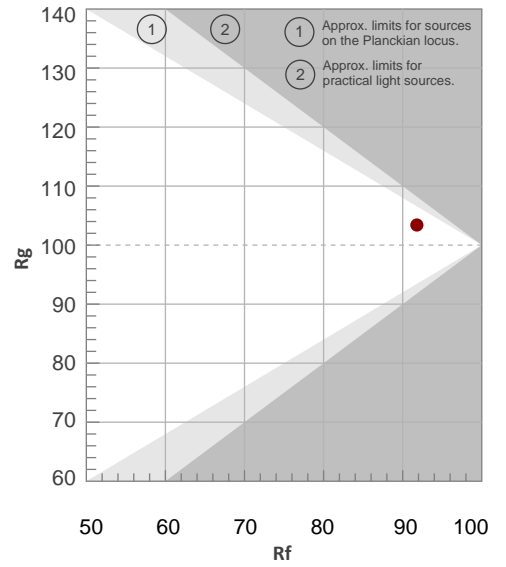
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
2677 K	88.2	53.9	91.8	103.4	86.6	0.470	0.425	0.262	0.356	0.0045

TM30 Details

**Rf 91.8**  
Fidelity Index Rf

**Rg 103.4**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	90	5%	-2%
2	89	3%	-6%
3	89	0%	-5%
4	92	-4%	-4%
5	94	-3%	3%
6	90	2%	7%
7	90	4%	5%
8	90	6%	1%
9	92	3%	-2%
10	94	2%	-3%
11	96	2%	-1%
12	94	2%	-3%
13	97	0%	-2%
14	91	3%	3%
15	93	2%	2%
16	90	7%	-3%



**Total Lumen Output: 6513 lm**

**Color Temperature: 3156 K**

**CRI: 89.7**

**TLCI: 94**

**TM30: 92.7**

**CQS: 91.1**

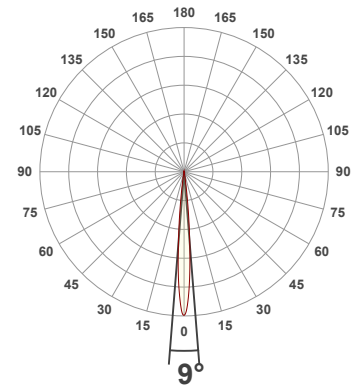
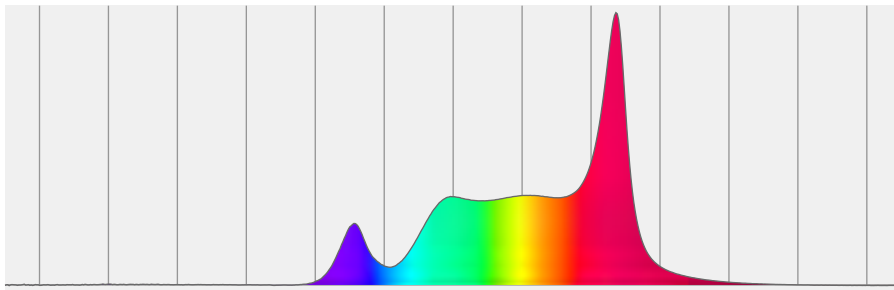
**Measurement Date: 6/30/2021**

**Voltage: 111 V, Current: 2.26 A**

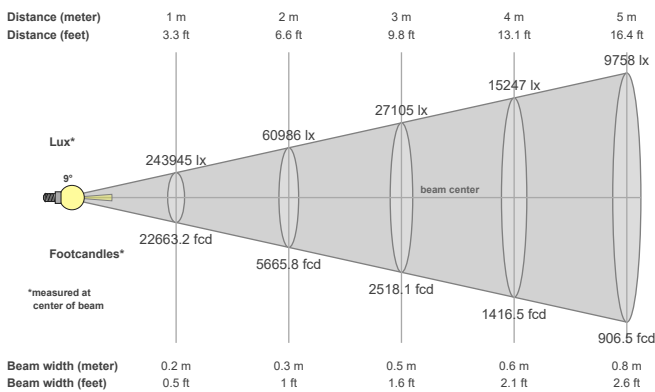
**Power: 250 W**

**Efficacy: 26 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 581



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9°	15.7°	19.4°

**Beam intensities**

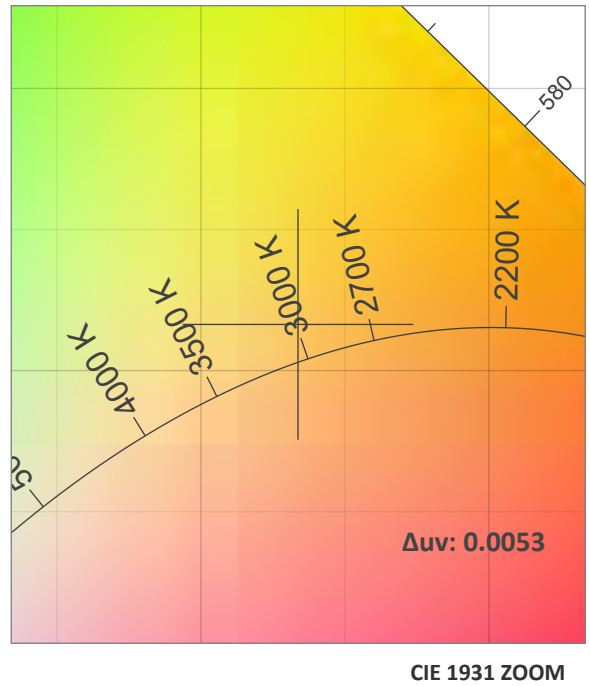
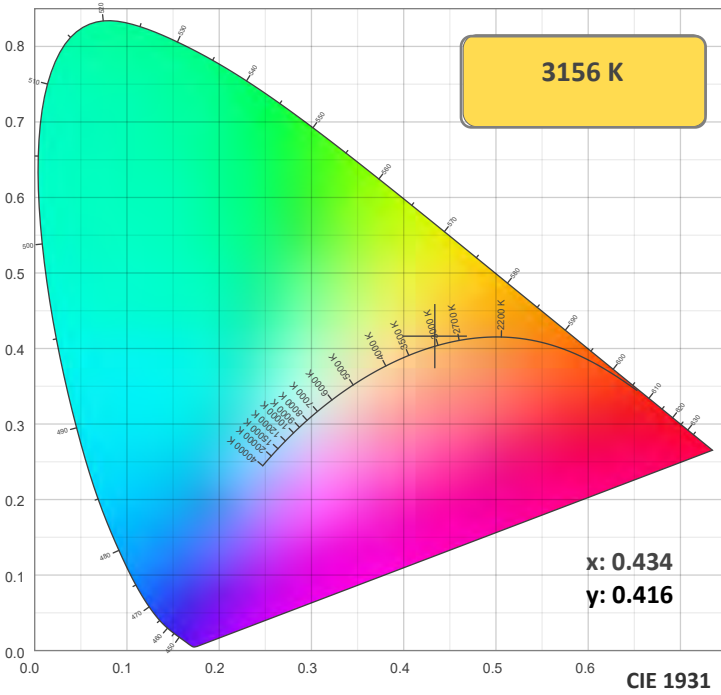
Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
244019 cd	100.0%	100.0%

**Beam Intensities from 1-20m**

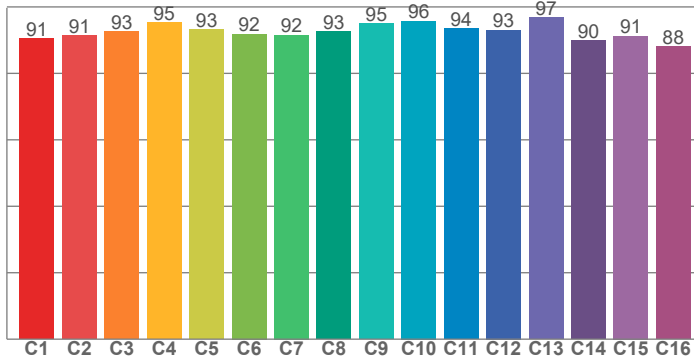
M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	243945	60986	27105	15247	9758	6776	4978	3812	3012	2439	2016	1694	1443	1245	1084	953	844	753	676	610
FC	22663.2	5665.8	2518.1	1416.5	906.5	629.5	462.5	354.1	279.8	226.6	187.3	157.4	134.1	115.6	100.7	88.5	78.4	69.9	62.8	56.7



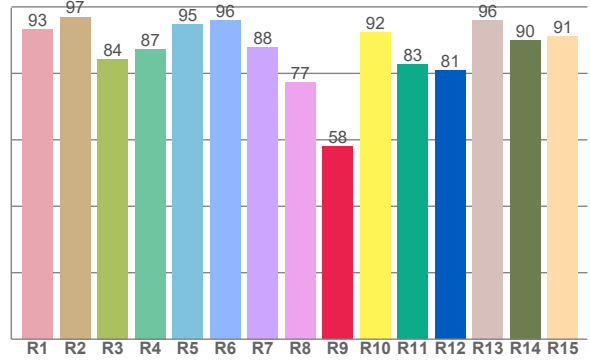
### Color Details



TM30: 92.7



CRI: 89.7 (R1-R8)



CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
93.2	97.0	84.3	87.3	94.6	96.0	87.9	77.3	58.0	92.2	82.6	80.8	96.1	90.1	91.2

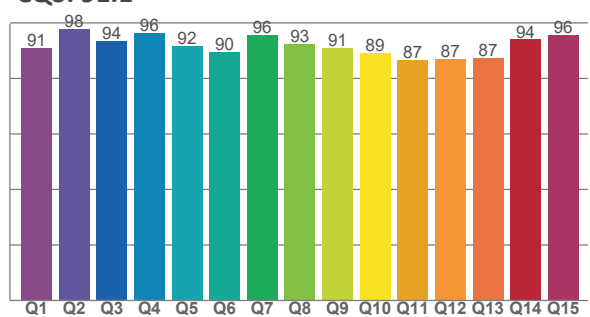
TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
90.5	91.4	92.6	95.3	93.2	91.9	91.5	92.6	95.0	95.8	93.6	93.1	96.8	90.0	91.3	88.1

CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
91.0	97.7	93.6	96.4	91.7	89.7	95.6	92.5	90.9	89.3	86.8	86.9	87.3	94.1	95.7

CQS: 91.1



### Color Parameters

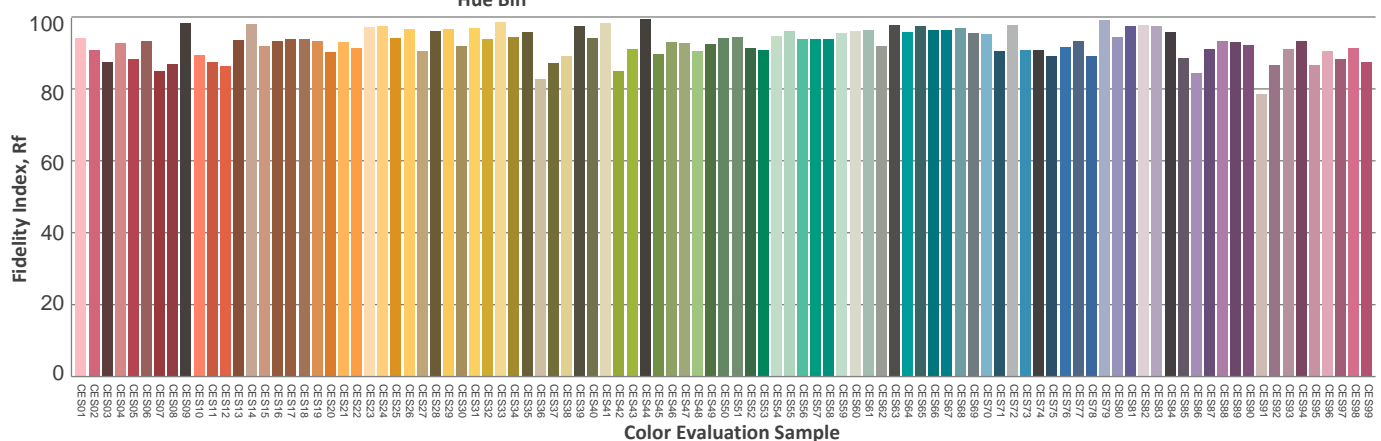
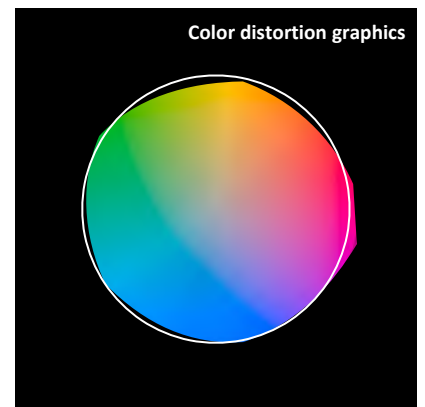
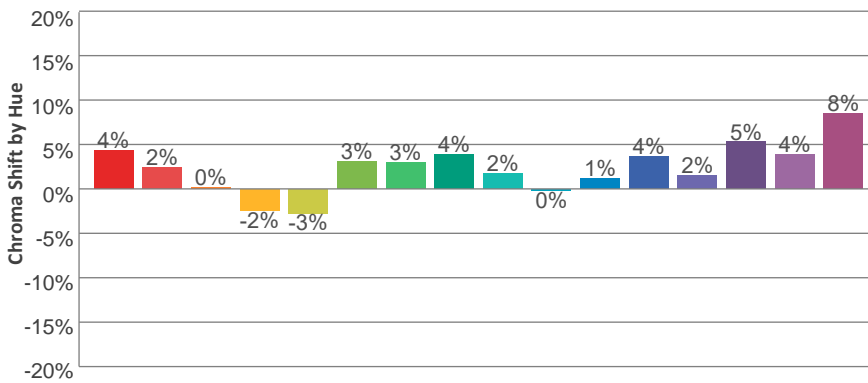
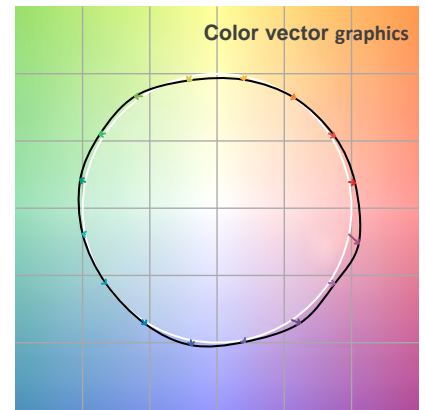
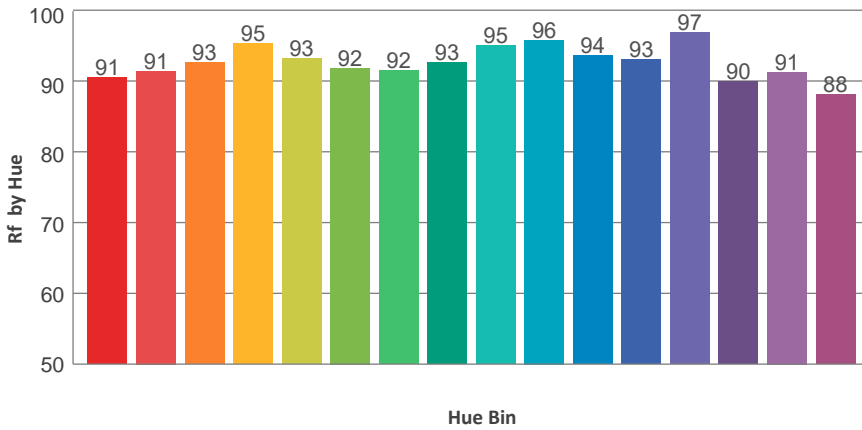
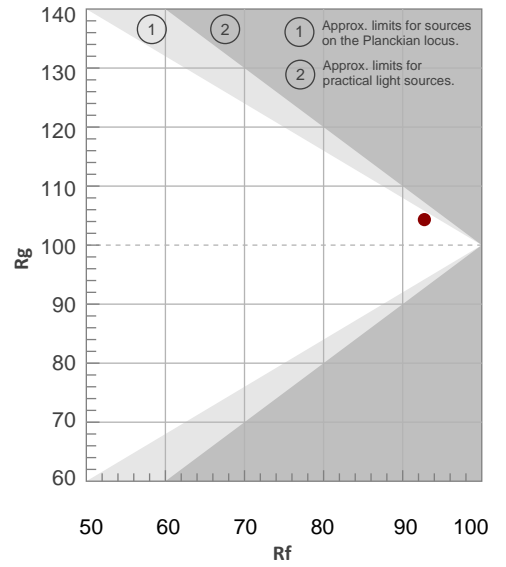
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Division from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
3156 K	89.7	58.0	92.7	104.3	91.1	0.434	0.416	0.243	0.350	0.0053

TM30 Details

**Rf 92.7**  
Fidelity Index Rf

**Rg 104.3**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	91	4%	-2%
2	91	2%	-4%
3	93	0%	-3%
4	95	-2%	-1%
5	93	-3%	3%
6	92	3%	4%
7	92	3%	3%
8	93	4%	-1%
9	95	2%	-1%
10	96	0%	1%
11	94	1%	4%
12	93	4%	1%
13	97	2%	1%
14	90	5%	4%
15	91	4%	2%
16	88	8%	-5%



**Total Lumen Output: 7137 lm**

**Color Temperature: 4522 K**

**CRI: 91.7**

**TLCI: 94**

**TM30: 91.4**

**CQS: 93.4**

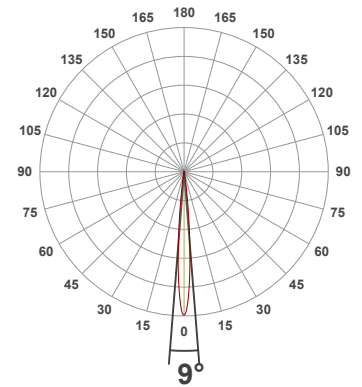
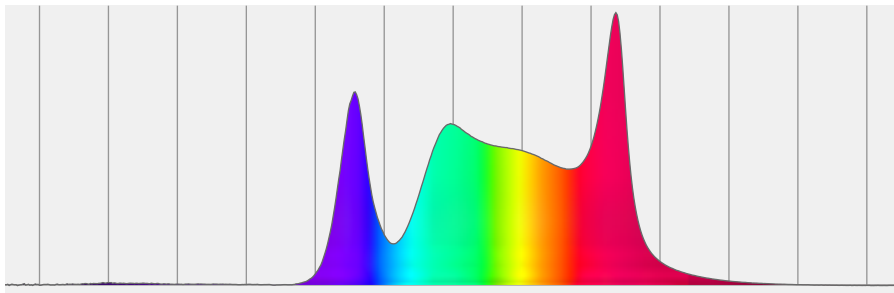
**Measurement Date: 7/1/2021**

**Voltage: 111 V, Current: 2.32 A**

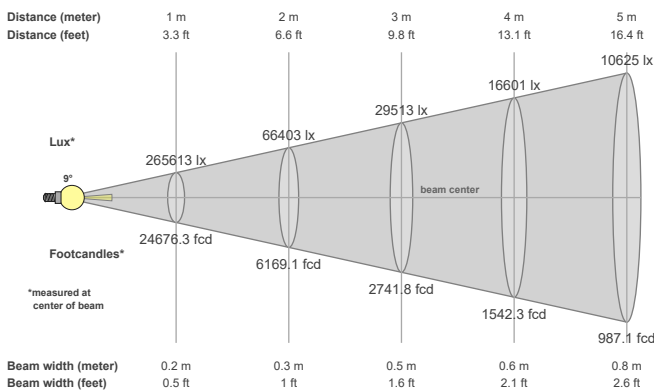
**Power: 255 W**

**Efficacy: 28 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 577



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9°	15.8°	19.5°

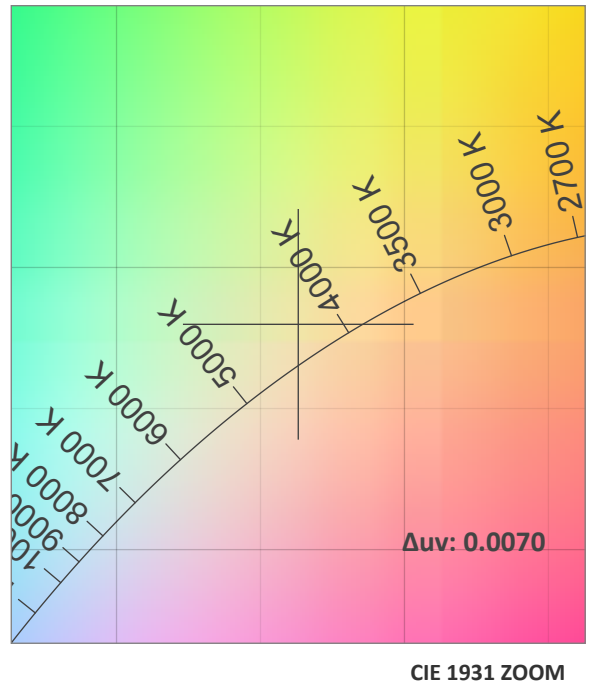
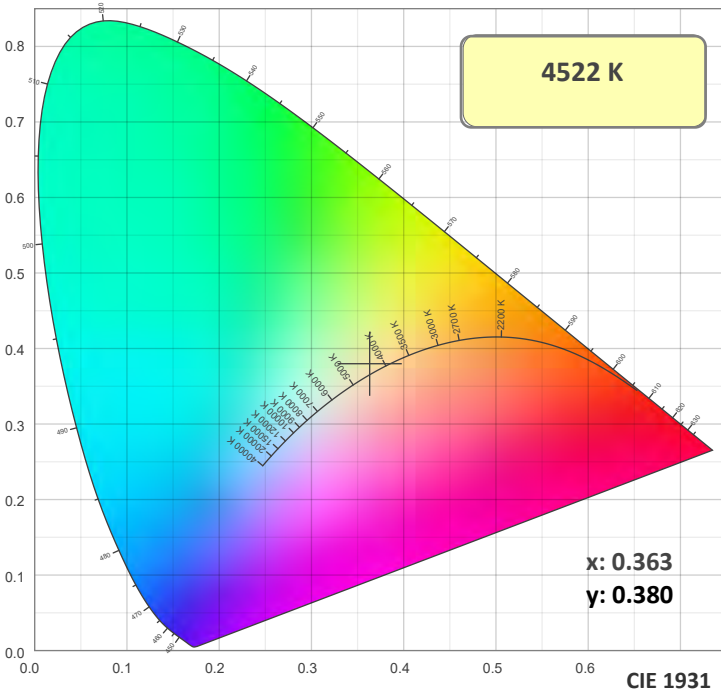
**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
265942 cd	100.0%	100.0%

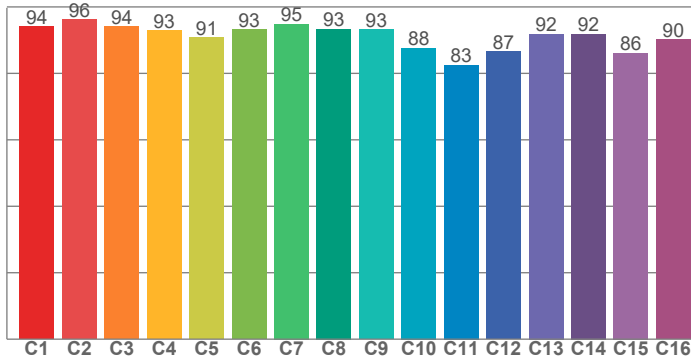
**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	265613	66403	29513	16601	10625	7378	5421	4150	3279	2656	2195	1845	1572	1355	1181	1038	919	820	736	664
FC	24676.3	6169.1	2741.8	1542.3	987.1	685.5	503.6	385.6	304.6	246.8	203.9	171.4	146	125.9	109.7	96.4	85.4	76.2	68.4	61.7

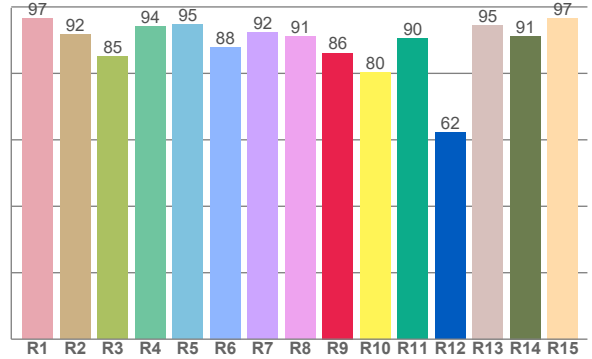
### Color Details



#### TM30: 91.4



#### CRI: 91.7 (R1-R8)



#### CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.6	91.7	85.1	94.0	94.6	88.0	92.3	91.1	86.2	80.4	90.4	62.2	94.5	91.3	96.7

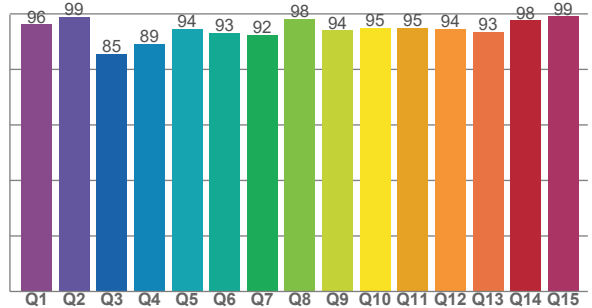
#### TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
94.1	96.3	94.0	93.0	90.8	93.2	94.8	93.3	93.1	87.7	82.6	86.6	91.8	91.9	86.1	90.1

#### CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
96.2	98.8	85.5	89.0	94.5	93.1	92.5	98.3	94.0	94.8	95.1	94.4	93.4	97.7	99.1

#### CQS: 93.4



### Color Parameters

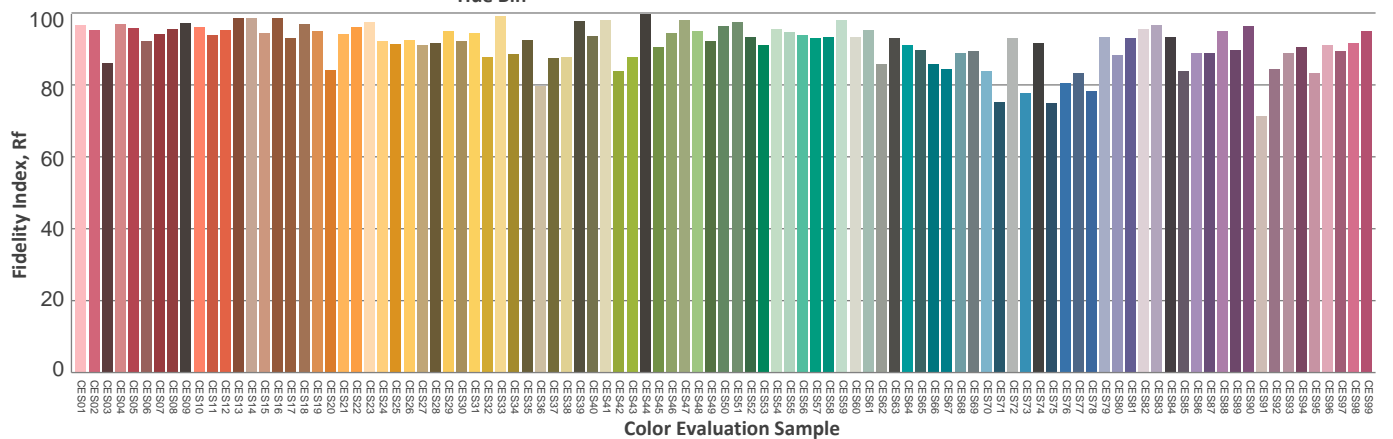
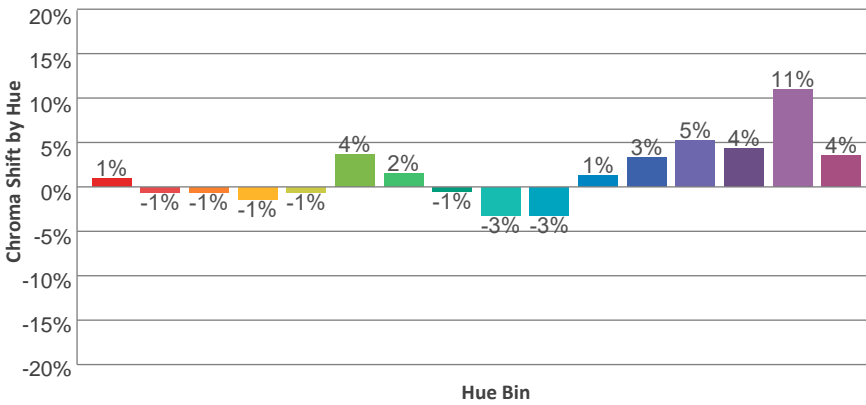
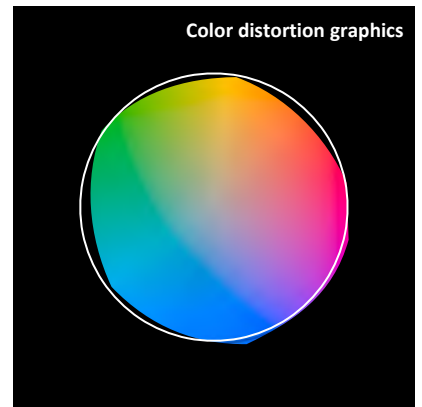
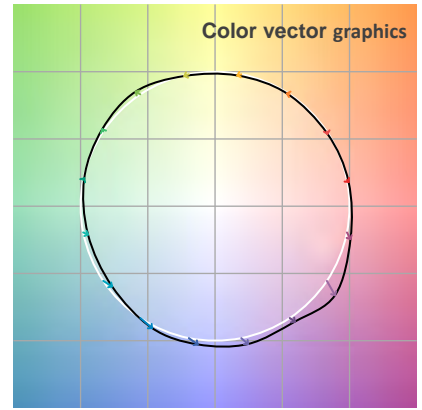
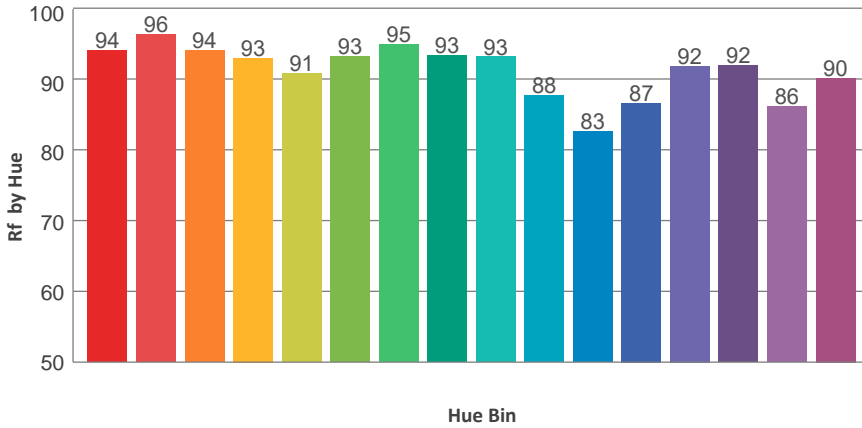
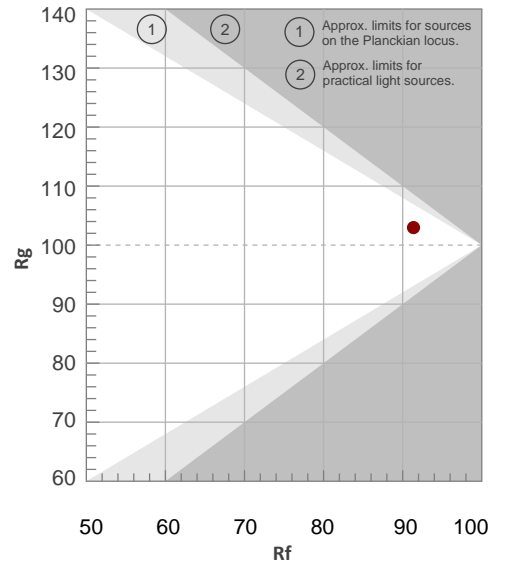
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
4522 K	91.7	86.2	91.4	103.0	93.4	0.363	0.380	0.213	0.334	0.0070

TM30 Details

**Rf 91.4**  
Fidelity Index Rf

**Rg 103.0**  
Gamut Index Rg

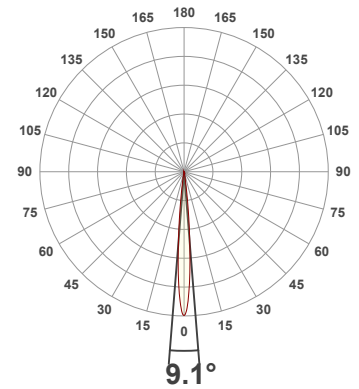
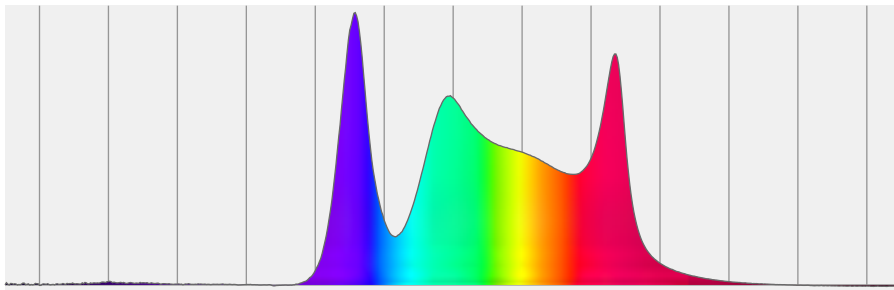
Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	94	1%	-2%
2	96	-1%	-2%
3	94	-1%	2%
4	93	-1%	3%
5	91	-1%	4%
6	93	4%	2%
7	95	2%	-1%
8	93	-1%	-1%
9	93	-3%	2%
10	88	-3%	7%
11	83	1%	11%
12	87	3%	7%
13	92	5%	4%
14	92	4%	2%
15	86	11%	-5%
16	90	4%	-4%



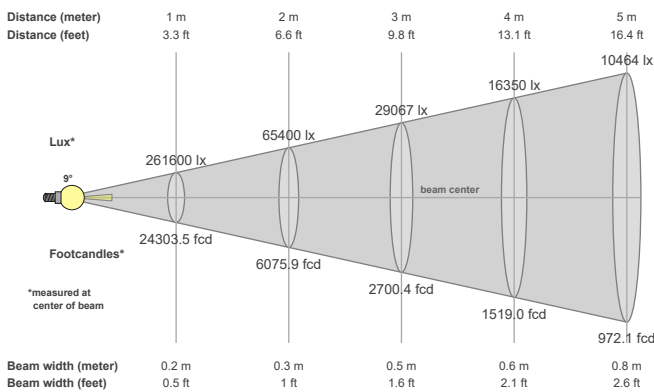
**Total Lumen Output: 7002 lm**  
**Color Temperature: 5607 K**  
**CRI: 91.4**  
**TLCI: 94**  
**TM30: 90.4**  
**CQS: 92.5**  
**Measurement Date: 7/1/2021**

**Voltage: 110 V, Current: 2.30 A**  
**Power: 252.6 W**  
**Efficacy: 28 Lumen/Watt**

**Spectral distribution**  
 Dominant Wavelength 572



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.1°	15.8°	19.3°

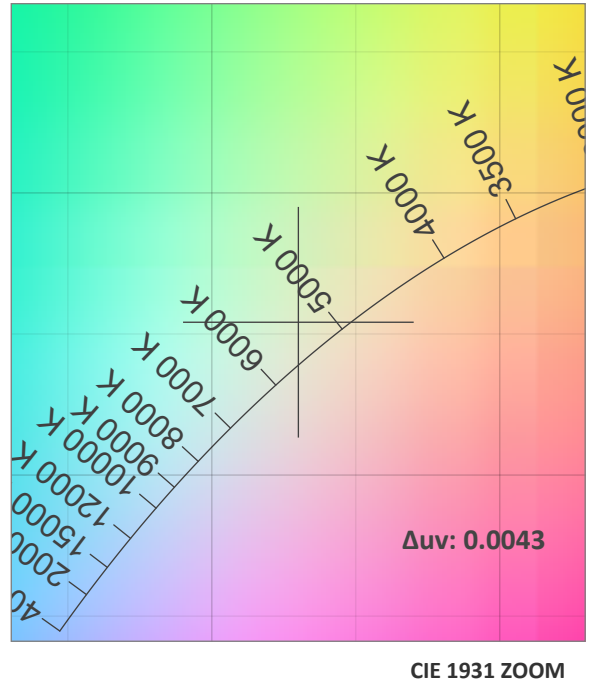
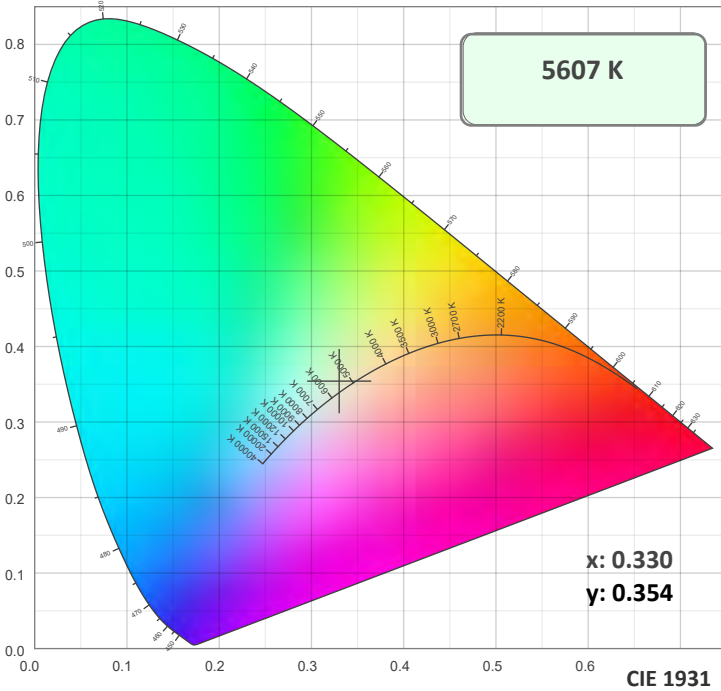
**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
262501 cd	100.0%	100.0%

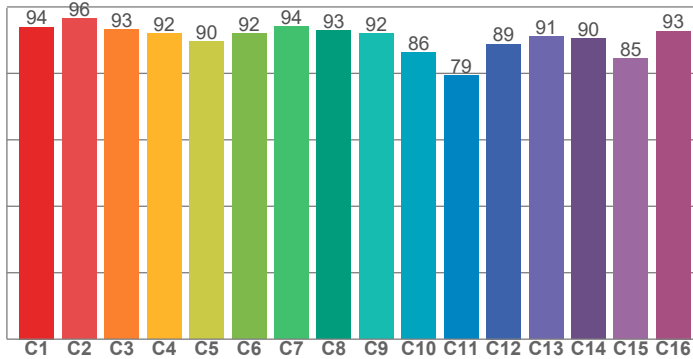
**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	261600	65400	29067	16350	10464	7267	5339	4088	3230	2616	2162	1817	1548	1335	1163	1022	905	807	725	654
FC	24303.5	6075.9	2700.4	1519	972.1	675.1	496	379.7	300	243	200.9	168.8	143.8	124	108	94.9	84.1	75	67.3	60.8

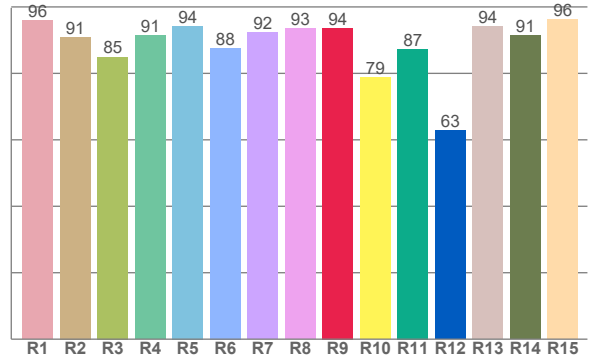
### Color Details



**TM30: 90.4**



**CRI: 91.4 (R1-R8)**



**CRI R values, only R1-R8 are used to calculate final CRI value**

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.0	90.9	85.0	91.4	94.2	87.6	92.3	93.5	93.6	78.8	87.3	62.7	94.2	91.4	96.3

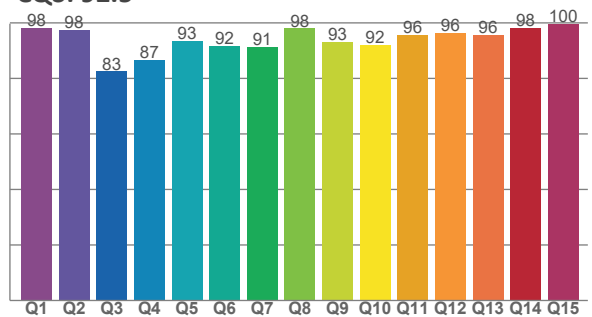
**TM30 C Values, 16 binned values out of total of 99 C values**

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
93.9	96.5	93.3	92.1	89.6	92.0	94.1	93.0	92.0	86.2	79.4	88.9	91.0	90.5	84.6	92.8

**CQS Q Values**

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
98.3	97.6	82.5	86.7	93.4	91.7	91.2	98.0	93.0	91.9	95.6	96.4	95.6	98.3	99.6

**CQS: 92.5**



### Color Parameters

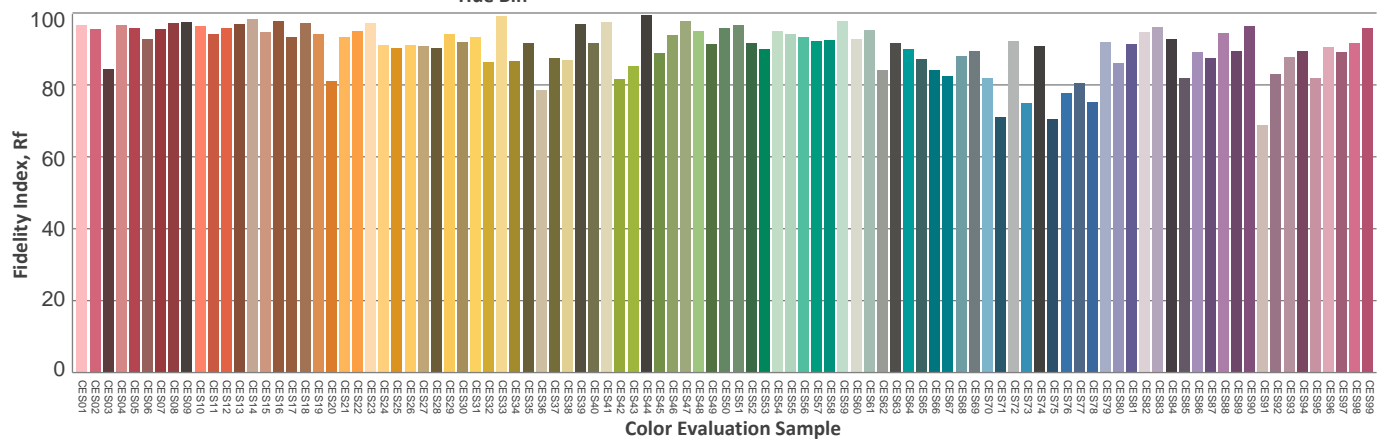
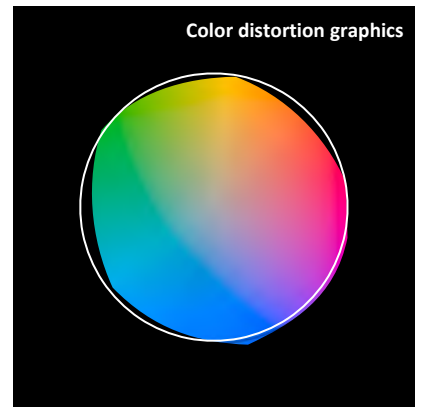
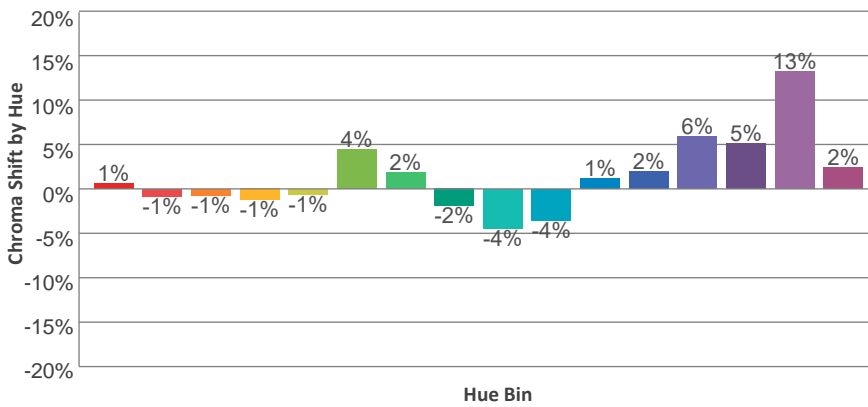
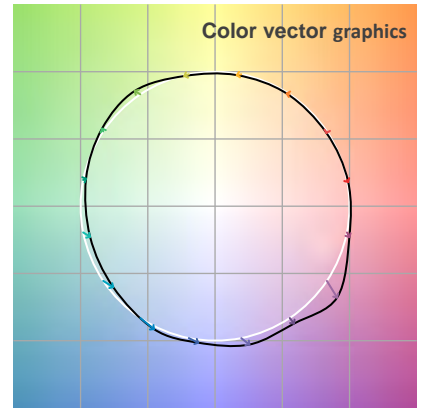
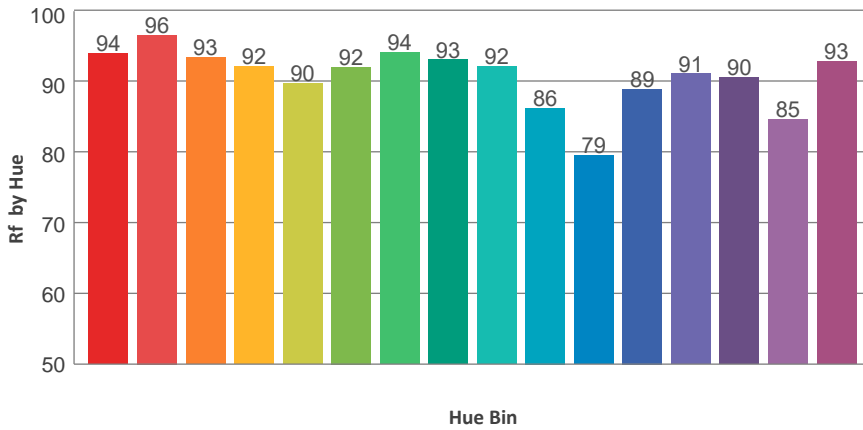
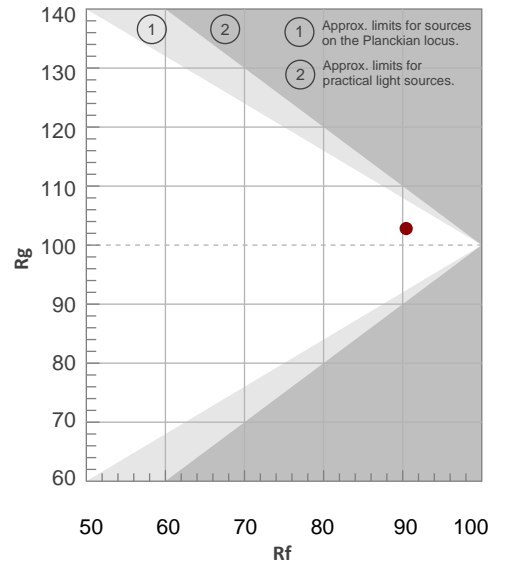
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
5607 K	91.4	93.6	90.4	102.8	92.5	0.330	0.354	0.200	0.322	0.0043

TM30 Details

**Rf 90.4**  
Fidelity Index Rf

**Rg 102.8**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	94	1%	-2%
2	96	-1%	-1%
3	93	-1%	2%
4	92	-1%	3%
5	90	-1%	4%
6	92	4%	2%
7	94	2%	-1%
8	93	-2%	-1%
9	92	-4%	4%
10	86	-4%	8%
11	79	1%	13%
12	89	2%	7%
13	91	6%	5%
14	90	5%	0%
15	85	13%	-6%
16	93	2%	-3%





**Total Lumen Output: 6987 lm**

**Color Temperature: 5976 K**

**CRI: 91.4**

**TLCI: 94**

**TM30: 90.4**

**CQS: 92.6**

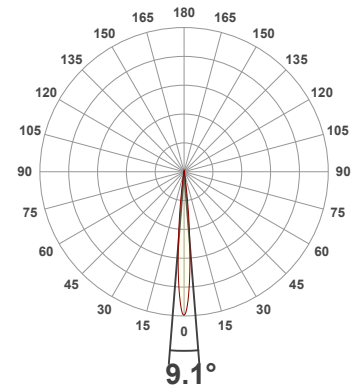
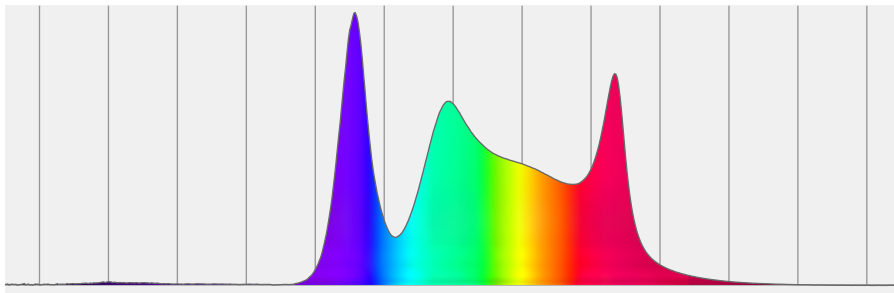
**Measurement Date: 7/1/2021**

**Voltage: 111 V, Current: 2.30 A**

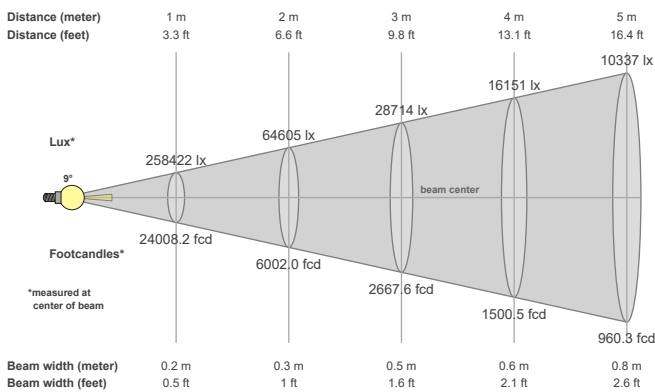
**Power: 253.1 W**

**Efficacy: 28 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 568



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.1°	15.8°	19.6°

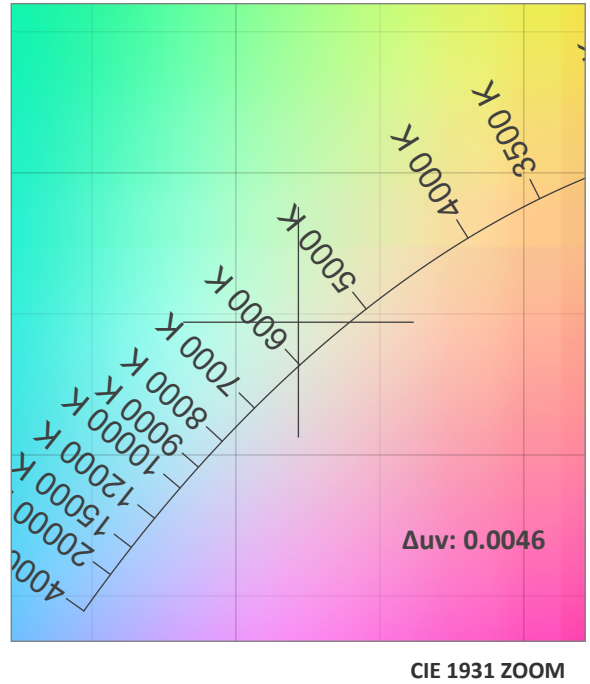
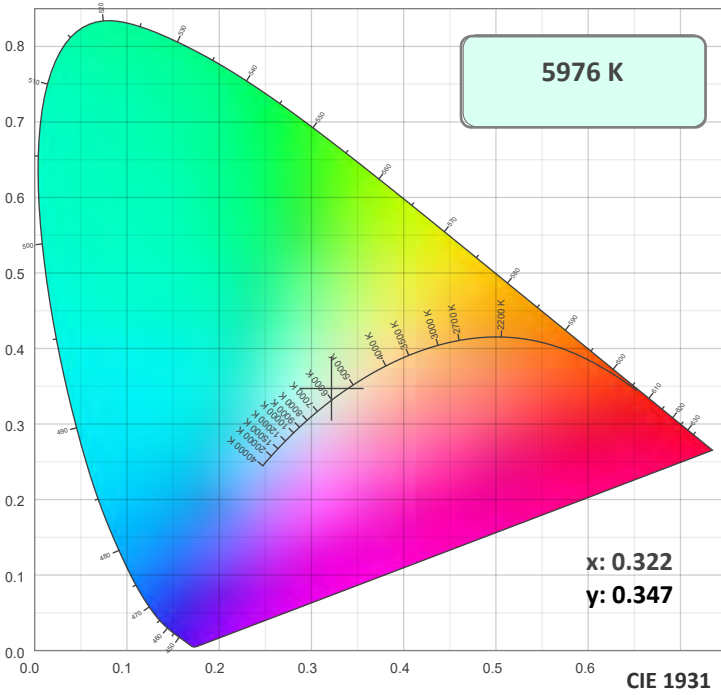
**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
258449 cd	100.0%	100.0%

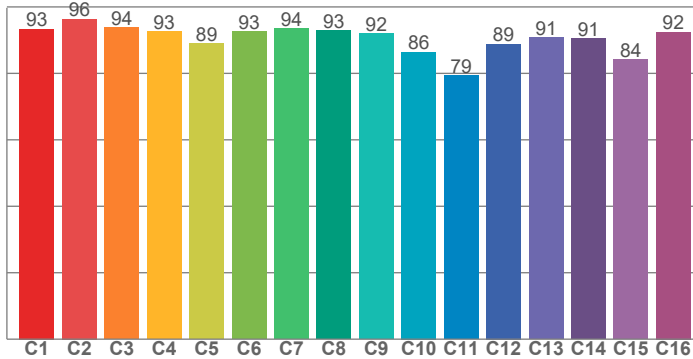
**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	258422	64605	28714	16151	10337	7178	5274	4038	3190	2584	2136	1795	1529	1318	1149	1009	894	798	716	646
FC	24008.2	6002	2667.6	1500.5	960.3	666.9	490	375.1	296.4	240.1	198.4	166.7	142.1	122.5	106.7	93.8	83.1	74.1	66.5	60

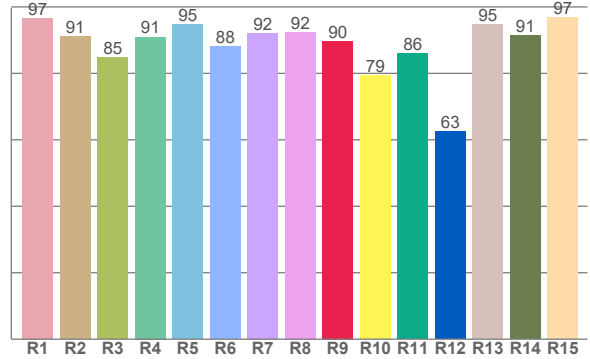
### Color Details



**TM30: 90.4**



**CRI: 91.4 (R1-R8)**



**CRI R values, only R1-R8 are used to calculate final CRI value**

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.7	91.1	84.7	91.0	94.8	88.0	92.1	92.4	89.8	79.4	86.1	62.5	94.7	91.3	96.9

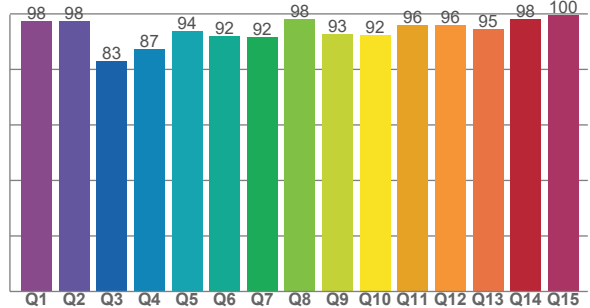
**TM30 C Values, 16 binned values out of total of 99 C values**

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
93.4	96.3	93.9	92.6	89.1	92.6	93.6	92.9	92.0	86.4	79.3	88.8	90.8	90.5	84.1	92.5

**CQS Q Values**

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
97.6	97.6	82.9	87.2	93.9	92.0	91.7	98.1	92.8	92.3	96.1	96.1	94.6	98.3	99.7

**CQS: 92.6**



**Color Parameters**

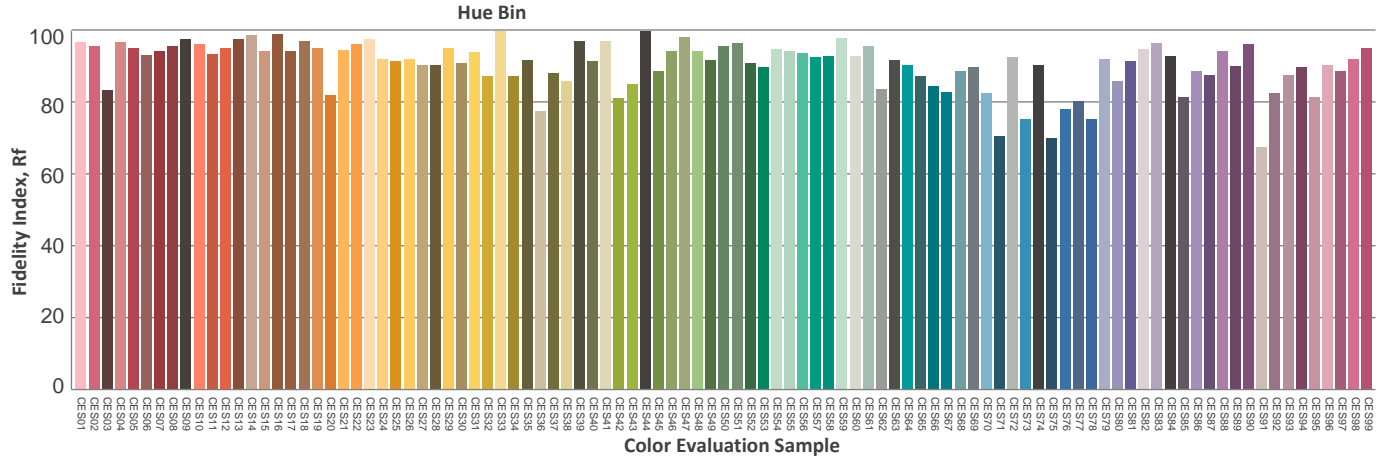
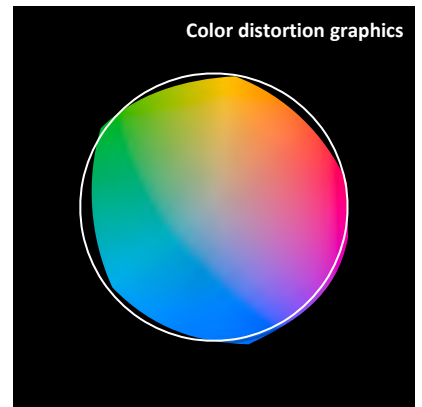
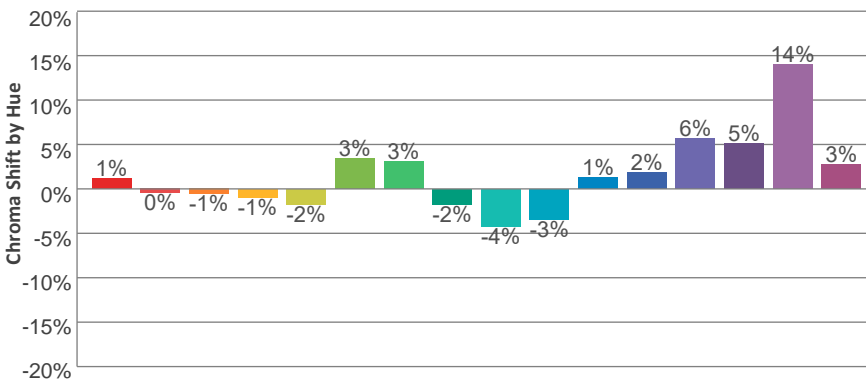
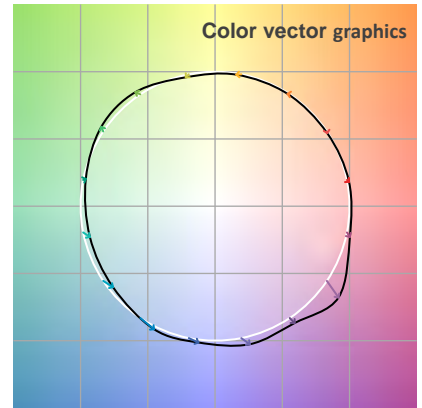
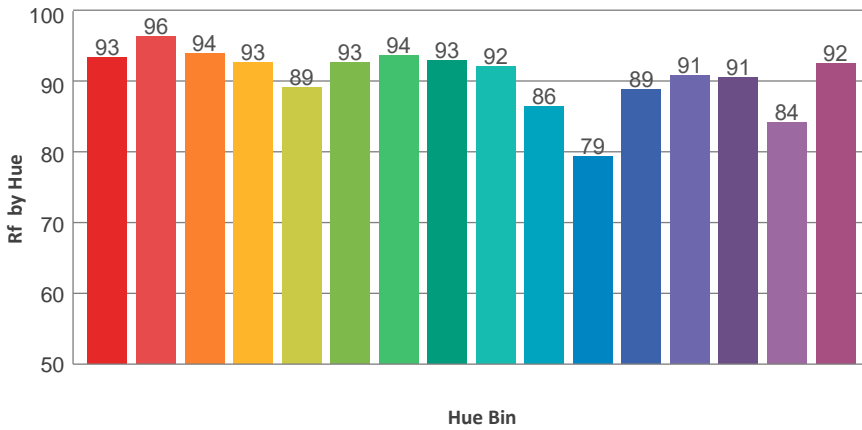
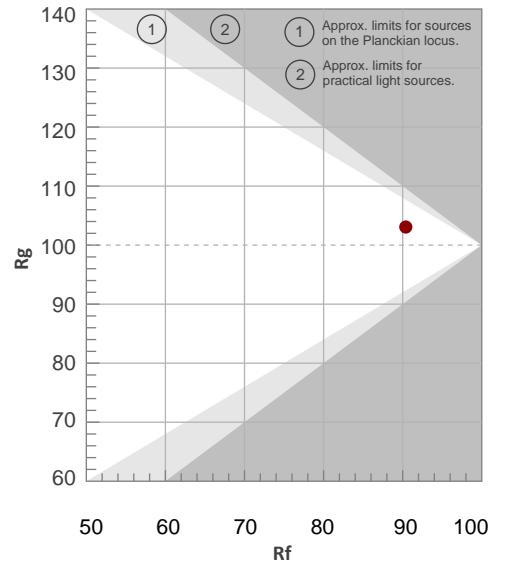
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
5976 K	91.4	89.8	90.4	103.1	92.6	0.322	0.347	0.197	0.319	0.0046

TM30 Details

**Rf 90.4**  
Fidelity Index Rf

**Rg 103.1**  
Gamut Index Rg

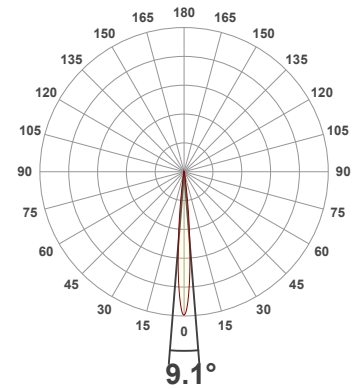
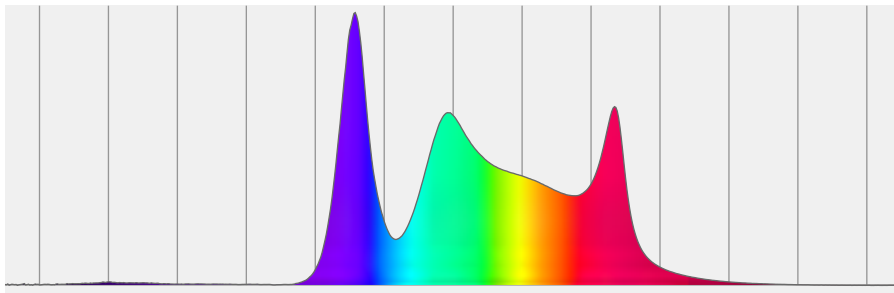
Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	93	1%	-2%
2	96	0%	-1%
3	94	-1%	2%
4	93	-1%	4%
5	89	-2%	3%
6	93	3%	2%
7	94	3%	-2%
8	93	-2%	-1%
9	92	-4%	4%
10	86	-3%	8%
11	79	1%	13%
12	89	2%	8%
13	91	6%	5%
14	91	5%	1%
15	84	14%	-5%
16	92	3%	-3%



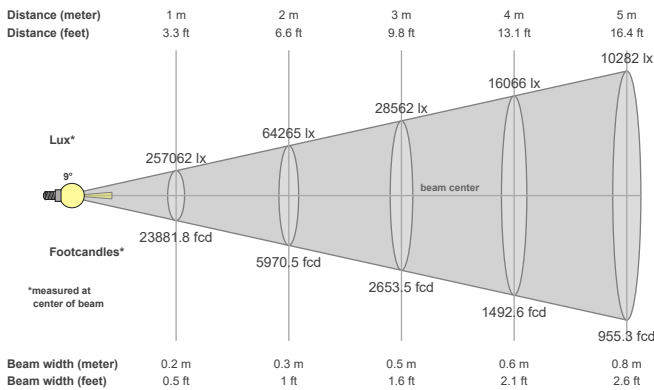
**Total Lumen Output: 6960 lm**  
**Color Temperature: 6505 K**  
**CRI: 91.3**  
**TLCI: 94**  
**TM30: 90.0**  
**CQS: 92.3**  
**Measurement Date: 7/1/2021**

**Voltage: 111 V, Current: 2.29 A**  
**Power: 253 W**  
**Efficacy: 28 Lumen/Watt**

**Spectral distribution**  
 Dominant Wavelength 545



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.1°	15.8°	19.6°

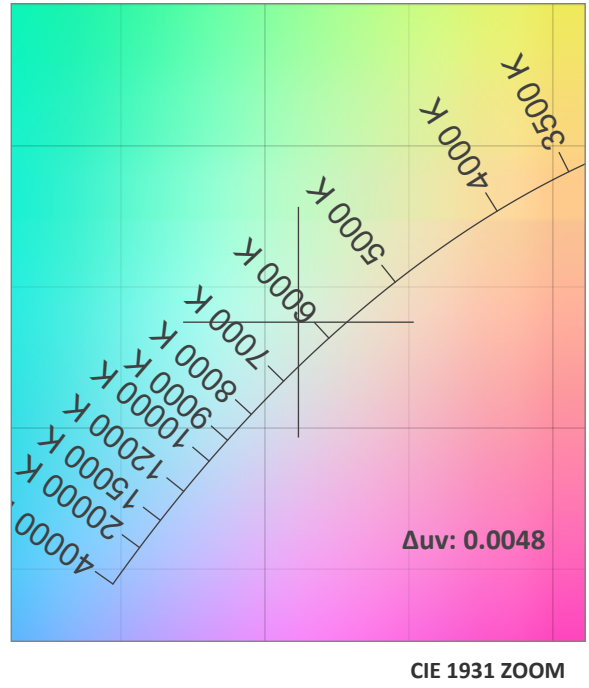
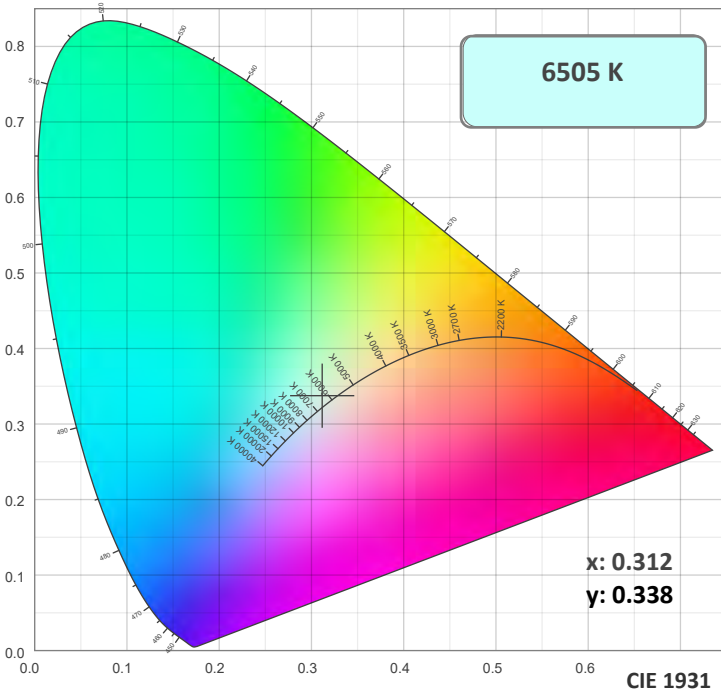
**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
257387 cd	100.0%	100.0%

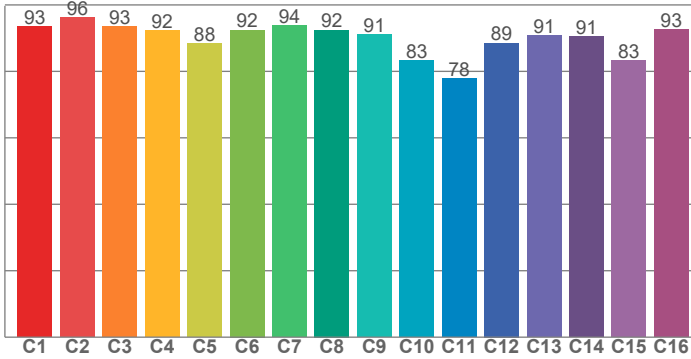
**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	257062	64265	28562	16066	10282	7141	5246	4017	3174	2571	2124	1785	1521	1312	1142	1004	889	793	712	643
FC	23881.8	5970.5	2653.5	1492.6	955.3	663.4	487.4	373.2	294.8	238.8	197.4	165.8	141.3	121.8	106.1	93.3	82.6	73.7	66.2	59.7

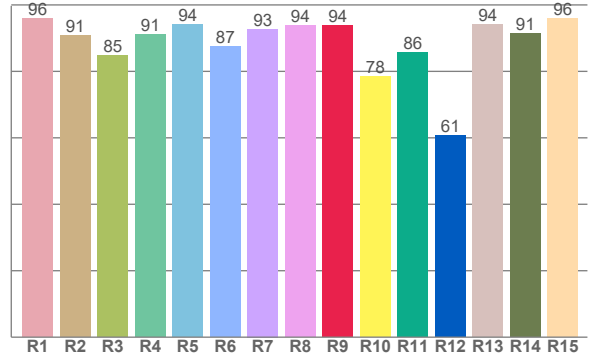
### Color Details



#### TM30: 90.0



#### CRI: 91.3 (R1-R8)



#### CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
95.9	90.7	84.8	91.1	94.0	87.5	92.7	93.9	93.7	78.4	85.8	60.6	94.1	91.5	95.8

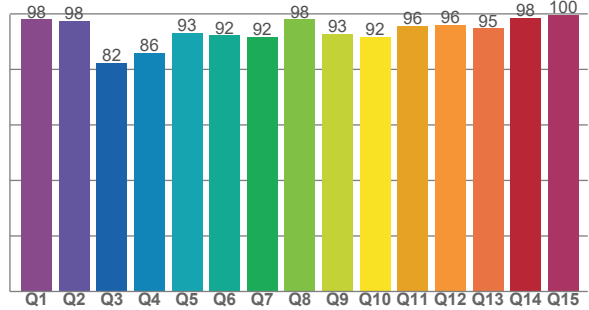
#### TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
93.5	96.2	93.5	92.3	88.5	92.5	93.8	92.4	91.2	83.2	77.8	88.5	90.8	90.6	83.3	92.7

#### CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
98.0	97.6	82.4	85.9	93.2	92.3	91.6	98.0	92.8	91.8	95.8	96.1	94.8	98.4	99.6

#### CQS: 92.3



#### Color Parameters

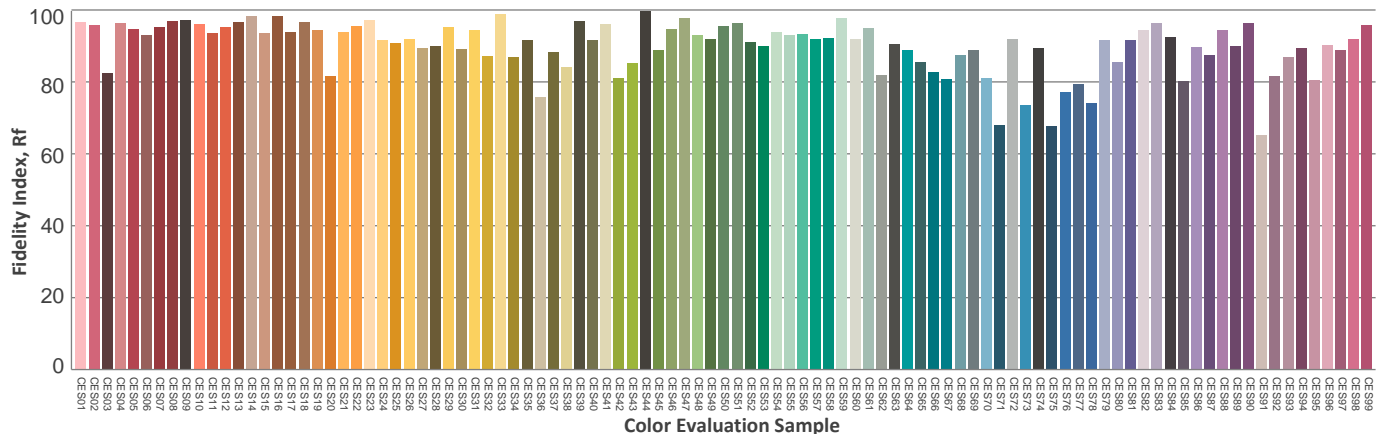
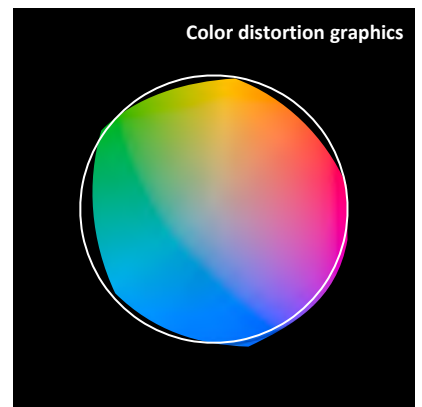
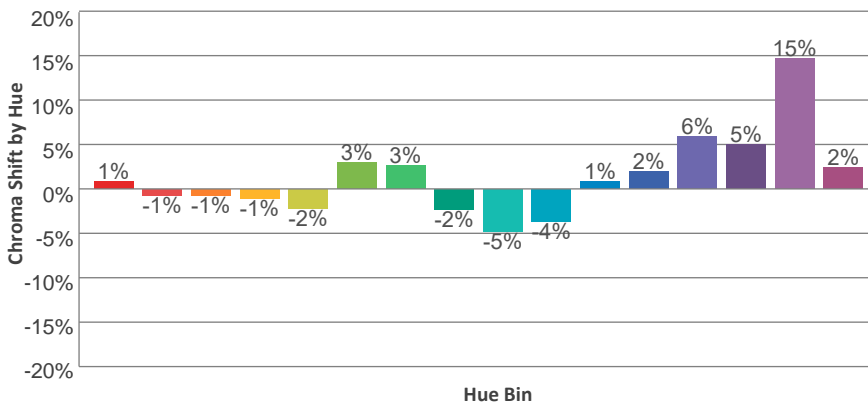
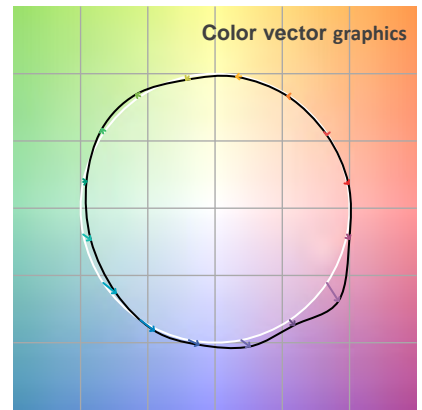
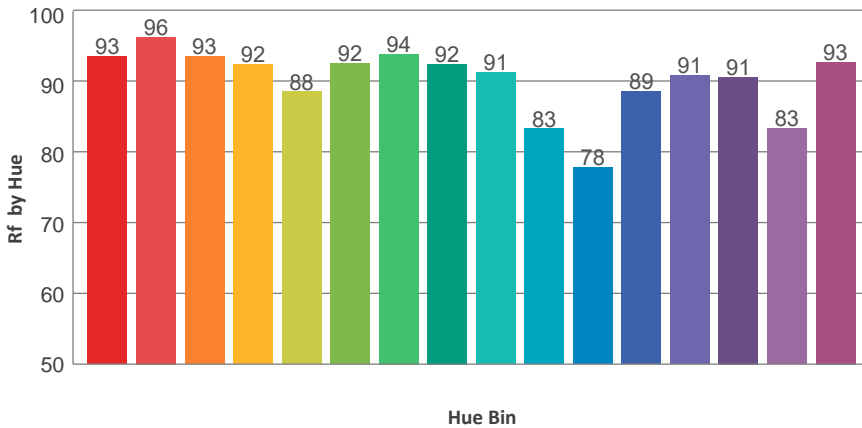
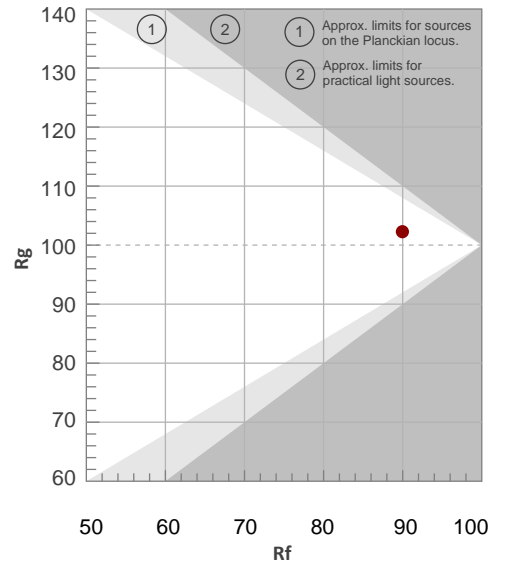
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	$\Delta uv$
6505 K	91.3	93.7	90.0	102.3	92.3	0.312	0.338	0.194	0.315	0.0048

TM30 Details

**Rf 90.0**  
Fidelity Index Rf

**Rg 102.3**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	93	1%	-2%
2	96	-1%	-1%
3	93	-1%	2%
4	92	-1%	4%
5	88	-2%	2%
6	92	3%	2%
7	94	3%	-2%
8	92	-2%	-1%
9	91	-5%	5%
10	83	-4%	11%
11	78	1%	13%
12	89	2%	8%
13	91	6%	5%
14	91	5%	1%
15	83	15%	-6%
16	93	2%	-3%



**Total Lumen Output: 7537 lm**

**Color Temperature: 6566 K**

**CRI: 92.1**

**TLCI: 94**

**TM30: 89.3**

**CQS: 91.1**

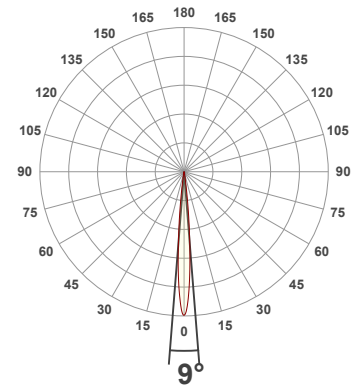
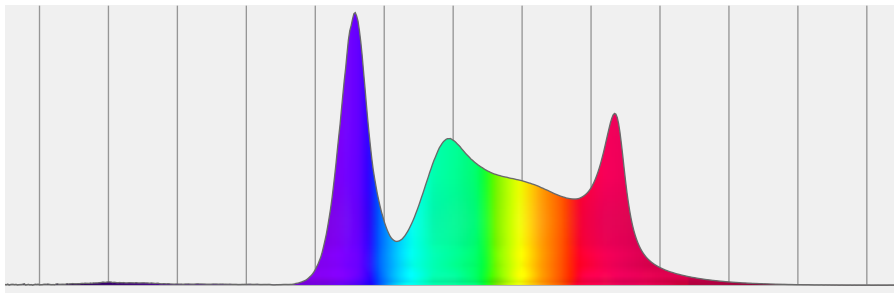
**Measurement Date: 6/30/2021**

**Voltage: 111 V, Current: 2.47 A**

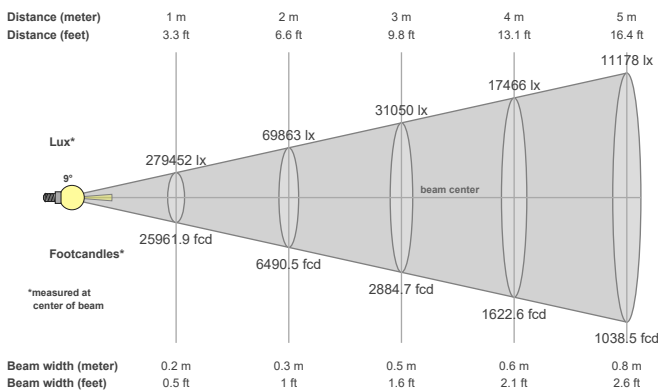
**Power: 272.9 W**

**Efficacy: 28 Lumen/Watt**

**Spectral distribution**  
Dominant Wavelength 360



**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9°	15.8°	19.6°

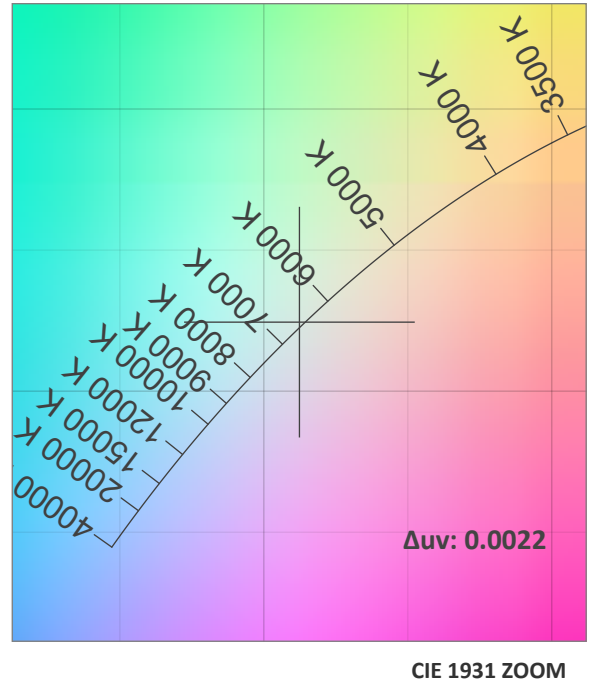
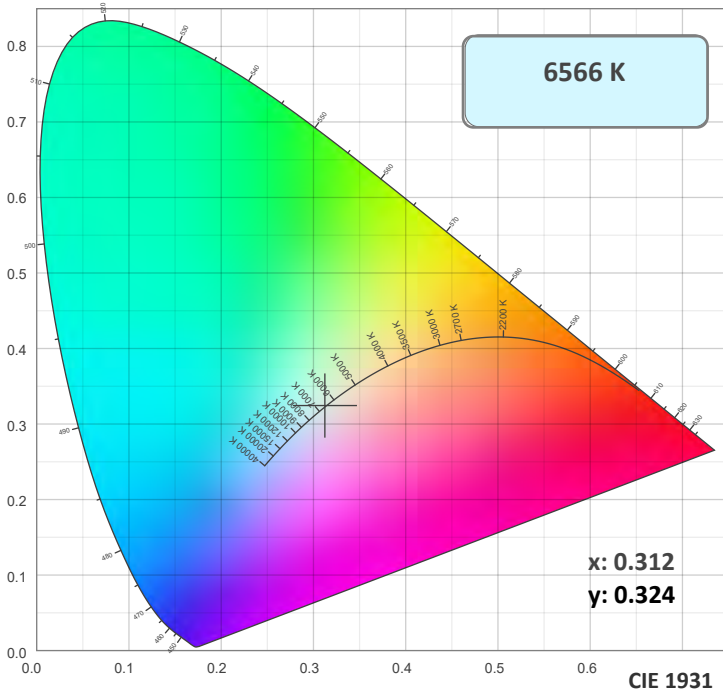
**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
279566 cd	100.0%	100.0%

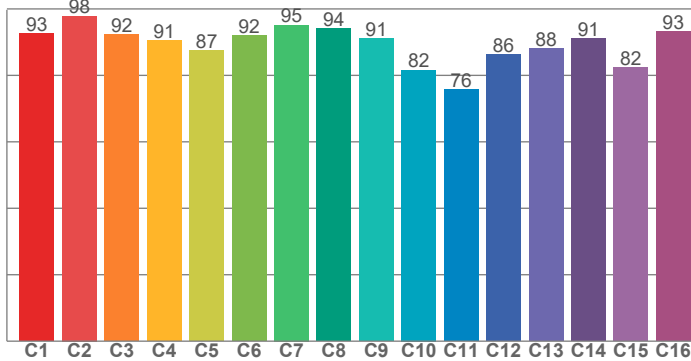
**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	279452	69863	31050	17466	11178	7763	5703	4366	3450	2795	2310	1941	1654	1426	1242	1092	967	863	774	699
FC	25961.9	6490.5	2884.7	1622.6	1038.5	721.2	529.8	405.7	320.5	259.6	214.6	180.3	153.6	132.5	115.4	101.4	89.8	80.1	71.9	64.9

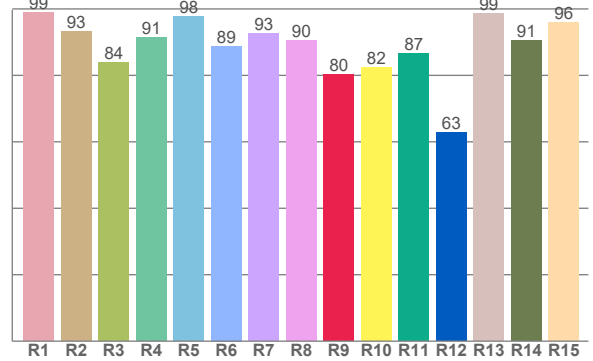
### Color Details



**TM30: 89.3**



**CRI: 92.1 (R1-R8)**



**CRI R values, only R1-R8 are used to calculate final CRI value**

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
99.0	93.3	83.8	91.4	97.7	88.8	92.7	90.5	80.3	82.4	86.6	62.9	98.6	90.5	96.0

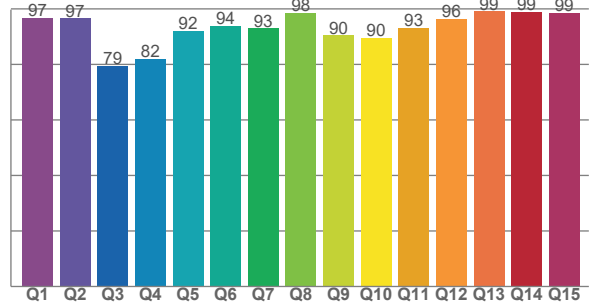
**TM30 C Values, 16 binned values out of total of 99 C values**

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
92.6	97.9	92.4	90.5	87.4	92.1	95.1	94.1	91.1	81.6	75.7	86.3	88.1	91.1	82.3	93.3

**CQS Q Values**

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
96.9	96.6	79.3	81.9	92.0	93.9	93.0	98.4	90.4	89.5	93.0	96.5	99.1	98.8	98.5

**CQS: 91.1**



### Color Parameters

Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
6566 K	92.1	80.3	89.3	103.5	91.1	0.312	0.324	0.199	0.311	0.0022

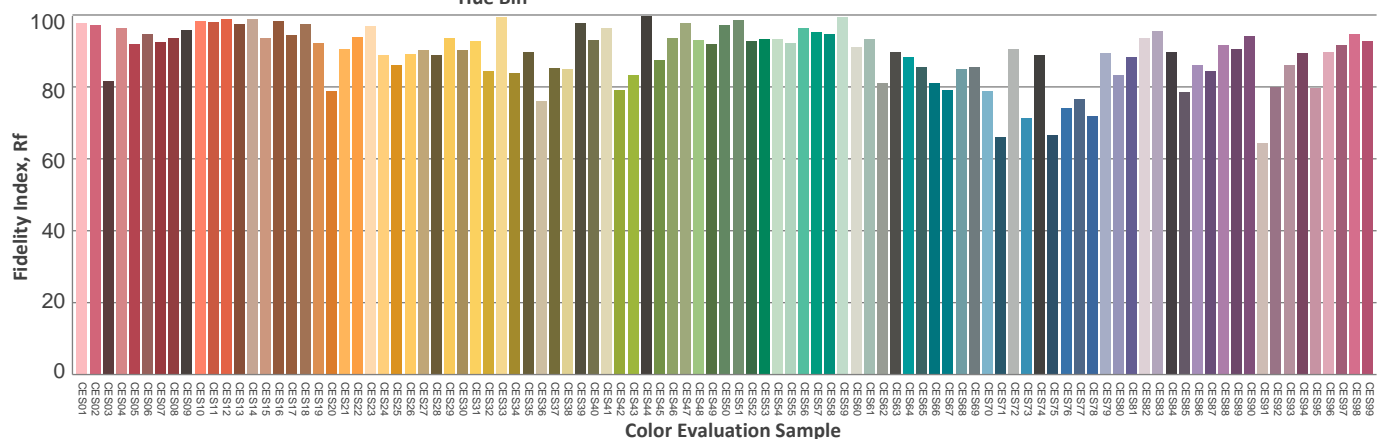
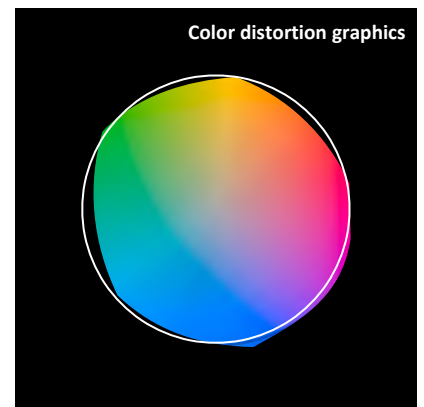
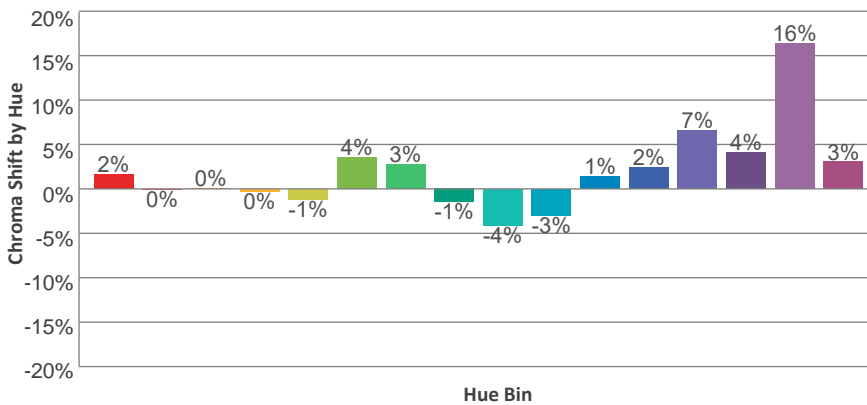
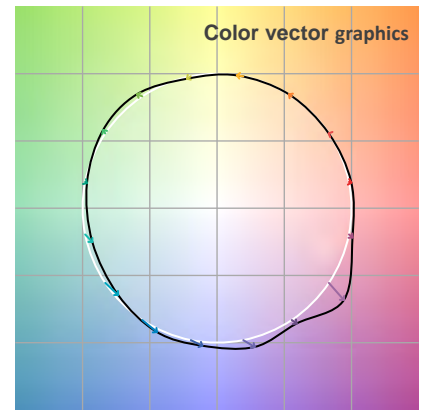
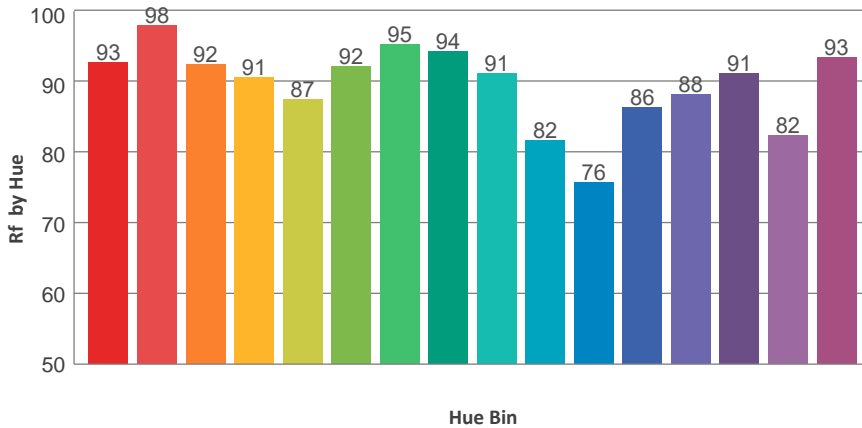
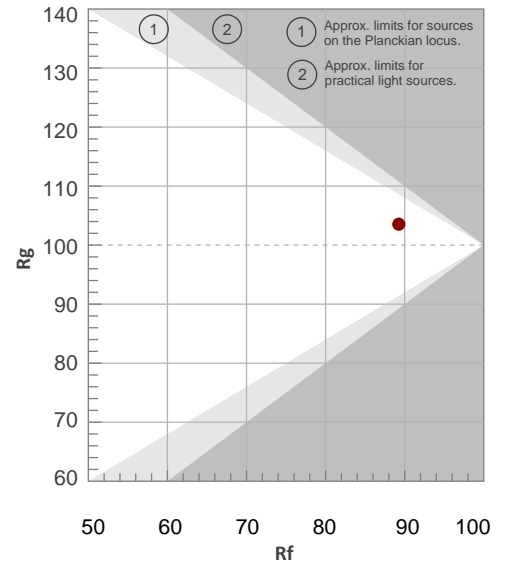


TM30 Details

**Rf 89.3**  
Fidelity Index Rf

**Rg 103.5**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	93	2%	-1%
2	98	0%	0%
3	92	0%	3%
4	91	0%	5%
5	87	-1%	3%
6	92	4%	2%
7	95	3%	-1%
8	94	-1%	1%
9	91	-4%	7%
10	82	-3%	13%
11	76	1%	14%
12	86	2%	9%
13	88	7%	7%
14	91	4%	2%
15	82	16%	-4%
16	93	3%	-2%



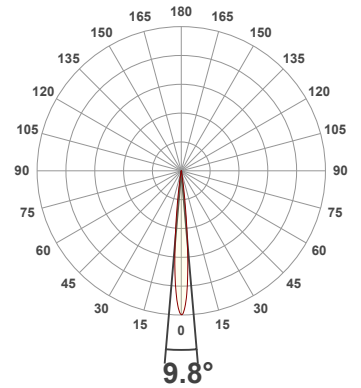
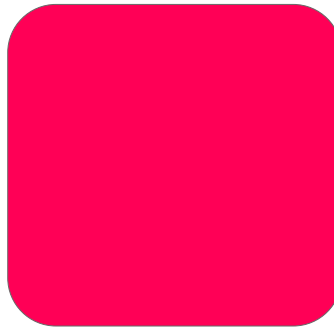
**Total Lumen Output: 1180 lm**

**Voltage: 114 V, Current: 0.758 A**

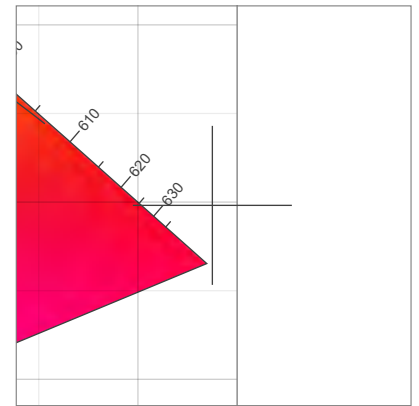
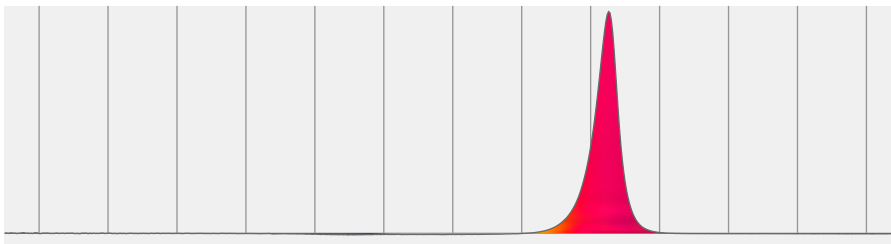
**Power: 82.6 W**

**Efficacy: 14 Lumen/Watt**

**Measurement Date: 6/30/2021**

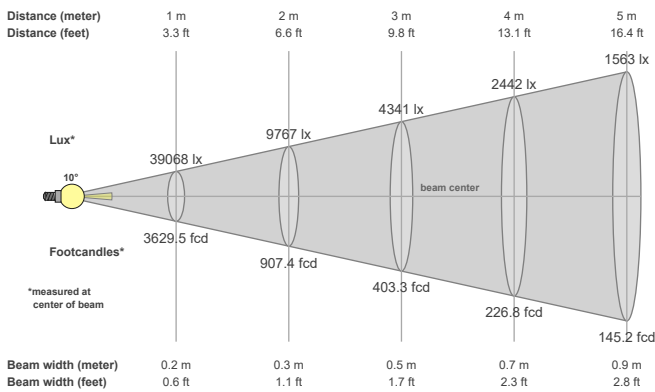


**Spectral distribution**



Dominant Wavelength	Color coordinate cie 1931	Color coordinate cie 1931	Color coordinate	Color coordinate
nm	x	y	u	v
624	0.738	0.298	0.578	0.351

**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.8°	16.3°	19.8°

**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
39172 cd	100.0%	100.0%

**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	39068	9767	4341	2442	1563	1085	797	610	482	391	323	271	231	199	174	153	135	121	108	98
FC	3629.5	907.4	403.3	226.8	145.2	100.8	74.1	56.7	44.8	36.3	30	25.2	21.5	18.5	16.1	14.2	12.6	11.2	10.1	9.1

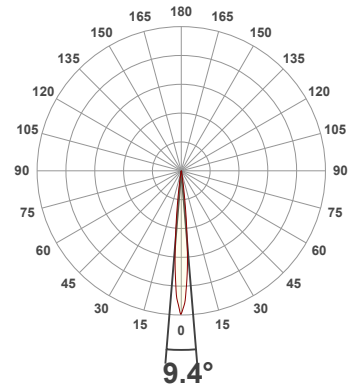
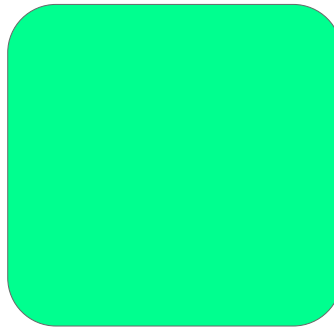
**Total Lumen Output: 1918 lm**

**Voltage: 114 V, Current: 0.556 A**

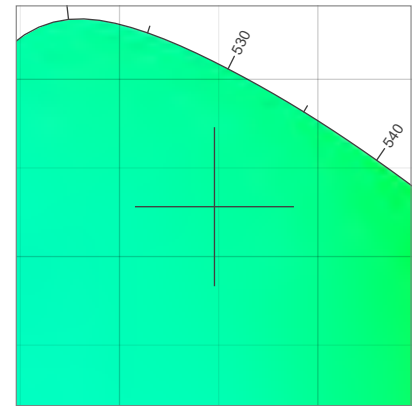
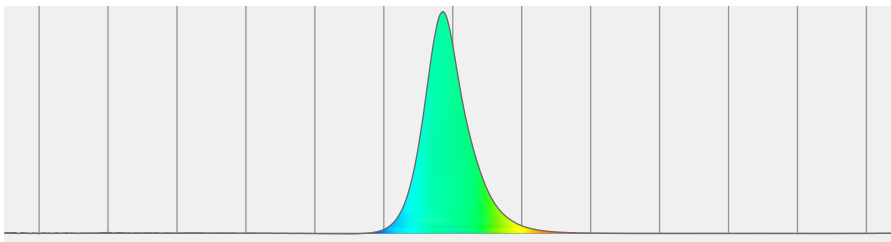
**Power: 59.2 W**

**Efficacy: 32 Lumen/Watt**

**Measurement Date: 6/30/2021**

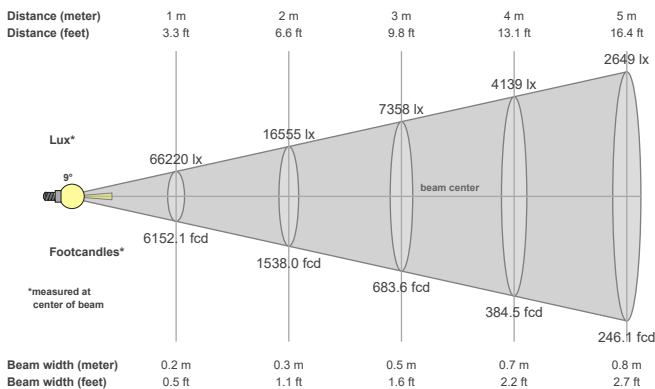


**Spectral distribution**



Dominant Wavelength	Color coordinate cie 1931	Color coordinate cie 1931	Color coordinate	Color coordinate
nm	x	y	u	v
524	0.148	0.728	0.052	0.382

**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.4°	16.1°	19.7°

**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
66648 cd	100.0%	100.0%

**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	66220	16555	7358	4139	2649	1839	1351	1035	818	662	547	460	392	338	294	259	229	204	183	166
FC	6152.1	1538	683.6	384.5	246.1	170.9	125.6	96.1	76	61.5	50.8	42.7	36.4	31.4	27.3	24	21.3	19	17	15.4

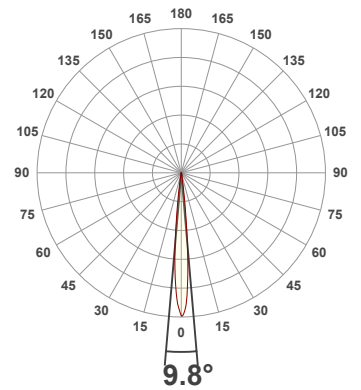
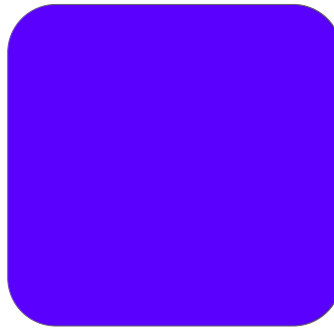
**Total Lumen Output: 512 lm**

**Voltage: 113 V, Current: 0.811 A**

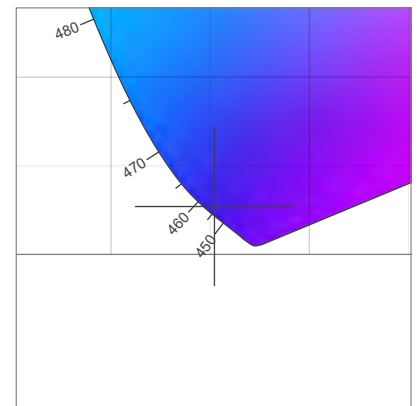
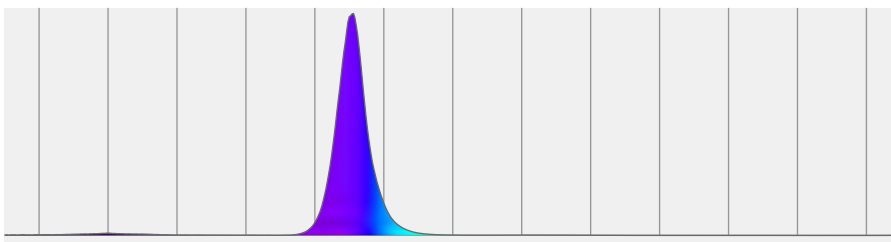
**Power: 88.4 W**

**Efficacy: 6 Lumen/Watt**

**Measurement Date: 6/30/2021**

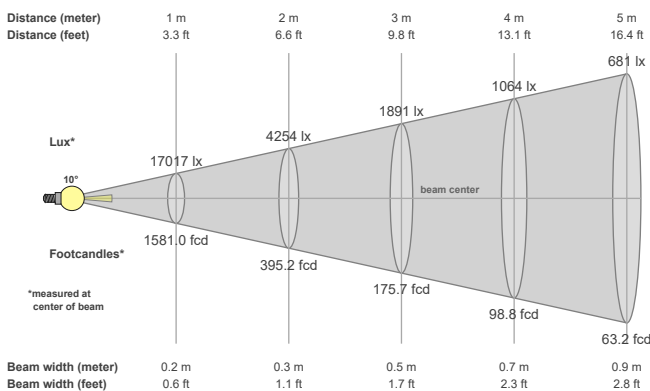


**Spectral distribution**



Dominant Wavelength	Color coordinate cie 1931	Color coordinate cie 1931	Color coordinate	Color coordinate
nm	x	y	u	v
456	0.152	0.027	0.202	0.054

**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9.8°	16.1°	19.6°

**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
17156 cd	100.0%	99.8%

**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	17017	4254	1891	1064	681	473	347	266	210	170	141	118	101	87	76	66	59	53	47	43
FC	1581	395.2	175.7	98.8	63.2	43.9	32.3	24.7	19.5	15.8	13.1	11	9.4	8.1	7	6.2	5.5	4.9	4.4	4

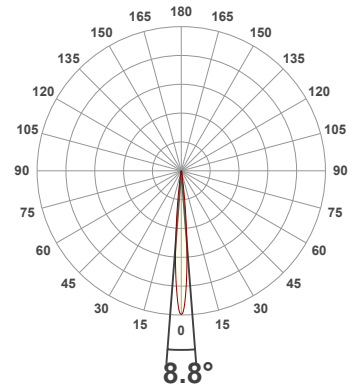
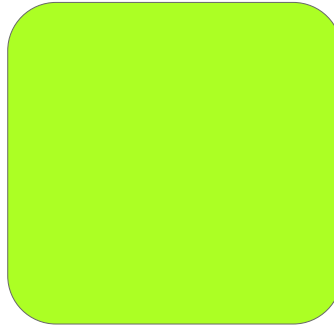
**Total Lumen Output: 9260 lm**

**Voltage: 113 V, Current: 1.75 A**

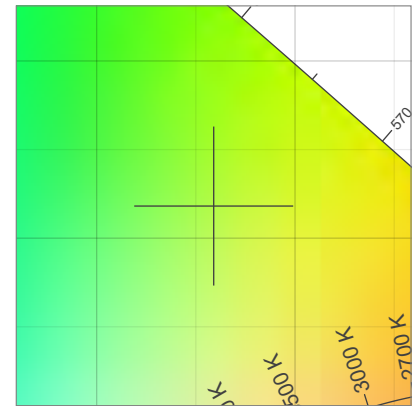
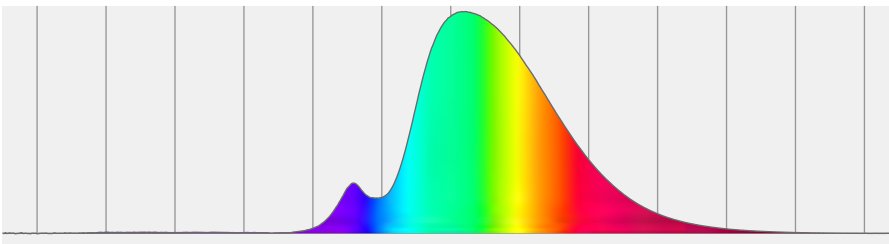
**Power: 194.8 W**

**Efficacy: 48 Lumen/Watt**

**Measurement Date: 6/30/2021**

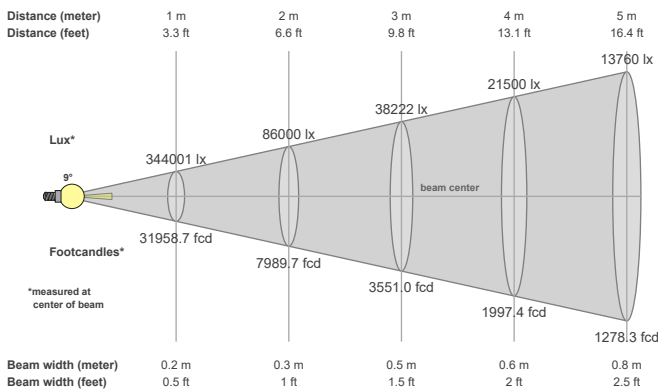


**Spectral distribution**



Dominant Wavelength	Color coordinate cie 1931	Color coordinate cie 1931	Color coordinate	Color coordinate
nm	x	y	u	v
561	0.359	0.518	0.169	0.366

**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
8.8°	15.7°	19.5°

**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
344127 cd	100.0%	100.0%

**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	344001	86000	38222	21500	13760	9556	7020	5375	4247	3440	2843	2389	2036	1755	1529	1344	1190	1062	953	860
FC	31958.7	7989.7	3551	1997.4	1278.3	887.7	652.2	499.4	394.6	319.6	264.1	221.9	189.1	163.1	142	124.8	110.6	98.6	88.5	79.9

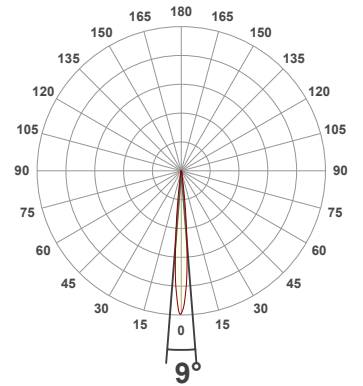
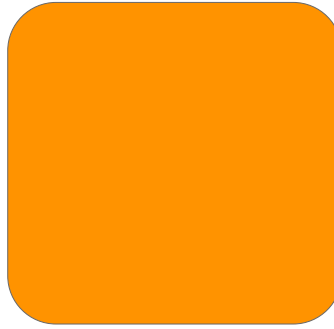
**Total Lumen Output: 1988 lm**

**Voltage: 113 V, Current: 0.872 A**

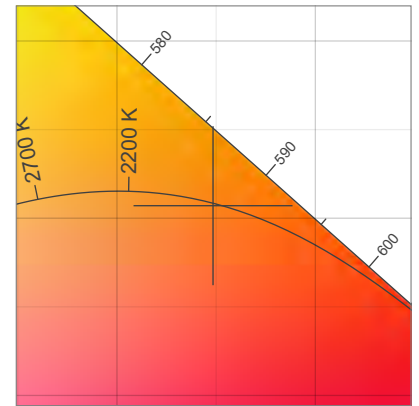
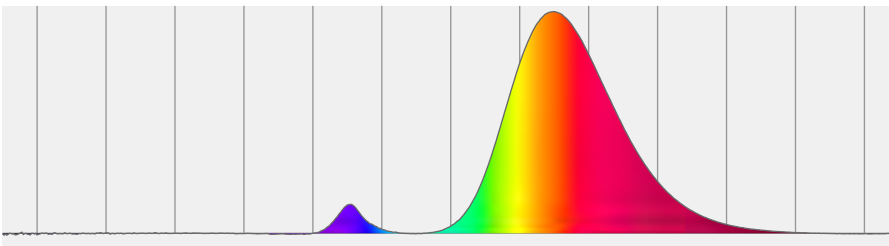
**Power: 95.5 W**

**Efficacy: 21 Lumen/Watt**

**Measurement Date: 6/30/2021**

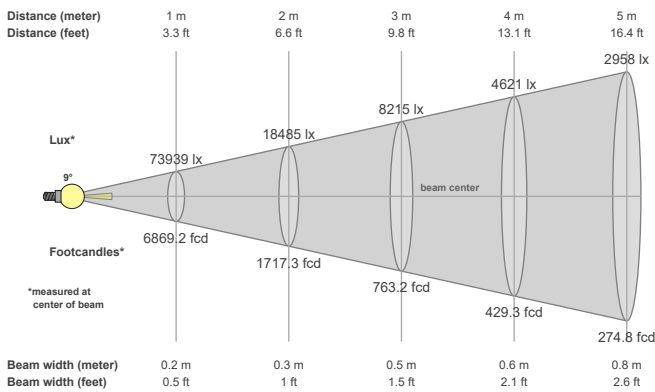


**Spectral distribution**



Dominant Wavelength	Color coordinate cie 1931	Color coordinate cie 1931	Color coordinate	Color coordinate
nm	x	y	u	v
591	0.548	0.407	0.323	0.360

**Beam details**



**Beam angles**

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%
9°	15.7°	19.5°

**Beam intensities**

Peak intensity	Int. ratio in 120° cone	Int. ratio in 90° cone
74340 cd	100.0%	100.0%

**Beam Intensities from 1-20m**

M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FT	3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6
LX	73939	18485	8215	4621	2958	2054	1509	1155	913	739	611	513	438	377	329	289	256	228	205	185
FC	6869.2	1717.3	763.2	429.3	274.8	190.8	140.2	107.3	84.8	68.7	56.8	47.7	40.6	35	30.5	26.8	23.8	21.2	19	17.2