



# FUZE SFX

## Photometric Test Report

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# TESTING PROCESS

## Total Lumen Measurements

Lumens are measured using a Viso Systems Lab Spion and a  $2\pi$  Integrating Sphere. As a goniophotometer, the Viso calculates the field lumens of the fixture by taking multiple measurements across the light beam. The measured lumens of the  $2\pi$  Integrating Sphere tends to be higher than the Viso goniophotometer due to a variety of differences in measurement principles. Therefore, both values are provided in the report.

Many lumens figures provided for entertainment lighting fixtures are only the  $2\pi$  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.

Fixtures are also analyzed using an  $2\pi$  Integrating Sphere. This technique takes the output of the fixture and measures the amount of light inside a sealed perfect sphere. Due to the size of most fixtures they shine into an opening on the side of the sphere. A sensor is mounted behind a glare shield to avoid direct light input and a very short measurement is taken to gather the total lumens within the sphere. Due to different measurement principles, distortion and measurement uncertainties, there is a difference in these results.

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](#)

# Photometric Report

## Total Lumen Output\*

Integrating Sphere      10767 lm

VISO Lab Spion          9014 lm

Beam Angle 50%	Field Angle 10%	Cutoff Angle 2.5%
4.6°	5.6°	5.9°

Color Temperature: 6562 K

CRI: 67.8

TLCI: 42

TM30: 63.9

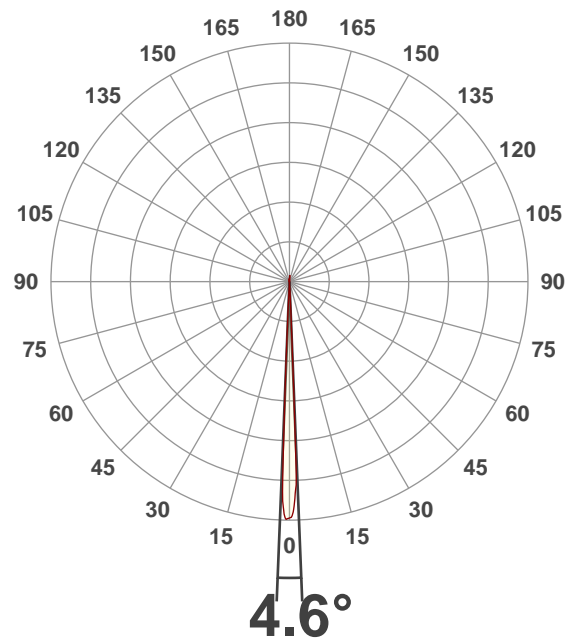
CQS: 66.4

Voltage: 117 V, Current: 3.58 A

Power: 419 W

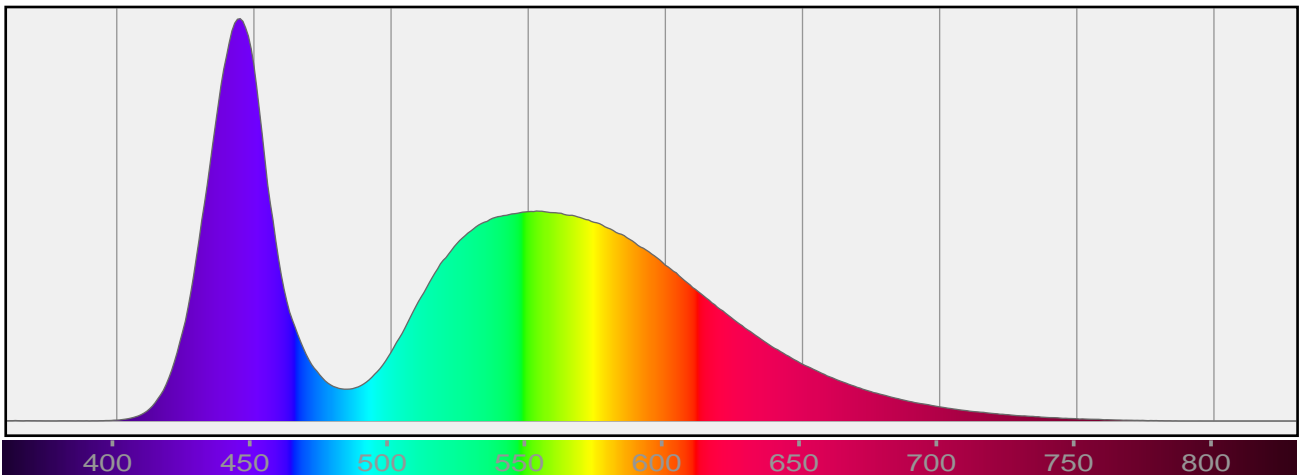
Efficacy: 22 Lumen/Watt

Measurement Date: 1/9/2020



## Spectral Distribution

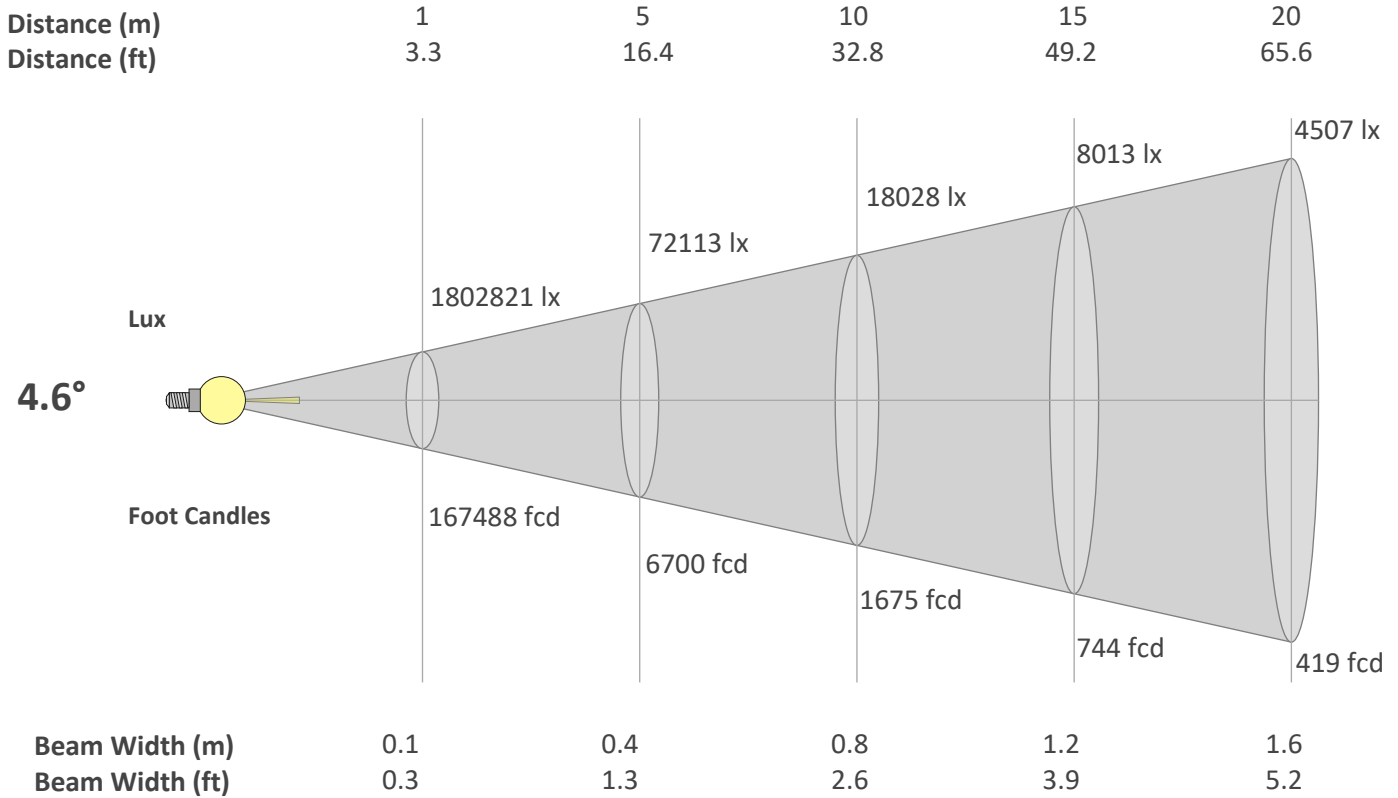
Dominant Wavelength 360 nm



\*Total Lumen measurements by calibrated Everfine 2π Integrating Sphere and Viso Systems Lab Spion

### Beam Details

Beam Angle 50%	Field Angle 10%	Cutoff Angle 2,5%
4.6°	5.6°	5.9°



**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	1802821	450705	200313	112676	72113	50078	36792	28169	22257	18028	14899	12520	10668	9198	8013	7042	6238	5564	4994	4507
FC	167487.6	41871.9	18609.7	10468	6699.5	4652.4	3418.1	2617	2067.7	1674.9	1384.2	1163.1	991.1	854.5	744.4	654.2	579.5	516.9	464	418.7

**Linear Distribution**

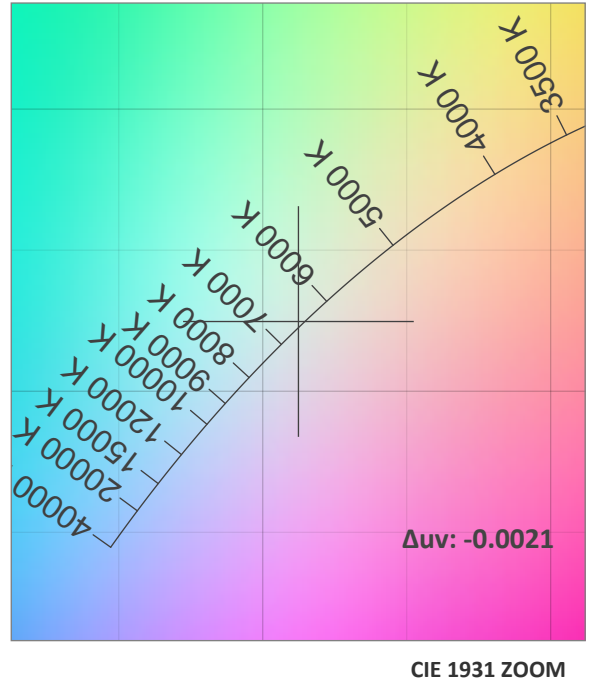
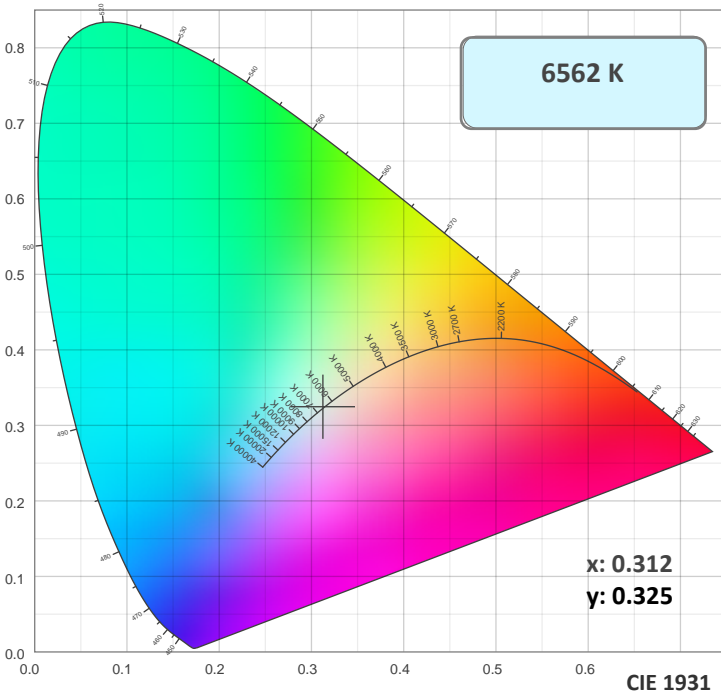


**Peak Candela**  
**1808470 cd**

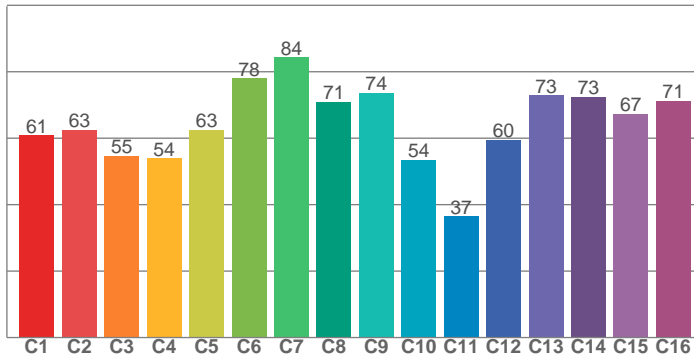
**Calculate Center Beam Intensities**

lux = 1808470 / distance(m)<sup>2</sup>  
 fc = 1808470 / distance(ft)<sup>2</sup>

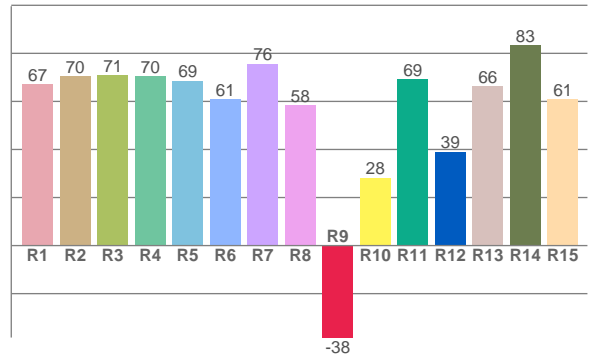
### Color Details



TM30: 63.9



CRI: 67.8 (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
67.1	70.4	70.9	70.5	68.6	60.9	75.7	58.5	-38.3	28.2	69.2	39.1	66.3	83.4	60.9

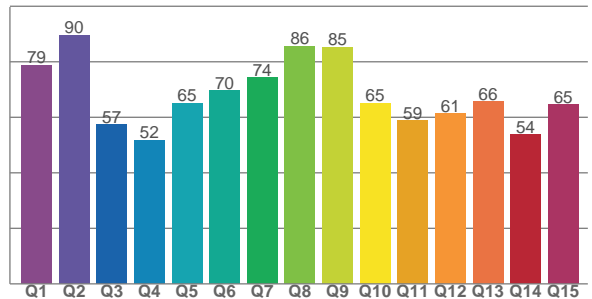
TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
60.8	62.5	54.8	53.9	62.5	78.0	84.3	71.0	73.7	53.5	36.5	59.6	72.9	72.5	67.4	71.3

CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
78.9	89.5	57.3	51.9	65.1	69.6	74.2	85.6	85.2	65.0	58.8	61.3	65.6	53.7	64.6

CQS: 66.4



### Color Parameters

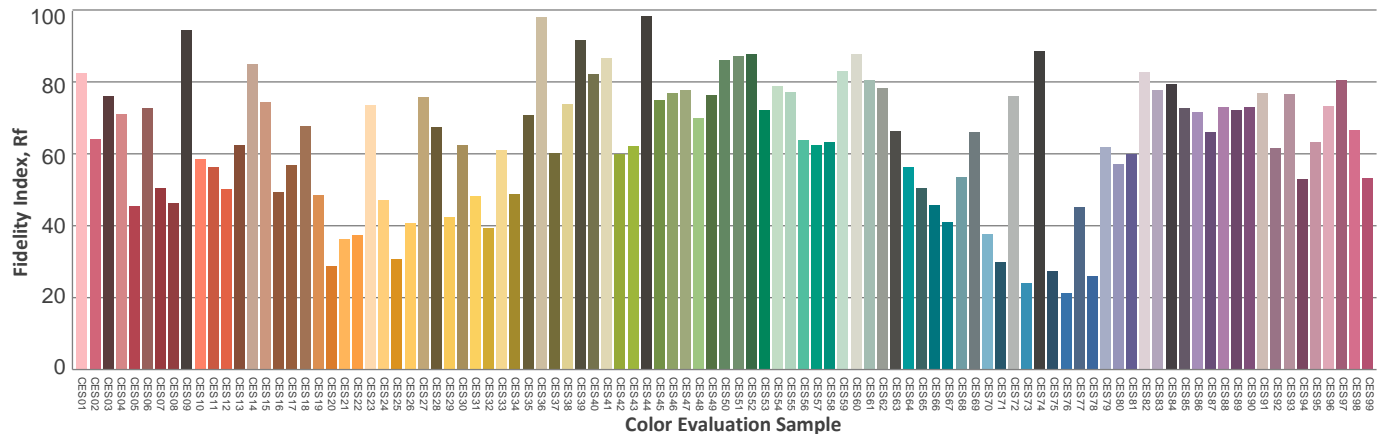
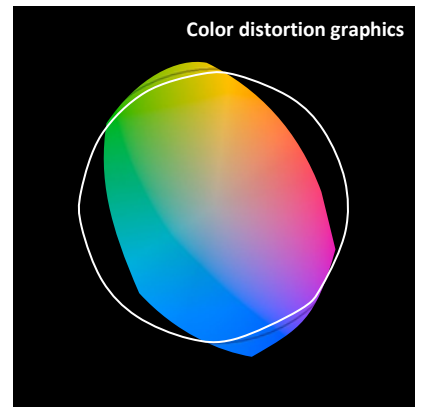
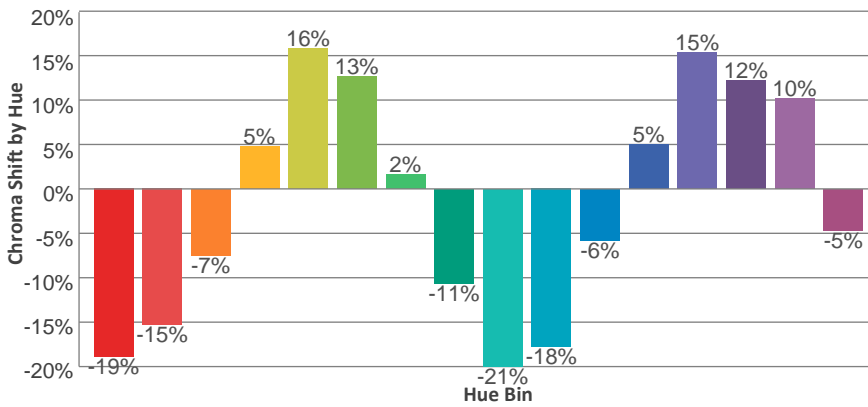
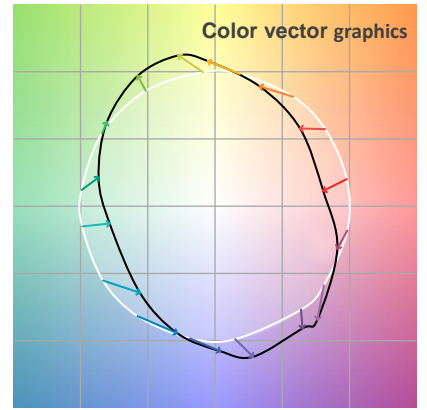
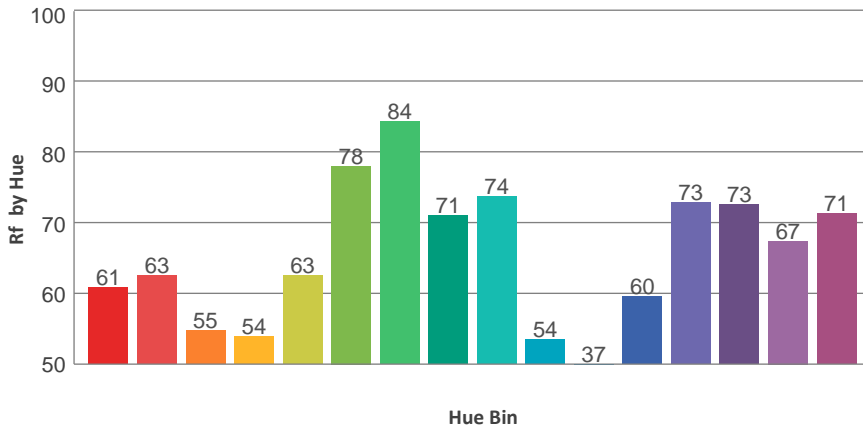
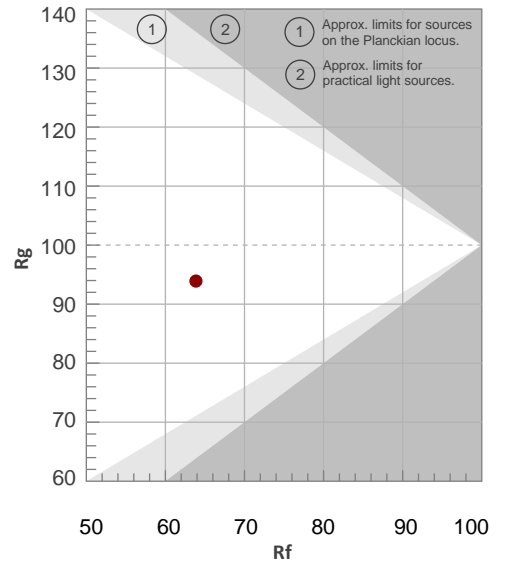
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Deviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
6562 K	67.8	-38.3	63.9	93.9	66.4	0.312	0.325	0.199	0.311	-0.0021

TM30 Details

**Rf 63.9**  
Fidelity Index Rf

**Rg 93.9**  
Gamut Index Rg

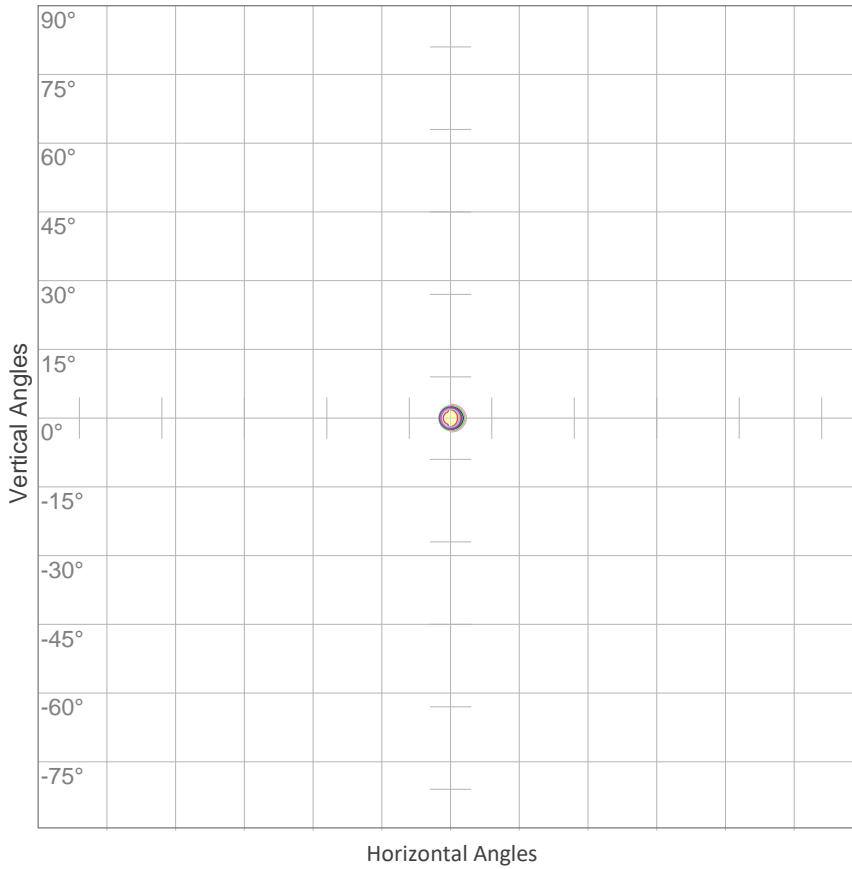
Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	61	-19%	-5%
2	63	-15%	11%
3	55	-7%	25%
4	54	5%	25%
5	63	16%	16%
6	78	13%	-1%
7	84	2%	-9%
8	71	-11%	-12%
9	74	-21%	2%
10	54	-18%	23%
11	37	-6%	32%
12	60	5%	24%
13	73	15%	11%
14	73	12%	-7%
15	67	10%	-24%
16	71	-5%	-15%





### ISO Diagrams

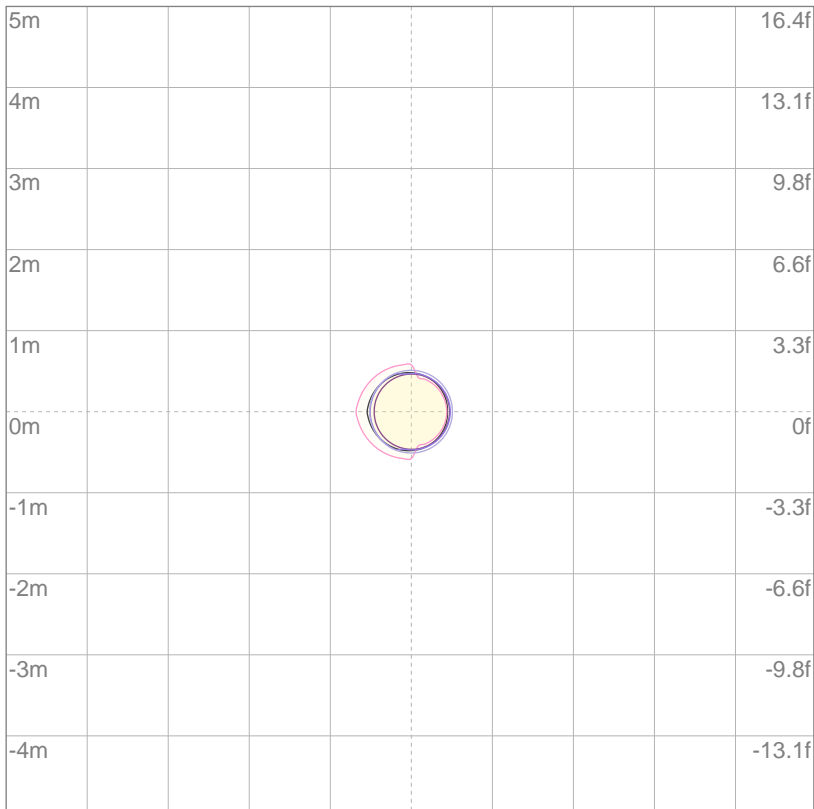
ISO Candela Diagram



10%	180282 cd
20%	360564 cd
30%	540846 cd
40%	721128 cd
50%	901410 cd
60%	1081693 cd
70%	1261975 cd
80%	1442257 cd
90%	1622539 cd

**Conditions:**  
 Number of c-planes: 2  
 Candela at center: 1802821 cd

ISO Lux Diagram



3%	541 lx
5%	901 lx
10%	1803 lx
30%	5408 lx
50%	9014 lx

**Conditions:**  
 Number of c-planes: 2  
 Lux at center: 18.0K lx

*Lux distribution on a surface when lamp is mounted at 10 meters from the surface.*

Mounting Height: 10 meters (33 feet)

# Photometric Report

## Total Lumen Output\*

Integrating Sphere      12135 lm

VISO Lab Spion          11224 lm

Beam Angle 50%	Field Angle 10%	Cutoff Angle 2.5%
15.1°	16.6°	16.9°

Color Temperature: 6681 K

CRI: 68.0

TLCI: 42

TM30: 63.7

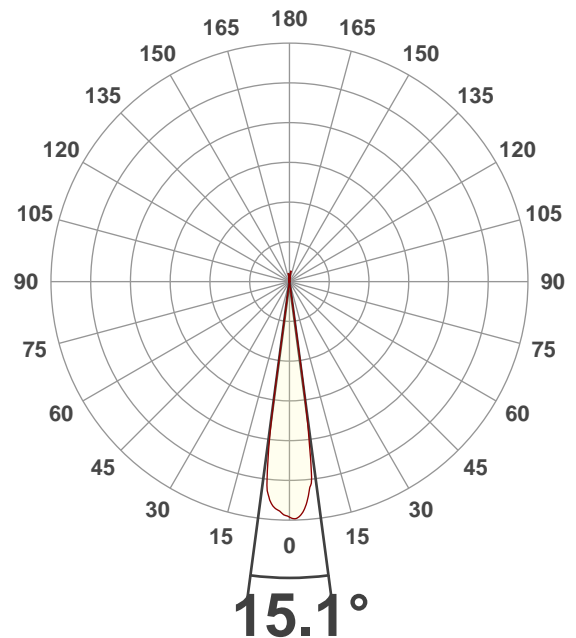
CQS: 66.3

Voltage: 117 V, Current: 3.60 A

Power: 420 W

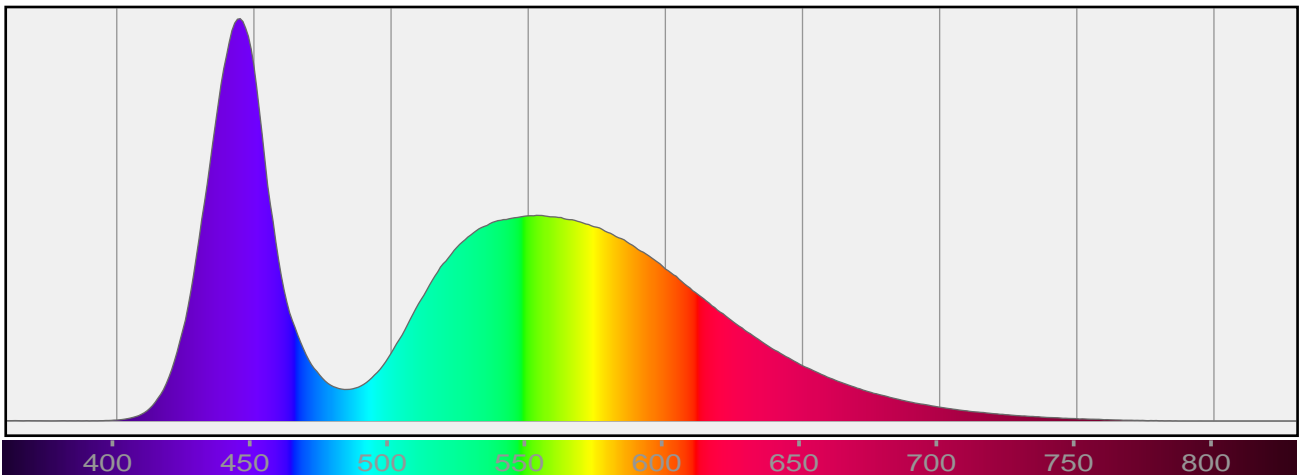
Efficacy: 27 Lumen/Watt

Measurement Date: 1/9/2020



## Spectral Distribution

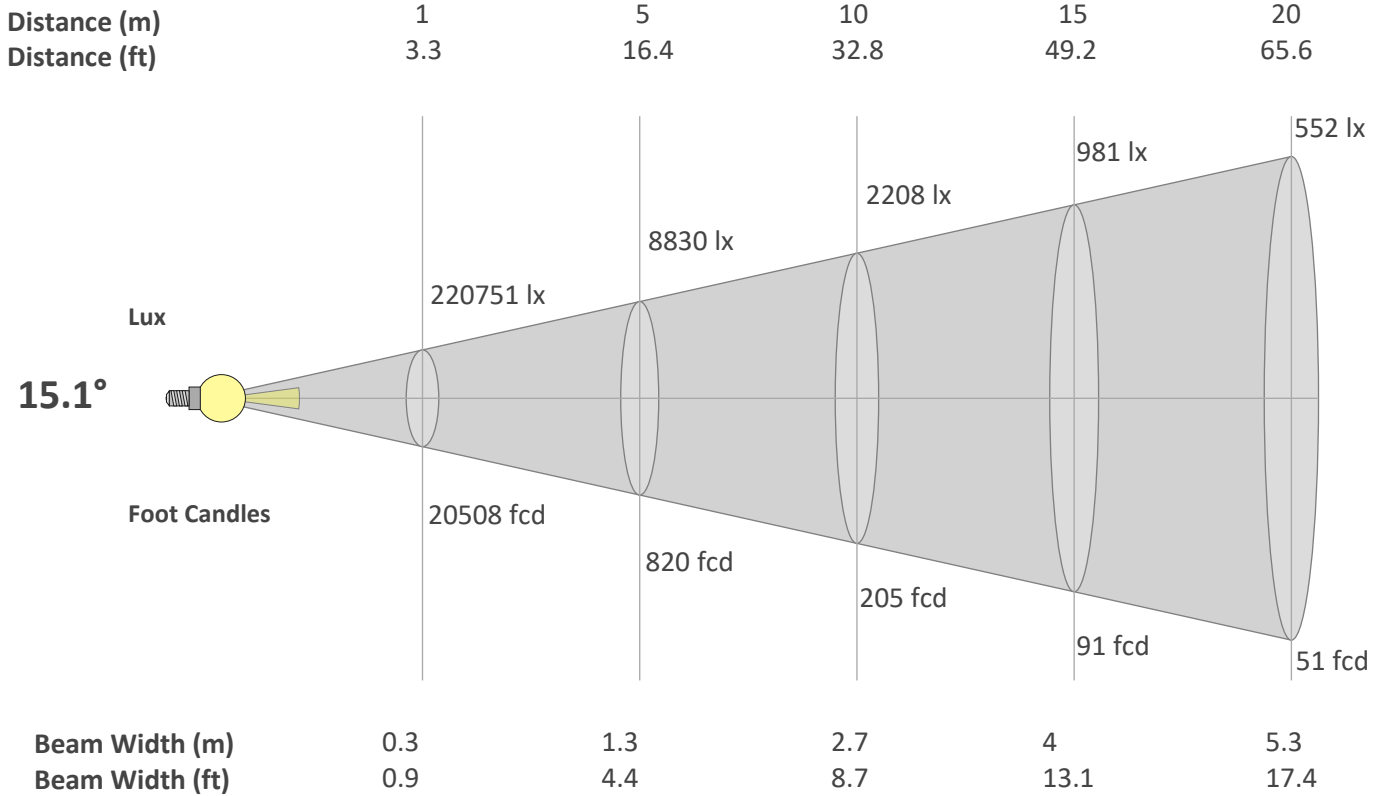
Dominant Wavelength 360 nm



\*Total Lumen measurements by calibrated Everfine 2π Integrating Sphere and Viso Systems Lab Spion

### Beam Details

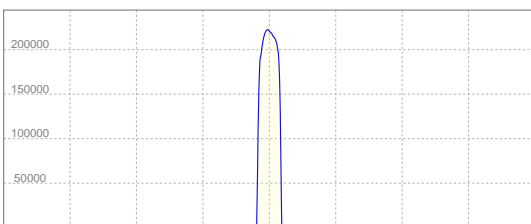
<b>Beam Angle 50%</b>	<b>Field Angle 10%</b>	<b>Cutoff Angle 2,5%</b>
<b>15.1°</b>	<b>16.6°</b>	<b>16.9°</b>



#### 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	220751	55188	24528	13797	8830	6132	4505	3449	2725	2208	1824	1533	1306	1126	981	862	764	681	611	552
FC	20508.5	5127.1	2278.7	1281.8	820.3	569.7	418.5	320.4	253.2	205.1	169.5	142.4	121.4	104.6	91.1	80.1	71	63.3	56.8	51.3

#### Linear Distribution



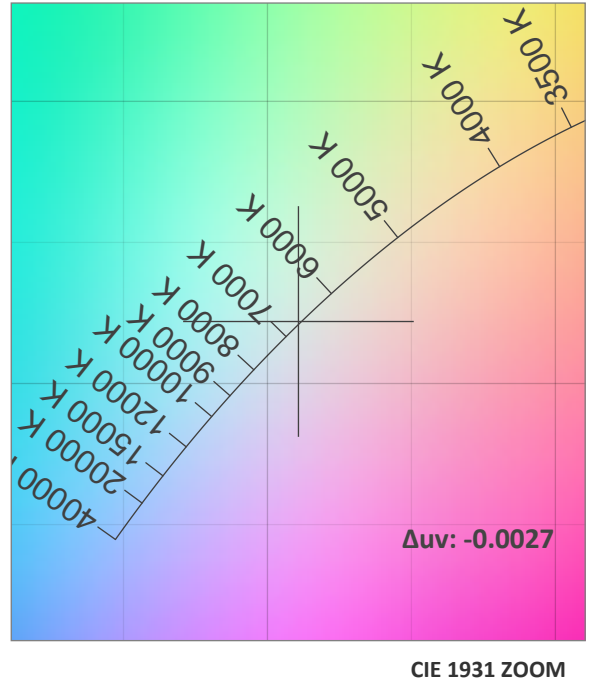
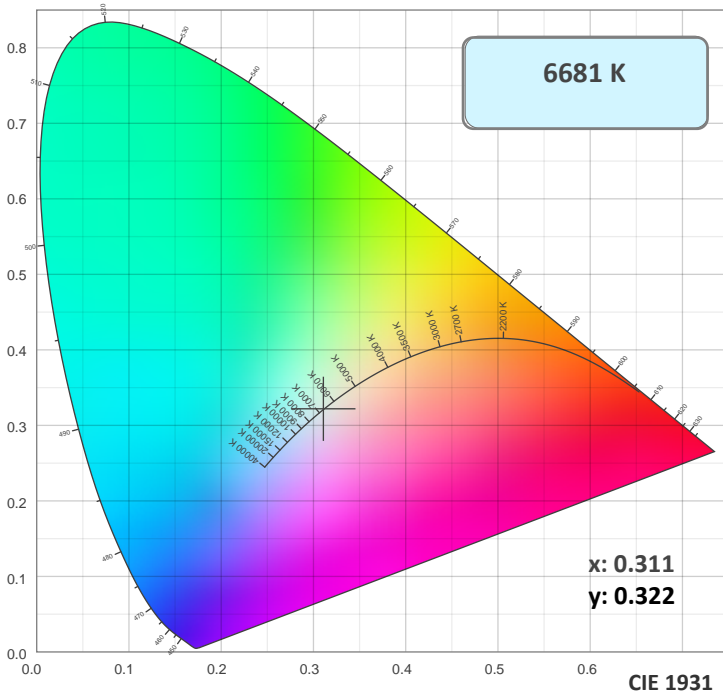
**Peak Candela**  
**222268 cd**

**Calculate Center Beam Intensities**

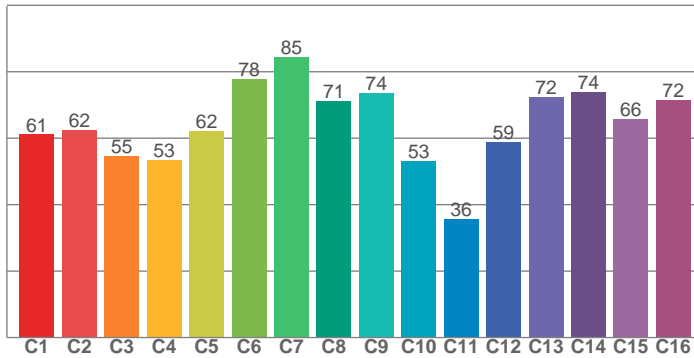
$lux = 222268 / distance(m)^2$

$fc = 222268 / distance(ft)^2$

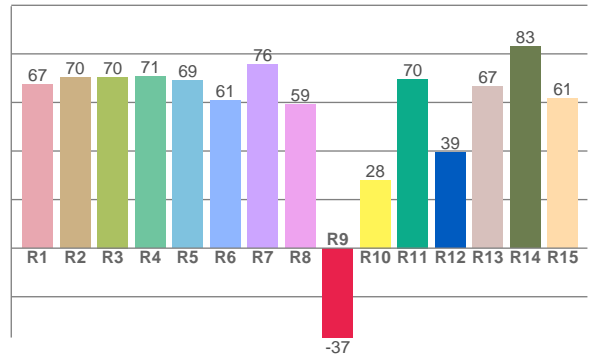
### Color Details



TM30: 63.7



CRI: 68.0 (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
67.5	70.4	70.4	70.7	69.0	60.8	75.7	59.1	-36.8	28.1	69.7	39.3	66.6	83.1	61.5

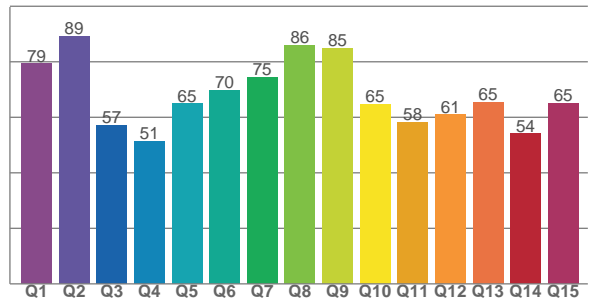
TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
61.1	62.5	54.6	53.5	62.2	77.9	84.5	71.3	73.7	53.2	35.8	58.9	72.4	73.9	65.8	71.6

CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79.3	89.3	57.1	51.4	65.0	69.8	74.6	86.0	84.8	64.7	58.3	60.9	65.5	54.1	65.0

CQS: 66.3



### Color Parameters

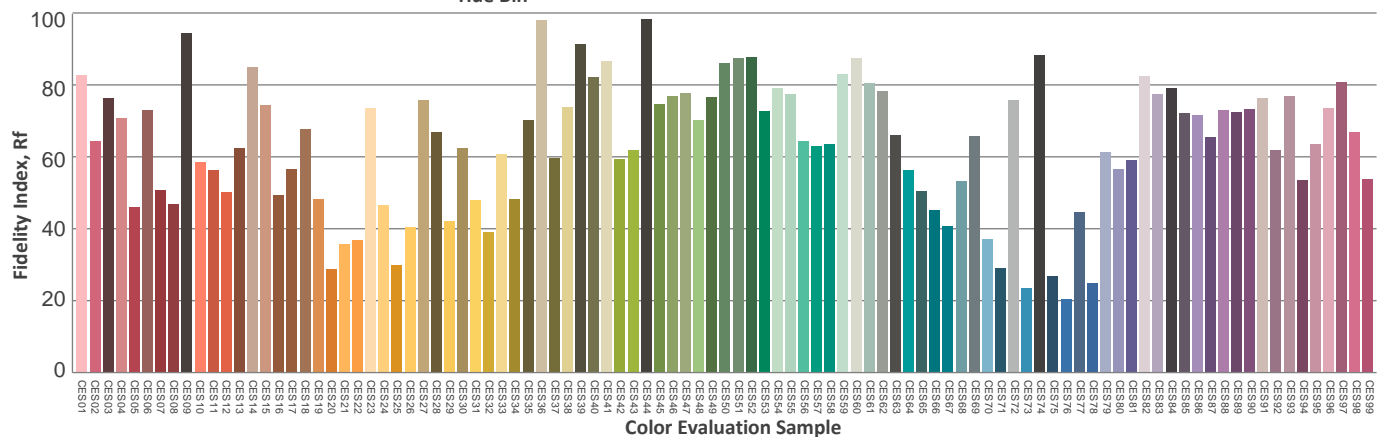
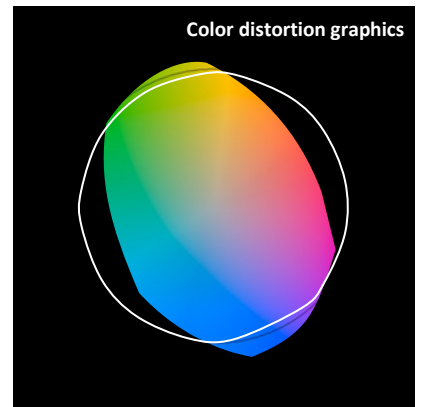
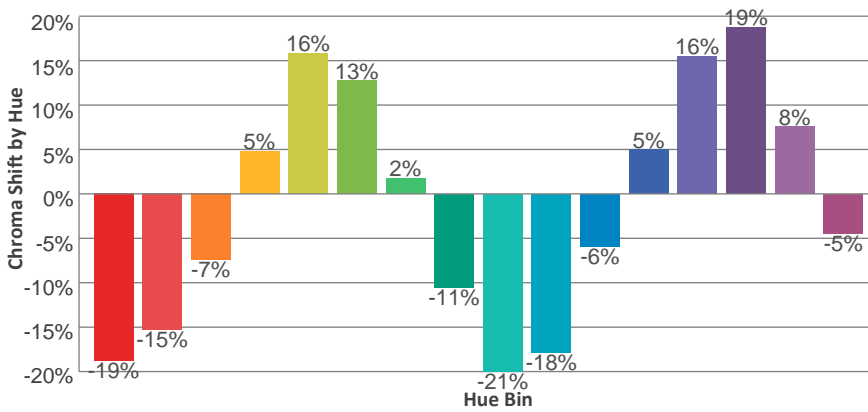
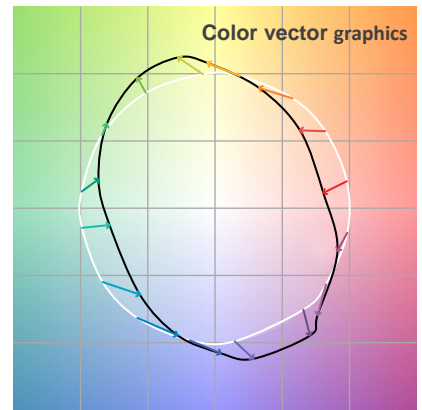
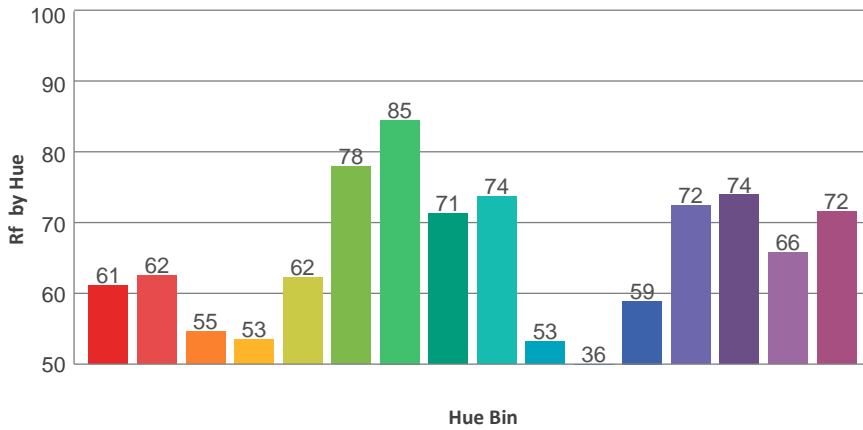
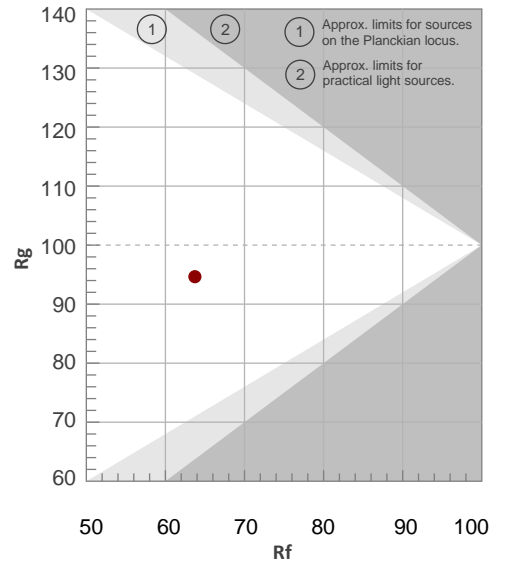
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
6681 K	68.0	-36.8	63.7	94.6	66.3	0.311	0.322	0.199	0.309	-0.0027

TM30 Details

**Rf 63.7**  
Fidelity Index Rf

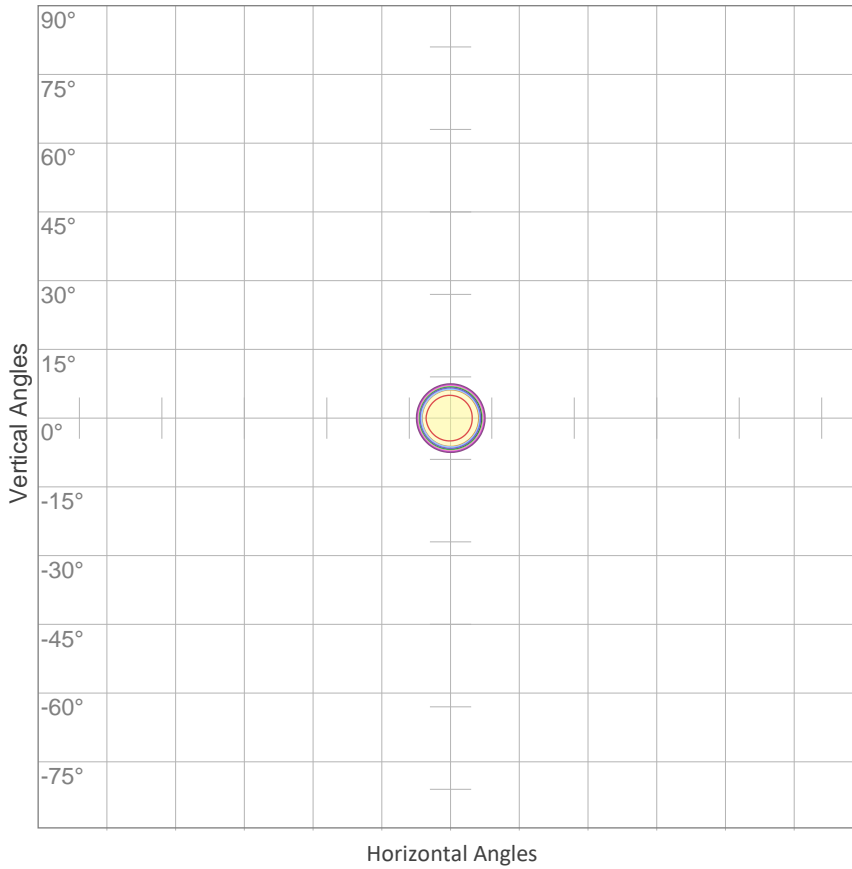
**Rg 94.6**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	61	-19%	-5%
2	62	-15%	11%
3	55	-7%	25%
4	53	5%	26%
5	62	16%	16%
6	78	13%	-1%
7	85	2%	-9%
8	71	-11%	-11%
9	74	-21%	2%
10	53	-18%	23%
11	36	-6%	32%
12	59	5%	24%
13	72	16%	11%
14	74	19%	-7%
15	66	8%	-22%
16	72	-5%	-15%



### ISO Diagrams

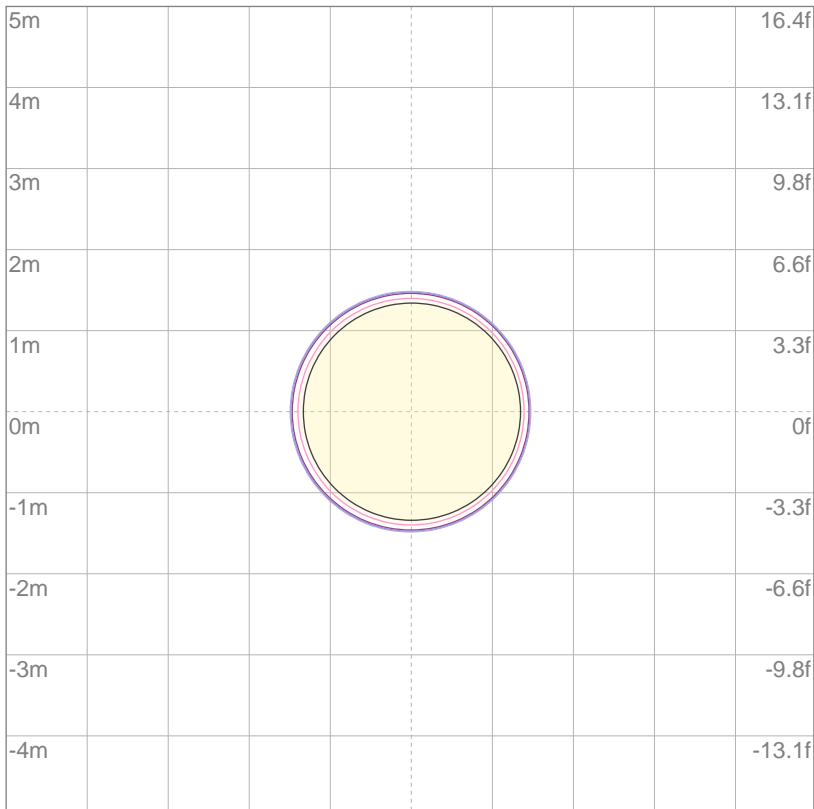
ISO Candela Diagram



10%	22075 cd
20%	44150 cd
30%	66225 cd
40%	88301 cd
50%	110376 cd
60%	132451 cd
70%	154526 cd
80%	176601 cd
90%	198676 cd

Conditions:  
 Number of c-planes: 2  
 Candela at center: 220751 cd

ISO Lux Diagram



3%	66.2 lx
5%	110 lx
10%	221 lx
30%	662 lx
50%	1104 lx

Conditions:  
 Number of c-planes: 2  
 Lux at center: 2208 lx

*Lux distribution on a surface when lamp is mounted at 10 meters from the surface.*

Mounting Height: 10 meters (33 feet)

# Photometric Report

## Total Lumen Output\*

Integrating Sphere      11807 lm

VISO Lab Spion          11676 lm

Beam Angle 50%	Field Angle 10%	Cutoff Angle 2.5%
38.2°	42.2°	43.6°

Color Temperature: 6722 K

CRI: 67.9

TLCI: 42

TM30: 63.6

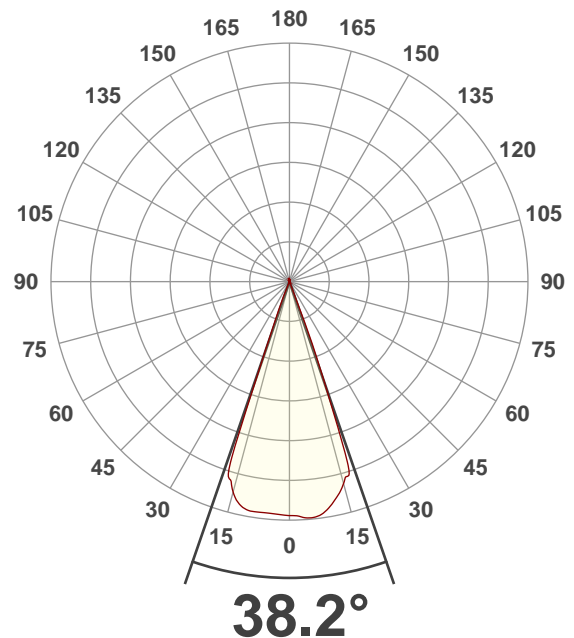
CQS: 66.3

Voltage: 116 V, Current: 3.63 A

Power: 420 W

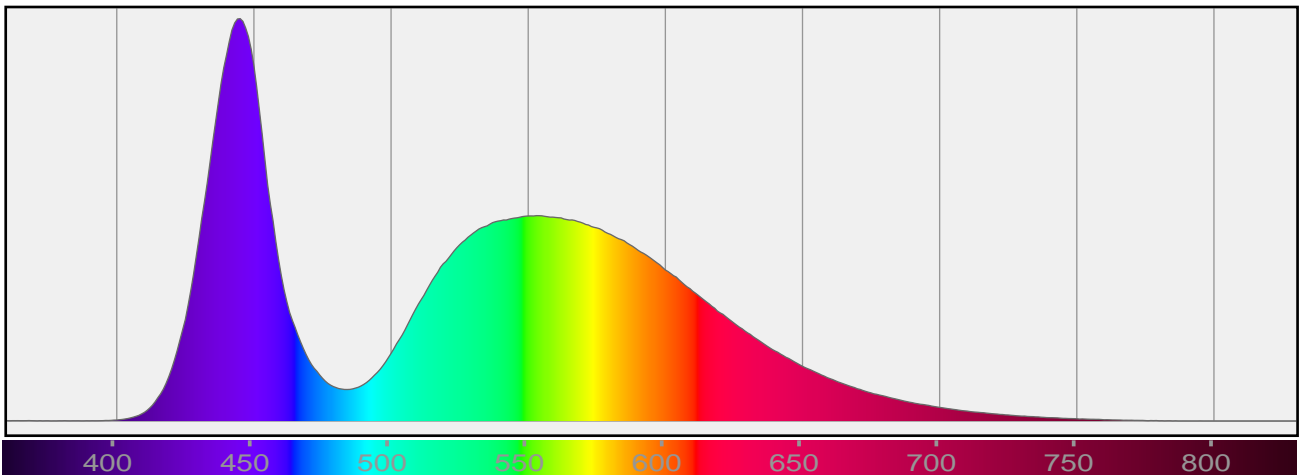
Efficacy: 28 Lumen/Watt

Measurement Date: 1/9/2020



## Spectral Distribution

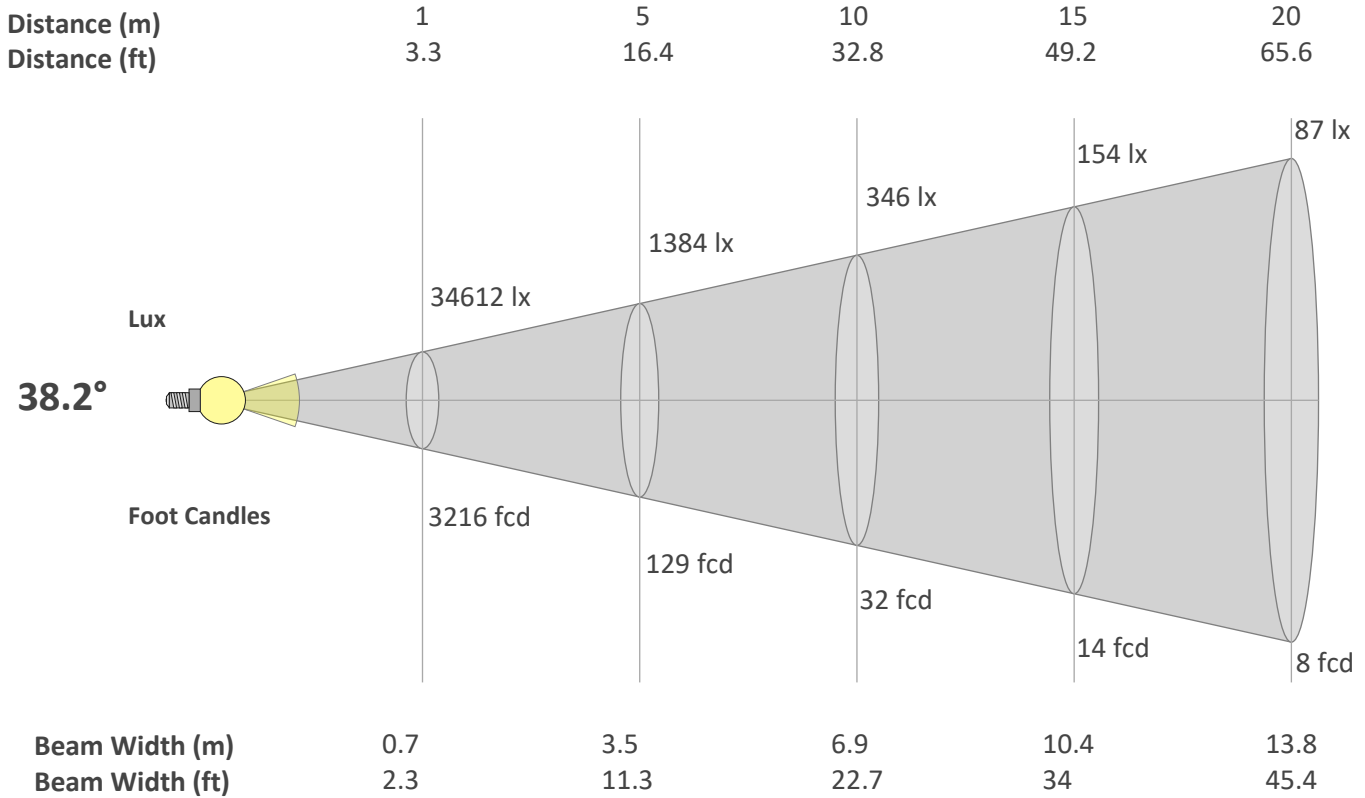
Dominant Wavelength 360 nm



\*Total Lumen measurements by calibrated Everfine 2π Integrating Sphere and Viso Systems Lab Spion

### Beam Details

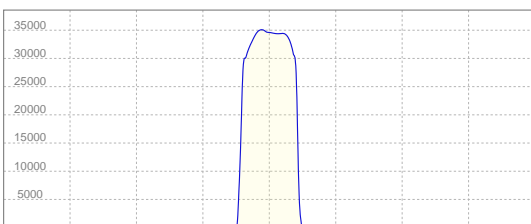
<b>Beam Angle 50%</b>	<b>Field Angle 10%</b>	<b>Cutoff Angle 2,5%</b>
<b>38.2°</b>	<b>42.2°</b>	<b>43.6°</b>



**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	34612	8653	3846	2163	1384	961	706	541	427	346	286	240	205	177	154	135	120	107	96	87
FC	3215.6	803.9	357.3	201	128.6	89.3	65.6	50.2	39.7	32.2	26.6	22.3	19	16.4	14.3	12.6	11.1	9.9	8.9	8

**Linear Distribution**



**Peak Candela**  
**35064 cd**

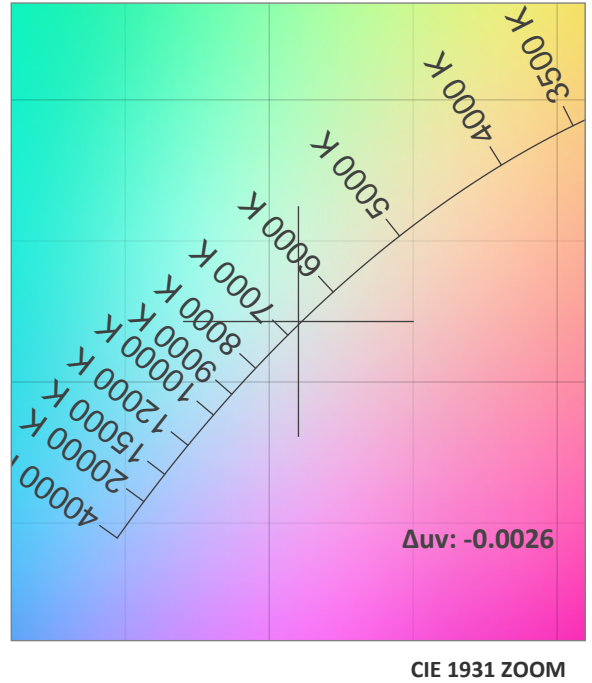
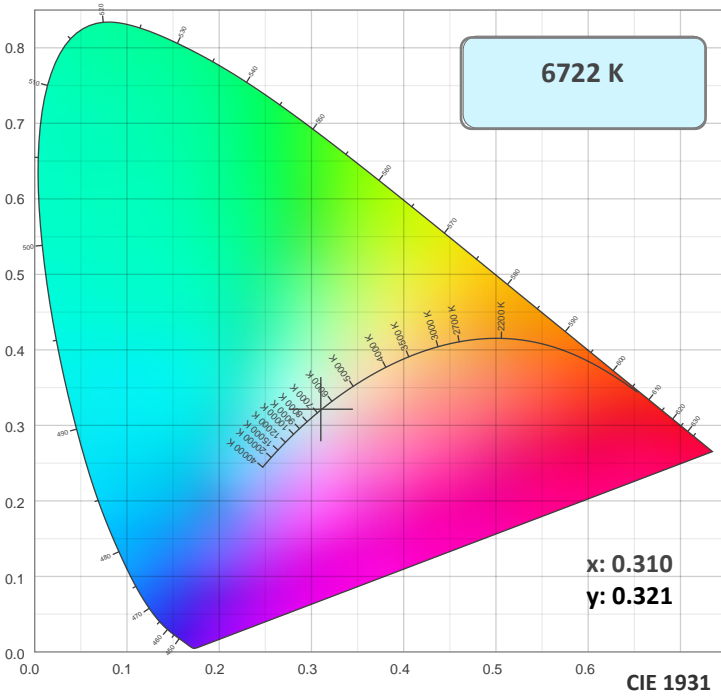
**Calculate Center Beam Intensities**

$lux = 35064 / distance(m)^2$

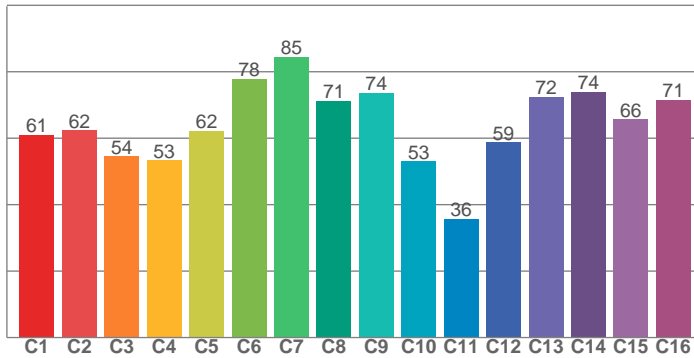
$fc = 35064 / distance(ft)^2$



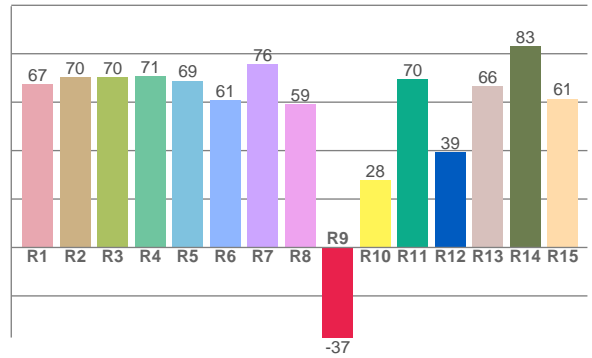
### Color Details



TM30: 63.6



CRI: 67.9 (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
67.4	70.3	70.3	70.7	68.9	60.7	75.6	59.1	-37.2	27.8	69.6	39.2	66.5	83.0	61.4

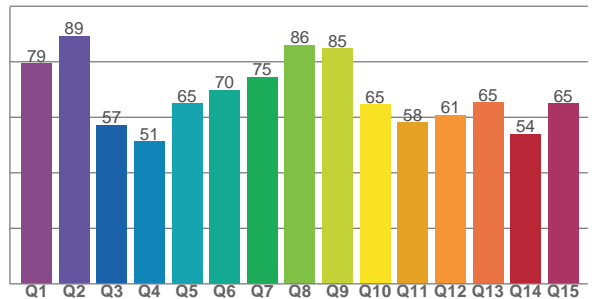
TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
61.0	62.4	54.5	53.4	62.1	77.9	84.5	71.2	73.6	53.0	35.6	58.8	72.4	73.9	65.7	71.5

CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79.3	89.3	57.1	51.3	64.9	69.8	74.6	86.0	84.8	64.6	58.2	60.8	65.4	54.0	65.0

CQS: 66.3



### Color Parameters

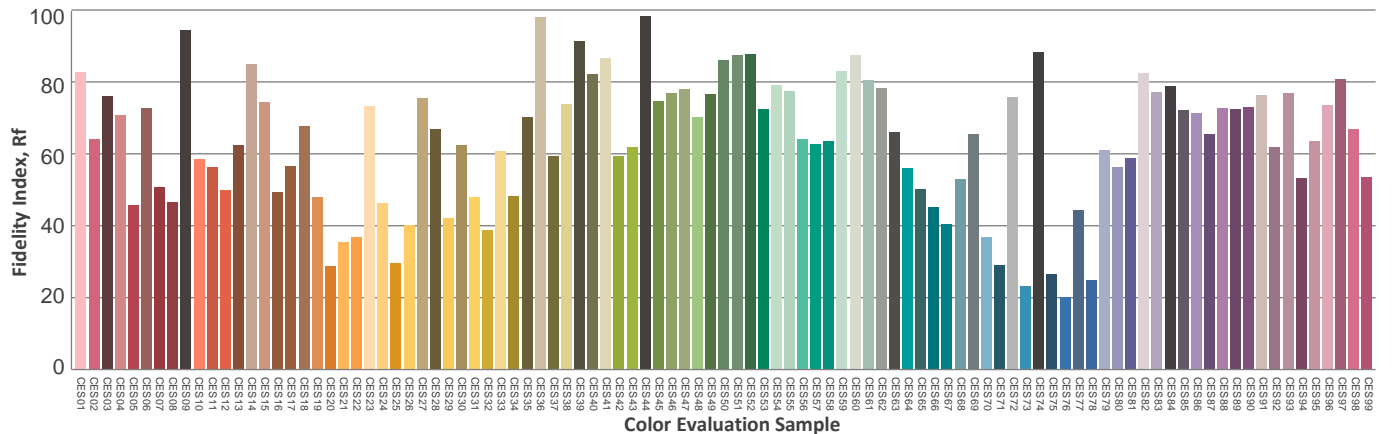
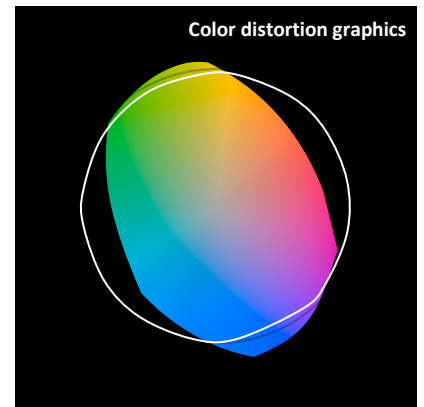
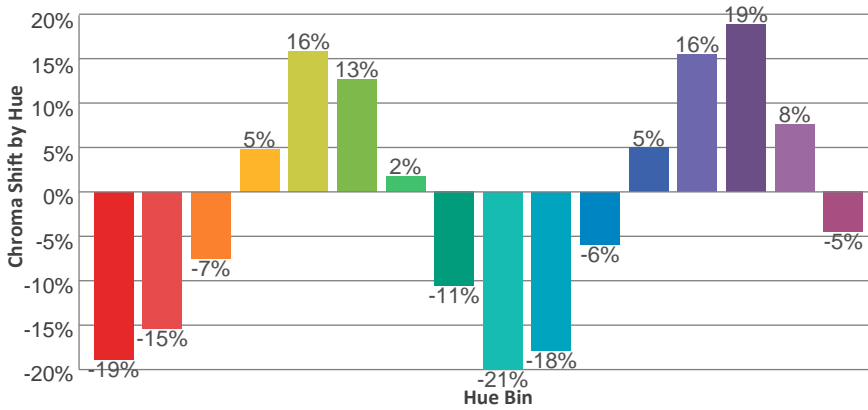
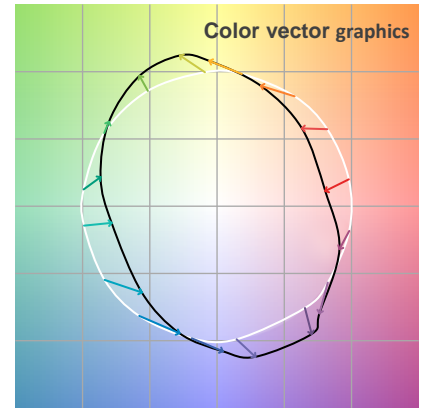
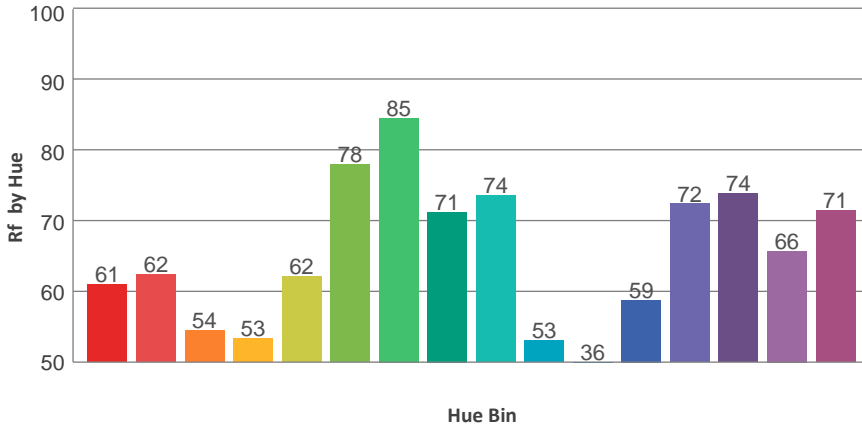
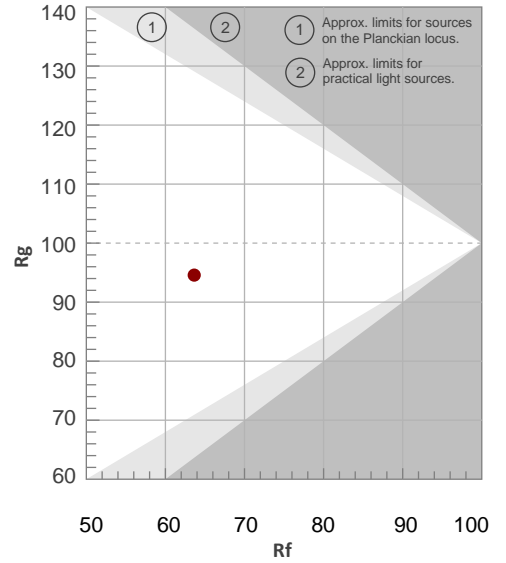
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
6722 K	67.9	-37.2	63.6	94.6	66.3	0.310	0.321	0.199	0.309	-0.0026

## TM30 Details

**Rf 63.6**  
Fidelity Index Rf

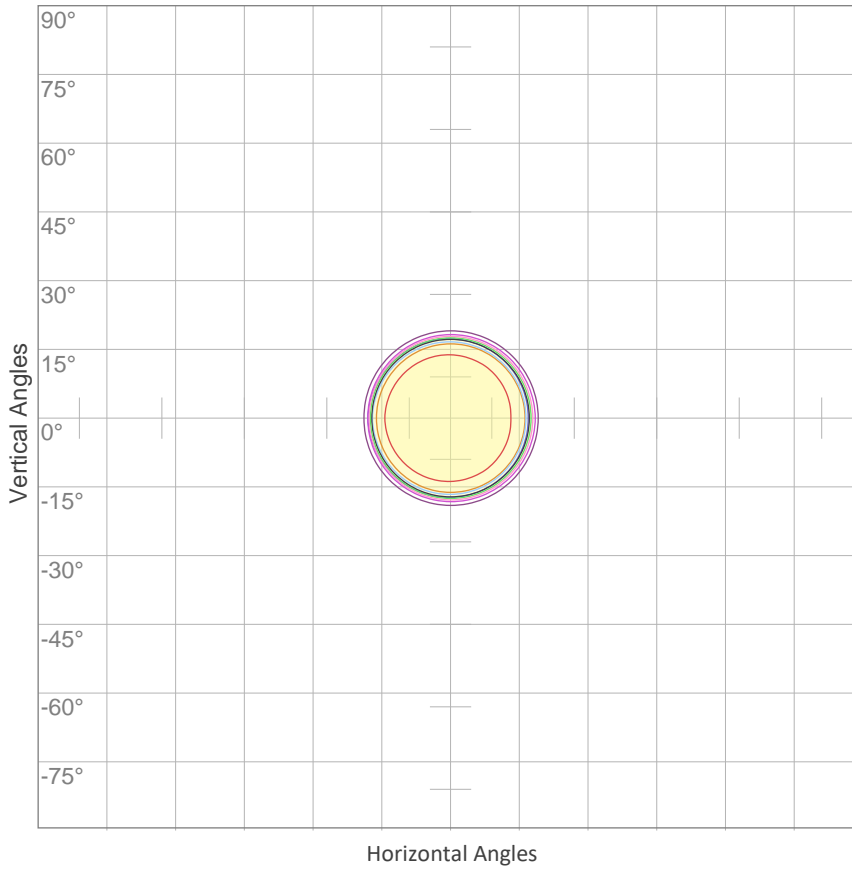
**Rg 94.6**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	61	-19%	-5%
2	62	-15%	11%
3	54	-7%	25%
4	53	5%	26%
5	62	16%	16%
6	78	13%	-1%
7	85	2%	-9%
8	71	-11%	-11%
9	74	-21%	2%
10	53	-18%	23%
11	36	-6%	32%
12	59	5%	24%
13	72	16%	11%
14	74	19%	-7%
15	66	8%	-22%
16	71	-5%	-15%



### ISO Diagrams

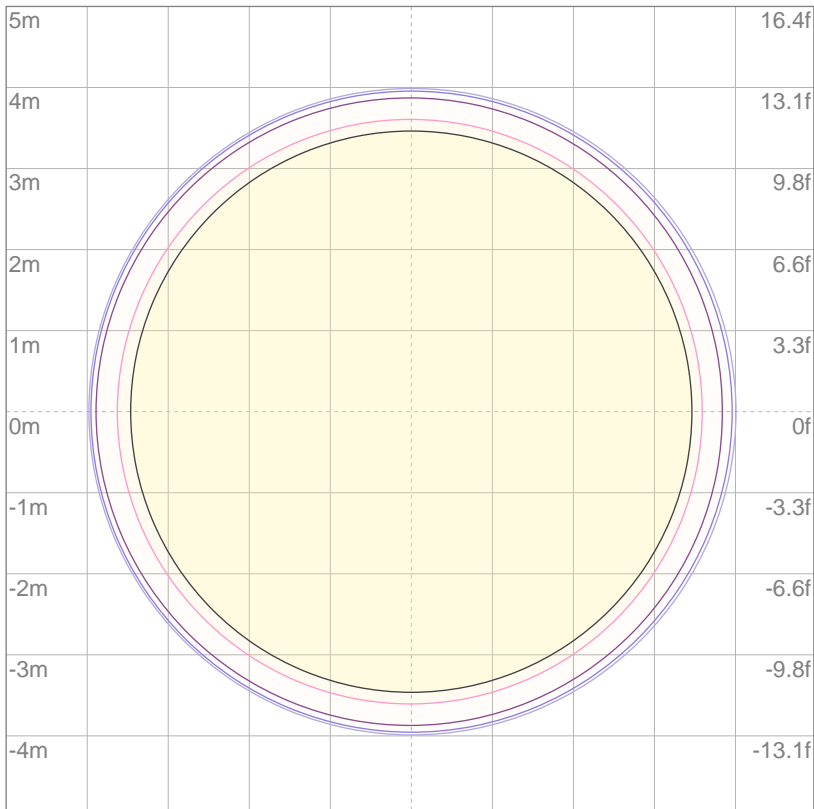
ISO Candela Diagram



10%	3461 cd
20%	6922 cd
30%	10384 cd
40%	13845 cd
50%	17306 cd
60%	20767 cd
70%	24228 cd
80%	27690 cd
90%	31151 cd

Conditions:  
 Number of c-planes: 2  
 Candela at center: 34612 cd

ISO Lux Diagram



3%	10.4 lx
5%	17.3 lx
10%	34.6 lx
30%	104 lx
50%	173 lx

Conditions:  
 Number of c-planes: 2  
 Lux at center: 346 lx

*Lux distribution on a surface when lamp is mounted at 10 meters from the surface.*

Mounting Height: 10 meters (33 feet)

# Photometric Report

## Total Lumen Output\*

Integrating Sphere      n/a  
 VISO Lab Spion            9883 lm

Beam Angle 50%	Field Angle 10%	Cutoff Angle 2.5%
14.4°	18.1°	20.1°

Color Temperature: 6641 K

CRI: 67.7

TLCI: 41

TM30: 63.8

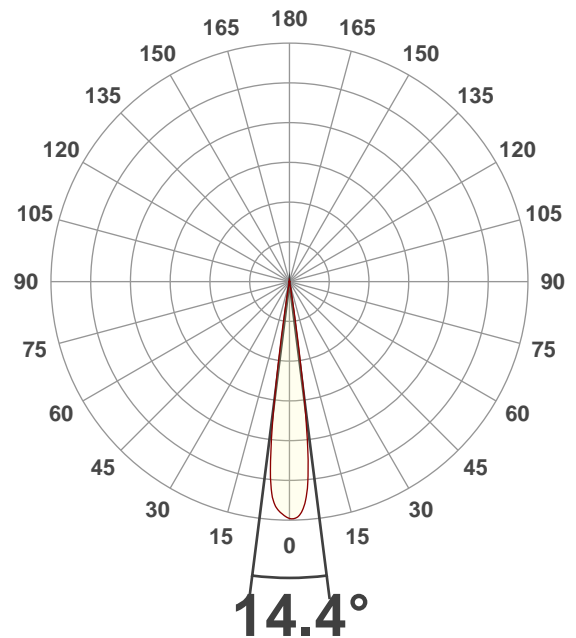
CQS: 66.3

Voltage: 117 V, Current: 3.48 A

Power: 408 W

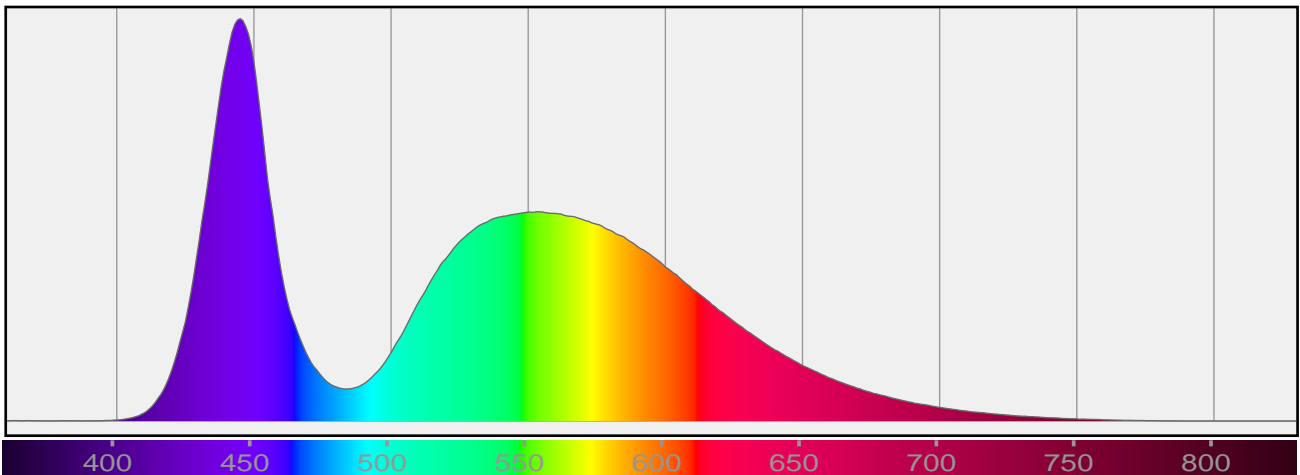
Efficacy: 24 Lumen/Watt

Measurement Date: 1/9/2020



## Spectral Distribution

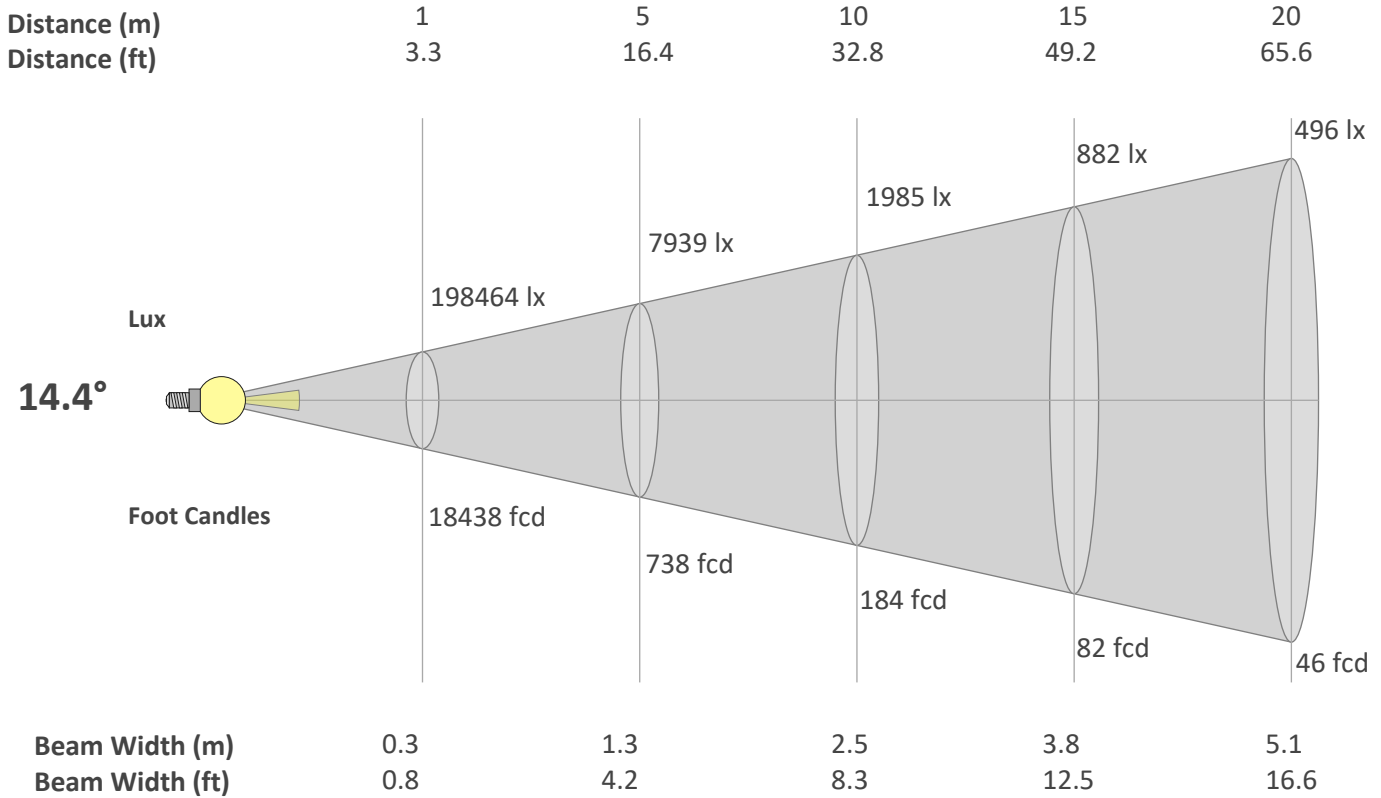
Dominant Wavelength 360 nm



\*Total Lumen measurements by calibrated Everfine 2π Integrating Sphere and Viso Systems Lab Spion

### Beam Details

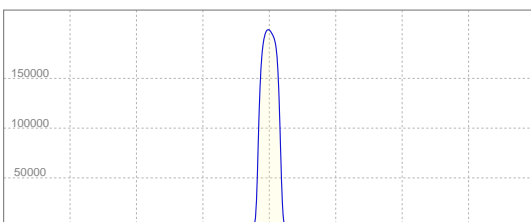
<b>Beam Angle 50%</b>	<b>Field Angle 10%</b>	<b>Cutoff Angle 2,5%</b>
<b>14.4°</b>	<b>18.1°</b>	<b>20.1°</b>



**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	198464	49616	22052	12404	7939	5513	4050	3101	2450	1985	1640	1378	1174	1013	882	775	687	613	550	496
FC	18438	4609.5	2048.7	1152.4	737.5	512.2	376.3	288.1	227.6	184.4	152.4	128	109.1	94.1	81.9	72	63.8	56.9	51.1	46.1

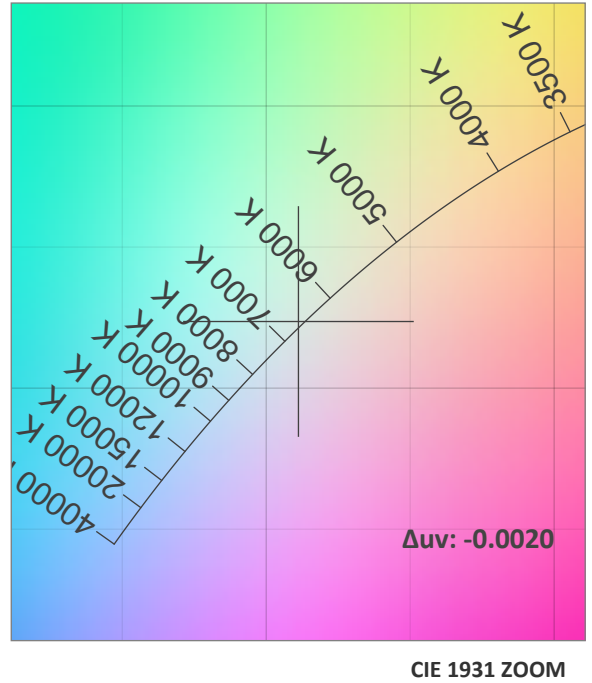
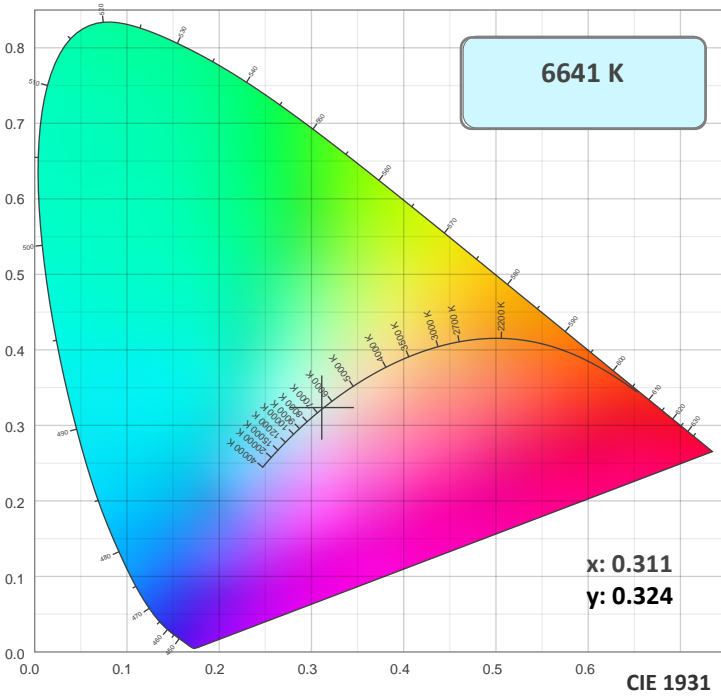
**Linear Distribution**



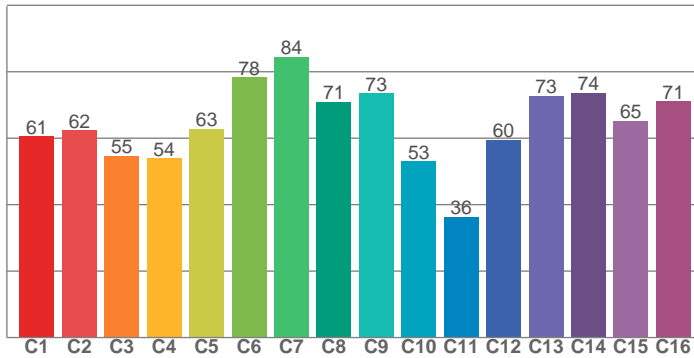
**Peak Candela**  
**198780 cd**

**Calculate Center Beam Intensities**  
 $lux = 198780 / distance(m)^2$   
 $fc = 198780 / distance(ft)^2$

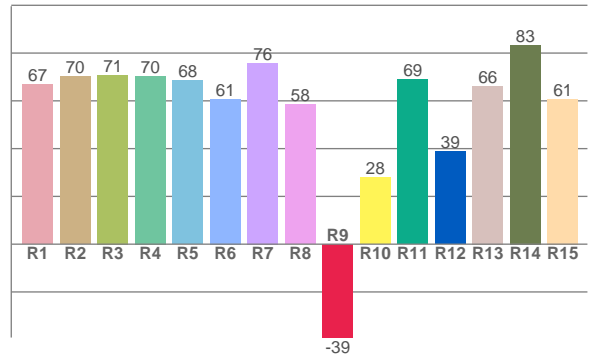
### Color Details



TM30: 63.8



CRI: 67.7 (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
66.9	70.3	70.8	70.4	68.5	60.7	75.8	58.4	-39.1	28.0	69.0	38.8	66.2	83.3	60.8

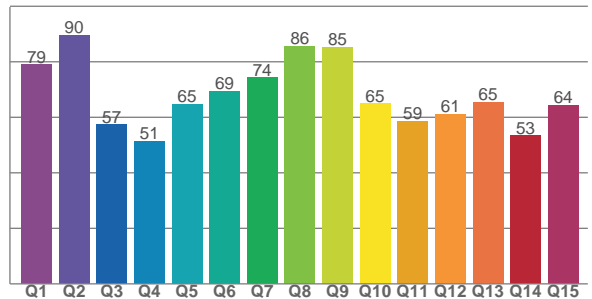
TM30 C Values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
60.5	62.3	54.7	53.9	62.8	78.3	84.4	71.0	73.5	53.1	36.2	59.5	72.8	73.7	65.3	71.1

CQS Q Values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79.0	89.6	57.3	51.5	64.8	69.4	74.2	85.6	85.2	64.9	58.6	61.1	65.4	53.5	64.5

CQS: 66.3



### Color Parameters

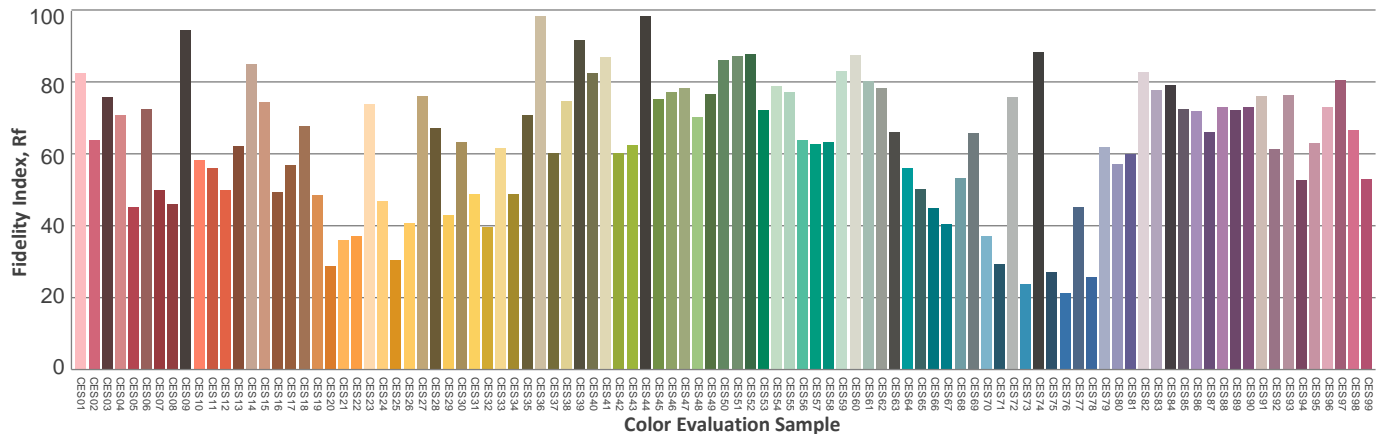
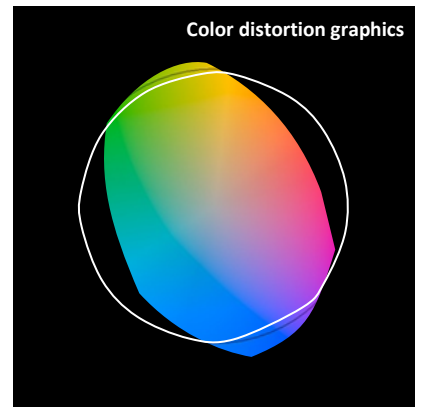
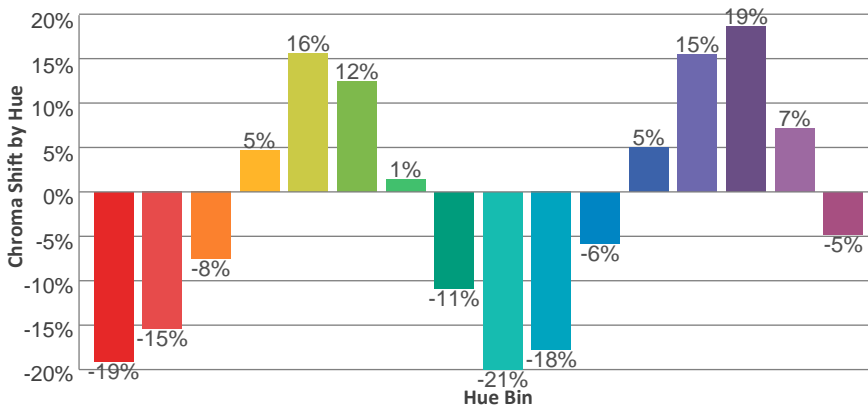
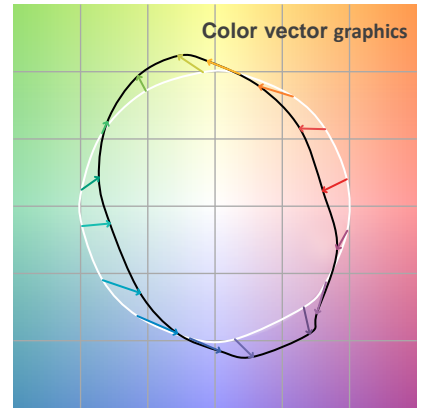
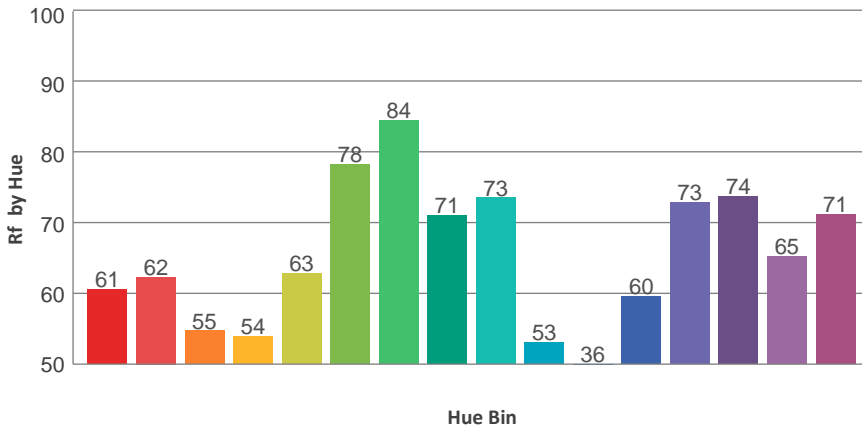
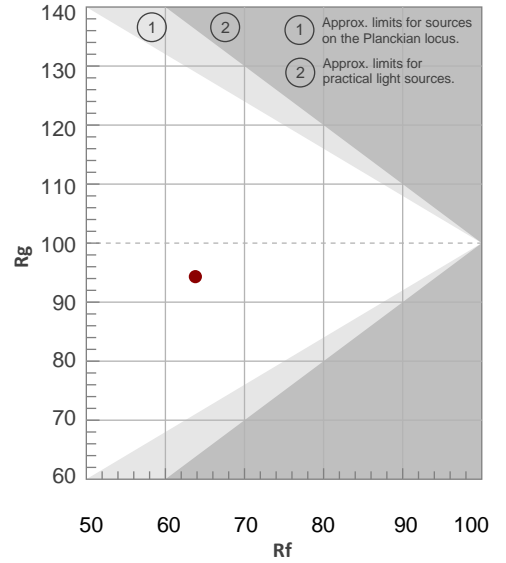
Color Temperature	Color Rendering Index	Red Component	Color Fidelity	Color Gamut	Color Quality Scale	Color Coordinate CIE 1931	Color Coordinate CIE 1931	Color Coordinate	Color Coordinate	Color Diviation from Black
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
6641 K	67.7	-39.1	63.8	94.3	66.3	0.311	0.324	0.199	0.310	-0.0020

TM30 Details

**Rf 63.8**  
Fidelity Index Rf

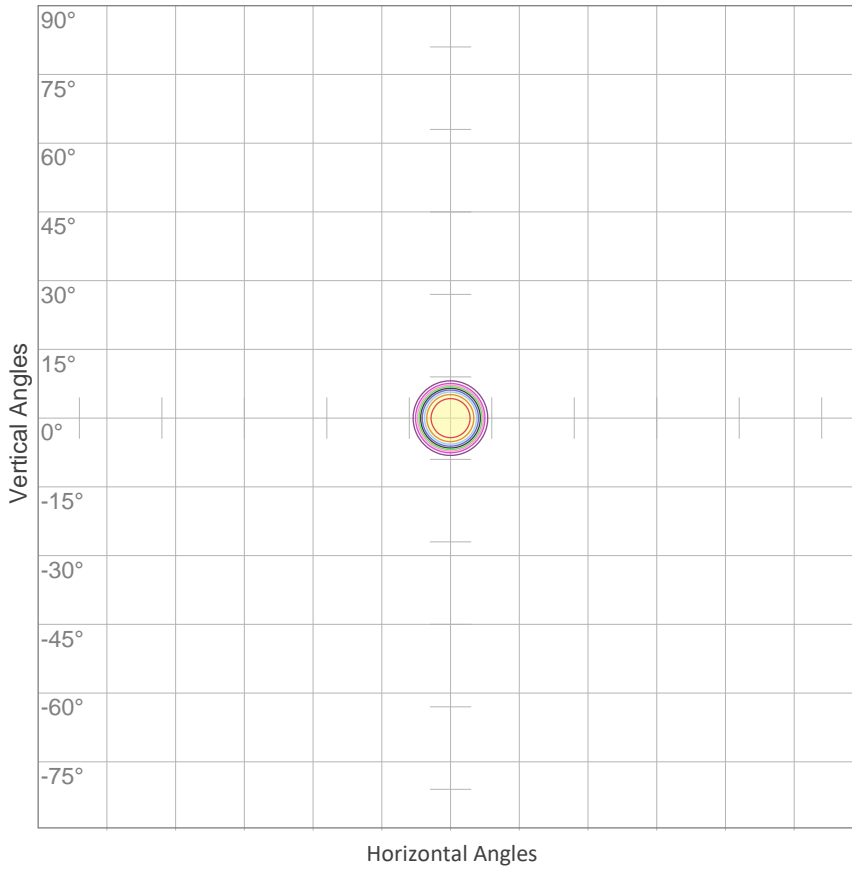
**Rg 94.3**  
Gamut Index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	61	-19%	-5%
2	62	-15%	11%
3	55	-8%	25%
4	54	5%	25%
5	63	16%	16%
6	78	12%	-1%
7	84	1%	-9%
8	71	-11%	-11%
9	73	-21%	2%
10	53	-18%	23%
11	36	-6%	32%
12	60	5%	24%
13	73	15%	10%
14	74	19%	-7%
15	65	7%	-23%
16	71	-5%	-15%



### ISO Diagrams

ISO Candela Diagram



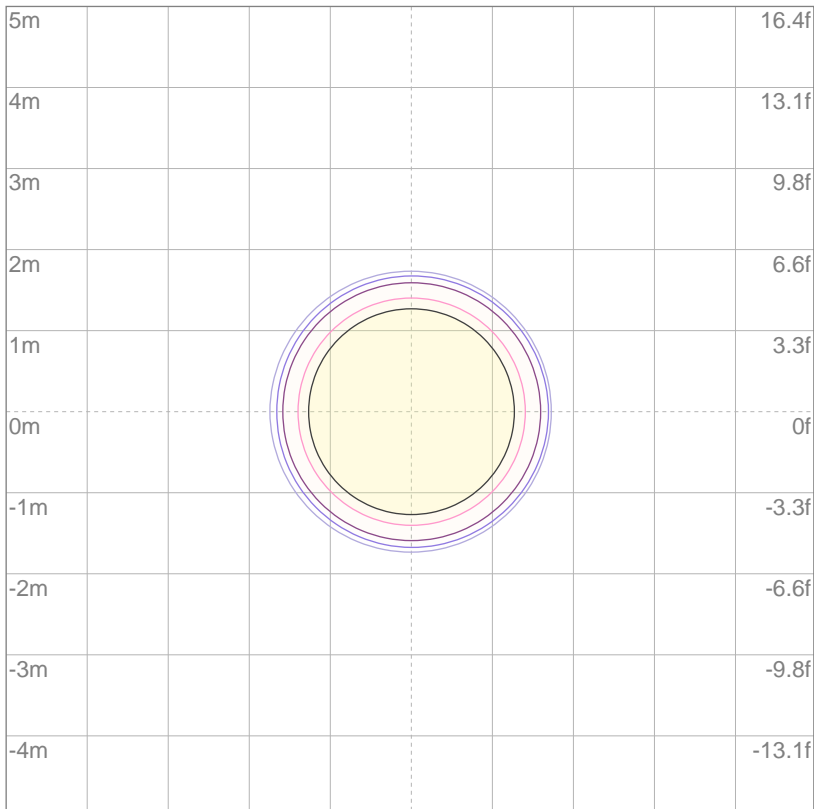
10%	19846 cd
20%	39693 cd
30%	59539 cd
40%	79386 cd
50%	99232 cd
60%	119079 cd
70%	138925 cd
80%	158772 cd
90%	178618 cd

Conditions:

Number of c-planes: 2

Candela at center: 198464 cd

ISO Lux Diagram



3%	59.5 lx
5%	99.2 lx
10%	198 lx
30%	595 lx
50%	992 lx

Conditions:

Number of c-planes: 2

Lux at center: 1985 lx

*Lux distribution on a surface when lamp is mounted at 10 meters from the surface.*

Mounting Height: 10 meters (33 feet)