

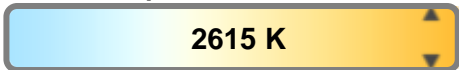
Light efficiency:



Light quality:



Color temperature:

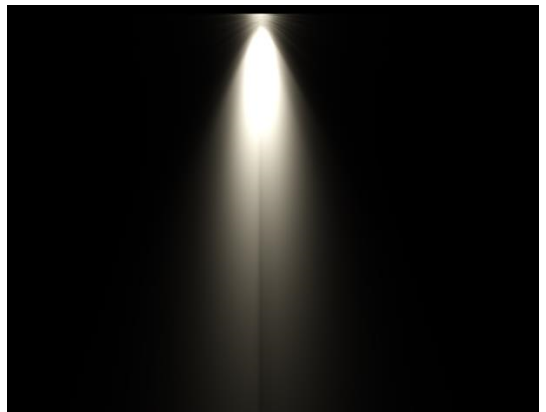


Output: 78,6 lm

Peak: 428 cd

Power: 3,0 W

PF: 1,0



Product name:

**bmd narrow**

Item number:

**33100.827.10.XX**

Date and time:

**25.07.2017 17:56:51**

Description:

**Toleranzen:**

**Lumen +/-4%**

**Candela +/-2,5%**

**Colour Temp +/-35 Grad K**

**CRI +/-0,7**

**Angular Resolution 1 Grad step**

**Last Calibration 30.06.2017**

**Pruefer:**

**Mourad Benzineb**

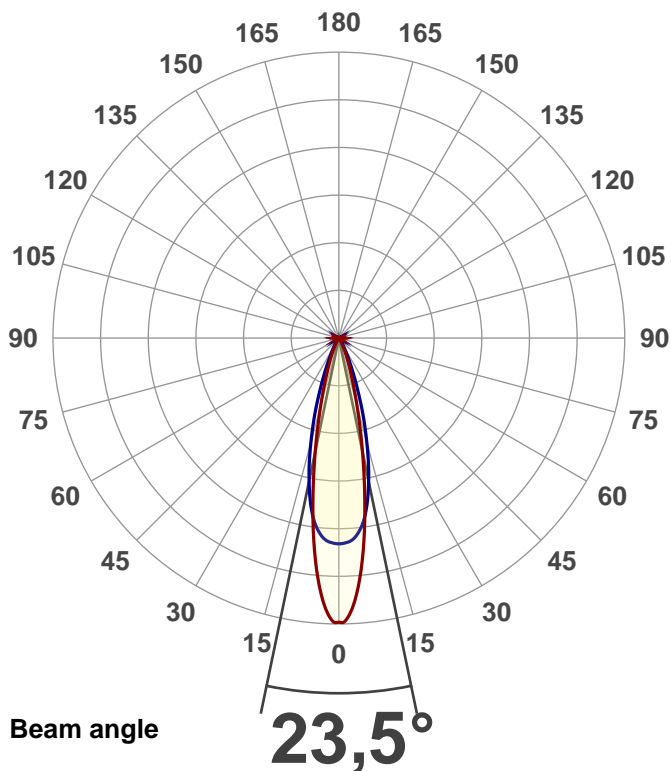
**Master of Engineering**

**Pruefort:**

**Lichtlabor**

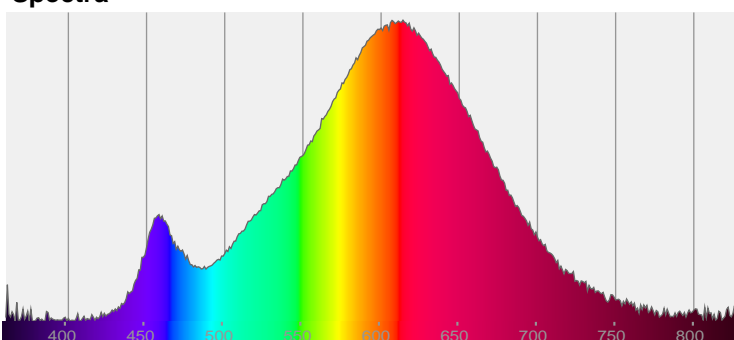
**Gaustasse13-15**

**55411 Bingen am Rhein**

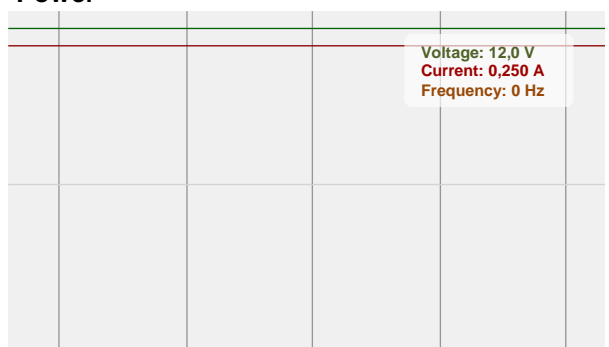


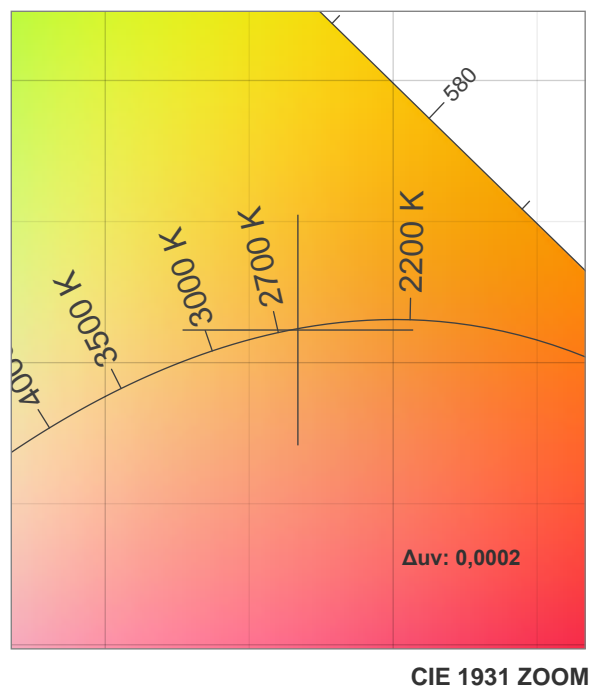
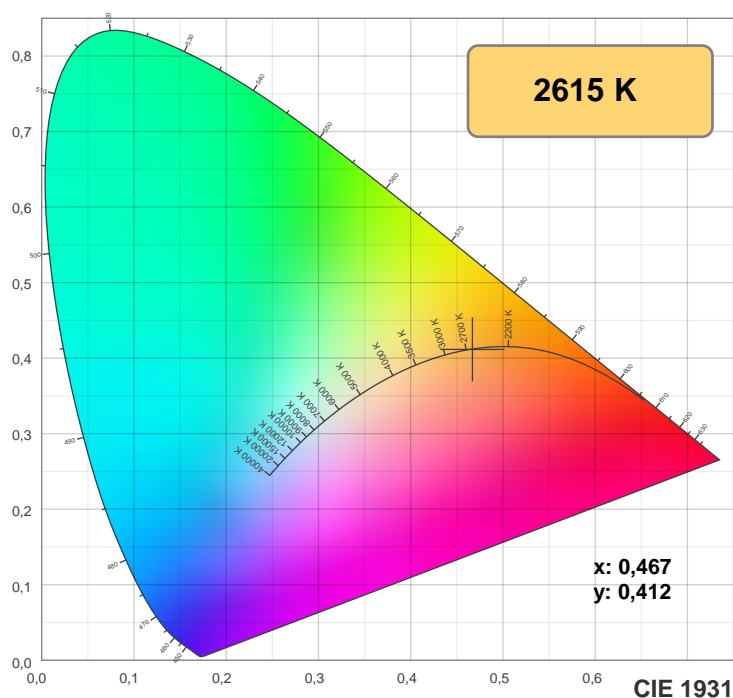
CIE 1931  
x: 0,467  
y: 0,412

Spectra

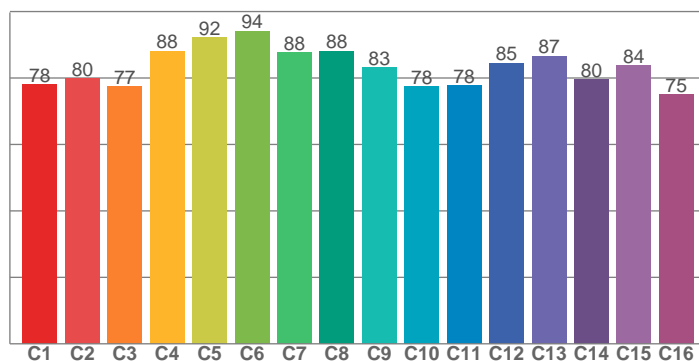


Power

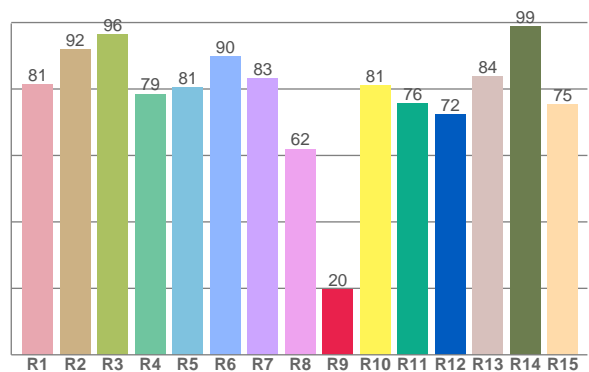




TM30: 82,9



CRI: 83,0 (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
81,3	92,0	96,4	78,6	80,5	89,8	83,3	62,0	19,6	81,0	75,6	72,3	83,7	98,9	75,4

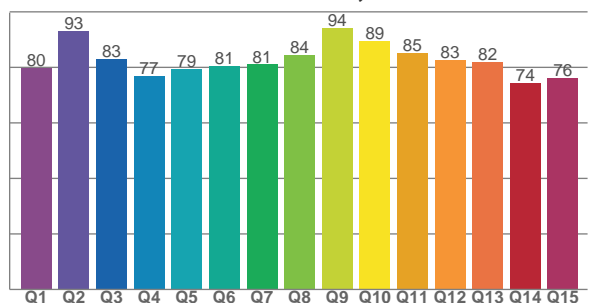
TM30 C values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
78,1	79,8	77,5	88,2	92,1	94,2	87,7	88,1	83,2	77,5	77,8	84,5	86,7	79,5	83,7	75,1

CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
79,8	93,1	82,9	76,9	79,4	80,6	81,1	84,4	94,3	89,4	85,2	82,7	82,1	74,5	76,2

CQS: 81,8



## 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 body
CCT	CRI	CRI R9	TM30 Rf	TM30 Rg	CQS	x	y	u	v	Δuv
2615 K	83,0	19,6	82,9	94,9	81,8	0,467	0,412	0,267	0,353	0,0002

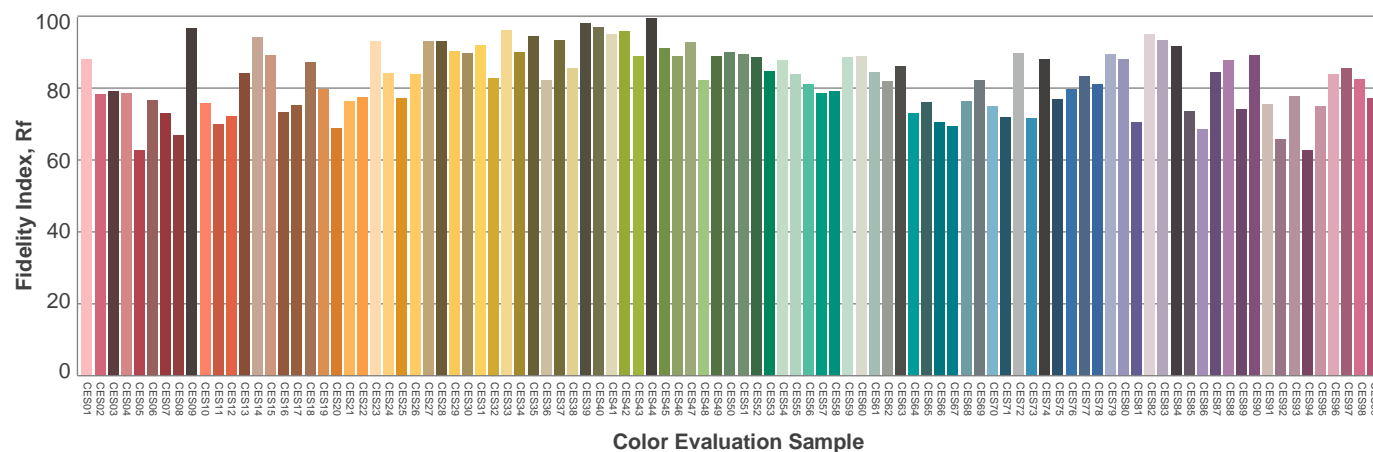
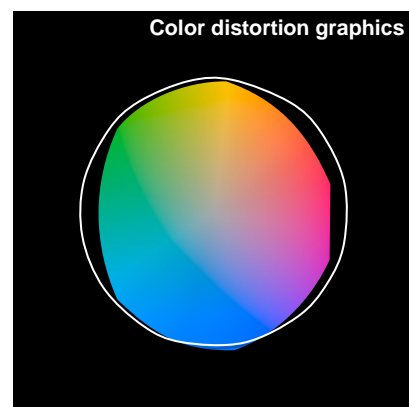
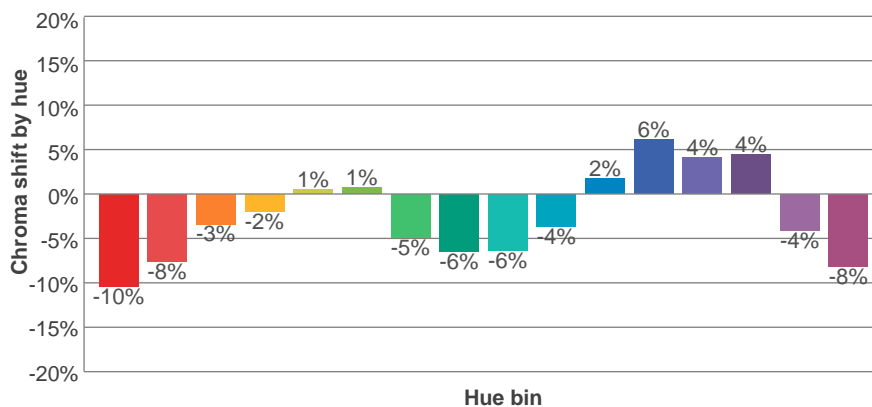
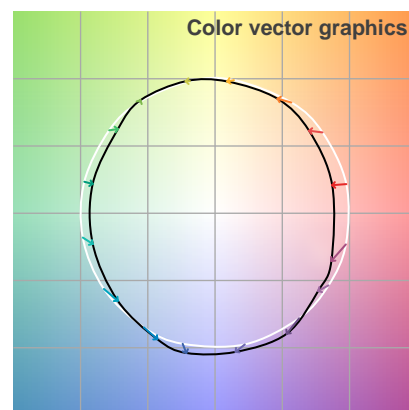
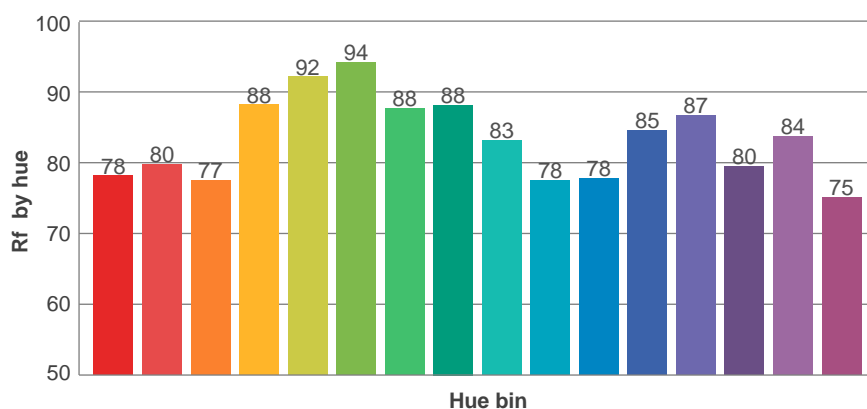
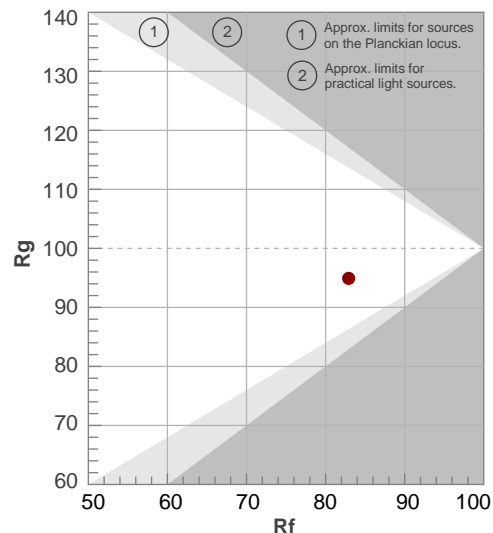
**Rf 82,9**

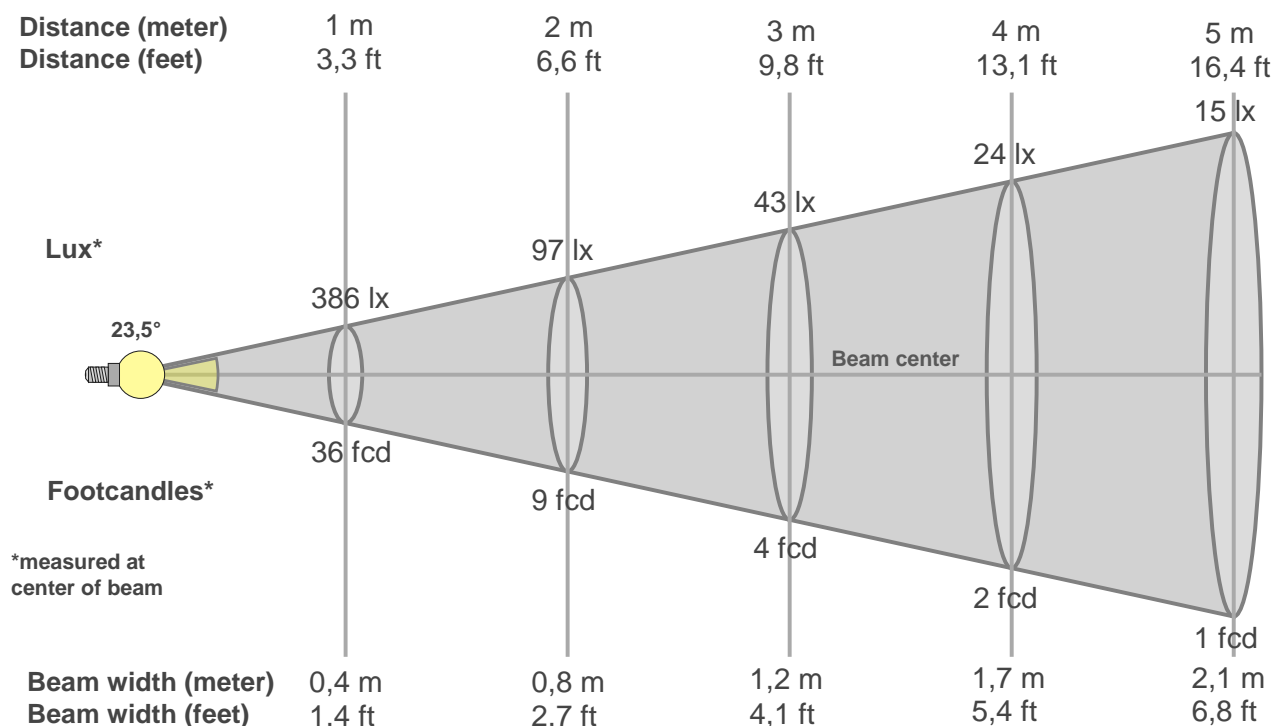
Fidelity index Rf

**Rg 94,9**

Gamut index Rg

Hue Bin	R <sub>f</sub>	Graphic shifts (%)	
		Chroma	Hue
1	78	-10%	1%
2	80	-8%	7%
3	77	-3%	10%
4	88	-2%	5%
5	92	1%	3%
6	94	1%	-1%
7	88	-5%	-4%
8	88	-6%	0%
9	83	-6%	6%
10	78	-4%	13%
11	78	2%	13%
12	85	6%	4%
13	87	4%	-8%
14	80	4%	-14%
15	84	-4%	-8%
16	75	-8%	-14%





#### Beam intensities from 1-20m

1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	20m
3,3ft	6,6ft	9,8ft	13,1ft	16,4ft	19,7ft	23ft	26,2ft	29,5ft	32,8ft	36,1ft	39,4ft	42,7ft	45,9ft	49,2ft	52,5ft	55,8ft	59,1ft	62,3ft	65,6ft
386lx	97lx	43lx	24lx	15lx	11lx	8lx	6lx	5lx	4lx	3lx	3lx	2lx	2lx	2lx	2lx	1lx	1lx	1lx	1lx
35,9fcd	9fcd	4fcd	2,2fcd	1,4fcd	1fcd	0,7fcd	0,6fcd	0,4fcd	0,4fcd	0,3fcd	0,2fcd	0,2fcd	0,2fcd	0,2fcd	0,1fcd	0,1fcd	0,1fcd	0,1fcd	0,1fcd

#### Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°
386	407	374	327	271	215	163	121	87	62	44	32	22	15	10	7	4	3	2	1
100%	105%	97%	85%	70%	56%	42%	31%	23%	16%	11%	8%	6%	4%	3%	2%	1%	1%	0%	0%

#### Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°
386	299	295	284	266	241	210	176	141	109	80	58	40	28	20	14	11	8	4	3
100%	77%	76%	74%	69%	62%	54%	45%	36%	28%	21%	15%	10%	7%	5%	4%	3%	2%	1%	1%

#### Intensities in 180° c-plane

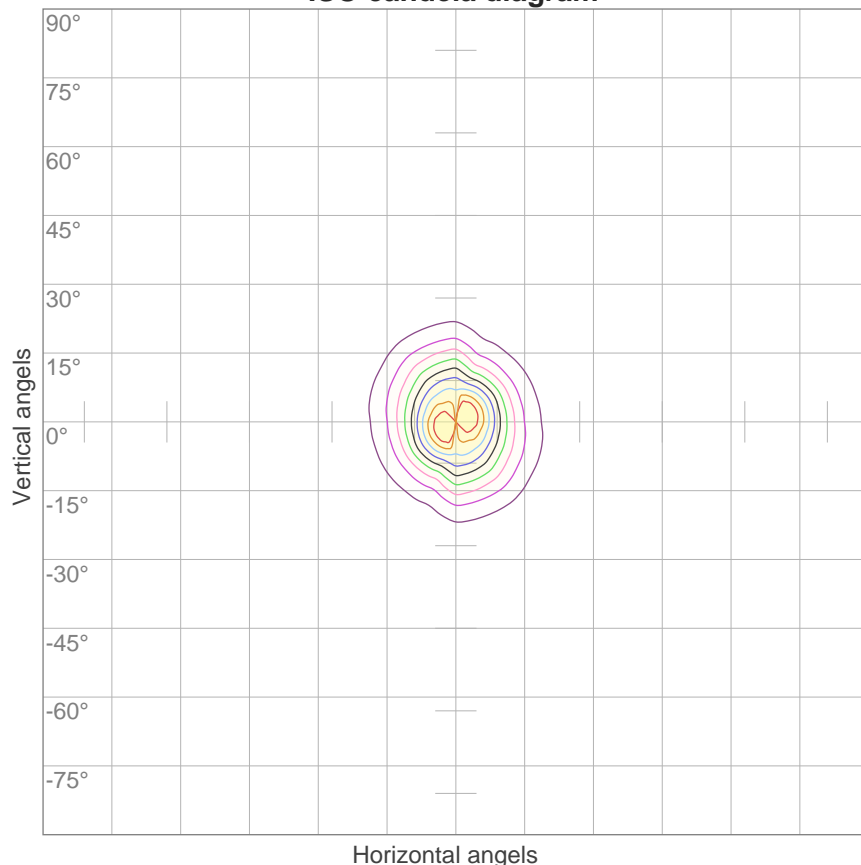
0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°
386	407	374	327	271	215	163	121	87	62	44	32	22	15	10	7	4	3	2	1
100%	105%	97%	85%	70%	56%	42%	31%	23%	16%	11%	8%	6%	4%	3%	2%	1%	1%	0%	0%

#### Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°
386	299	295	284	266	241	210	176	141	109	80	58	40	28	20	14	11	8	4	3
100%	77%	76%	74%	69%	62%	54%	45%	36%	28%	21%	15%	10%	7%	5%	4%	3%	2%	1%	1%

Beam angle 50%	Field angle 10%	Cutoff angle 2,5%	Intensity ratio in 120° cone	Intensity ratio in 90° cone
23,5°	44,2°	60,1°	98,7%	98,0%

## ISO candela diagram



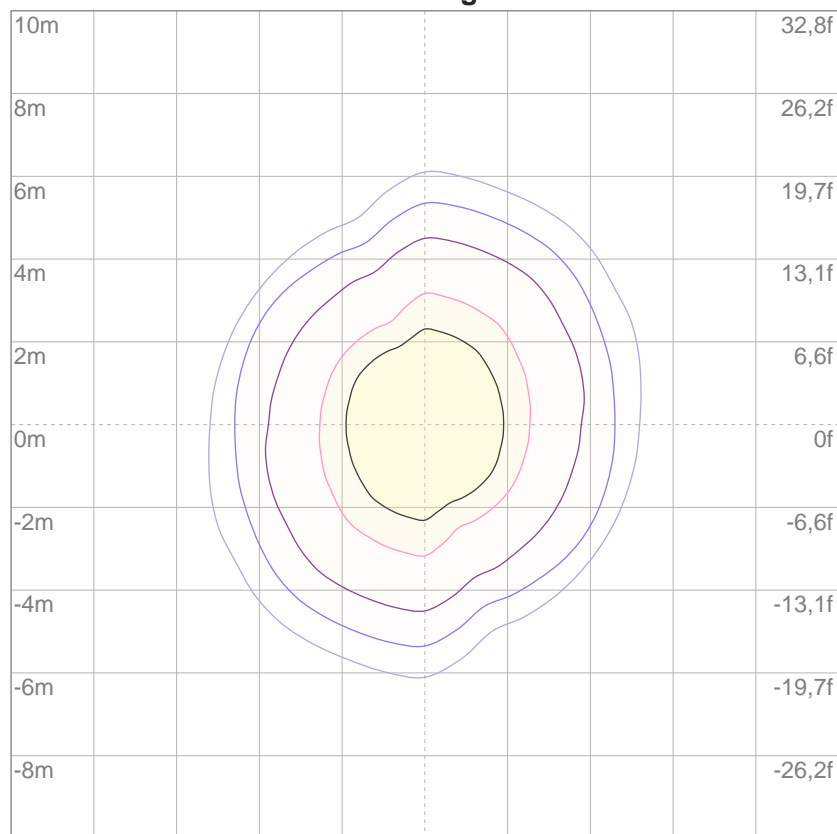
10%	39 cd
20%	77 cd
30%	116 cd
40%	154 cd
50%	193 cd
60%	232 cd
70%	270 cd
80%	309 cd
90%	348 cd

### Conditions:

Number of c-planes: 20

Candela at center: 386 cd

## ISO lux diagram



3%	0,116 lx
5%	0,193 lx
10%	0,386 lx
30%	1,16 lx
50%	1,93 lx

### Conditions:

Number of c-planes: 20

Lux at center: 3,86 lx

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

### Glare Evaluation According to UGR

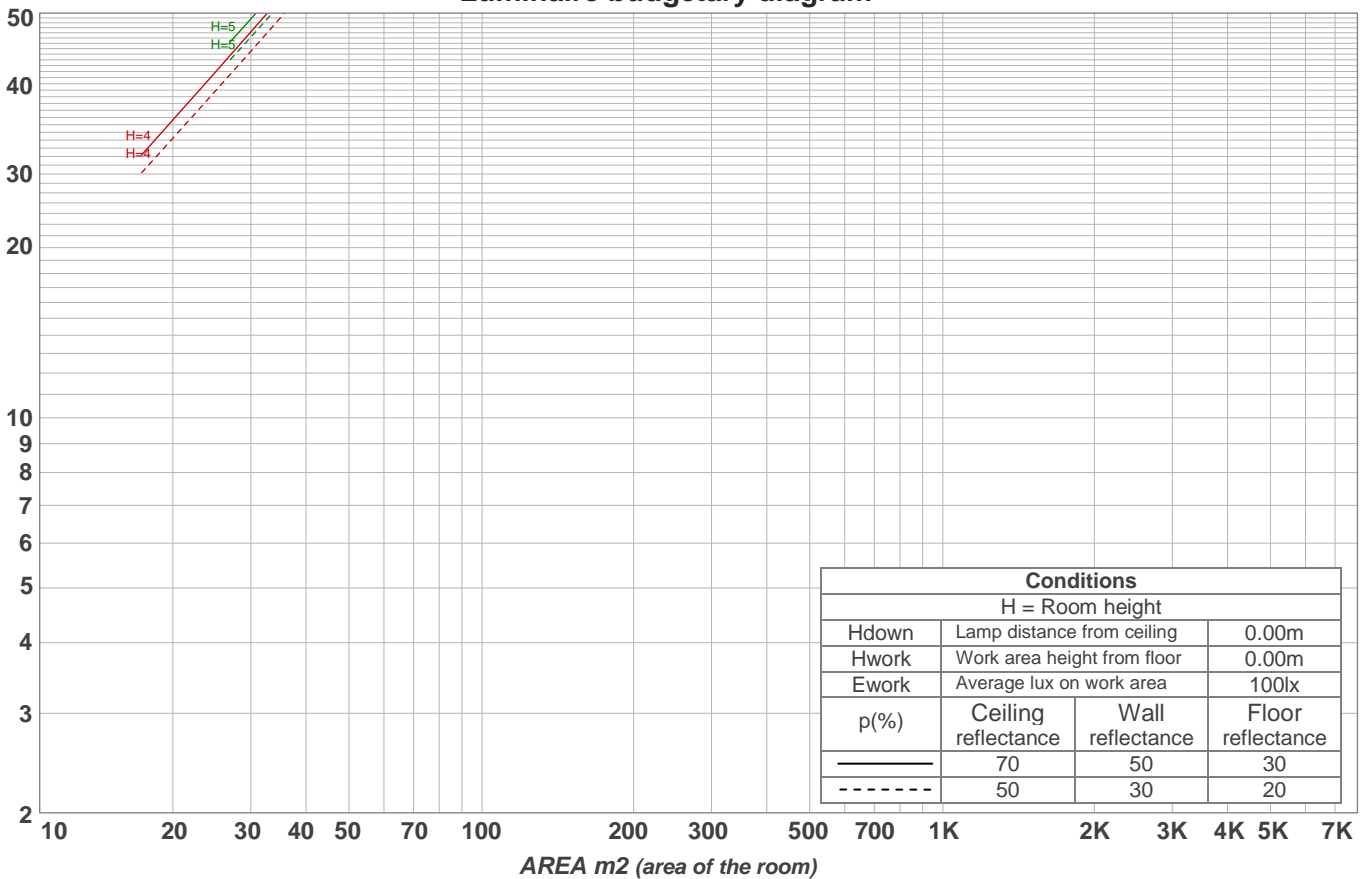
p Ceiling		70	70	50	50	30	70	70	50	50	30
p Walls		50	30	50	30	30	50	30	50	30	30
p Floor		20	20	20	20	20	20	20	20	20	20
Room size X      Y		Viewing direction at right angles to lamp axis					Viewing direction parallel to lamp axis				
2H	2H	5,8	6,4	6,0	6,6	6,8	5,8	6,4	6,0	6,6	6,8
	3H	7,4	8,0	7,7	8,2	8,5	7,4	8,0	7,7	8,2	8,5
	4H	8,8	9,4	9,1	9,6	9,9	8,8	9,4	9,1	9,6	9,9
	6H	10,2	10,7	10,5	11,0	11,3	10,2	10,7	10,5	11,0	11,3
	8H	11,3	11,8	11,6	12,1	12,4	11,3	11,8	11,6	12,1	12,4
	12H	12,4	12,9	12,8	13,2	13,5	12,4	12,9	12,8	13,2	13,5
4H	2H	6,2	6,8	6,5	7,0	7,3	6,2	6,8	6,5	7,0	7,3
	3H	8,3	8,8	8,6	9,1	9,4	8,3	8,8	8,6	9,1	9,4
	4H	10,0	10,4	10,4	10,7	11,1	10,0	10,4	10,4	10,7	11,1
	6H	11,6	12,0	12,0	12,3	12,7	11,6	12,0	12,0	12,3	12,7
	8H	12,9	13,2	13,3	13,6	14,0	12,9	13,2	13,3	13,6	14,0
	12H	14,2	14,4	14,6	14,8	15,3	14,2	14,4	14,6	14,8	15,3
8H	4H	10,7	11,0	11,1	11,3	11,7	10,7	11,0	11,1	11,3	11,7
	6H	12,7	12,9	13,1	13,3	13,8	12,7	12,9	13,1	13,3	13,8
	8H	14,1	14,3	14,6	14,8	15,2	14,1	14,3	14,6	14,8	15,2
	12H	15,6	15,7	16,1	16,2	16,7	15,6	15,7	16,1	16,2	16,7
12H	4H	10,8	11,1	11,3	11,5	11,9	10,8	11,1	11,3	11,5	11,9
	6H	13,0	13,2	13,5	13,7	14,1	13,0	13,2	13,5	13,7	14,1
	8H	14,6	14,7	15,1	15,2	15,7	14,6	14,7	15,1	15,2	15,7
Variation of the observer position for the luminaire distance S											
S = 1,0H		+0,3 / -0,3					+0,3 / -0,3				
S = 1,5H		+0,7 / -0,4					+0,7 / -0,4				
S = 2,0H		+1,3 / -0,6					+1,3 / -0,6				
Standard table		BK12					BK12				
Correction summand		-2,3					-2,3				
Corrected glare indices referring to 78,6 lm total luminous flux											

### Coefficients of Utilization

Ceiling reflectance	80				70				50			30			10			0
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR	(RCR: Room Cavity Ratio) Room Values are expressed as percentage of Lumens delivered to the task surface																	
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	115	113	111	109	112	110	109	107	106	105	104	103	102	101	99	99	98	96
2	111	107	104	101	109	106	103	100	102	100	98	100	98	96	97	95	94	93
3	107	103	99	96	106	101	98	95	99	96	94	96	94	92	94	93	91	90
4	104	99	95	91	102	97	94	91	96	92	90	94	91	89	92	90	88	87
5	101	95	91	88	100	94	90	87	93	89	87	91	88	86	90	87	85	84
6	98	92	88	85	97	91	87	84	90	86	84	89	86	83	87	85	83	82
7	95	89	85	82	94	88	84	82	87	84	81	86	83	81	85	82	80	79
8	93	86	82	79	92	86	82	79	85	81	79	84	81	78	83	80	78	77
9	90	84	80	77	90	83	79	77	83	79	77	82	79	76	81	78	76	75
10	88	81	77	75	87	81	77	75	80	77	75	80	77	74	79	76	74	73

LAMPS (number of lamps)

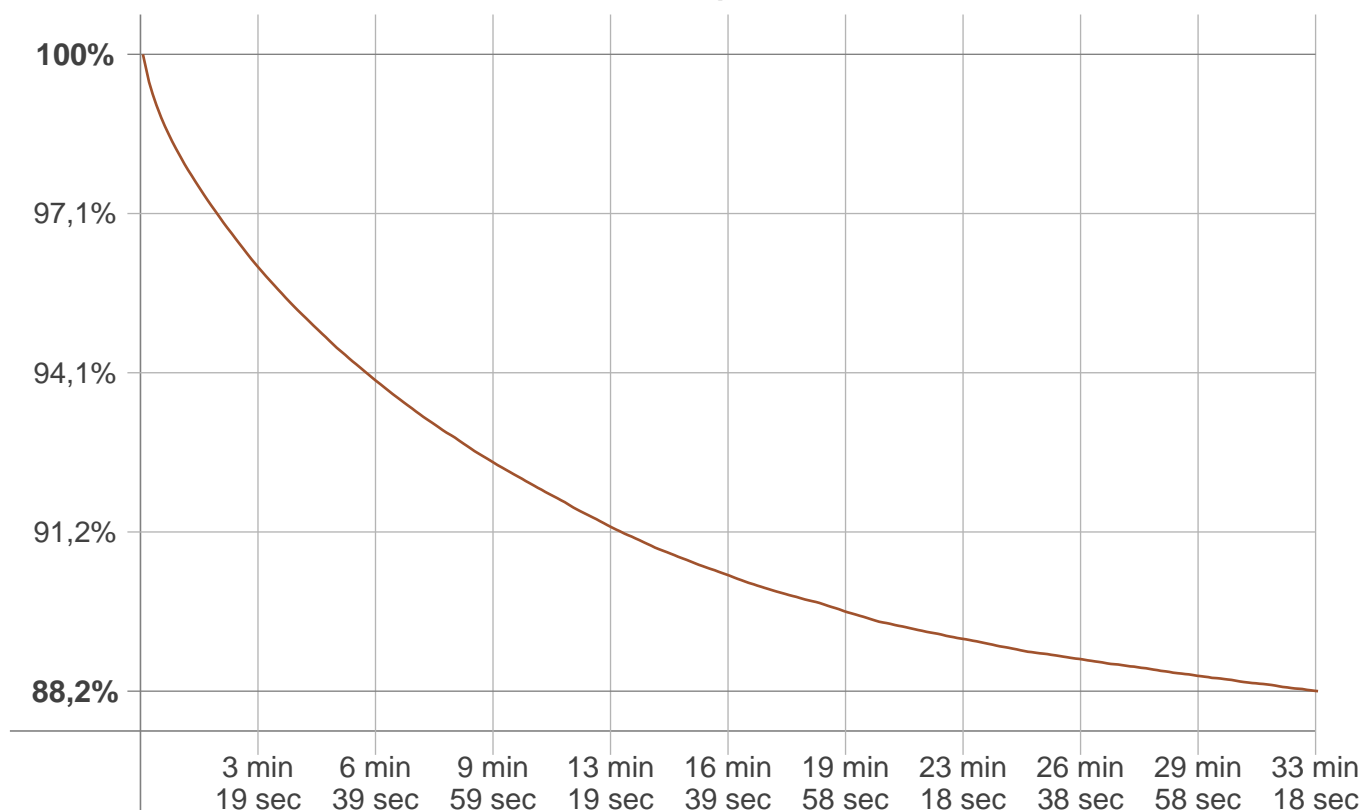
Luminaire budgetary diagram



### Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
{LUM0-10}	34,0 lm	11,7 lm	2,41 lm	0,580 lm	0,372 lm	0,325 lm	0,328 lm	0,326 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,010 lm	0,000 lm	0,000 lm	0,000 lm	0,000 lm	0,000 lm	0,000 lm	0,000 lm	0,000 lm

### Warmup curve



### Warmup result

Warmup time:	33 min 22 sec
Warmup variation	-12,0%

### Warmup conditions

Stable period:	15 min
Stable change max:	2,0%
Minimum time:	15 min

### Color temperature change

CCT start	CCT change	CCT end
2617 K	-2 K	2615 K

### Output change

Output start	Output change	Output end
87,9 lm	-9,3 lm	78,6 lm