NATA LIGHTING CO.,LTD.
www.nata.cn
Email:info@nata.com
Tel:+86-750-3770000 Fax:+86-750-3771111
Address:380JinOu Road,GaoXin Zone,Jiang Men City,Guangdong,China

Client:
LumCAT: 1687-M
Luminaire: 92.70.123.00

Report No: nt0100	Voltage(V): 34.8200
Test No: GC2019121605	Current(A): 0.1970
LampCAT: LUMINUS CXM-6-AC40	Power (W): 6.8500
Lamp flux(lm): 830.0	PF: 1.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 0	Width(mm): 0
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 757.45, Efficiency(%): 91.26% , Luminous Efficacy(lm/W): 110.58
Central intensity(cd): 2461.992, Maximum intensity(cd): 2461.992
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=23.0
[C90/270]Total=23.0
Field angle(10%Imax): [C0/180]Total=69.6
[C90/270]Total=69.6
Maximum s/h(1/2): C0_180=0.39 C90_270=0.39
Maximum s/h(1/4): C0_180=0.39 C90_270=0.39
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 91.26%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.641%

Equipment: GMS1980	Date: 2019/12/16	Operator: NT07
Temperature(°C): 25.0	Humidity(%): 65.0%	Distance(m): 7.50

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	2461.992	0.000	0	.000%	.000%
1.0	2445.820	2.348	2.348	.283%	.310%
2.0	2401.875	6.958	9.306	.838%	1.229%
3.0	2334.094	11.327	20.633	1.365%	2.724%
4.0	2248.594	15.340	35.973	1.848%	4.749%
5.0	2155.430	18.946	54.919	2.283%	7.250%
6.0	2033.789	22.015	76.934	2.652%	10.157%
7.0	1905.328	24.450	101.384	2.946%	13.385%
8.0	1780.453	26.378	127.763	3.178%	16.867%
9.0	1628.016	27.624	155.386	3.328%	20.514%
10.0	1454.723	27.898	183.284	3.361%	24.197%
11.0	1314.176	27.667	210.951	3.333%	27.850%
12.0	1138.458	26.811	237.762	3.230%	31.390%
13.0	985.978	25.212	262.974	3.038%	34.718%
14.0	850.303	23.504	286.478	2.832%	37.821%
15.0	724.563	21.620	308.098	2.605%	40.676%
16.0	616.120	19.645	327.743	2.367%	43.269%
17.0	528.926	17.831	345.574	2.148%	45.623%
18.0	460.209	16.309	361.883	1.965%	47.776%
19.0	411.237	15.161	377.044	1.827%	49.778%
20.0	375.061	14.391	391.436	1.734%	51.678%
21.0	347.013	13.865	405.301	1.671%	53.509%
22.0	327.923	13.563	418.864	1.634%	55.299%
23.0	313.144	13.451	432.316	1.621%	57.075%
24.0	300.691	13.421	445.736	1.617%	58.847%
25.0	292.071	13.478	459.214	1.624%	60.626%
26.0	284.154	13.602	472.816	1.639%	62.422%
27.0	278.768	13.772	486.588	1.659%	64.240%
28.0	272.988	13.969	500.558	1.683%	66.085%
29.0	268.123	14.157	514.715	1.706%	67.954%
30.0	263.988	14.367	529.081	1.731%	69.850%
31.0	259.896	14.579	543.66	1.756%	71.775%
32.0	256.324	14.789	558.45	1.782%	73.728%
33.0	252.970	15.004	573.454	1.808%	75.708%
34.0	249.230	15.198	588.652	1.831%	77.715%
35.0	245.215	15.356	604.007	1.850%	79.742%
36.0	241.235	15.489	619.496	1.866%	81.787%
37.0	236.559	15.583	635.079	1.877%	83.844%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	229.366	15.552	650.631	1.874%	85.897%
39.0	217.779	15.262	665.893	1.839%	87.912%
40.0	201.825	14.634	680.527	1.763%	89.844%
41.0	182.405	13.682	694.21	1.648%	91.651%
42.0	157.064	12.333	706.543	1.486%	93.279%
43.0	124.685	10.437	716.98	1.257%	94.657%
44.0	96.047	8.331	725.311	1.004%	95.757%
45.0	69.813	6.374	731.685	.768%	96.598%
46.0	44.761	4.481	736.166	.540%	97.190%
47.0	28.652	2.920	739.086	.352%	97.575%
48.0	17.550	1.868	740.953	.225%	97.822%
49.0	10.962	1.171	742.124	.141%	97.977%
50.0	7.931	0.788	742.912	.095%	98.081%
51.0	6.792	0.623	743.535	.075%	98.163%
52.0	5.850	0.542	744.077	.065%	98.234%
53.0	5.098	0.476	744.554	.057%	98.297%
54.0	4.584	0.427	744.98	.051%	98.354%
55.0	4.233	0.394	745.374	.047%	98.406%
56.0	4.029	0.373	745.747	.045%	98.455%
57.0	3.881	0.362	746.109	.044%	98.503%
58.0	3.755	0.353	746.462	.043%	98.549%
59.0	3.663	0.347	746.809	.042%	98.595%
60.0	3.614	0.344	747.153	.041%	98.640%
61.0	3.551	0.342	747.495	.041%	98.686%
62.0	3.509	0.340	747.835	.041%	98.731%
63.0	3.466	0.339	748.174	.041%	98.775%
64.0	3.431	0.338	748.513	.041%	98.820%
65.0	3.403	0.338	748.851	.041%	98.865%
66.0	3.382	0.339	749.189	.041%	98.909%
67.0	3.368	0.339	749.529	.041%	98.954%
68.0	3.347	0.340	749.869	.041%	98.999%
69.0	3.326	0.340	750.209	.041%	99.044%
70.0	3.305	0.341	750.55	.041%	99.089%
71.0	3.298	0.341	750.891	.041%	99.134%
72.0	3.277	0.342	751.233	.041%	99.179%
73.0	3.270	0.342	751.575	.041%	99.224%
74.0	3.255	0.343	751.918	.041%	99.270%
75.0	3.255	0.344	752.262	.041%	99.315%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	3.241	0.345	752.607	.042%	99.361%
77.0	3.213	0.344	752.951	.041%	99.406%
78.0	3.220	0.344	753.296	.041%	99.451%
79.0	3.206	0.345	753.641	.042%	99.497%
80.0	3.206	0.346	753.987	.042%	99.543%
81.0	3.206	0.347	754.333	.042%	99.588%
82.0	3.192	0.347	754.68	.042%	99.634%
83.0	3.192	0.347	755.027	.042%	99.680%
84.0	3.178	0.347	755.374	.042%	99.726%
85.0	3.178	0.347	755.721	.042%	99.772%
86.0	3.164	0.347	756.068	.042%	99.817%
87.0	3.157	0.346	756.414	.042%	99.863%
88.0	3.150	0.345	756.76	.042%	99.909%
89.0	3.150	0.345	757.105	.042%	99.954%
90.0	3.157	0.346	757.451	.042%	100.000%

Zonal flux distribution table

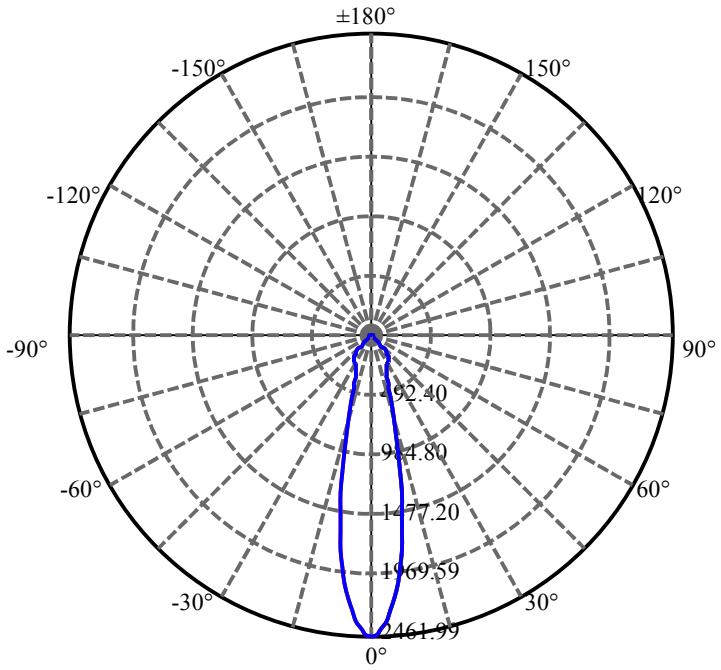
ZONAL LUMEN SUMMARY

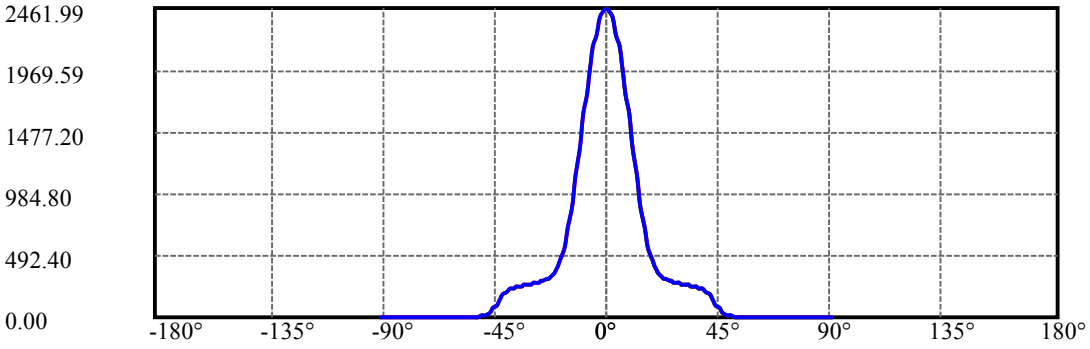
Zone	Lumens	%Lamp	%Fixt
0-30	529.08	63.74%	69.85%
0-40	680.53	81.99%	89.84%
0-60	747.15	90.02%	98.64%
0-90	757.10	91.22%	99.95%
0-120	757.10	91.22%	99.95%
0-180	757.45	91.26%	100.00%
60-90	10.30	1.24%	1.36%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-35.13	605.96	73.01%	80.00%

ZONAL LUMEN SUMMARY

0-10	183.28
10-20	208.15
20-30	137.65
30-40	151.45
40-50	62.38
50-60	4.24
60-70	3.40
70-80	3.44
80-90	3.12
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

Light Distribution Curve [Unit:cd]





C0(Max):

C0/C180:

C90/C270:

Field angle(10%Imax):C0/180Left:34.8 Right:34.8
:C90/270Left:34.8 Right:34.8

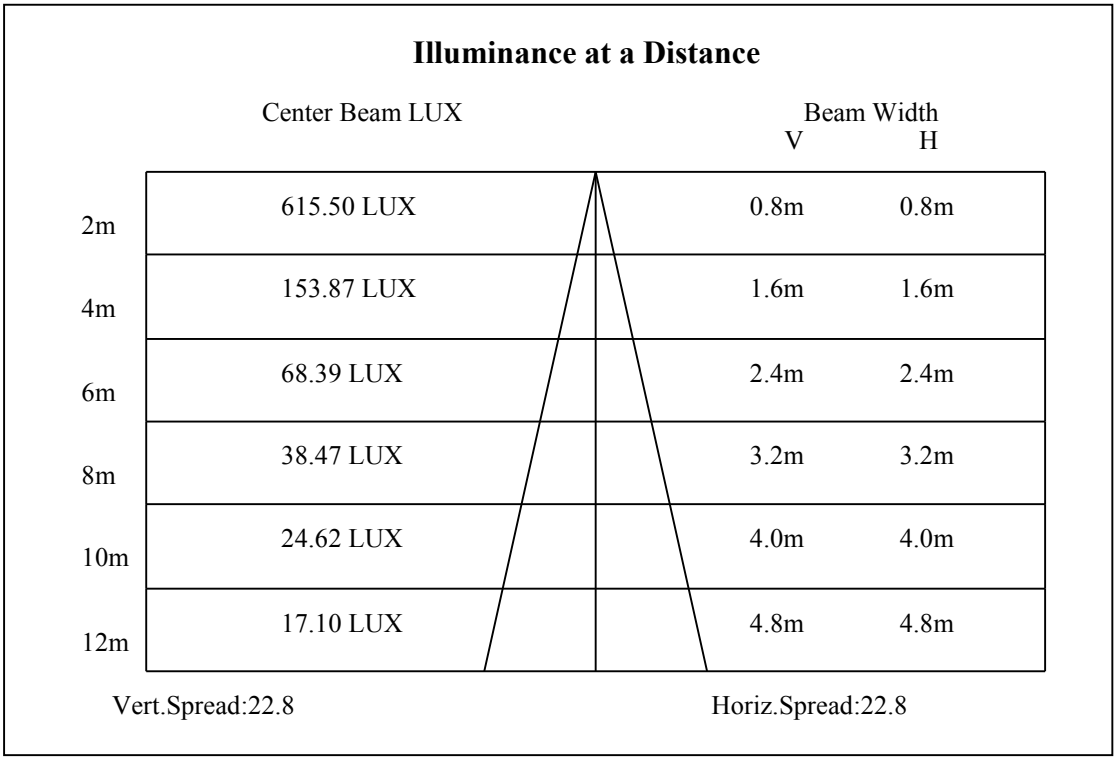
Beam Angle(50%Imax):C0/180Left:11.5 Right:11.5
:C90/270Left:11.5 Right:11.5

Equipment: GMS1980
Temperature(°C): 25.0

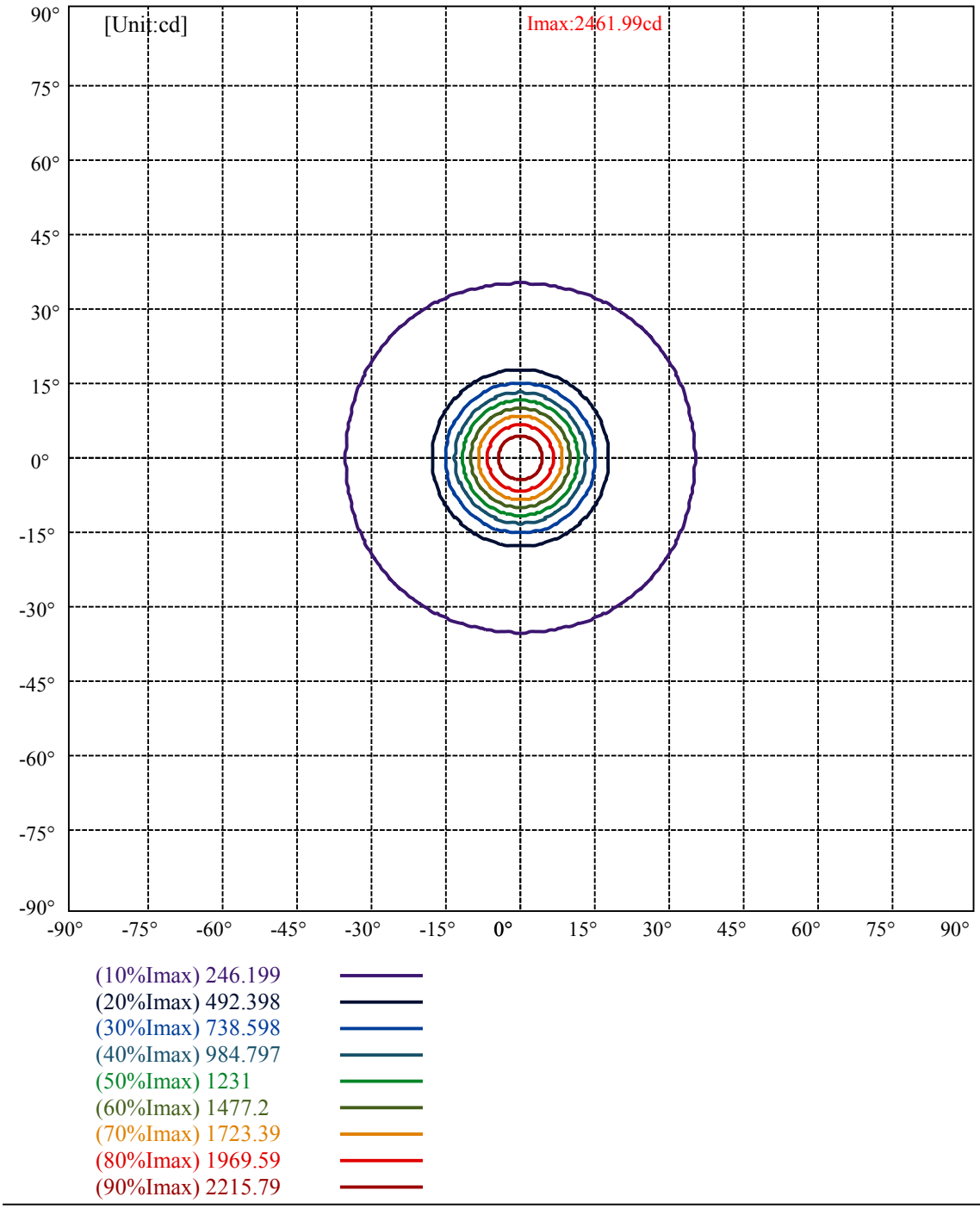
Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Lux distance Curve



ISO-Intensity(V-H)

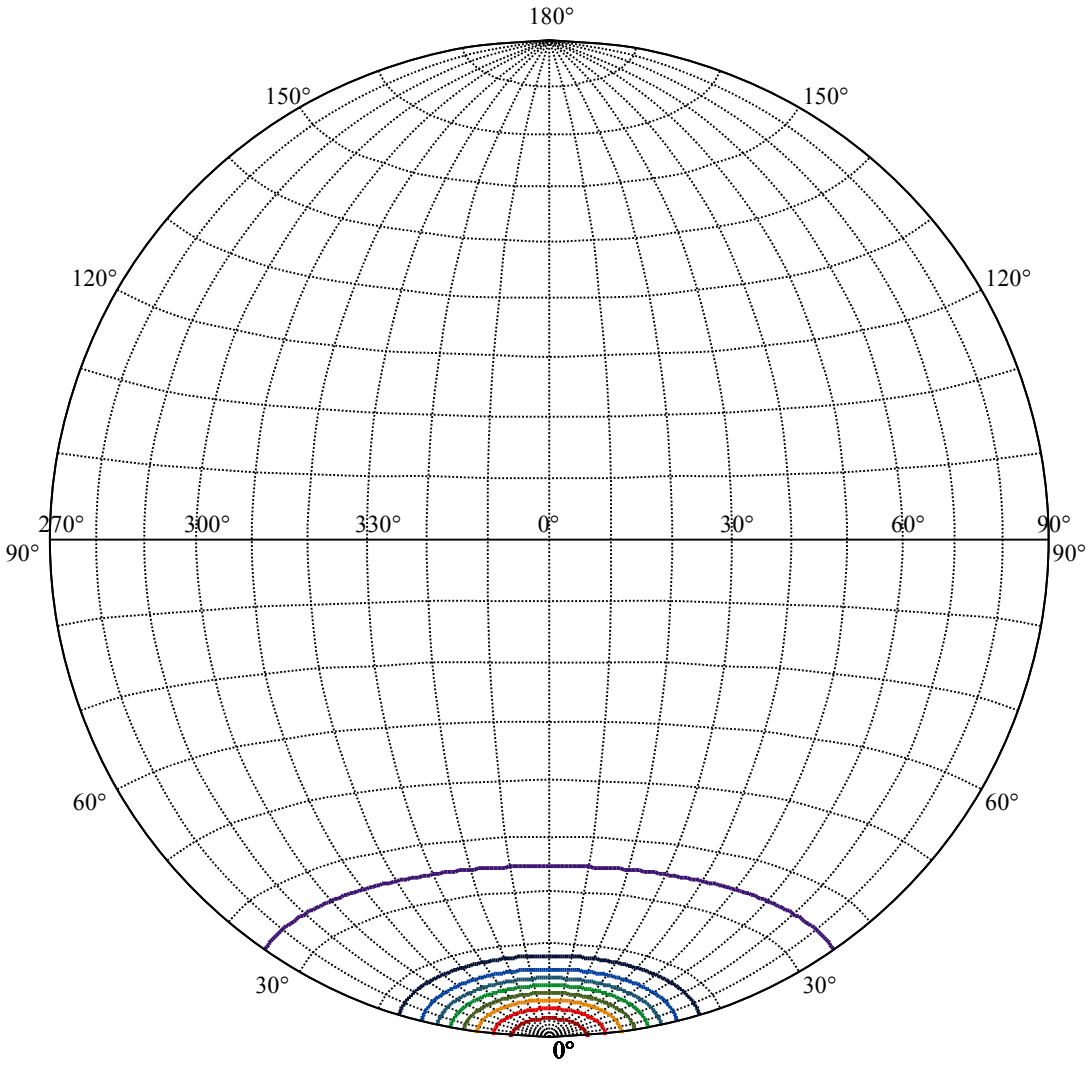


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

ISO candela diagram on circular web



House [Unit:cd] Road

Imax:2461.99

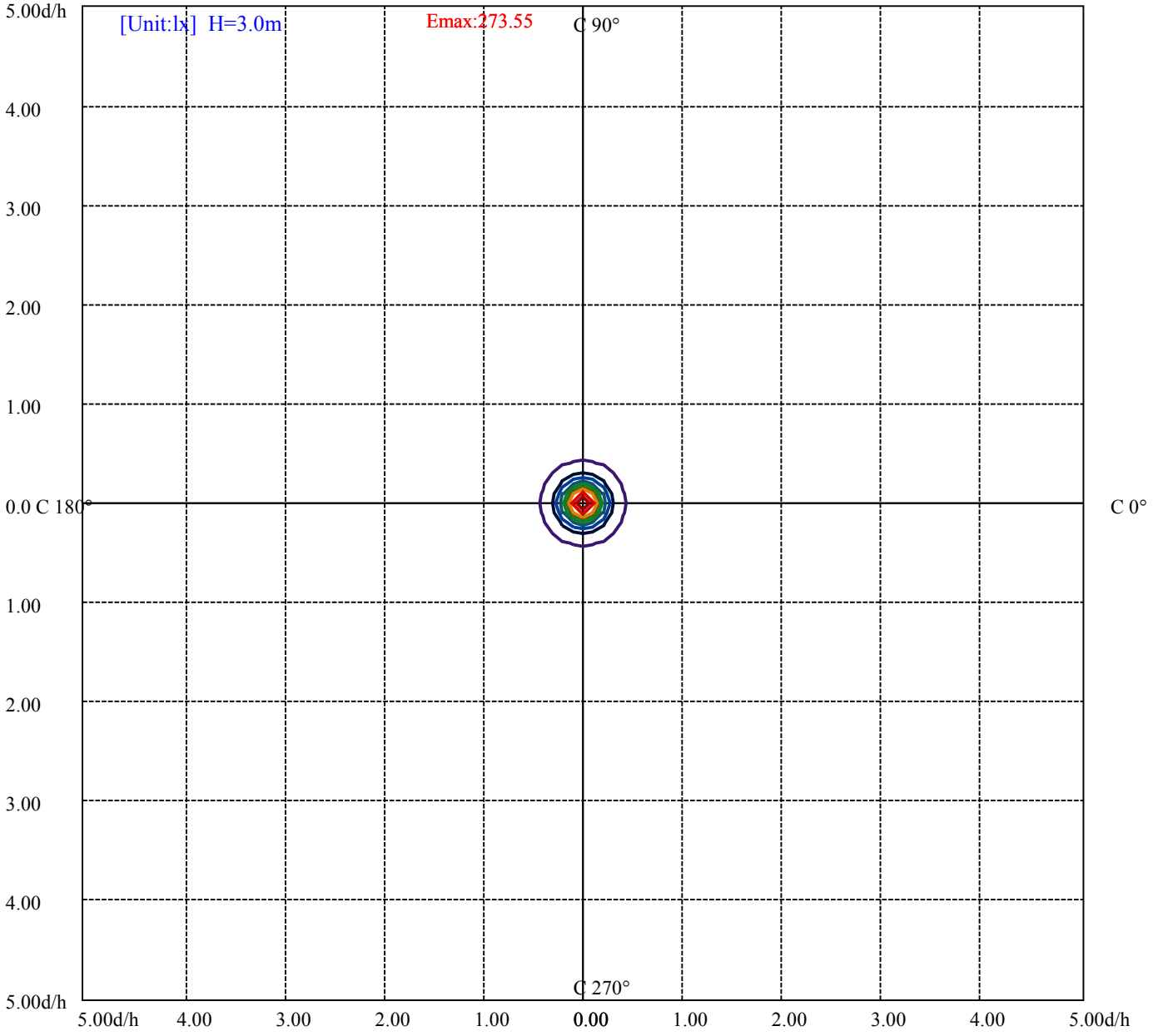
(10%Imax) 246.199
(20%Imax) 492.398
(30%Imax) 738.598
(40%Imax) 984.797
(50%Imax) 1231
(60%Imax) 1477.2
(70%Imax) 1723.39
(80%Imax) 1969.59
(90%Imax) 2215.79

Equipment: GMS1980
Temperature(°C): 25.0

Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

ISO illuminance diagram

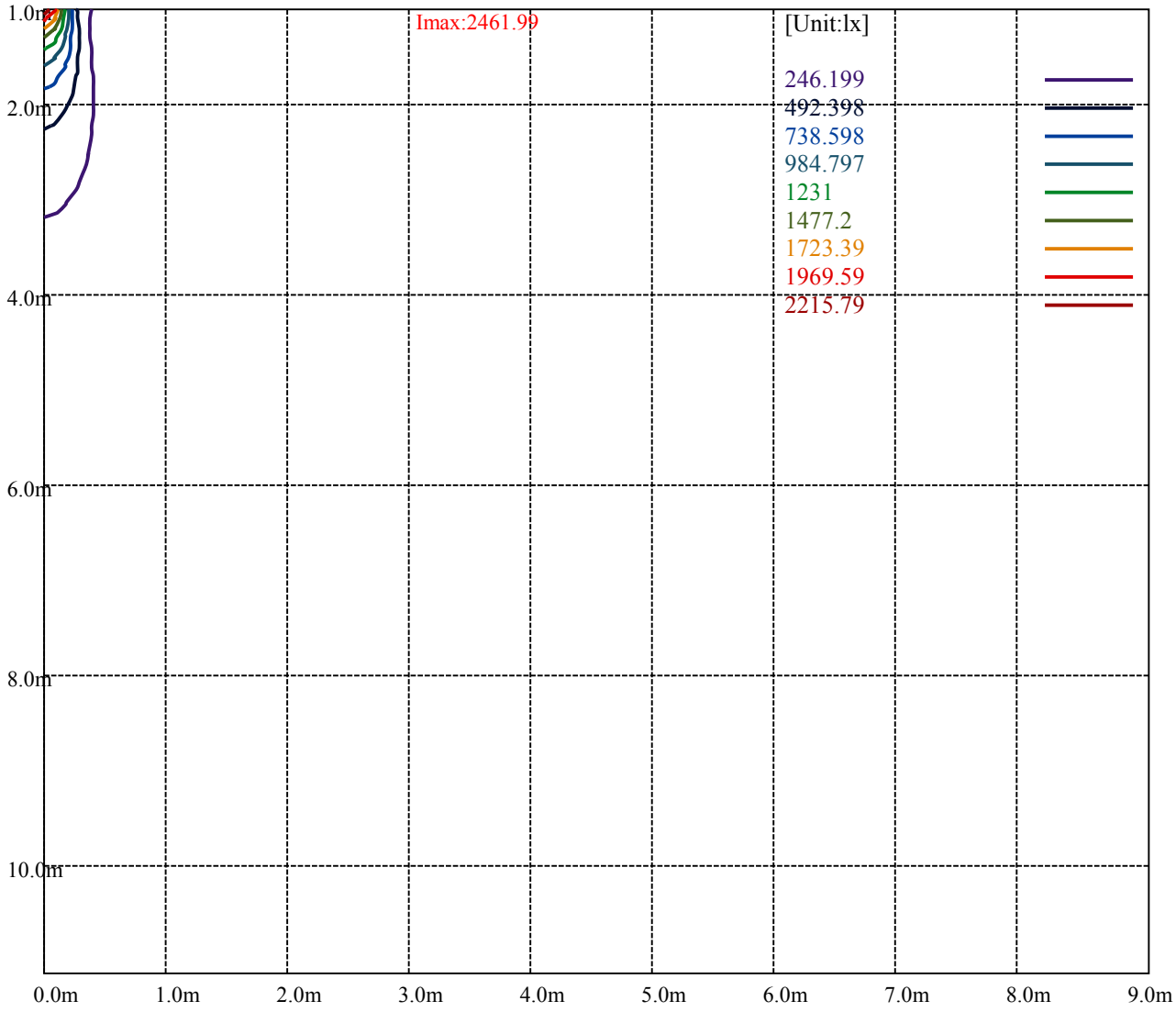


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Space ISO Lux diagram



Equipment: GMS1980
Temperature(°C): 25.0

Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

1687-M

Luminance Limitting Curve(no luminous side)

Luminance Table

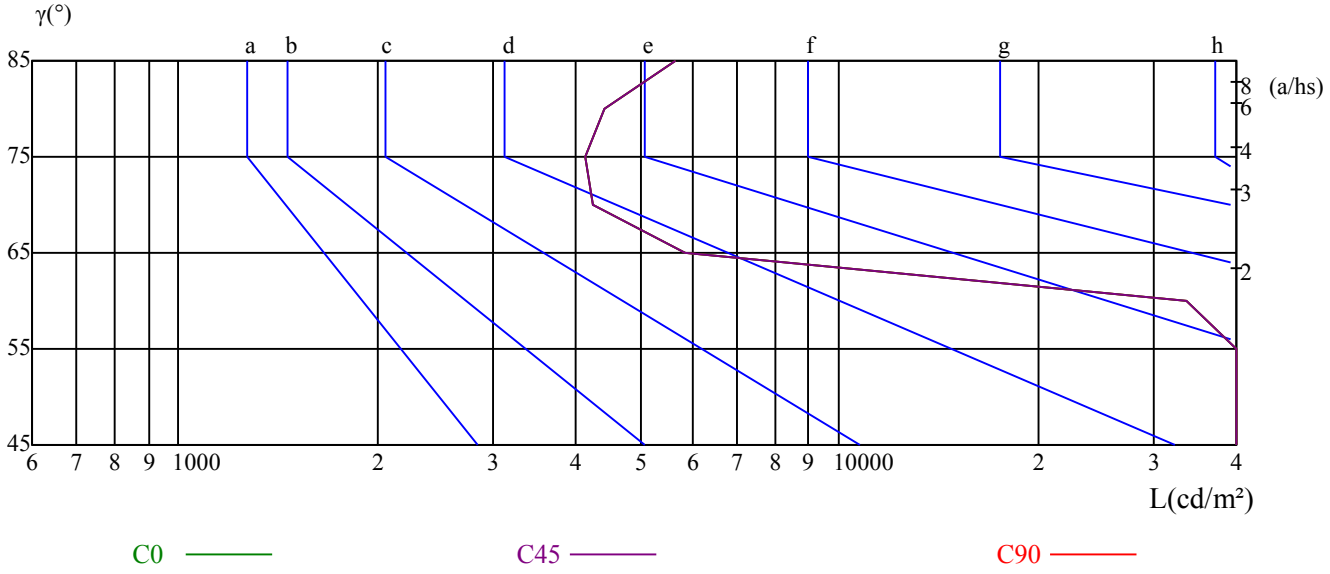
γ	45	50	55	60	65	70	75	80	85
C0	46650	52836	53885	33658	5848	4245	4131	4405	5640
C45	46650	52836	53885	33658	5848	4245	4131	4405	5640
C90	46650	52836	53885	33658	5848	4245	4131	4405	5640

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
5848	5848	5848	4131	4131	4131	5640	5640	5640

Glare Table

Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

Luminance Limitting Curve

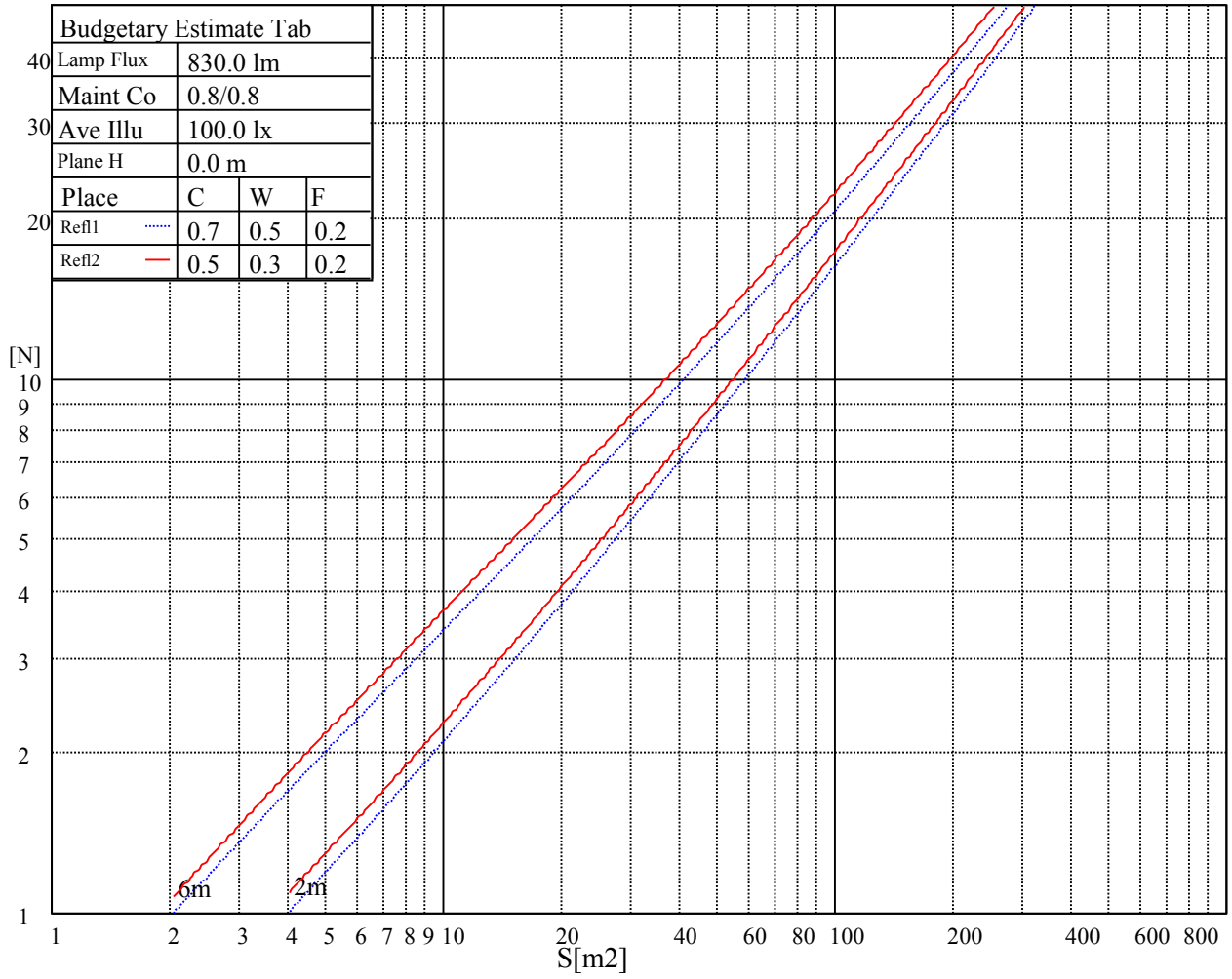


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Budgetary Estimate Table

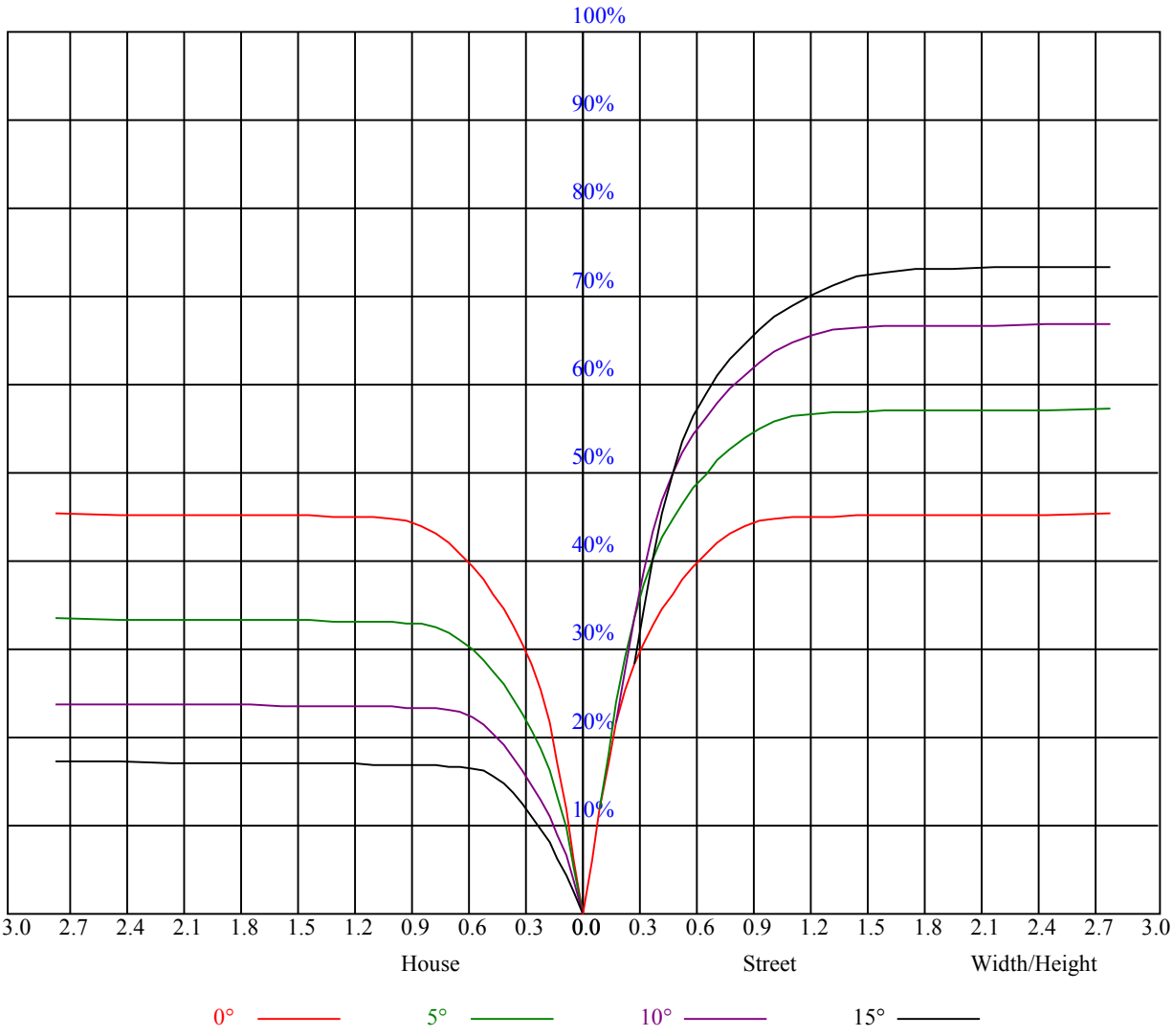


Equipment: GMS1980 Date: 2019/12/16 Operator: NT07
Temperature(°C): 25.0 Humidity(%): 65.0% Distance(m): 7.50

Utilization factor table for indoor luminaire

RHOCC	80			70			50			30			10			0
RHOW	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	COEFFCIENTS OF UTILIZATION RHOFC=20 CU															
0	1.09	1.09	1.09	1.06	1.06	1.06	1.01	1.01	1.01	0.97	0.97	0.97	0.93	0.93	0.93	0.91
1	1.01	0.99	0.97	0.99	0.97	0.96	0.96	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86
2	0.95	0.91	0.88	0.93	0.90	0.87	0.90	0.88	0.85	0.88	0.85	0.84	0.85	0.83	0.82	0.80
3	0.89	0.85	0.81	0.88	0.84	0.81	0.85	0.82	0.79	0.83	0.80	0.78	0.81	0.79	0.77	0.76
4	0.84	0.79	0.76	0.83	0.78	0.75	0.81	0.77	0.74	0.79	0.76	0.73	0.77	0.75	0.73	0.71
5	0.79	0.74	0.71	0.78	0.74	0.70	0.77	0.73	0.70	0.75	0.72	0.69	0.74	0.71	0.68	0.67
6	0.75	0.70	0.66	0.74	0.70	0.66	0.73	0.69	0.66	0.72	0.68	0.65	0.71	0.67	0.65	0.64
7	0.71	0.66	0.63	0.71	0.66	0.63	0.70	0.65	0.62	0.69	0.65	0.62	0.68	0.64	0.62	0.60
8	0.68	0.63	0.60	0.67	0.63	0.59	0.66	0.62	0.59	0.66	0.62	0.59	0.65	0.61	0.59	0.58
9	0.65	0.60	0.57	0.64	0.60	0.57	0.64	0.59	0.56	0.63	0.59	0.56	0.62	0.59	0.56	0.55
10	0.62	0.57	0.54	0.62	0.57	0.54	0.61	0.57	0.54	0.60	0.56	0.54	0.60	0.56	0.54	0.53

Coefficient Utilization Curve

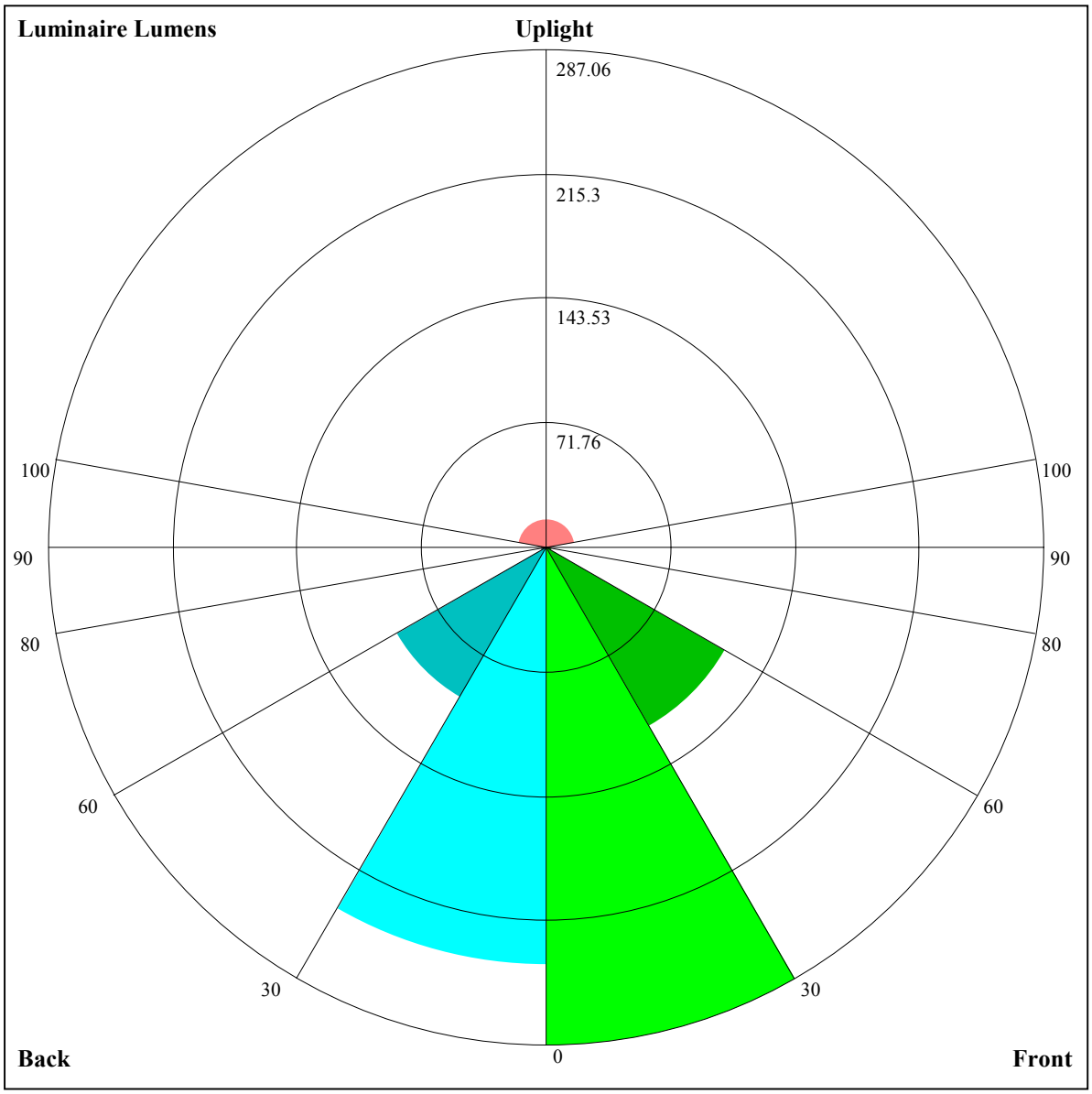


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2019/12/16
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

LCS Graph



Luminaire Lumens:

FL=287.06,FM=119.01,FH=3.45,FVH=1.74

BL=240.55,BM=99.48,BH=3.39,BVH=1.73

UL=3.44,UH=16.39

BUG Rating:B1-U2-G0

Intensity data(cd)

C/γ(°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
0.0	2433.94	2507.63	2554.88	2555.44	2514.38	2453.63	2327.63	2227.50	2135.25
45.0	2466.56	2518.31	2536.31	2513.81	2453.06	2373.75	2269.69	2155.50	2048.06
90.0	2474.44	2459.25	2415.94	2341.69	2251.13	2158.31	2055.94	1915.88	1793.25
135.0	2477.25	2423.25	2335.50	2234.25	2142.00	2046.94	1914.19	1793.25	1660.50
180.0	2433.94	2326.50	2224.13	2110.50	1998.00	1889.44	1748.81	1591.31	1441.69
225.0	2458.13	2376.56	2267.44	2169.00	2058.19	1950.75	1815.75	1667.81	1527.75
270.0	2474.44	2454.75	2397.38	2311.88	2221.31	2109.94	1989.00	1868.63	1739.25
315.0	2477.25	2500.31	2483.44	2436.19	2350.69	2260.69	2149.31	2022.75	1897.88
360.0	2433.94	2507.63	2554.88	2555.44	2514.38	2453.63	2327.63	2227.50	2135.25

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	1972.69	1845.56	1725.75	1541.25	1368.56	1233.00	1042.88	896.06	765.00
45.0	1916.44	1766.25	1618.31	1459.13	1261.13	1108.69	964.13	812.81	680.06
90.0	1660.50	1482.19	1332.56	1105.48	1014.41	859.67	736.99	619.26	534.32
135.0	1480.50	1328.06	1173.94	1006.31	847.13	719.44	599.06	515.81	445.50
180.0	1288.69	1112.74	946.13	805.95	680.57	555.24	480.32	425.70	377.04
225.0	1381.50	1113.30	1036.97	889.48	724.44	615.83	528.08	453.15	399.43
270.0	1563.75	1413.00	1259.44	1089.56	925.31	789.75	657.00	548.44	476.44
315.0	1760.06	1576.69	1420.31	1210.50	1066.28	920.81	788.06	657.73	553.61
360.0	1972.69	1845.56	1725.75	1541.25	1368.56	1233.00	1042.88	896.06	765.00

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	627.75	543.38	478.69	421.31	388.13	362.25	337.50	321.19	308.25
45.0	579.38	491.63	432.00	392.63	361.69	339.19	321.19	306.00	294.75
90.0	462.04	410.63	377.49	349.26	328.44	313.88	301.50	290.08	283.89
135.0	395.44	363.38	336.94	316.13	303.19	293.06	284.63	284.06	273.38
180.0	348.53	327.43	311.40	299.93	292.28	285.47	279.68	275.06	269.89
225.0	365.01	336.88	319.39	304.71	293.18	285.92	279.96	275.29	271.69
270.0	419.06	383.63	353.81	332.44	318.38	306.56	297.00	290.81	285.75
315.0	484.48	432.96	390.77	359.72	338.12	318.83	304.09	294.08	285.64
360.0	627.75	543.38	478.69	421.31	388.13	362.25	337.50	321.19	308.25

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	296.44	288.56	284.06	275.91	270.39	266.57	262.58	259.14	255.38
45.0	288.00	284.63	273.21	268.65	263.59	259.99	256.61	252.96	249.30
90.0	278.94	273.26	268.76	264.94	260.61	257.23	254.03	249.98	246.99
135.0	269.38	264.43	261.00	257.46	253.91	250.76	247.28	243.96	240.24
180.0	266.01	261.73	257.63	254.08	250.54	246.09	242.27	238.39	232.43
225.0	267.53	263.64	261.11	258.58	255.71	252.68	249.69	245.87	241.48
270.0	284.06	273.71	269.89	266.91	262.35	259.14	256.28	251.66	247.95
315.0	279.79	273.94	269.33	265.39	262.07	258.13	255.04	251.89	247.95
360.0	296.44	288.56	284.06	275.91	270.39	266.57	262.58	259.14	255.38

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	251.55	248.06	243.62	238.61	234.00	229.89	218.36	197.78	171.51
45.0	246.09	241.99	238.44	233.27	228.60	223.71	207.00	179.83	151.48
90.0	242.94	237.60	233.55	228.88	214.48	196.26	169.20	126.90	98.83
135.0	235.63	231.13	227.19	212.63	189.23	162.11	123.64	92.64	63.96
180.0	227.81	221.91	202.50	175.28	147.32	113.68	85.28	53.89	28.58
225.0	236.87	232.03	220.22	194.63	164.03	134.38	105.36	68.12	41.57
270.0	244.52	238.67	233.27	227.53	209.98	187.59	159.08	120.43	89.33
315.0	244.46	241.09	236.14	231.41	226.97	211.61	188.61	157.89	123.13
360.0	251.55	248.06	243.62	238.61	234.00	229.89	218.36	197.78	171.51

Intensity data(cd)

C/γ(°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0
0.0	140.06	105.75	77.51	46.24	24.36	11.93	9.73	8.49	7.14
45.0	122.91	86.06	57.77	33.08	14.79	10.01	8.89	7.31	5.91
90.0	68.63	39.88	19.80	11.14	9.28	7.99	6.86	5.74	5.01
135.0	38.64	17.10	9.79	8.66	7.54	6.41	5.51	4.78	4.33
180.0	14.63	9.06	8.04	6.98	6.02	5.01	4.33	3.99	3.88
225.0	21.71	10.29	9.17	8.16	6.98	5.91	5.12	4.67	4.50
270.0	60.13	30.94	16.09	9.96	8.61	7.48	6.36	5.34	4.50
315.0	91.80	59.01	31.05	16.20	10.13	8.72	7.54	6.47	5.51
360.0	140.06	105.75	77.51	46.24	24.36	11.93	9.73	8.49	7.14

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	5.96	5.23	4.89	4.67	4.22	3.88	3.83	3.71	3.71
45.0	4.95	4.33	4.11	3.94	3.83	3.77	3.71	3.66	3.60
90.0	4.61	4.44	4.11	3.83	3.71	3.66	3.60	3.54	3.49
135.0	4.05	3.83	3.77	3.71	3.60	3.54	3.54	3.49	3.49
180.0	3.77	3.71	3.66	3.54	3.54	3.49	3.43	3.43	3.38
225.0	4.39	3.83	3.71	3.66	3.60	3.54	3.49	3.43	3.38
270.0	4.16	3.99	3.88	3.83	3.71	3.66	3.60	3.54	3.49
315.0	4.78	4.50	4.11	3.88	3.83	3.77	3.71	3.60	3.54
360.0	5.96	5.23	4.89	4.67	4.22	3.88	3.83	3.71	3.71

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	3.60	3.54	3.54	3.49	3.43	3.43	3.38	3.32	3.32
45.0	3.54	3.49	3.43	3.43	3.43	3.38	3.38	3.38	3.32
90.0	3.49	3.43	3.43	3.38	3.32	3.32	3.32	3.32	3.32
135.0	3.43	3.38	3.38	3.38	3.38	3.32	3.32	3.32	3.26
180.0	3.38	3.38	3.32	3.32	3.32	3.26	3.26	3.26	3.26
225.0	3.38	3.32	3.32	3.32	3.32	3.32	3.26	3.26	3.26
270.0	3.43	3.43	3.38	3.38	3.38	3.38	3.32	3.26	3.32
315.0	3.49	3.49	3.43	3.38	3.38	3.38	3.38	3.32	3.32
360.0	3.60	3.54	3.54	3.49	3.43	3.43	3.38	3.32	3.32

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	3.32	3.32	3.32	3.32	3.26	3.26	3.26	3.26	3.21
45.0	3.32	3.32	3.26	3.26	3.26	3.21	3.21	3.21	3.21
90.0	3.26	3.32	3.26	3.26	3.26	3.21	3.26	3.21	3.21
135.0	3.26	3.26	3.26	3.26	3.21	3.21	3.21	3.21	3.21
180.0	3.21	3.21	3.21	3.21	3.21	3.15	3.21	3.15	3.21
225.0	3.26	3.21	3.21	3.21	3.21	3.21	3.21	3.21	3.21
270.0	3.26	3.26	3.26	3.26	3.26	3.21	3.21	3.21	3.21
315.0	3.32	3.26	3.26	3.26	3.26	3.26	3.21	3.21	3.21
360.0	3.32	3.32	3.32	3.32	3.26	3.26	3.26	3.26	3.21

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	3.21	3.21	3.21	3.21	3.21	3.15	3.21	3.15	3.15
45.0	3.21	3.21	3.21	3.21	3.21	3.21	3.15	3.15	3.15
90.0	3.21	3.21	3.21	3.15	3.21	3.15	3.15	3.15	3.15
135.0	3.15	3.15	3.21	3.15	3.15	3.15	3.15	3.15	3.15
180.0	3.21	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15
225.0	3.21	3.21	3.15	3.15	3.15	3.15	3.15	3.15	3.15
270.0	3.21	3.21	3.21	3.21	3.21	3.15	3.15	3.15	3.15
315.0	3.26	3.21	3.21	3.21	3.15	3.21	3.15	3.15	3.15
360.0	3.21	3.21	3.21	3.21	3.21	3.15	3.21	3.15	3.15

Intensity data(cd)

C/γ(°)	90.0
0.0	3.21
45.0	3.15
90.0	3.15
135.0	3.15
180.0	3.15
225.0	3.15
270.0	3.15
315.0	3.15
360.0	3.21