NATA LIGHTING CO.,LTD.
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Address:380JinOu Road,GaoXin Zone,Jiang Men City,Guangdong,China

Nata

Client:
LumCAT: 1654-S
Luminaire: 92.70.064.00

Report No: GC2019091909	Voltage(V): 220.5000
Test No: NATA07	Current(A): 0.0420
LampCAT: TRIDONIC SLE G7 9MM	Power (W): 8.3000
Lamp flux(lm): 1011.0	PF: 0.8970
Number of Lamps: 1	Ballast type: AC
Length(mm): 32	Width(mm): 32
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 877.85, Efficiency(%): 86.83% , Luminous Efficacy(lm/W): 105.77
Central intensity(cd): 3125.195, Maximum intensity(cd): 3125.195
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=25.6
[C90/270]Total=25.6
Field angle(10%Imax): [C0/180]Total=58.2
[C90/270]Total=58.2
Maximum s/h(1/2): C0_180=0.43 C90_270=0.43
Maximum s/h(1/4): C0_180=0.44 C90_270=0.44
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 86.83%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 99.497%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	3125.196	0.000	0	.000%	.000%
1.0	3114.465	2.986	2.986	.295%	.340%
2.0	3076.182	8.885	11.871	.879%	1.352%
3.0	3026.008	14.594	26.465	1.444%	3.015%
4.0	2947.239	19.994	46.46	1.978%	5.292%
5.0	2848.574	24.933	71.393	2.466%	8.133%
6.0	2724.155	29.286	100.679	2.897%	11.469%
7.0	2583.495	32.944	133.624	3.259%	15.222%
8.0	2418.125	35.796	169.419	3.541%	19.299%
9.0	2243.126	37.777	207.196	3.737%	23.603%
10.0	2063.197	38.971	246.167	3.855%	28.042%
11.0	1874.800	39.349	285.516	3.892%	32.524%
12.0	1692.492	38.996	324.511	3.857%	36.966%
13.0	1522.076	38.149	362.66	3.773%	41.312%
14.0	1332.692	36.541	399.201	3.614%	45.475%
15.0	1163.314	34.266	433.467	3.389%	49.378%
16.0	1058.025	32.549	466.016	3.219%	53.086%
17.0	922.406	30.841	496.857	3.051%	56.599%
18.0	829.286	28.882	525.738	2.857%	59.889%
19.0	738.219	27.271	553.009	2.697%	62.996%
20.0	660.470	25.600	578.609	2.532%	65.912%
21.0	594.450	24.097	602.706	2.383%	68.657%
22.0	540.628	22.810	625.516	2.256%	71.255%
23.0	495.739	21.746	647.262	2.151%	73.732%
24.0	460.049	20.897	668.159	2.067%	76.113%
25.0	427.386	20.178	688.337	1.996%	78.411%
26.0	398.326	19.491	707.828	1.928%	80.632%
27.0	371.946	18.845	726.673	1.864%	82.778%
28.0	343.118	18.104	744.777	1.791%	84.841%
29.0	316.801	17.265	762.042	1.708%	86.807%
30.0	284.278	16.229	778.271	1.605%	88.656%
31.0	257.956	15.090	793.361	1.493%	90.375%
32.0	231.089	14.011	807.372	1.386%	91.971%
33.0	198.165	12.646	820.018	1.251%	93.412%
34.0	176.855	11.349	831.367	1.123%	94.704%
35.0	141.600	9.890	841.257	.978%	95.831%
36.0	109.663	8.000	849.257	.791%	96.742%
37.0	83.445	6.298	855.555	.623%	97.460%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	61.937	4.853	860.408	.480%	98.013%
39.0	42.807	3.575	863.983	.354%	98.420%
40.0	27.952	2.468	866.451	.244%	98.701%
41.0	16.491	1.583	868.033	.157%	98.881%
42.0	11.177	1.005	869.039	.099%	98.996%
43.0	7.111	0.677	869.716	.067%	99.073%
44.0	5.557	0.478	870.194	.047%	99.127%
45.0	4.443	0.384	870.579	.038%	99.171%
46.0	3.242	0.301	870.879	.030%	99.205%
47.0	2.668	0.235	871.114	.023%	99.232%
48.0	2.488	0.208	871.323	.021%	99.256%
49.0	2.372	0.200	871.522	.020%	99.279%
50.0	2.280	0.194	871.716	.019%	99.301%
51.0	2.169	0.188	871.904	.019%	99.322%
52.0	2.111	0.184	872.088	.018%	99.343%
53.0	2.048	0.181	872.269	.018%	99.364%
54.0	1.984	0.178	872.447	.018%	99.384%
55.0	1.891	0.173	872.62	.017%	99.404%
56.0	1.839	0.169	872.788	.017%	99.423%
57.0	1.810	0.167	872.955	.017%	99.442%
58.0	1.769	0.165	873.121	.016%	99.461%
59.0	1.694	0.162	873.282	.016%	99.479%
60.0	1.659	0.158	873.441	.016%	99.497%
61.0	1.636	0.157	873.598	.016%	99.515%
62.0	1.607	0.156	873.754	.015%	99.533%
63.0	1.549	0.153	873.908	.015%	99.550%
64.0	1.537	0.151	874.059	.015%	99.568%
65.0	1.508	0.151	874.21	.015%	99.585%
66.0	1.473	0.149	874.359	.015%	99.602%
67.0	1.473	0.148	874.507	.015%	99.619%
68.0	1.433	0.147	874.654	.015%	99.635%
69.0	1.421	0.146	874.8	.014%	99.652%
70.0	1.386	0.144	874.944	.014%	99.668%
71.0	1.398	0.144	875.088	.014%	99.685%
72.0	1.380	0.144	875.232	.014%	99.701%
73.0	1.351	0.143	875.375	.014%	99.718%
74.0	1.357	0.142	875.517	.014%	99.734%
75.0	1.328	0.142	875.659	.014%	99.750%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	1.340	0.142	875.801	.014%	99.766%
77.0	1.322	0.142	875.943	.014%	99.782%
78.0	1.311	0.141	876.084	.014%	99.798%
79.0	1.299	0.140	876.224	.014%	99.814%
80.0	1.299	0.140	876.364	.014%	99.830%
81.0	1.305	0.141	876.505	.014%	99.846%
82.0	1.282	0.140	876.645	.014%	99.862%
83.0	1.328	0.142	876.787	.014%	99.878%
84.0	1.317	0.144	876.931	.014%	99.895%
85.0	1.340	0.145	877.076	.014%	99.911%
86.0	1.392	0.149	877.226	.015%	99.928%
87.0	1.444	0.155	877.381	.015%	99.946%
88.0	1.456	0.159	877.54	.016%	99.964%
89.0	1.439	0.159	877.698	.016%	99.982%
90.0	1.404	0.156	877.854	.015%	100.000%

Zonal flux distribution table

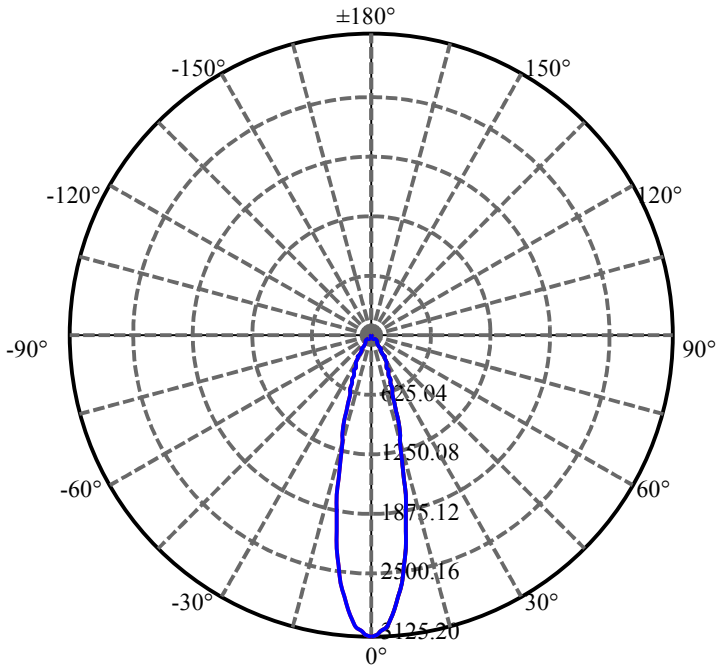
ZONAL LUMEN SUMMARY

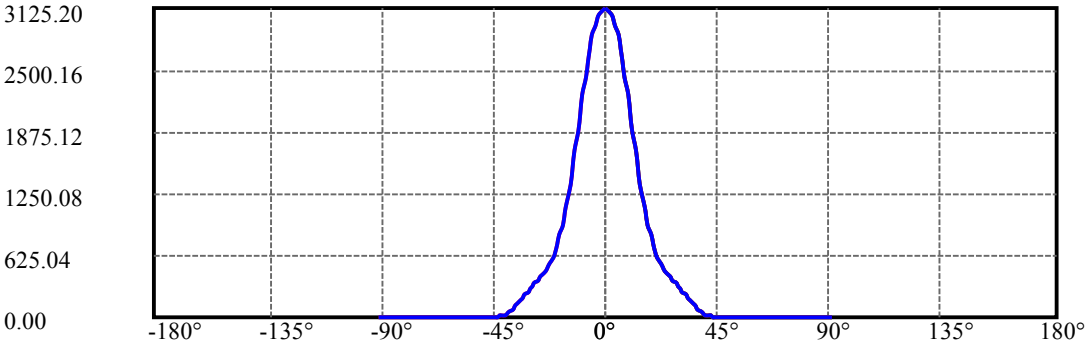
Zone	Lumens	%Lamp	%Fixt
0-30	778.27	76.98%	88.66%
0-40	866.45	85.70%	98.70%
0-60	873.44	86.39%	99.50%
0-90	877.70	86.81%	99.98%
0-120	877.70	86.81%	99.98%
0-180	877.85	86.83%	100.00%
60-90	4.42	0.44%	0.50%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-25.72	702.28	69.46%	80.00%

ZONAL LUMEN SUMMARY

0-10	246.17
10-20	332.44
20-30	199.66
30-40	88.18
40-50	5.27
50-60	1.72
60-70	1.50
70-80	1.42
80-90	1.33
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):

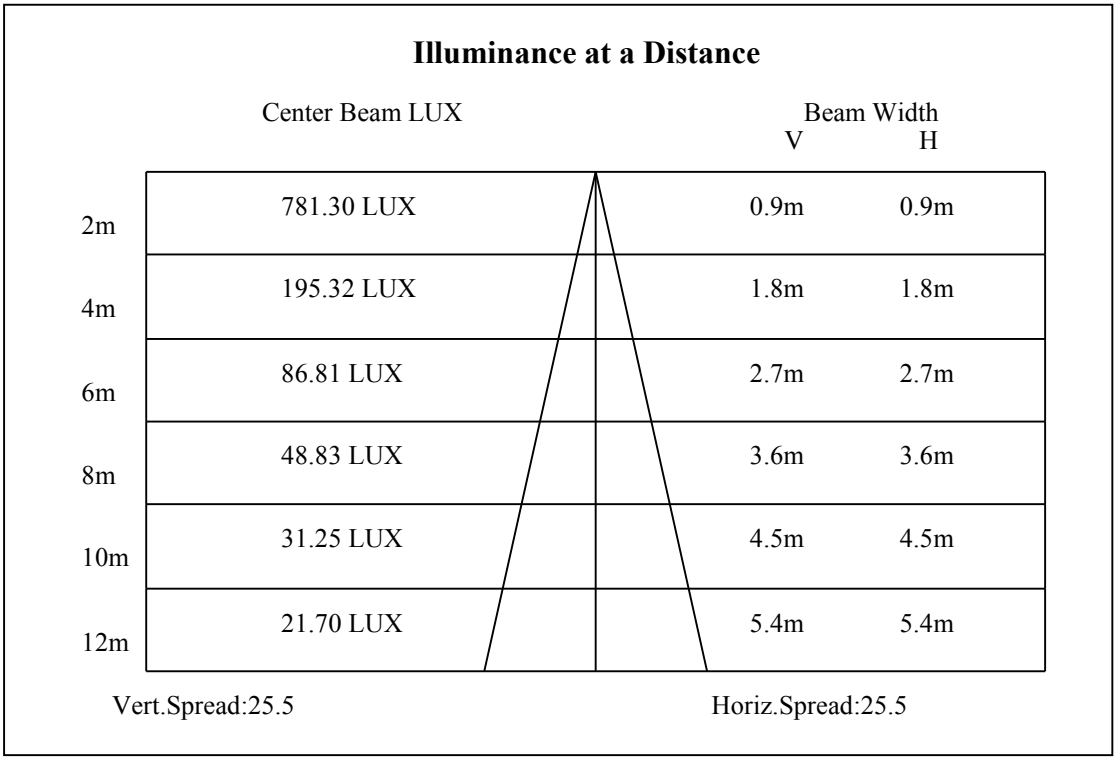
C0/C180:

C90/C270:

Field angle(10%Imax):C0/180Left:29.1 Right:29.1
:C90/270Left:29.1 Right:29.1

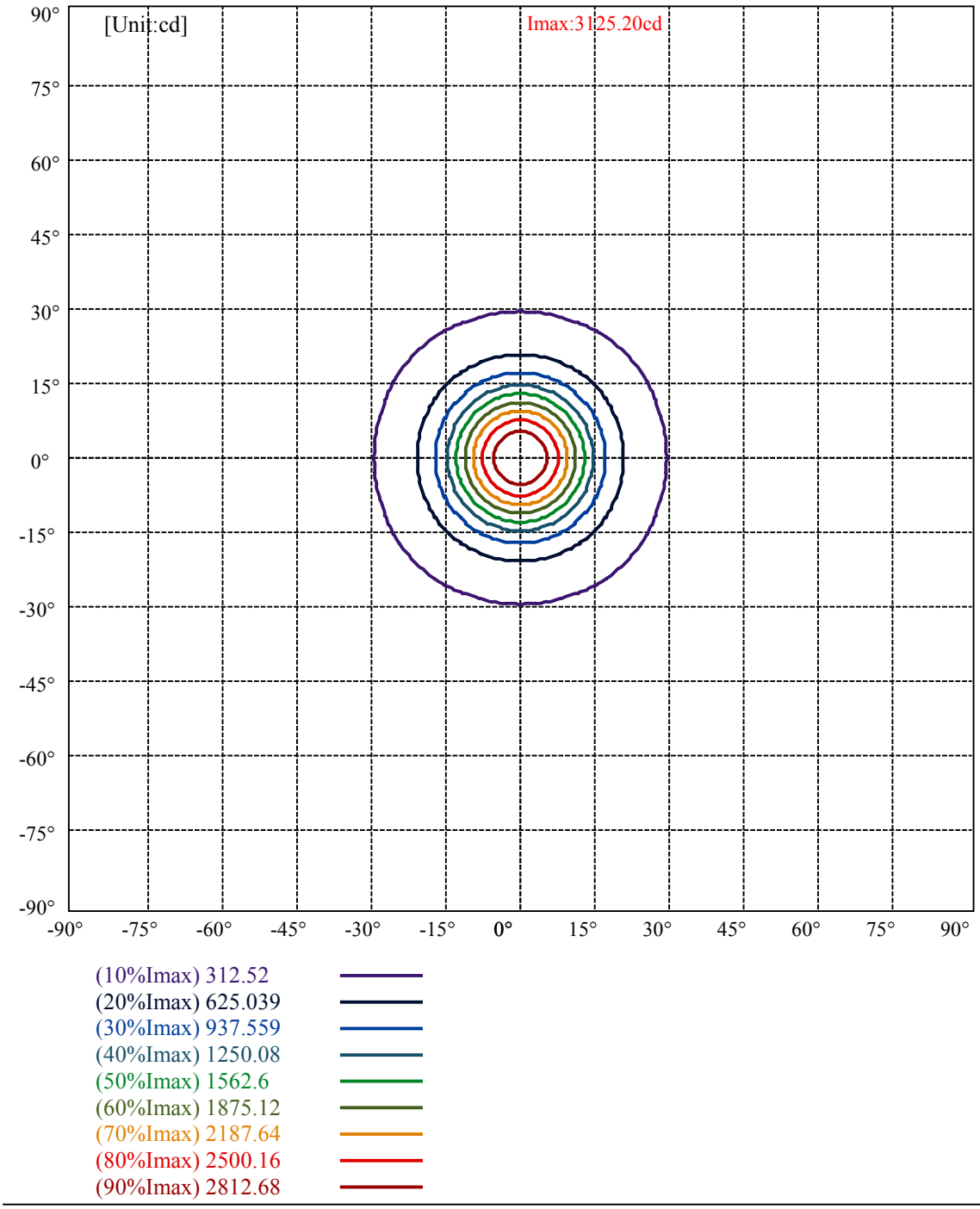
Beam Angle(50%Imax):C0/180Left:12.8 Right:12.8
:C90/270Left:12.8 Right:12.8

Lux distance Curve



Equipment: GMS 1800 Date: 2019/9/24 Operator: GC2019092410
Temperature(°C): 25.0 Humidity(%): 60.0% Distance(m): 6.81

ISO-Intensity(V-H)

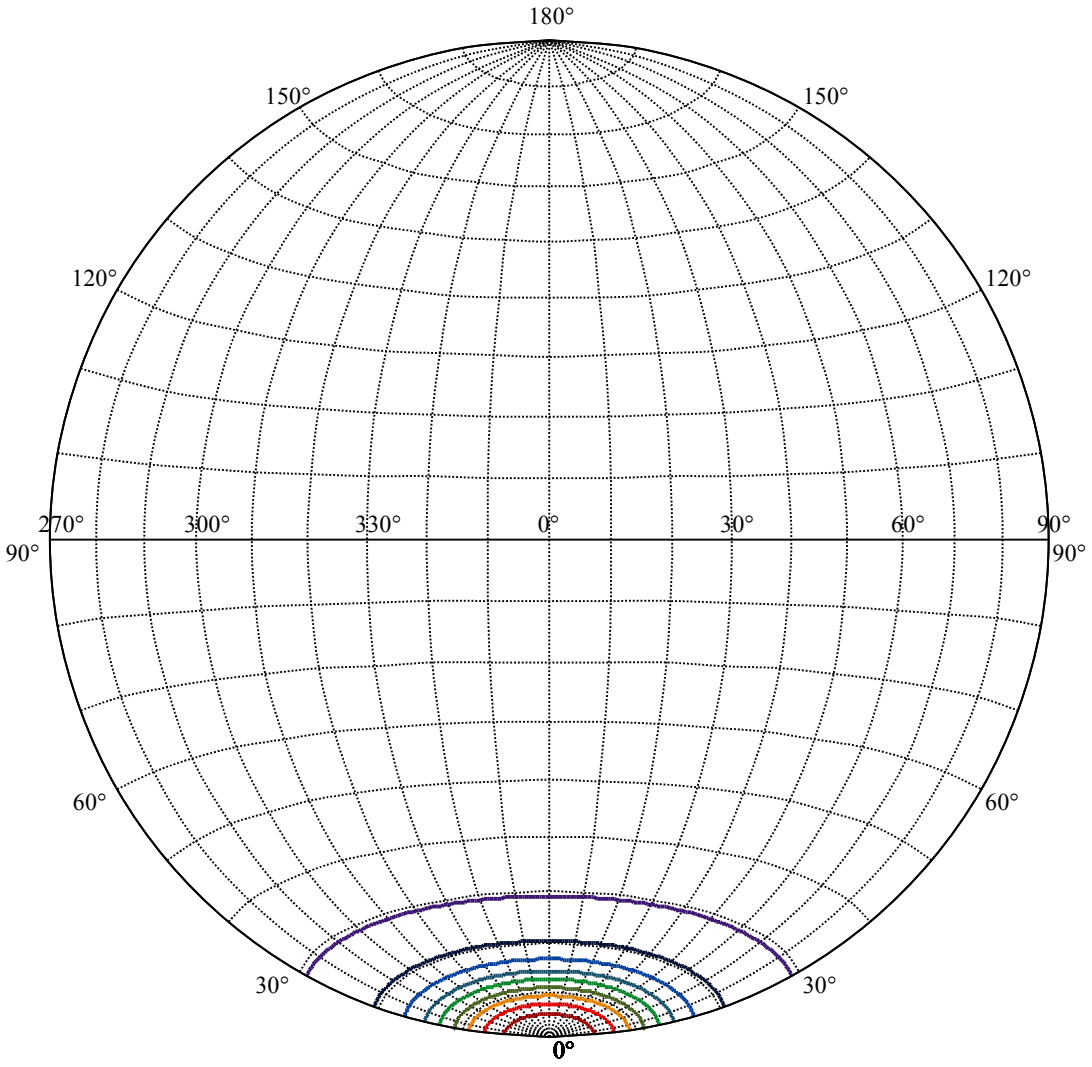


Equipment: GMS 1800
Temperature(°C): 25.0

Date: 2019/9/24
Humidity(%): 60.0%

Operator: GC2019092410
Distance(m): 6.81

ISO candela diagram on circular web



House [Unit:cd] Road

Imax:3125.20

(10%Imax) 312.52
(20%Imax) 625.039
(30%Imax) 937.559
(40%Imax) 1250.08
(50%Imax) 1562.6
(60%Imax) 1875.12
(70%Imax) 2187.64
(80%Imax) 2500.16
(90%Imax) 2812.68

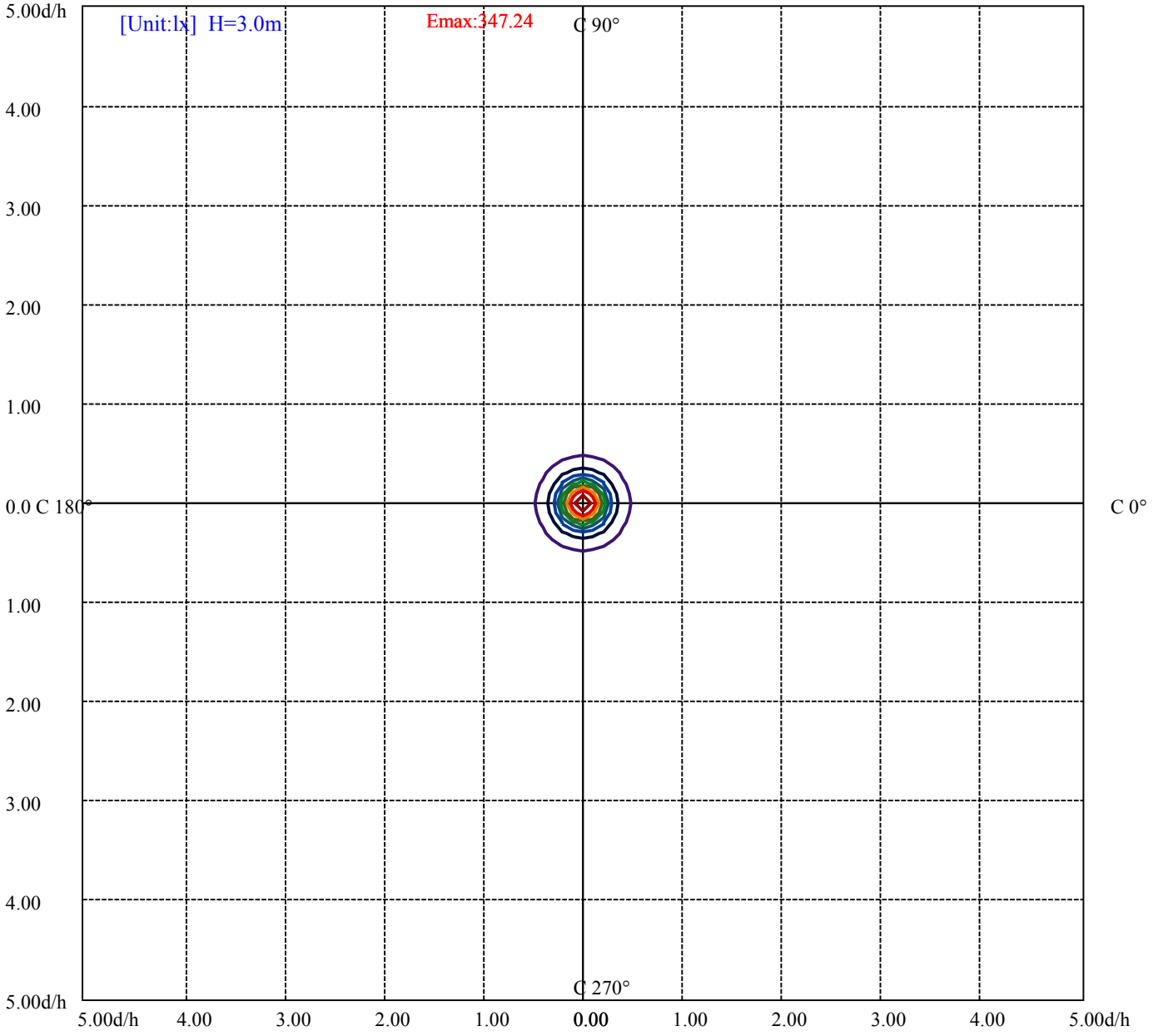
Equipment: GMS 1800
Temperature(°C): 25.0

Date: 2019/9/24
Humidity(%): 60.0%

Operator: GC2019092410
Distance(m): 6.81

Nata 1654-S

ISO illuminance diagram

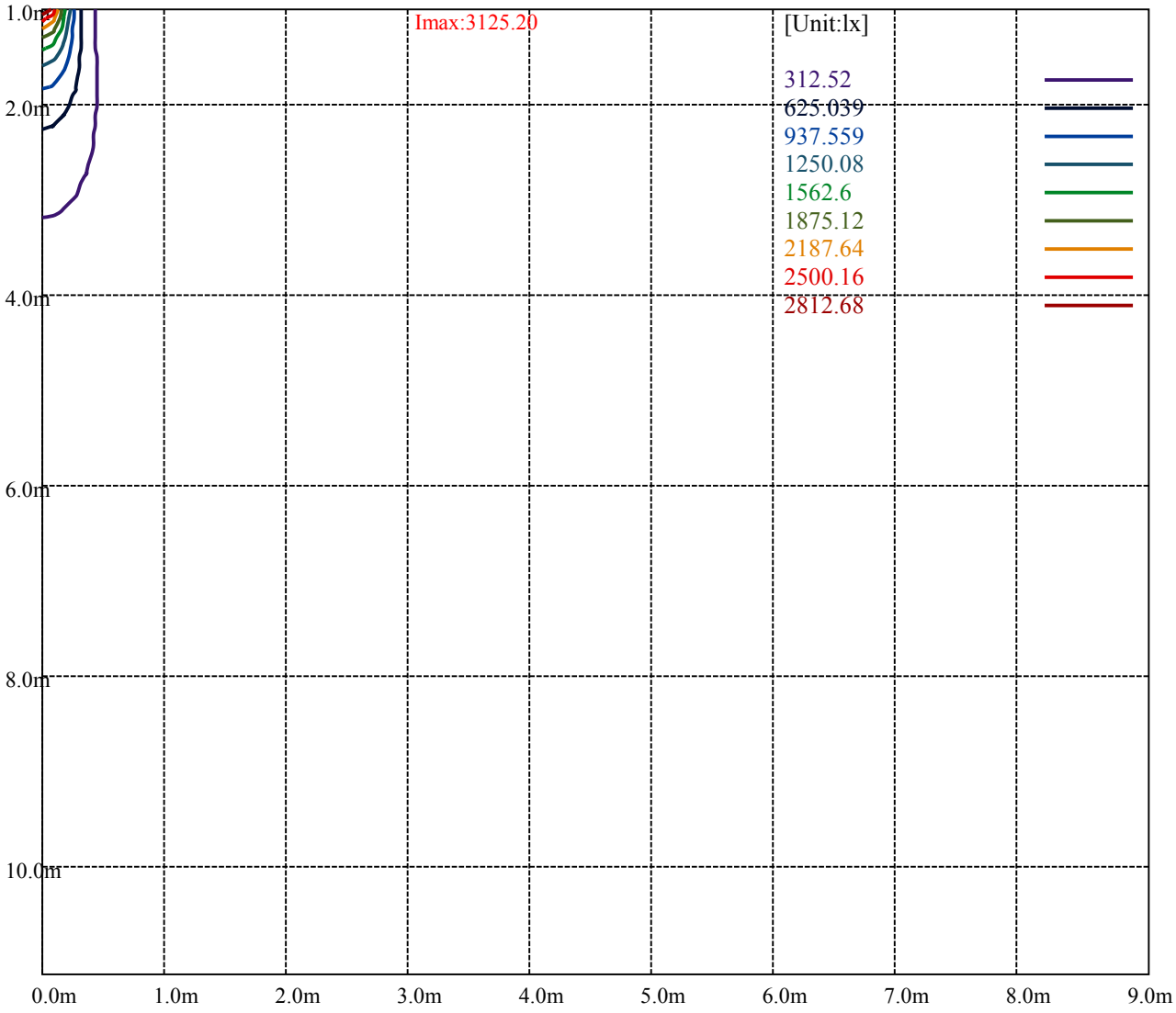


Equipment: GMS 1800
Temperature(°C): 25.0

Date: 2019/9/24
Humidity(%): 60.0%

Operator: GC2019092410
Distance(m): 6.81

Space ISO Lux diagram



Equipment: GMS 1800
Temperature(°C): 25.0

Date: 2019/9/24
Humidity(%): 60.0%

Operator: GC2019092410
Distance(m): 6.81

Nata 1654-S

Luminance Limitting Curve(no luminous side)

Luminance Table

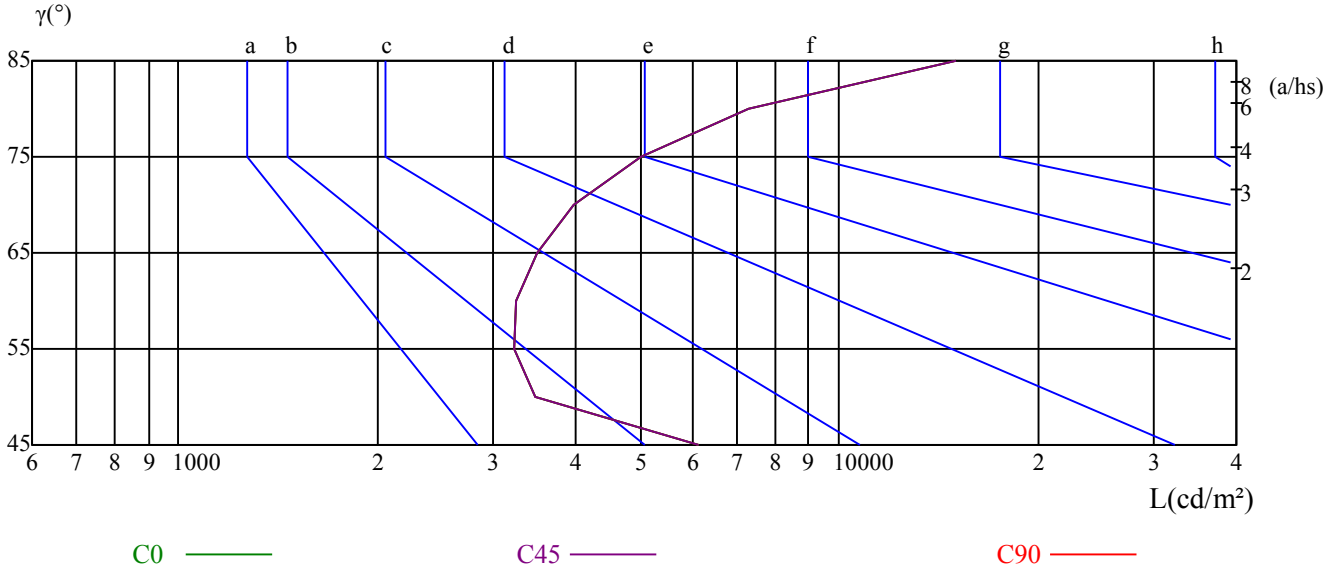
γ	45	50	55	60	65	70	75	80	85
C0	6136	3463	3219	3240	3485	3958	5012	7307	15013
C45	6136	3463	3219	3240	3485	3958	5012	7307	15013
C90	6136	3463	3219	3240	3485	3958	5012	7307	15013

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3485	3485	3485	5012	5012	5012	15013	15013	15013

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

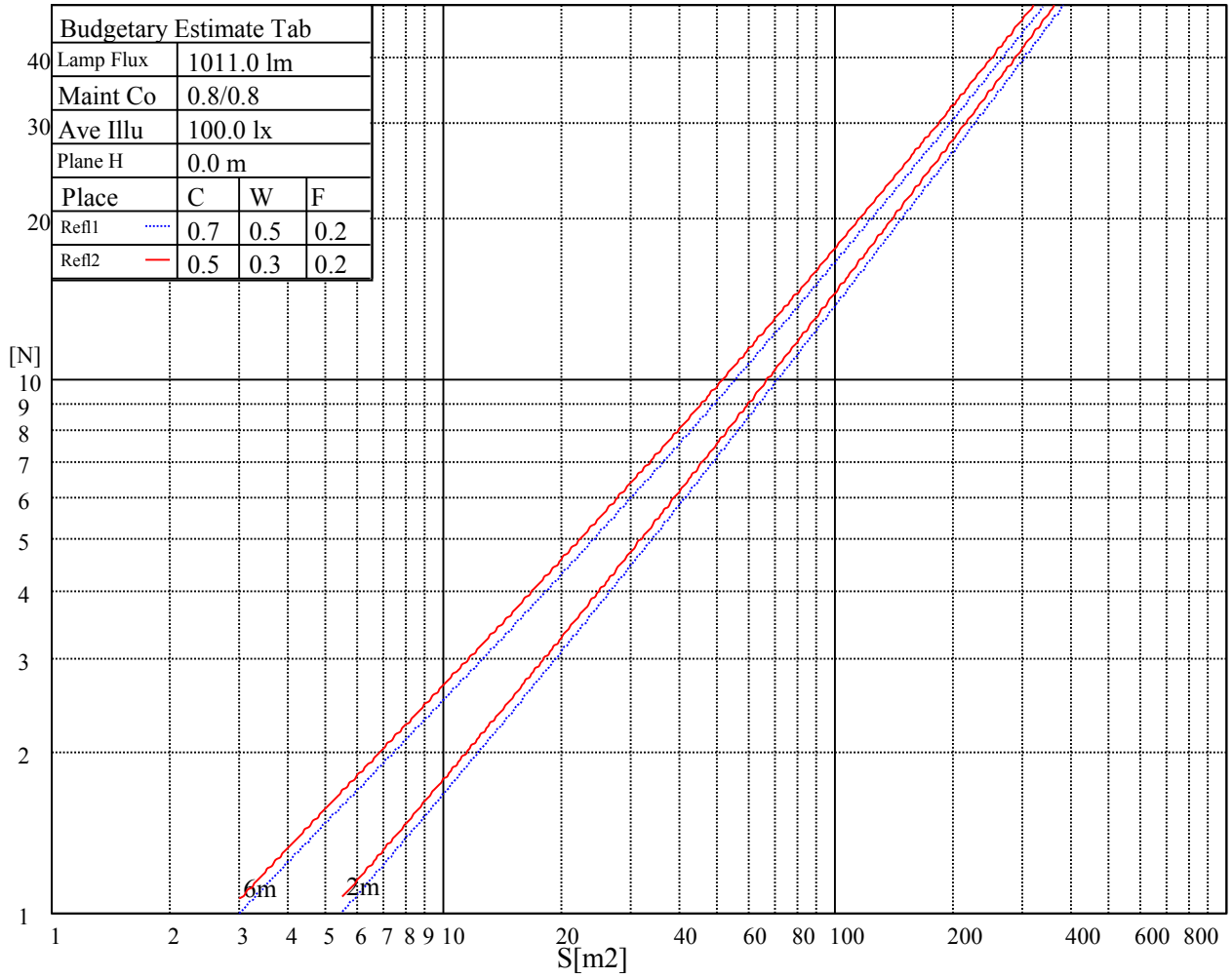


Equipment: GMS 1800
Temperature(°C): 25.0

Date: 2019/9/24
Humidity(%): 60.0%

Operator: GC2019092410
Distance(m): 6.81

Budgetary Estimate Table



Equipment: GMS 1800
Temperature(°C): 25.0

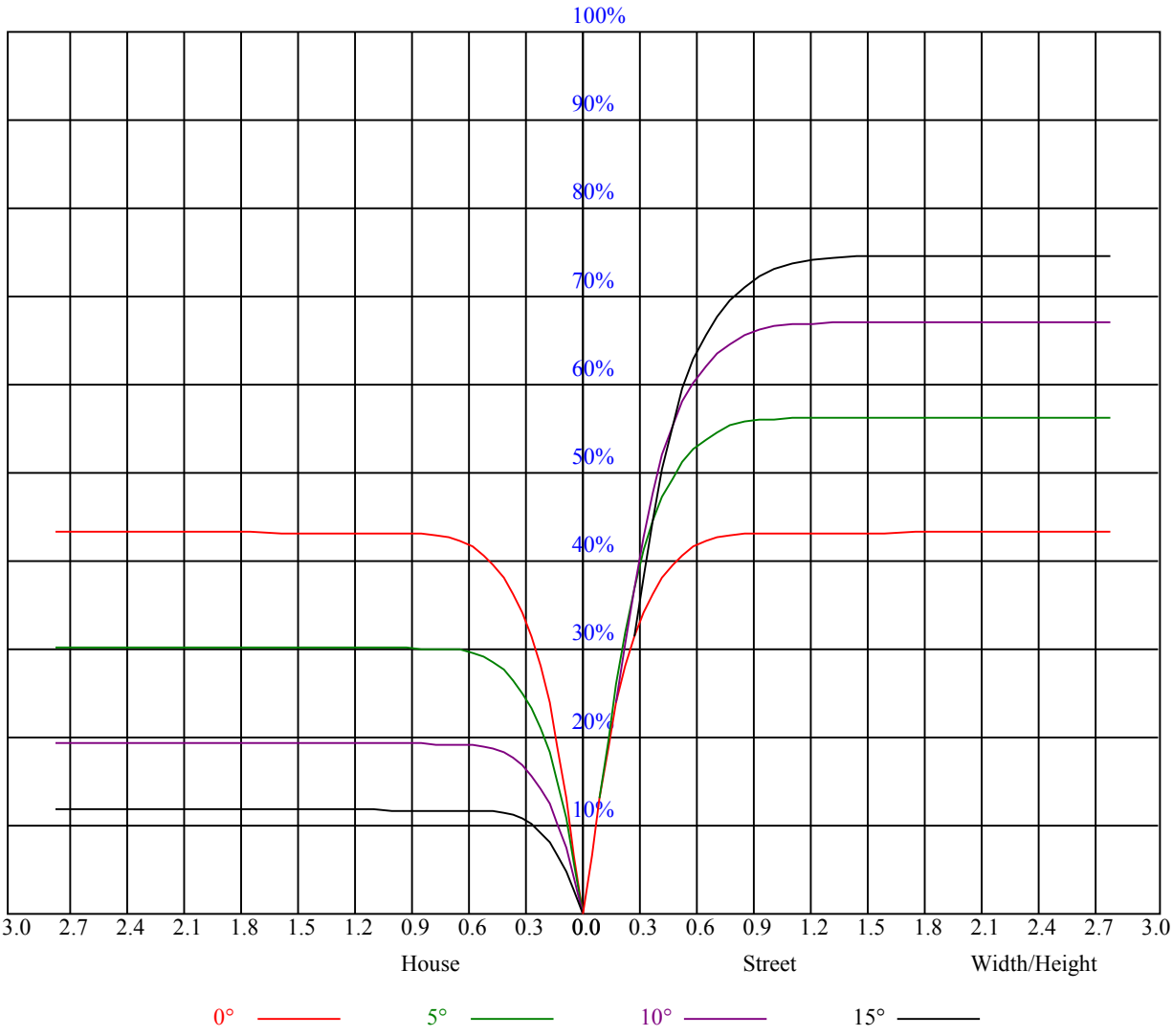
Date: 2019/9/24
Humidity(%): 60.0%

Operator: GC2019092410
Distance(m): 6.81

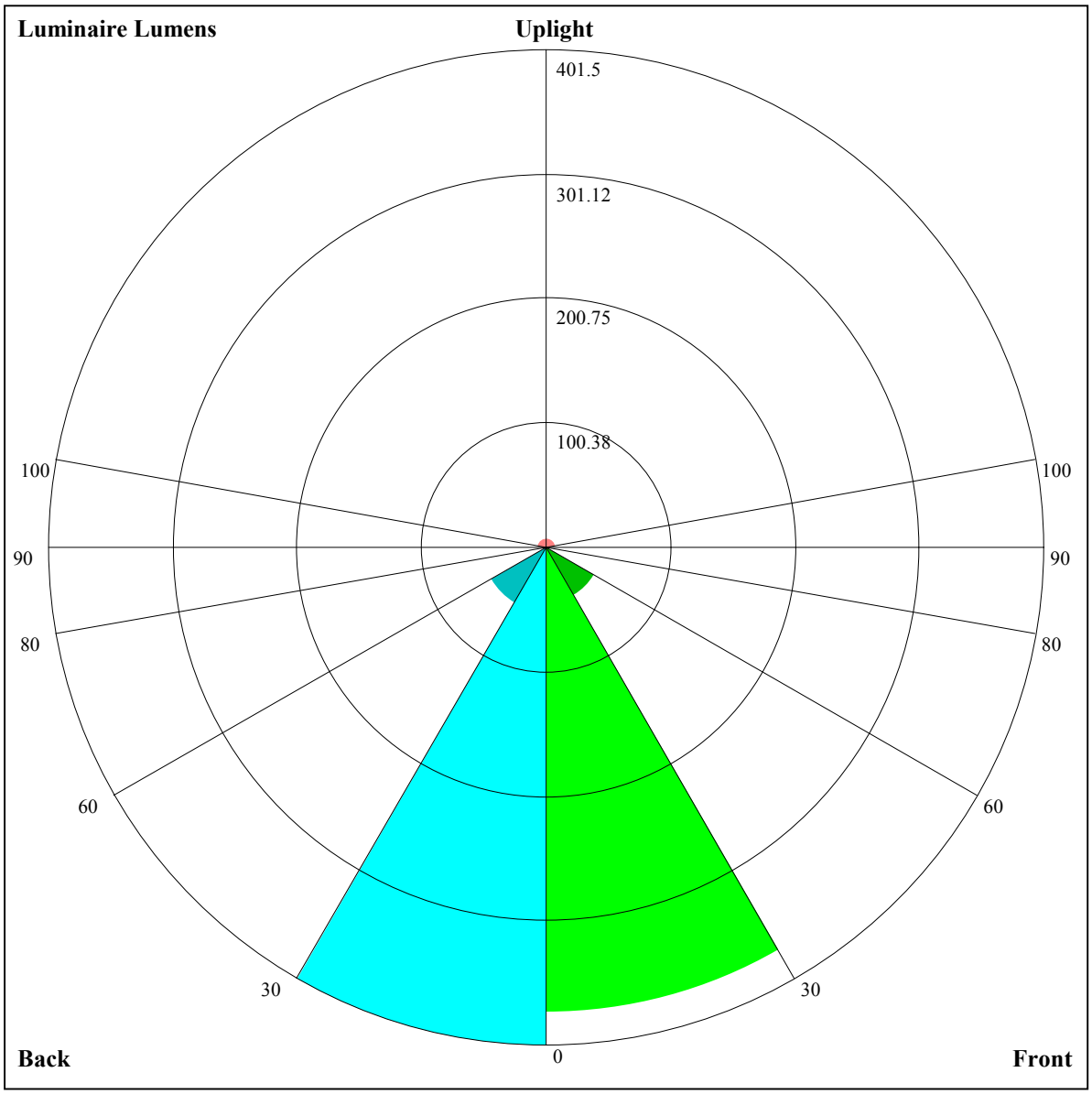
Utilization factor table for indoor luminaire

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	1.03	1.03	1.03	1.01	1.01	1.01	0.96	0.96	0.96	0.92	0.92	0.92	0.89	0.89	0.89	0.87
1	0.97	0.96	0.94	0.96	0.94	0.92	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.85	0.83
2	0.92	0.89	0.87	0.91	0.88	0.86	0.88	0.86	0.84	0.86	0.84	0.82	0.83	0.82	0.81	0.79
3	0.88	0.84	0.81	0.87	0.83	0.81	0.84	0.82	0.80	0.82	0.80	0.78	0.80	0.79	0.77	0.76
4	0.84	0.80	0.77	0.83	0.79	0.76	0.81	0.78	0.76	0.79	0.77	0.75	0.78	0.76	0.74	0.73
5	0.80	0.76	0.73	0.79	0.76	0.73	0.78	0.75	0.72	0.76	0.74	0.72	0.75	0.73	0.71	0.70
6	0.77	0.73	0.70	0.76	0.72	0.69	0.75	0.71	0.69	0.74	0.71	0.69	0.73	0.70	0.68	0.67
7	0.74	0.70	0.67	0.73	0.69	0.67	0.72	0.69	0.66	0.71	0.68	0.66	0.70	0.68	0.66	0.65
8	0.71	0.67	0.64	0.70	0.67	0.64	0.70	0.66	0.64	0.69	0.66	0.63	0.68	0.65	0.63	0.62
9	0.68	0.64	0.62	0.68	0.64	0.61	0.67	0.64	0.61	0.66	0.63	0.61	0.66	0.63	0.61	0.60
10	0.66	0.62	0.59	0.66	0.62	0.59	0.65	0.62	0.59	0.64	0.61	0.59	0.64	0.61	0.59	0.58

Coefficient Utilization Curve



Equipment: GMS 1800	Date: 2019/9/24	Operator: GC2019092410
Temperature(°C): 25.0	Humidity(%): 60.0%	Distance(m): 6.81



Luminaire Lumens:
FL=375.13,FM=44.07,FH=1.46,FVH=0.77
BL=401.5,BM=52.07,BH=1.46,BVH=0.73
UL=1.53,UH=7.29

BUG Rating:B1-U1-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	3127.63	3107.21	3021.37	2974.96	2887.26	2769.40	2617.20	2450.14	2268.71
45.0	3137.84	3137.38	3116.49	3072.41	3011.62	2960.12	2861.28	2738.31	2591.67
90.0	3134.59	3137.38	3119.28	3082.62	3018.12	2937.38	2835.75	2704.90	2549.45
135.0	3100.72	3132.74	3138.30	3124.85	3080.30	3013.02	2932.27	2832.97	2700.26
180.0	3127.63	3144.80	3131.81	3110.93	3058.49	2986.57	2900.26	2783.78	2633.90
225.0	3137.84	3112.78	3065.45	2993.06	2903.04	2784.71	2639.00	2473.34	2293.76
270.0	3134.59	3103.04	3050.14	2977.75	2875.20	2754.55	2603.74	2464.53	2279.38
315.0	3100.72	3040.39	2966.61	2871.49	2743.88	2582.86	2403.74	2219.98	2027.87
360.0	3127.63	3107.21	3021.37	2974.96	2887.26	2769.40	2617.20	2450.14	2268.71

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	2081.24	1894.69	1709.08	1532.28	1368.02	1213.49	901.43	901.43	834.42
45.0	2424.62	2246.90	2057.11	1870.57	1690.98	1516.97	1353.17	1197.72	1056.19
90.0	2377.29	2197.24	2010.24	1823.70	1638.55	1463.14	1365.23	1211.64	899.90
135.0	2605.13	2361.51	2175.44	2062.21	1871.03	1681.24	1499.80	1332.29	1178.69
180.0	2464.06	2283.55	2099.33	1910.01	1711.40	1524.86	1353.63	1194.93	1049.69
225.0	2103.51	1905.83	1710.47	1522.54	1345.74	1184.26	895.82	895.82	830.48
270.0	2053.86	1895.62	1700.73	1512.80	1338.32	1181.01	1040.87	917.90	811.18
315.0	1835.30	1720.22	1536.00	1305.84	1212.57	896.56	896.56	812.48	718.69
360.0	2081.24	1894.69	1709.08	1532.28	1368.02	1213.49	901.43	901.43	834.42

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	753.03	652.20	598.32	543.06	494.57	455.82	423.66	398.98	374.94
45.0	931.36	821.39	728.11	651.55	589.83	539.25	512.80	460.37	440.88
90.0	899.90	834.84	741.76	665.38	603.20	551.50	506.21	468.12	435.96
135.0	1035.77	912.34	803.29	710.48	633.92	573.59	524.87	484.03	451.55
180.0	920.69	810.71	715.12	636.70	583.80	531.36	487.28	450.16	419.07
225.0	732.34	653.17	589.60	536.61	491.04	453.82	422.08	396.38	371.55
270.0	719.76	644.12	583.34	531.83	484.03	445.52	413.96	387.51	361.53
315.0	641.43	576.98	524.22	480.00	444.64	415.03	389.51	373.55	331.13
360.0	753.03	652.20	598.32	543.06	494.57	455.82	423.66	398.98	374.94

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	346.96	314.94	285.10	252.90	220.93	190.07	160.65	130.95	105.15
45.0	413.04	378.23	361.06	330.44	298.42	265.47	241.34	241.34	163.90
90.0	409.60	386.86	360.32	330.25	298.23	271.97	240.14	201.99	177.59
135.0	424.17	399.58	373.13	343.43	318.37	280.79	254.80	235.78	235.78
180.0	394.47	369.42	341.58	310.48	281.71	249.70	243.20	231.14	159.86
225.0	343.66	314.34	295.17	251.13	219.95	202.13	158.00	140.23	111.14
270.0	331.83	299.81	282.18	238.10	238.10	232.06	158.98	130.49	102.69
315.0	311.83	281.76	235.87	217.49	187.93	156.52	128.21	102.92	76.70
360.0	346.96	314.94	285.10	252.90	220.93	190.07	160.65	130.95	105.15

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	90.39	55.78	36.38	25.57	14.99	8.45	6.87	5.38	3.53
45.0	132.99	105.75	79.77	56.61	36.43	21.48	15.64	7.93	7.15
90.0	147.10	118.70	90.90	66.45	44.41	27.19	16.33	9.88	8.12
135.0	159.81	132.34	105.94	78.05	55.87	34.85	19.68	11.23	8.72
180.0	130.16	103.85	88.26	62.32	41.76	18.47	12.95	8.54	7.29
225.0	85.71	61.76	40.83	23.48	12.71	8.26	7.10	5.52	3.67
270.0	77.12	54.20	34.11	19.40	10.44	7.15	6.08	5.10	3.34
315.0	54.01	35.17	19.30	10.58	7.01	6.08	4.78	3.29	2.64
360.0	90.39	55.78	36.38	25.57	14.99	8.45	6.87	5.38	3.53

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	2.83	2.69	2.55	2.41	2.32	2.27	2.13	2.04	2.00
45.0	5.61	3.76	2.92	2.74	2.60	2.46	2.32	2.32	2.23
90.0	5.85	3.71	2.97	2.74	2.60	2.41	2.37	2.32	2.23
135.0	7.84	4.83	3.25	2.88	2.60	2.60	2.46	2.32	2.27
180.0	5.61	3.67	2.83	2.64	2.51	2.37	2.27	2.23	2.13
225.0	2.74	2.51	2.32	2.27	2.18	2.09	1.95	1.95	1.90
270.0	2.64	2.46	2.27	2.13	2.09	2.04	1.95	1.86	1.86
315.0	2.41	2.32	2.23	2.09	2.09	2.00	1.90	1.86	1.76
360.0	2.83	2.69	2.55	2.41	2.32	2.27	2.13	2.04	2.00

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	2.00	1.90	1.81	1.81	1.76	1.72	1.67	1.58	1.58
45.0	2.13	2.04	2.00	1.95	1.90	1.81	1.76	1.81	1.72
90.0	2.18	2.00	1.95	1.90	1.90	1.81	1.76	1.72	1.72
135.0	2.23	2.09	2.00	1.95	1.95	1.86	1.76	1.72	1.72
180.0	2.04	1.95	1.90	1.90	1.86	1.72	1.72	1.67	1.67
225.0	1.76	1.76	1.72	1.67	1.62	1.58	1.53	1.58	1.53
270.0	1.81	1.72	1.67	1.67	1.62	1.53	1.53	1.53	1.48
315.0	1.72	1.67	1.67	1.62	1.53	1.53	1.53	1.48	1.44
360.0	2.00	1.90	1.81	1.81	1.76	1.72	1.67	1.58	1.58

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	1.53	1.58	1.48	1.44	1.48	1.48	1.48	1.39	1.39
45.0	1.62	1.62	1.62	1.58	1.58	1.58	1.53	1.48	1.53
90.0	1.67	1.62	1.53	1.58	1.58	1.48	1.48	1.48	1.48
135.0	1.72	1.62	1.58	1.58	1.53	1.48	1.48	1.44	1.48
180.0	1.62	1.53	1.53	1.48	1.53	1.44	1.39	1.39	1.44
225.0	1.44	1.44	1.48	1.39	1.35	1.35	1.35	1.30	1.30
270.0	1.39	1.48	1.44	1.39	1.44	1.30	1.35	1.30	1.30
315.0	1.39	1.39	1.39	1.35	1.30	1.35	1.30	1.30	1.25
360.0	1.53	1.58	1.48	1.44	1.48	1.48	1.48	1.39	1.39

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	1.39	1.39	1.35	1.35	1.35	1.35	1.30	1.30	1.35
45.0	1.53	1.48	1.48	1.44	1.48	1.48	1.39	1.44	1.48
90.0	1.44	1.39	1.44	1.39	1.44	1.39	1.44	1.39	1.35
135.0	1.44	1.39	1.35	1.35	1.39	1.35	1.30	1.30	1.35
180.0	1.39	1.30	1.35	1.39	1.35	1.30	1.25	1.30	1.30
225.0	1.35	1.30	1.30	1.25	1.30	1.25	1.30	1.25	1.16
270.0	1.25	1.25	1.30	1.25	1.21	1.21	1.25	1.21	1.21
315.0	1.25	1.30	1.30	1.21	1.21	1.25	1.25	1.21	1.21
360.0	1.39	1.39	1.35	1.35	1.35	1.35	1.30	1.30	1.35

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	1.39	1.30	1.39	1.39	1.48	1.53	1.53	1.44	1.35
45.0	1.44	1.39	1.58	1.58	1.48	1.62	1.76	1.90	1.90
90.0	1.39	1.35	1.39	1.39	1.48	1.58	1.72	1.90	1.95
135.0	1.30	1.25	1.30	1.30	1.30	1.35	1.53	1.53	1.62
180.0	1.25	1.25	1.30	1.25	1.21	1.30	1.25	1.30	1.25
225.0	1.21	1.21	1.25	1.21	1.25	1.25	1.21	1.21	1.16
270.0	1.21	1.25	1.25	1.21	1.25	1.30	1.30	1.16	1.11
315.0	1.25	1.25	1.16	1.21	1.25	1.21	1.25	1.21	1.16
360.0	1.39	1.30	1.39	1.39	1.48	1.53	1.53	1.44	1.35

Intensity data(cd)

C/γ(°)	90.0
0.0	1.30
45.0	1.72
90.0	1.86
135.0	1.58
180.0	1.21
225.0	1.16
270.0	1.21
315.0	1.21
360.0	1.30