
NATA

Client:

LumCAT: 2-1299-N

Luminaire: 92.70.065.00+92.70.059.00

Report No: nata-0100

Voltage(V): 36.2000

Test No: GC2018112103

Current(A): 0.5000

LampCAT: OSRAM SOLERIQ S13

Power (W): 18.1000

Lamp flux(lm): 1781.0

PF: 0.0000

Number of Lamps: 1

Ballast type: DC

Length(mm): 70

Width(mm): 70

Phm Type: C

Height(mm): 0

Photometric Results

Lumens(lm): 1356.86, Efficiency(%): 76.19% , Luminous Efficacy(lm/W): 74.96

Central intensity(cd): 6594.609, Maximum intensity(cd): 6594.609

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=20.6

[C90/270]Total=20.6

Field angle(10%Imax): [C0/180]Total=41.4

[C90/270]Total=41.4

Maximum s/h(1/2): C0_180=0.35 C90_270=0.35

Maximum s/h(1/4): C0_180=0.36 C90_270=0.36

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 76.27%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 97.659%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6594.609	1.578	1.578	.089%	.116%
1.0	6548.484	12.533	14.111	.704%	1.040%
2.0	6399.914	24.493	38.604	1.375%	2.845%
3.0	6166.758	35.392	73.996	1.987%	5.453%
4.0	5879.883	44.978	118.974	2.525%	8.768%
5.0	5506.664	52.630	171.605	2.955%	12.647%
6.0	5114.250	58.623	230.228	3.292%	16.968%
7.0	4704.398	62.871	293.099	3.530%	21.601%
8.0	4281.820	65.348	358.447	3.669%	26.417%
9.0	3834.211	65.775	424.222	3.693%	31.265%
10.0	3414.023	65.011	489.233	3.650%	36.056%
11.0	2999.320	62.759	551.992	3.524%	40.682%
12.0	2613.023	59.576	611.568	3.345%	45.072%
13.0	2239.945	55.256	666.824	3.103%	49.145%
14.0	1891.336	50.176	717	2.817%	52.843%
15.0	1588.057	45.073	762.073	2.531%	56.164%
16.0	1339.130	40.477	802.55	2.273%	59.148%
17.0	1121.351	35.952	838.503	2.019%	61.797%
18.0	956.841	32.425	870.927	1.821%	64.187%
19.0	830.208	29.640	900.567	1.664%	66.371%
20.0	719.332	26.979	927.547	1.515%	68.360%
21.0	630.886	24.793	952.34	1.392%	70.187%
22.0	570.516	23.437	975.777	1.316%	71.914%
23.0	518.477	22.216	997.992	1.247%	73.552%
24.0	472.380	21.070	1019.062	1.183%	75.104%
25.0	434.552	20.139	1039.201	1.131%	76.589%
26.0	400.950	19.275	1058.476	1.082%	78.009%
27.0	367.763	18.309	1076.785	1.028%	79.359%
28.0	338.702	17.437	1094.222	.979%	80.644%
29.0	309.783	16.469	1110.691	.925%	81.857%
30.0	288.984	15.845	1126.537	.890%	83.025%
31.0	260.986	14.740	1141.277	.828%	84.112%
32.0	240.391	13.969	1155.246	.784%	85.141%
33.0	219.122	13.087	1168.334	.735%	86.106%
34.0	201.853	12.378	1180.712	.695%	87.018%
35.0	185.168	11.647	1192.358	.654%	87.876%
36.0	169.608	10.932	1203.291	.614%	88.682%
37.0	156.881	10.353	1213.644	.581%	89.445%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	144.246	9.739	1223.383	.547%	90.163%
39.0	131.688	9.088	1232.471	.510%	90.833%
40.0	120.860	8.519	1240.99	.478%	91.460%
41.0	110.672	7.962	1248.952	.447%	92.047%
42.0	100.512	7.375	1256.328	.414%	92.591%
43.0	91.821	6.867	1263.195	.386%	93.097%
44.0	84.192	6.413	1269.608	.360%	93.570%
45.0	76.894	5.962	1275.571	.335%	94.009%
46.0	70.713	5.578	1281.149	.313%	94.420%
47.0	64.505	5.173	1286.322	.290%	94.801%
48.0	58.901	4.800	1291.122	.270%	95.155%
49.0	53.733	4.447	1295.569	.250%	95.483%
50.0	48.748	4.095	1299.664	.230%	95.785%
51.0	44.290	3.774	1303.439	.212%	96.063%
52.0	40.444	3.495	1306.934	.196%	96.320%
53.0	36.640	3.209	1310.143	.180%	96.557%
54.0	33.223	2.947	1313.09	.165%	96.774%
55.0	30.424	2.733	1315.823	.153%	96.976%
56.0	27.689	2.517	1318.34	.141%	97.161%
57.0	25.165	2.314	1320.655	.130%	97.332%
58.0	22.999	2.139	1322.794	.120%	97.489%
59.0	21.059	1.979	1324.773	.111%	97.635%
60.0	19.132	1.817	1326.59	.102%	97.769%
61.0	17.550	1.683	1328.273	.095%	97.893%
62.0	16.158	1.564	1329.838	.088%	98.008%
63.0	14.998	1.465	1331.303	.082%	98.116%
64.0	14.041	1.384	1332.687	.078%	98.218%
65.0	13.345	1.326	1334.014	.074%	98.316%
66.0	12.797	1.282	1335.296	.072%	98.411%
67.0	12.347	1.246	1336.542	.070%	98.503%
68.0	11.960	1.216	1337.758	.068%	98.592%
69.0	11.595	1.187	1338.945	.067%	98.680%
70.0	11.250	1.159	1340.104	.065%	98.765%
71.0	10.913	1.131	1341.236	.064%	98.848%
72.0	10.610	1.107	1342.342	.062%	98.930%
73.0	10.273	1.077	1343.42	.060%	99.009%
74.0	10.005	1.055	1344.474	.059%	99.087%
75.0	9.668	1.024	1345.498	.057%	99.163%

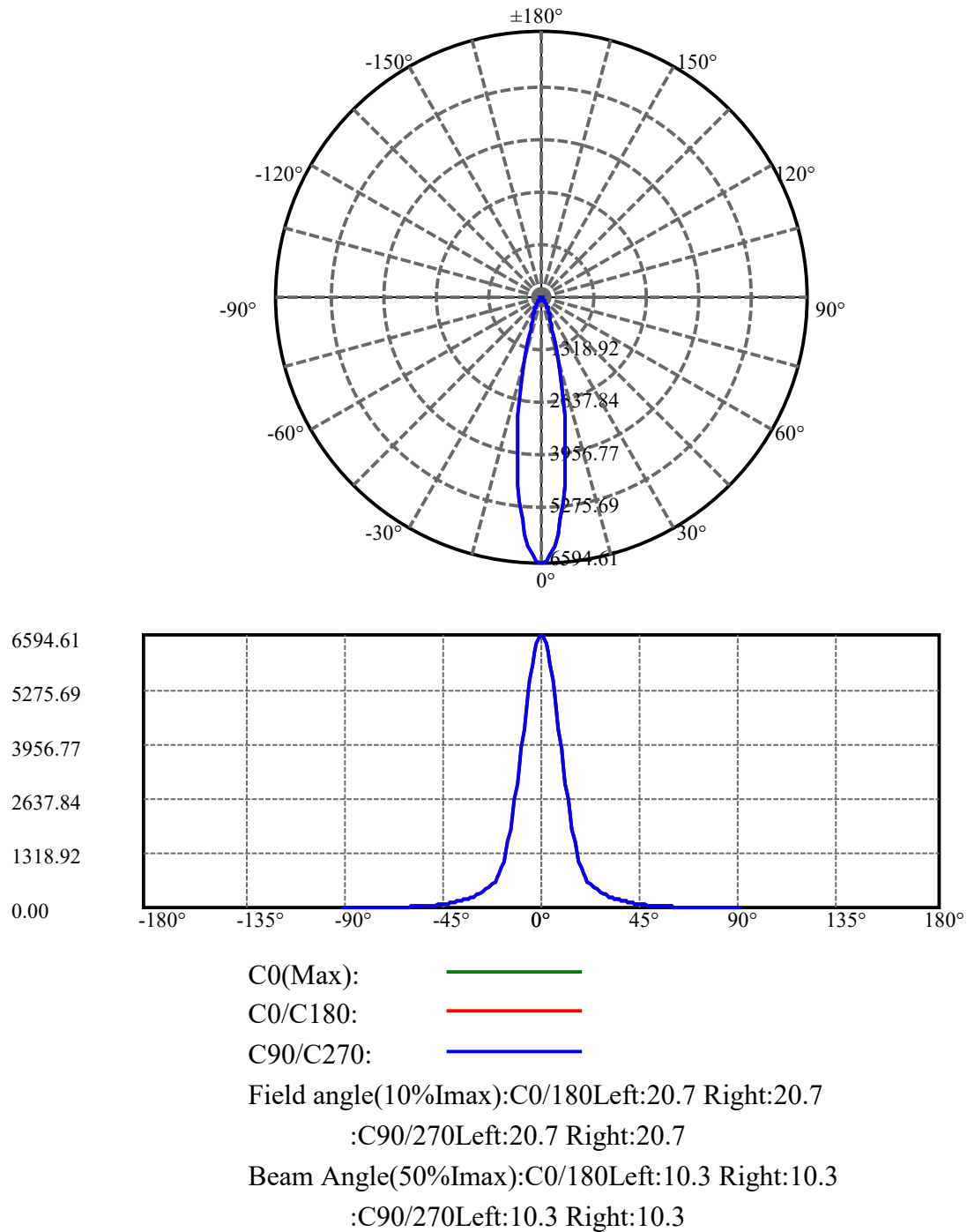
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	9.345	0.994	1346.493	.056%	99.236%
77.0	9.035	0.965	1347.458	.054%	99.307%
78.0	8.712	0.934	1348.393	.052%	99.376%
79.0	8.388	0.903	1349.295	.051%	99.442%
80.0	8.065	0.871	1350.166	.049%	99.507%
81.0	7.720	0.836	1351.003	.047%	99.568%
82.0	7.397	0.803	1351.806	.045%	99.627%
83.0	7.059	0.768	1352.574	.043%	99.684%
84.0	6.736	0.735	1353.309	.041%	99.738%
85.0	6.462	0.706	1354.015	.040%	99.790%
86.0	6.138	0.671	1354.686	.038%	99.840%
87.0	5.892	0.645	1355.332	.036%	99.887%
88.0	5.667	0.621	1355.953	.035%	99.933%
89.0	5.548	0.608	1356.561	.034%	99.978%
90.0	5.463	0.300	1356.86	.017%	100.000%

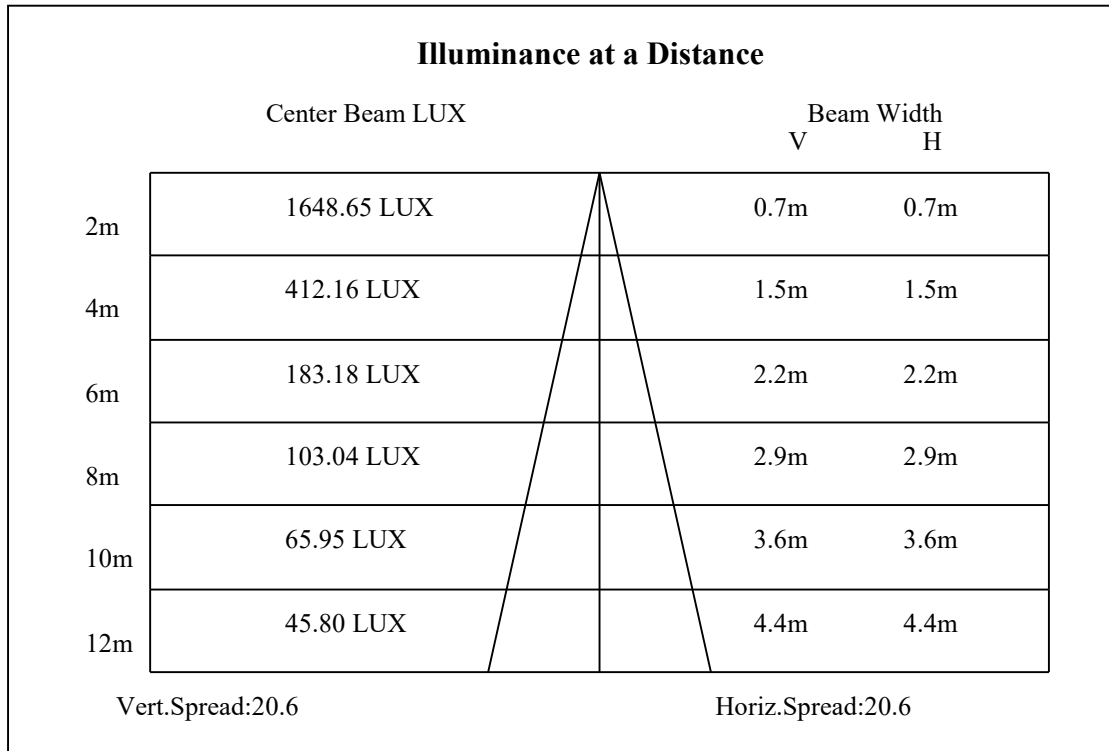
ZONAL LUMEN SUMMARY

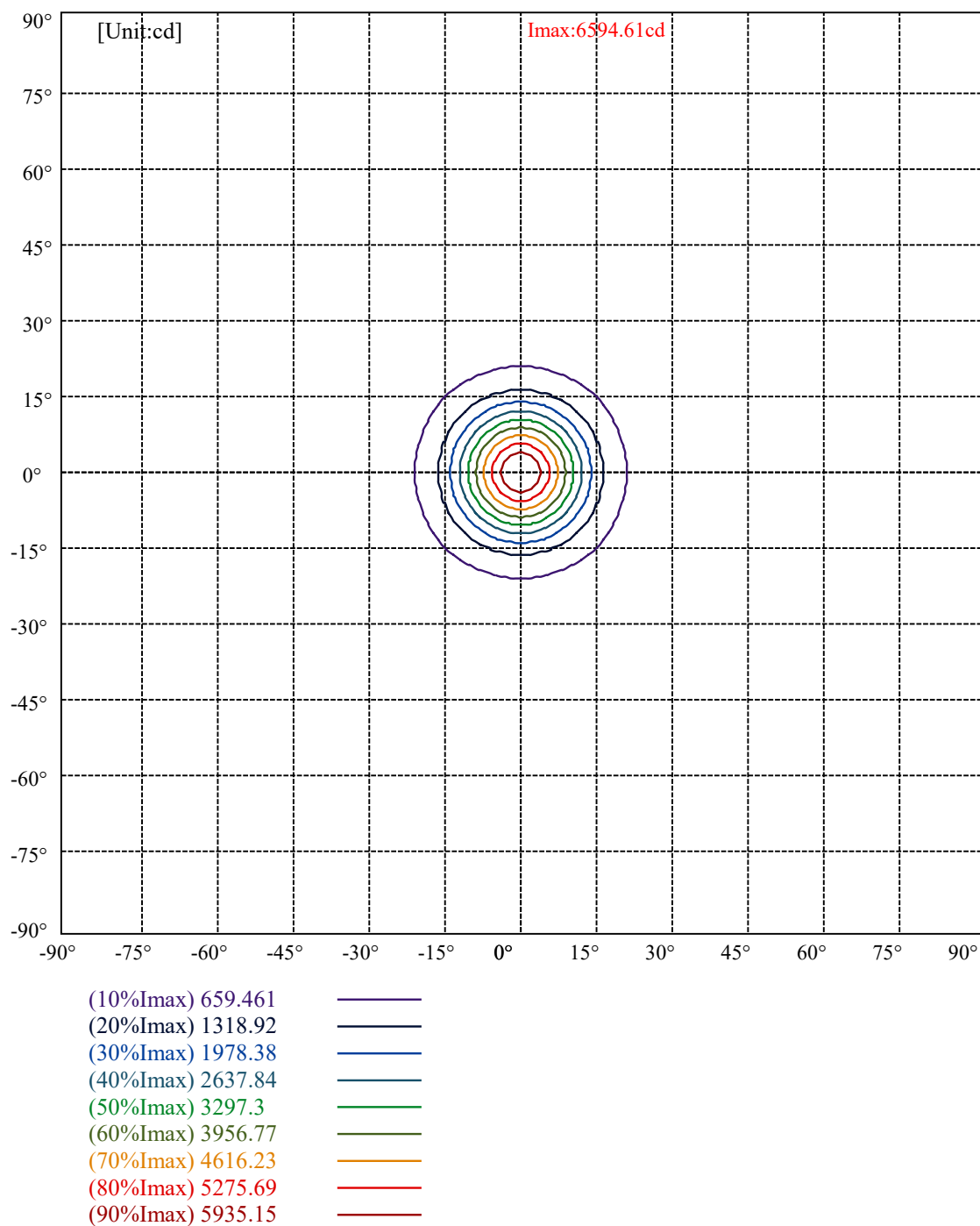
Zone	Lumens	%Lamp	%Fixt
0-30	1126.54	63.25%	83.03%
0-40	1240.99	69.68%	91.46%
0-60	1326.59	74.49%	97.77%
0-90	1356.56	76.17%	99.98%
0-120	1356.56	76.17%	99.98%
0-180	1356.86	76.19%	100.00%
60-90	31.79	1.78%	2.34%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-27.50	1085.49	60.95%	80.00%

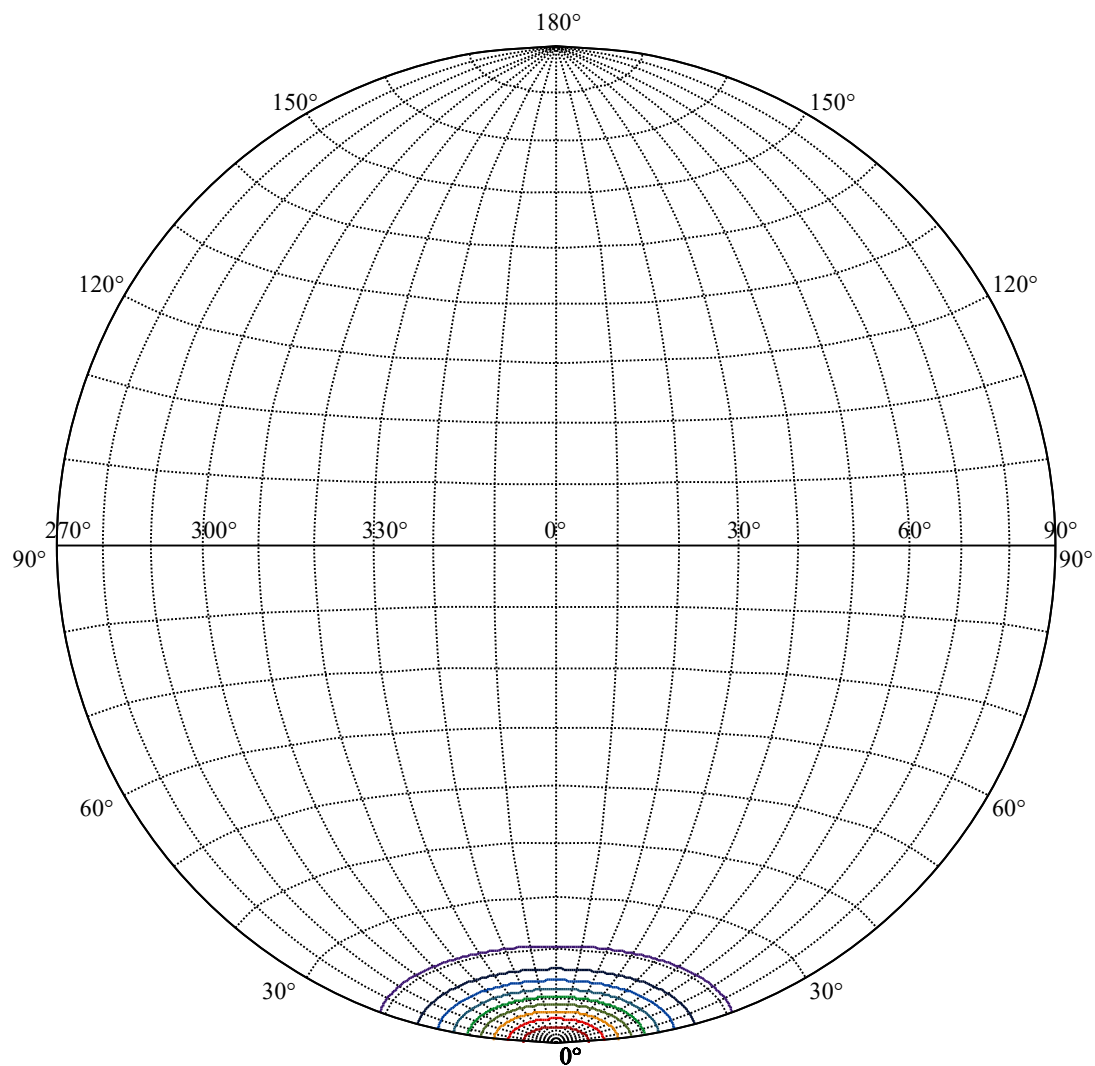
ZONAL LUMEN SUMMARY

0-10	489.23
10-20	438.31
20-30	198.99
30-40	114.45
40-50	58.67
50-60	26.93
60-70	13.51
70-80	10.06
80-90	6.39
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









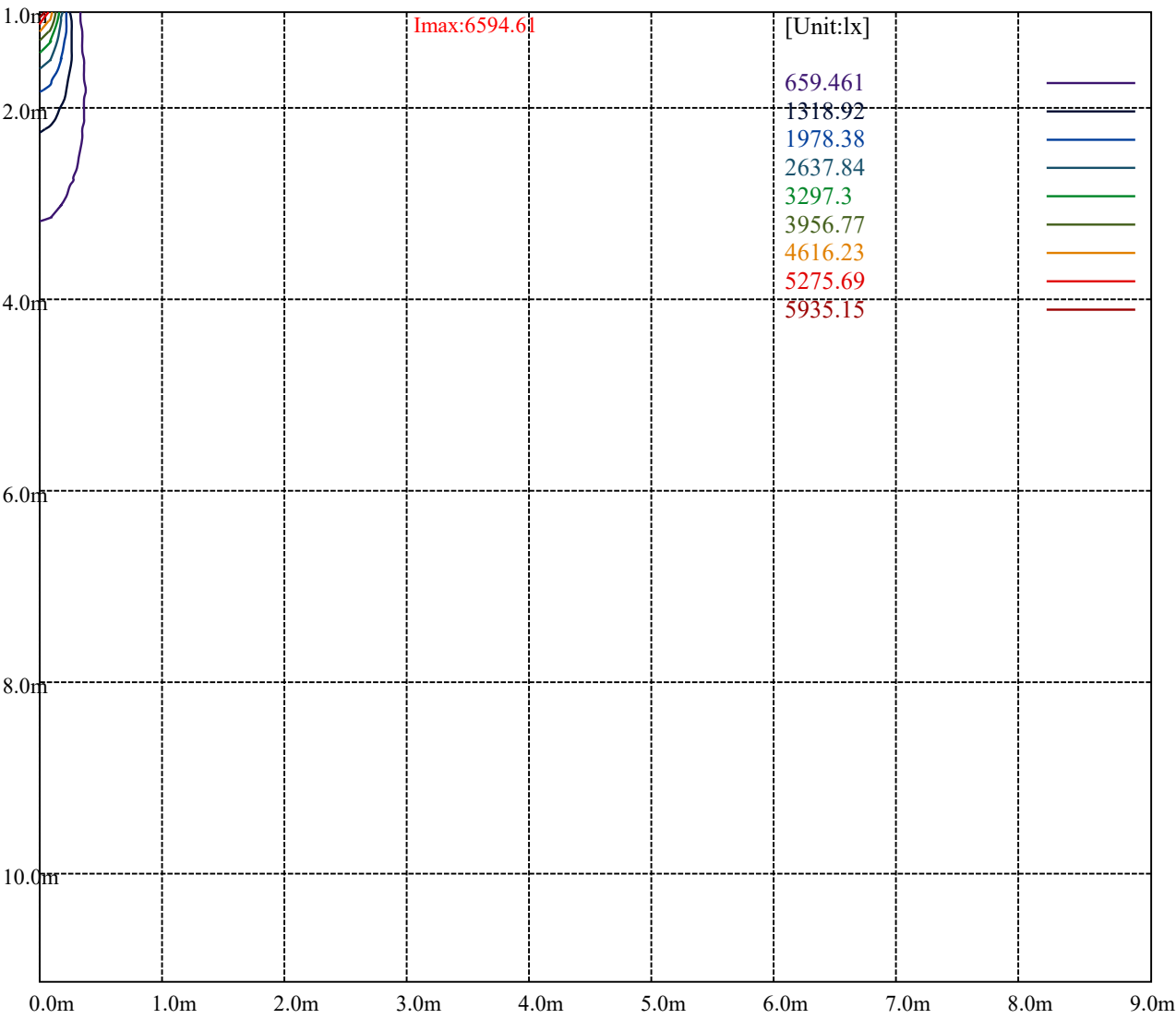
House

[Unit:cd]

Road

Imax:6594.61

(10%Imax)	659.461	—
(20%Imax)	1318.92	—
(30%Imax)	1978.38	—
(40%Imax)	2637.84	—
(50%Imax)	3297.3	—
(60%Imax)	3956.77	—
(70%Imax)	4616.23	—
(80%Imax)	5275.69	—
(90%Imax)	5935.15	—



Luminance Table

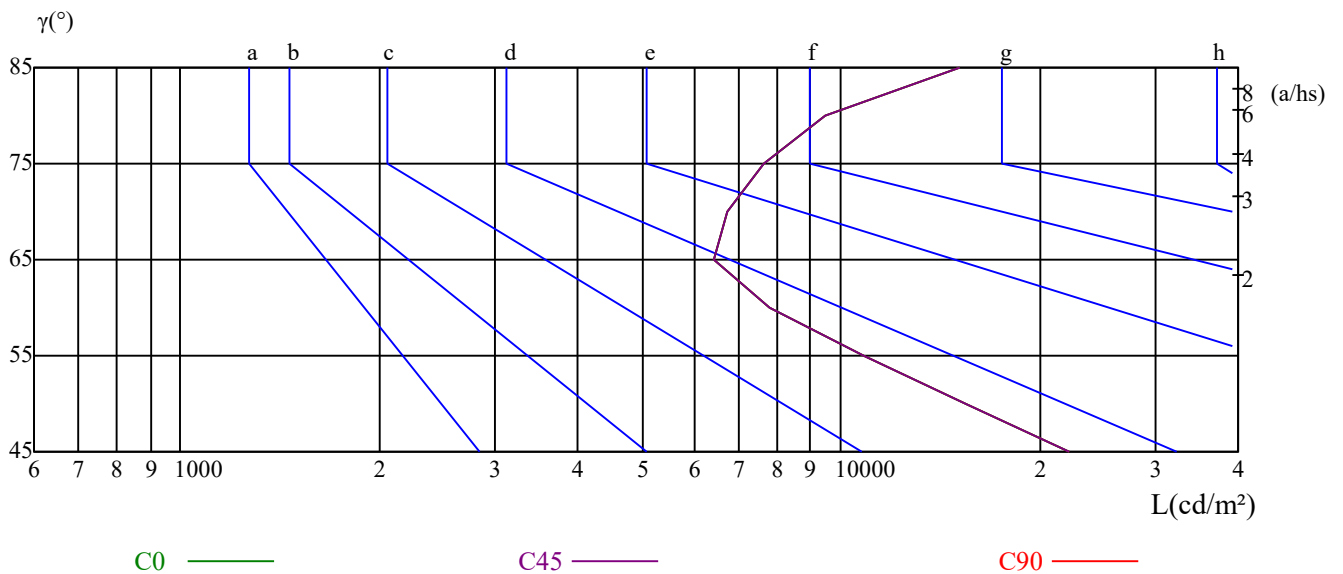
γ	45	50	55	60	65	70	75	80	85
C0	22193	15477	10825	7809	6444	6713	7623	9478	15131
C45	22193	15477	10825	7809	6444	6713	7623	9478	15131
C90	22193	15477	10825	7809	6444	6713	7623	9478	15131

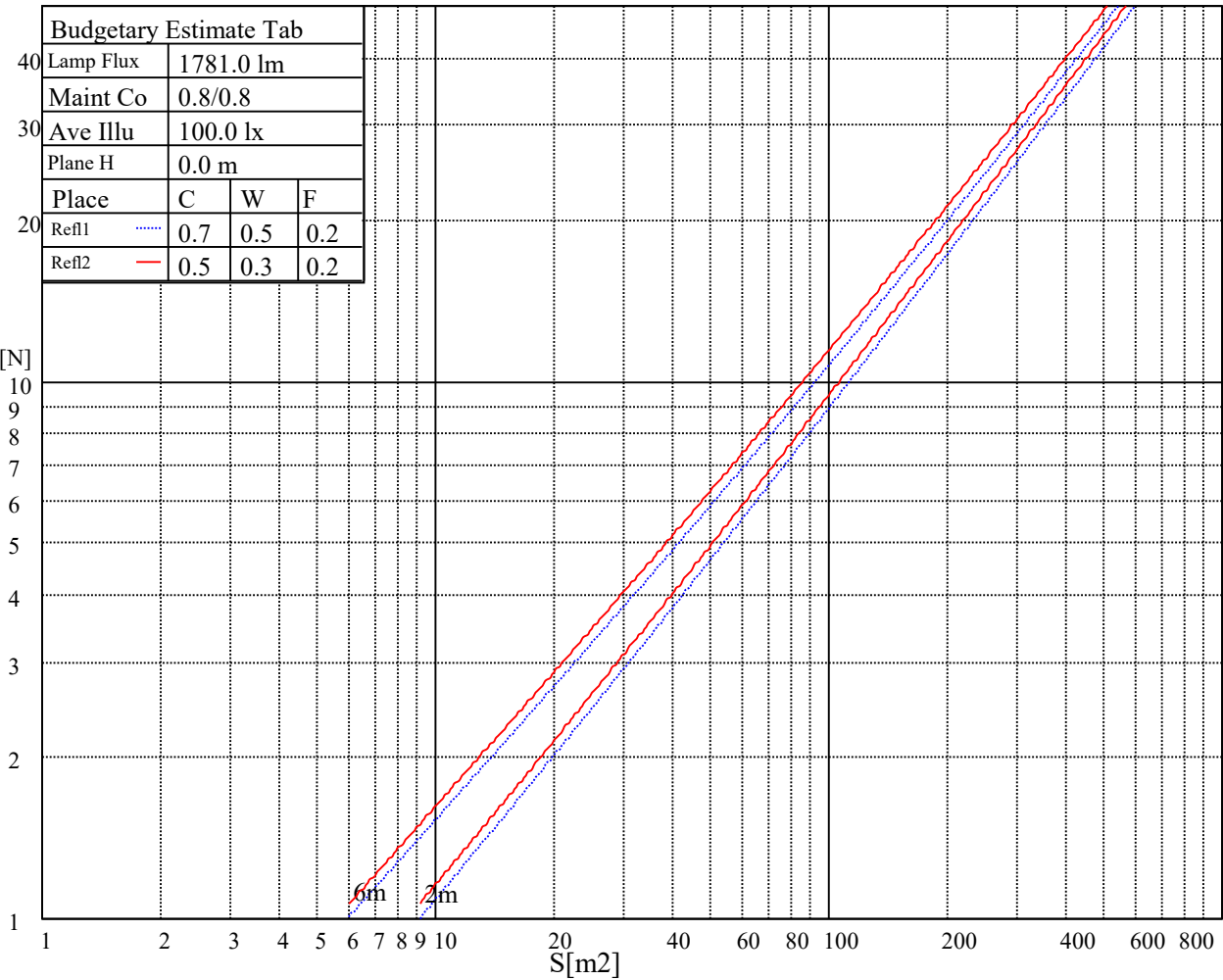
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
6444	6444	6444	7623	7623	7623	15131	15131	15131

Glare Table

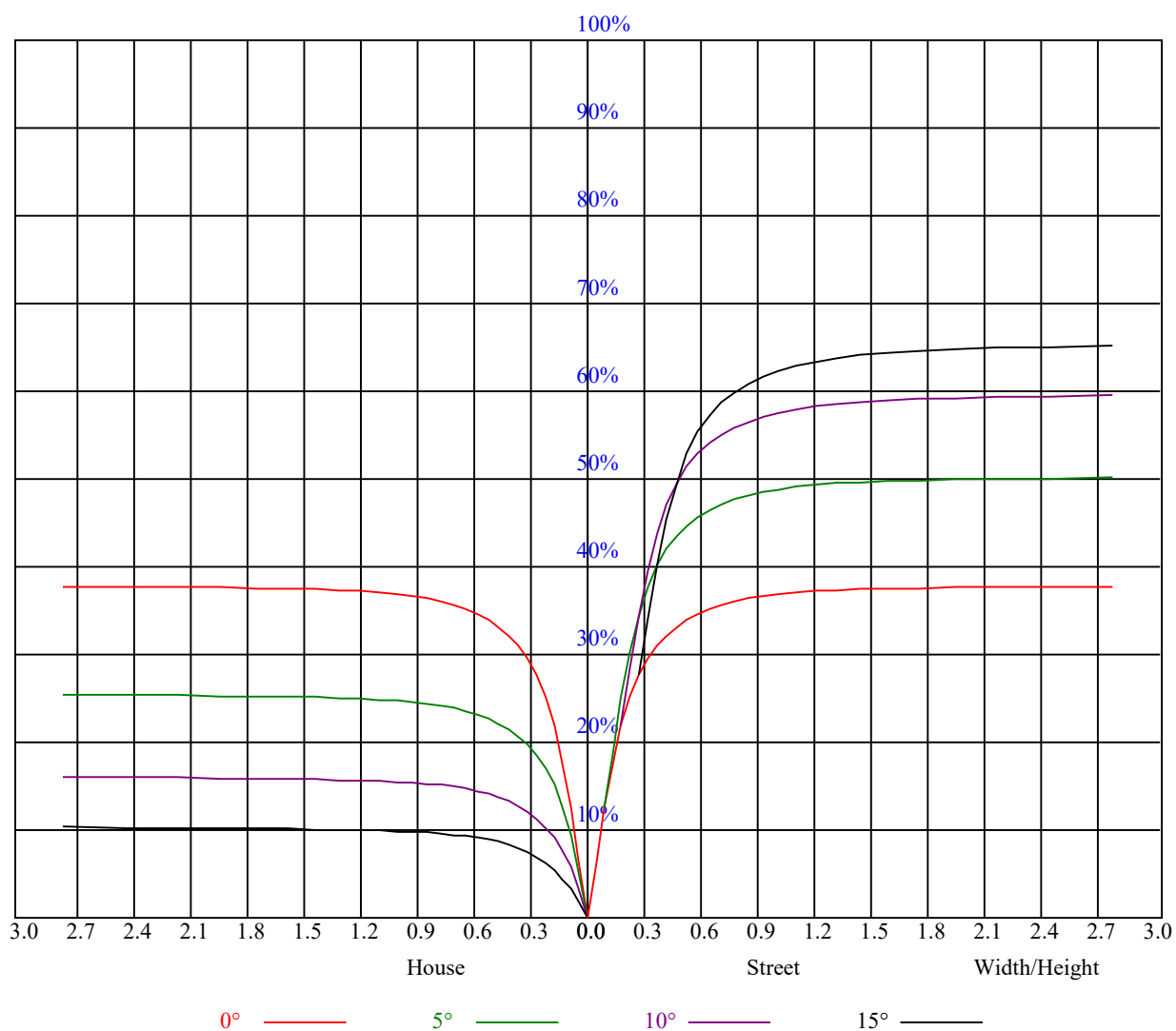
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

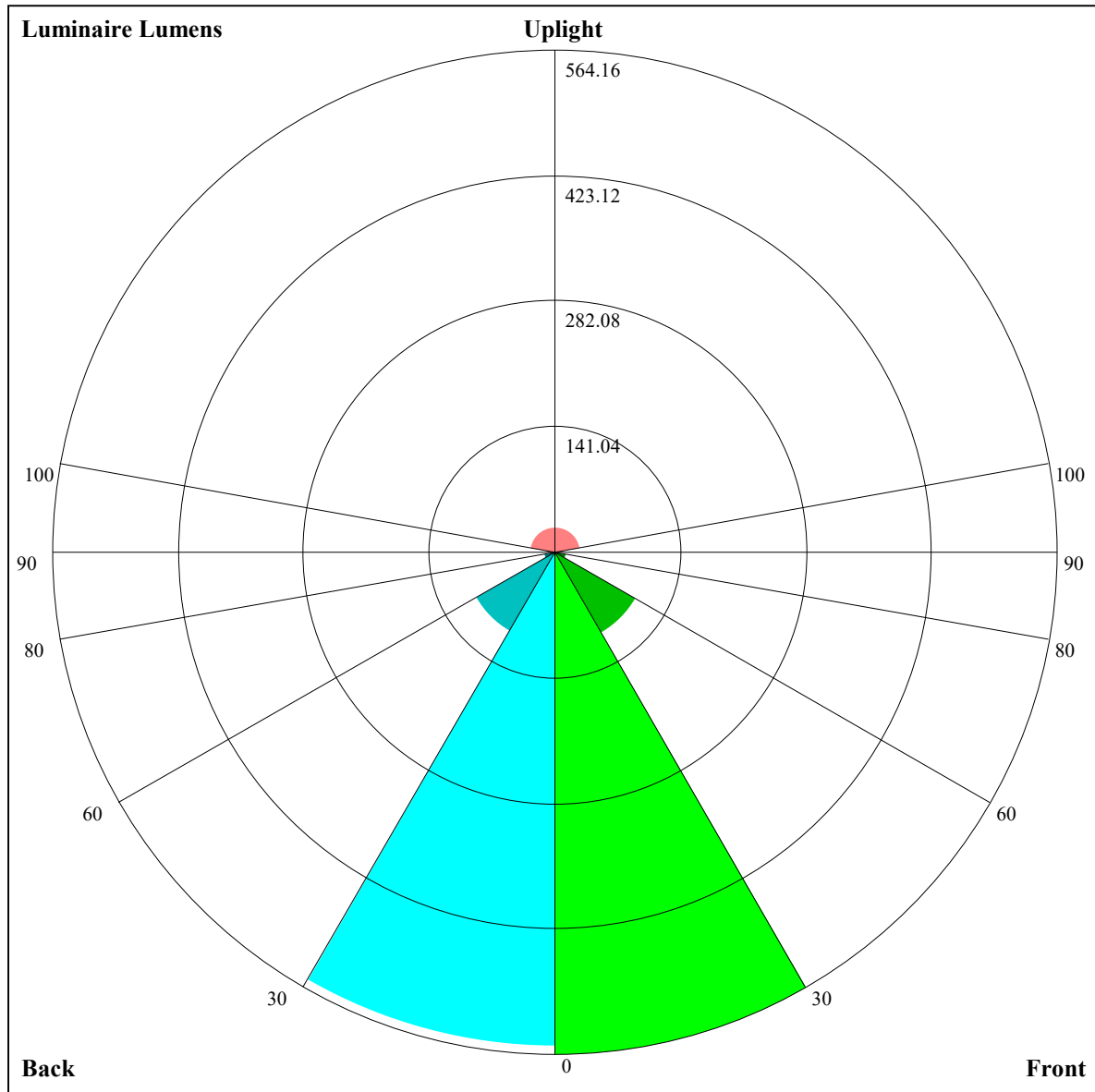
Luminance Limiting Curve





RHOC	80			70			50			30			10			0
RHOW	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	COEFFICIENTS OF UTILIZATION RHOFC=20 CU															
0	0.91	0.91	0.91	0.89	0.89	0.89	0.85	0.85	0.85	0.81	0.81	0.81	0.78	0.78	0.78	0.76
1	0.85	0.83	0.82	0.83	0.82	0.81	0.80	0.79	0.78	0.78	0.77	0.76	0.75	0.74	0.74	0.72
2	0.80	0.78	0.75	0.79	0.77	0.75	0.77	0.75	0.73	0.74	0.73	0.71	0.72	0.71	0.70	0.69
3	0.76	0.73	0.71	0.75	0.72	0.70	0.73	0.71	0.69	0.72	0.70	0.68	0.70	0.68	0.67	0.66
4	0.73	0.69	0.67	0.72	0.69	0.66	0.70	0.68	0.65	0.69	0.67	0.65	0.68	0.66	0.64	0.63
5	0.70	0.66	0.63	0.69	0.66	0.63	0.68	0.65	0.63	0.66	0.64	0.62	0.65	0.63	0.61	0.61
6	0.67	0.63	0.61	0.66	0.63	0.60	0.65	0.62	0.60	0.64	0.62	0.60	0.63	0.61	0.59	0.58
7	0.64	0.61	0.58	0.64	0.60	0.58	0.63	0.60	0.58	0.62	0.59	0.57	0.61	0.59	0.57	0.56
8	0.62	0.59	0.56	0.62	0.58	0.56	0.61	0.58	0.56	0.60	0.58	0.56	0.60	0.57	0.55	0.55
9	0.60	0.57	0.54	0.60	0.56	0.54	0.59	0.56	0.54	0.59	0.56	0.54	0.58	0.55	0.54	0.53
10	0.58	0.55	0.53	0.58	0.55	0.52	0.57	0.54	0.52	0.57	0.54	0.52	0.56	0.54	0.52	0.51





Luminaire Lumens:

FL=564.16,FM=105.21,FH=12.11,FVH=3.6

BL=555.38,BM=102.7,BH=11.99,BVH=3.56

UL=5.96,UH=28.37

BUG Rating:B2-U2-G0

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Intensity data(cd)									Appendix Page: 17 Total:19	
C/γ(°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	
0.0	6624.56	6657.75	6575.63	6418.13	6207.19	5826.94	5428.13	5101.31	4613.63	
45.0	6594.75	6432.75	6152.63	5810.06	5460.19	5038.88	4592.81	4199.63	3803.63	
90.0	6539.06	6338.25	6085.13	5725.69	5322.94	4938.19	4535.44	4029.75	3619.69	
135.0	6620.06	6534.00	6314.63	6058.69	5738.06	5285.25	4901.06	4511.25	4062.94	
180.0	6624.56	6516.56	6303.94	5996.25	5671.13	5260.50	4820.06	4415.06	3945.94	
225.0	6594.75	6661.13	6626.81	6498.00	6264.56	5983.31	5645.81	5176.69	4785.75	
270.0	6539.06	6624.00	6614.44	6504.75	6312.38	6011.44	5639.06	5275.13	4938.19	
315.0	6620.06	6623.44	6526.13	6322.50	6062.63	5708.81	5351.63	4926.38	4484.81	
360.0	6624.56	6657.75	6575.63	6418.13	6207.19	5826.94	5428.13	5101.31	4613.63	
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	
0.0	4173.19	3828.94	3337.88	2954.81	2586.94	2160.56	1854.56	1582.31	1293.75	
45.0	3302.44	2911.50	2543.06	2162.25	1818.00	1551.94	1297.69	1089.56	942.75	
90.0	3217.50	2786.06	2388.94	2058.19	1761.75	1441.13	1109.64	1046.93	885.26	
135.0	3601.13	3200.06	2767.50	2404.13	2025.56	1697.06	1442.81	1199.25	1005.19	
180.0	3535.88	3093.75	2670.75	2312.44	1983.94	1623.38	1380.38	1119.49	971.61	
225.0	4381.31	3876.19	3465.56	3069.56	2597.63	2243.25	1920.38	1566.56	1352.81	
270.0	4380.19	3978.56	3627.56	3134.81	2703.94	2387.25	1967.06	1636.88	1411.88	
315.0	4082.06	3637.13	3193.31	2808.00	2441.81	2026.13	1731.94	1472.06	1107.56	
360.0	4173.19	3828.94	3337.88	2954.81	2586.94	2160.56	1854.56	1582.31	1293.75	
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	
0.0	1109.25	957.94	809.44	716.63	644.06	580.50	527.63	487.13	446.06	
45.0	808.31	717.19	639.56	574.31	526.50	484.88	439.31	406.13	375.75	
90.0	759.04	674.33	600.58	543.66	500.18	458.44	424.18	389.59	356.79	
135.0	865.69	756.56	646.88	582.75	532.69	480.94	442.13	411.19	377.44	
180.0	821.64	716.12	632.19	556.09	509.74	469.97	427.28	396.39	367.76	
225.0	1119.21	958.67	811.52	697.33	618.02	551.19	503.72	454.78	421.14	
270.0	1146.38	977.06	842.63	712.13	633.38	574.31	516.38	476.44	441.00	
315.0	1025.21	883.80	771.86	664.20	599.57	547.59	498.43	454.78	421.65	
360.0	1109.25	957.94	809.44	716.63	644.06	580.50	527.63	487.13	446.06	
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0	
0.0	411.75	376.31	342.00	314.44	286.88	269.10	239.85	221.40	199.86	
45.0	340.31	315.56	289.13	286.31	239.06	220.56	203.63	186.86	171.39	
90.0	329.63	301.05	275.01	253.97	234.84	212.96	197.27	182.87	168.30	
135.0	346.50	320.63	292.50	284.06	245.48	226.97	208.07	190.91	177.13	
180.0	336.66	306.23	282.04	257.51	238.16	218.36	200.08	185.06	169.54	
225.0	390.54	362.31	329.01	304.65	282.15	255.38	235.86	217.74	198.79	
270.0	399.94	369.56	341.44	312.19	285.75	270.79	238.73	218.25	201.26	
315.0	386.78	357.98	327.15	298.74	275.57	249.02	229.50	211.73	195.08	
360.0	411.75	376.31	342.00	314.44	286.88	269.10	239.85	221.40	199.86	
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0	
0.0	183.99	169.59	154.80	141.30	130.73	119.48	108.62	100.24	91.58	
45.0	157.22	145.07	133.20	121.11	110.81	101.76	92.42	84.60	78.30	
90.0	154.97	143.89	132.81	120.99	110.03	99.62	91.69	83.31	75.66	
135.0	162.51	150.53	138.32	126.68	115.20	105.30	95.18	87.19	80.10	
180.0	155.53	143.66	133.26	120.83	110.31	101.03	91.52	83.53	77.23	
225.0	182.14	168.81	154.91	141.75	131.12	119.64	109.18	98.61	89.61	
270.0	184.05	170.49	156.15	142.99	132.53	122.63	110.36	101.36	92.87	
315.0	176.46	163.01	150.53	137.87	126.17	115.93	105.13	95.74	88.20	
360.0	183.99	169.59	154.80	141.30	130.73	119.48	108.62	100.24	91.58	

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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	84.66	77.46	70.71	65.03	59.79	53.61	48.94	44.83	40.11
45.0	70.59	64.74	59.18	54.17	48.43	44.61	40.61	36.56	32.91
90.0	69.58	63.79	57.26	52.43	47.81	42.69	38.98	35.61	32.12
135.0	72.39	66.88	61.54	55.69	50.46	46.29	41.91	38.19	34.48
180.0	70.71	64.63	59.40	54.11	49.61	45.00	40.73	37.24	34.20
225.0	82.63	76.33	68.91	63.34	58.28	52.43	47.93	43.93	39.83
270.0	83.98	77.63	71.49	65.08	59.06	54.11	48.94	44.72	40.50
315.0	80.61	74.25	67.56	61.37	56.42	51.24	46.29	42.47	38.98
360.0	84.66	77.46	70.71	65.03	59.79	53.61	48.94	44.83	40.11
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	36.73	33.69	30.60	27.79	25.48	23.06	20.98	19.24	17.44
45.0	30.15	27.28	24.69	22.61	20.64	18.96	17.33	15.92	14.79
90.0	29.08	26.66	24.19	22.16	20.19	18.45	16.99	15.58	14.40
135.0	31.33	28.74	26.16	23.63	21.71	20.25	18.00	16.59	15.47
180.0	30.71	28.24	25.88	23.23	21.38	19.63	17.94	16.43	15.24
225.0	36.17	33.13	30.09	27.51	24.98	22.61	20.76	19.01	17.33
270.0	36.73	33.64	30.54	27.79	25.54	23.46	21.04	19.41	17.83
315.0	34.88	32.01	29.36	26.61	24.08	22.05	20.03	18.23	16.76
360.0	36.73	33.69	30.60	27.79	25.48	23.06	20.98	19.24	17.44
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	16.14	14.79	13.84	13.33	12.88	12.38	12.04	11.70	11.25
45.0	14.12	13.22	12.83	12.43	11.93	11.64	11.36	10.97	10.69
90.0	13.67	13.11	12.66	12.26	11.87	11.48	11.14	10.80	10.46
135.0	14.29	13.56	13.16	12.60	12.21	11.81	11.42	11.08	10.86
180.0	14.12	13.44	12.94	12.49	12.09	11.70	11.36	11.03	10.74
225.0	16.03	14.91	13.78	13.16	12.60	12.21	11.81	11.42	11.08
270.0	16.31	15.02	14.06	13.22	12.71	12.32	11.93	11.64	11.19
315.0	15.30	14.29	13.50	12.88	12.49	12.15	11.70	11.36	11.03
360.0	16.14	14.79	13.84	13.33	12.88	12.38	12.04	11.70	11.25
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	10.97	10.63	10.35	9.96	9.68	9.39	9.11	8.72	8.44
45.0	10.41	10.01	9.73	9.45	9.06	8.72	8.44	8.04	7.76
90.0	10.18	9.84	9.56	9.28	8.89	8.55	8.27	7.93	7.54
135.0	10.46	10.18	9.96	9.51	9.23	8.89	8.55	8.21	7.88
180.0	10.41	10.07	9.84	9.45	9.17	8.83	8.44	8.10	7.82
225.0	10.80	10.46	10.13	9.90	9.51	9.23	8.94	8.72	8.33
270.0	10.91	10.58	10.35	10.01	9.73	9.45	9.06	8.78	8.49
315.0	10.74	10.41	10.13	9.79	9.51	9.23	8.89	8.61	8.27
360.0	10.97	10.63	10.35	9.96	9.68	9.39	9.11	8.72	8.44
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	8.10	7.82	7.37	7.09	6.81	6.47	6.19	5.79	5.63
45.0	7.43	7.03	6.75	6.41	6.13	5.79	5.63	5.46	5.46
90.0	7.31	6.98	6.64	6.36	6.08	5.74	5.57	5.46	5.46
135.0	7.48	7.14	6.81	6.47	6.19	5.91	5.68	5.51	5.40
180.0	7.43	7.09	6.81	6.41	6.19	5.91	5.68	5.46	5.40
225.0	7.99	7.71	7.37	7.09	6.75	6.47	6.19	5.91	5.74
270.0	8.16	7.82	7.48	7.14	6.86	6.53	6.19	5.96	5.74
315.0	7.88	7.59	7.26	6.92	6.69	6.30	6.02	5.79	5.57
360.0	8.10	7.82	7.37	7.09	6.81	6.47	6.19	5.79	5.63

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	5.46
45.0	5.46
90.0	5.46
135.0	5.40
180.0	5.40
225.0	5.51
270.0	5.57
315.0	5.46
360.0	5.46