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NATA

Client:

LumCAT: 3-1548-A3

Luminaire: 99.02.73.172+92.76.365.00

Report No: nata-0100

Test No: GC2018111506

LampCAT: OSRAM SOLERIQ S15

Lamp flux(lm): 2616.0

Number of Lamps: 1

Length(mm): 79

Phm Type: C

Voltage(V): 36.3000

Current(A): 0.5600

Power (W): 20.3280

PF: 0.0000

Ballast type: DC

Width(mm): 79

Height(mm): 0

Photometric Results

Lumens(lm): 2396.74, Efficiency(%): 91.62% , Luminous Efficacy(lm/W): 117.90

Central intensity(cd): 19288.130, Maximum intensity(cd): 19288.130

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=14.2

[C90/270]Total=14.2

Field angle(10%Imax): [C0/180]Total=29.6

[C90/270]Total=29.6

Maximum s/h(1/2): C0_180=0.24 C90_270=0.24

Maximum s/h(1/4): C0_180=0.25 C90_270=0.25

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 91.79%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 98.545%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	19288.125	4.615	4.615	.176%	.193%
1.0	19001.953	36.367	40.981	1.390%	1.710%
2.0	18204.609	69.671	110.652	2.663%	4.617%
3.0	16892.578	96.950	207.602	3.706%	8.662%
4.0	15322.500	117.210	324.813	4.481%	13.552%
5.0	13458.234	128.628	453.441	4.917%	18.919%
6.0	11508.820	131.922	585.363	5.043%	24.423%
7.0	9727.031	129.995	715.358	4.969%	29.847%
8.0	8091.070	123.485	838.842	4.720%	34.999%
9.0	6395.133	109.707	948.549	4.194%	39.577%
10.0	4981.781	94.865	1043.414	3.626%	43.535%
11.0	3974.484	83.163	1126.578	3.179%	47.005%
12.0	3157.172	71.983	1198.56	2.752%	50.008%
13.0	2550.094	62.907	1261.467	2.405%	52.633%
14.0	2223.492	58.988	1320.455	2.255%	55.094%
15.0	1855.336	52.659	1373.114	2.013%	57.291%
16.0	1619.930	48.965	1422.079	1.872%	59.334%
17.0	1453.852	46.613	1468.692	1.782%	61.279%
18.0	1321.102	44.768	1513.46	1.711%	63.147%
19.0	1222.186	43.635	1557.094	1.668%	64.967%
20.0	1151.670	43.195	1600.289	1.651%	66.769%
21.0	1100.145	43.235	1643.524	1.653%	68.573%
22.0	1062.928	43.665	1687.189	1.669%	70.395%
23.0	1025.740	43.951	1731.139	1.680%	72.229%
24.0	992.341	44.262	1775.401	1.692%	74.076%
25.0	961.228	44.548	1819.949	1.703%	75.934%
26.0	936.281	45.009	1864.958	1.721%	77.812%
27.0	912.424	45.425	1910.383	1.736%	79.707%
28.0	890.852	45.863	1956.246	1.753%	81.621%
29.0	869.625	46.233	2002.48	1.767%	83.550%
30.0	850.746	46.647	2049.126	1.783%	85.496%
31.0	827.487	46.736	2095.862	1.787%	87.446%
32.0	783.169	45.511	2141.373	1.740%	89.345%
33.0	724.113	43.248	2184.622	1.653%	91.150%
34.0	641.363	39.329	2223.951	1.503%	92.791%
35.0	539.852	33.956	2257.907	1.298%	94.207%
36.0	435.860	28.094	2286.001	1.074%	95.379%
37.0	339.138	22.382	2308.383	.856%	96.313%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	227.053	15.329	2323.712	.586%	96.953%
39.0	154.041	10.631	2334.343	.406%	97.396%
40.0	82.413	5.809	2340.152	.222%	97.639%
41.0	46.596	3.352	2343.504	.128%	97.779%
42.0	32.126	2.357	2345.862	.090%	97.877%
43.0	26.058	1.949	2347.81	.074%	97.958%
44.0	21.755	1.657	2349.468	.063%	98.028%
45.0	18.155	1.408	2350.875	.054%	98.086%
46.0	15.898	1.254	2352.129	.048%	98.139%
47.0	13.423	1.077	2353.206	.041%	98.183%
48.0	12.734	1.038	2354.244	.040%	98.227%
49.0	12.417	1.028	2355.271	.039%	98.270%
50.0	12.122	1.018	2356.29	.039%	98.312%
51.0	11.911	1.015	2357.305	.039%	98.354%
52.0	11.686	1.010	2358.315	.039%	98.397%
53.0	11.482	1.006	2359.32	.038%	98.439%
54.0	11.306	1.003	2360.323	.038%	98.480%
55.0	11.152	1.002	2361.325	.038%	98.522%
56.0	10.990	0.999	2362.324	.038%	98.564%
57.0	10.856	0.998	2363.322	.038%	98.606%
58.0	10.737	0.998	2364.321	.038%	98.647%
59.0	10.638	1.000	2365.321	.038%	98.689%
60.0	10.547	1.002	2366.323	.038%	98.731%
61.0	10.434	1.001	2367.323	.038%	98.773%
62.0	10.336	1.001	2368.324	.038%	98.814%
63.0	10.259	1.002	2369.326	.038%	98.856%
64.0	10.188	1.004	2370.331	.038%	98.898%
65.0	10.125	1.006	2371.337	.038%	98.940%
66.0	10.069	1.009	2372.346	.039%	98.982%
67.0	10.020	1.011	2373.357	.039%	99.024%
68.0	9.970	1.014	2374.371	.039%	99.067%
69.0	9.942	1.018	2375.389	.039%	99.109%
70.0	9.914	1.022	2376.41	.039%	99.152%
71.0	9.858	1.022	2377.432	.039%	99.194%
72.0	9.837	1.026	2378.458	.039%	99.237%
73.0	9.809	1.029	2379.487	.039%	99.280%
74.0	9.795	1.032	2380.519	.039%	99.323%
75.0	9.766	1.034	2381.554	.040%	99.366%

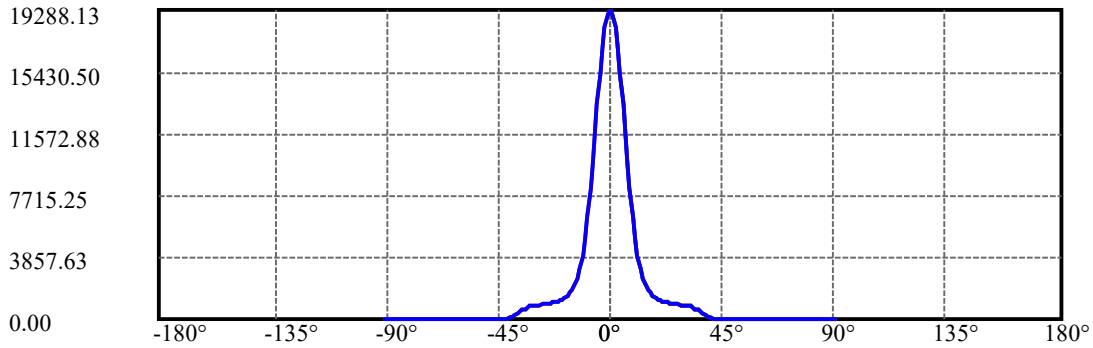
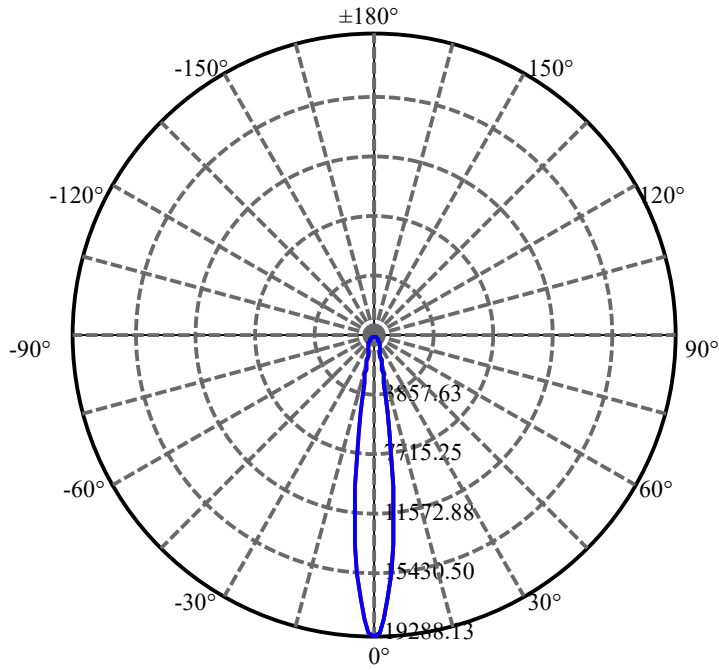
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	9.745	1.037	2382.591	.040%	99.410%
77.0	9.724	1.039	2383.63	.040%	99.453%
78.0	9.724	1.043	2384.673	.040%	99.496%
79.0	9.703	1.045	2385.717	.040%	99.540%
80.0	9.675	1.045	2386.762	.040%	99.584%
81.0	9.675	1.048	2387.81	.040%	99.627%
82.0	9.654	1.048	2388.859	.040%	99.671%
83.0	9.654	1.051	2389.909	.040%	99.715%
84.0	9.668	1.054	2390.964	.040%	99.759%
85.0	9.689	1.058	2392.022	.040%	99.803%
86.0	9.605	1.051	2393.073	.040%	99.847%
87.0	9.598	1.051	2394.124	.040%	99.891%
88.0	9.584	1.050	2395.174	.040%	99.935%
89.0	9.541	1.046	2396.22	.040%	99.978%
90.0	9.534	0.523	2396.743	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	2049.13	78.33%	85.50%
0-40	2340.15	89.46%	97.64%
0-60	2366.32	90.46%	98.73%
0-90	2396.22	91.60%	99.98%
0-120	2396.22	91.60%	99.98%
0-180	2396.74	91.62%	100.00%
60-90	30.90	1.18%	1.29%
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%
0-27.15	1917.40	73.29%	80.00%

ZONAL LUMEN SUMMARY

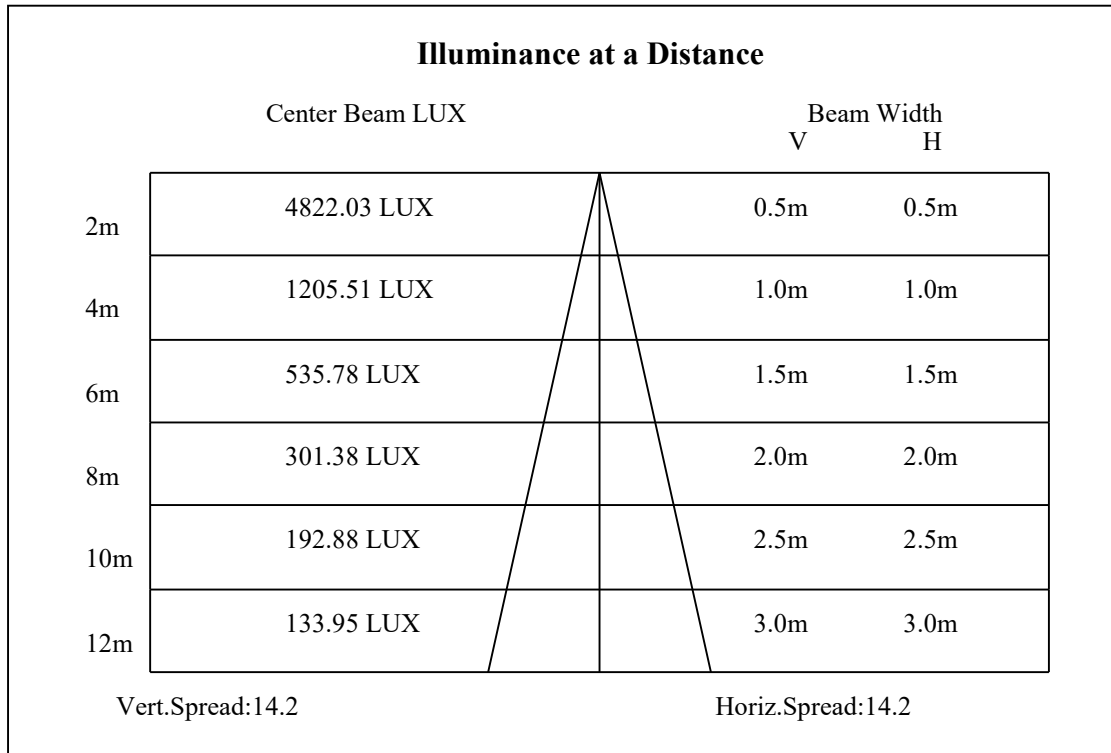
0-10	1043.41
10-20	556.87
20-30	448.84
30-40	291.03
40-50	16.14
50-60	10.03
60-70	10.09
70-80	10.35
80-90	9.46
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

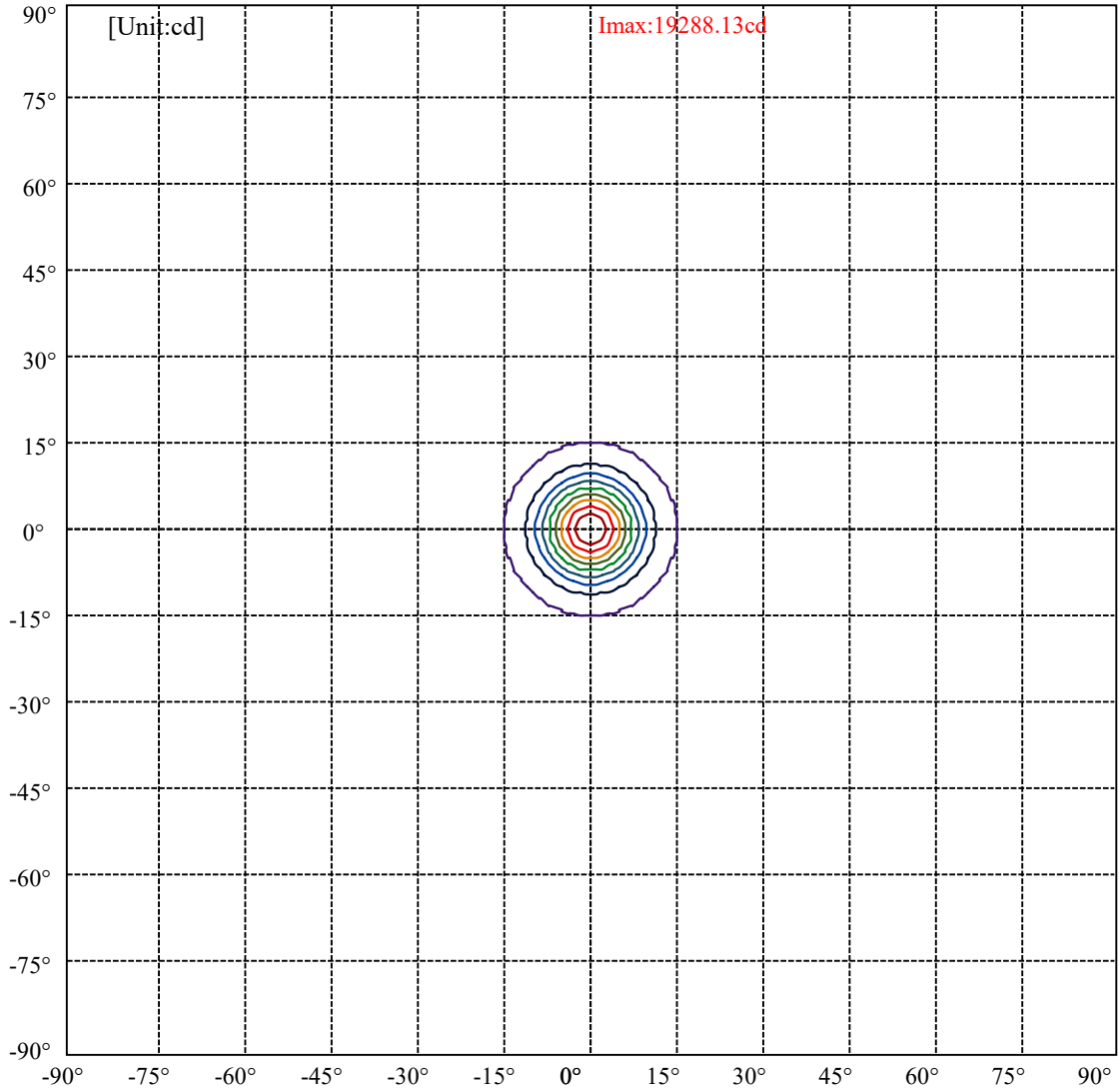


C0(Max): —————
C0/C180: —————
C90/C270: —————

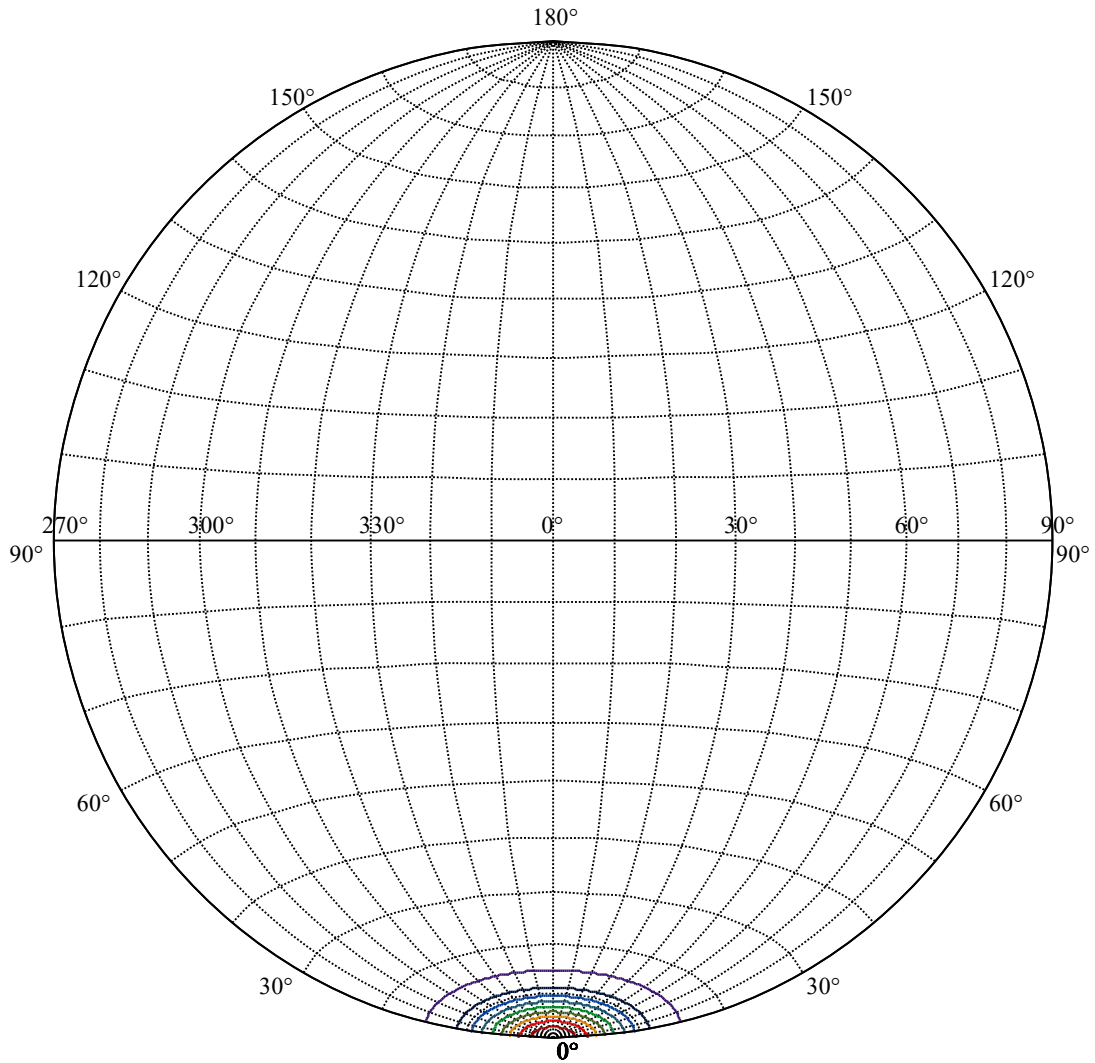
Field angle(10%Imax):C0/180Left:14.8 Right:14.8
:C90/270Left:14.8 Right:14.8

Beam Angle(50%Imax):C0/180Left:7.1 Right:7.1
:C90/270Left:7.1 Right:7.1





(10%Imax) 1928.81	—
(20%Imax) 3857.63	—
(30%Imax) 5786.44	—
(40%Imax) 7715.25	—
(50%Imax) 9644.06	—
(60%Imax) 11572.9	—
(70%Imax) 13501.7	—
(80%Imax) 15430.5	—
(90%Imax) 17359.3	—



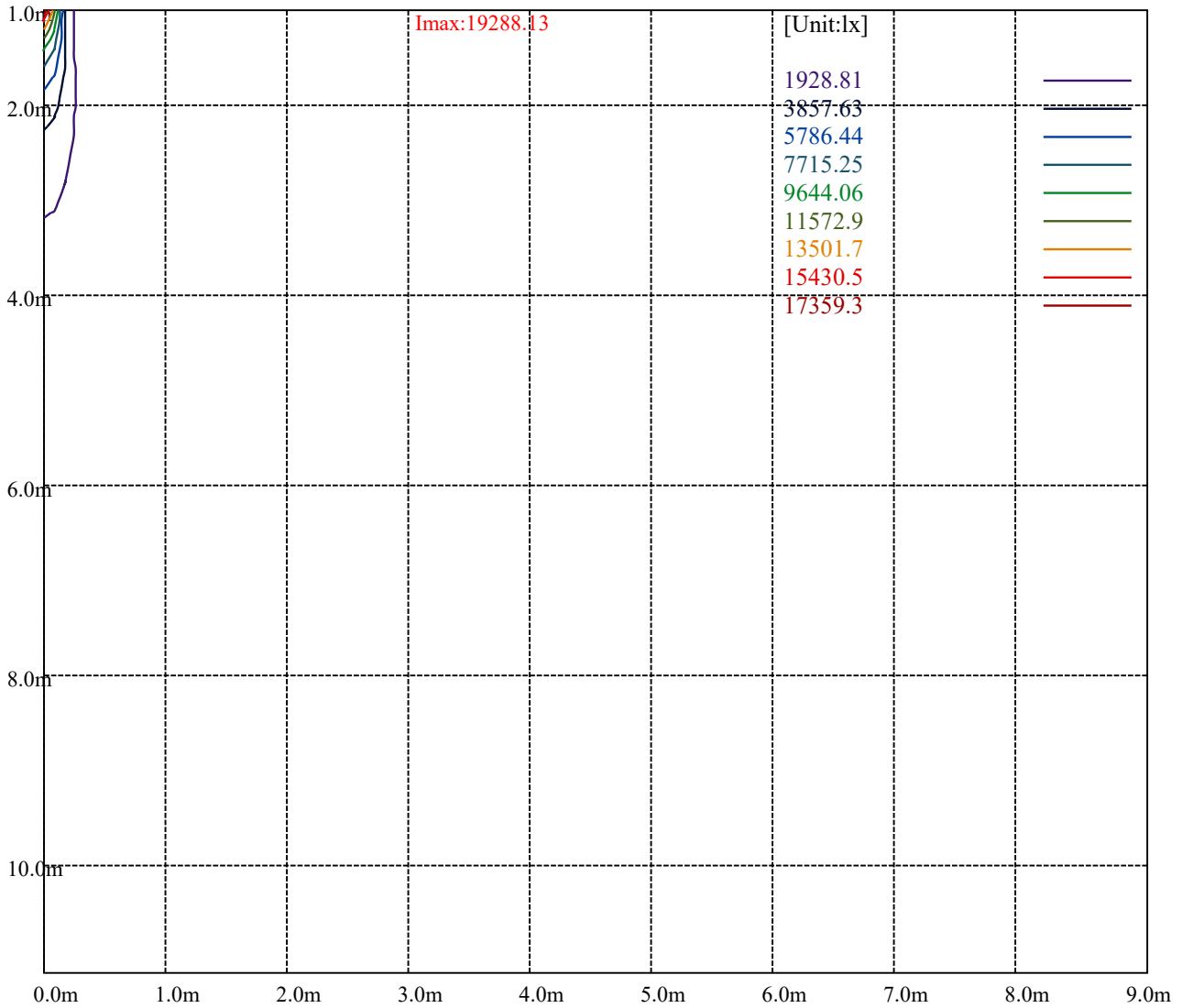
House

[Unit:cd]

Road

Imax:19288.13

(10%Imax) 1928.81	—
(20%Imax) 3857.63	—
(30%Imax) 5786.44	—
(40%Imax) 7715.25	—
(50%Imax) 9644.06	—
(60%Imax) 11572.9	—
(70%Imax) 13501.7	—
(80%Imax) 15430.5	—
(90%Imax) 17359.3	—



Luminance Table

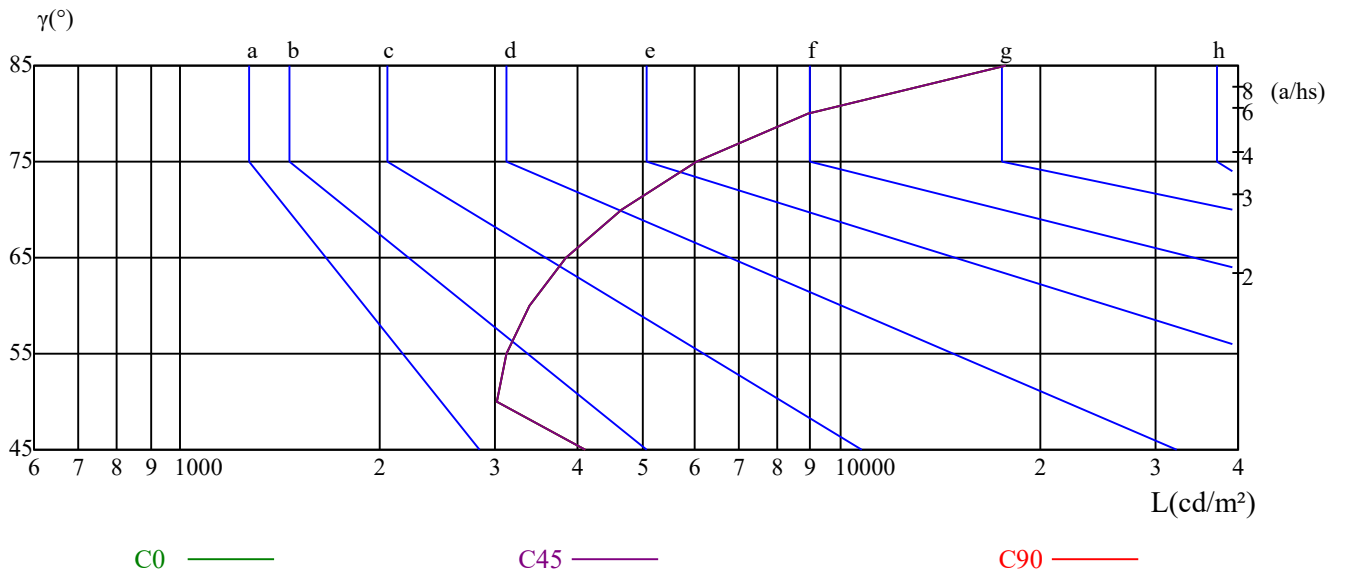
γ	45	50	55	60	65	70	75	80	85
C0	4114	3022	3115	3380	3839	4645	6046	8927	17813
C45	4114	3022	3115	3380	3839	4645	6046	8927	17813
C90	4114	3022	3115	3380	3839	4645	6046	8927	17813

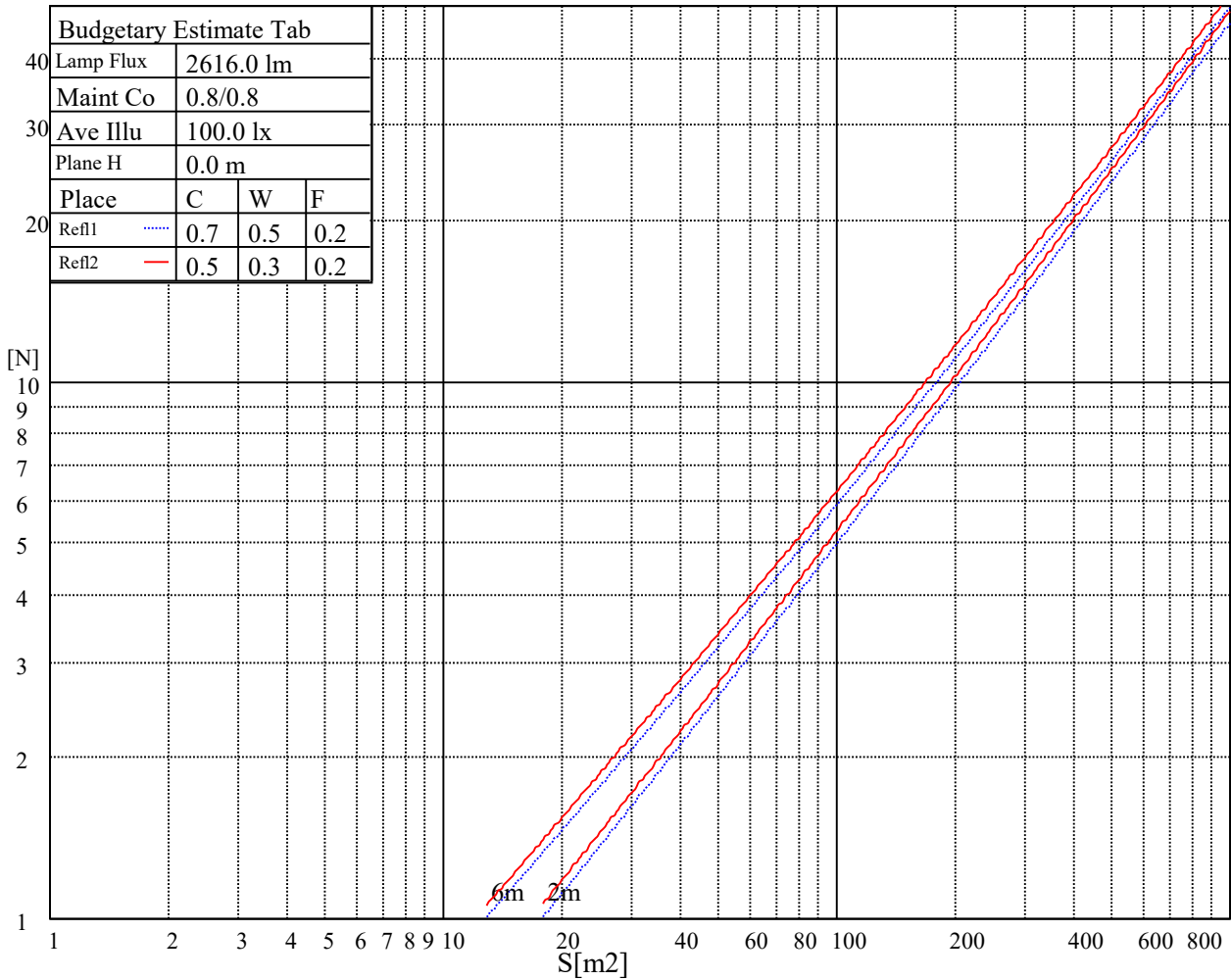
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3839	3839	3839	6046	6046	6046	17813	17813	17813

Glare Table

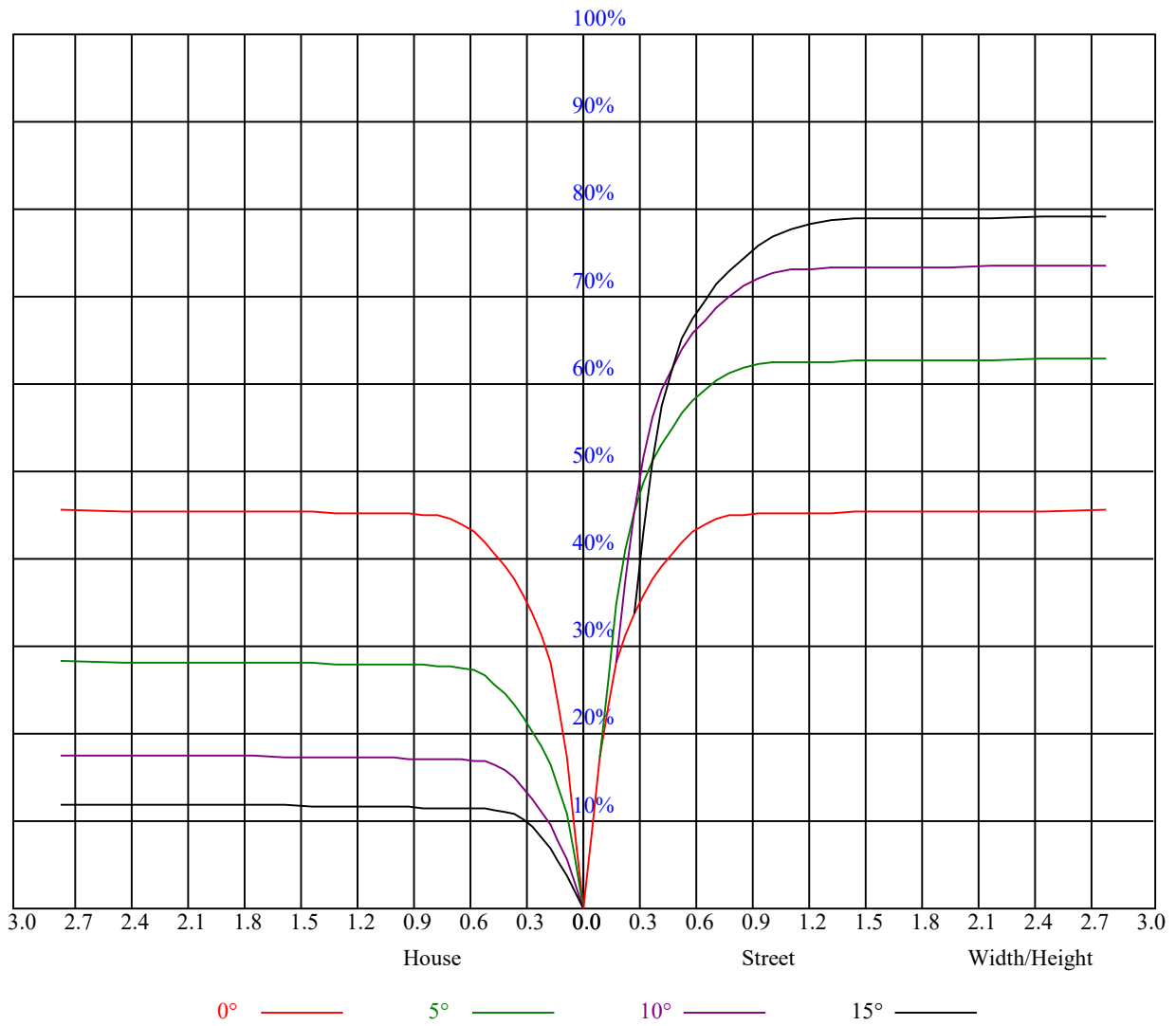
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

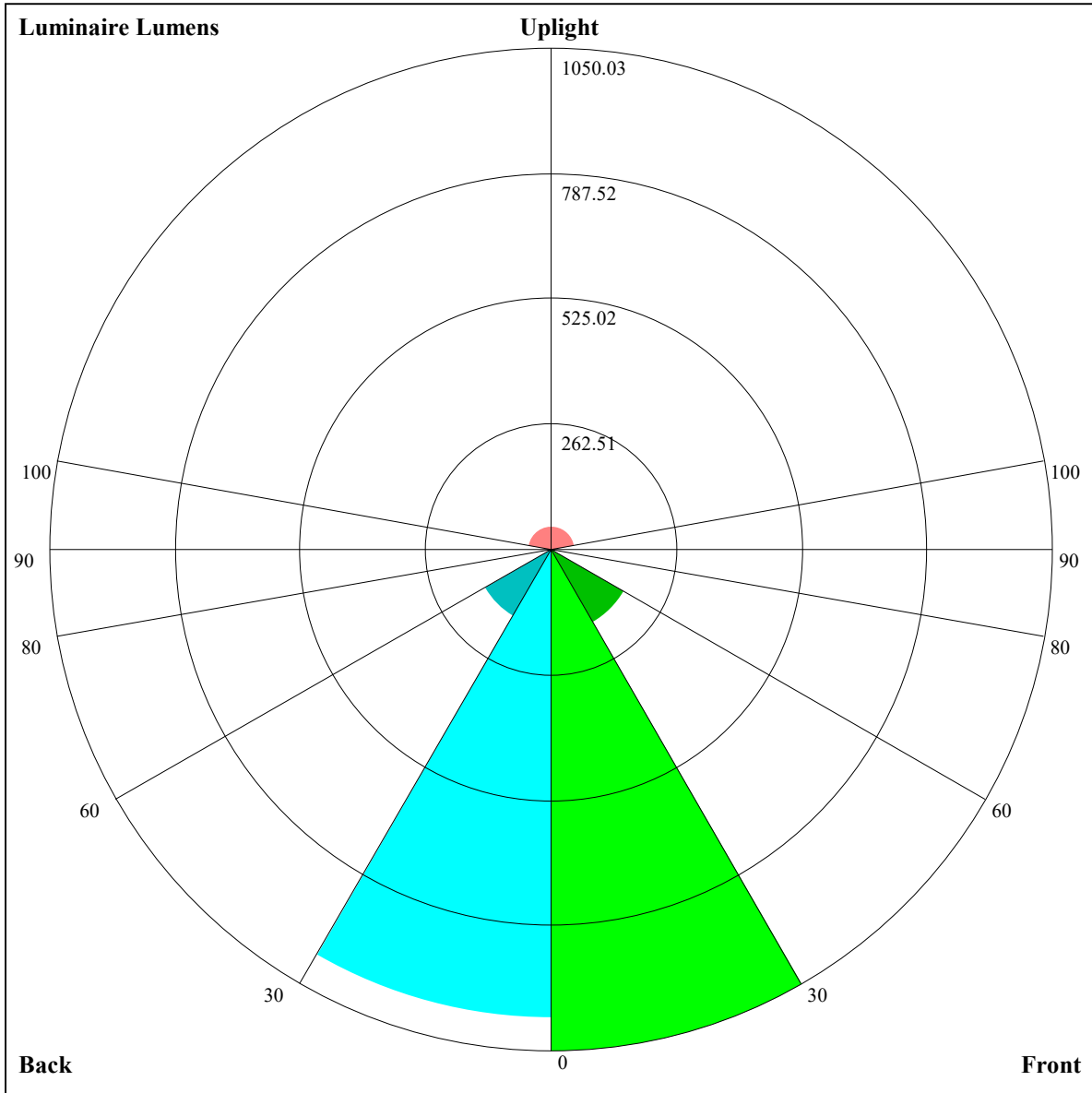
Luminance Limiting Curve





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	COEFFICIENTS OF UTILIZATION RHOFC=20 CU															
0	1.09	1.09	1.09	1.07	1.07	1.07	1.02	1.02	1.02	0.98	0.98	0.98	0.94	0.94	0.94	0.92
1	1.03	1.01	0.99	1.01	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88
2	0.98	0.95	0.92	0.96	0.93	0.91	0.93	0.91	0.89	0.91	0.89	0.87	0.88	0.87	0.85	0.84
3	0.93	0.90	0.87	0.92	0.89	0.86	0.90	0.87	0.85	0.88	0.85	0.83	0.86	0.84	0.82	0.81
4	0.89	0.85	0.82	0.88	0.85	0.82	0.86	0.83	0.81	0.85	0.82	0.80	0.83	0.81	0.79	0.78
5	0.86	0.82	0.79	0.85	0.81	0.78	0.83	0.80	0.78	0.82	0.79	0.77	0.81	0.78	0.76	0.75
6	0.83	0.79	0.76	0.82	0.78	0.75	0.81	0.77	0.75	0.80	0.77	0.74	0.78	0.76	0.74	0.73
7	0.80	0.76	0.73	0.79	0.75	0.73	0.78	0.75	0.72	0.77	0.74	0.72	0.76	0.74	0.72	0.71
8	0.77	0.73	0.70	0.77	0.73	0.70	0.76	0.73	0.70	0.75	0.72	0.70	0.74	0.72	0.70	0.69
9	0.75	0.71	0.68	0.75	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.68	0.72	0.70	0.68	0.67
10	0.73	0.69	0.66	0.72	0.69	0.66	0.72	0.68	0.66	0.71	0.68	0.66	0.71	0.68	0.66	0.65





Luminaire Lumens:

FL=1050.03,FM=177.98,FH=10.22,FVH=5.26

BL=981.4,BM=162.2,BH=10.2,BVH=5.25

UL=10.4,UH=49.5

BUG Rating:B2-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	19108.13	19501.88	19333.13	18568.13	17409.38	15744.38	13826.25	11998.13	10231.88
45.0	19411.88	18855.00	17656.88	16065.00	14433.75	12425.63	10406.25	8718.75	7357.50
90.0	19215.00	18309.38	17066.25	15345.00	13415.63	11117.81	9782.44	7734.94	6244.31
135.0	19417.50	18821.25	17600.63	16036.88	14394.38	12363.75	10321.88	8623.13	7076.25
180.0	19108.13	18084.38	16807.50	15086.25	13117.50	11042.44	9478.13	7428.38	5944.50
225.0	19411.88	19462.50	18950.63	17820.00	16301.25	14720.63	12341.25	10902.94	8959.50
270.0	19215.00	19524.38	19260.00	18365.63	17156.25	15468.75	13505.63	11677.50	9911.25
315.0	19417.50	19456.88	18961.88	17853.75	16351.88	14782.50	12408.75	10732.50	9003.38
360.0	19108.13	19501.88	19333.13	18568.13	17409.38	15744.38	13826.25	11998.13	10231.88
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	8161.88	6660.00	5315.63	3943.13	3166.88	2868.75	2234.81	1878.19	1662.75
45.0	5422.50	4258.13	3481.88	2840.63	2252.81	1949.06	1690.31	1495.69	1363.50
90.0	4951.69	3704.06	3016.69	2525.06	2163.38	1830.38	1628.44	1467.00	1325.81
135.0	5349.38	4218.75	3380.63	2851.88	2282.63	1982.81	1755.56	1537.88	1392.19
180.0	4665.94	3480.19	2842.88	2386.13	2015.44	1742.06	1554.75	1391.63	1283.06
225.0	7349.63	5713.88	4320.56	3400.88	2761.88	2217.38	1914.19	1684.69	1486.69
270.0	7846.88	6350.63	5017.50	3808.13	2970.00	2896.88	2076.19	1784.25	1584.00
315.0	7413.19	5468.63	4420.13	3501.56	2787.75	2300.63	1988.44	1720.13	1532.81
360.0	8161.88	6660.00	5315.63	3943.13	3166.88	2868.75	2234.81	1878.19	1662.75
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1494.00	1350.56	1249.31	1186.31	1135.13	1094.06	1058.06	1016.44	983.25
45.0	1252.69	1178.44	1113.75	1065.38	1032.75	1002.38	968.63	943.31	921.38
90.0	1222.31	1113.69	1097.21	1055.31	1021.22	984.15	953.83	925.82	902.25
135.0	1266.75	1186.88	1116.56	1060.88	1022.06	990.00	957.38	934.88	915.19
180.0	1195.31	1118.42	1088.16	1046.76	1006.76	973.35	943.48	913.11	894.09
225.0	1341.56	1247.06	1121.18	1110.54	1073.25	1037.19	1006.76	974.93	946.86
270.0	1414.69	1303.88	1218.38	1157.63	1116.00	1073.81	1033.88	1000.13	970.31
315.0	1381.50	1278.56	1208.81	1118.36	1096.26	1050.98	1016.72	981.23	956.93
360.0	1494.00	1350.56	1249.31	1186.31	1135.13	1094.06	1058.06	1016.44	983.25
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	952.31	925.88	906.19	887.06	860.63	843.19	826.31	761.06	677.25
45.0	896.63	874.69	856.69	835.31	812.81	763.88	686.81	583.31	480.38
90.0	883.52	860.23	839.59	823.33	800.33	726.08	639.51	546.64	438.58
135.0	893.25	871.88	853.31	836.44	810.00	756.56	677.25	585.00	475.31
180.0	874.07	855.51	834.30	816.69	783.39	689.46	600.02	505.46	399.38
225.0	926.04	907.37	882.56	864.45	847.91	822.09	773.49	705.38	591.98
270.0	939.38	918.56	898.88	876.94	857.25	840.38	809.44	732.38	643.50
315.0	934.20	912.71	885.49	865.74	847.58	823.73	780.08	711.68	612.45
360.0	952.31	925.88	906.19	887.06	860.63	843.19	826.31	761.06	677.25
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	596.25	476.44	365.63	289.13	157.11	81.11	43.20	32.23	26.21
45.0	363.38	285.19	161.83	88.03	46.35	31.84	24.86	18.34	16.26
90.0	331.14	238.50	140.23	63.23	36.11	27.56	21.32	16.88	15.24
135.0	373.50	286.31	164.64	93.77	44.72	30.99	25.43	19.29	17.72
180.0	294.41	205.43	113.23	54.00	36.68	31.16	25.03	21.15	17.49
225.0	486.45	380.81	254.98	165.88	98.94	48.94	38.31	32.91	25.93
270.0	538.88	441.00	329.06	292.50	128.64	65.64	41.91	36.11	30.54
315.0	502.88	399.43	286.82	185.79	110.76	55.52	36.96	31.56	24.64
360.0	596.25	476.44	365.63	289.13	157.11	81.11	43.20	32.23	26.21

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	19.86	16.82	14.57	13.28	12.88	12.54	12.26	12.04	11.76
45.0	14.46	13.39	13.05	12.71	12.43	12.21	12.04	11.76	11.59
90.0	13.84	13.28	12.88	12.66	12.43	12.15	11.93	11.70	11.48
135.0	15.24	13.50	13.16	12.88	12.38	12.15	11.93	11.70	11.48
180.0	13.05	12.66	12.32	12.15	11.93	11.64	11.53	11.31	11.14
225.0	22.78	18.17	12.77	12.49	12.21	11.87	11.70	11.53	11.36
270.0	25.37	21.66	15.58	13.05	12.66	12.32	12.04	11.81	11.59
315.0	20.64	17.72	13.05	12.66	12.43	12.09	11.87	11.64	11.48
360.0	19.86	16.82	14.57	13.28	12.88	12.54	12.26	12.04	11.76
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	11.59	11.42	11.19	11.08	10.91	10.80	10.69	10.52	10.46
45.0	11.42	11.25	11.08	10.91	10.80	10.74	10.63	10.52	10.41
90.0	11.31	11.14	10.97	10.86	10.74	10.63	10.58	10.46	10.35
135.0	11.25	11.14	10.97	10.80	10.74	10.63	10.52	10.41	10.29
180.0	10.97	10.86	10.74	10.63	10.52	10.41	10.35	10.29	10.18
225.0	11.19	11.03	10.91	10.80	10.69	10.58	10.52	10.41	10.29
270.0	11.48	11.25	11.08	10.97	10.80	10.69	10.58	10.46	10.41
315.0	11.25	11.14	10.97	10.80	10.69	10.63	10.52	10.41	10.29
360.0	11.59	11.42	11.19	11.08	10.91	10.80	10.69	10.52	10.46
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	10.35	10.29	10.24	10.13	10.07	10.01	9.96	9.96	9.90
45.0	10.35	10.24	10.18	10.13	10.07	10.01	10.01	9.96	9.90
90.0	10.24	10.18	10.13	10.07	10.01	10.01	9.96	9.90	9.90
135.0	10.24	10.18	10.13	10.13	10.01	10.01	9.96	9.96	9.90
180.0	10.13	10.07	10.01	9.96	9.96	9.90	9.90	9.84	9.79
225.0	10.24	10.18	10.13	10.07	10.01	9.96	9.90	9.90	9.84
270.0	10.29	10.18	10.13	10.07	10.01	9.96	9.96	9.90	9.84
315.0	10.24	10.18	10.07	10.01	10.01	9.90	9.90	9.90	9.79
360.0	10.35	10.29	10.24	10.13	10.07	10.01	9.96	9.96	9.90
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	9.84	9.84	9.84	9.79	9.73	9.73	9.73	9.68	9.68
45.0	9.90	9.84	9.84	9.79	9.79	9.73	9.73	9.73	9.68
90.0	9.84	9.84	9.79	9.79	9.79	9.73	9.73	9.73	9.68
135.0	9.84	9.84	9.84	9.79	9.79	9.79	9.79	9.73	9.73
180.0	9.79	9.79	9.73	9.73	9.68	9.68	9.68	9.68	9.68
225.0	9.84	9.79	9.79	9.79	9.73	9.73	9.73	9.73	9.68
270.0	9.84	9.79	9.79	9.73	9.73	9.73	9.73	9.68	9.68
315.0	9.79	9.73	9.73	9.73	9.73	9.68	9.68	9.68	9.62
360.0	9.84	9.84	9.84	9.79	9.73	9.73	9.73	9.68	9.68
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	9.68	9.62	9.62	9.62	9.62	9.62	9.73	9.56	9.56
45.0	9.68	9.68	9.73	9.84	9.96	9.62	9.56	9.56	9.56
90.0	9.68	9.68	9.73	9.73	9.73	9.56	9.51	9.56	9.56
135.0	9.73	9.68	9.68	9.68	9.73	9.62	9.56	9.56	9.51
180.0	9.68	9.62	9.62	9.62	9.62	9.56	9.56	9.51	9.51
225.0	9.68	9.68	9.62	9.62	9.62	9.62	9.62	9.62	9.56
270.0	9.68	9.68	9.62	9.62	9.62	9.68	9.68	9.73	9.56
315.0	9.62	9.62	9.62	9.62	9.62	9.56	9.56	9.56	9.51
360.0	9.68	9.62	9.62	9.62	9.62	9.62	9.73	9.56	9.56

Intensity data(cd)

C/γ(°)	90.0
0.0	9.56
45.0	9.51
90.0	9.51
135.0	9.56
180.0	9.51
225.0	9.56
270.0	9.56
315.0	9.51
360.0	9.56