
NATA

Client:

LumCAT: 2-1259-N

Luminaire: 92.70.065.00+92.70.059.00

Report No: nata-0100

Voltage(V): 36.2000

Test No: GC2018112104

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): 1336.79, Efficiency(%): 75.06% , Luminous Efficacy(lm/W): 73.86

Central intensity(cd): 2825.297, Maximum intensity(cd): 2825.297

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=36.4

[C90/270]Total=36.4

Field angle(10%Imax): [C0/180]Total=64.2

[C90/270]Total=64.2

Maximum s/h(1/2): C0_180=0.61 C90_270=0.61

Maximum s/h(1/4): C0_180=0.58 C90_270=0.58

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 75.09%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 97.375%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	2825.297	0.676	0.676	.038%	.051%
1.0	2822.555	5.402	6.078	.303%	.455%
2.0	2815.031	10.773	16.851	.605%	1.261%
3.0	2801.461	16.078	32.929	.903%	2.463%
4.0	2779.734	21.264	54.193	1.194%	4.054%
5.0	2751.750	26.300	80.493	1.477%	6.021%
6.0	2709.070	31.053	111.546	1.744%	8.344%
7.0	2651.484	35.435	146.982	1.990%	10.995%
8.0	2593.125	39.576	186.558	2.222%	13.956%
9.0	2515.078	43.146	229.703	2.423%	17.183%
10.0	2419.594	46.075	275.778	2.587%	20.630%
11.0	2330.789	48.770	324.548	2.738%	24.278%
12.0	2227.641	50.790	375.338	2.852%	28.078%
13.0	2104.875	51.924	427.262	2.915%	31.962%
14.0	1984.078	52.636	479.898	2.955%	35.899%
15.0	1864.617	52.922	532.82	2.971%	39.858%
16.0	1720.547	52.006	584.826	2.920%	43.749%
17.0	1588.781	50.939	635.765	2.860%	47.559%
18.0	1442.813	48.893	684.658	2.745%	51.217%
19.0	1311.504	46.823	731.482	2.629%	54.719%
20.0	1180.645	44.282	775.763	2.486%	58.032%
21.0	1042.889	40.984	816.748	2.301%	61.098%
22.0	930.178	38.211	854.959	2.146%	63.956%
23.0	823.472	35.284	890.243	1.981%	66.596%
24.0	728.339	32.486	922.729	1.824%	69.026%
25.0	639.021	29.615	952.345	1.663%	71.241%
26.0	569.454	27.375	979.719	1.537%	73.289%
27.0	504.098	25.097	1004.816	1.409%	75.166%
28.0	445.971	22.960	1027.776	1.289%	76.884%
29.0	395.684	21.036	1048.812	1.181%	78.458%
30.0	355.873	19.513	1068.325	1.096%	79.917%
31.0	317.686	17.943	1086.267	1.007%	81.259%
32.0	285.884	16.613	1102.881	.933%	82.502%
33.0	258.251	15.424	1118.305	.866%	83.656%
34.0	235.554	14.445	1132.749	.811%	84.737%
35.0	212.716	13.380	1146.129	.751%	85.738%
36.0	195.202	12.582	1158.711	.706%	86.679%
37.0	179.459	11.843	1170.555	.665%	87.565%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	165.284	11.159	1181.713	.627%	88.399%
39.0	151.798	10.476	1192.189	.588%	89.183%
40.0	139.191	9.811	1202.001	.551%	89.917%
41.0	128.102	9.216	1211.217	.517%	90.606%
42.0	117.113	8.593	1219.81	.483%	91.249%
43.0	106.334	7.953	1227.763	.447%	91.844%
44.0	97.763	7.447	1235.21	.418%	92.401%
45.0	89.613	6.949	1242.159	.390%	92.921%
46.0	81.654	6.441	1248.6	.362%	93.403%
47.0	74.707	5.992	1254.592	.336%	93.851%
48.0	68.653	5.595	1260.186	.314%	94.270%
49.0	62.339	5.159	1265.346	.290%	94.656%
50.0	56.813	4.773	1270.118	.268%	95.013%
51.0	52.109	4.441	1274.559	.249%	95.345%
52.0	47.348	4.092	1278.651	.230%	95.651%
53.0	43.320	3.794	1282.444	.213%	95.935%
54.0	39.635	3.516	1285.961	.197%	96.198%
55.0	36.218	3.253	1289.214	.183%	96.441%
56.0	33.223	3.020	1292.235	.170%	96.667%
57.0	30.579	2.812	1295.047	.158%	96.877%
58.0	27.886	2.593	1297.64	.146%	97.071%
59.0	25.720	2.418	1300.058	.136%	97.252%
60.0	23.625	2.244	1302.302	.126%	97.420%
61.0	21.502	2.062	1304.364	.116%	97.574%
62.0	19.870	1.924	1306.288	.108%	97.718%
63.0	18.415	1.799	1308.087	.101%	97.853%
64.0	17.170	1.692	1309.779	.095%	97.980%
65.0	16.228	1.613	1311.392	.091%	98.100%
66.0	15.490	1.552	1312.944	.087%	98.216%
67.0	14.787	1.493	1314.437	.084%	98.328%
68.0	14.210	1.445	1315.881	.081%	98.436%
69.0	13.676	1.400	1317.282	.079%	98.541%
70.0	13.155	1.356	1318.637	.076%	98.642%
71.0	12.656	1.312	1319.949	.074%	98.740%
72.0	12.171	1.269	1321.219	.071%	98.835%
73.0	11.707	1.228	1322.447	.069%	98.927%
74.0	11.264	1.187	1323.634	.067%	99.016%
75.0	10.793	1.143	1324.777	.064%	99.101%

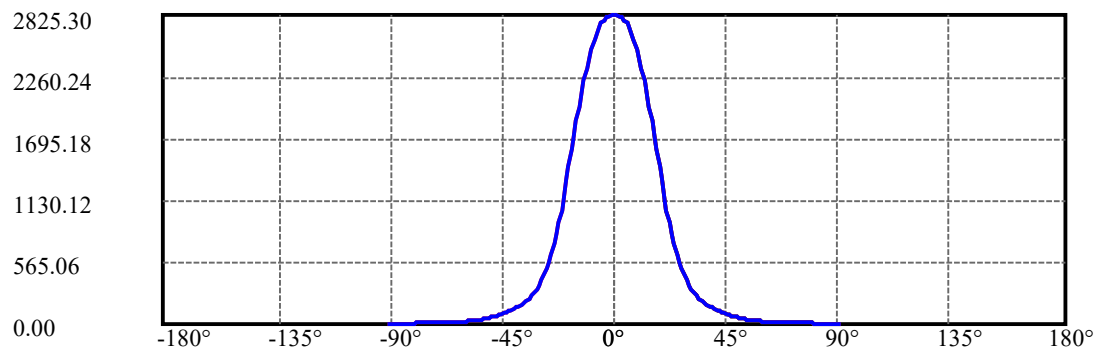
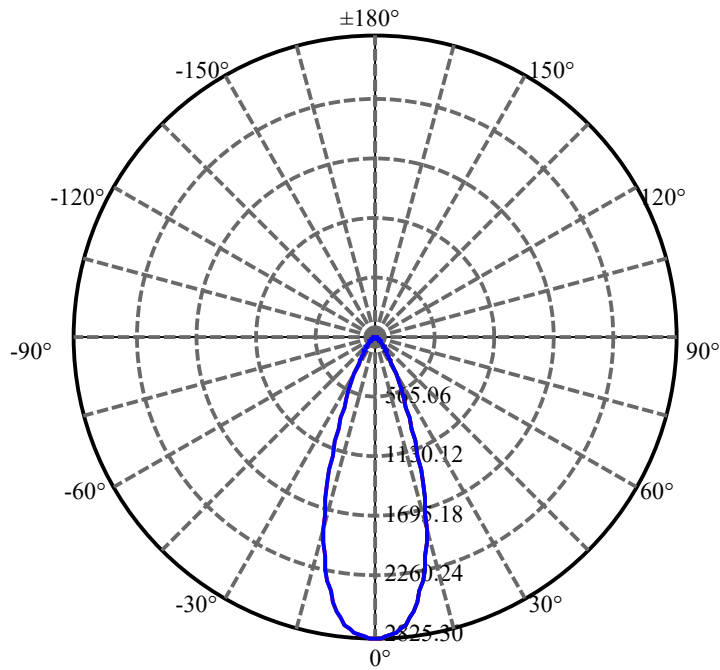
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	10.350	1.101	1325.878	.062%	99.184%
77.0	9.935	1.062	1326.94	.060%	99.263%
78.0	9.499	1.019	1327.959	.057%	99.340%
79.0	9.063	0.976	1328.935	.055%	99.412%
80.0	8.634	0.932	1329.867	.052%	99.482%
81.0	8.220	0.890	1330.757	.050%	99.549%
82.0	7.805	0.848	1331.605	.048%	99.612%
83.0	7.397	0.805	1332.41	.045%	99.672%
84.0	7.031	0.767	1333.177	.043%	99.730%
85.0	6.645	0.726	1333.903	.041%	99.784%
86.0	6.286	0.688	1334.59	.039%	99.836%
87.0	5.984	0.655	1335.246	.037%	99.885%
88.0	5.730	0.628	1335.874	.035%	99.932%
89.0	5.583	0.612	1336.486	.034%	99.977%
90.0	5.520	0.303	1336.788	.017%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1068.32	59.98%	79.92%
0-40	1202.00	67.49%	89.92%
0-60	1302.30	73.12%	97.42%
0-90	1336.49	75.04%	99.98%
0-120	1336.49	75.04%	99.98%
0-180	1336.79	75.06%	100.00%
60-90	36.43	2.05%	2.73%
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%
0-30.06	1069.43	60.05%	80.00%

ZONAL LUMEN SUMMARY

0-10	275.78
10-20	499.99
20-30	292.56
30-40	133.68
40-50	68.12
50-60	32.18
60-70	16.34
70-80	11.23
80-90	6.62
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

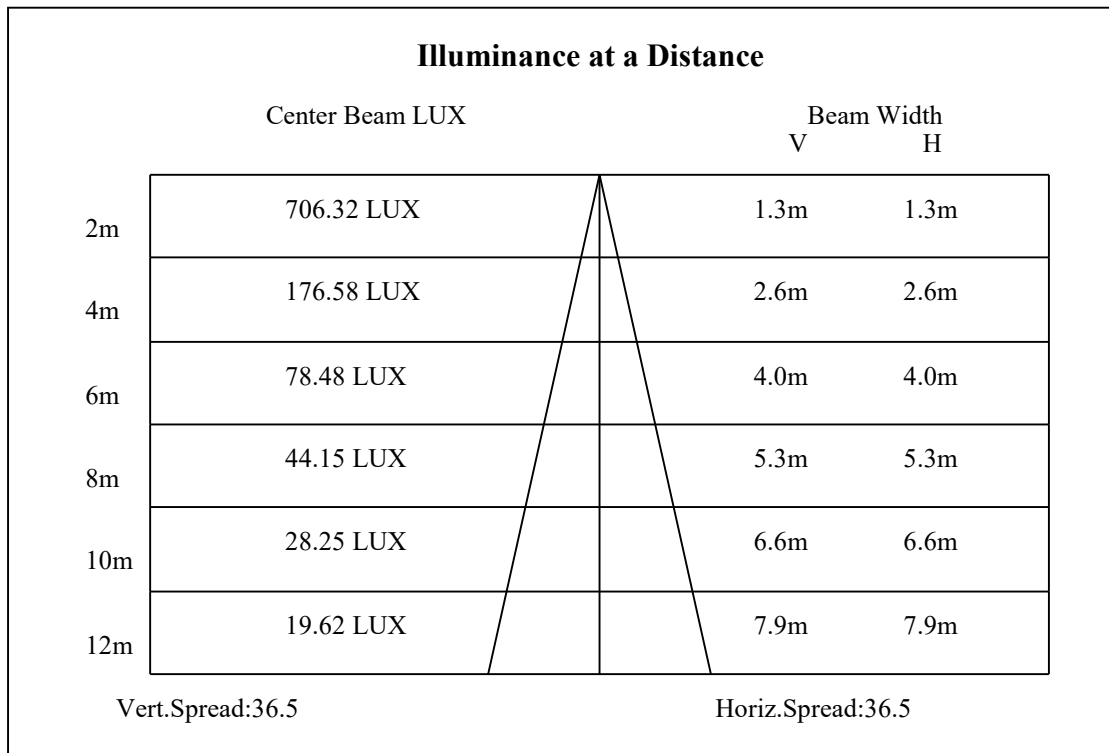
C0(Max): —————C0/C180: —————C90/C270: —————

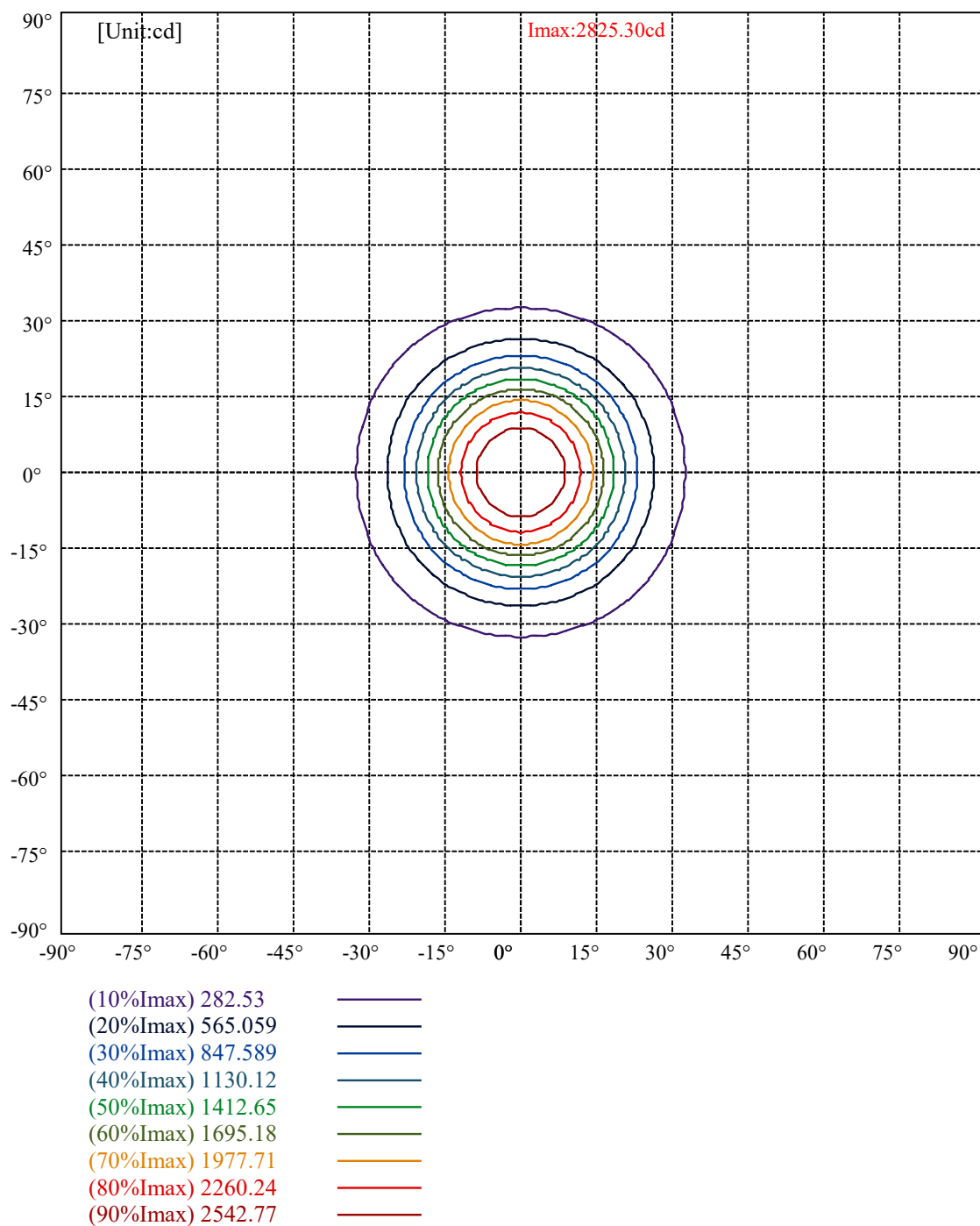
Field angle(10%Imax):C0/180Left:32.1 Right:32.1

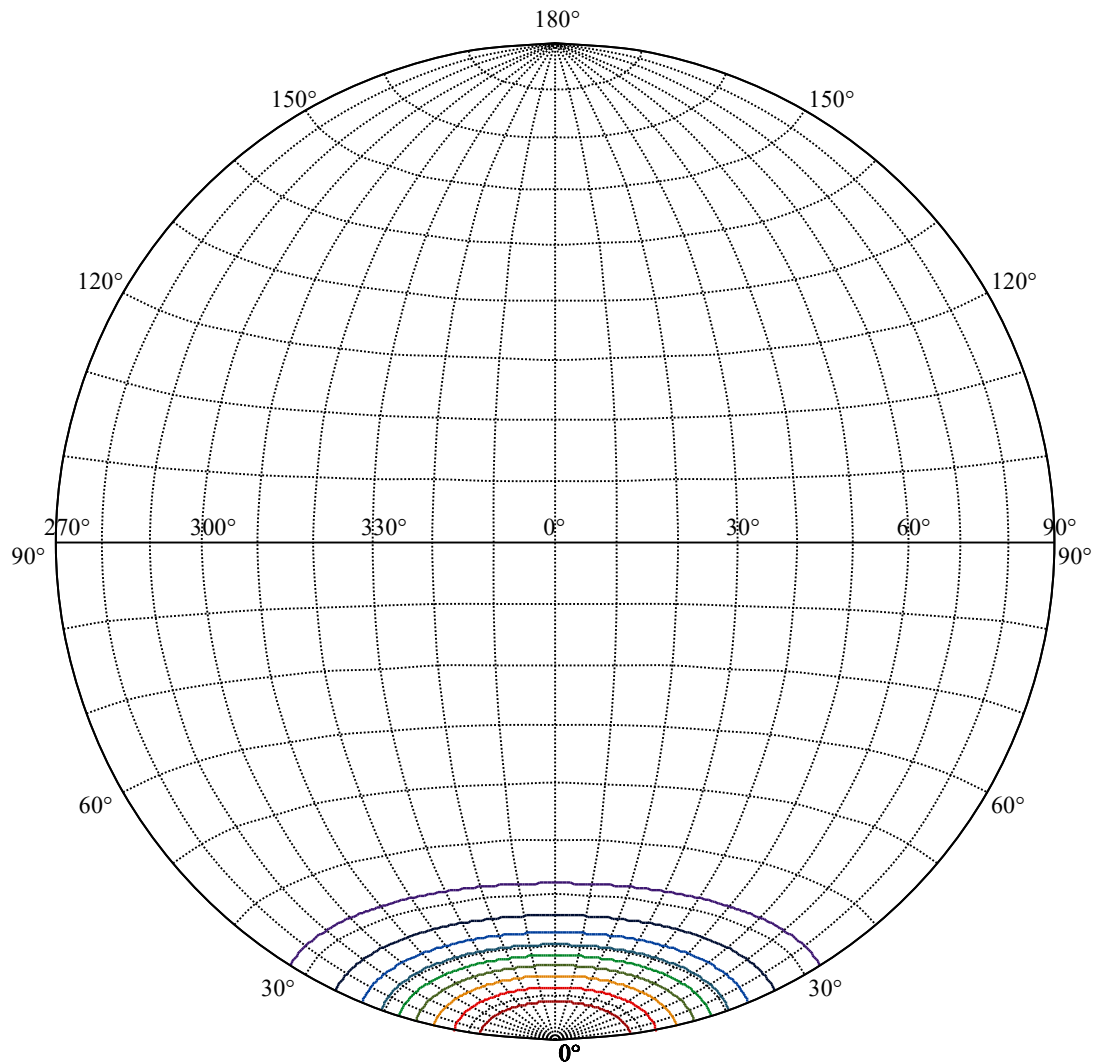
:C90/270Left:32.1 Right:32.1

Beam Angle(50%Imax):C0/180Left:18.2 Right:18.2

:C90/270Left:18.2 Right:18.2







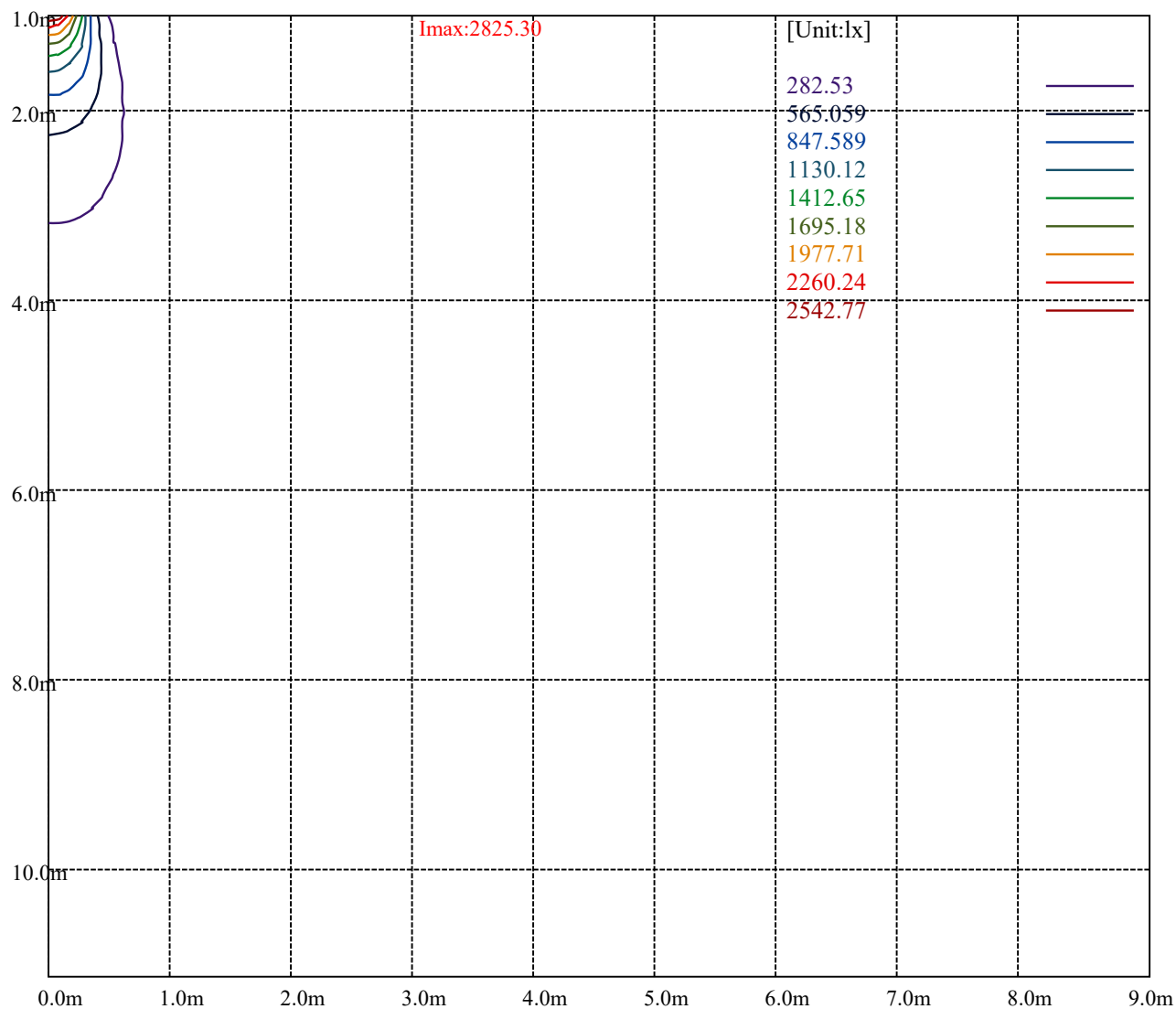
House

[Unit:cd]

Road

Imax:2825.30

(10%Imax)	282.53	—
(20%Imax)	565.059	—
(30%Imax)	847.589	—
(40%Imax)	1130.12	—
(50%Imax)	1412.65	—
(60%Imax)	1695.18	—
(70%Imax)	1977.71	—
(80%Imax)	2260.24	—
(90%Imax)	2542.77	—



Luminance Table

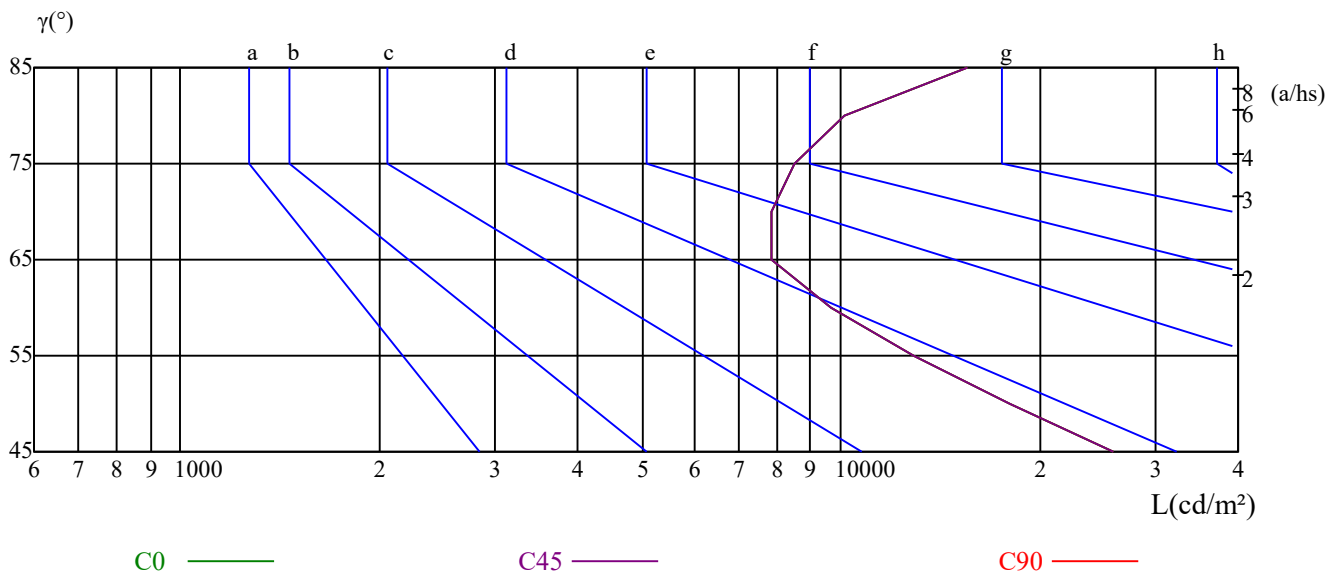
γ	45	50	55	60	65	70	75	80	85
C0	25864	18038	12887	9643	7837	7850	8510	10148	15559
C45	25864	18038	12887	9643	7837	7850	8510	10148	15559
C90	25864	18038	12887	9643	7837	7850	8510	10148	15559

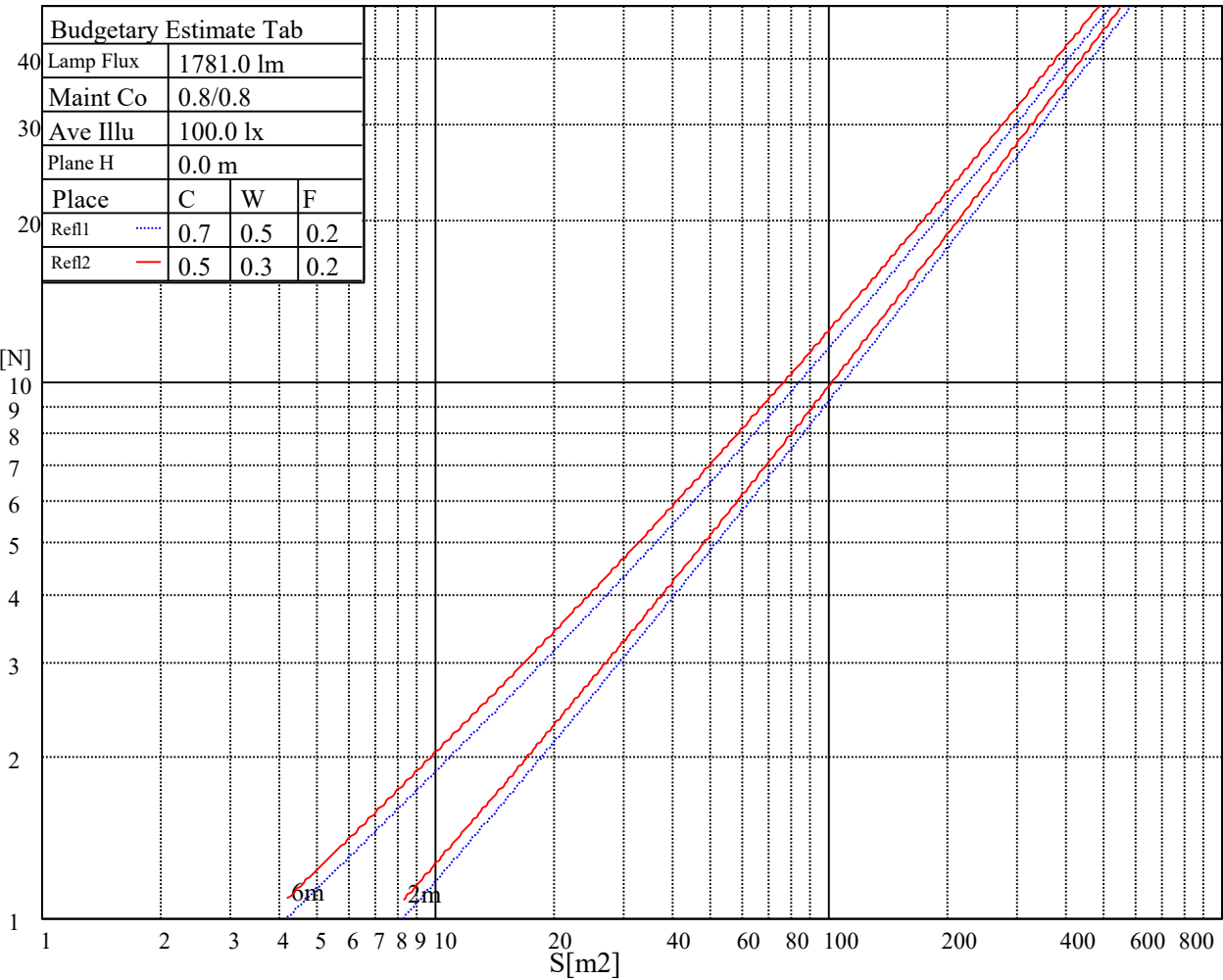
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
7837	7837	7837	8510	8510	8510	15559	15559	15559

Glare Table

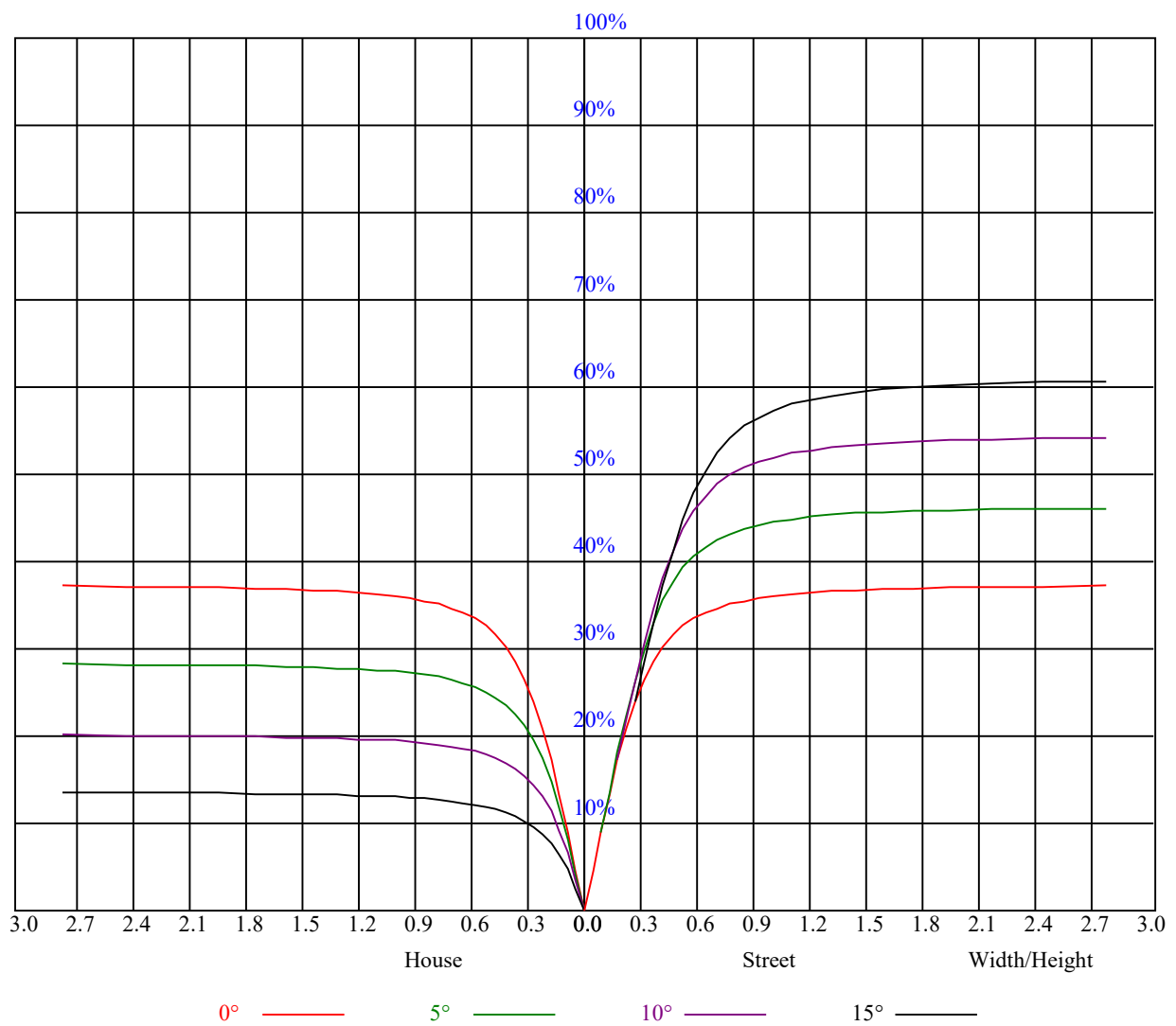
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

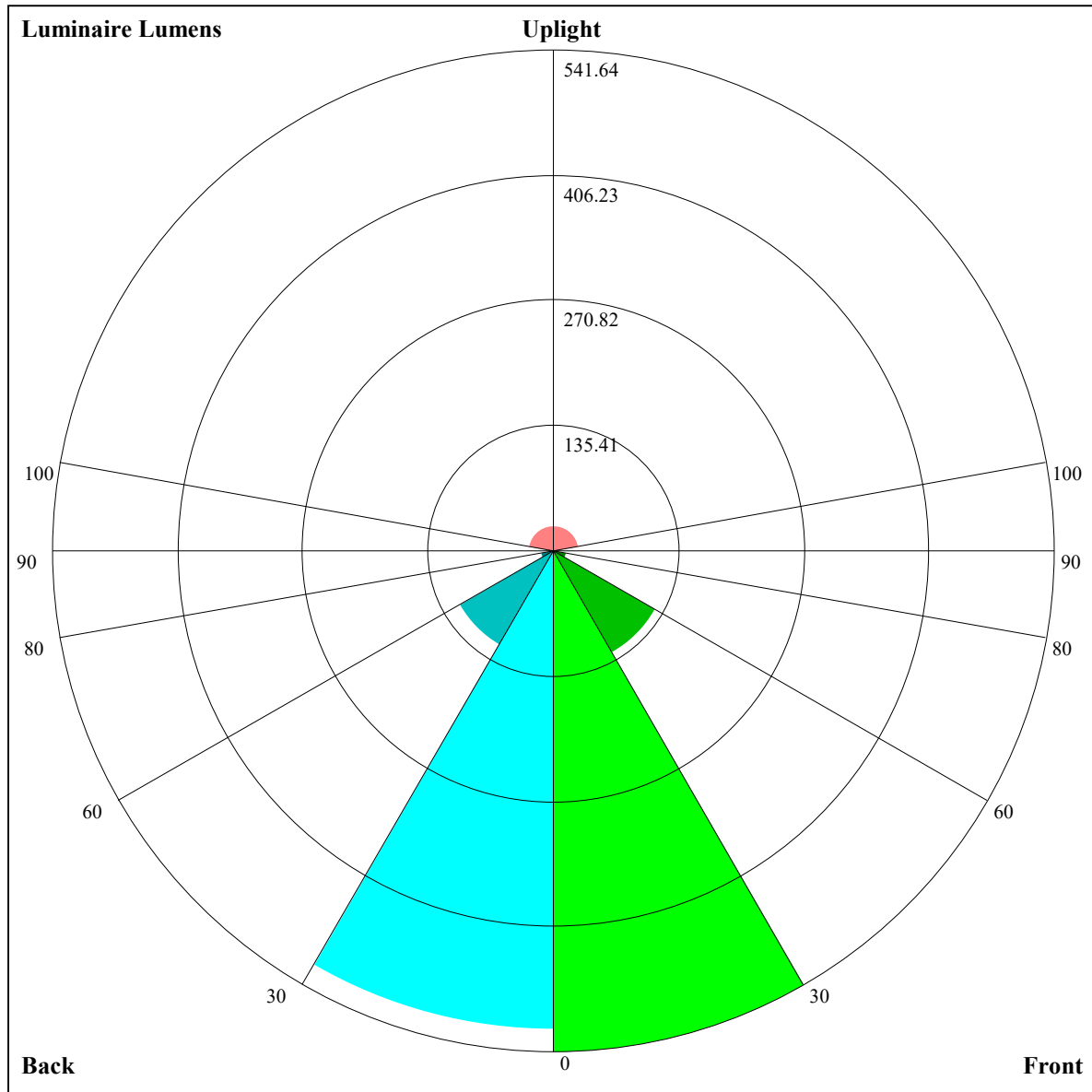
Luminance Limiting Curve





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	0.89	0.89	0.89	0.87	0.87	0.87	0.83	0.83	0.83	0.80	0.80	0.80	0.77	0.77	0.77	0.75
1	0.83	0.81	0.80	0.82	0.80	0.79	0.79	0.77	0.76	0.76	0.75	0.74	0.73	0.72	0.72	0.70
2	0.78	0.75	0.73	0.77	0.74	0.72	0.74	0.72	0.70	0.72	0.70	0.69	0.70	0.69	0.67	0.66
3	0.73	0.70	0.67	0.72	0.69	0.67	0.70	0.68	0.65	0.69	0.66	0.64	0.67	0.65	0.63	0.62
4	0.69	0.65	0.63	0.68	0.65	0.62	0.67	0.64	0.61	0.65	0.63	0.61	0.64	0.62	0.60	0.59
5	0.66	0.62	0.59	0.65	0.61	0.58	0.64	0.60	0.58	0.62	0.60	0.57	0.61	0.59	0.57	0.56
6	0.62	0.58	0.55	0.62	0.58	0.55	0.61	0.57	0.55	0.60	0.57	0.55	0.59	0.56	0.54	0.53
7	0.59	0.55	0.53	0.59	0.55	0.52	0.58	0.55	0.52	0.57	0.54	0.52	0.56	0.54	0.52	0.51
8	0.57	0.53	0.50	0.56	0.53	0.50	0.56	0.52	0.50	0.55	0.52	0.50	0.54	0.51	0.49	0.48
9	0.54	0.50	0.48	0.54	0.50	0.48	0.53	0.50	0.48	0.53	0.50	0.47	0.52	0.49	0.47	0.46
10	0.52	0.48	0.46	0.52	0.48	0.46	0.51	0.48	0.46	0.51	0.48	0.46	0.50	0.47	0.45	0.45





Luminaire Lumens:

FL=541.64,FM=126.66,FH=14.49,FVH=3.76

BL=517.8,BM=117.07,BH=13.81,BVH=3.64

UL=6.02,UH=28.66

BUG Rating:B2-U2-G0

NATA 2-1259-N

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	2837.81	2836.69	2835.56	2828.25	2814.19	2793.94	2755.13	2716.31	2670.75		
45.0	2815.88	2805.75	2786.06	2764.69	2729.81	2696.06	2641.50	2577.38	2505.38		
90.0	2818.13	2805.19	2782.69	2757.38	2722.50	2678.63	2628.00	2548.13	2472.19		
135.0	2829.38	2825.44	2810.81	2792.25	2769.75	2730.38	2678.06	2619.00	2550.94		
180.0	2837.81	2827.13	2814.75	2795.06	2761.31	2727.00	2676.94	2580.19	2513.25		
225.0	2815.88	2823.75	2825.44	2819.81	2808.00	2792.25	2756.25	2718.56	2671.88		
270.0	2818.13	2822.06	2828.81	2826.00	2820.38	2803.50	2777.63	2744.44	2702.81		
315.0	2829.38	2834.44	2836.13	2828.25	2811.94	2792.25	2759.06	2707.88	2657.81		
360.0	2837.81	2836.69	2835.56	2828.25	2814.19	2793.94	2755.13	2716.31	2670.75		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	2597.06	2530.69	2451.38	2356.31	2252.25	2148.75	2027.81	1893.38	1770.75		
45.0	2418.75	2320.88	2228.06	2139.75	1992.94	1875.94	1772.44	1618.88	1478.25		
90.0	2388.94	2273.06	2172.94	2064.94	1937.25	1802.81	1679.06	1538.44	1408.50		
135.0	2446.88	2351.81	2255.06	2133.56	2003.06	1878.19	1738.13	1592.44	1461.38		
180.0	2424.38	2285.44	2192.06	2079.56	1944.56	1805.06	1679.06	1528.31	1393.88		
225.0	2610.56	2521.13	2433.94	2324.25	2205.00	2094.19	1974.38	1834.88	1691.44		
270.0	2634.75	2568.38	2492.44	2394.56	2286.00	2174.06	2064.38	1911.94	1784.81		
315.0	2599.31	2505.38	2420.44	2328.19	2217.94	2093.63	1981.69	1846.13	1721.25		
360.0	2597.06	2530.69	2451.38	2356.31	2252.25	2148.75	2027.81	1893.38	1770.75		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	1630.13	1504.13	1364.06	1226.81	1108.13	980.44	862.88	768.38	686.81		
45.0	1368.00	1216.13	1082.81	981.56	843.19	751.50	666.56	579.38	521.44		
90.0	1265.06	1112.01	1007.83	886.05	776.31	690.98	615.71	535.39	479.64		
135.0	1316.25	1190.25	1053.56	922.50	817.88	720.00	630.56	565.31	503.44		
180.0	1208.81	1121.96	990.96	872.72	779.91	686.19	612.84	539.21	473.18		
225.0	1541.81	1413.00	1285.88	1110.49	1006.54	896.06	785.36	689.85	614.59		
270.0	1638.56	1505.81	1359.56	1232.44	1091.81	958.50	852.19	744.75	660.94		
315.0	1573.88	1428.75	1300.50	1110.54	1017.68	904.11	800.61	689.91	615.60		
360.0	1630.13	1504.13	1364.06	1226.81	1108.13	980.44	862.88	768.38	686.81		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	597.38	535.50	480.94	426.94	380.81	344.81	308.81	286.88	249.08		
45.0	468.56	408.94	368.44	331.88	293.06	285.75	240.41	218.25	199.24		
90.0	429.41	379.35	330.92	301.67	269.49	242.10	221.79	202.11	186.75		
135.0	438.19	392.06	348.75	308.81	286.31	248.96	228.54	206.55	191.31		
180.0	420.02	373.05	323.61	291.77	264.54	235.86	216.11	198.79	181.69		
225.0	549.11	475.99	425.14	380.76	335.98	298.74	270.68	244.29	221.74		
270.0	578.81	508.50	454.50	413.44	357.75	322.88	296.44	269.38	237.83		
315.0	551.31	494.38	433.18	391.73	353.53	307.97	283.22	258.19	234.11		
360.0	597.38	535.50	480.94	426.94	380.81	344.81	308.81	286.88	249.08		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	224.72	205.54	187.03	170.55	157.95	145.35	132.36	121.44	111.38		
45.0	183.83	168.58	156.26	142.99	128.93	118.07	108.28	98.44	91.13		
90.0	171.79	158.18	147.09	134.16	121.78	112.33	103.44	93.49	86.23		
135.0	177.41	163.07	150.41	139.05	126.11	115.93	105.92	96.41	89.33		
180.0	166.84	154.69	142.26	129.99	119.53	109.29	100.86	92.08	84.15		
225.0	204.53	187.54	173.93	159.98	146.76	134.78	123.36	111.38	102.88		
270.0	219.15	200.64	183.99	171.00	157.84	146.93	133.48	120.49	110.76		
315.0	213.36	197.44	181.29	166.67	154.63	142.14	129.21	116.94	106.26		
360.0	224.72	205.54	187.03	170.55	157.95	145.35	132.36	121.44	111.38		

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Intensity data(cd)										Appendix Page: 18 Total:19	
C/ γ (°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0		
0.0	100.80	93.09	85.95	78.41	71.33	65.42	59.40	54.17	49.78		
45.0	84.38	76.11	69.75	64.07	58.44	53.33	48.88	44.27	40.39		
90.0	79.48	71.55	65.76	60.47	54.51	50.06	45.90	41.18	38.42		
135.0	81.51	73.86	67.95	63.11	56.36	51.81	48.15	43.20	39.32		
180.0	77.57	71.44	64.41	59.23	54.56	49.11	45.06	41.40	37.63		
225.0	94.84	85.56	78.58	72.17	65.64	59.63	54.62	49.67	45.62		
270.0	100.80	91.91	84.49	77.63	69.69	63.79	58.50	53.10	48.21		
315.0	97.54	89.72	80.78	74.14	68.18	61.37	56.36	51.81	47.19		
360.0	100.80	93.09	85.95	78.41	71.33	65.42	59.40	54.17	49.78		
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0		
0.0	45.34	41.79	38.19	34.88	32.23	29.87	27.11	24.98	23.12		
45.0	37.29	34.14	31.44	28.86	26.38	24.36	22.28	20.31	18.84		
90.0	34.93	31.56	29.48	27.28	24.47	22.89	21.15	19.01	17.83		
135.0	36.51	33.08	30.32	28.07	25.43	23.51	21.71	19.69	18.23		
180.0	34.31	31.67	28.91	26.72	24.36	22.22	20.48	18.73	17.33		
225.0	41.46	37.74	34.76	31.73	28.97	26.66	24.58	22.16	20.42		
270.0	44.27	40.28	36.62	33.81	30.88	28.46	25.99	23.68	21.83		
315.0	42.98	39.49	36.06	33.30	30.38	27.79	25.71	23.46	21.38		
360.0	45.34	41.79	38.19	34.88	32.23	29.87	27.11	24.98	23.12		
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0		
0.0	21.09	19.35	18.06	16.88	16.03	15.36	14.68	14.12	13.56		
45.0	17.61	16.37	15.75	15.08	14.40	13.84	13.33	12.83	12.38		
90.0	16.76	15.86	15.19	14.57	14.01	13.56	13.05	12.49	12.09		
135.0	16.99	15.98	15.36	14.79	14.12	13.67	13.22	12.77	12.26		
180.0	16.48	15.75	15.02	14.46	13.89	13.39	12.88	12.43	11.98		
225.0	18.79	17.38	16.31	15.58	14.85	14.23	13.73	13.16	12.71		
270.0	19.91	18.34	17.16	16.37	15.47	14.79	14.29	13.73	13.16		
315.0	19.69	18.34	16.99	16.20	15.53	14.85	14.23	13.73	13.11		
360.0	21.09	19.35	18.06	16.88	16.03	15.36	14.68	14.12	13.56		
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0		
0.0	12.99	12.54	12.09	11.53	11.08	10.69	10.24	9.79	9.39		
45.0	11.93	11.42	11.03	10.58	10.13	9.73	9.28	8.78	8.38		
90.0	11.64	11.19	10.74	10.35	9.79	9.45	9.00	8.61	8.10		
135.0	11.81	11.36	10.91	10.46	10.01	9.62	9.11	8.72	8.33		
180.0	11.48	11.03	10.58	10.13	9.68	9.23	8.83	8.44	7.99		
225.0	12.21	11.76	11.31	10.86	10.46	10.01	9.68	9.17	8.78		
270.0	12.71	12.21	11.76	11.25	10.86	10.41	9.96	9.51	9.11		
315.0	12.60	12.15	11.70	11.19	10.80	10.35	9.90	9.51	9.00		
360.0	12.99	12.54	12.09	11.53	11.08	10.69	10.24	9.79	9.39		
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0		
0.0	8.83	8.44	8.10	7.59	7.26	6.81	6.47	6.13	5.85		
45.0	7.93	7.59	7.14	6.81	6.41	6.08	5.74	5.57	5.46		
90.0	7.76	7.31	6.92	6.64	6.24	5.91	5.68	5.51	5.40		
135.0	7.88	7.48	7.09	6.75	6.41	6.02	5.79	5.57	5.51		
180.0	7.65	7.26	6.86	6.53	6.13	5.79	5.63	5.46	5.51		
225.0	8.38	7.93	7.54	7.14	6.81	6.47	6.08	5.79	5.57		
270.0	8.72	8.21	7.82	7.48	6.98	6.64	6.24	5.91	5.68		
315.0	8.61	8.21	7.71	7.31	6.92	6.58	6.24	5.91	5.68		
360.0	8.83	8.44	8.10	7.59	7.26	6.81	6.47	6.13	5.85		

Intensity data(cd)

Appendix Page: 19 Total:19

C/γ(°)	90.0
0.0	5.68
45.0	5.40
90.0	5.46
135.0	5.51
180.0	5.51
225.0	5.46
270.0	5.57
315.0	5.57
360.0	5.68