
NATA

Client:

LumCAT: 3-2116-N

Luminaire: 92.70.131.00

Report No: nata-0100

Test No: GC2018121205

LampCAT: OSRAM SOLERIQ S13

Lamp flux(lm): 1828.0

Number of Lamps: 1

Length(mm): 80

Phm Type: C

Voltage(V): 36.7000

Current(A): 0.5100

Power (W): 18.7170

PF: 0.0000

Ballast type: DC

Width(mm): 80

Height(mm): 0

Photometric Results

Lumens(lm): 1475.91, Efficiency(%): 80.74% , Luminous Efficacy(lm/W): 78.85

Central intensity(cd): 3723.609, Maximum intensity(cd): 3723.609

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=59.6

[C90/270]Total=59.6

Maximum s/h(1/2): C0_180=0.62 C90_270=0.62

Maximum s/h(1/4): C0_180=0.55 C90_270=0.55

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 80.78%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 98.089%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	3723.609	0.891	0.891	.049%	.060%
1.0	3721.992	7.123	8.014	.390%	.543%
2.0	3705.820	14.183	22.197	.776%	1.504%
3.0	3683.531	21.141	43.337	1.156%	2.936%
4.0	3656.109	27.968	71.305	1.530%	4.831%
5.0	3624.047	34.637	105.942	1.895%	7.178%
6.0	3582.773	41.068	147.01	2.247%	9.961%
7.0	3535.805	47.254	194.264	2.585%	13.162%
8.0	3484.688	53.183	247.447	2.909%	16.766%
9.0	3416.273	58.605	306.052	3.206%	20.736%
10.0	3329.859	63.409	369.46	3.469%	25.033%
11.0	3239.016	67.774	437.234	3.708%	29.625%
12.0	3124.266	71.233	508.467	3.897%	34.451%
13.0	2969.648	73.256	581.723	4.007%	39.415%
14.0	2810.461	74.560	656.283	4.079%	44.466%
15.0	2620.125	74.365	730.648	4.068%	49.505%
16.0	2396.813	72.448	803.096	3.963%	54.414%
17.0	2166.891	69.474	872.57	3.801%	59.121%
18.0	1915.805	64.921	937.491	3.551%	63.520%
19.0	1653.188	59.022	996.513	3.229%	67.519%
20.0	1384.270	51.919	1048.432	2.840%	71.036%
21.0	1185.539	46.590	1095.023	2.549%	74.193%
22.0	991.793	40.743	1135.765	2.229%	76.954%
23.0	861.448	36.911	1172.676	2.019%	79.454%
24.0	755.445	33.695	1206.372	1.843%	81.738%
25.0	684.893	31.741	1238.113	1.736%	83.888%
26.0	636.265	30.587	1268.699	1.673%	85.961%
27.0	583.263	29.038	1297.737	1.588%	87.928%
28.0	515.974	26.564	1324.301	1.453%	89.728%
29.0	437.386	23.253	1347.554	1.272%	91.303%
30.0	353.841	19.401	1366.956	1.061%	92.618%
31.0	258.300	14.589	1381.544	.798%	93.606%
32.0	195.019	11.333	1392.877	.620%	94.374%
33.0	116.761	6.974	1399.851	.381%	94.847%
34.0	73.350	4.498	1404.349	.246%	95.151%
35.0	52.622	3.310	1407.658	.181%	95.376%
36.0	45.759	2.950	1410.608	.161%	95.576%
37.0	40.830	2.695	1413.303	.147%	95.758%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	36.605	2.471	1415.774	.135%	95.926%
39.0	33.216	2.292	1418.066	.125%	96.081%
40.0	30.354	2.140	1420.206	.117%	96.226%
41.0	28.048	2.018	1422.224	.110%	96.363%
42.0	25.854	1.897	1424.121	.104%	96.491%
43.0	23.822	1.782	1425.902	.097%	96.612%
44.0	22.310	1.700	1427.602	.093%	96.727%
45.0	20.904	1.621	1429.223	.089%	96.837%
46.0	19.547	1.542	1430.765	.084%	96.941%
47.0	18.513	1.485	1432.249	.081%	97.042%
48.0	17.648	1.438	1433.688	.079%	97.139%
49.0	16.763	1.387	1435.075	.076%	97.233%
50.0	16.024	1.346	1436.421	.074%	97.324%
51.0	15.455	1.317	1437.738	.072%	97.414%
52.0	14.871	1.285	1439.023	.070%	97.501%
53.0	14.365	1.258	1440.281	.069%	97.586%
54.0	13.915	1.234	1441.516	.068%	97.670%
55.0	13.493	1.212	1442.728	.066%	97.752%
56.0	13.106	1.192	1443.919	.065%	97.833%
57.0	12.783	1.176	1445.095	.064%	97.912%
58.0	12.431	1.156	1446.251	.063%	97.991%
59.0	12.150	1.142	1447.393	.062%	98.068%
60.0	11.869	1.127	1448.52	.062%	98.144%
61.0	11.559	1.109	1449.629	.061%	98.219%
62.0	11.341	1.098	1450.727	.060%	98.294%
63.0	11.123	1.087	1451.814	.059%	98.367%
64.0	10.870	1.071	1452.885	.059%	98.440%
65.0	10.666	1.060	1453.946	.058%	98.512%
66.0	10.470	1.049	1454.994	.057%	98.583%
67.0	10.273	1.037	1456.031	.057%	98.653%
68.0	10.076	1.024	1457.056	.056%	98.723%
69.0	9.900	1.014	1458.069	.055%	98.791%
70.0	9.745	1.004	1459.074	.055%	98.859%
71.0	9.548	0.990	1460.064	.054%	98.926%
72.0	9.387	0.979	1461.043	.054%	98.993%
73.0	9.225	0.967	1462.01	.053%	99.058%
74.0	9.077	0.957	1462.967	.052%	99.123%
75.0	8.895	0.942	1463.909	.052%	99.187%

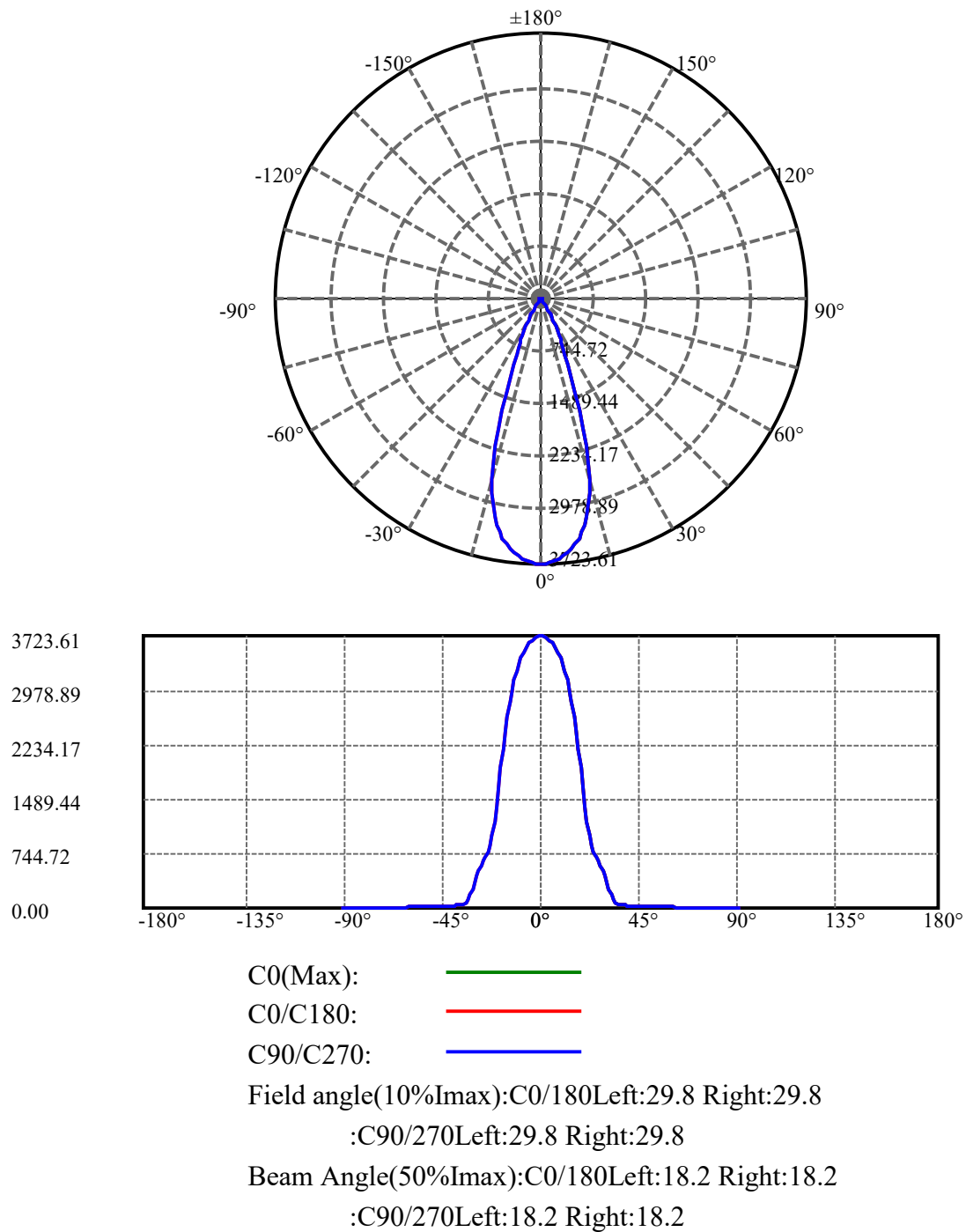
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	8.726	0.928	1464.837	.051%	99.250%
77.0	8.557	0.914	1465.752	.050%	99.312%
78.0	8.388	0.900	1466.652	.049%	99.373%
79.0	8.213	0.884	1467.536	.048%	99.433%
80.0	8.044	0.869	1468.404	.048%	99.491%
81.0	7.889	0.854	1469.259	.047%	99.549%
82.0	7.727	0.839	1470.098	.046%	99.606%
83.0	7.580	0.825	1470.923	.045%	99.662%
84.0	7.411	0.808	1471.731	.044%	99.717%
85.0	7.263	0.793	1472.525	.043%	99.771%
86.0	7.116	0.778	1473.303	.043%	99.823%
87.0	6.947	0.761	1474.064	.042%	99.875%
88.0	6.806	0.746	1474.81	.041%	99.925%
89.0	6.722	0.737	1475.547	.040%	99.975%
90.0	6.616	0.363	1475.909	.020%	100.000%

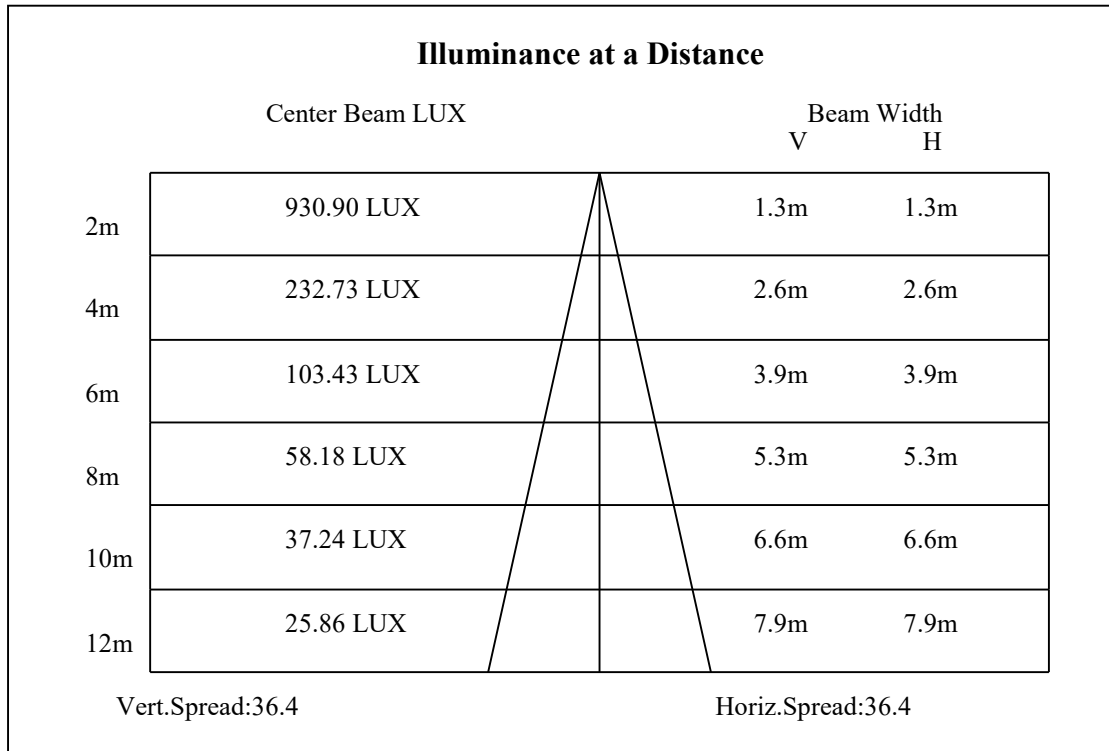
ZONAL LUMEN SUMMARY

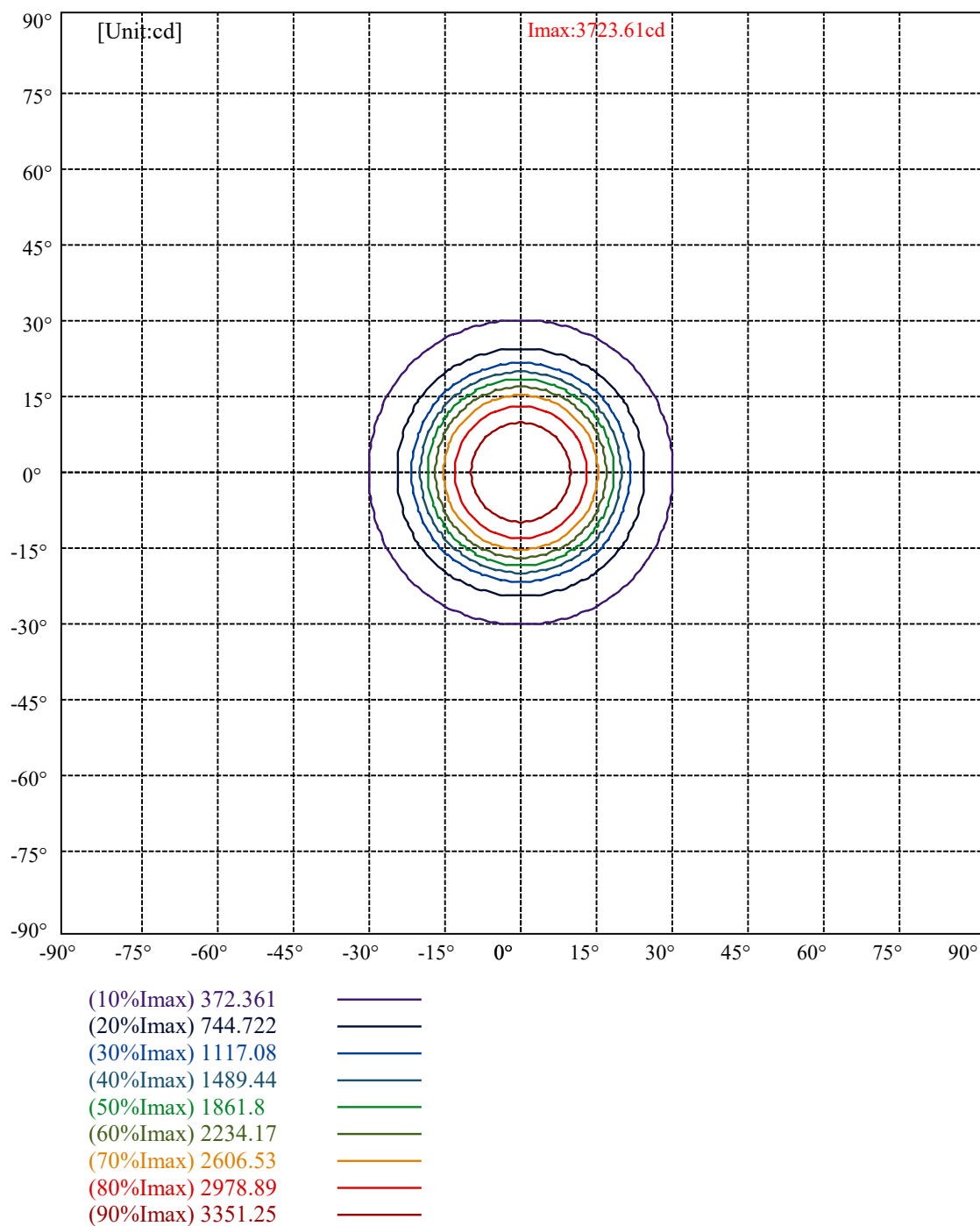
Zone	Lumens	%Lamp	%Fixt
0-30	1366.96	74.78%	92.62%
0-40	1420.21	77.69%	96.23%
0-60	1448.52	79.24%	98.14%
0-90	1475.55	80.72%	99.98%
0-120	1475.55	80.72%	99.98%
0-180	1475.91	80.74%	100.00%
60-90	28.15	1.54%	1.91%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-23.24	1180.73	64.59%	80.00%

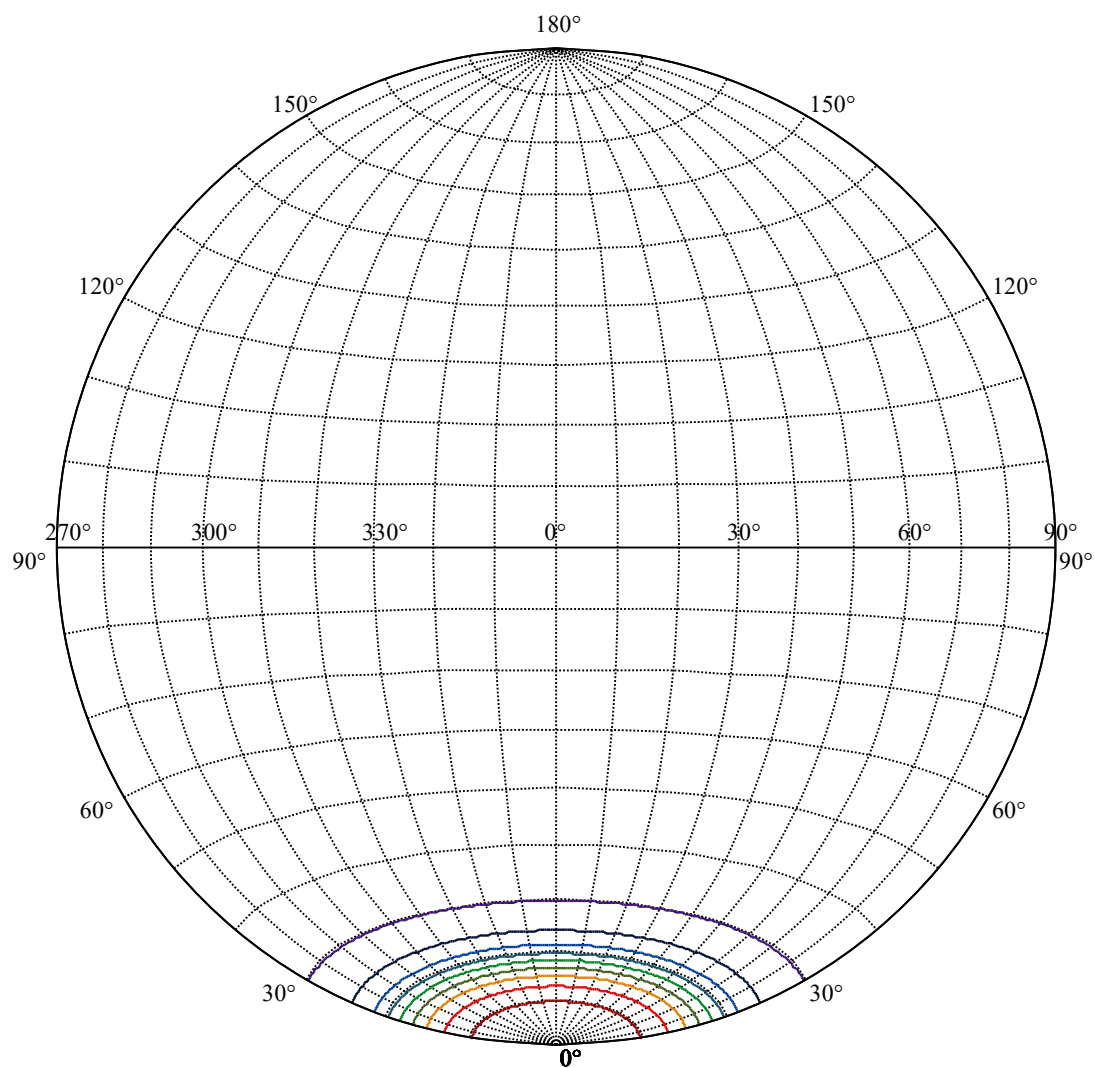
ZONAL LUMEN SUMMARY

0-10	369.46
10-20	678.97
20-30	318.52
30-40	53.25
40-50	16.22
50-60	12.10
60-70	10.55
70-80	9.33
80-90	7.14
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









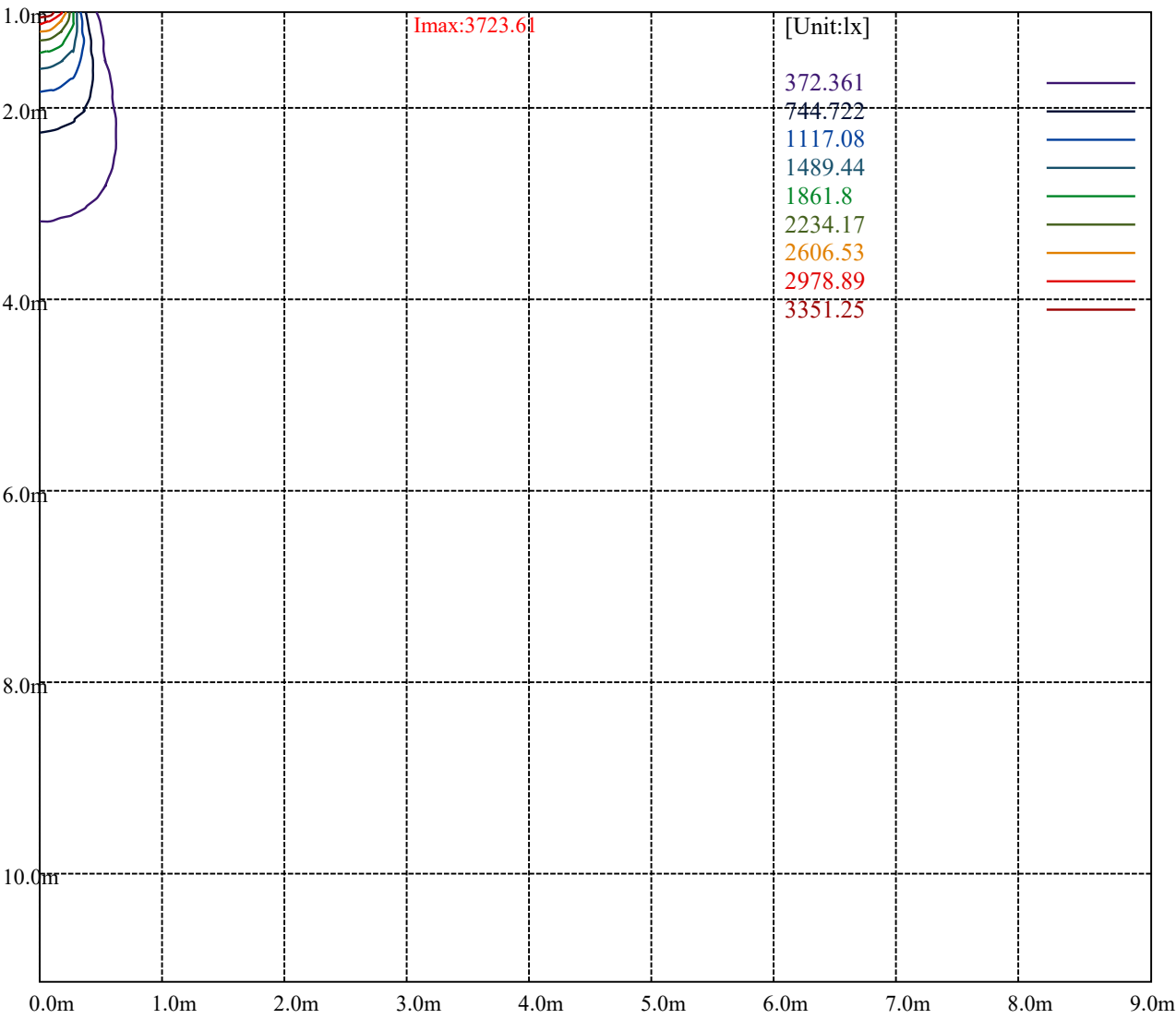
House

[Unit:cd]

Road

Imax:3723.61

(10%Imax)	372.361	—
(20%Imax)	744.722	—
(30%Imax)	1117.08	—
(40%Imax)	1489.44	—
(50%Imax)	1861.8	—
(60%Imax)	2234.17	—
(70%Imax)	2606.53	—
(80%Imax)	2978.89	—
(90%Imax)	3351.25	—



Luminance Table

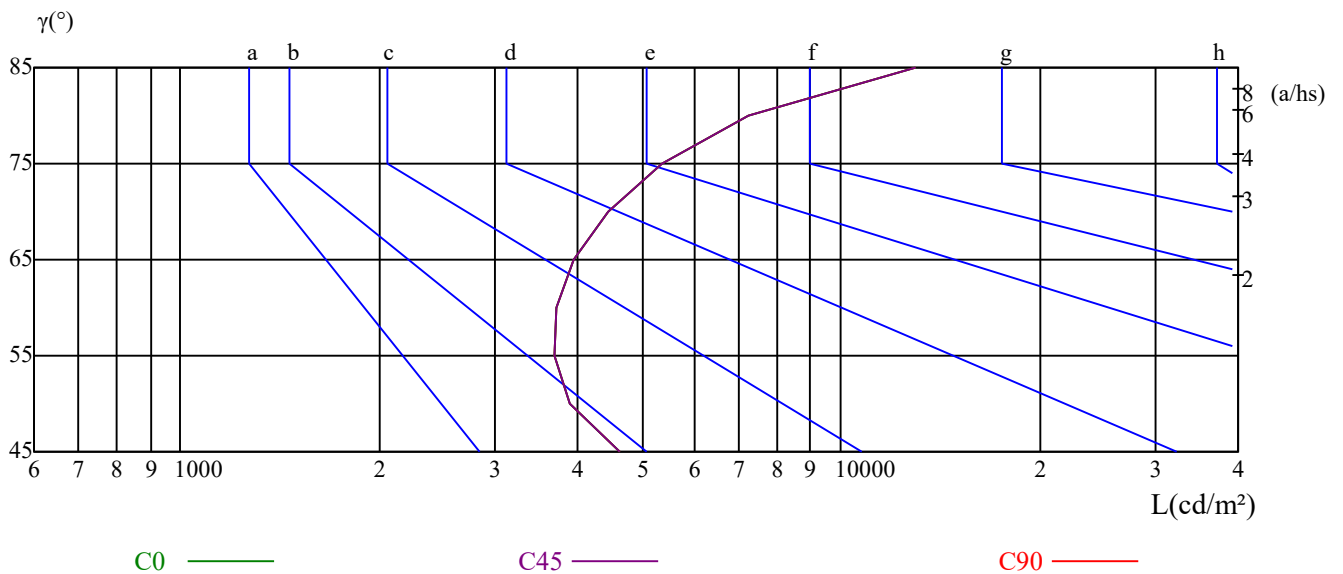
γ	45	50	55	60	65	70	75	80	85
C0	4619	3895	3676	3709	3944	4452	5370	7238	13021
C45	4619	3895	3676	3709	3944	4452	5370	7238	13021
C90	4619	3895	3676	3709	3944	4452	5370	7238	13021

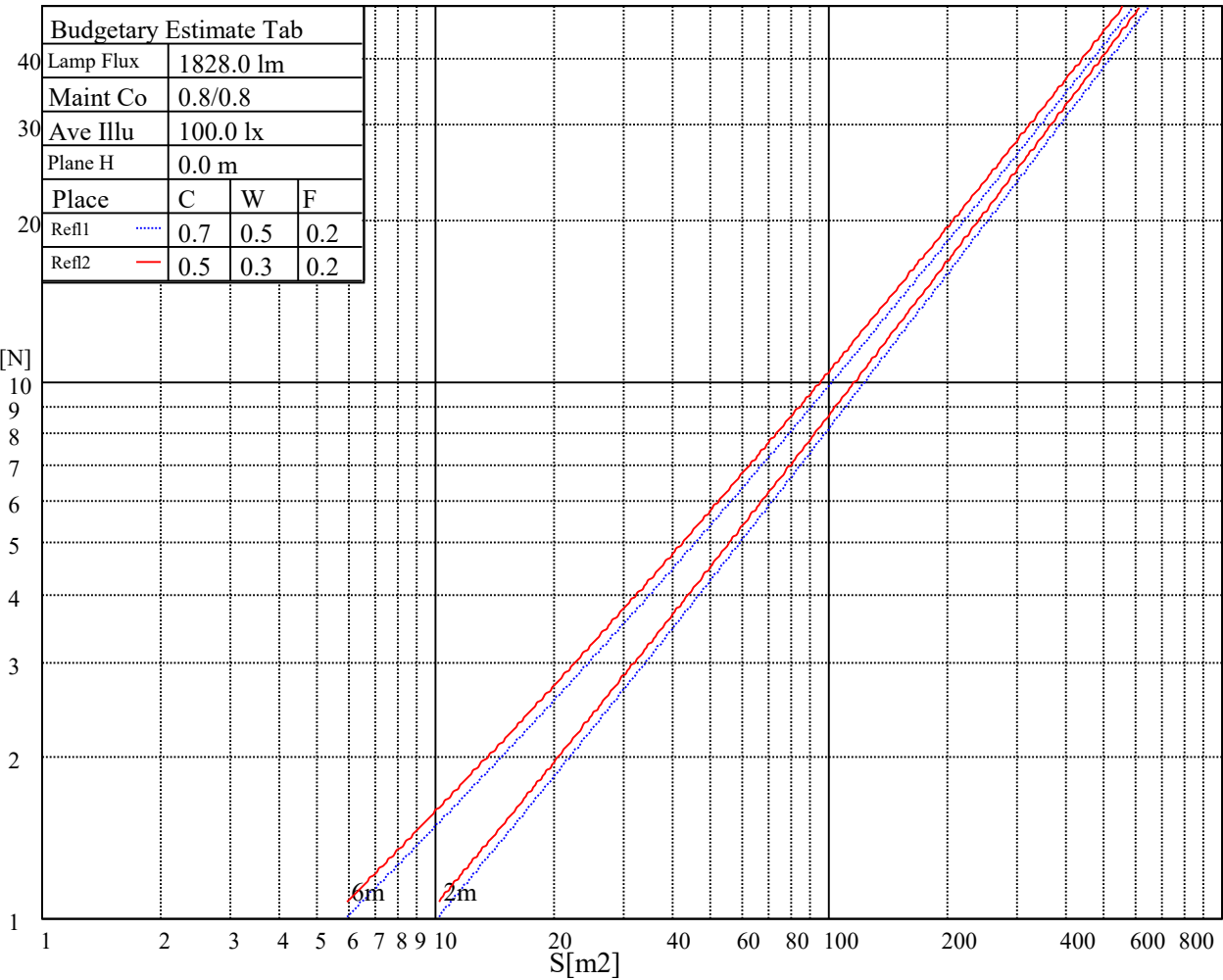
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3944	3944	3944	5370	5370	5370	13021	13021	13021

Glare Table

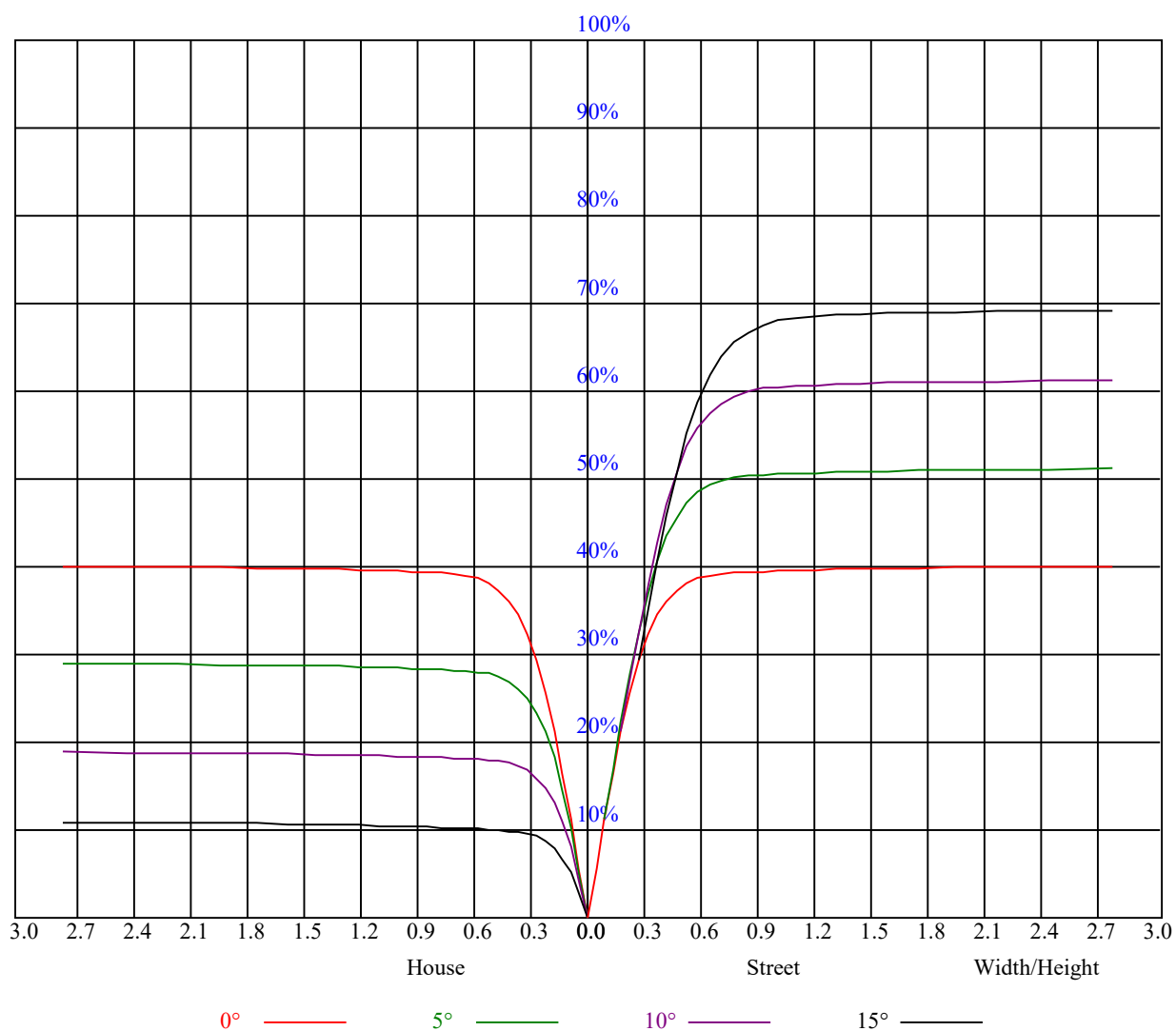
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

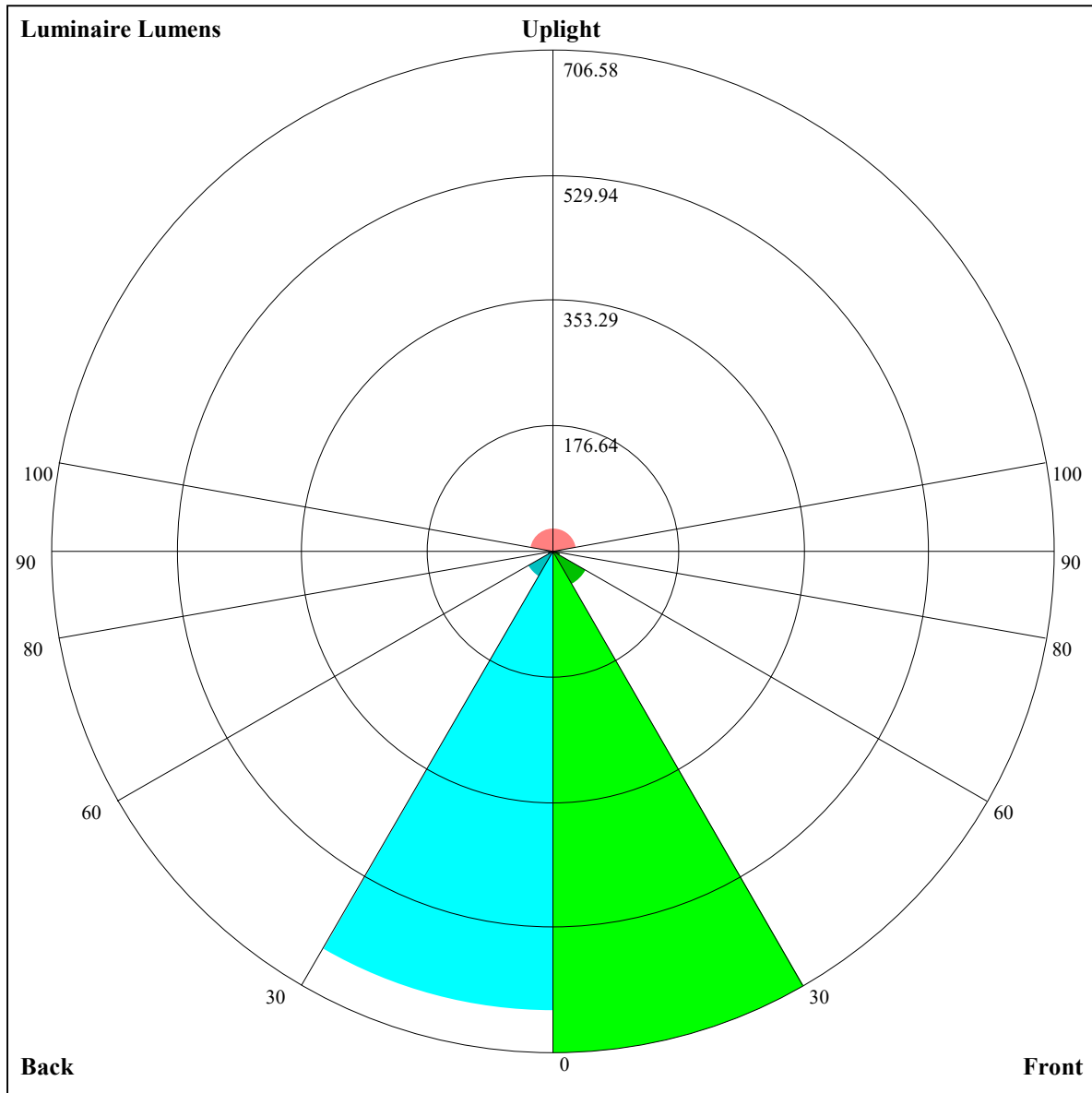
Luminance Limiting Curve





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	0.96	0.96	0.96	0.94	0.94	0.94	0.90	0.90	0.90	0.86	0.86	0.86	0.82	0.82	0.82	0.81
1	0.90	0.89	0.87	0.89	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.80	0.80	0.79	0.78	0.77
2	0.85	0.83	0.80	0.84	0.82	0.79	0.82	0.80	0.78	0.79	0.78	0.76	0.77	0.76	0.75	0.73
3	0.81	0.78	0.75	0.80	0.77	0.75	0.78	0.76	0.74	0.76	0.74	0.72	0.74	0.73	0.71	0.70
4	0.78	0.74	0.71	0.77	0.73	0.71	0.75	0.72	0.70	0.73	0.71	0.69	0.72	0.70	0.68	0.67
5	0.74	0.70	0.68	0.73	0.70	0.67	0.72	0.69	0.67	0.71	0.68	0.66	0.70	0.67	0.66	0.65
6	0.71	0.67	0.65	0.71	0.67	0.64	0.70	0.66	0.64	0.68	0.66	0.64	0.67	0.65	0.63	0.62
7	0.68	0.65	0.62	0.68	0.64	0.62	0.67	0.64	0.62	0.66	0.63	0.61	0.65	0.63	0.61	0.60
8	0.66	0.62	0.60	0.66	0.62	0.59	0.65	0.62	0.59	0.64	0.61	0.59	0.63	0.61	0.59	0.58
9	0.64	0.60	0.57	0.63	0.60	0.57	0.63	0.59	0.57	0.62	0.59	0.57	0.61	0.59	0.57	0.56
10	0.61	0.58	0.55	0.61	0.58	0.55	0.61	0.57	0.55	0.60	0.57	0.55	0.60	0.57	0.55	0.54





Luminaire Lumens:

FL=706.58,FM=52.74,FH=10.1,FVH=3.99

BL=648.35,BM=41.21,BH=9.91,BVH=3.95

UL=7.22,UH=34.35

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	3725.44	3727.69	3711.94	3691.69	3661.31	3629.25	3590.44	3557.81	3516.75		
45.0	3717.00	3724.88	3717.00	3697.31	3674.81	3649.50	3618.56	3574.13	3535.88		
90.0	3726.56	3727.69	3714.19	3691.13	3668.63	3639.94	3606.19	3566.25	3511.13		
135.0	3725.44	3727.69	3718.13	3705.19	3687.19	3664.69	3621.94	3587.63	3531.94		
180.0	3725.44	3718.69	3709.13	3690.00	3664.69	3628.13	3592.13	3521.81	3450.38		
225.0	3717.00	3709.69	3687.75	3659.06	3632.06	3591.56	3543.75	3485.81	3427.88		
270.0	3726.56	3720.94	3702.94	3669.75	3641.06	3606.19	3552.75	3504.94	3457.69		
315.0	3725.44	3718.69	3685.50	3664.13	3619.13	3583.13	3536.44	3488.06	3445.88		
360.0	3725.44	3727.69	3711.94	3691.69	3661.31	3629.25	3590.44	3557.81	3516.75		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	3459.94	3404.81	3344.06	3260.81	3150.00	3035.25	2873.25	2681.44	2478.38		
45.0	3475.13	3396.94	3318.19	3222.00	3075.19	2922.75	2753.44	2509.31	2294.44		
90.0	3444.19	3345.75	3236.63	3109.50	2915.44	2729.25	2527.88	2274.75	2005.88		
135.0	3443.06	3358.13	3243.38	3093.19	2910.94	2727.56	2491.88	2267.44	2000.81		
180.0	3362.06	3228.19	3106.13	2960.44	2750.06	2555.44	2342.81	2068.88	1868.06		
225.0	3361.50	3261.94	3155.63	3024.00	2876.63	2687.63	2465.44	2250.00	2023.31		
270.0	3388.50	3321.56	3254.06	3150.00	3029.63	2903.63	2732.06	2549.25	2320.88		
315.0	3395.81	3321.56	3254.06	3174.19	3049.31	2922.19	2774.25	2573.44	2343.38		
360.0	3459.94	3404.81	3344.06	3260.81	3150.00	3035.25	2873.25	2681.44	2478.38		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	2232.56	2009.25	1744.88	1478.25	1255.50	1063.13	880.31	784.69	713.25		
45.0	2053.69	1805.06	1548.00	1316.81	1084.50	901.13	791.44	701.44	646.31		
90.0	1762.31	1481.63	1121.96	997.37	828.96	733.44	658.13	606.32	578.98		
135.0	1709.44	1477.13	1211.06	988.31	838.69	737.44	646.88	601.31	574.88		
180.0	1601.44	1228.50	1099.80	929.08	811.63	718.82	660.43	609.75	561.15		
225.0	1735.88	1504.69	1119.15	1051.43	888.75	796.84	728.21	664.76	624.66		
270.0	2104.88	1847.25	1590.75	1338.19	1135.69	972.00	835.31	757.69	697.50		
315.0	2126.25	1872.00	1638.56	1384.88	1090.63	968.79	842.85	753.19	693.39		
360.0	2232.56	2009.25	1744.88	1478.25	1255.50	1063.13	880.31	784.69	713.25		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	651.94	612.56	555.19	469.69	376.31	291.94	200.08	122.63	71.55		
45.0	596.25	546.19	477.00	402.19	300.38	291.38	151.09	81.34	57.21		
90.0	534.49	453.88	374.79	291.38	192.99	123.19	70.76	50.96	46.07		
135.0	527.06	451.13	374.63	292.50	188.94	118.07	70.37	52.59	46.46		
180.0	497.42	424.07	323.33	240.13	162.84	88.14	55.74	49.56	44.27		
225.0	558.28	465.30	366.13	278.61	190.13	116.66	66.77	51.58	46.29		
270.0	653.63	586.13	512.44	425.81	320.63	289.69	156.77	88.82	54.22		
315.0	647.04	588.54	515.59	430.43	334.18	241.09	162.51	89.33	54.90		
360.0	651.94	612.56	555.19	469.69	376.31	291.94	200.08	122.63	71.55		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	53.89	48.38	42.30	37.52	34.43	31.73	28.74	26.72	24.81		
45.0	51.13	45.17	39.43	36.11	32.68	30.09	27.51	25.26	23.63		
90.0	41.34	36.23	33.64	30.77	27.90	26.10	24.36	22.16	21.04		
135.0	41.85	37.35	34.14	31.16	28.46	26.38	24.30	22.56	21.15		
180.0	39.09	35.66	32.51	30.09	27.62	25.43	23.74	22.11	20.70		
225.0	41.06	36.56	33.64	30.66	28.07	26.10	24.30	22.39	20.98		
270.0	48.77	43.26	38.42	34.59	31.56	29.14	26.72	24.64	23.01		
315.0	48.94	44.04	38.76	34.82	32.12	29.42	27.17	24.75	23.18		
360.0	53.89	48.38	42.30	37.52	34.43	31.73	28.74	26.72	24.81		

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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	22.84	21.38	20.25	19.13	17.94	17.16	16.48	15.75	15.19		
45.0	21.83	20.48	19.35	18.34	17.33	16.59	15.98	15.30	14.68		
90.0	19.86	18.51	17.72	16.99	16.09	15.47	14.91	14.40	13.95		
135.0	20.19	18.73	17.83	17.16	16.26	15.64	15.13	14.57	14.06		
180.0	19.58	18.62	17.55	16.82	16.20	15.53	14.96	14.51	14.01		
225.0	19.86	18.68	17.66	16.88	16.09	15.41	14.96	14.40	14.01		
270.0	21.49	19.97	18.79	17.89	16.99	16.14	15.58	14.96	14.40		
315.0	21.60	20.03	18.96	18.00	17.21	16.26	15.64	15.08	14.63		
360.0	22.84	21.38	20.25	19.13	17.94	17.16	16.48	15.75	15.19		
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0		
0.0	14.68	14.18	13.73	13.39	12.99	12.71	12.32	12.04	11.76		
45.0	14.29	13.73	13.28	12.94	12.60	12.32	11.98	11.70	11.53		
90.0	13.50	13.11	12.77	12.43	12.09	11.87	11.59	11.31	11.08		
135.0	13.67	13.28	12.88	12.54	12.21	11.93	11.70	11.36	11.19		
180.0	13.61	13.28	12.94	12.60	12.32	11.98	11.76	11.48	11.25		
225.0	13.50	13.11	12.77	12.54	12.15	11.93	11.70	11.36	11.14		
270.0	14.01	13.56	13.16	12.88	12.49	12.21	11.93	11.59	11.36		
315.0	14.06	13.73	13.33	12.94	12.60	12.26	11.98	11.64	11.42		
360.0	14.68	14.18	13.73	13.39	12.99	12.71	12.32	12.04	11.76		
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0		
0.0	11.64	11.36	11.08	10.91	10.63	10.46	10.29	10.07	9.90		
45.0	11.25	10.97	10.80	10.58	10.35	10.13	9.96	9.79	9.51		
90.0	10.91	10.58	10.46	10.29	10.13	9.90	9.73	9.62	9.45		
135.0	10.97	10.69	10.52	10.29	10.07	9.96	9.73	9.56	9.39		
180.0	10.97	10.80	10.52	10.35	10.18	9.96	9.79	9.68	9.45		
225.0	10.91	10.69	10.46	10.24	10.07	9.96	9.73	9.56	9.39		
270.0	11.14	10.91	10.74	10.52	10.35	10.13	9.96	9.84	9.62		
315.0	11.19	10.97	10.74	10.58	10.41	10.13	10.01	9.84	9.68		
360.0	11.64	11.36	11.08	10.91	10.63	10.46	10.29	10.07	9.90		
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0		
0.0	9.73	9.51	9.39	9.17	9.00	8.83	8.66	8.49	8.33		
45.0	9.39	9.23	9.06	8.94	8.72	8.55	8.33	8.16	7.99		
90.0	9.28	9.17	9.00	8.78	8.61	8.49	8.33	8.10	7.99		
135.0	9.28	9.11	8.94	8.78	8.61	8.44	8.27	8.10	7.88		
180.0	9.28	9.17	9.00	8.83	8.66	8.44	8.27	8.10	7.93		
225.0	9.23	9.06	8.94	8.72	8.55	8.38	8.27	8.10	7.93		
270.0	9.45	9.28	9.17	9.00	8.83	8.66	8.49	8.38	8.21		
315.0	9.45	9.28	9.11	8.94	8.83	8.66	8.49	8.27	8.10		
360.0	9.73	9.51	9.39	9.17	9.00	8.83	8.66	8.49	8.33		
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0		
0.0	8.16	7.93	7.76	7.59	7.48	7.26	7.14	7.03	6.92		
45.0	7.82	7.65	7.54	7.37	7.14	7.09	6.98	6.75	6.69		
90.0	7.82	7.65	7.48	7.20	7.03	6.92	6.75	6.64	6.58		
135.0	7.76	7.59	7.48	7.31	7.20	7.03	6.81	6.69	6.64		
180.0	7.76	7.65	7.48	7.37	7.26	7.03	6.92	6.75	6.69		
225.0	7.76	7.65	7.48	7.37	7.26	7.14	6.92	6.75	6.64		
270.0	8.04	7.88	7.76	7.65	7.43	7.26	7.03	6.92	6.75		
315.0	7.99	7.82	7.65	7.43	7.31	7.20	7.03	6.92	6.86		
360.0	8.16	7.93	7.76	7.59	7.48	7.26	7.14	7.03	6.92		

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	6.75
45.0	6.58
90.0	6.53
135.0	6.58
180.0	6.69
225.0	6.58
270.0	6.58
315.0	6.64
360.0	6.75