
NATA

Client:

LumCAT: 3-2115-N

Luminaire: 92.70.131.00

Report No: nata-0100

Test No: GC2018121204

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): 1548.62, Efficiency(%): 84.72% , Luminous Efficacy(lm/W): 82.74

Central intensity(cd): 11989.690, Maximum intensity(cd): 11989.690

Angle of maximum intensity: C=0.0 γ =0.0

Beam Angle(50%Imax): [C0/180]Total=13.8

[C90/270]Total=13.8

Field angle(10%Imax): [C0/180]Total=36.0

[C90/270]Total=36.0

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

Maximum s/h(1/4): C0_180=0.27 C90_270=0.27

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 84.87%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in π solid angle : 98.292%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	11989.688	2.868	2.868	.157%	.185%
1.0	11760.258	22.507	25.376	1.231%	1.639%
2.0	11455.313	43.841	69.217	2.398%	4.470%
3.0	10617.188	60.934	130.151	3.333%	8.404%
4.0	9572.906	73.228	203.379	4.006%	13.133%
5.0	8340.750	79.717	283.097	4.361%	18.281%
6.0	7075.688	81.106	364.203	4.437%	23.518%
7.0	5927.414	79.216	443.419	4.333%	28.633%
8.0	5082.609	77.570	520.989	4.243%	33.642%
9.0	4287.375	73.549	594.537	4.023%	38.391%
10.0	3633.117	69.183	663.721	3.785%	42.859%
11.0	3148.242	65.875	729.596	3.604%	47.113%
12.0	2710.336	61.795	791.391	3.380%	51.103%
13.0	2378.672	58.678	850.068	3.210%	54.892%
14.0	2017.969	53.535	903.604	2.929%	58.349%
15.0	1766.742	50.144	953.748	2.743%	61.587%
16.0	1538.438	46.502	1000.25	2.544%	64.590%
17.0	1341.401	43.008	1043.258	2.353%	67.367%
18.0	1199.299	40.641	1083.898	2.223%	69.991%
19.0	1067.913	38.127	1122.025	2.086%	72.453%
20.0	963.584	36.140	1158.165	1.977%	74.787%
21.0	868.240	34.121	1192.286	1.867%	76.990%
22.0	798.588	32.806	1225.092	1.795%	79.108%
23.0	739.069	31.668	1256.76	1.732%	81.153%
24.0	689.801	30.767	1287.527	1.683%	83.140%
25.0	649.554	30.103	1317.63	1.647%	85.084%
26.0	618.413	29.728	1347.359	1.626%	87.004%
27.0	585.598	29.154	1376.513	1.595%	88.886%
28.0	545.210	28.069	1404.582	1.535%	90.699%
29.0	478.104	25.418	1430	1.390%	92.340%
30.0	401.611	22.021	1452.02	1.205%	93.762%
31.0	318.277	17.976	1469.996	.983%	94.923%
32.0	222.933	12.955	1482.951	.709%	95.759%
33.0	160.453	9.583	1492.534	.524%	96.378%
34.0	78.202	4.795	1497.33	.262%	96.688%
35.0	45.120	2.838	1500.168	.155%	96.871%
36.0	31.873	2.054	1502.222	.112%	97.004%
37.0	27.134	1.791	1504.013	.098%	97.119%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	23.210	1.567	1505.58	.086%	97.221%
39.0	20.018	1.381	1506.962	.076%	97.310%
40.0	17.346	1.223	1508.184	.067%	97.389%
41.0	15.131	1.089	1509.273	.060%	97.459%
42.0	13.486	0.990	1510.262	.054%	97.523%
43.0	12.319	0.921	1511.184	.050%	97.582%
44.0	11.426	0.870	1512.054	.048%	97.639%
45.0	10.898	0.845	1512.899	.046%	97.693%
46.0	10.350	0.816	1513.716	.045%	97.746%
47.0	10.027	0.804	1514.52	.044%	97.798%
48.0	9.759	0.795	1515.315	.044%	97.849%
49.0	9.555	0.791	1516.106	.043%	97.900%
50.0	9.359	0.786	1516.892	.043%	97.951%
51.0	9.246	0.788	1517.68	.043%	98.002%
52.0	9.098	0.786	1518.466	.043%	98.053%
53.0	8.986	0.787	1519.253	.043%	98.104%
54.0	8.923	0.792	1520.045	.043%	98.155%
55.0	8.880	0.798	1520.843	.044%	98.206%
56.0	8.852	0.805	1521.647	.044%	98.258%
57.0	8.796	0.809	1522.456	.044%	98.310%
58.0	8.782	0.817	1523.273	.045%	98.363%
59.0	8.789	0.826	1524.099	.045%	98.416%
60.0	8.859	0.841	1524.941	.046%	98.471%
61.0	8.909	0.854	1525.795	.047%	98.526%
62.0	9.077	0.879	1526.674	.048%	98.583%
63.0	9.197	0.899	1527.573	.049%	98.641%
64.0	9.225	0.909	1528.482	.050%	98.699%
65.0	9.141	0.908	1529.39	.050%	98.758%
66.0	8.902	0.892	1530.282	.049%	98.816%
67.0	8.634	0.872	1531.154	.048%	98.872%
68.0	8.290	0.843	1531.996	.046%	98.926%
69.0	8.079	0.827	1532.824	.045%	98.980%
70.0	7.805	0.804	1533.628	.044%	99.032%
71.0	7.671	0.795	1534.423	.044%	99.083%
72.0	7.516	0.784	1535.207	.043%	99.134%
73.0	7.481	0.785	1535.992	.043%	99.184%
74.0	7.432	0.783	1536.775	.043%	99.235%
75.0	7.404	0.784	1537.559	.043%	99.286%

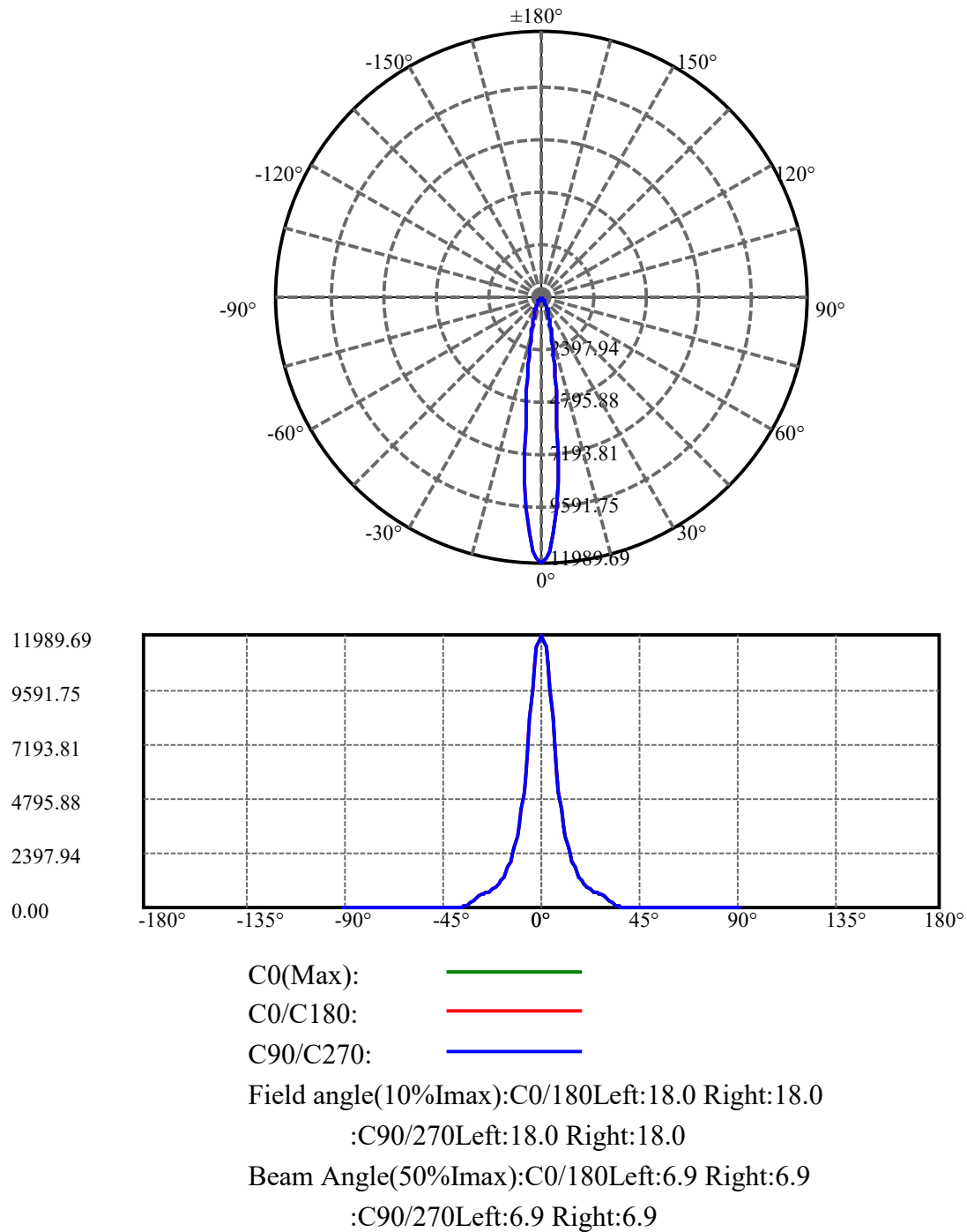
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	7.348	0.782	1538.341	.043%	99.336%
77.0	7.305	0.781	1539.122	.043%	99.386%
78.0	7.249	0.778	1539.899	.043%	99.437%
79.0	7.200	0.775	1540.674	.042%	99.487%
80.0	7.158	0.773	1541.447	.042%	99.537%
81.0	7.109	0.770	1542.217	.042%	99.586%
82.0	7.088	0.770	1542.987	.042%	99.636%
83.0	7.073	0.770	1543.757	.042%	99.686%
84.0	7.017	0.765	1544.522	.042%	99.735%
85.0	6.954	0.760	1545.282	.042%	99.784%
86.0	6.884	0.753	1546.035	.041%	99.833%
87.0	6.820	0.747	1546.782	.041%	99.881%
88.0	6.771	0.742	1547.524	.041%	99.929%
89.0	6.701	0.735	1548.259	.040%	99.976%
90.0	6.645	0.364	1548.623	.020%	100.000%

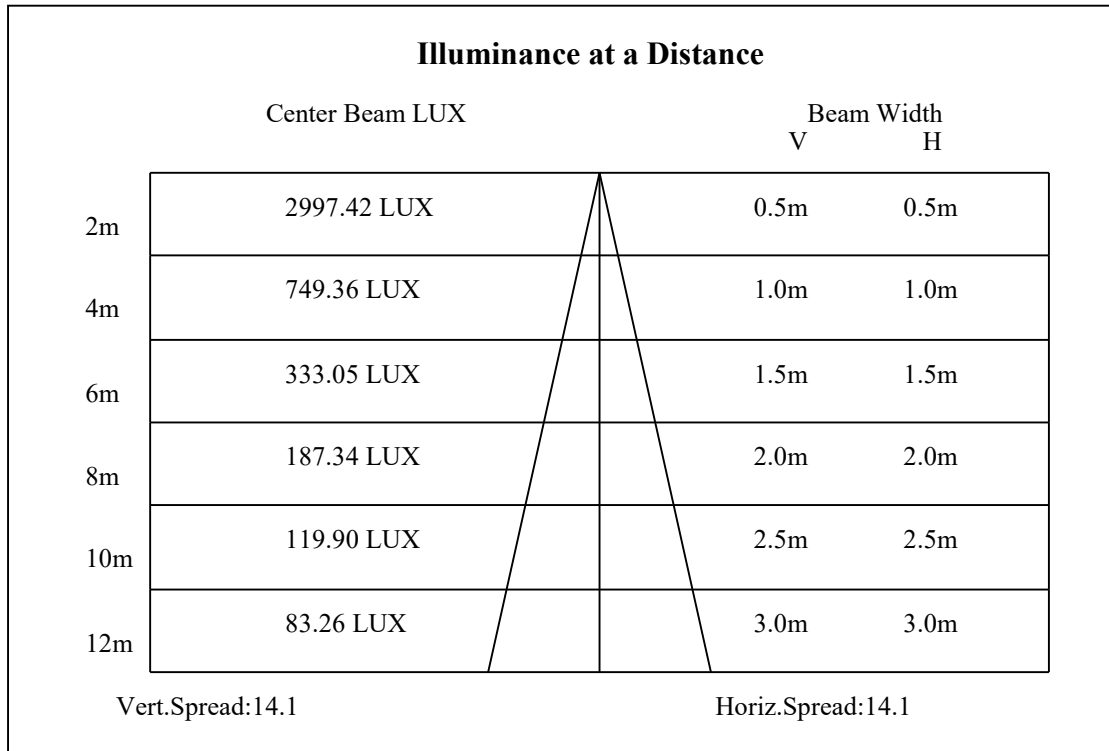
ZONAL LUMEN SUMMARY

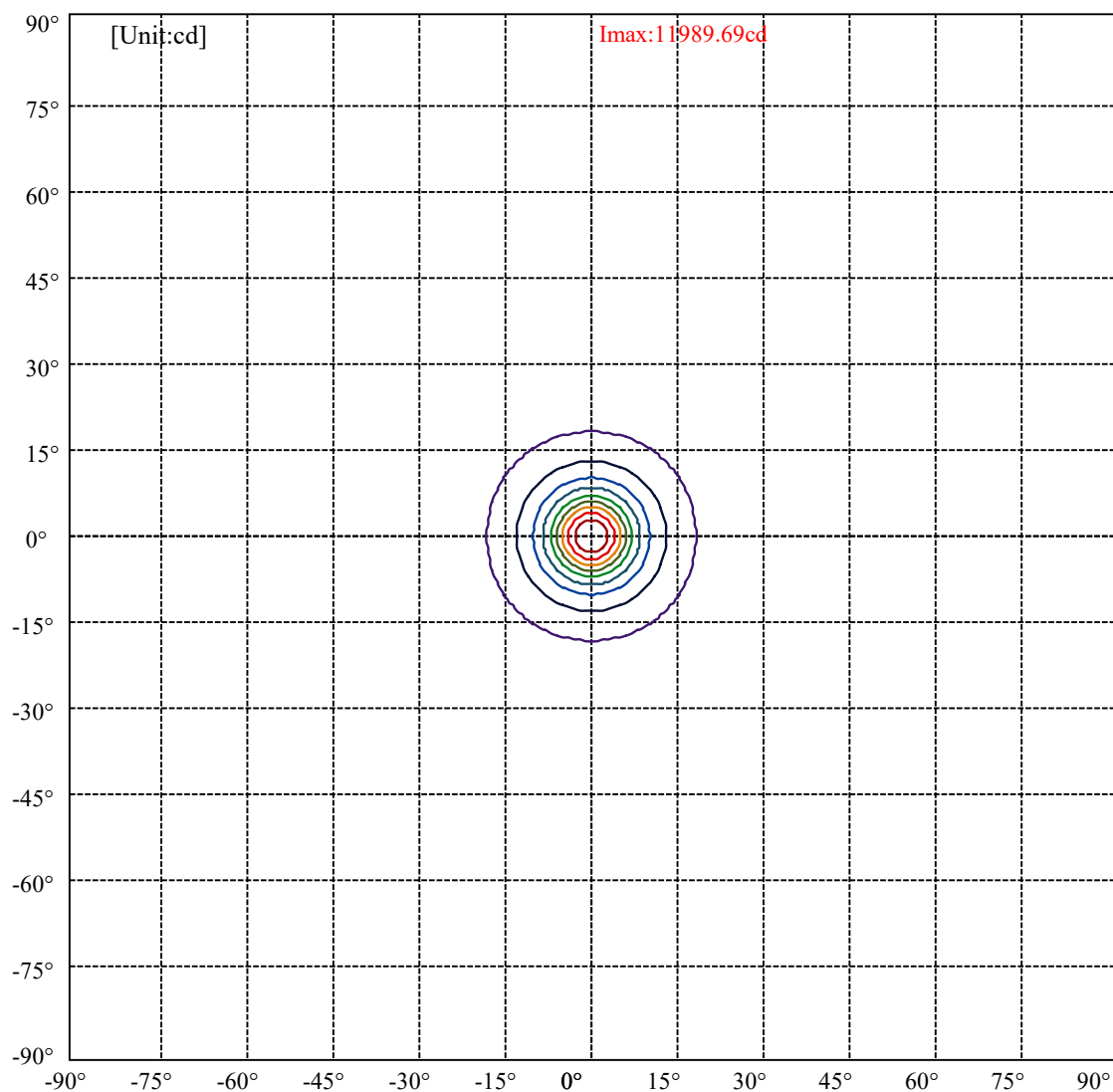
Zone	Lumens	%Lamp	%Fixt
0-30	1452.02	79.43%	93.76%
0-40	1508.18	82.50%	97.39%
0-60	1524.94	83.42%	98.47%
0-90	1548.26	84.70%	99.98%
0-120	1548.26	84.70%	99.98%
0-180	1548.62	84.72%	100.00%
60-90	24.16	1.32%	1.56%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-22.44	1238.90	67.77%	80.00%

ZONAL LUMEN SUMMARY

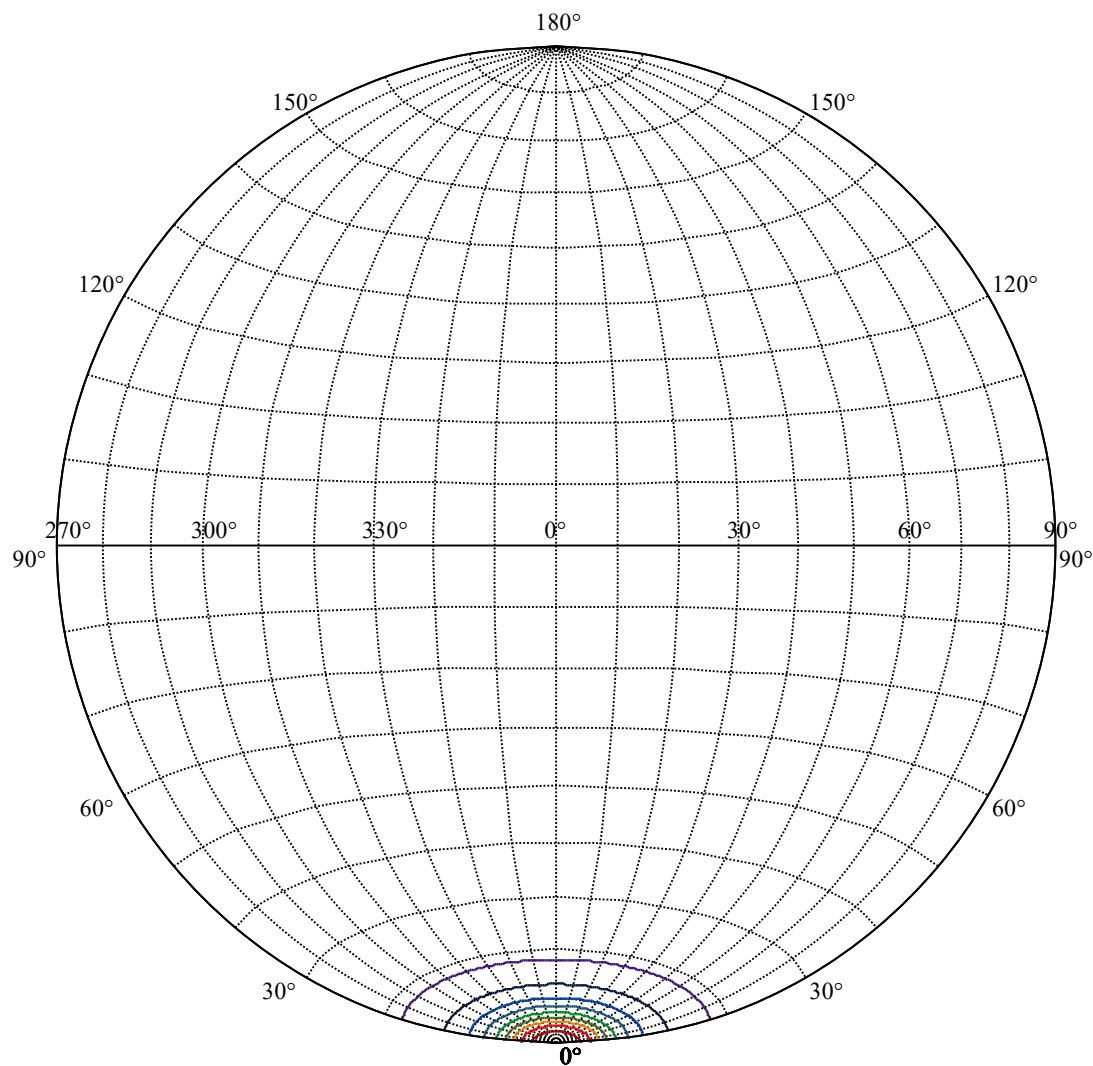
0-10	663.72
10-20	494.44
20-30	293.85
30-40	56.16
40-50	8.71
50-60	8.05
60-70	8.69
70-80	7.82
80-90	6.81
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00







(10%Imax)	1198.97	—
(20%Imax)	2397.94	—
(30%Imax)	3596.91	—
(40%Imax)	4795.88	—
(50%Imax)	5994.84	—
(60%Imax)	7193.81	—
(70%Imax)	8392.78	—
(80%Imax)	9591.75	—
(90%Imax)	10790.7	—

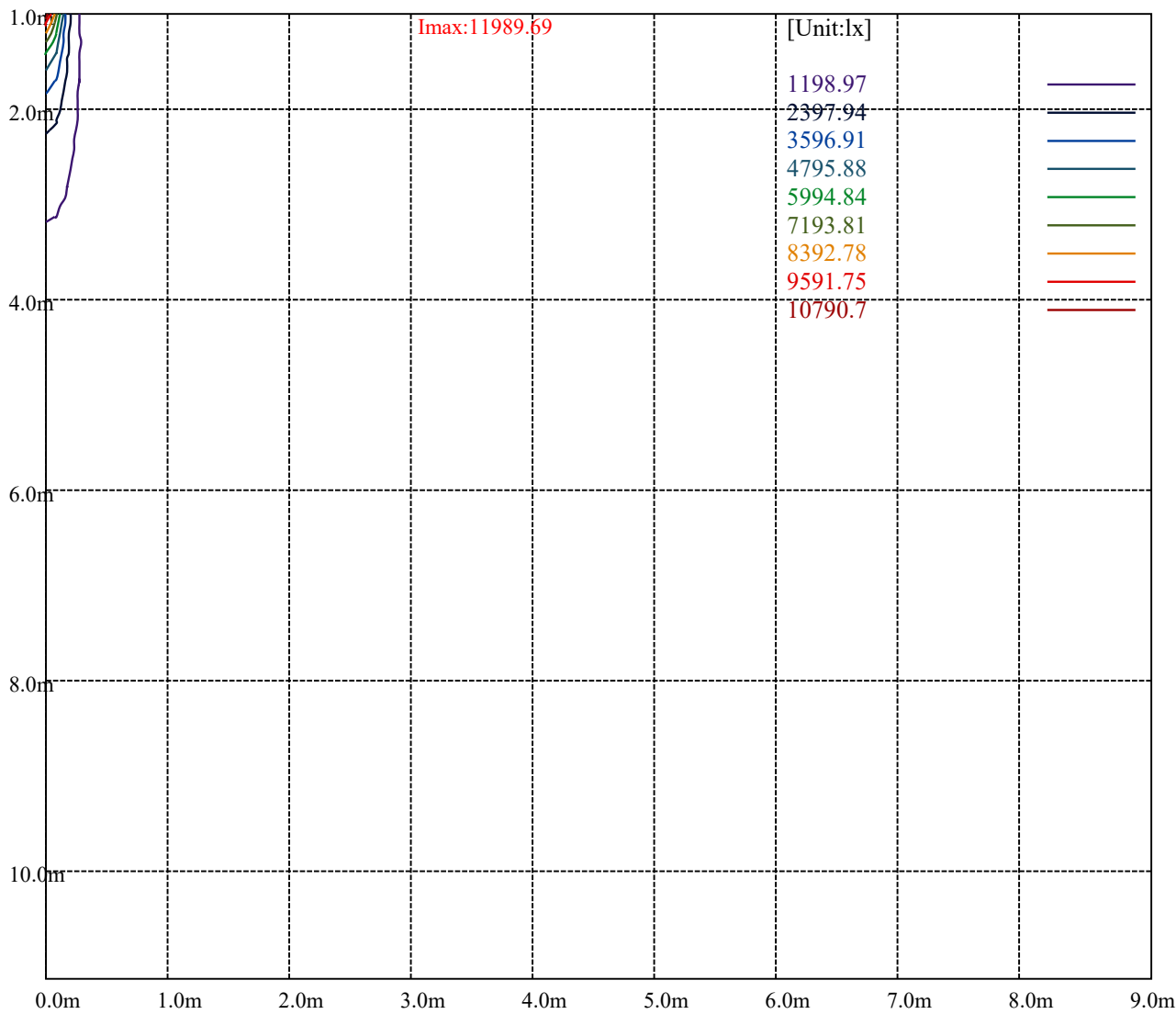


House

[Unit:cd]

Road

Imax:11989.69	
(10%Imax)	1198.97
(20%Imax)	2397.94
(30%Imax)	3596.91
(40%Imax)	4795.88
(50%Imax)	5994.84
(60%Imax)	7193.81
(70%Imax)	8392.78
(80%Imax)	9591.75
(90%Imax)	10790.7



Luminance Table

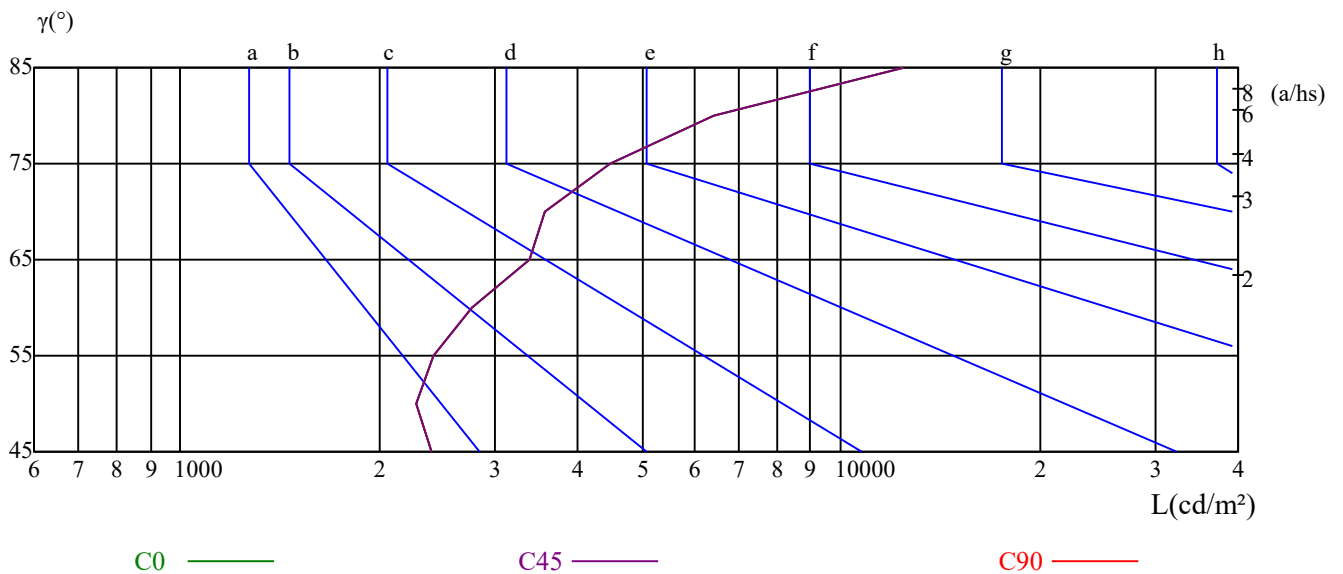
γ	45	50	55	60	65	70	75	80	85
C0	2408	2275	2419	2769	3379	3566	4470	6441	12467
C45	2408	2275	2419	2769	3379	3566	4470	6441	12467
C90	2408	2275	2419	2769	3379	3566	4470	6441	12467

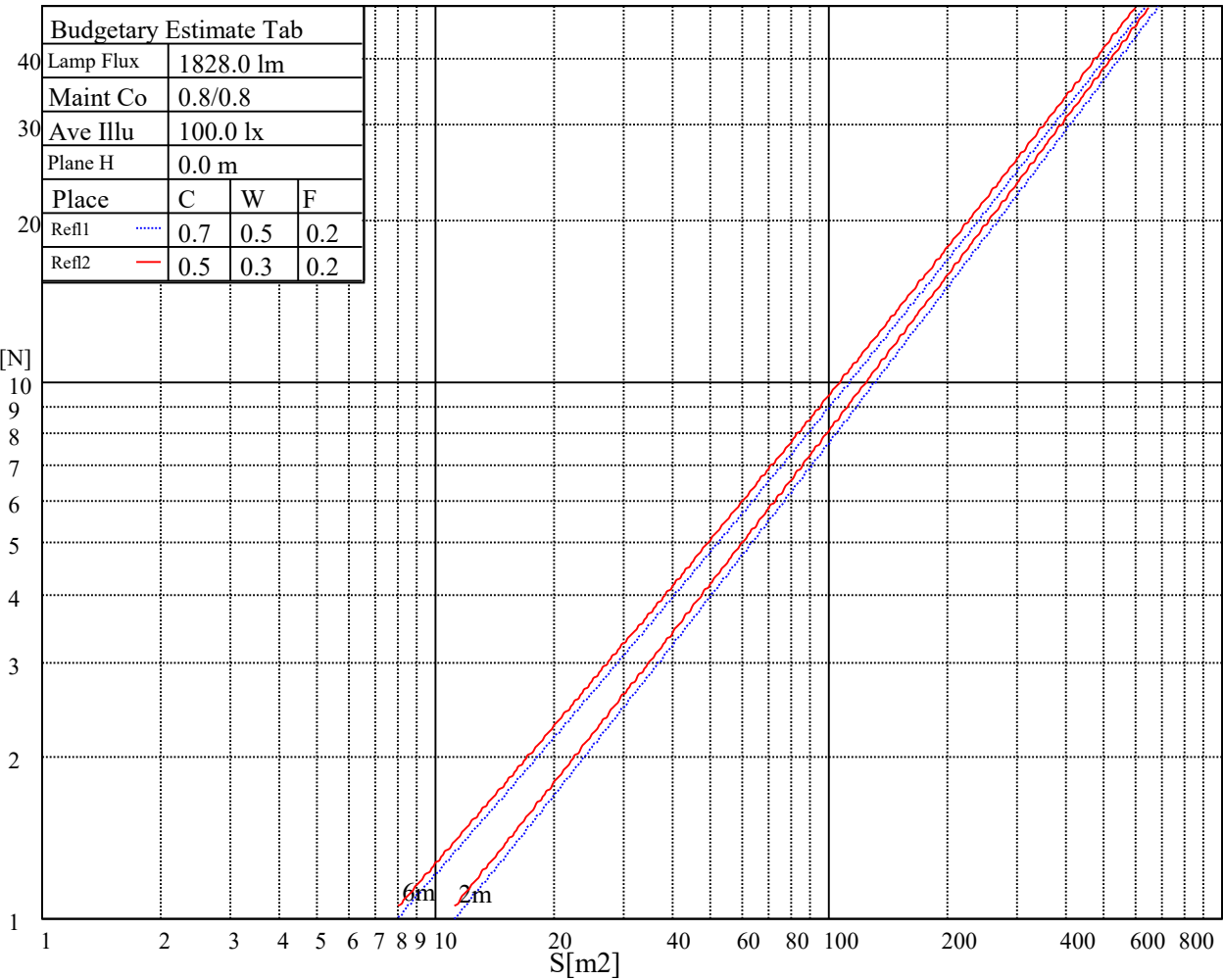
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3379	3379	3379	4470	4470	4470	12467	12467	12467

Glare Table

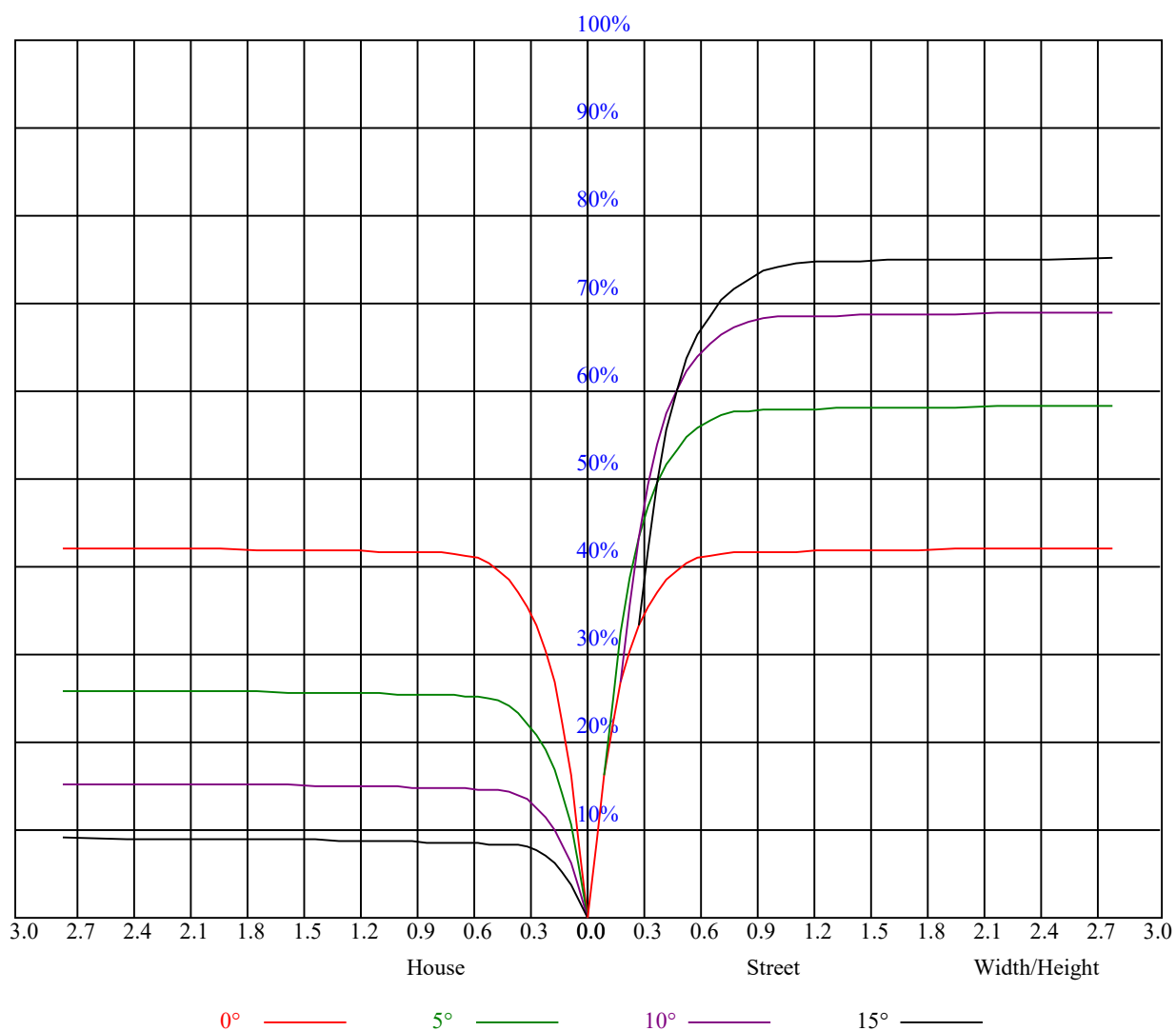
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

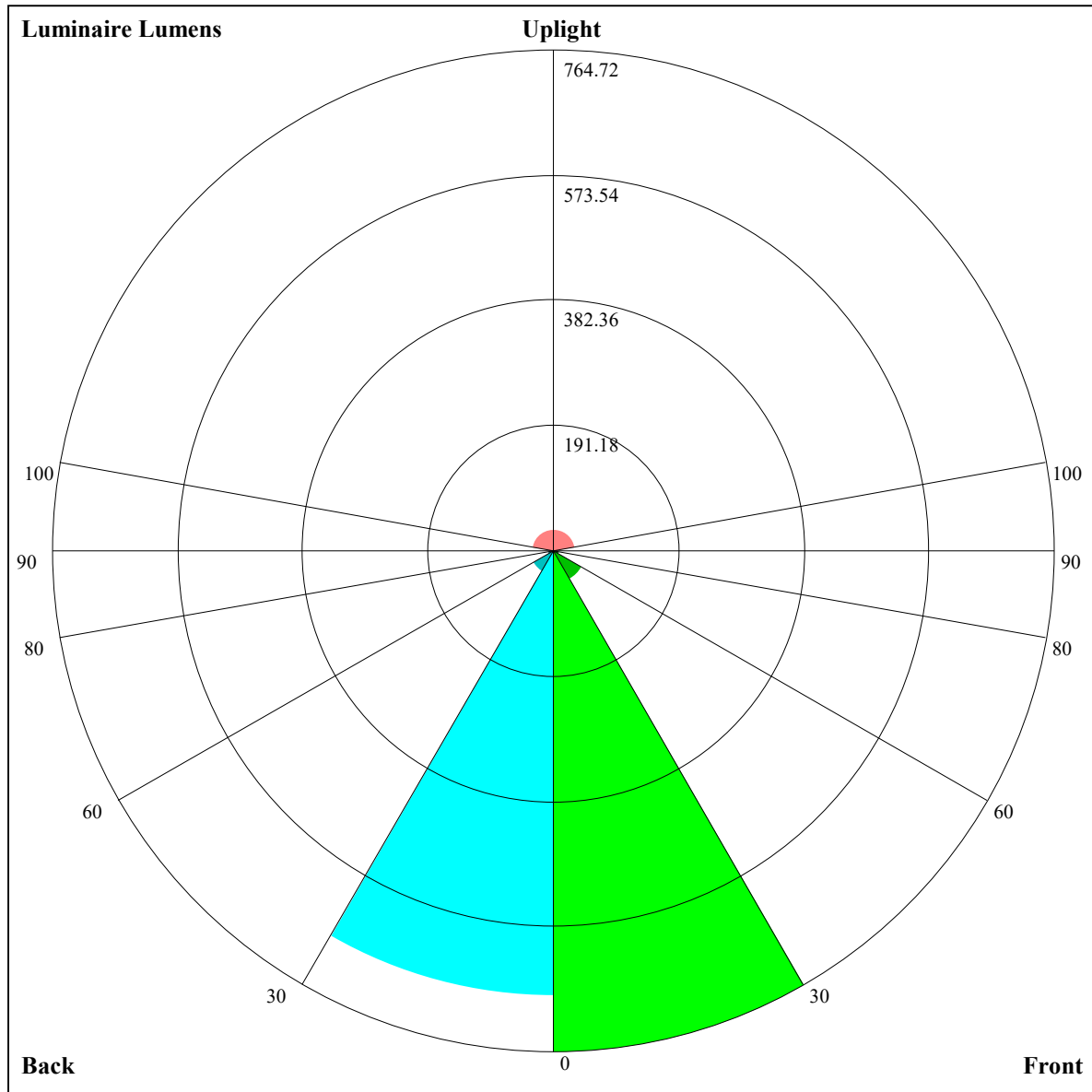
Luminance Limiting Curve





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	1.01	1.01	1.01	0.99	0.99	0.99	0.94	0.94	0.94	0.90	0.90	0.90	0.87	0.87	0.87	0.85
1	0.95	0.94	0.92	0.94	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.83	0.81
2	0.91	0.88	0.86	0.89	0.87	0.85	0.87	0.85	0.83	0.84	0.83	0.81	0.82	0.81	0.80	0.78
3	0.87	0.84	0.81	0.86	0.83	0.81	0.84	0.81	0.79	0.82	0.80	0.78	0.80	0.78	0.77	0.76
4	0.84	0.80	0.78	0.83	0.80	0.77	0.81	0.78	0.76	0.79	0.77	0.75	0.78	0.76	0.75	0.74
5	0.81	0.77	0.74	0.80	0.77	0.74	0.79	0.76	0.74	0.77	0.75	0.73	0.76	0.74	0.72	0.71
6	0.78	0.74	0.72	0.77	0.74	0.72	0.76	0.73	0.71	0.75	0.73	0.71	0.74	0.72	0.70	0.69
7	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.71	0.69	0.72	0.70	0.68	0.68
8	0.73	0.70	0.67	0.73	0.70	0.67	0.72	0.69	0.67	0.71	0.69	0.67	0.71	0.68	0.67	0.66
9	0.71	0.68	0.66	0.71	0.68	0.66	0.70	0.67	0.65	0.70	0.67	0.65	0.69	0.67	0.65	0.64
10	0.70	0.66	0.64	0.69	0.66	0.64	0.69	0.66	0.64	0.68	0.65	0.64	0.68	0.65	0.63	0.63





Luminaire Lumens:

FL=764.72,FM=48.86,FH=8.3,FVH=3.79

BL=680.52,BM=37.81,BH=8.25,BVH=3.77

UL=7.25,UH=34.5

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	11970.00	12105.00	12015.00	11615.63	10873.13	9630.00	8223.75	7031.25	6001.88		
45.0	11958.75	11981.25	11750.63	11036.25	10074.38	8898.75	7363.13	6277.50	5366.25		
90.0	11981.25	11197.13	11008.13	9916.31	8577.56	7376.06	6301.13	5166.56	4431.94		
135.0	12048.75	11784.38	11115.00	10040.63	8848.13	7464.38	6221.25	5304.38	4556.25		
180.0	11970.00	11199.94	10788.19	9585.00	8167.50	6937.31	5869.69	4814.44	4146.75		
225.0	11958.75	11688.75	11183.06	10192.50	9053.44	7639.88	6468.75	5401.69	4559.06		
270.0	11981.25	12031.88	11857.50	11356.88	10575.00	9354.38	7970.63	6817.50	5833.13		
315.0	12048.75	12093.75	11925.00	11194.31	10414.13	9425.25	8187.19	6606.00	5765.63		
360.0	11970.00	12105.00	12015.00	11615.63	10873.13	9630.00	8223.75	7031.25	6001.88		
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	4955.63	4263.75	3673.13	3127.50	2863.13	2333.25	2044.69	1742.06	1544.06		
45.0	4438.13	3819.38	3279.38	2840.63	2391.19	2089.13	1811.81	1582.88	1407.38		
90.0	3803.63	3154.50	2728.69	2373.19	2076.19	1767.38	1559.25	1384.88	1113.24		
135.0	3785.63	3268.13	2874.38	2419.31	2083.50	1832.63	1599.19	1403.44	1253.25		
180.0	3576.38	2989.13	2606.06	2282.06	1944.00	1718.44	1524.38	1319.63	1114.65		
225.0	3941.44	3349.13	2856.38	2491.88	2183.06	1857.94	1641.94	1454.63	1277.44		
270.0	4843.13	4179.38	3616.88	3076.88	2868.75	2295.56	1977.75	1708.31	1508.06		
315.0	4955.63	4041.56	3551.06	3071.25	2619.56	2249.44	1974.94	1711.69	1513.13		
360.0	4955.63	4263.75	3673.13	3127.50	2863.13	2333.25	2044.69	1742.06	1544.06		
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	1374.19	1215.00	1082.81	970.88	887.63	820.13	758.25	706.50	667.13		
45.0	1231.31	1112.06	990.56	888.19	817.31	760.50	703.13	667.69	634.50		
90.0	1069.82	968.40	867.71	785.98	726.98	674.83	637.31	600.53	572.63		
135.0	1101.38	997.88	891.00	806.63	747.00	696.38	656.44	626.06	600.75		
180.0	1057.16	944.27	860.12	783.39	727.43	677.76	641.03	602.04	579.15		
225.0	1112.29	1020.32	920.59	834.36	770.79	712.46	674.49	638.66	610.26		
270.0	1318.50	1175.06	1040.63	929.25	847.69	781.88	713.25	668.81	636.19		
315.0	1329.75	1110.32	1055.25	947.25	863.89	788.63	734.51	686.14	646.71		
360.0	1374.19	1215.00	1082.81	970.88	887.63	820.13	758.25	706.50	667.13		
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	628.88	603.56	566.44	510.19	402.19	318.38	286.31	131.91	67.84		
45.0	600.75	573.75	518.63	432.56	339.75	286.88	172.18	85.56	42.75		
90.0	548.44	497.53	409.56	331.93	251.16	153.68	86.29	42.41	31.22		
135.0	560.81	502.31	417.38	336.38	293.63	147.71	85.78	36.34	30.49		
180.0	537.98	475.59	382.05	297.51	211.39	116.21	58.16	37.63	32.40		
225.0	587.76	531.90	442.24	358.76	271.97	169.76	98.33	48.43	36.51		
270.0	601.88	581.63	543.38	471.94	383.06	300.38	289.69	117.84	61.54		
315.0	618.30	595.41	545.18	473.63	393.08	290.48	206.89	125.49	58.22		
360.0	628.88	603.56	566.44	510.19	402.19	318.38	286.31	131.91	67.84		
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	38.81	32.46	26.49	22.84	19.86	16.82	14.63	12.88	11.81		
45.0	33.86	28.74	23.91	21.38	17.94	15.64	13.44	12.32	11.53		
90.0	27.23	23.18	20.59	17.44	15.36	13.56	12.71	11.81	11.08		
135.0	26.78	22.95	20.14	17.55	15.08	13.50	12.38	11.42	10.86		
180.0	27.51	23.46	20.98	17.10	15.36	13.50	12.32	11.70	10.80		
225.0	30.83	26.38	23.06	19.52	16.99	14.74	13.44	12.09	11.48		
270.0	35.83	30.32	25.54	22.56	19.35	17.16	14.85	13.56	12.32		
315.0	34.14	29.59	24.98	21.77	18.84	16.14	14.12	12.77	11.53		
360.0	38.81	32.46	26.49	22.84	19.86	16.82	14.63	12.88	11.81		

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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	11.31	10.52	10.18	9.84	9.62	9.39	9.28	9.11	8.94		
45.0	10.86	10.29	10.01	9.79	9.51	9.39	9.28	9.06	8.94		
90.0	10.58	10.35	10.01	9.73	9.62	9.34	9.23	9.06	9.11		
135.0	10.35	10.01	9.84	9.56	9.34	9.28	9.17	9.06	9.00		
180.0	10.52	10.13	9.84	9.62	9.51	9.39	9.23	9.17	9.00		
225.0	10.91	10.46	10.07	9.90	9.68	9.39	9.28	9.17	9.00		
270.0	11.53	10.74	10.35	10.01	9.73	9.45	9.39	9.17	9.06		
315.0	11.14	10.29	9.90	9.62	9.45	9.23	9.11	9.00	8.83		
360.0	11.31	10.52	10.18	9.84	9.62	9.39	9.28	9.11	8.94		
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0		
0.0	8.89	8.89	8.83	8.72	8.72	8.72	8.66	8.78	8.78		
45.0	8.94	8.94	8.89	8.83	8.78	8.83	8.78	8.83	8.94		
90.0	8.94	8.89	8.89	8.83	8.83	8.83	9.00	9.11	9.28		
135.0	8.94	8.89	8.89	8.83	8.83	8.83	8.94	9.00	9.17		
180.0	9.00	8.89	8.89	8.83	8.89	8.89	9.06	9.11	9.51		
225.0	8.94	8.89	8.83	8.78	8.78	8.78	8.89	8.89	9.06		
270.0	8.94	8.89	8.89	8.83	8.78	8.78	8.83	8.89	9.06		
315.0	8.78	8.78	8.72	8.72	8.66	8.66	8.72	8.66	8.83		
360.0	8.89	8.89	8.83	8.72	8.72	8.72	8.66	8.78	8.78		
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0		
0.0	8.83	9.06	9.06	9.00	9.00	8.55	8.49	8.04	7.93		
45.0	9.17	9.51	9.23	9.11	8.61	8.55	8.04	7.93	7.65		
90.0	9.56	9.17	8.94	8.49	8.38	7.99	7.82	7.65	7.59		
135.0	9.34	9.28	8.89	8.89	8.27	8.16	7.82	7.65	7.59		
180.0	9.34	9.28	9.23	8.66	8.44	8.16	7.99	7.71	7.54		
225.0	9.45	9.17	9.23	8.72	8.49	8.04	7.88	7.59	7.48		
270.0	9.11	9.39	9.51	9.34	8.94	8.49	8.33	7.99	7.76		
315.0	8.78	8.94	9.06	9.00	8.94	8.38	8.27	7.88	7.82		
360.0	8.83	9.06	9.06	9.00	9.00	8.55	8.49	8.04	7.93		
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0		
0.0	7.59	7.59	7.59	7.54	7.48	7.43	7.37	7.31	7.31		
45.0	7.59	7.54	7.37	7.43	7.31	7.31	7.26	7.14	7.14		
90.0	7.48	7.48	7.43	7.43	7.37	7.20	7.20	7.20	7.03		
135.0	7.48	7.43	7.37	7.37	7.31	7.31	7.20	7.20	7.14		
180.0	7.48	7.48	7.48	7.37	7.37	7.31	7.26	7.20	7.20		
225.0	7.43	7.37	7.31	7.31	7.26	7.20	7.14	7.09	7.03		
270.0	7.54	7.48	7.48	7.43	7.37	7.37	7.31	7.26	7.26		
315.0	7.54	7.48	7.43	7.37	7.31	7.31	7.26	7.20	7.14		
360.0	7.59	7.59	7.59	7.54	7.48	7.43	7.37	7.31	7.31		
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0		
0.0	7.26	7.20	7.20	7.14	7.09	7.03	6.98	6.98	6.86		
45.0	7.03	7.03	7.03	6.92	6.92	6.81	6.81	6.69	6.64		
90.0	7.03	7.03	7.09	6.92	6.86	6.75	6.69	6.64	6.58		
135.0	7.09	7.09	7.03	7.03	6.98	6.86	6.81	6.75	6.64		
180.0	7.14	7.14	7.09	7.09	6.98	6.92	6.92	6.81	6.75		
225.0	7.03	6.98	6.92	6.92	6.86	6.81	6.69	6.69	6.64		
270.0	7.20	7.14	7.14	7.09	6.98	6.92	6.81	6.75	6.69		
315.0	7.09	7.09	7.09	7.03	6.98	6.98	6.86	6.86	6.81		
360.0	7.26	7.20	7.20	7.14	7.09	7.03	6.98	6.98	6.86		

Intensity data(cd)

Appendix Page: 19 Total:19

C/ $\gamma(^{\circ})$	90.0
0.0	6.81
45.0	6.58
90.0	6.58
135.0	6.64
180.0	6.69
225.0	6.53
270.0	6.64
315.0	6.69
360.0	6.81