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NATA

LumCAT: 2-1674-M	
Luminaire: 92.70.131.00	
Report No: NATA0100	Voltage(V): 36.7000
Test No: GC2018121105	Current(A): 0.5100
LampCAT: OSRAM SOLERIQ S13	Power (W): 18.7170
Lamp flux(lm): 1804.0	PF: 0.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 71	Width(mm): 71
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 1639.89
Efficiency(%): 90.90%
Lumens(lm)/Power(W): 87.78
Central intensity(cd): 13498.590
Maximum intensity(cd): 13498.590
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=28.2
[C90/270]Total=28.2
Maximum s/h(1/2): C0_180=0.24 C90_270=0.24
Maximum s/h(1/4): C0_180=0.23 C90_270=0.23
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 91.08%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.548%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	13498.594	3.229	3.229	.179%	.197%
1.0	13385.391	25.618	28.847	1.420%	1.759%
2.0	13014.141	49.807	78.654	2.761%	4.796%
3.0	12030.328	69.045	147.698	3.827%	9.007%
4.0	11109.375	84.982	232.68	4.711%	14.189%
5.0	9734.203	93.035	325.715	5.157%	19.862%
6.0	8174.953	93.707	419.422	5.194%	25.576%
7.0	6561.281	87.687	507.109	4.861%	30.923%
8.0	5181.047	79.072	586.181	4.383%	35.745%
9.0	3855.516	66.140	652.322	3.666%	39.778%
10.0	2936.953	55.927	708.248	3.100%	43.189%
11.0	2392.102	50.053	758.302	2.775%	46.241%
12.0	1883.391	42.941	801.242	2.380%	48.859%
13.0	1596.445	39.382	840.624	2.183%	51.261%
14.0	1368.809	36.314	876.938	2.013%	53.475%
15.0	1207.680	34.277	911.214	1.900%	55.566%
16.0	1099.413	33.232	944.446	1.842%	57.592%
17.0	994.760	31.894	976.34	1.768%	59.537%
18.0	899.318	30.475	1006.815	1.689%	61.395%
19.0	831.333	29.680	1036.495	1.645%	63.205%
20.0	770.210	28.888	1065.383	1.601%	64.967%
21.0	724.416	28.469	1093.852	1.578%	66.703%
22.0	693.246	28.478	1122.33	1.579%	68.439%
23.0	667.463	28.599	1150.929	1.585%	70.183%
24.0	645.195	28.778	1179.707	1.595%	71.938%
25.0	627.799	29.095	1208.802	1.613%	73.712%
26.0	611.402	29.391	1238.194	1.629%	75.505%
27.0	597.326	29.738	1267.932	1.648%	77.318%
28.0	585.661	30.151	1298.083	1.671%	79.157%
29.0	575.058	30.573	1328.656	1.695%	81.021%
30.0	565.207	30.991	1359.646	1.718%	82.911%
31.0	555.595	31.380	1391.026	1.739%	84.824%
32.0	545.351	31.691	1422.717	1.757%	86.757%
33.0	532.209	31.787	1454.504	1.762%	88.695%
34.0	504.752	30.952	1485.456	1.716%	90.583%
35.0	454.753	28.603	1514.059	1.586%	92.327%
36.0	389.475	25.104	1539.164	1.392%	93.858%
37.0	326.327	21.536	1560.7	1.194%	95.171%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	259.158	17.497	1578.197	.970%	96.238%
39.0	189.422	13.072	1591.269	.725%	97.035%
40.0	117.260	8.266	1599.535	.458%	97.539%
41.0	62.937	4.528	1604.062	.251%	97.815%
42.0	27.780	2.038	1606.101	.113%	97.939%
43.0	15.061	1.126	1607.227	.062%	98.008%
44.0	13.141	1.001	1608.228	.055%	98.069%
45.0	11.763	0.912	1609.141	.051%	98.125%
46.0	10.329	0.815	1609.955	.045%	98.174%
47.0	9.084	0.729	1610.684	.040%	98.219%
48.0	8.360	0.681	1611.365	.038%	98.260%
49.0	7.889	0.653	1612.018	.036%	98.300%
50.0	7.741	0.650	1612.668	.036%	98.340%
51.0	7.643	0.651	1613.32	.036%	98.380%
52.0	7.545	0.652	1613.972	.036%	98.419%
53.0	7.439	0.652	1614.623	.036%	98.459%
54.0	7.362	0.653	1615.276	.036%	98.499%
55.0	7.263	0.652	1615.929	.036%	98.539%
56.0	7.179	0.653	1616.581	.036%	98.579%
57.0	7.116	0.654	1617.236	.036%	98.618%
58.0	7.038	0.655	1617.89	.036%	98.658%
59.0	7.010	0.659	1618.549	.037%	98.699%
60.0	6.940	0.659	1619.208	.037%	98.739%
61.0	6.898	0.662	1619.87	.037%	98.779%
62.0	6.884	0.667	1620.537	.037%	98.820%
63.0	6.855	0.670	1621.206	.037%	98.861%
64.0	6.820	0.672	1621.879	.037%	98.902%
65.0	6.785	0.674	1622.553	.037%	98.943%
66.0	6.778	0.679	1623.232	.038%	98.984%
67.0	6.771	0.683	1623.915	.038%	99.026%
68.0	6.750	0.686	1624.602	.038%	99.068%
69.0	6.722	0.688	1625.29	.038%	99.110%
70.0	6.715	0.692	1625.982	.038%	99.152%
71.0	6.708	0.696	1626.677	.039%	99.194%
72.0	6.694	0.698	1627.376	.039%	99.237%
73.0	6.673	0.700	1628.075	.039%	99.279%
74.0	6.659	0.702	1628.777	.039%	99.322%
75.0	6.659	0.705	1629.482	.039%	99.365%

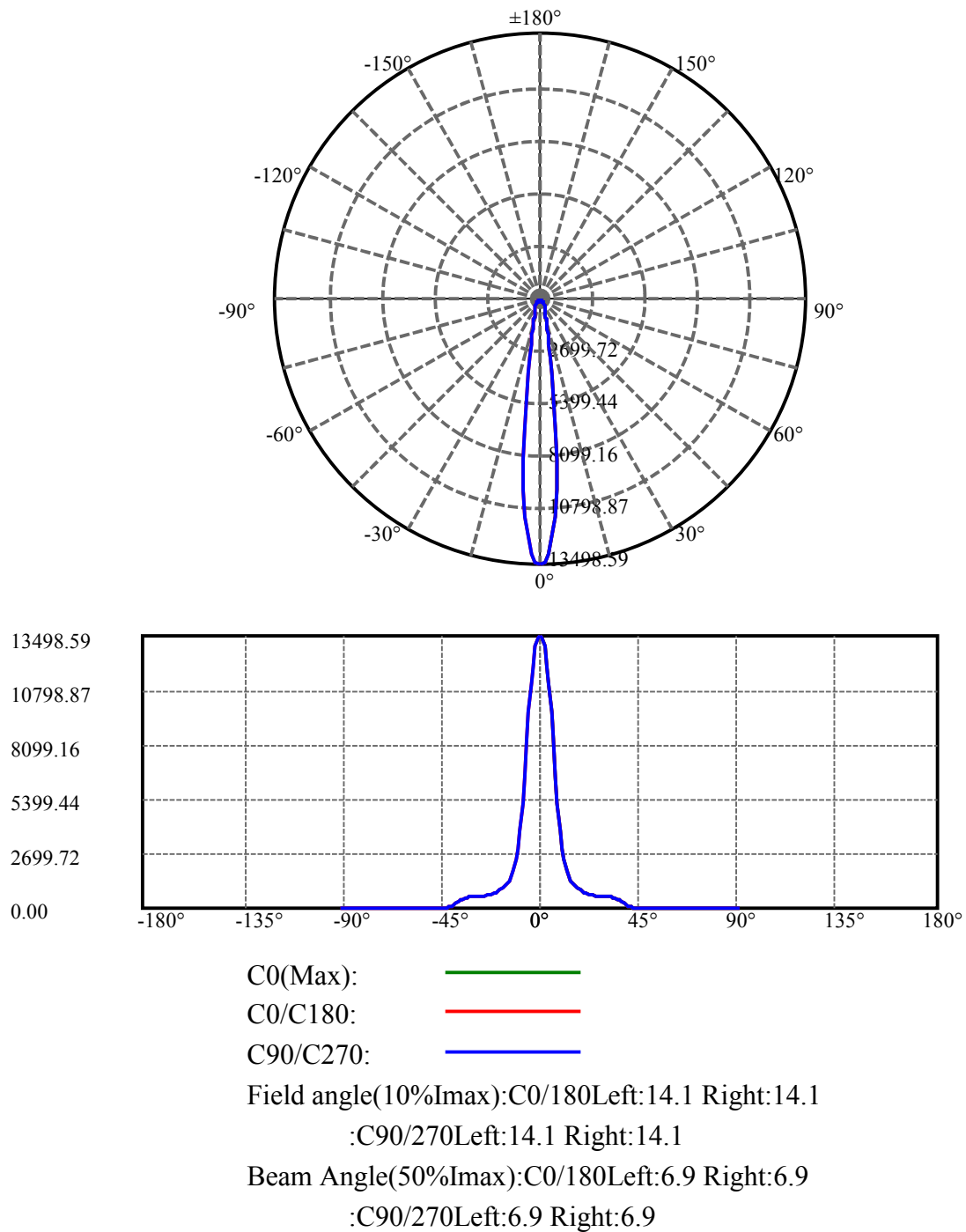
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	6.652	0.708	1630.19	.039%	99.408%
77.0	6.645	0.710	1630.9	.039%	99.452%
78.0	6.645	0.713	1631.613	.040%	99.495%
79.0	6.630	0.714	1632.327	.040%	99.539%
80.0	6.630	0.716	1633.043	.040%	99.582%
81.0	6.616	0.717	1633.759	.040%	99.626%
82.0	6.630	0.720	1634.479	.040%	99.670%
83.0	6.630	0.722	1635.201	.040%	99.714%
84.0	6.623	0.722	1635.923	.040%	99.758%
85.0	6.623	0.724	1636.647	.040%	99.802%
86.0	6.588	0.721	1637.368	.040%	99.846%
87.0	6.588	0.721	1638.089	.040%	99.890%
88.0	6.588	0.722	1638.811	.040%	99.934%
89.0	6.560	0.719	1639.531	.040%	99.978%
90.0	6.588	0.361	1639.892	.020%	100.000%

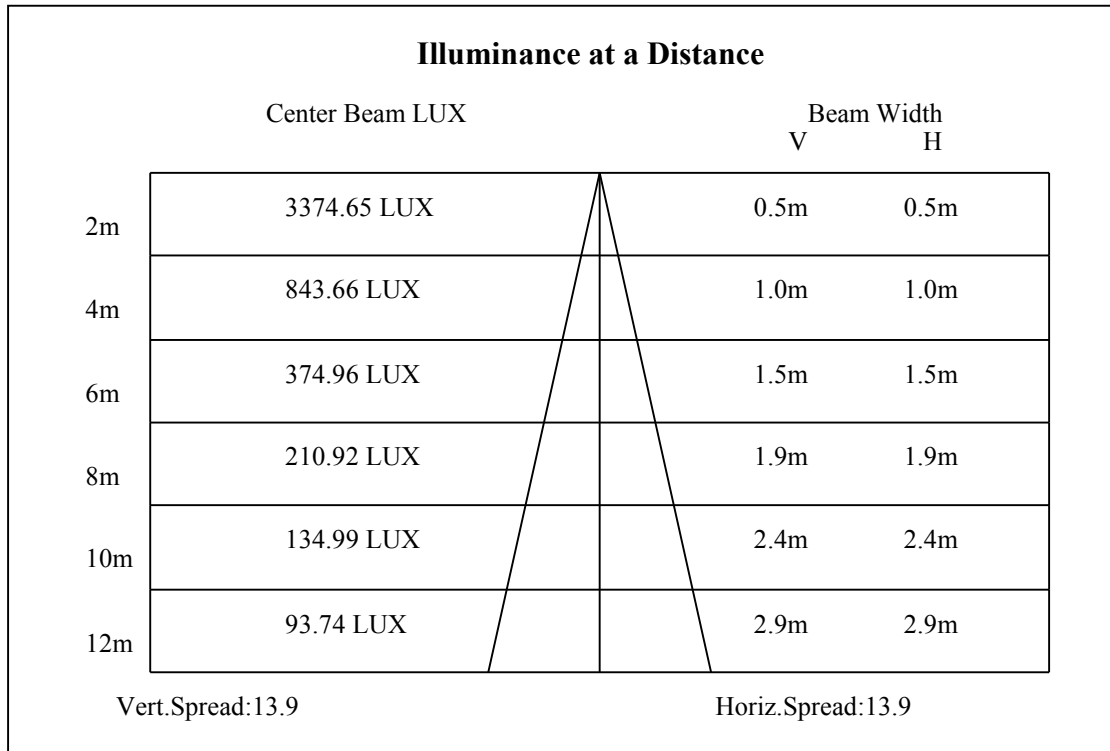
ZONAL LUMEN SUMMARY

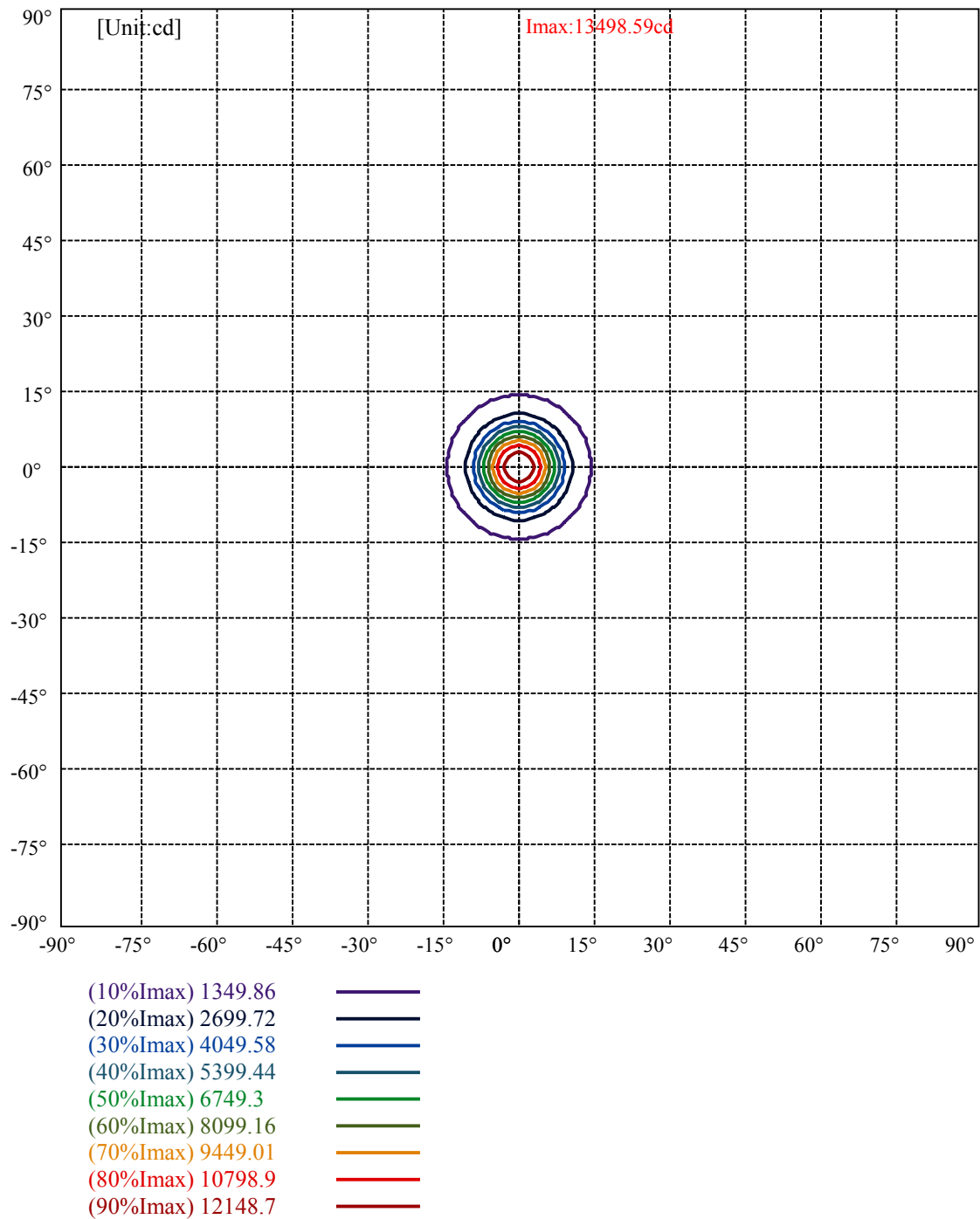
Zone	Lumens	%Lamp	%Fixt
0-30	1359.65	75.37%	82.91%
0-40	1599.53	88.67%	97.54%
0-60	1619.21	89.76%	98.74%
0-90	1639.53	90.88%	99.98%
0-120	1639.53	90.88%	99.98%
0-180	1639.89	90.90%	100.00%
60-90	20.98	1.16%	1.28%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-28.45	1311.91	72.72%	80.00%

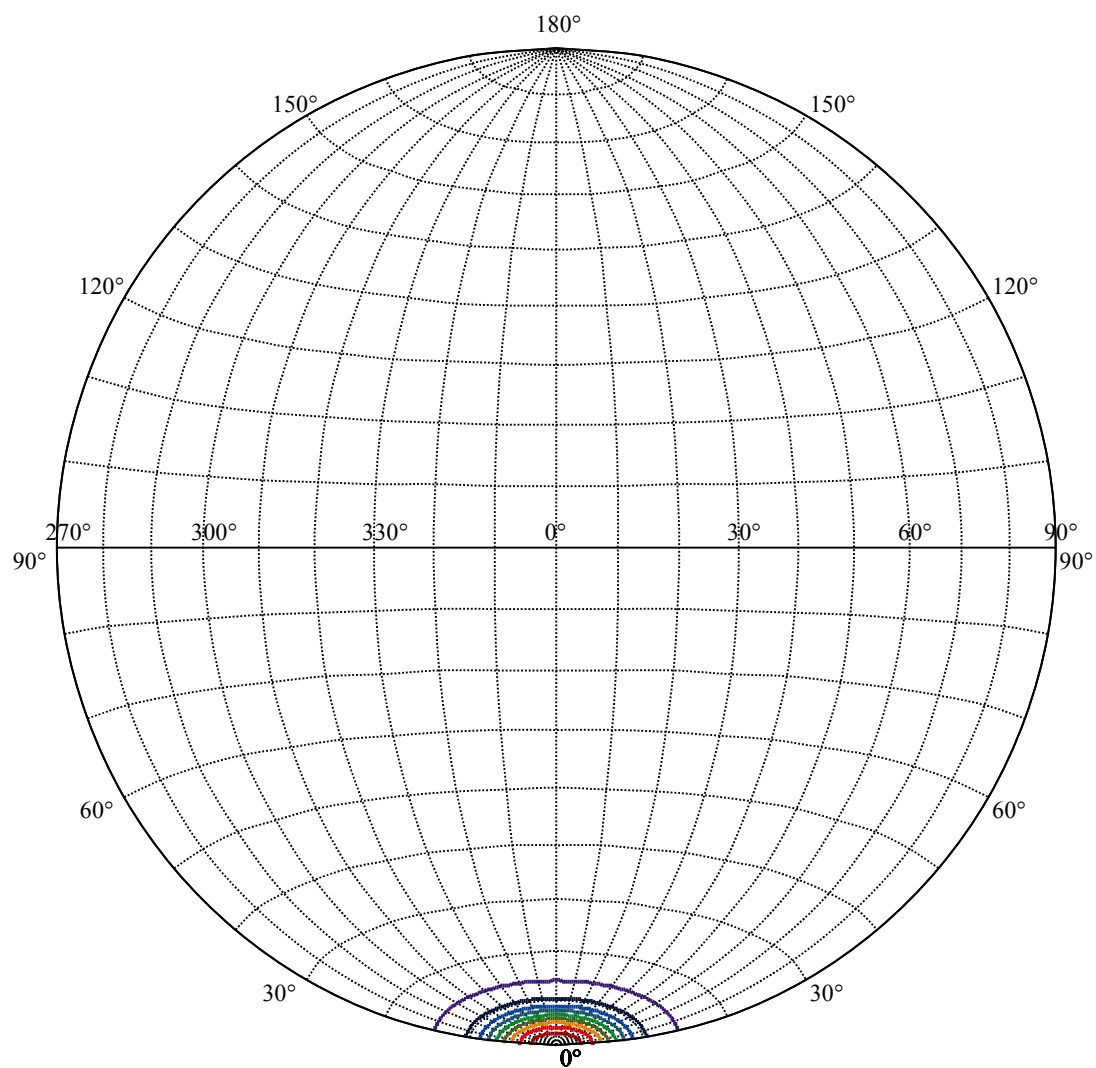
ZONAL LUMEN SUMMARY

0-10	708.25
10-20	357.13
20-30	294.26
30-40	239.89
40-50	13.13
50-60	6.54
60-70	6.77
70-80	7.06
80-90	6.49
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









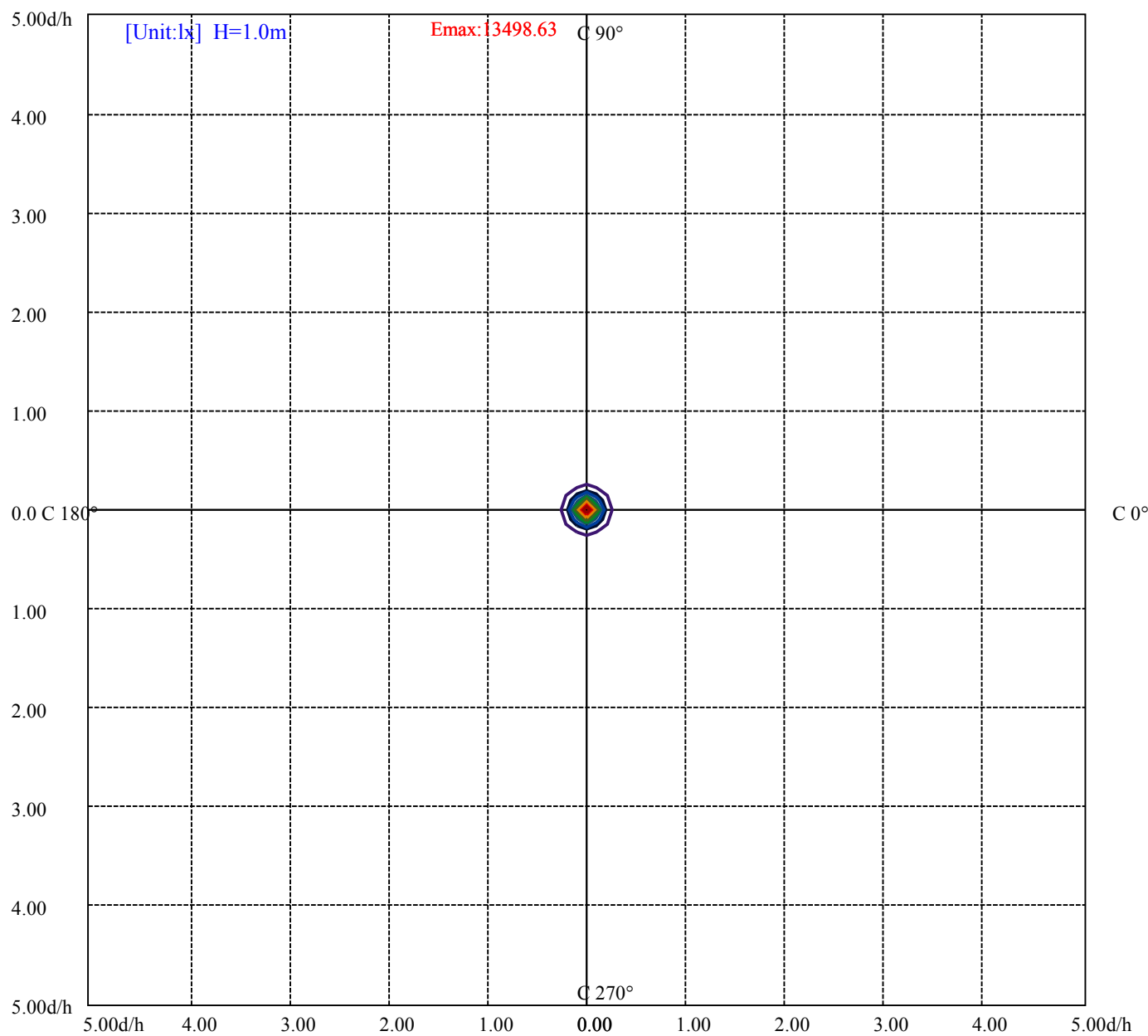
House

[Unit:cd]

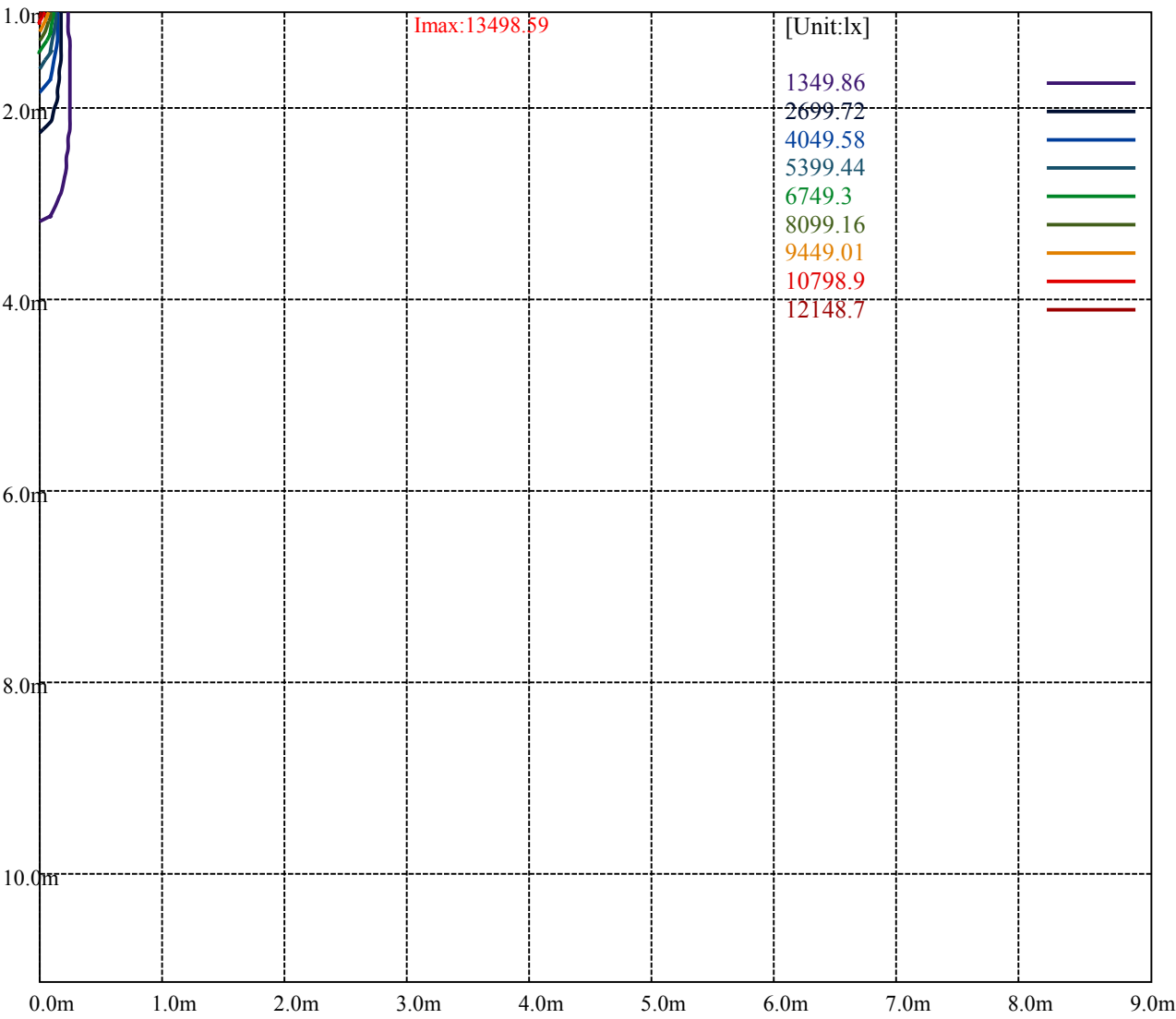
Road

Imax:13498.59

(10%Imax)	1349.86	—
(20%Imax)	2699.72	—
(30%Imax)	4049.58	—
(40%Imax)	5399.44	—
(50%Imax)	6749.3	—
(60%Imax)	8099.16	—
(70%Imax)	9449.01	—
(80%Imax)	10798.9	—
(90%Imax)	12148.7	—



(10%Emax) 1349.86	—
(20%Emax) 2699.72	—
(30%Emax) 4049.57	—
(40%Emax) 5399.43	—
(50%Emax) 6749.29	—
(60%Emax) 8099.15	—
(70%Emax) 9449	—
(80%Emax) 10798.9	—
(90%Emax) 12148.7	—



Luminance Table

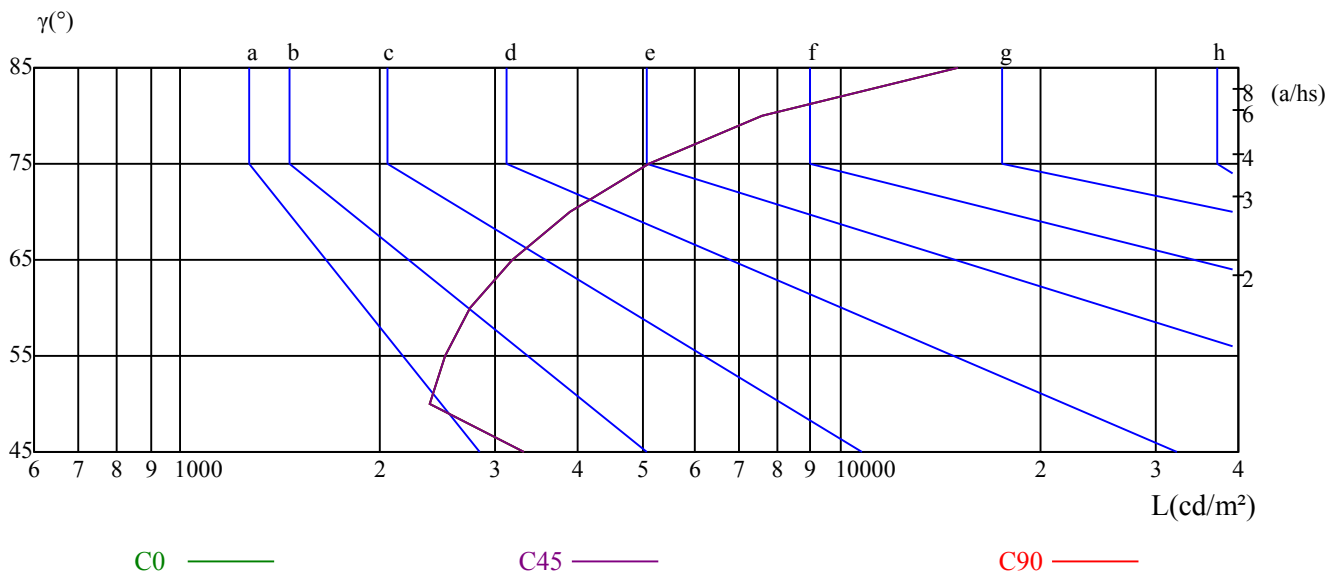
γ	45	50	55	60	65	70	75	80	85
C0	3300	2389	2512	2753	3185	3895	5104	7575	15075
C45	3300	2389	2512	2753	3185	3895	5104	7575	15075
C90	3300	2389	2512	2753	3185	3895	5104	7575	15075

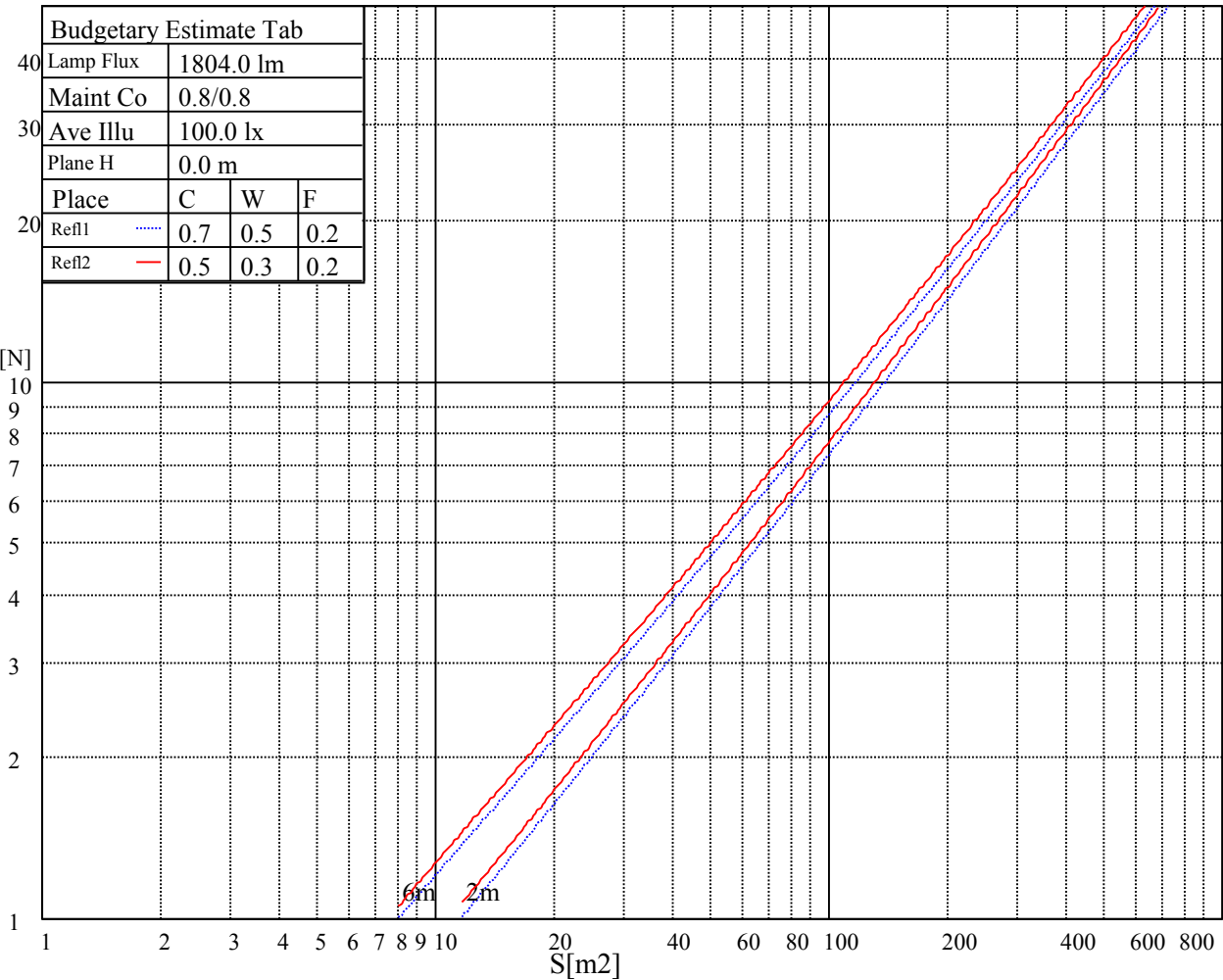
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3185	3185	3185	5104	5104	5104	15075	15075	15075

Glare Table

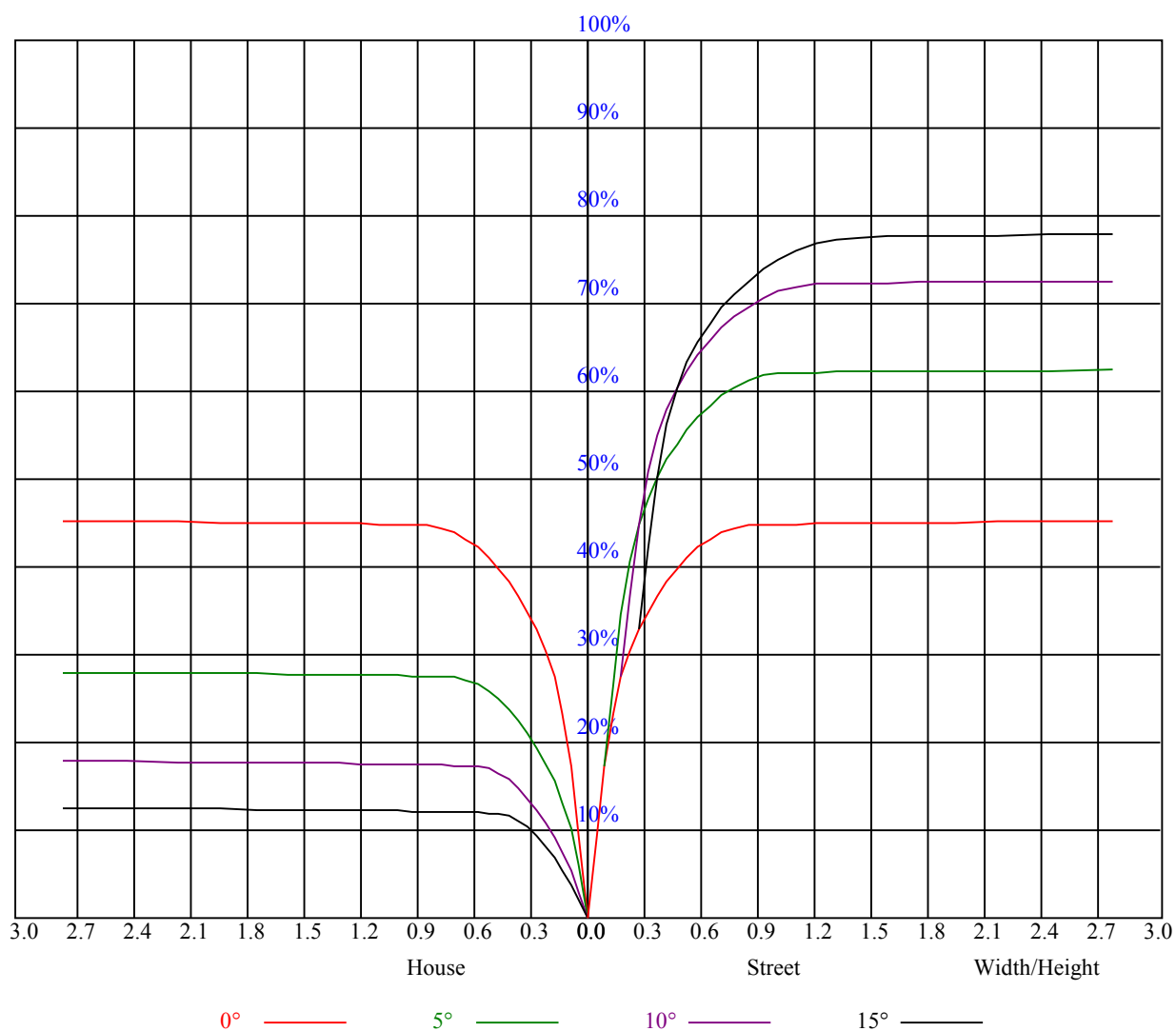
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	≤ 300				
1.5	B		2000	1000	500	≤ 300			
1.85	C			2000	1000	500	≤ 300		
2.2	D				2000	1000	500	≤ 300	
2.55	E					2000	1000	500	≤ 300
		a	b	c	d	e	f	g	h

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	1.08	1.08	1.08	1.06	1.06	1.06	1.01	1.01	1.01	0.97	0.97	0.97	0.93	0.93	0.93	0.91
1	1.02	1.00	0.98	1.00	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87
2	0.97	0.94	0.91	0.95	0.92	0.90	0.92	0.90	0.88	0.90	0.88	0.86	0.87	0.86	0.85	0.83
3	0.92	0.89	0.86	0.91	0.88	0.85	0.89	0.86	0.84	0.87	0.84	0.82	0.85	0.83	0.81	0.80
4	0.88	0.84	0.81	0.87	0.84	0.81	0.85	0.82	0.80	0.84	0.81	0.79	0.82	0.80	0.78	0.77
5	0.85	0.81	0.77	0.84	0.80	0.77	0.82	0.79	0.77	0.81	0.78	0.76	0.80	0.77	0.75	0.74
6	0.81	0.77	0.74	0.81	0.77	0.74	0.80	0.76	0.74	0.78	0.75	0.73	0.77	0.75	0.73	0.72
7	0.79	0.74	0.72	0.78	0.74	0.71	0.77	0.74	0.71	0.76	0.73	0.71	0.75	0.72	0.70	0.69
8	0.76	0.72	0.69	0.76	0.72	0.69	0.75	0.71	0.69	0.74	0.71	0.68	0.73	0.70	0.68	0.67
9	0.74	0.70	0.67	0.73	0.69	0.67	0.72	0.69	0.67	0.72	0.69	0.66	0.71	0.68	0.66	0.65
10	0.71	0.68	0.65	0.71	0.67	0.65	0.71	0.67	0.65	0.70	0.67	0.65	0.69	0.66	0.64	0.64



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Intensity data(cd)									
Appendix Page: 16 Total:18									
C/ γ (°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
0.0	13483.13	13545.00	13393.13	12915.00	12133.13	10850.63	9275.63	7790.63	6333.75
45.0	13477.50	13516.88	13291.88	12825.00	12037.50	10608.75	9208.13	7695.00	6238.13
90.0	13505.63	13342.50	12948.75	11184.75	11030.06	9496.13	7994.81	6305.63	4780.69
135.0	13528.13	13410.00	13072.50	12195.00	11126.25	9787.50	7925.63	6418.13	5062.50
180.0	13483.13	13168.13	12577.50	11210.06	9869.06	8576.44	7057.69	5092.31	4021.31
225.0	13477.50	13230.00	12588.75	11117.81	10301.63	8660.25	7164.00	5563.13	4169.81
270.0	13505.63	13460.63	13134.38	12414.38	11441.25	9978.75	8325.00	6845.63	5625.00
315.0	13528.13	13410.00	13106.25	12380.63	10936.13	9915.19	8448.75	6779.81	5217.19
360.0	13483.13	13545.00	13393.13	12915.00	12133.13	10850.63	9275.63	7790.63	6333.75
C/ γ (°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4691.25	3605.63	2891.25	2218.50	1830.38	1584.56	1374.19	1209.94	1093.50
45.0	4612.50	3526.88	2902.50	2140.31	1756.69	1523.25	1328.63	1177.31	1069.88
90.0	3657.38	2727.56	2120.06	1773.56	1532.81	1312.31	1111.05	1074.83	974.93
135.0	3633.75	2868.75	2194.31	1778.63	1506.38	1325.25	1172.25	1060.88	978.19
180.0	3054.38	2255.06	1861.88	1596.94	1401.75	1116.84	1104.47	1012.50	912.38
225.0	3205.69	2439.56	1947.94	1661.06	1449.56	1254.94	1118.36	1029.60	927.79
270.0	3965.63	3065.63	2885.63	1961.44	1640.81	1433.25	1256.63	1117.13	1013.06
315.0	4023.56	3006.56	2333.25	1936.69	1653.19	1400.06	1195.88	1113.13	988.37
360.0	4691.25	3605.63	2891.25	2218.50	1830.38	1584.56	1374.19	1209.94	1093.50
C/ γ (°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	981.00	896.06	821.81	764.44	724.50	694.69	666.00	647.44	631.13
45.0	960.19	884.81	812.25	753.19	712.13	681.75	653.63	636.19	619.31
90.0	888.13	823.33	762.75	715.11	684.28	657.96	638.89	621.39	604.97
135.0	887.06	822.38	762.75	718.88	691.31	667.13	642.38	627.19	611.44
180.0	831.49	774.96	726.53	691.82	667.13	644.06	628.37	609.24	594.62
225.0	844.76	786.71	731.31	699.92	675.56	653.12	636.47	616.89	601.26
270.0	914.06	841.50	779.06	731.81	699.75	675.56	649.69	634.50	617.63
315.0	887.85	820.91	765.23	720.17	691.31	665.44	646.14	629.55	610.88
360.0	981.00	896.06	821.81	764.44	724.50	694.69	666.00	647.44	631.13
C/ γ (°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	612.00	599.63	588.94	578.25	569.25	559.69	550.13	541.13	508.50
45.0	601.88	590.06	578.81	568.69	557.44	547.88	537.75	525.38	487.69
90.0	593.38	581.51	570.09	559.52	549.68	538.43	526.84	496.01	439.99
135.0	596.81	585.56	575.44	564.19	554.06	544.50	532.13	497.81	440.44
180.0	583.54	572.12	561.60	551.93	542.98	531.79	506.03	460.29	399.26
225.0	591.86	580.39	569.19	560.93	552.26	540.68	522.34	479.08	416.98
270.0	600.75	589.50	579.94	570.38	560.25	551.81	542.81	519.19	475.88
315.0	598.39	586.52	576.45	567.79	558.84	548.04	539.66	519.13	469.29
360.0	612.00	599.63	588.94	578.25	569.25	559.69	550.13	541.13	508.50
C/ γ (°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	452.25	392.63	317.25	290.81	169.82	111.88	60.92	19.52	14.34
45.0	429.75	369.56	297.00	247.16	156.66	99.39	40.05	15.86	13.56
90.0	373.50	309.83	228.54	165.15	104.96	47.81	19.46	14.23	12.94
135.0	369.00	308.81	284.06	165.09	98.83	47.31	17.66	14.40	13.16
180.0	331.76	265.78	192.21	124.76	71.27	25.99	14.91	13.61	11.98
225.0	346.84	279.17	202.89	133.31	80.16	31.61	15.02	13.61	12.32
270.0	410.06	345.94	286.88	199.52	128.48	72.96	25.65	14.51	13.39
315.0	402.64	338.91	264.43	189.56	127.91	66.54	28.58	14.74	13.44
360.0	452.25	392.63	317.25	290.81	169.82	111.88	60.92	19.52	14.34

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Intensity data(cd)										Appendix Page: 17 Total:18	
C/ γ (°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0		
0.0	13.28	11.48	9.90	8.89	7.93	7.82	7.71	7.54	7.48		
45.0	12.32	10.97	9.62	8.61	7.88	7.76	7.65	7.54	7.43		
90.0	11.76	10.29	9.00	8.33	7.76	7.65	7.59	7.48	7.37		
135.0	11.53	9.90	8.89	7.88	7.71	7.54	7.48	7.43	7.31		
180.0	10.35	9.45	8.16	7.82	7.71	7.59	7.48	7.43	7.31		
225.0	10.86	9.62	8.66	8.10	7.93	7.76	7.65	7.59	7.48		
270.0	11.93	10.46	9.28	8.55	8.21	7.99	7.88	7.76	7.65		
315.0	12.09	10.46	9.17	8.72	7.99	7.82	7.71	7.59	7.48		
360.0	13.28	11.48	9.90	8.89	7.93	7.82	7.71	7.54	7.48		
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0		
0.0	7.43	7.26	7.20	7.09	7.09	7.03	6.98	6.92	6.86		
45.0	7.37	7.31	7.20	7.14	7.03	7.03	6.98	6.92	6.92		
90.0	7.31	7.20	7.14	7.09	7.03	6.98	6.92	6.86	6.86		
135.0	7.26	7.20	7.09	7.03	6.98	6.92	6.92	6.86	6.86		
180.0	7.26	7.20	7.09	7.03	6.98	6.98	6.92	6.86	6.86		
225.0	7.37	7.26	7.20	7.14	7.03	7.03	6.92	6.92	6.86		
270.0	7.54	7.43	7.31	7.26	7.14	7.14	6.98	6.98	6.92		
315.0	7.37	7.26	7.20	7.14	7.03	6.98	6.92	6.86	6.92		
360.0	7.43	7.26	7.20	7.09	7.09	7.03	6.98	6.92	6.86		
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0		
0.0	6.86	6.81	6.75	6.81	6.81	6.75	6.75	6.75	6.69		
45.0	6.86	6.86	6.81	6.81	6.81	6.75	6.75	6.75	6.75		
90.0	6.86	6.81	6.81	6.75	6.75	6.75	6.69	6.69	6.69		
135.0	6.81	6.75	6.75	6.75	6.75	6.75	6.69	6.64	6.69		
180.0	6.81	6.81	6.75	6.75	6.75	6.75	6.69	6.69	6.75		
225.0	6.86	6.86	6.81	6.81	6.75	6.75	6.75	6.75	6.69		
270.0	6.92	6.86	6.86	6.81	6.81	6.75	6.75	6.75	6.69		
315.0	6.86	6.81	6.75	6.75	6.75	6.75	6.69	6.69	6.69		
360.0	6.86	6.81	6.75	6.81	6.81	6.75	6.75	6.75	6.69		
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0		
0.0	6.69	6.64	6.64	6.64	6.64	6.69	6.64	6.64	6.64		
45.0	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.64	6.69		
90.0	6.69	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64		
135.0	6.69	6.64	6.64	6.64	6.64	6.64	6.58	6.64	6.58		
180.0	6.69	6.69	6.64	6.64	6.64	6.64	6.64	6.64	6.64		
225.0	6.69	6.69	6.69	6.69	6.69	6.64	6.64	6.64	6.64		
270.0	6.75	6.69	6.69	6.69	6.64	6.64	6.64	6.64	6.64		
315.0	6.64	6.69	6.64	6.64	6.64	6.64	6.64	6.58	6.58		
360.0	6.69	6.64	6.64	6.64	6.64	6.69	6.64	6.64	6.64		
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0		
0.0	6.64	6.64	6.64	6.64	6.64	6.58	6.64	6.58	6.53		
45.0	6.64	6.69	6.69	6.69	6.64	6.58	6.58	6.58	6.58		
90.0	6.58	6.58	6.58	6.64	6.58	6.58	6.58	6.58	6.53		
135.0	6.58	6.64	6.58	6.58	6.64	6.58	6.58	6.58	6.53		
180.0	6.64	6.64	6.64	6.58	6.64	6.58	6.58	6.58	6.58		
225.0	6.64	6.64	6.69	6.64	6.64	6.58	6.58	6.64	6.58		
270.0	6.64	6.64	6.64	6.64	6.64	6.64	6.58	6.58	6.58		
315.0	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58		
360.0	6.64	6.64	6.64	6.64	6.64	6.58	6.64	6.58	6.53		

Intensity data(cd)

Appendix Page: 18 Total:18

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