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NATA

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Client:

LumCAT: 2-1793-N

Luminaire: 92.70.131.00

Report No: nata-0100

Test No: GC2018121201

LampCAT: OSRAM SOLERIQ S13

Lamp flux(lm): 1828.0

Number of Lamps: 1

Length(mm): 69

Phm Type: C

Voltage(V): 36.6000

Current(A): 0.5100

Power (W): 18.6660

PF: 1.0000

Ballast type: DC

Width(mm): 69

Height(mm): 0

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Photometric Results

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Lumens(lm): 1533.15, Efficiency(%): 83.87% , Luminous Efficacy(lm/W): 82.14

Central intensity(cd): 10374.330, Maximum intensity(cd): 10374.330

Angle of maximum intensity: C=0.0  $\gamma$ =0.0

Beam Angle(50%Imax): [C0/180]Total=16.4

[C90/270]Total=16.4

Field angle(10%Imax): [C0/180]Total=37.2

[C90/270]Total=37.2

Maximum s/h(1/2): C0\_180=0.28 C90\_270=0.28

Maximum s/h(1/4): C0\_180=0.29 C90\_270=0.29

Up flux rate of lamp(%): 0.00%

Down flux rate of lamp(%): 84.00%

Up flux rate of LUM(%): - -

Down flux rate of LUM(%): 100.00%

CIE Type : Direct lighting

Output flux ratio in  $\pi$  solid angle : 97.909%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	10374.328	2.482	2.482	.136%	.162%
1.0	10260.281	19.637	22.119	1.074%	1.443%
2.0	9933.891	38.018	60.137	2.080%	3.922%
3.0	9359.227	53.715	113.851	2.938%	7.426%
4.0	8669.461	66.318	180.169	3.628%	11.752%
5.0	7863.469	75.156	255.324	4.111%	16.654%
6.0	7019.578	80.463	335.788	4.402%	21.902%
7.0	6121.406	81.808	417.596	4.475%	27.238%
8.0	5328.000	81.315	498.911	4.448%	32.542%
9.0	4476.234	76.789	575.7	4.201%	37.550%
10.0	3733.242	71.090	646.79	3.889%	42.187%
11.0	3152.953	65.973	712.763	3.609%	46.490%
12.0	2635.102	60.080	772.843	3.287%	50.409%
13.0	2206.547	54.432	827.274	2.978%	53.959%
14.0	1887.117	50.064	877.339	2.739%	57.225%
15.0	1630.406	46.275	923.613	2.531%	60.243%
16.0	1418.414	42.874	966.487	2.345%	63.039%
17.0	1250.353	40.088	1006.576	2.193%	65.654%
18.0	1103.435	37.392	1043.968	2.046%	68.093%
19.0	998.409	35.645	1079.613	1.950%	70.418%
20.0	902.264	33.841	1113.454	1.851%	72.625%
21.0	820.273	32.236	1145.689	1.763%	74.728%
22.0	760.570	31.244	1176.933	1.709%	76.766%
23.0	714.502	30.615	1207.548	1.675%	78.763%
24.0	672.827	30.010	1237.559	1.642%	80.720%
25.0	637.664	29.552	1267.111	1.617%	82.648%
26.0	610.270	29.337	1296.448	1.605%	84.561%
27.0	579.248	28.838	1325.286	1.578%	86.442%
28.0	537.820	27.688	1352.974	1.515%	88.248%
29.0	479.419	25.488	1378.462	1.394%	89.911%
30.0	411.870	22.583	1401.045	1.235%	91.384%
31.0	337.134	19.041	1420.087	1.042%	92.626%
32.0	267.567	15.549	1435.635	.851%	93.640%
33.0	196.868	11.758	1447.393	.643%	94.407%
34.0	125.213	7.678	1455.072	.420%	94.908%
35.0	80.374	5.055	1460.127	.277%	95.237%
36.0	55.069	3.550	1463.677	.194%	95.469%
37.0	45.865	3.027	1466.703	.166%	95.666%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	40.760	2.752	1469.455	.151%	95.846%
39.0	36.563	2.523	1471.979	.138%	96.010%
40.0	33.237	2.343	1474.321	.128%	96.163%
41.0	30.382	2.186	1476.507	.120%	96.306%
42.0	27.591	2.025	1478.532	.111%	96.438%
43.0	25.109	1.878	1480.41	.103%	96.560%
44.0	23.070	1.757	1482.167	.096%	96.675%
45.0	21.234	1.647	1483.813	.090%	96.782%
46.0	19.758	1.559	1485.372	.085%	96.884%
47.0	18.443	1.479	1486.851	.081%	96.980%
48.0	17.487	1.425	1488.276	.078%	97.073%
49.0	16.601	1.374	1489.65	.075%	97.163%
50.0	15.834	1.330	1490.98	.073%	97.250%
51.0	15.286	1.303	1492.283	.071%	97.335%
52.0	14.822	1.281	1493.564	.070%	97.418%
53.0	14.365	1.258	1494.822	.069%	97.500%
54.0	14.077	1.249	1496.071	.068%	97.582%
55.0	13.823	1.242	1497.312	.068%	97.663%
56.0	13.598	1.236	1498.549	.068%	97.743%
57.0	13.402	1.233	1499.781	.067%	97.824%
58.0	13.233	1.231	1501.012	.067%	97.904%
59.0	13.050	1.227	1502.239	.067%	97.984%
60.0	12.916	1.227	1503.465	.067%	98.064%
61.0	12.762	1.224	1504.689	.067%	98.144%
62.0	12.642	1.224	1505.913	.067%	98.224%
63.0	12.593	1.230	1507.144	.067%	98.304%
64.0	12.361	1.218	1508.362	.067%	98.383%
65.0	12.080	1.201	1509.563	.066%	98.462%
66.0	11.805	1.183	1510.745	.065%	98.539%
67.0	11.503	1.161	1511.906	.064%	98.615%
68.0	11.215	1.140	1513.047	.062%	98.689%
69.0	10.941	1.120	1514.167	.061%	98.762%
70.0	10.666	1.099	1515.266	.060%	98.834%
71.0	10.427	1.081	1516.347	.059%	98.904%
72.0	10.174	1.061	1517.408	.058%	98.973%
73.0	9.914	1.040	1518.448	.057%	99.041%
74.0	9.724	1.025	1519.473	.056%	99.108%
75.0	9.506	1.007	1520.48	.055%	99.174%

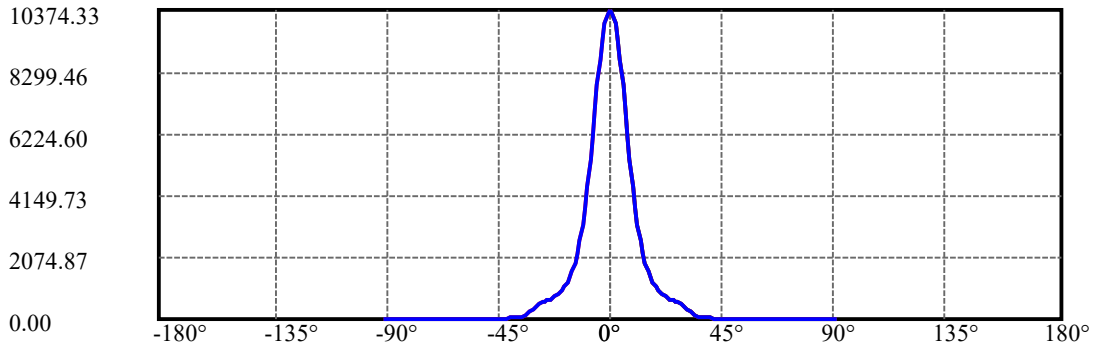
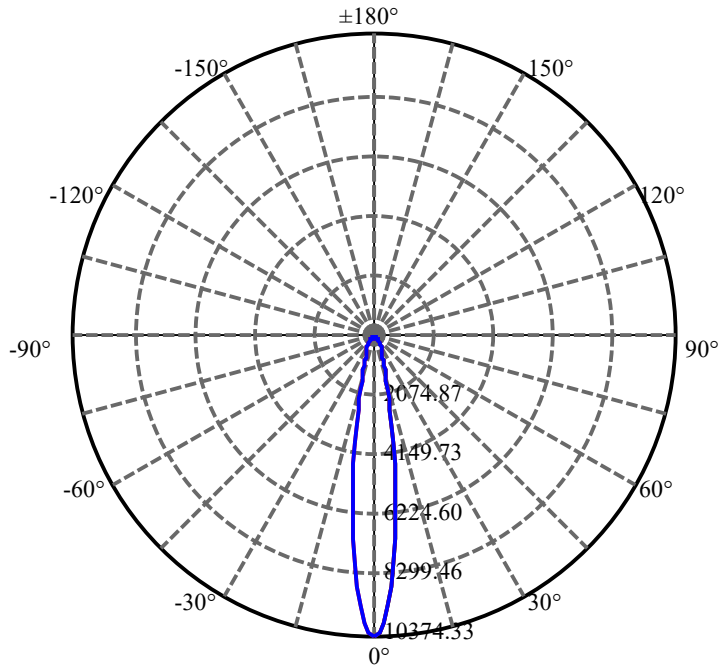
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	9.295	0.989	1521.469	.054%	99.238%
77.0	9.091	0.971	1522.44	.053%	99.302%
78.0	8.923	0.957	1523.397	.052%	99.364%
79.0	8.726	0.939	1524.337	.051%	99.425%
80.0	8.564	0.925	1525.262	.051%	99.486%
81.0	8.395	0.909	1526.171	.050%	99.545%
82.0	8.220	0.893	1527.064	.049%	99.603%
83.0	8.044	0.876	1527.939	.048%	99.660%
84.0	7.896	0.861	1528.8	.047%	99.717%
85.0	7.671	0.838	1529.638	.046%	99.771%
86.0	7.495	0.820	1530.458	.045%	99.825%
87.0	7.305	0.800	1531.258	.044%	99.877%
88.0	7.045	0.772	1532.03	.042%	99.927%
89.0	6.827	0.749	1532.779	.041%	99.976%
90.0	6.701	0.367	1533.146	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1401.05	76.64%	91.38%
0-40	1474.32	80.65%	96.16%
0-60	1503.47	82.25%	98.06%
0-90	1532.78	83.85%	99.98%
0-120	1532.78	83.85%	99.98%
0-180	1533.15	83.87%	100.00%
60-90	30.54	1.67%	1.99%
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%
0-23.63	1226.52	67.10%	80.00%

ZONAL LUMEN SUMMARY

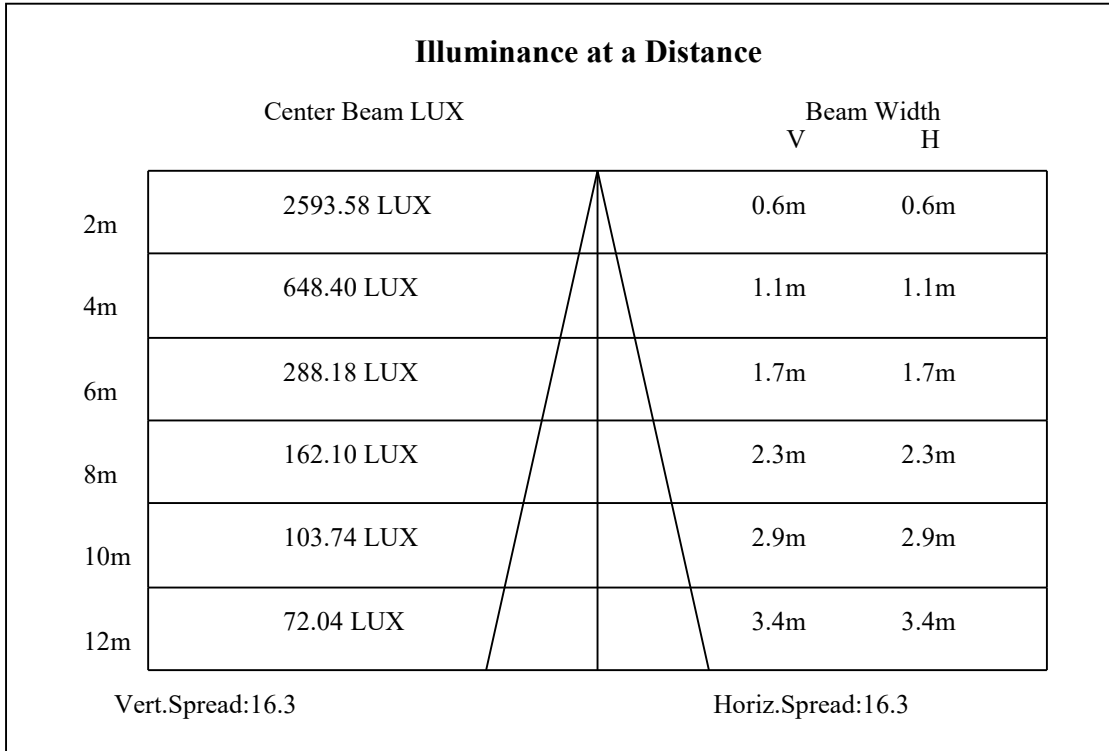
0-10	646.79
10-20	466.66
20-30	287.59
30-40	73.28
40-50	16.66
50-60	12.48
60-70	11.80
70-80	10.00
80-90	7.52
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

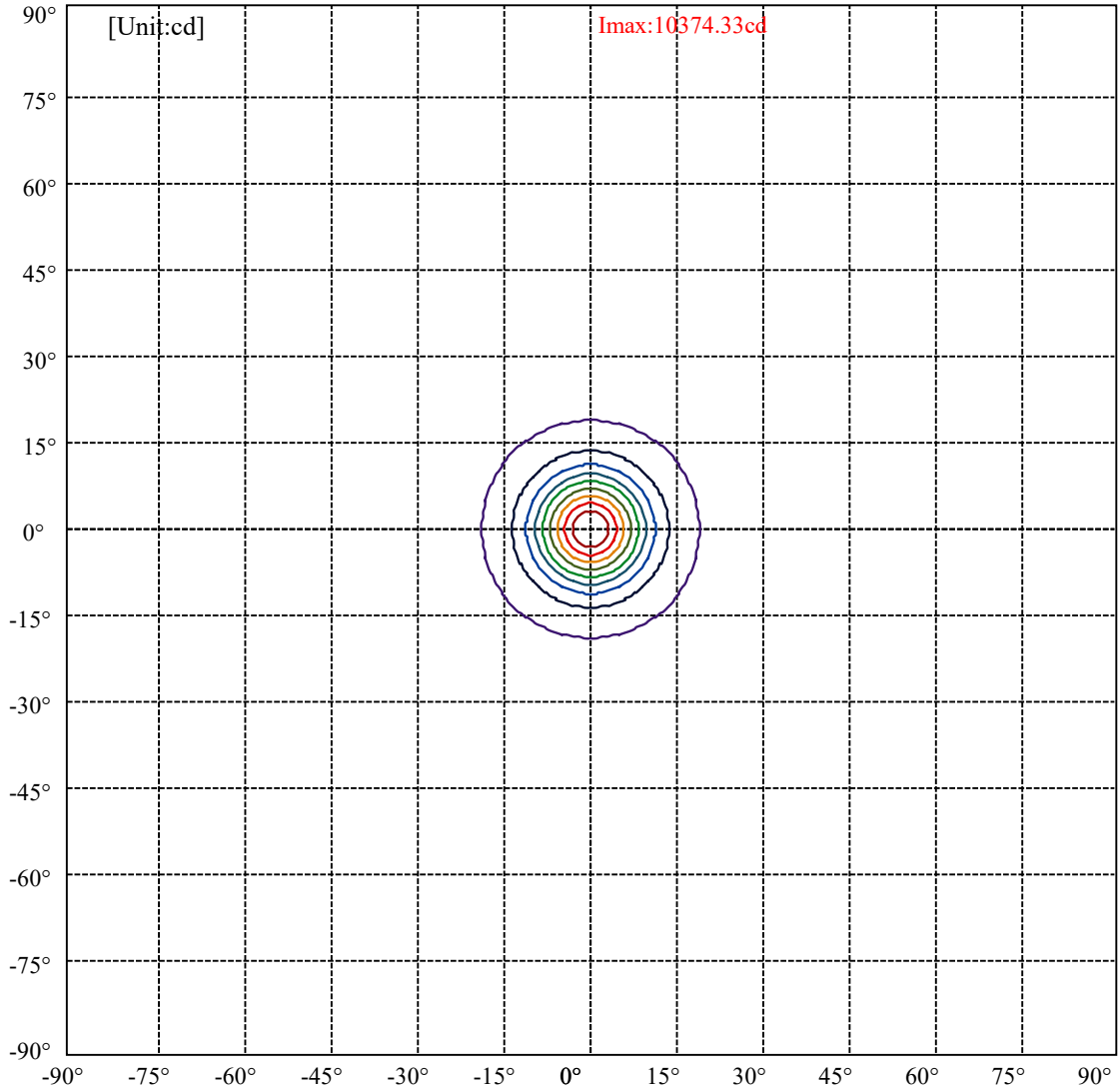


C0(Max): —————  
C0/C180: —————  
C90/C270: —————

Field angle(10%Imax):C0/180Left:18.6 Right:18.6  
:C90/270Left:18.6 Right:18.6

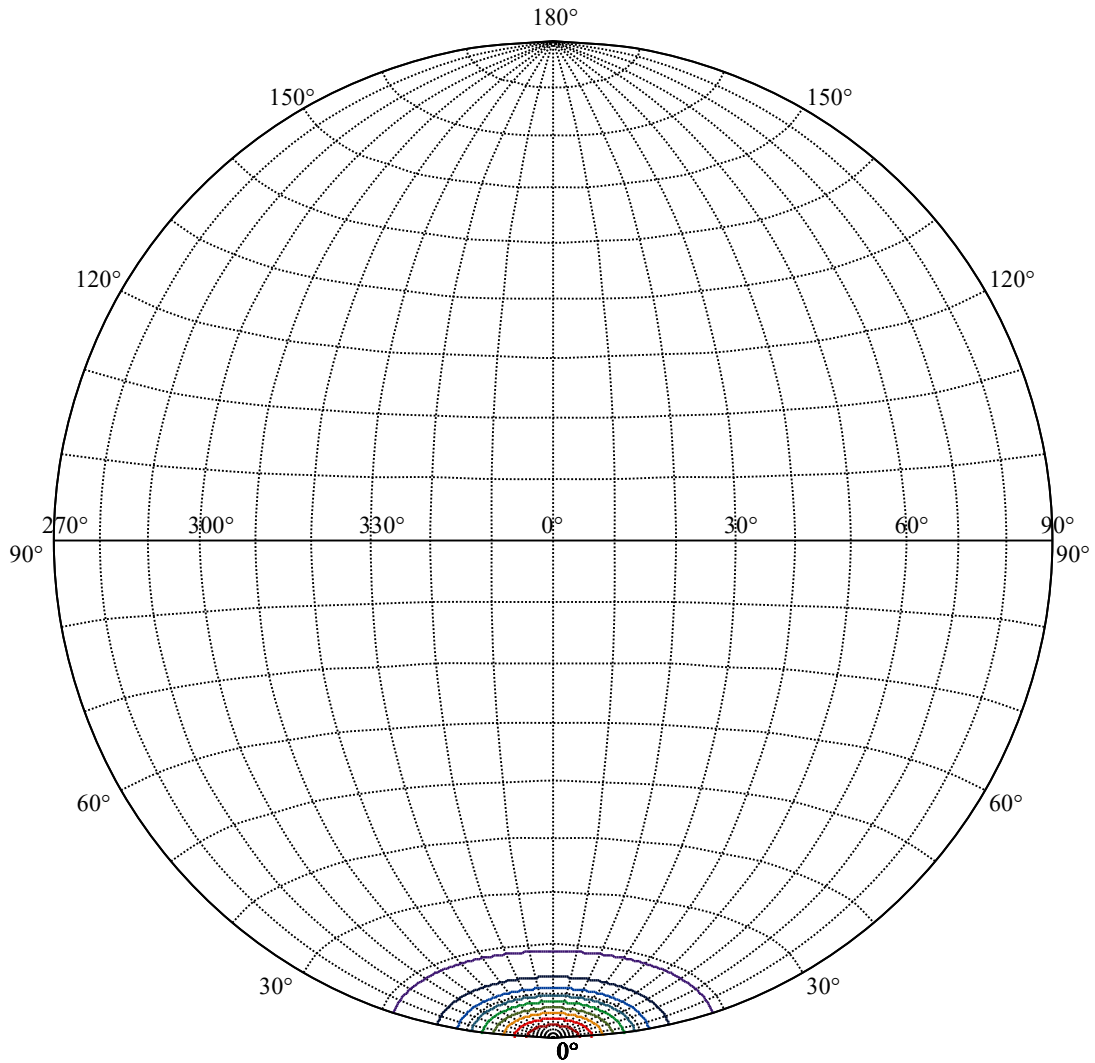
Beam Angle(50%Imax):C0/180Left:8.2 Right:8.2  
:C90/270Left:8.2 Right:8.2





(10%Imax) 1037.43	—
(20%Imax) 2074.87	—
(30%Imax) 3112.3	—
(40%Imax) 4149.73	—
(50%Imax) 5187.16	—
(60%Imax) 6224.6	—
(70%Imax) 7262.03	—
(80%Imax) 8299.46	—
(90%Imax) 9336.9	—





House

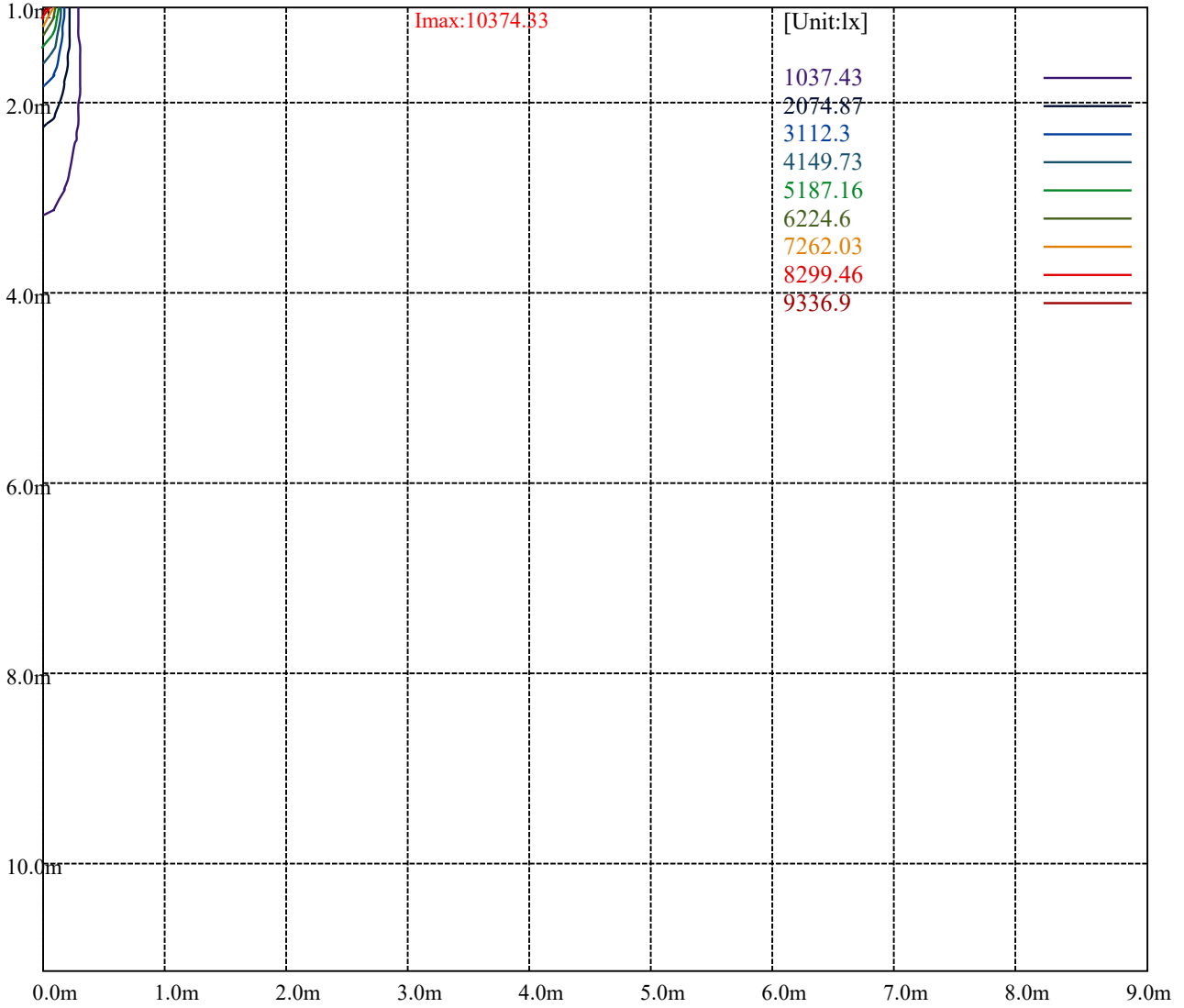
[Unit:cd]

Road

**Imax:10374.33**

(10%Imax) 1037.43	—
(20%Imax) 2074.87	—
(30%Imax) 3112.3	—
(40%Imax) 4149.73	—
(50%Imax) 5187.16	—
(60%Imax) 6224.6	—
(70%Imax) 7262.03	—
(80%Imax) 8299.46	—
(90%Imax) 9336.9	—





Luminance Table

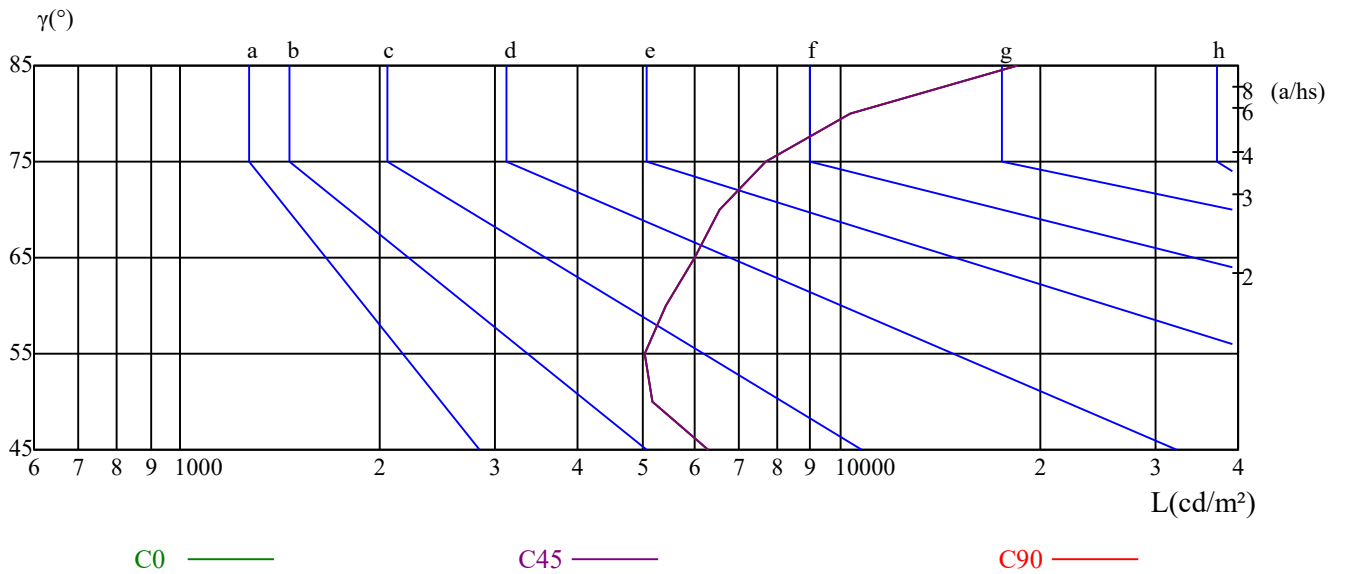
$\gamma$	45	50	55	60	65	70	75	80	85
C0	6307	5174	5062	5426	6004	6550	7715	10359	18487
C45	6307	5174	5062	5426	6004	6550	7715	10359	18487
C90	6307	5174	5062	5426	6004	6550	7715	10359	18487

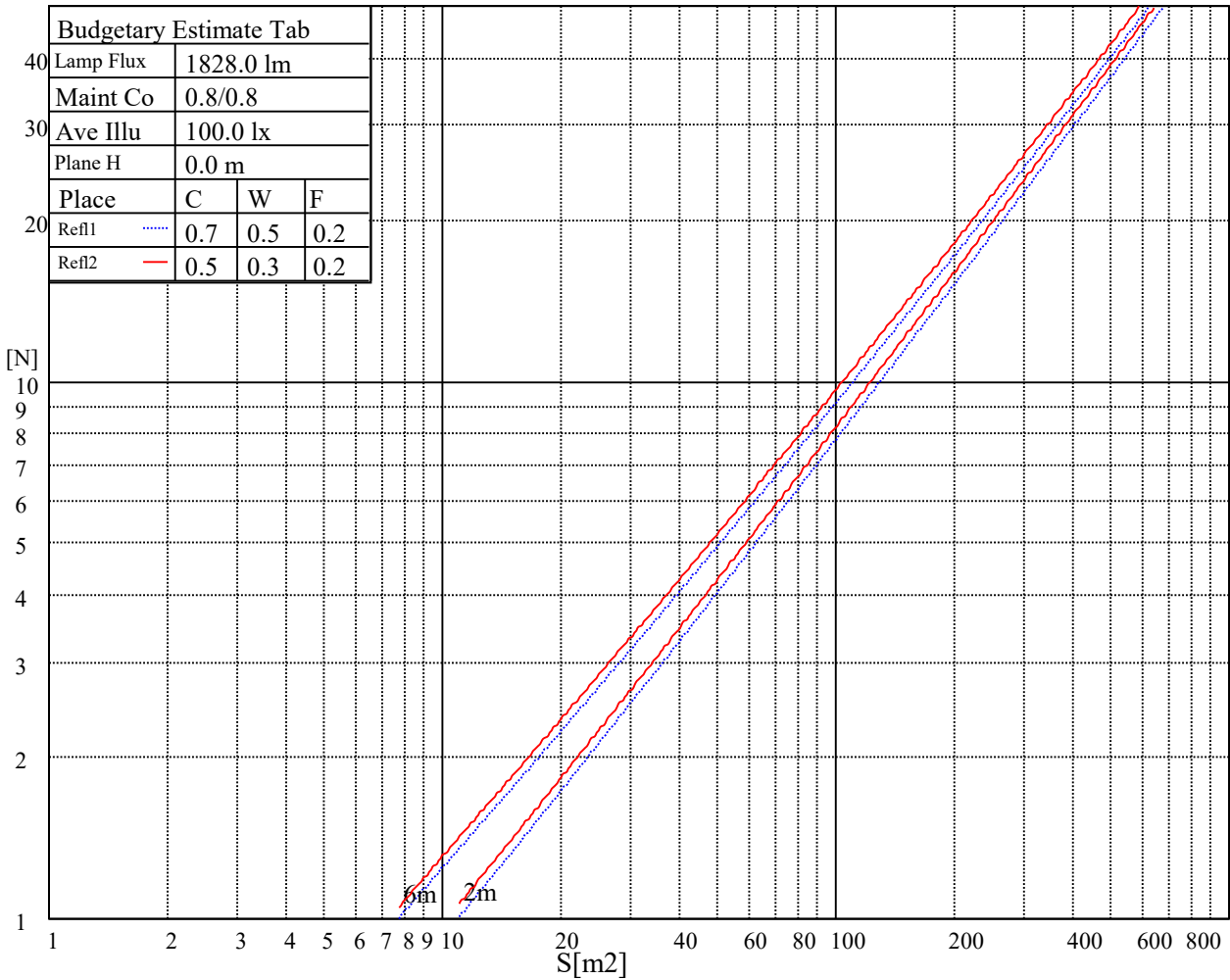
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
6004	6004	6004	7715	7715	7715	18487	18487	18487

Glare Table

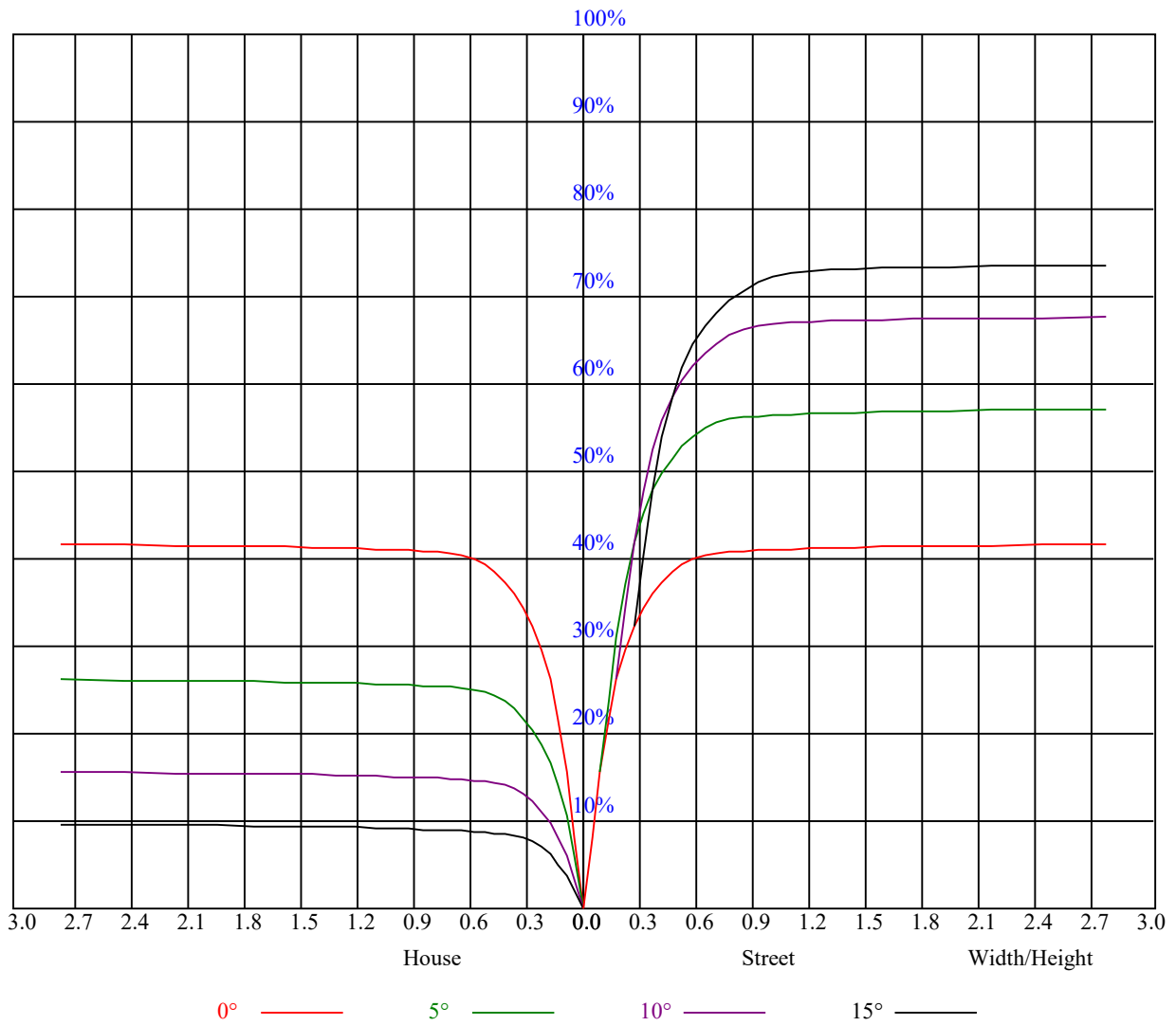
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

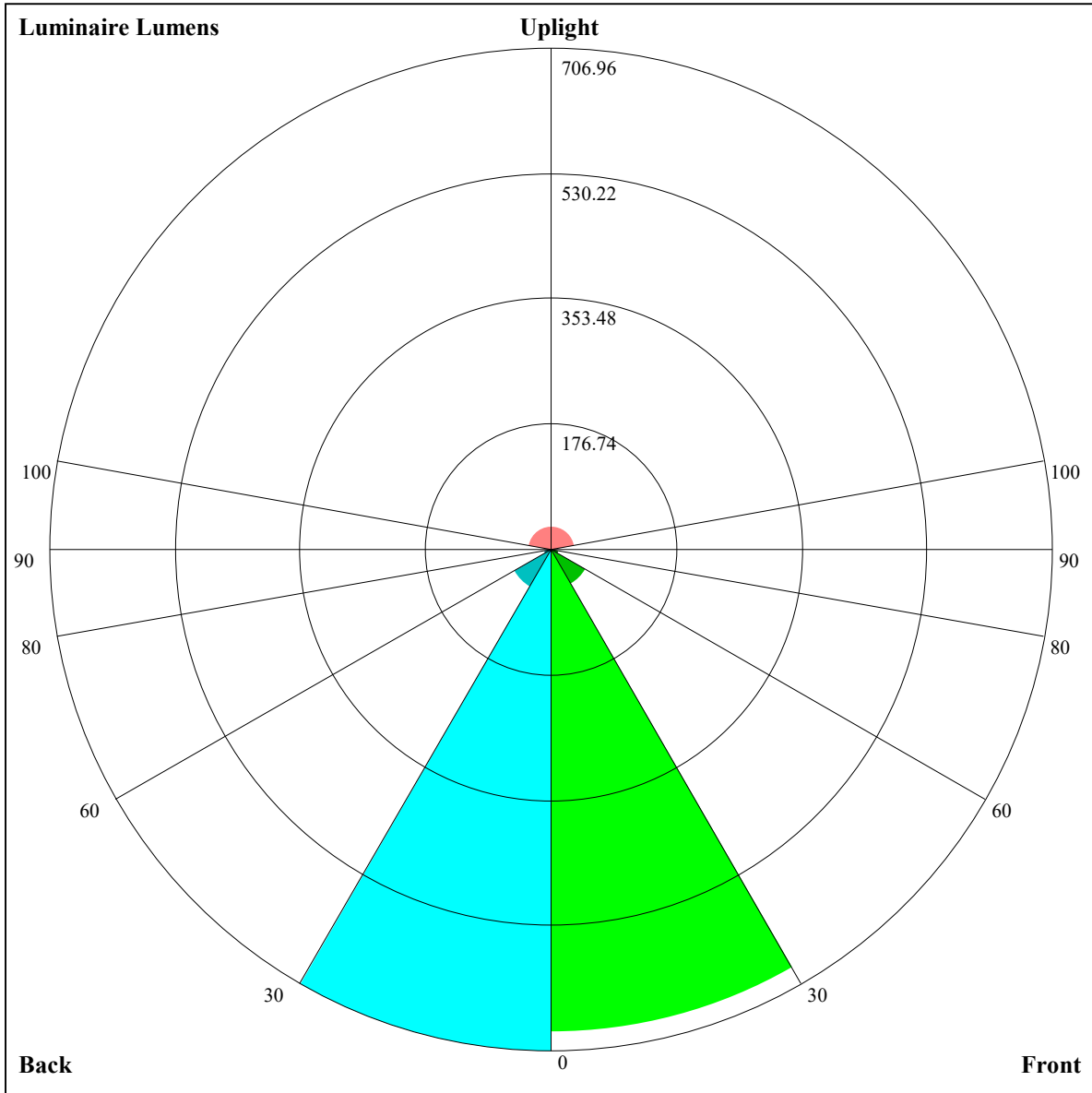
Luminance Limiting Curve





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	1.00	1.00	1.00	0.98	0.98	0.98	0.93	0.93	0.93	0.89	0.89	0.89	0.86	0.86	0.86	0.84
1	0.94	0.92	0.91	0.92	0.91	0.89	0.89	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.82	0.80
2	0.90	0.87	0.85	0.88	0.86	0.84	0.85	0.84	0.82	0.83	0.81	0.80	0.81	0.80	0.78	0.77
3	0.86	0.82	0.80	0.84	0.81	0.79	0.82	0.80	0.78	0.80	0.78	0.77	0.79	0.77	0.76	0.74
4	0.82	0.79	0.76	0.81	0.78	0.76	0.80	0.77	0.75	0.78	0.76	0.74	0.77	0.75	0.73	0.72
5	0.79	0.75	0.73	0.78	0.75	0.72	0.77	0.74	0.72	0.76	0.73	0.71	0.75	0.72	0.71	0.70
6	0.76	0.73	0.70	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.73	0.70	0.69	0.68
7	0.74	0.70	0.68	0.73	0.70	0.68	0.73	0.69	0.67	0.72	0.69	0.67	0.71	0.68	0.67	0.66
8	0.72	0.68	0.66	0.71	0.68	0.66	0.71	0.68	0.65	0.70	0.67	0.65	0.69	0.67	0.65	0.64
9	0.70	0.66	0.64	0.69	0.66	0.64	0.69	0.66	0.64	0.68	0.65	0.63	0.67	0.65	0.63	0.62
10	0.68	0.64	0.62	0.68	0.64	0.62	0.67	0.64	0.62	0.66	0.64	0.62	0.66	0.63	0.62	0.61





Luminaire Lumens:

FL=681.14,FM=55.5,FH=10.91,FVH=4.16

BL=706.96,BM=60.02,BH=11.06,BVH=4.19

UL=7.31,UH=34.79

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	10360.13	10267.31	9829.13	9264.94	8577.00	7595.44	6791.63	5984.44	5289.75
45.0	10400.06	10417.50	10217.25	9717.75	9104.63	8296.31	7411.50	6593.63	5775.19
90.0	10420.88	10436.06	10276.88	9831.94	9166.50	8447.63	7648.31	6611.63	5779.69
135.0	10316.25	10429.88	10384.88	10037.25	9544.50	8898.75	7968.94	7159.50	6340.50
180.0	10360.13	10293.75	9967.50	9396.00	8751.38	7939.13	7165.13	6255.56	5360.06
225.0	10400.06	10148.06	9700.88	9019.69	8202.94	7424.44	6614.44	5619.38	4844.25
270.0	10420.88	10217.25	9714.94	8992.69	8243.44	7350.19	6424.88	5607.00	4833.00
315.0	10316.25	9872.44	9379.69	8613.56	7765.31	6955.88	6131.81	5140.13	4401.56
360.0	10360.13	10267.31	9829.13	9264.94	8577.00	7595.44	6791.63	5984.44	5289.75
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4286.81	3647.25	3160.13	2578.50	2171.25	1911.38	1620.56	1410.19	1274.06
45.0	4782.38	4051.69	3413.25	2813.06	2333.25	2002.50	1710.56	1486.13	1319.63
90.0	4971.38	4044.38	3405.94	2868.19	2322.00	1978.31	1708.88	1445.63	1294.88
135.0	5338.69	4560.75	3854.25	3179.25	2626.31	2238.19	1898.44	1636.31	1441.69
180.0	4604.63	3834.00	3174.75	2697.75	2299.50	1905.19	1666.69	1471.50	1289.81
225.0	4127.06	3342.38	2818.13	2389.50	2009.81	1720.13	1516.50	1327.50	1109.76
270.0	3956.06	3340.69	2817.00	2343.94	1975.50	1720.13	1487.81	1297.13	1154.25
315.0	3742.88	3044.81	2580.19	2210.63	1914.75	1621.13	1433.81	1272.94	1118.76
360.0	4286.81	3647.25	3160.13	2578.50	2171.25	1911.38	1620.56	1410.19	1274.06
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1109.25	999.00	908.44	816.19	757.69	715.50	665.44	633.38	607.50
45.0	1158.75	1042.31	933.75	842.06	777.94	726.75	678.94	645.19	617.06
90.0	1112.63	1009.01	899.27	813.94	745.20	697.84	659.98	619.65	592.59
135.0	1254.94	1127.25	1006.31	902.81	833.63	777.94	722.25	684.00	650.25
180.0	1118.93	1023.36	923.01	842.18	784.24	731.48	692.83	653.34	620.44
225.0	1055.31	952.26	879.75	810.68	746.94	711.00	674.89	633.49	610.82
270.0	1022.63	928.69	843.19	775.13	726.19	682.88	645.19	616.50	591.75
315.0	995.06	905.40	824.40	759.21	712.74	672.64	643.11	615.77	591.75
360.0	1109.25	999.00	908.44	816.19	757.69	715.50	665.44	633.38	607.50
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	574.31	524.81	465.19	390.94	312.19	284.63	163.29	101.19	61.76
45.0	591.19	561.94	507.38	443.25	361.69	287.44	243.51	138.71	88.03
90.0	570.09	548.61	496.46	438.98	375.81	291.26	225.23	158.51	106.59
135.0	614.81	590.63	555.19	486.56	409.50	335.81	284.63	182.14	124.14
180.0	596.53	563.29	503.04	437.57	366.47	276.41	208.69	147.32	89.72
225.0	584.61	529.88	460.97	394.03	314.16	235.29	171.79	107.72	64.57
270.0	551.25	500.06	438.75	363.38	285.75	243.96	154.86	90.84	57.77
315.0	551.19	483.36	408.38	340.26	271.52	185.74	122.96	75.26	50.40
360.0	574.31	524.81	465.19	390.94	312.19	284.63	163.29	101.19	61.76
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	47.98	43.48	38.36	33.75	31.44	28.63	25.59	23.63	21.77
45.0	56.59	48.26	42.81	38.31	34.03	31.44	28.13	25.54	23.40
90.0	64.58	48.71	44.27	40.28	36.06	32.96	30.09	27.06	24.69
135.0	74.76	51.69	44.72	39.99	36.45	32.91	29.64	27.45	25.26
180.0	54.23	46.35	40.95	36.90	33.02	30.32	27.90	25.26	23.06
225.0	49.28	43.99	39.49	34.71	31.67	29.08	26.61	23.91	22.11
270.0	48.43	43.71	39.26	35.61	32.79	30.04	27.11	24.64	22.84
315.0	44.72	40.73	36.23	32.96	30.43	27.68	25.65	23.40	21.43
360.0	47.98	43.48	38.36	33.75	31.44	28.63	25.59	23.63	21.77

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	19.80	18.51	17.38	16.59	15.64	15.08	14.51	14.12	13.67
45.0	21.32	19.74	18.45	17.38	16.43	15.64	15.13	14.57	14.12
90.0	22.73	20.98	19.35	18.17	17.44	16.37	15.81	15.36	14.79
135.0	22.95	21.43	20.14	18.68	17.83	17.04	16.20	15.75	15.19
180.0	21.38	20.08	18.45	17.61	16.82	15.86	15.36	14.85	14.46
225.0	20.64	19.18	17.83	17.16	16.20	15.41	15.02	14.63	14.18
270.0	21.04	19.46	18.45	17.61	16.54	15.98	15.53	14.96	14.51
315.0	20.03	18.68	17.49	16.71	15.92	15.30	14.74	14.34	14.01
360.0	19.80	18.51	17.38	16.59	15.64	15.08	14.51	14.12	13.67
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	13.44	13.28	13.05	12.88	12.77	12.60	12.49	12.26	12.32
45.0	13.84	13.61	13.39	13.16	13.11	12.88	12.77	12.66	12.43
90.0	14.34	14.12	13.89	13.61	13.50	13.28	13.11	12.99	12.77
135.0	14.79	14.51	14.18	13.95	13.73	13.61	13.33	13.22	13.05
180.0	14.06	13.78	13.56	13.44	13.33	12.99	12.99	12.88	12.71
225.0	14.01	13.78	13.56	13.39	13.16	13.05	12.94	12.71	12.66
270.0	14.29	13.95	13.73	13.50	13.22	13.05	12.94	12.71	12.66
315.0	13.84	13.56	13.44	13.28	13.05	12.94	12.77	12.66	12.54
360.0	13.44	13.28	13.05	12.88	12.77	12.60	12.49	12.26	12.32
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	12.26	11.98	11.76	11.59	11.25	10.97	10.74	10.46	10.29
45.0	12.54	12.38	12.09	11.87	11.53	11.31	11.03	10.74	10.46
90.0	12.77	12.66	12.38	12.09	11.87	11.42	11.14	10.86	10.63
135.0	12.99	12.83	12.66	12.26	12.04	11.70	11.42	11.08	10.80
180.0	12.71	12.54	12.09	11.93	11.59	11.31	11.08	10.80	10.58
225.0	12.60	12.26	11.98	11.70	11.36	11.08	10.74	10.52	10.29
270.0	12.49	12.09	11.87	11.59	11.19	11.03	10.74	10.46	10.24
315.0	12.38	12.15	11.81	11.42	11.19	10.91	10.63	10.41	10.13
360.0	12.26	11.98	11.76	11.59	11.25	10.97	10.74	10.46	10.29
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	10.01	9.73	9.62	9.34	9.23	9.00	8.83	8.66	8.49
45.0	10.29	9.96	9.84	9.56	9.34	9.23	9.00	8.83	8.66
90.0	10.41	10.13	9.90	9.73	9.45	9.28	9.11	8.89	8.72
135.0	10.58	10.29	10.01	9.79	9.56	9.28	9.11	8.89	8.78
180.0	10.24	9.96	9.79	9.56	9.28	9.11	8.89	8.72	8.55
225.0	10.01	9.79	9.56	9.34	9.17	8.94	8.78	8.61	8.44
270.0	9.96	9.79	9.62	9.45	9.23	9.00	8.89	8.61	8.49
315.0	9.90	9.68	9.45	9.28	9.11	8.89	8.78	8.61	8.38
360.0	10.01	9.73	9.62	9.34	9.23	9.00	8.83	8.66	8.49
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	8.27	8.10	7.93	7.76	7.59	7.43	7.31	6.92	6.69
45.0	8.49	8.33	8.16	7.93	7.76	7.59	7.43	7.20	6.92
90.0	8.55	8.38	8.21	8.04	7.71	7.54	7.37	7.14	6.98
135.0	8.55	8.38	8.21	8.04	7.82	7.65	7.54	7.26	7.09
180.0	8.38	8.21	8.04	7.99	7.76	7.59	7.37	7.20	6.81
225.0	8.27	8.16	7.93	7.82	7.65	7.54	7.26	6.98	6.81
270.0	8.38	8.16	7.99	7.88	7.54	7.31	7.14	6.86	6.69
315.0	8.27	8.04	7.88	7.71	7.54	7.31	7.03	6.81	6.64
360.0	8.27	8.10	7.93	7.76	7.59	7.43	7.31	6.92	6.69

Intensity data(cd)

C/γ(°)	90.0
0.0	6.64
45.0	6.81
90.0	6.69
135.0	6.81
180.0	6.64
225.0	6.69
270.0	6.69
315.0	6.64
360.0	6.64