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NATA

LumCAT: 2-1672-M
Luminaire: 92.70.131.00
Report No: NATA0100
Test No: GC2018121105
LampCAT: OSRAM SOLERIQ S13
Lamp flux(lm): 1804.0
Number of Lamps: 1
Length(mm): 70
Phm Type: C

Voltage(V): 36.6000
Current(A): 0.5100
Power (W): 18.6660
PF: 0.0000
Ballast type: DC
Width(mm): 70
Height(mm): 0

Photometric Results

Lumens(lm): 1631.79
Efficiency(%): 90.45%
Lumens(lm)/Power(W): 87.50
Central intensity(cd): 6083.156
Maximum intensity(cd): 6083.156
Angle of maximum intensity: C=0.0 γ =0.0
Beam Angle(50%Imax): [C0/180]Total=25.0
 [C90/270]Total=25.0
Field angle(10%Imax): [C0/180]Total=52.2
 [C90/270]Total=52.2
Maximum s/h(1/2): C0_180=0.43 C90_270=0.43
Maximum s/h(1/4): C0_180=0.40 C90_270=0.40
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 90.53%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.614%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6083.156	1.455	1.455	.081%	.089%
1.0	6062.133	11.602	13.057	.643%	.800%
2.0	5997.234	22.952	36.009	1.272%	2.207%
3.0	5907.586	33.905	69.914	1.879%	4.285%
4.0	5804.086	44.399	114.313	2.461%	7.005%
5.0	5664.094	54.135	168.448	3.001%	10.323%
6.0	5474.109	62.748	231.196	3.478%	14.168%
7.0	5233.641	69.944	301.14	3.877%	18.455%
8.0	4944.867	75.468	376.608	4.183%	23.079%
9.0	4596.398	78.850	455.458	4.371%	27.911%
10.0	4186.758	79.726	535.184	4.419%	32.797%
11.0	3741.961	78.298	613.482	4.340%	37.596%
12.0	3289.992	75.011	688.493	4.158%	42.192%
13.0	2799.914	69.069	757.562	3.829%	46.425%
14.0	2325.164	61.685	819.247	3.419%	50.205%
15.0	1925.297	54.644	873.891	3.029%	53.554%
16.0	1575.984	47.637	921.528	2.641%	56.473%
17.0	1270.969	40.749	962.278	2.259%	58.971%
18.0	1065.178	36.096	998.373	2.001%	61.183%
19.0	938.159	33.494	1031.868	1.857%	63.235%
20.0	828.541	31.075	1062.943	1.723%	65.140%
21.0	752.140	29.558	1092.501	1.638%	66.951%
22.0	704.377	28.936	1121.437	1.604%	68.724%
23.0	670.479	28.729	1150.165	1.592%	70.485%
24.0	646.671	28.844	1179.009	1.599%	72.252%
25.0	626.998	29.058	1208.067	1.611%	74.033%
26.0	609.926	29.320	1237.387	1.625%	75.830%
27.0	595.610	29.652	1267.04	1.644%	77.647%
28.0	584.072	30.070	1297.11	1.667%	79.490%
29.0	574.467	30.541	1327.651	1.693%	81.361%
30.0	565.109	30.985	1358.636	1.718%	83.260%
31.0	556.207	31.414	1390.05	1.741%	85.185%
32.0	547.052	31.790	1421.84	1.762%	87.134%
33.0	531.316	31.733	1453.573	1.759%	89.078%
34.0	497.580	30.512	1484.086	1.691%	90.948%
35.0	440.655	27.717	1511.803	1.536%	92.647%
36.0	375.729	24.218	1536.021	1.342%	94.131%
37.0	312.159	20.601	1556.622	1.142%	95.393%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	242.184	16.351	1572.973	.906%	96.395%
39.0	163.034	11.251	1584.224	.624%	97.085%
40.0	105.110	7.409	1591.633	.411%	97.539%
41.0	53.916	3.879	1595.512	.215%	97.777%
42.0	23.077	1.693	1597.206	.094%	97.880%
43.0	14.463	1.082	1598.287	.060%	97.947%
44.0	13.212	1.006	1599.294	.056%	98.008%
45.0	11.686	0.906	1600.2	.050%	98.064%
46.0	10.238	0.808	1601.007	.045%	98.113%
47.0	9.190	0.737	1601.744	.041%	98.158%
48.0	8.550	0.697	1602.441	.039%	98.201%
49.0	8.170	0.676	1603.117	.037%	98.243%
50.0	7.988	0.671	1603.788	.037%	98.284%
51.0	7.875	0.671	1604.459	.037%	98.325%
52.0	7.777	0.672	1605.131	.037%	98.366%
53.0	7.678	0.672	1605.804	.037%	98.407%
54.0	7.601	0.674	1606.478	.037%	98.449%
55.0	7.516	0.675	1607.153	.037%	98.490%
56.0	7.453	0.678	1607.831	.038%	98.531%
57.0	7.376	0.678	1608.509	.038%	98.573%
58.0	7.327	0.681	1609.191	.038%	98.615%
59.0	7.270	0.683	1609.874	.038%	98.657%
60.0	7.221	0.686	1610.56	.038%	98.699%
61.0	7.179	0.689	1611.248	.038%	98.741%
62.0	7.151	0.692	1611.941	.038%	98.783%
63.0	7.109	0.695	1612.635	.039%	98.826%
64.0	7.059	0.696	1613.331	.039%	98.869%
65.0	7.045	0.700	1614.031	.039%	98.911%
66.0	7.010	0.702	1614.734	.039%	98.954%
67.0	6.982	0.705	1615.438	.039%	98.998%
68.0	6.961	0.708	1616.146	.039%	99.041%
69.0	6.926	0.709	1616.855	.039%	99.084%
70.0	6.905	0.712	1617.567	.039%	99.128%
71.0	6.884	0.714	1618.28	.040%	99.172%
72.0	6.877	0.717	1618.998	.040%	99.216%
73.0	6.841	0.717	1619.715	.040%	99.260%
74.0	6.848	0.722	1620.437	.040%	99.304%
75.0	6.820	0.722	1621.159	.040%	99.348%

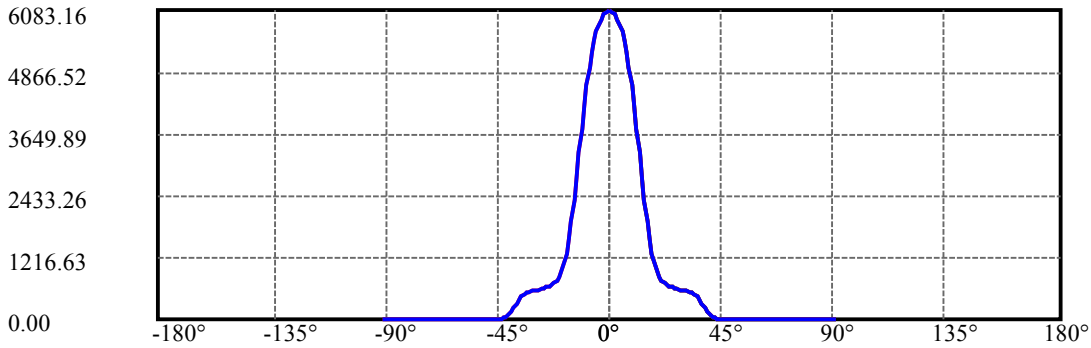
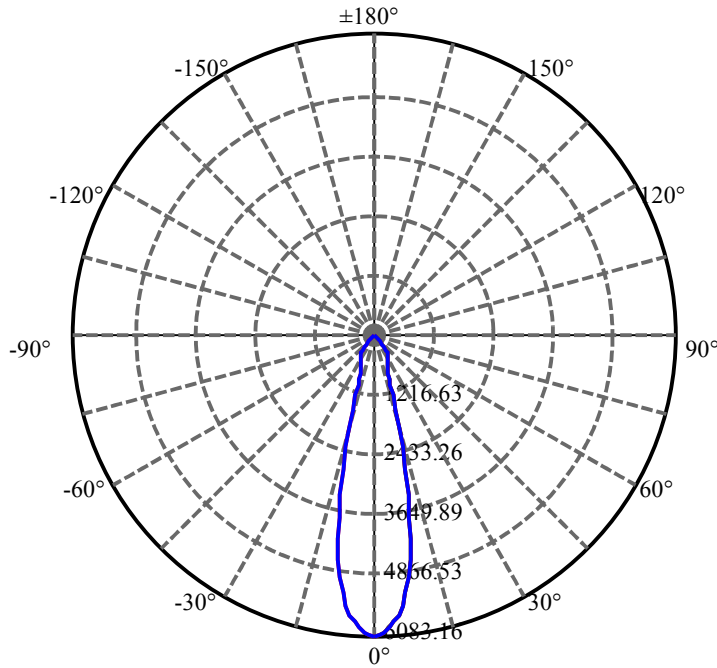
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	6.806	0.724	1621.884	.040%	99.393%
77.0	6.813	0.728	1622.612	.040%	99.437%
78.0	6.813	0.731	1623.343	.041%	99.482%
79.0	6.792	0.731	1624.074	.041%	99.527%
80.0	6.771	0.731	1624.805	.041%	99.572%
81.0	6.764	0.733	1625.538	.041%	99.617%
82.0	6.764	0.735	1626.272	.041%	99.662%
83.0	6.757	0.735	1627.008	.041%	99.707%
84.0	6.764	0.738	1627.745	.041%	99.752%
85.0	6.757	0.738	1628.483	.041%	99.797%
86.0	6.729	0.736	1629.219	.041%	99.842%
87.0	6.722	0.736	1629.956	.041%	99.887%
88.0	6.701	0.734	1630.69	.041%	99.932%
89.0	6.708	0.735	1631.425	.041%	99.977%
90.0	6.729	0.369	1631.794	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	1358.64	75.31%	83.26%
0-40	1591.63	88.23%	97.54%
0-60	1610.56	89.28%	98.70%
0-90	1631.43	90.43%	99.98%
0-120	1631.43	90.43%	99.98%
0-180	1631.79	90.45%	100.00%
60-90	21.55	1.19%	1.32%
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%
0-28.27	1305.44	72.36%	80.00%

ZONAL LUMEN SUMMARY

0-10	535.18
10-20	527.76
20-30	295.69
30-40	233.00
40-50	12.16
50-60	6.77
60-70	7.01
70-80	7.24
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



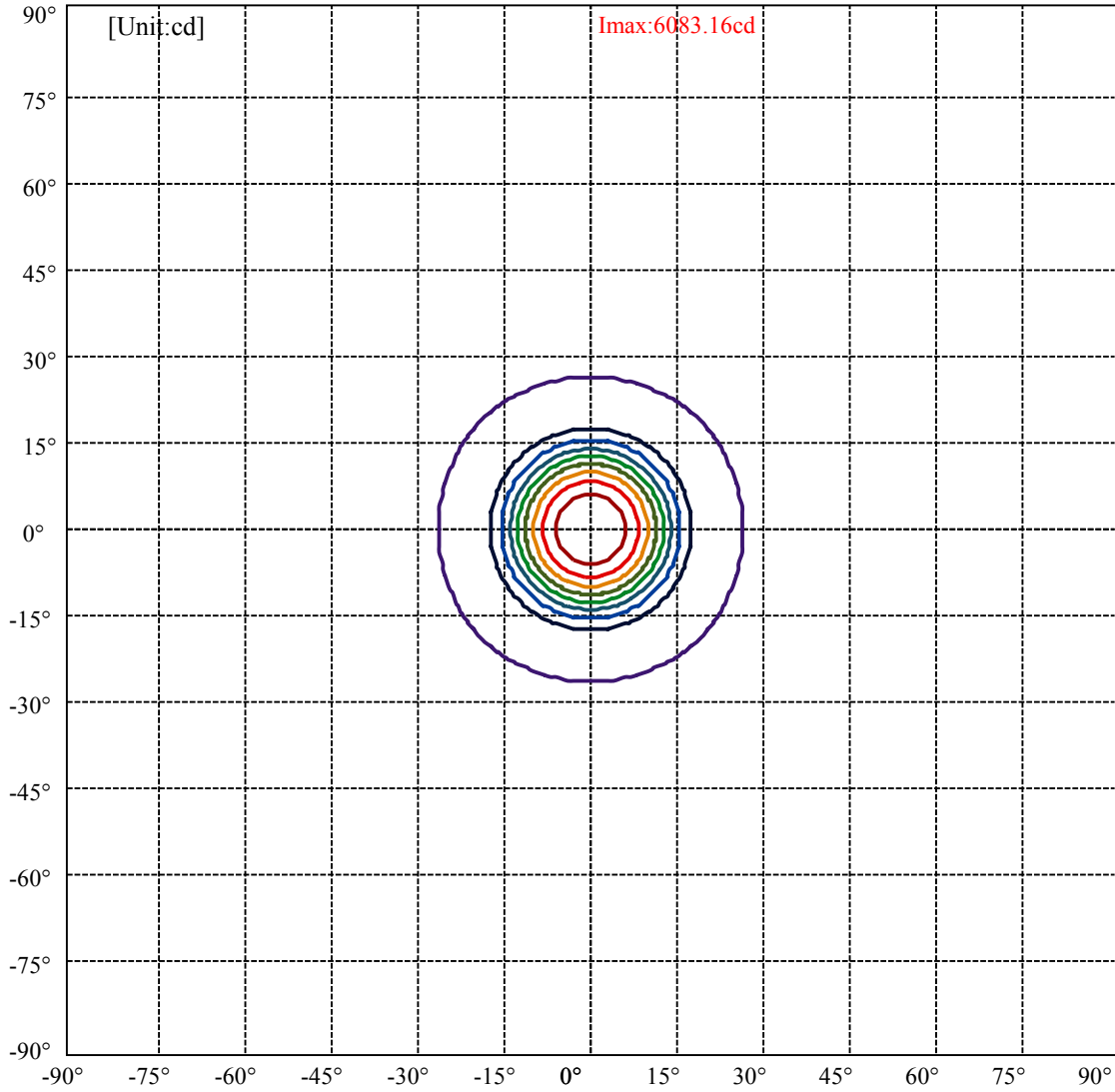
C0(Max): —————

C0/C180: —————

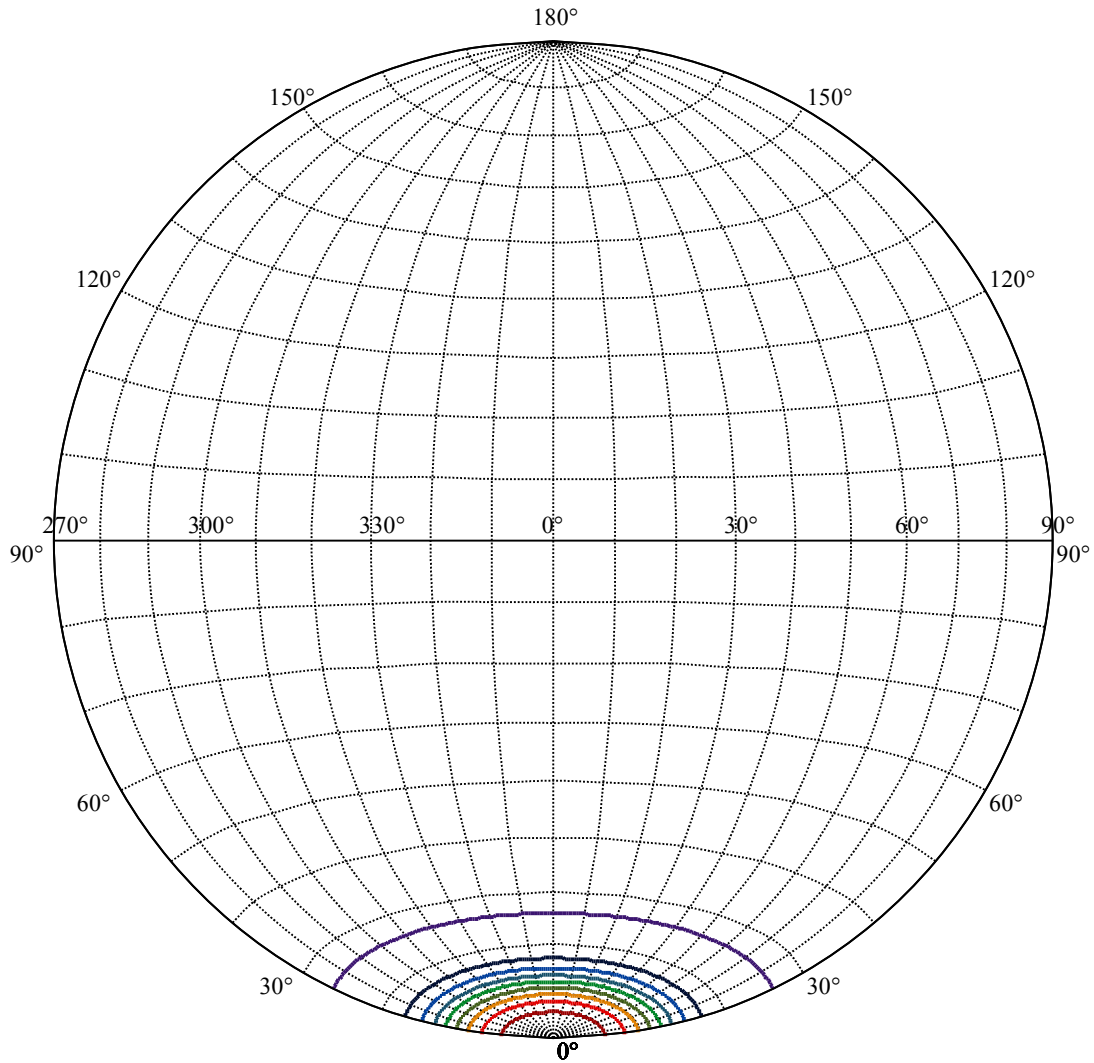
C90/C270: —————

Field angle(10%Imax):C0/180Left:26.1 Right:26.1
:C90/270Left:26.1 Right:26.1

Beam Angle(50%Imax):C0/180Left:12.5 Right:12.5
:C90/270Left:12.5 Right:12.5



(10%Imax) 608.316	—
(20%Imax) 1216.63	—
(30%Imax) 1824.95	—
(40%Imax) 2433.26	—
(50%Imax) 3041.58	—
(60%Imax) 3649.89	—
(70%Imax) 4258.21	—
(80%Imax) 4866.52	—
(90%Imax) 5474.84	—



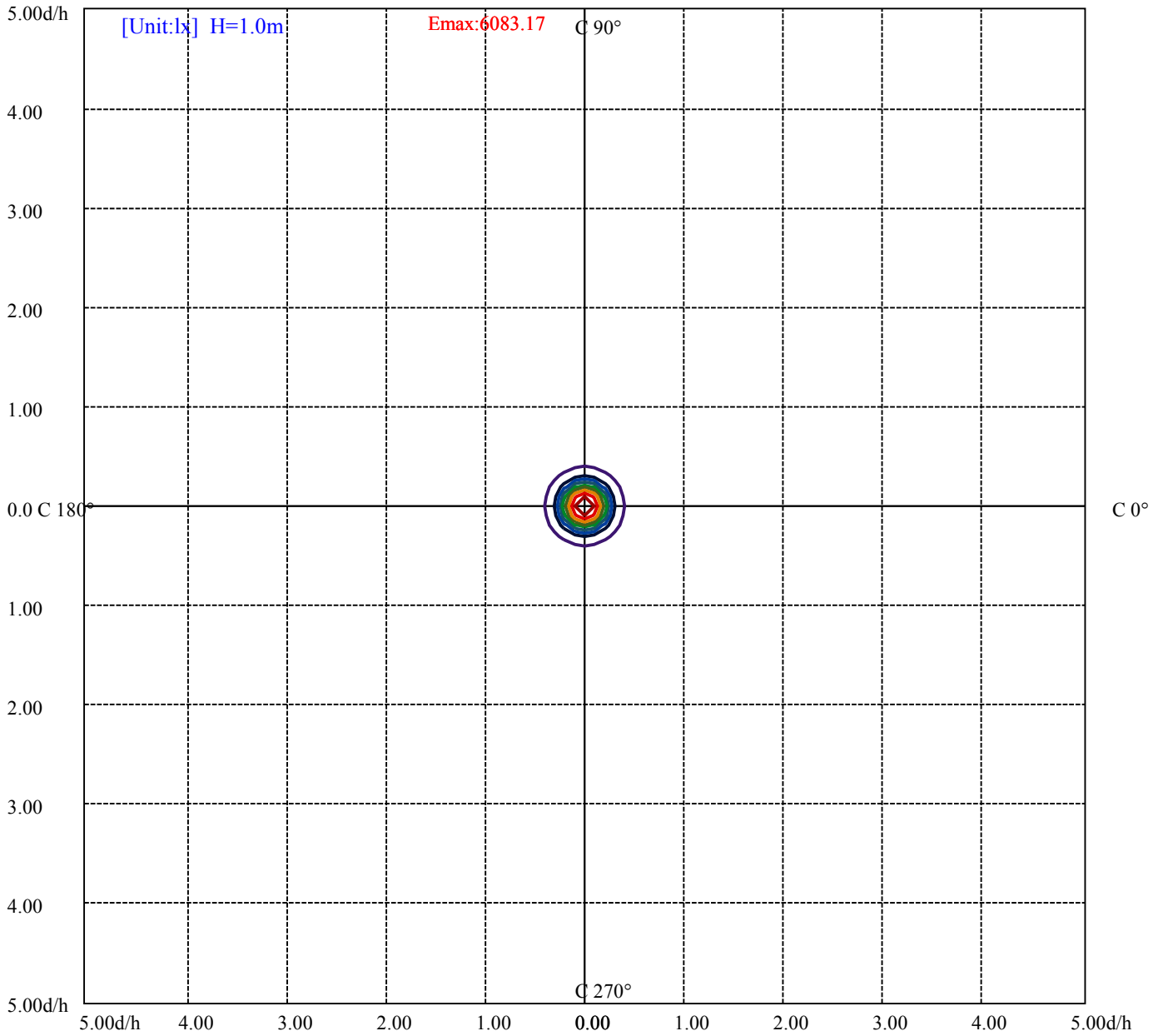
House

[Unit:cd]

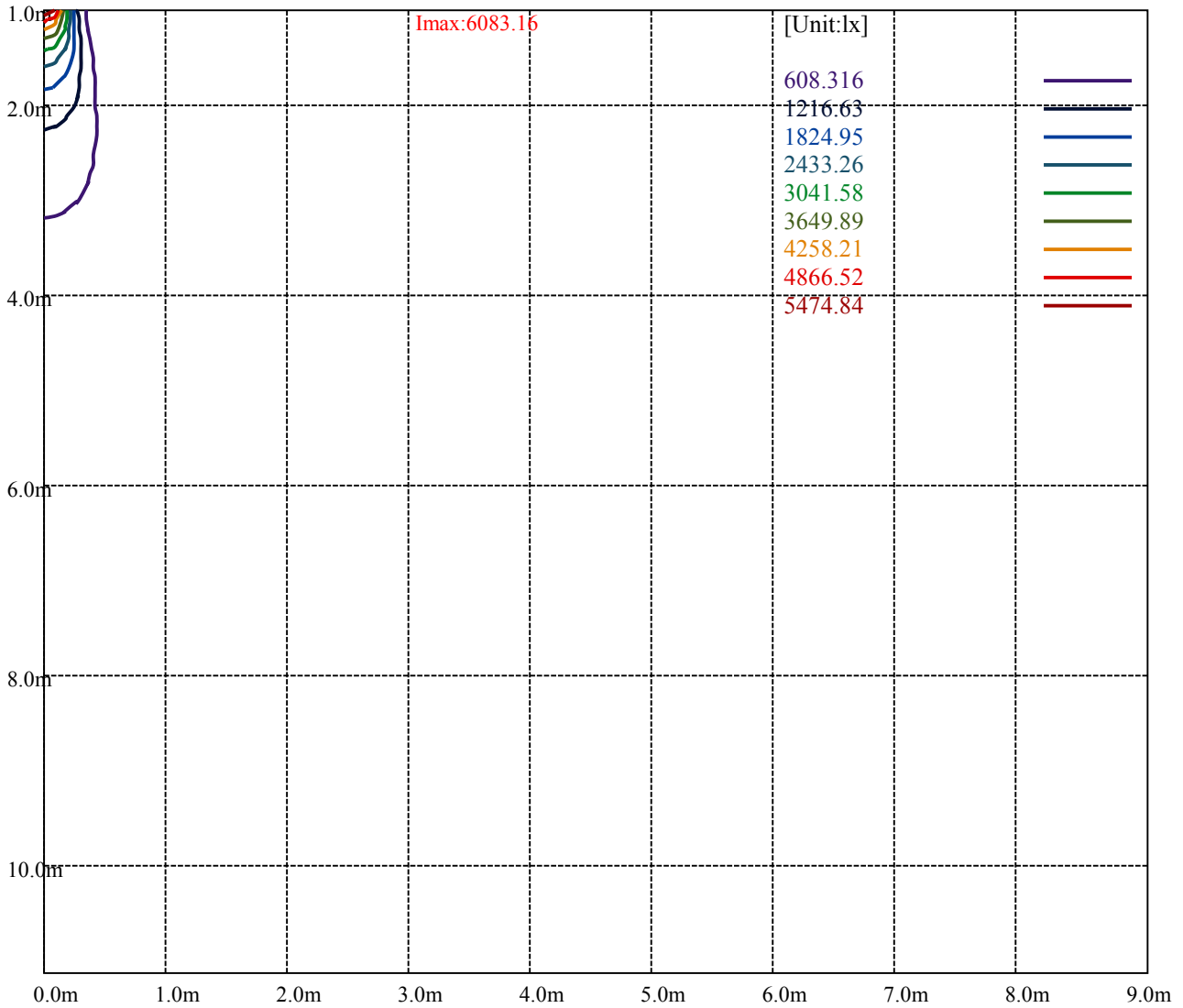
Road

Imax:6083.16

(10%Imax) 608.316	—
(20%Imax) 1216.63	—
(30%Imax) 1824.95	—
(40%Imax) 2433.26	—
(50%Imax) 3041.58	—
(60%Imax) 3649.89	—
(70%Imax) 4258.21	—
(80%Imax) 4866.52	—
(90%Imax) 5474.84	—



(10%Emax) 608.315	—
(20%Emax) 1216.63	—
(30%Emax) 1824.95	—
(40%Emax) 2433.26	—
(50%Emax) 3041.58	—
(60%Emax) 3649.89	—
(70%Emax) 4258.21	—
(80%Emax) 4866.52	—
(90%Emax) 5474.84	—



Luminance Table

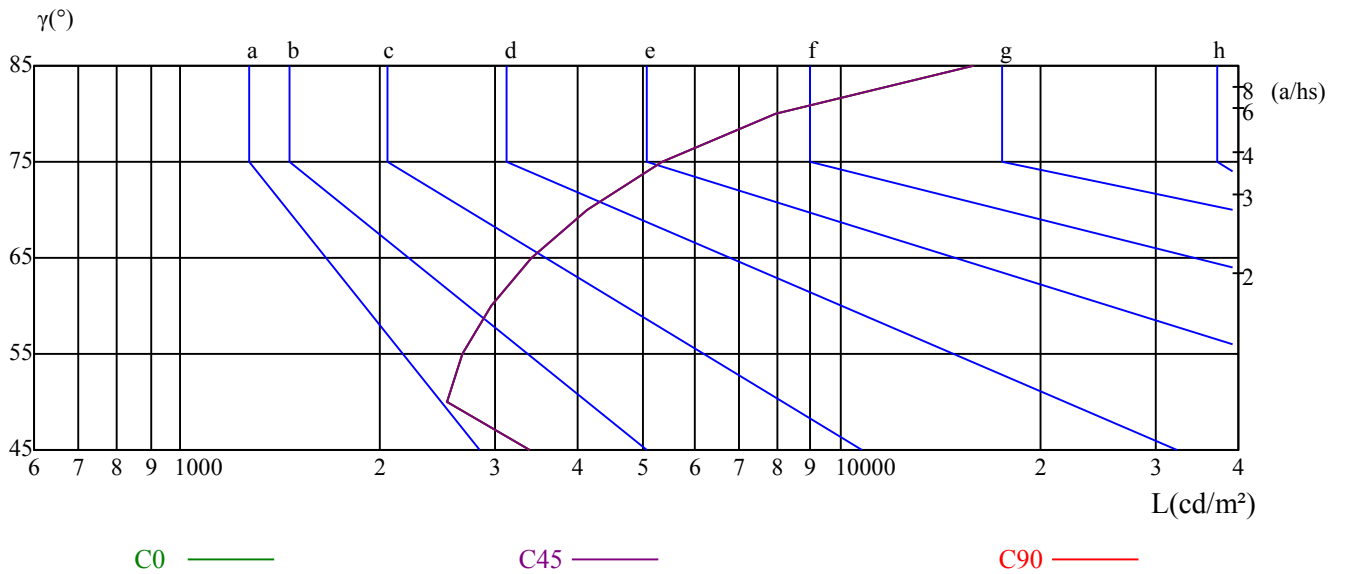
γ	45	50	55	60	65	70	75	80	85
C0	3373	2536	2674	2947	3402	4120	5378	7958	15822
C45	3373	2536	2674	2947	3402	4120	5378	7958	15822
C90	3373	2536	2674	2947	3402	4120	5378	7958	15822

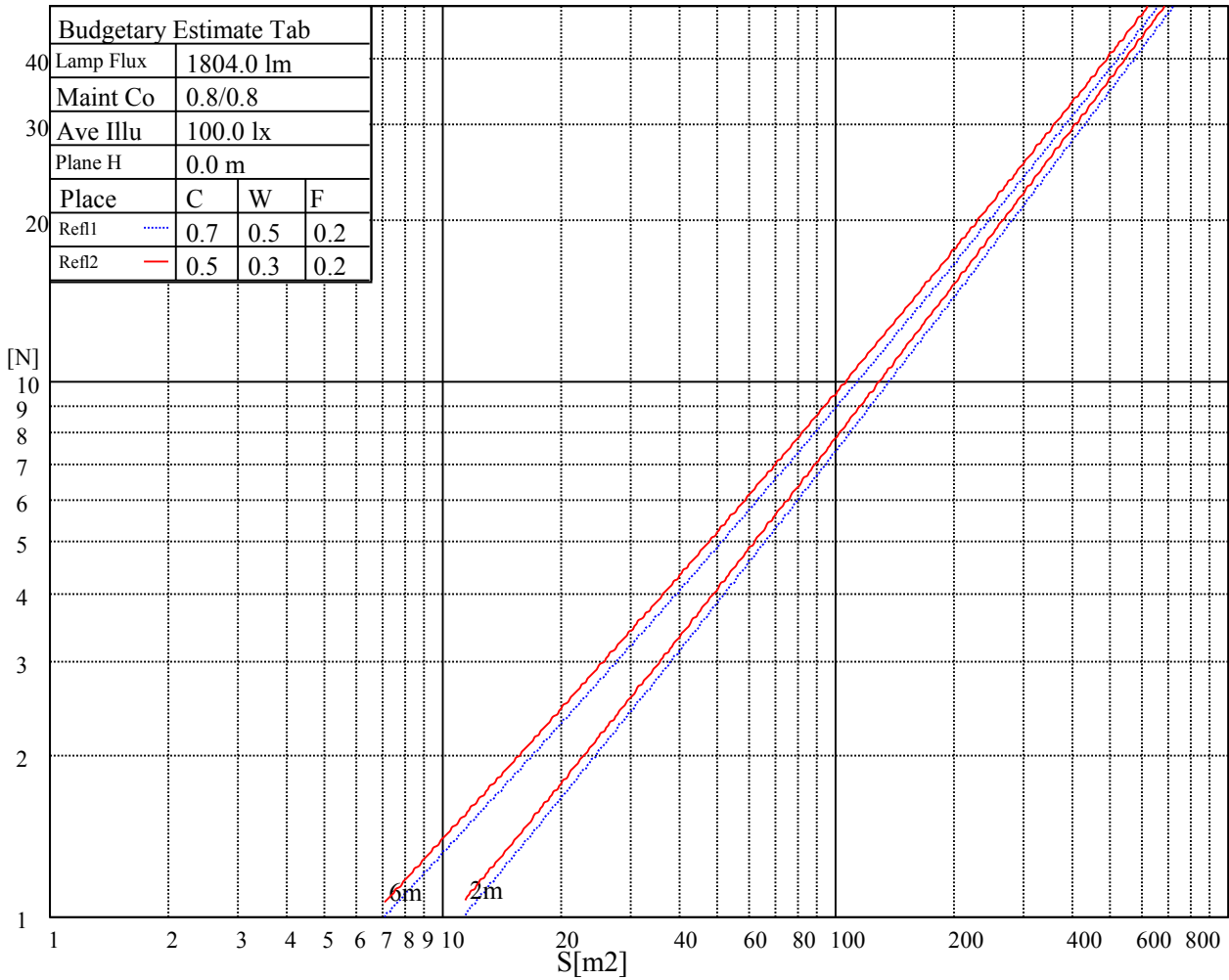
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3402	3402	3402	5378	5378	5378	15822	15822	15822

Glare Table

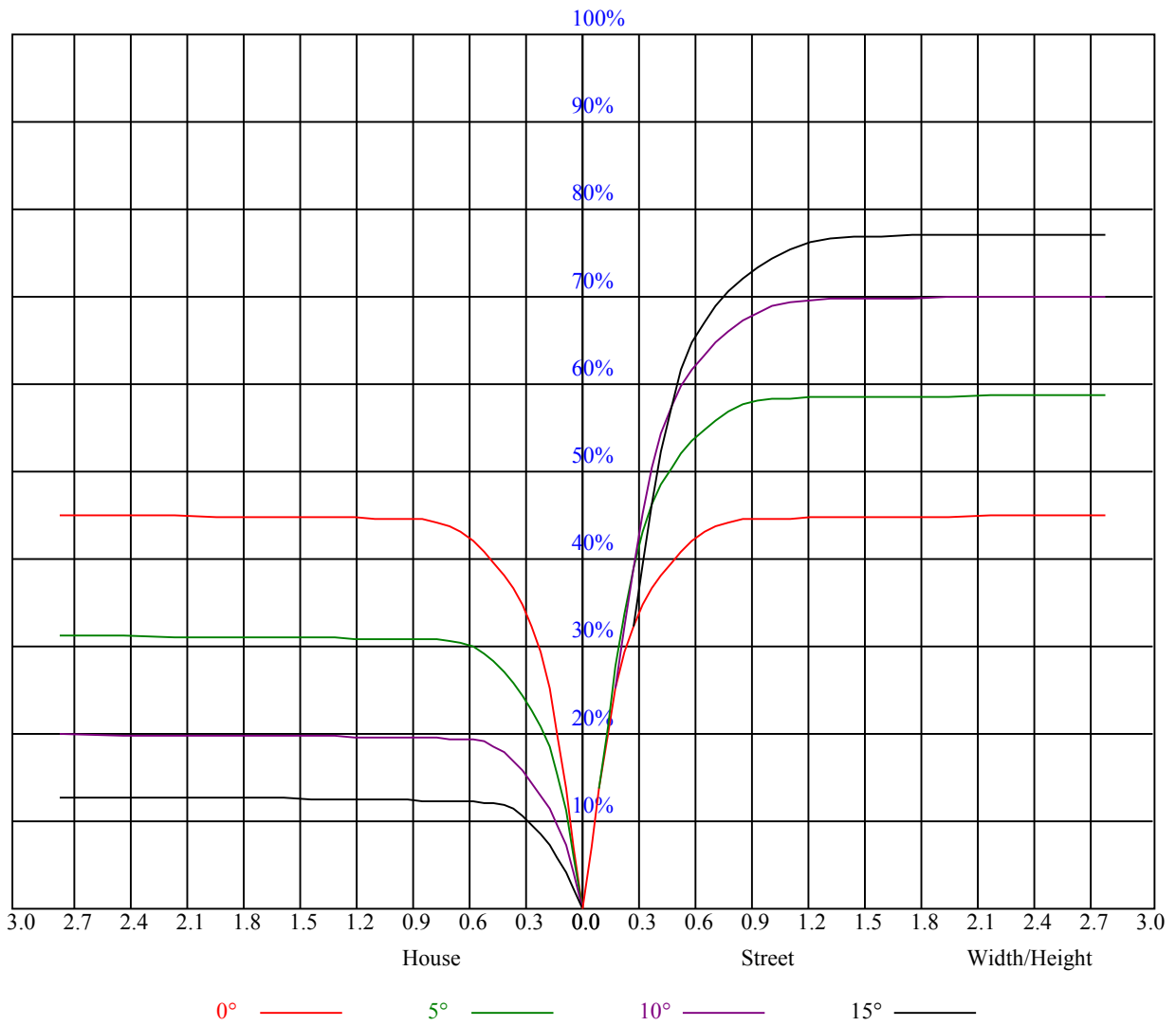
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

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	1.05	1.05	1.05	1.01	1.01	1.01	0.96	0.96	0.96	0.92	0.92	0.92	0.91
1	1.01	0.99	0.97	0.99	0.98	0.96	0.96	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.88	0.86
2	0.96	0.93	0.90	0.94	0.91	0.89	0.91	0.89	0.87	0.89	0.87	0.85	0.86	0.85	0.84	0.82
3	0.91	0.87	0.84	0.90	0.86	0.84	0.87	0.85	0.82	0.85	0.83	0.81	0.83	0.81	0.80	0.79
4	0.87	0.83	0.80	0.86	0.82	0.79	0.84	0.81	0.78	0.82	0.79	0.77	0.81	0.78	0.76	0.75
5	0.83	0.79	0.76	0.82	0.78	0.75	0.81	0.77	0.75	0.79	0.76	0.74	0.78	0.75	0.73	0.72
6	0.80	0.75	0.72	0.79	0.75	0.72	0.78	0.74	0.71	0.76	0.73	0.71	0.75	0.73	0.71	0.69
7	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
8	0.74	0.69	0.66	0.73	0.69	0.66	0.72	0.69	0.66	0.71	0.68	0.66	0.71	0.68	0.66	0.65
9	0.71	0.67	0.64	0.71	0.67	0.64	0.70	0.66	0.64	0.69	0.66	0.64	0.68	0.66	0.63	0.62
10	0.69	0.65	0.62	0.68	0.64	0.62	0.68	0.64	0.62	0.67	0.64	0.61	0.66	0.63	0.61	0.60



NATA 2-1672-M

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	6085.69	6039.56	5952.94	5855.63	5729.63	5581.69	5353.88	5071.50	4779.00
45.0	6095.25	6055.31	5967.56	5881.50	5780.81	5609.81	5413.50	5165.44	4832.44
90.0	6078.38	6035.63	5959.69	5868.00	5767.31	5608.69	5412.94	5126.63	4781.25
135.0	6073.31	6074.44	6031.69	5965.31	5878.13	5778.00	5625.00	5400.00	5153.63
180.0	6085.69	6084.00	6043.50	5951.25	5861.81	5758.88	5577.19	5369.63	5117.06
225.0	6095.25	6096.38	6048.56	5958.00	5859.56	5727.94	5575.50	5348.25	5064.75
270.0	6078.38	6084.00	6036.75	5956.31	5853.38	5700.38	5543.44	5346.00	5074.31
315.0	6073.31	6027.75	5937.19	5824.69	5702.06	5547.38	5291.44	5041.69	4756.50
360.0	6085.69	6039.56	5952.94	5855.63	5729.63	5581.69	5353.88	5071.50	4779.00

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	4397.06	3949.88	3515.06	3074.06	2526.75	2107.69	1737.56	1402.88	1155.38
45.0	4439.81	4028.63	3526.88	3072.38	2564.44	2088.00	1724.63	1398.94	1154.81
90.0	4419.56	3959.44	3467.25	3024.00	2581.31	2063.81	1710.00	1421.44	1098.79
135.0	4821.19	4417.88	4004.44	3563.44	3055.50	2549.81	2129.63	1721.25	1395.00
180.0	4781.81	4384.69	3982.50	3499.31	3004.31	2566.13	2100.38	1738.13	1403.44
225.0	4771.69	4388.06	3942.00	3513.38	3075.75	2536.88	2130.75	1764.56	1427.63
270.0	4756.50	4424.06	3990.38	3564.00	3072.38	2579.06	2162.81	1746.56	1415.81
315.0	4383.56	3941.44	3507.19	3009.38	2518.88	2109.94	1706.63	1414.13	1116.90
360.0	4397.06	3949.88	3515.06	3074.06	2526.75	2107.69	1737.56	1402.88	1155.38

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	997.31	870.19	783.00	729.00	689.63	665.44	644.63	623.81	608.63
45.0	984.94	870.75	770.06	714.94	677.25	646.88	629.44	610.88	596.81
90.0	983.76	865.52	779.46	708.86	674.44	648.34	631.07	611.33	597.26
135.0	1162.69	991.13	862.88	779.63	717.19	680.06	651.94	632.25	613.69
180.0	1105.48	990.90	873.34	768.71	712.63	676.07	645.58	627.53	609.58
225.0	1109.93	1015.48	883.63	789.92	732.21	688.78	662.23	640.46	619.48
270.0	1193.06	1028.81	883.13	801.00	743.06	695.25	668.81	648.56	627.75
315.0	984.26	872.49	792.84	725.06	688.61	663.02	639.68	621.17	606.21
360.0	997.31	870.19	783.00	729.00	689.63	665.44	644.63	623.81	608.63

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	596.25	584.44	576.00	568.13	558.56	550.69	529.88	480.38	417.94
45.0	583.31	573.75	565.88	555.19	546.75	538.31	514.69	467.44	406.13
90.0	584.78	575.27	565.31	555.69	547.71	538.71	513.79	469.52	412.37
135.0	600.19	586.69	577.13	568.69	558.00	549.56	542.25	524.81	469.69
180.0	593.61	580.84	571.28	560.98	552.15	542.64	533.42	512.44	461.48
225.0	604.74	592.43	580.33	571.05	562.11	550.63	543.54	521.27	469.52
270.0	609.19	597.38	586.69	577.69	568.69	559.13	551.25	528.19	477.56
315.0	592.82	581.79	573.13	563.46	555.69	546.75	521.72	476.61	410.57
360.0	596.25	584.44	576.00	568.13	558.56	550.69	529.88	480.38	417.94

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	356.06	288.56	206.78	135.79	81.17	32.91	15.13	13.89	12.32
45.0	338.63	284.63	207.17	131.68	80.38	35.27	14.29	13.22	12.09
90.0	334.01	269.27	204.53	135.39	73.29	29.03	14.51	13.16	12.04
135.0	407.81	347.63	290.25	196.99	136.80	72.51	29.03	15.08	13.84
180.0	406.07	336.60	269.83	188.33	129.94	77.51	35.27	15.02	13.95
225.0	406.41	344.25	267.30	191.31	131.79	72.34	31.28	15.30	14.01
270.0	419.06	354.38	285.75	197.89	135.34	79.59	29.53	15.92	14.74
315.0	337.78	271.97	205.88	126.90	72.17	32.18	15.58	14.12	12.71
360.0	356.06	288.56	206.78	135.79	81.17	32.91	15.13	13.89	12.32

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	10.69	9.34	8.72	8.04	7.88	7.76	7.71	7.65	7.48
45.0	10.35	9.28	8.72	8.10	7.99	7.88	7.82	7.71	7.59
90.0	10.46	9.23	8.72	8.33	8.27	8.10	7.99	7.88	7.76
135.0	12.54	10.86	9.56	9.11	8.44	8.04	7.93	7.82	7.76
180.0	12.71	10.74	9.34	8.55	8.10	7.93	7.82	7.71	7.65
225.0	12.71	11.31	9.56	8.66	8.16	8.04	7.88	7.76	7.71
270.0	13.22	11.64	10.29	9.45	8.49	8.27	8.10	7.99	7.88
315.0	10.80	9.51	8.61	8.16	8.04	7.88	7.76	7.71	7.59
360.0	10.69	9.34	8.72	8.04	7.88	7.76	7.71	7.65	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	7.37	7.31	7.20	7.26	7.14	7.09	7.09	7.09
45.0	7.54	7.48	7.43	7.37	7.31	7.20	7.20	7.14	7.14
90.0	7.71	7.59	7.54	7.48	7.37	7.37	7.31	7.26	7.20
135.0	7.65	7.59	7.54	7.37	7.37	7.31	7.26	7.20	7.14
180.0	7.54	7.43	7.37	7.37	7.26	7.26	7.20	7.14	7.09
225.0	7.59	7.54	7.43	7.37	7.31	7.26	7.20	7.20	7.14
270.0	7.82	7.71	7.65	7.54	7.48	7.37	7.31	7.26	7.26
315.0	7.54	7.43	7.37	7.31	7.26	7.26	7.20	7.14	7.14
360.0	7.43	7.37	7.31	7.20	7.26	7.14	7.09	7.09	7.09
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	7.03	6.98	6.98	6.92	6.92	6.92	6.86	6.86	6.86
45.0	7.09	7.03	7.03	7.03	6.98	6.98	6.92	6.92	6.86
90.0	7.14	7.09	7.09	7.03	7.03	6.98	6.92	6.92	6.86
135.0	7.14	7.09	7.03	7.03	7.03	6.98	6.98	6.92	6.86
180.0	7.09	7.03	7.03	6.98	6.98	6.92	6.92	6.86	6.86
225.0	7.09	7.09	7.03	7.03	6.98	6.98	6.92	6.92	6.92
270.0	7.20	7.14	7.14	7.09	7.03	7.03	7.03	6.98	6.98
315.0	7.09	7.03	7.03	6.98	6.92	6.92	6.86	6.86	6.86
360.0	7.03	6.98	6.98	6.92	6.92	6.92	6.86	6.86	6.86
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	6.86	6.81	6.81	6.81	6.75	6.81	6.81	6.81	6.75
45.0	6.86	6.86	6.86	6.86	6.86	6.81	6.81	6.81	6.81
90.0	6.86	6.86	6.86	6.81	6.81	6.86	6.81	6.81	6.75
135.0	6.92	6.86	6.86	6.81	6.81	6.81	6.81	6.81	6.75
180.0	6.86	6.81	6.81	6.81	6.81	6.81	6.81	6.75	6.75
225.0	6.86	6.86	6.86	6.86	6.81	6.81	6.81	6.81	6.81
270.0	6.92	6.86	6.92	6.81	6.81	6.81	6.86	6.81	6.81
315.0	6.86	6.81	6.81	6.81	6.81	6.81	6.81	6.75	6.75
360.0	6.86	6.81	6.81	6.81	6.75	6.81	6.81	6.81	6.75
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	6.75	6.75	6.75	6.75	6.75	6.69	6.69	6.69	6.69
45.0	6.81	6.81	6.81	6.81	6.81	6.75	6.69	6.69	6.69
90.0	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.69	6.69
135.0	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.69	6.69
180.0	6.75	6.75	6.69	6.75	6.75	6.69	6.69	6.69	6.69
225.0	6.81	6.81	6.81	6.81	6.75	6.75	6.75	6.69	6.75
270.0	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
315.0	6.75	6.75	6.75	6.75	6.75	6.69	6.69	6.69	6.69
360.0	6.75	6.75	6.75	6.75	6.75	6.69	6.69	6.69	6.69

Intensity data(cd)

C/γ(°)	90.0
0.0	6.69
45.0	6.75
90.0	6.69
135.0	6.75
180.0	6.69
225.0	6.75
270.0	6.75
315.0	6.75
360.0	6.69