NATA LIGHTING CO.,LTD.
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NATA

LumCAT: 2-1610-A
Luminaire: 92.70.046.00+92.70.147.00

Report No: NATA0100	Voltage(V): 36.4000
Test No: GC2018121303	Current(A): 0.4100
LampCAT: CREE CXA1512	Power (W): 14.9240
Lamp flux(lm): 2030.0	PF: 0.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 75	Width(mm): 75
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 1661.71
Efficiency(%): 81.86%
Lumens(lm)/Power(W): 111.44
Central intensity(cd): 6040.266
Maximum intensity(cd): 6040.266
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=25.9
[C90/270]Total=25.9
Field angle(10%Imax): [C0/180]Total=50.0
[C90/270]Total=50.0
Maximum s/h(1/2): C0_180=0.44 C90_270=0.44
Maximum s/h(1/4): C0_180=0.41 C90_270=0.41
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 81.93%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 97.934%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6040.266	1.445	1.445	.071%	.087%
1.0	6033.234	11.547	12.992	.569%	.782%
2.0	6013.125	23.013	36.005	1.134%	2.167%
3.0	5958.422	34.197	70.201	1.685%	4.225%
4.0	5873.344	44.928	115.13	2.213%	6.928%
5.0	5749.102	54.947	170.077	2.707%	10.235%
6.0	5561.930	63.755	233.832	3.141%	14.072%
7.0	5324.344	71.156	304.988	3.505%	18.354%
8.0	5070.656	77.388	382.376	3.812%	23.011%
9.0	4733.648	81.205	463.58	4.000%	27.898%
10.0	4331.180	82.476	546.056	4.063%	32.861%
11.0	3938.273	82.406	628.462	4.059%	37.820%
12.0	3490.945	79.593	708.055	3.921%	42.610%
13.0	2993.133	73.836	781.89	3.637%	47.053%
14.0	2542.289	67.445	849.335	3.322%	51.112%
15.0	2135.109	60.599	909.935	2.985%	54.759%
16.0	1741.746	52.647	962.582	2.593%	57.927%
17.0	1467.766	47.059	1009.641	2.318%	60.759%
18.0	1232.536	41.767	1051.408	2.057%	63.273%
19.0	1077.265	38.461	1089.869	1.895%	65.587%
20.0	955.470	35.836	1125.705	1.765%	67.744%
21.0	861.630	33.861	1159.566	1.668%	69.781%
22.0	786.410	32.305	1191.871	1.591%	71.726%
23.0	721.849	30.930	1222.801	1.524%	73.587%
24.0	660.635	29.466	1252.268	1.452%	75.360%
25.0	603.520	27.970	1280.237	1.378%	77.043%
26.0	554.231	26.643	1306.881	1.312%	78.647%
27.0	504.879	25.135	1332.016	1.238%	80.159%
28.0	458.072	23.583	1355.599	1.162%	81.579%
29.0	419.238	22.289	1377.887	1.098%	82.920%
30.0	384.272	21.070	1398.957	1.038%	84.188%
31.0	349.973	19.766	1418.724	.974%	85.377%
32.0	320.766	18.640	1437.364	.918%	86.499%
33.0	296.121	17.686	1455.05	.871%	87.563%
34.0	268.467	16.463	1471.513	.811%	88.554%
35.0	246.783	15.522	1487.035	.765%	89.488%
36.0	226.983	14.631	1501.666	.721%	90.369%
37.0	207.380	13.686	1515.352	.674%	91.192%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	190.723	12.876	1528.228	.634%	91.967%
39.0	173.827	11.996	1540.224	.591%	92.689%
40.0	158.126	11.146	1551.37	.549%	93.360%
41.0	143.452	10.320	1561.691	.508%	93.981%
42.0	127.800	9.378	1571.068	.462%	94.545%
43.0	112.873	8.442	1579.51	.416%	95.053%
44.0	99.724	7.597	1587.107	.374%	95.510%
45.0	86.730	6.725	1593.832	.331%	95.915%
46.0	73.301	5.782	1599.614	.285%	96.263%
47.0	62.114	4.982	1604.596	.245%	96.563%
48.0	52.291	4.261	1608.857	.210%	96.819%
49.0	42.975	3.557	1612.414	.175%	97.033%
50.0	35.184	2.956	1615.37	.146%	97.211%
51.0	28.582	2.436	1617.805	.120%	97.358%
52.0	22.690	1.961	1619.766	.097%	97.476%
53.0	17.979	1.575	1621.341	.078%	97.571%
54.0	14.709	1.305	1622.646	.064%	97.649%
55.0	12.558	1.128	1623.774	.056%	97.717%
56.0	11.398	1.036	1624.81	.051%	97.779%
57.0	10.793	0.993	1625.802	.049%	97.839%
58.0	10.568	0.983	1626.785	.048%	97.898%
59.0	10.364	0.974	1627.759	.048%	97.957%
60.0	10.202	0.969	1628.728	.048%	98.015%
61.0	10.041	0.963	1629.691	.047%	98.073%
62.0	9.893	0.958	1630.649	.047%	98.131%
63.0	9.788	0.956	1631.606	.047%	98.188%
64.0	9.703	0.956	1632.562	.047%	98.246%
65.0	9.626	0.957	1633.519	.047%	98.303%
66.0	9.612	0.963	1634.482	.047%	98.361%
67.0	9.605	0.970	1635.451	.048%	98.420%
68.0	9.640	0.980	1636.431	.048%	98.479%
69.0	9.703	0.993	1637.425	.049%	98.539%
70.0	9.844	1.014	1638.439	.050%	98.600%
71.0	10.005	1.037	1639.476	.051%	98.662%
72.0	10.195	1.063	1640.54	.052%	98.726%
73.0	10.371	1.088	1641.627	.054%	98.791%
74.0	10.498	1.107	1642.734	.055%	98.858%
75.0	10.709	1.134	1643.868	.056%	98.926%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	11.004	1.171	1645.039	.058%	98.997%
77.0	11.348	1.213	1646.252	.060%	99.070%
78.0	11.651	1.250	1647.501	.062%	99.145%
79.0	11.960	1.287	1648.789	.063%	99.222%
80.0	12.347	1.333	1650.122	.066%	99.303%
81.0	12.656	1.371	1651.493	.068%	99.385%
82.0	13.043	1.416	1652.909	.070%	99.470%
83.0	13.627	1.483	1654.393	.073%	99.560%
84.0	14.203	1.549	1655.942	.076%	99.653%
85.0	13.746	1.502	1657.443	.074%	99.743%
86.0	12.023	1.315	1658.759	.065%	99.822%
87.0	9.570	1.048	1659.806	.052%	99.885%
88.0	7.024	0.770	1660.576	.038%	99.932%
89.0	6.912	0.758	1661.334	.037%	99.977%
90.0	6.855	0.376	1661.71	.019%	100.000%

Zonal flux distribution table

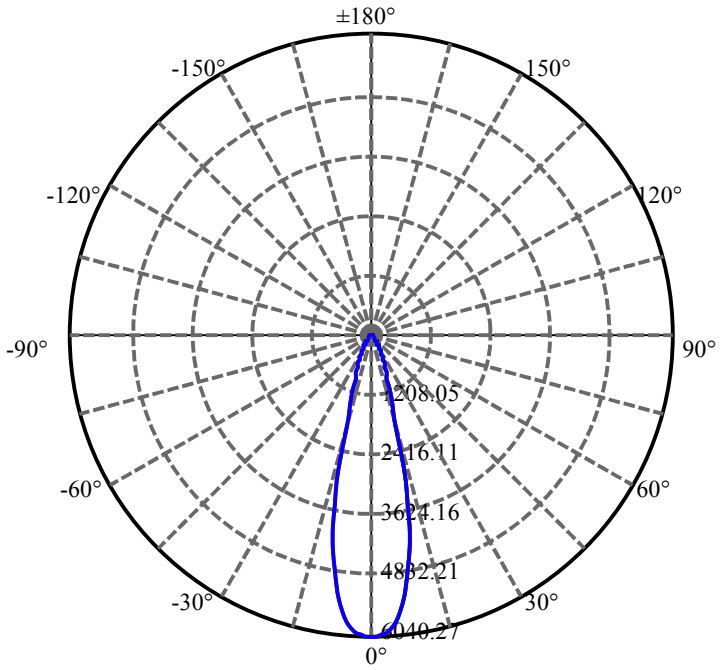
ZONAL LUMEN SUMMARY

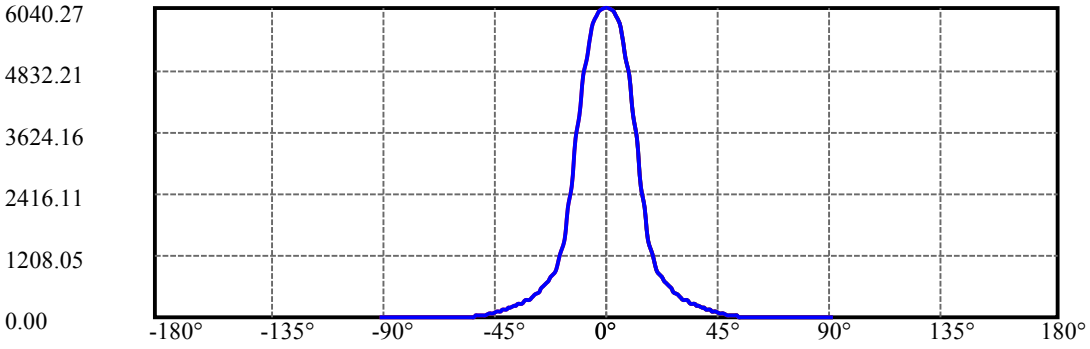
Zone	Lumens	%Lamp	%Fixt
0-30	1398.96	68.91%	84.19%
0-40	1551.37	76.42%	93.36%
0-60	1628.73	80.23%	98.02%
0-90	1661.33	81.84%	99.98%
0-120	1661.33	81.84%	99.98%
0-180	1661.71	81.86%	100.00%
60-90	33.57	1.65%	2.02%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.89	1329.37	65.49%	80.00%

ZONAL LUMEN SUMMARY

0-10	546.06
10-20	579.65
20-30	273.25
30-40	152.41
40-50	64.00
50-60	13.36
60-70	9.71
70-80	11.68
80-90	11.21
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

Light Distribution Curve [Unit:cd]





C0(Max):

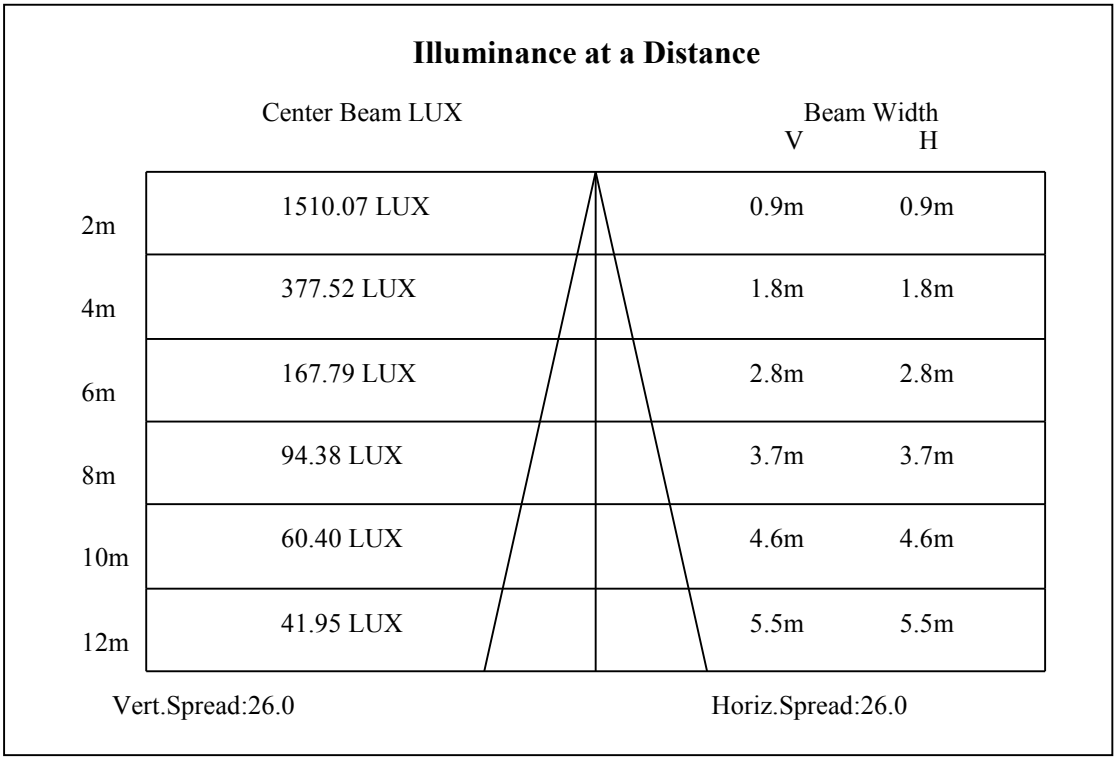
C0/C180:

C90/C270:

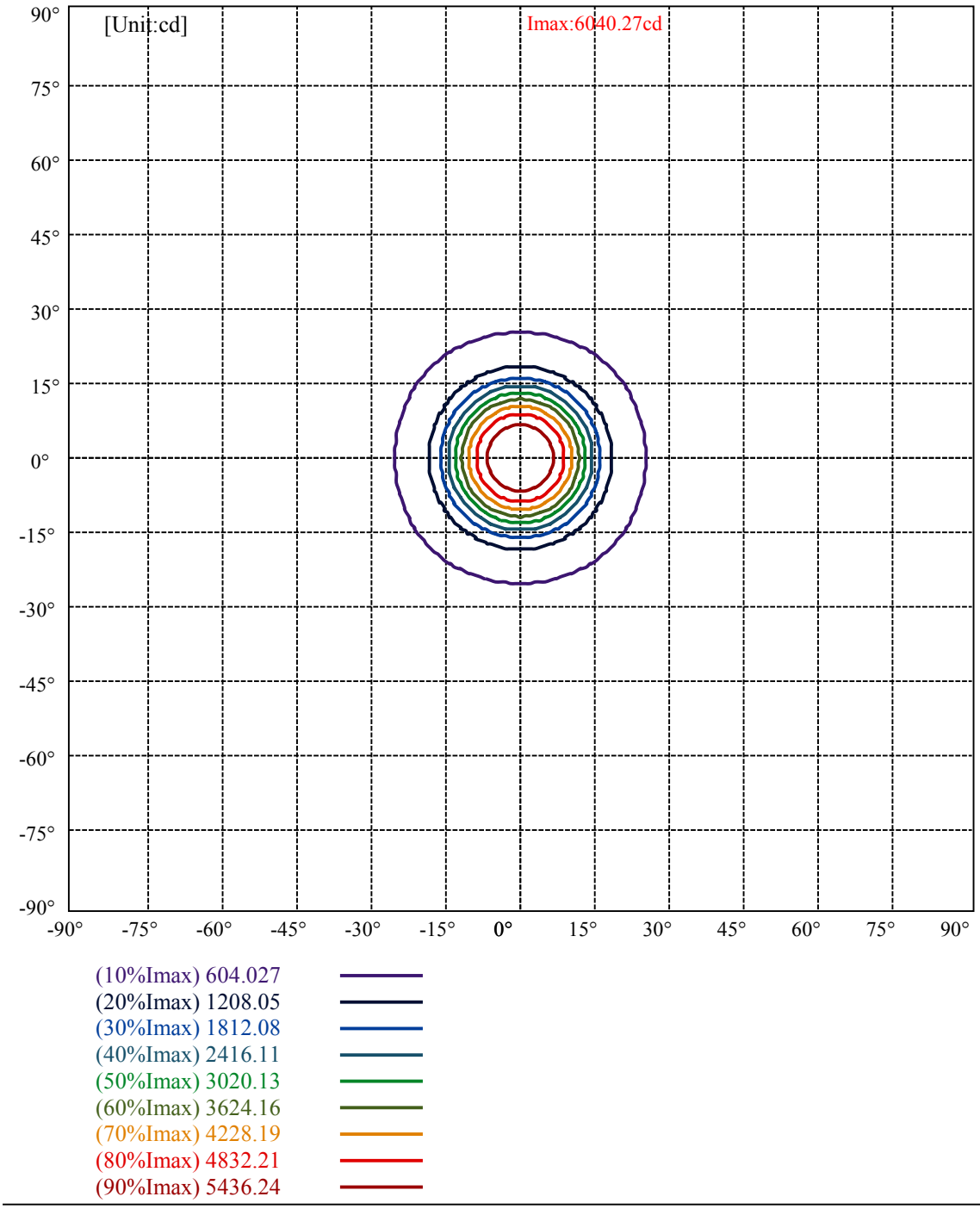
Field angle(10%Imax):C0/180Left:25.0 Right:25.0
:C90/270Left:25.0 Right:25.0

Beam Angle(50%Imax):C0/180Left:12.9 Right:12.9
:C90/270Left:12.9 Right:12.9

Lux distance Curve



ISO-Intensity(V-H)

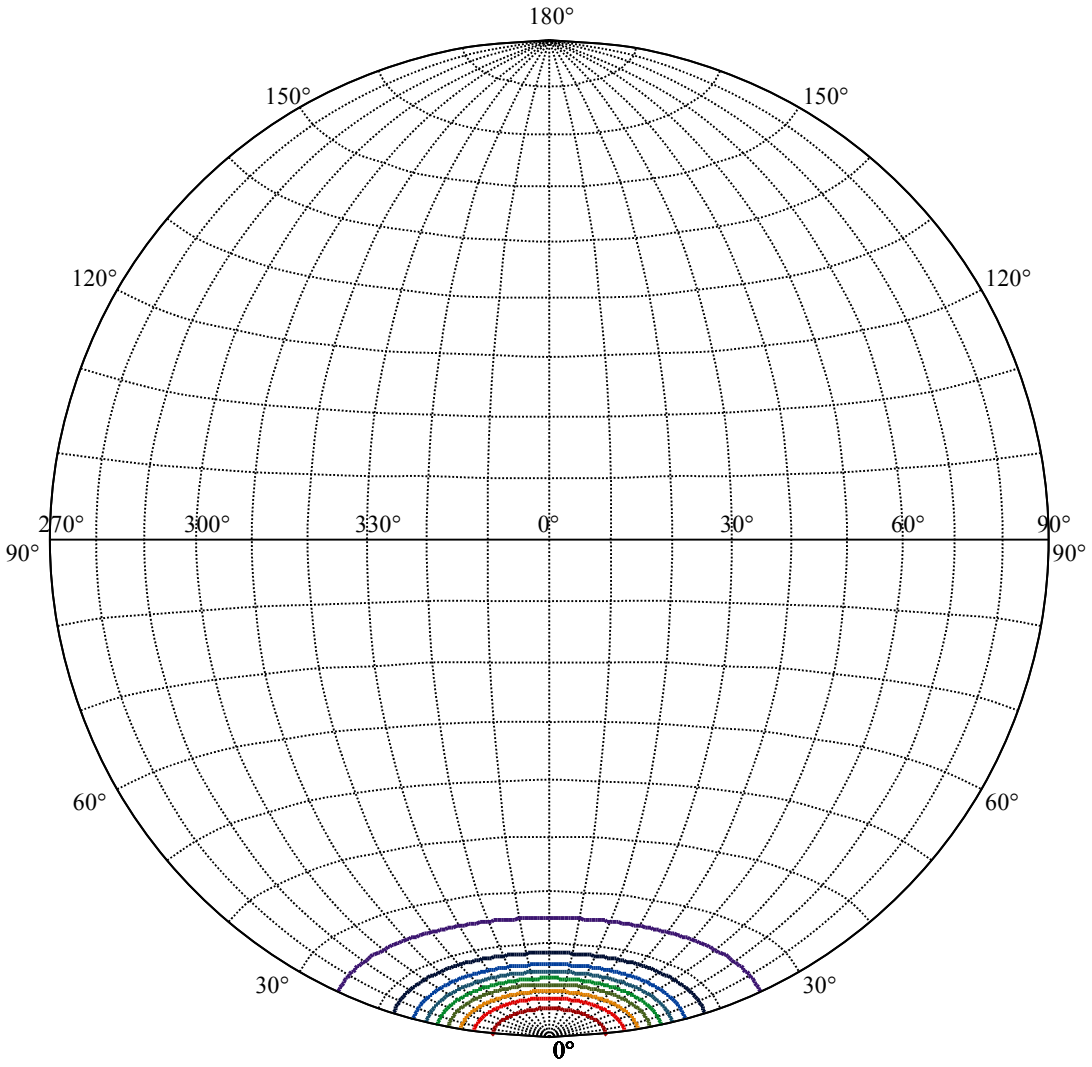


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2018/12/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

ISO candela diagram on circular web

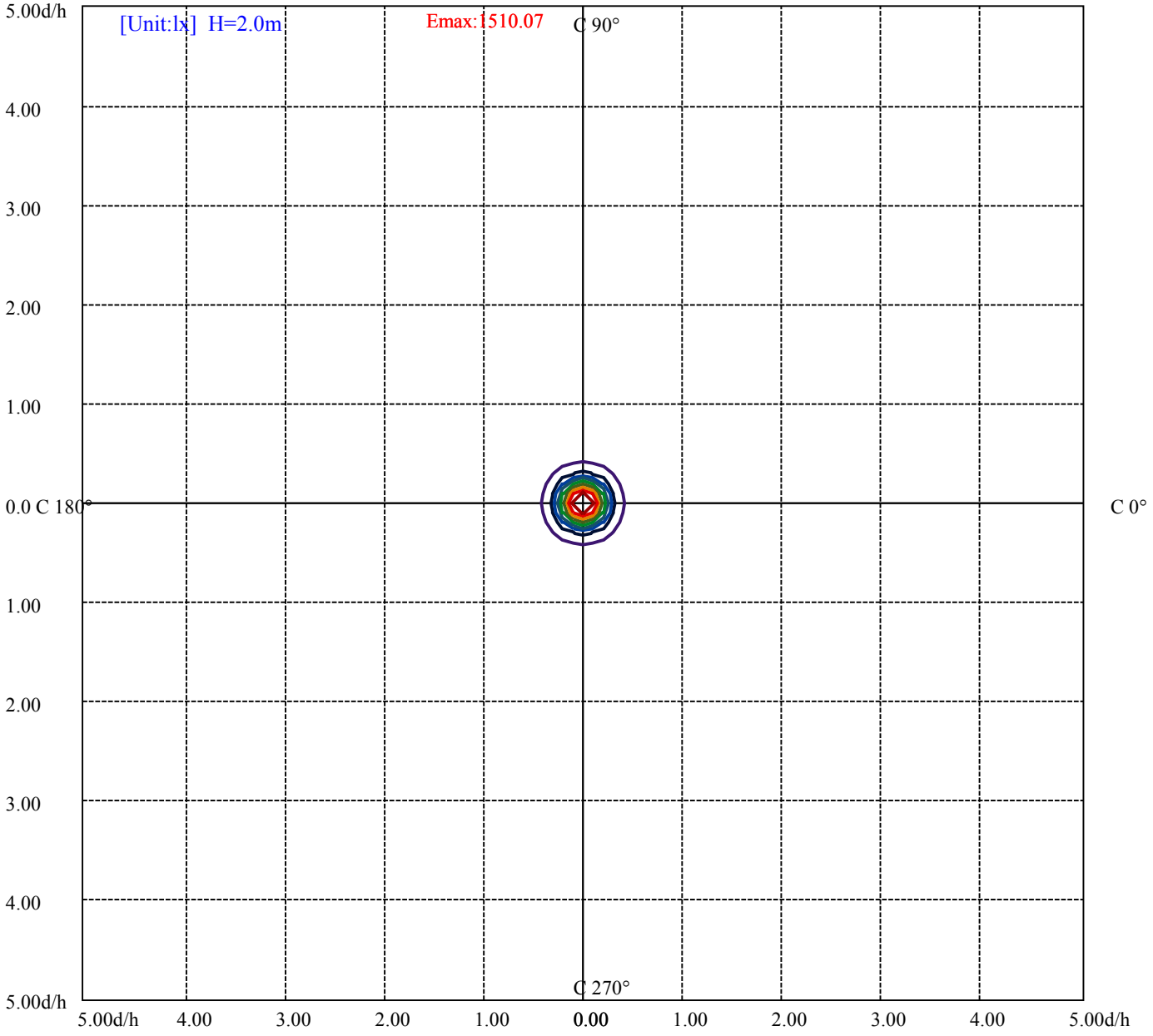


House [Unit:cd] Road

Imax:6040.27

(10%Imax) 604.027
(20%Imax) 1208.05
(30%Imax) 1812.08
(40%Imax) 2416.11
(50%Imax) 3020.13
(60%Imax) 3624.16
(70%Imax) 4228.19
(80%Imax) 4832.21
(90%Imax) 5436.24

ISO illuminance diagram

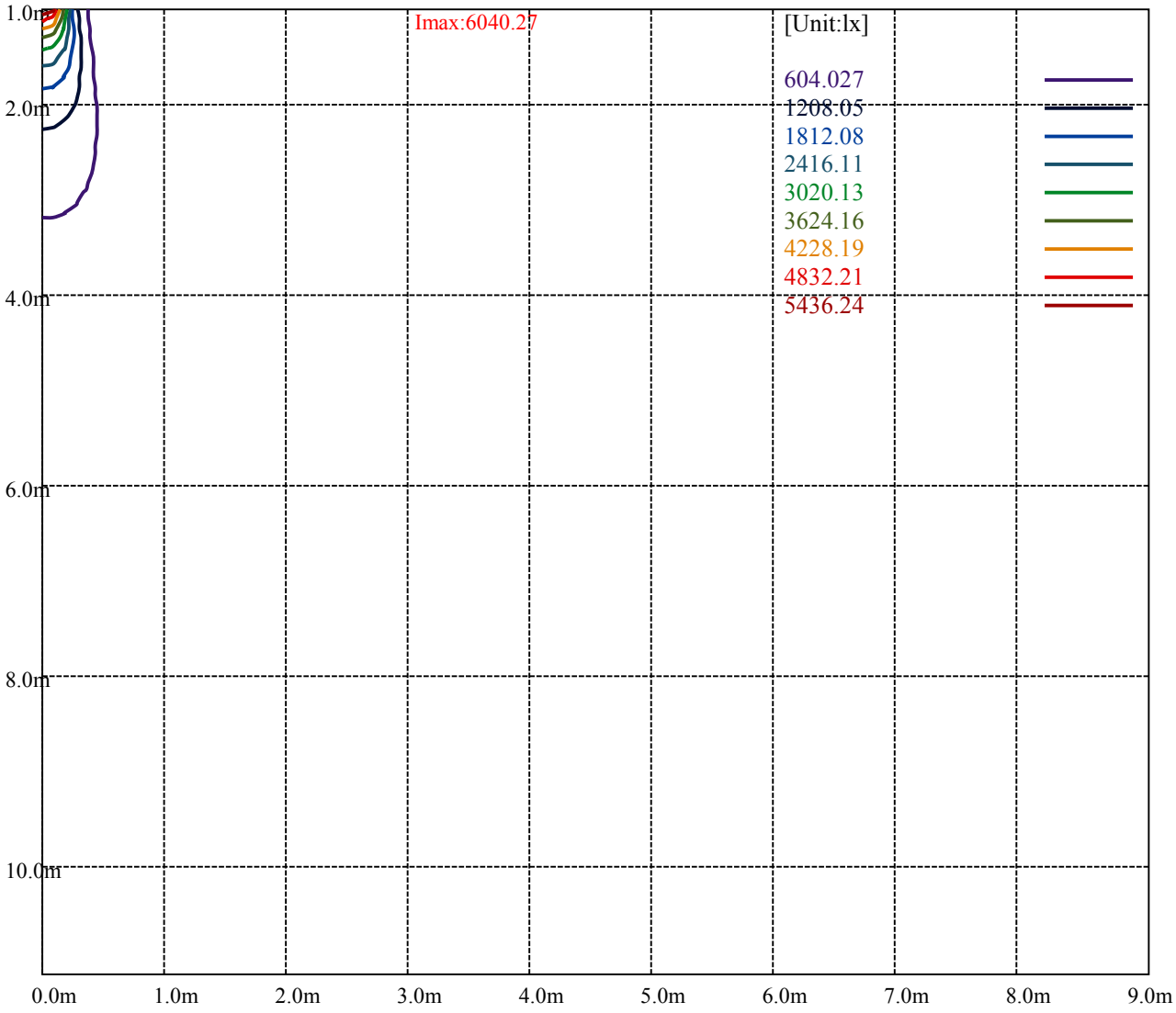


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2018/12/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Space ISO Lux diagram



Equipment: GMS1980
Temperature(°C): 25.0

Date: 2018/12/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Luminance Limitting Curve(no luminous side)

Luminance Table

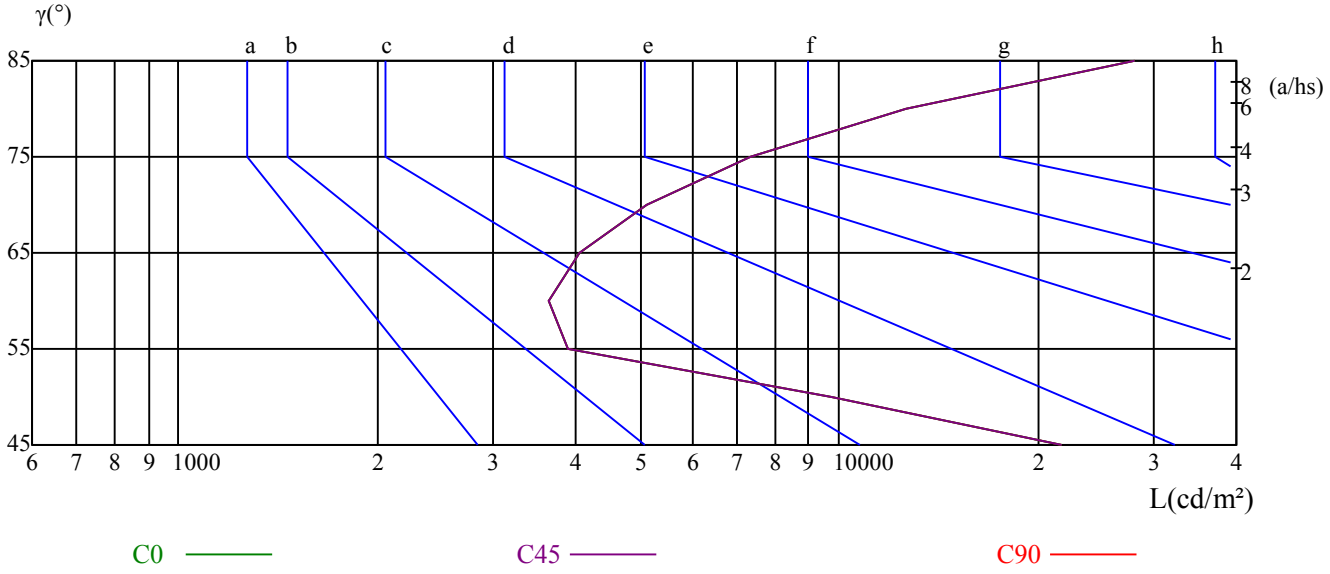
γ	45	50	55	60	65	70	75	80	85
C0	21805	9731	3892	3628	4049	5117	7356	12641	28039
C45	21805	9731	3892	3628	4049	5117	7356	12641	28039
C90	21805	9731	3892	3628	4049	5117	7356	12641	28039

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
4049	4049	4049	7356	7356	7356	28039	28039	28039

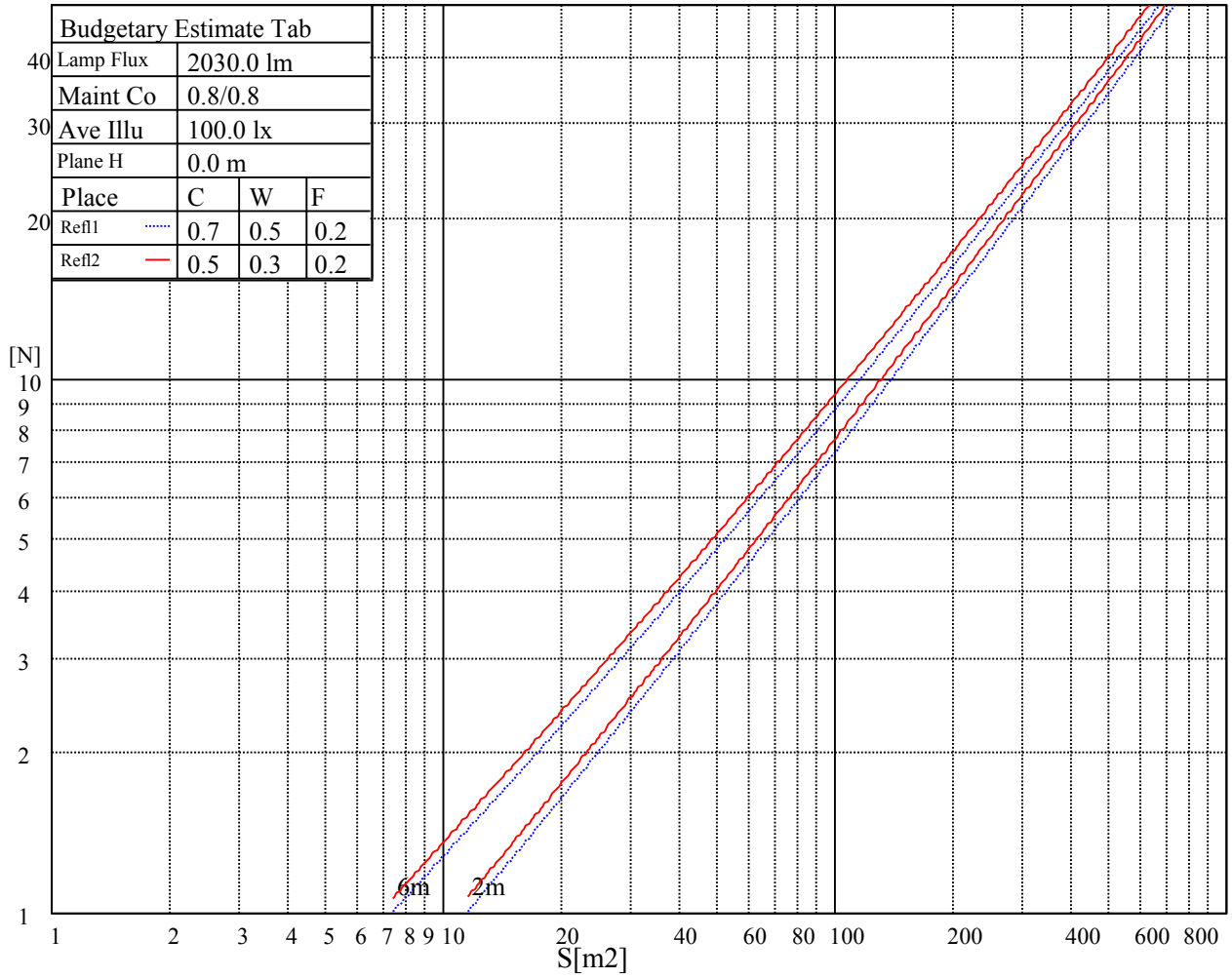
Glare Table

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 Limitting Curve



Budgetary Estimate Table

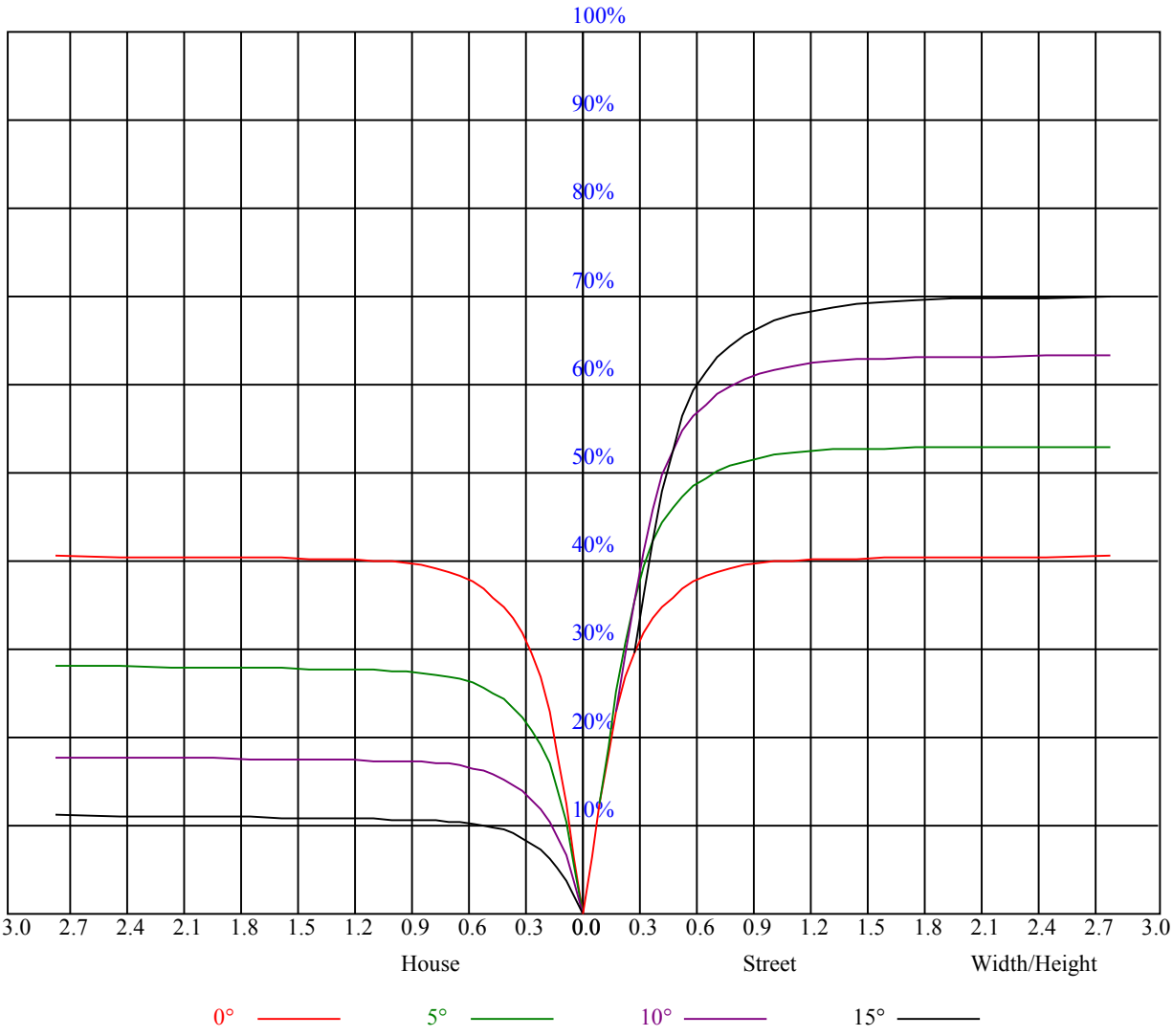


Equipment: GMS1980 Date: 2018/12/13 Operator: NT07
Temperature(°C): 25.0 Humidity(%): 65.0% Distance(m): 7.50

Utilization factor table for indoor luminaire

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	COEFFCIENTS OF UTILIZATION RHOFC=20 CU															
0	0.98	0.98	0.98	0.95	0.95	0.95	0.91	0.91	0.91	0.87	0.87	0.87	0.84	0.84	0.84	0.82
1	0.91	0.90	0.88	0.90	0.88	0.87	0.86	0.85	0.84	0.83	0.82	0.81	0.81	0.80	0.79	0.78
2	0.86	0.84	0.81	0.85	0.82	0.80	0.82	0.80	0.78	0.80	0.78	0.77	0.78	0.76	0.75	0.74
3	0.82	0.79	0.76	0.81	0.78	0.75	0.79	0.76	0.74	0.77	0.75	0.73	0.75	0.73	0.72	0.71
4	0.78	0.74	0.72	0.77	0.74	0.71	0.76	0.73	0.70	0.74	0.72	0.70	0.73	0.71	0.69	0.68
5	0.75	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.67	0.71	0.69	0.67	0.70	0.68	0.66	0.65
6	0.72	0.68	0.65	0.71	0.67	0.65	0.70	0.67	0.64	0.69	0.66	0.64	0.68	0.66	0.64	0.63
7	0.69	0.65	0.62	0.69	0.65	0.62	0.68	0.64	0.62	0.67	0.64	0.62	0.66	0.63	0.61	0.60
8	0.67	0.63	0.60	0.66	0.62	0.60	0.65	0.62	0.60	0.65	0.62	0.59	0.64	0.61	0.59	0.58
9	0.64	0.60	0.58	0.64	0.60	0.58	0.63	0.60	0.58	0.63	0.60	0.58	0.62	0.59	0.57	0.56
10	0.62	0.59	0.56	0.62	0.58	0.56	0.61	0.58	0.56	0.61	0.58	0.56	0.60	0.58	0.56	0.55

Coefficient Utilization Curve



Equipment: GMS1980
Temperature(°C): 25.0

Date: 2018/12/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

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	6057.00	6034.50	6010.31	5978.81	5950.69	5909.06	5843.25	5754.94	5625.56
45.0	6027.75	6041.81	6045.75	6046.31	6036.75	6011.44	5963.63	5857.31	5711.06
90.0	6044.63	6075.00	6105.94	6098.63	6044.63	5942.81	5780.25	5506.31	5235.19
135.0	6031.69	6066.56	6085.13	6058.13	5972.06	5832.56	5566.50	5295.38	4988.81
180.0	6057.00	6054.75	6016.50	5913.00	5754.38	5510.81	5203.69	4826.25	4438.69
225.0	6027.75	6006.38	5951.25	5819.63	5685.75	5484.38	5196.38	4856.63	4506.19
270.0	6044.63	6006.38	5958.56	5876.44	5760.56	5599.13	5394.38	5173.31	4916.81
315.0	6031.69	5980.50	5931.56	5876.44	5781.94	5702.63	5547.38	5324.63	5142.94
360.0	6057.00	6034.50	6010.31	5978.81	5950.69	5909.06	5843.25	5754.94	5625.56

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	5427.56	5214.94	4944.38	4572.00	4124.81	3677.63	3141.56	2664.56	2172.38
45.0	5491.13	5190.75	4861.69	4488.19	3948.75	3472.31	2985.75	2401.31	1977.19
90.0	4917.38	4463.44	4053.94	3612.38	3089.81	2573.44	2144.25	1732.50	1440.56
135.0	4586.06	4114.13	3714.19	3124.13	2655.00	2167.31	1752.75	1465.88	1223.44
180.0	4001.63	3469.50	2932.88	2486.25	2019.38	1641.38	1378.69	1122.24	1013.51
225.0	4051.69	3544.31	3068.44	2547.56	2126.25	1722.38	1415.25	1116.23	1068.81
270.0	4532.63	4174.88	3769.88	3336.19	2769.75	2328.75	1933.31	1534.50	1297.13
315.0	4861.13	4477.50	4160.81	3760.88	3211.31	2755.13	2329.31	1896.75	1549.13
360.0	5427.56	5214.94	4944.38	4572.00	4124.81	3677.63	3141.56	2664.56	2172.38

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1758.38	1474.88	1238.63	1073.81	969.75	896.06	802.13	743.63	695.81
45.0	1608.19	1326.94	1118.81	995.63	891.56	810.56	750.38	686.81	634.50
90.0	1110.94	1026.39	924.41	837.34	764.21	705.09	651.77	585.73	536.18
135.0	1052.44	961.88	882.00	798.19	736.31	678.38	616.50	560.81	512.44
180.0	922.61	849.38	777.83	713.59	660.32	604.86	551.70	505.86	459.17
225.0	959.74	877.22	812.81	744.53	681.53	628.43	577.86	517.11	472.56
270.0	1127.81	995.06	899.44	828.56	757.13	693.00	639.00	583.31	534.38
315.0	1320.19	1106.38	989.83	901.41	830.48	758.42	695.76	644.91	588.83
360.0	1758.38	1474.88	1238.63	1073.81	969.75	896.06	802.13	743.63	695.81

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	631.69	575.44	533.81	479.81	438.75	411.19	371.25	342.00	312.75
45.0	578.81	525.38	479.81	441.00	397.13	366.19	339.19	306.56	285.19
90.0	489.94	442.86	401.18	367.65	334.29	304.82	280.46	255.32	236.25
135.0	464.06	420.75	388.13	353.25	326.25	297.00	285.19	246.77	225.23
180.0	422.83	385.54	350.94	322.14	295.09	262.58	239.96	222.69	203.23
225.0	432.84	394.26	360.28	332.89	304.31	277.09	252.73	230.91	214.76
270.0	479.81	432.56	396.56	369.00	330.75	304.88	284.06	252.62	233.72
315.0	539.04	487.80	443.19	408.43	373.22	342.39	316.13	290.87	263.14
360.0	631.69	575.44	533.81	479.81	438.75	411.19	371.25	342.00	312.75

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	286.88	250.65	231.13	209.14	193.56	179.49	159.08	142.71	128.19
45.0	257.96	233.55	214.26	199.52	183.15	171.06	154.13	138.38	125.10
90.0	217.46	200.81	186.64	172.07	157.89	143.21	129.94	114.92	103.05
135.0	206.83	191.59	178.31	162.62	146.76	132.36	117.06	103.16	90.51
180.0	188.66	175.56	158.46	139.28	124.03	109.01	96.53	82.86	70.09
225.0	198.11	183.88	171.34	150.19	132.92	119.25	106.54	90.68	78.58
270.0	217.29	198.84	182.70	169.76	151.93	136.97	120.83	106.43	93.49
315.0	242.66	224.16	202.95	188.04	174.77	156.26	138.32	123.86	108.79
360.0	286.88	250.65	231.13	209.14	193.56	179.49	159.08	142.71	128.19

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	113.40	98.72	85.28	71.44	60.86	50.12	40.78	33.64	26.61
45.0	112.39	97.71	85.39	73.97	60.64	51.75	43.43	34.48	26.66
90.0	90.45	75.32	64.80	54.90	44.55	37.63	30.66	23.12	18.90
135.0	76.56	63.84	53.55	43.59	36.45	29.36	22.78	17.89	14.12
180.0	59.63	48.66	39.09	32.34	26.21	19.80	15.47	11.93	9.56
225.0	67.39	55.97	45.45	37.74	30.43	23.79	18.90	14.74	12.32
270.0	79.37	66.60	56.70	47.48	37.63	30.94	25.54	20.64	16.59
315.0	94.67	79.59	66.66	56.87	47.03	38.08	31.11	25.09	19.07
360.0	113.40	98.72	85.28	71.44	60.86	50.12	40.78	33.64	26.61

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	20.59	16.03	12.60	10.24	10.01	9.84	9.73	9.68	9.56
45.0	20.98	15.81	12.26	11.14	10.86	10.63	10.46	10.29	10.13
90.0	14.57	12.09	11.76	11.42	11.03	10.80	10.58	10.29	10.13
135.0	11.25	10.69	10.58	10.35	10.18	10.01	9.90	9.73	9.62
180.0	9.45	9.39	9.34	9.23	9.23	9.17	9.17	9.23	9.23
225.0	11.59	11.48	11.36	11.31	11.14	10.97	10.80	10.52	10.35
270.0	14.01	12.66	12.32	11.98	11.70	11.36	11.03	10.80	10.52
315.0	15.24	12.32	10.97	10.69	10.41	10.13	9.96	9.79	9.62
360.0	20.59	16.03	12.60	10.24	10.01	9.84	9.73	9.68	9.56

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	9.51	9.45	9.45	9.45	9.45	9.45	9.45	9.51	9.56
45.0	10.01	9.96	9.90	9.84	9.90	10.07	10.29	10.58	10.91
90.0	9.96	9.90	9.79	9.79	9.79	9.79	9.84	10.07	10.07
135.0	9.56	9.45	9.34	9.34	9.34	9.28	9.34	9.45	9.56
180.0	9.28	9.34	9.28	9.28	9.28	9.28	9.23	9.23	9.23
225.0	10.13	9.90	9.79	9.73	9.68	9.73	9.84	10.13	10.69
270.0	10.29	10.13	10.01	9.96	9.90	9.96	9.96	10.01	10.07
315.0	9.56	9.51	9.45	9.51	9.51	9.56	9.68	9.79	9.96
360.0	9.51	9.45	9.45	9.45	9.45	9.45	9.45	9.51	9.56

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	9.68	9.79	9.79	9.90	9.90	9.90	9.96	10.07	10.24
45.0	10.97	11.03	11.25	11.53	11.64	11.87	11.81	11.64	11.59
90.0	10.18	10.35	10.46	10.69	10.86	11.03	11.42	11.76	12.26
135.0	9.68	9.84	10.13	10.63	11.64	12.71	13.28	13.78	14.18
180.0	9.23	9.28	9.34	9.51	9.68	9.84	9.96	10.18	10.46
225.0	11.53	12.09	11.98	11.93	12.15	12.49	13.16	13.84	14.57
270.0	10.13	10.24	10.41	10.52	10.80	11.08	11.42	11.87	12.32
315.0	10.18	10.35	10.63	10.97	11.36	11.87	12.21	12.54	13.16
360.0	9.68	9.79	9.79	9.90	9.90	9.90	9.96	10.07	10.24

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	10.46	10.63	10.80	11.14	11.59	12.32	11.93	7.20	7.14
45.0	11.64	11.87	11.81	11.81	11.31	11.19	7.14	6.98	6.92
90.0	12.66	13.05	13.44	13.67	12.77	7.59	7.03	6.92	6.81
135.0	14.18	14.51	15.13	15.47	13.95	11.08	7.03	6.98	6.81
180.0	10.86	11.53	12.94	13.89	13.67	8.10	7.09	6.92	6.86
225.0	14.63	14.63	15.36	16.88	13.84	13.16	7.26	6.92	6.86
270.0	12.94	13.61	14.18	14.74	15.92	16.09	14.74	7.20	6.86
315.0	13.89	14.51	15.36	16.03	16.93	16.65	14.34	7.09	7.03
360.0	10.46	10.63	10.80	11.14	11.59	12.32	11.93	7.20	7.14

Intensity data(cd)

C/γ(°)	90.0
0.0	7.14
45.0	6.92
90.0	6.75
135.0	6.69
180.0	6.81
225.0	6.81
270.0	6.81
315.0	6.92
360.0	7.14