NATA LIGHTING CO.,LTD
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Nata

LumCAT: 4-2273-M
Luminaire: 92.70.131.00
Report No: GC2017071907
Test No: NT-0010
LampCAT: SEOUL SAWx15
Lamp flux(lm): 2937.0
Number of Lamps: 1
Length(mm): 100
Phm Type: C

Voltage(V): 34.7600
Current(A): 0.6000
Power (W): 20.8560
PF: 0.0000
Ballast type: DC
Width(mm): 100
Height(mm): 0

Photometric Results

Lumens(lm): 2565.88
Efficiency(%): 87.36%
Lumens(lm)/Power(W): 123.03
Central intensity(cd): 30600.030
Maximum intensity(cd): 30600.030
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=10.9
[C90/270]Total=10.9
Field angle(10%Imax): [C0/180]Total=23.6
[C90/270]Total=23.6
Maximum s/h(1/2): C0_180=0.19 C90_270=0.19
Maximum s/h(1/4): C0_180=0.20 C90_270=0.20
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 87.36%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.716%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	30600.031	0.000	0	.000%	.000%
1.0	29836.215	28.918	28.918	.985%	1.127%
2.0	27772.234	82.685	111.603	2.815%	4.349%
3.0	24591.051	125.236	236.839	4.264%	9.230%
4.0	21059.262	152.806	389.645	5.203%	15.186%
5.0	16957.738	163.547	553.192	5.569%	21.560%
6.0	13262.820	158.817	712.009	5.407%	27.749%
7.0	10172.347	145.462	857.471	4.953%	33.418%
8.0	8094.595	130.733	988.204	4.451%	38.513%
9.0	6078.059	114.862	1103.065	3.911%	42.990%
10.0	4603.361	96.663	1199.728	3.291%	46.757%
11.0	3593.424	81.903	1281.631	2.789%	49.949%
12.0	2929.222	71.302	1352.933	2.428%	52.728%
13.0	2210.064	60.990	1413.923	2.077%	55.105%
14.0	1884.433	52.409	1466.332	1.784%	57.147%
15.0	1574.801	47.490	1513.822	1.617%	58.998%
16.0	1400.681	43.599	1557.421	1.484%	60.697%
17.0	1291.882	41.930	1599.352	1.428%	62.332%
18.0	1204.433	41.159	1640.511	1.401%	63.936%
19.0	1143.759	40.854	1681.364	1.391%	65.528%
20.0	1098.124	41.033	1722.397	1.397%	67.127%
21.0	1066.932	41.573	1763.971	1.416%	68.747%
22.0	1040.775	42.355	1806.326	1.442%	70.398%
23.0	1018.598	43.211	1849.537	1.471%	72.082%
24.0	998.313	44.097	1893.634	1.501%	73.801%
25.0	982.070	45.030	1938.664	1.533%	75.556%
26.0	967.795	46.027	1984.69	1.567%	77.349%
27.0	953.757	47.011	2031.702	1.601%	79.181%
28.0	939.823	47.941	2079.643	1.632%	81.050%
29.0	922.884	48.734	2128.377	1.659%	82.949%
30.0	908.415	49.445	2177.821	1.684%	84.876%
31.0	892.749	50.124	2227.945	1.707%	86.830%
32.0	865.737	50.379	2278.324	1.715%	88.793%
33.0	808.910	49.336	2327.659	1.680%	90.716%
34.0	715.005	46.118	2373.778	1.570%	92.513%
35.0	594.992	40.684	2414.461	1.385%	94.099%
36.0	463.960	33.717	2448.179	1.148%	95.413%
37.0	341.130	26.258	2474.436	.894%	96.436%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	202.794	18.155	2492.592	.618%	97.144%
39.0	111.874	10.740	2503.332	.366%	97.562%
40.0	51.394	5.694	2509.026	.194%	97.784%
41.0	28.563	2.847	2511.874	.097%	97.895%
42.0	21.071	1.803	2513.677	.061%	97.965%
43.0	16.779	1.402	2515.079	.048%	98.020%
44.0	14.755	1.190	2516.269	.041%	98.067%
45.0	13.683	1.093	2517.362	.037%	98.109%
46.0	13.342	1.057	2518.419	.036%	98.150%
47.0	12.995	1.047	2519.466	.036%	98.191%
48.0	12.772	1.042	2520.508	.035%	98.232%
49.0	12.536	1.039	2521.547	.035%	98.272%
50.0	12.313	1.036	2522.583	.035%	98.313%
51.0	12.146	1.035	2523.618	.035%	98.353%
52.0	11.951	1.034	2524.652	.035%	98.393%
53.0	11.770	1.032	2525.684	.035%	98.433%
54.0	11.596	1.030	2526.714	.035%	98.474%
55.0	11.478	1.030	2527.744	.035%	98.514%
56.0	11.360	1.032	2528.776	.035%	98.554%
57.0	11.269	1.035	2529.811	.035%	98.594%
58.0	11.172	1.038	2530.848	.035%	98.635%
59.0	11.102	1.041	2531.89	.035%	98.675%
60.0	11.019	1.045	2532.935	.036%	98.716%
61.0	10.942	1.048	2533.983	.036%	98.757%
62.0	10.887	1.052	2535.035	.036%	98.798%
63.0	10.817	1.056	2536.09	.036%	98.839%
64.0	10.762	1.059	2537.149	.036%	98.880%
65.0	10.713	1.063	2538.212	.036%	98.922%
66.0	10.671	1.067	2539.279	.036%	98.963%
67.0	10.629	1.071	2540.35	.036%	99.005%
68.0	10.581	1.074	2541.424	.037%	99.047%
69.0	10.581	1.080	2542.504	.037%	99.089%
70.0	10.553	1.085	2543.589	.037%	99.131%
71.0	10.532	1.090	2544.679	.037%	99.174%
72.0	10.483	1.093	2545.772	.037%	99.216%
73.0	10.449	1.095	2546.866	.037%	99.259%
74.0	10.442	1.098	2547.965	.037%	99.302%
75.0	10.428	1.103	2549.067	.038%	99.345%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	10.435	1.107	2550.175	.038%	99.388%
77.0	10.393	1.110	2551.285	.038%	99.431%
78.0	10.386	1.112	2552.398	.038%	99.475%
79.0	10.365	1.115	2553.512	.038%	99.518%
80.0	10.372	1.118	2554.63	.038%	99.562%
81.0	10.344	1.120	2555.751	.038%	99.605%
82.0	10.372	1.123	2556.874	.038%	99.649%
83.0	10.344	1.126	2558	.038%	99.693%
84.0	10.316	1.126	2559.126	.038%	99.737%
85.0	10.330	1.127	2560.253	.038%	99.781%
86.0	10.309	1.128	2561.381	.038%	99.825%
87.0	10.282	1.127	2562.508	.038%	99.869%
88.0	10.275	1.126	2563.634	.038%	99.912%
89.0	10.226	1.124	2564.758	.038%	99.956%
90.0	10.247	1.122	2565.88	.038%	100.000%

Zonal flux distribution table

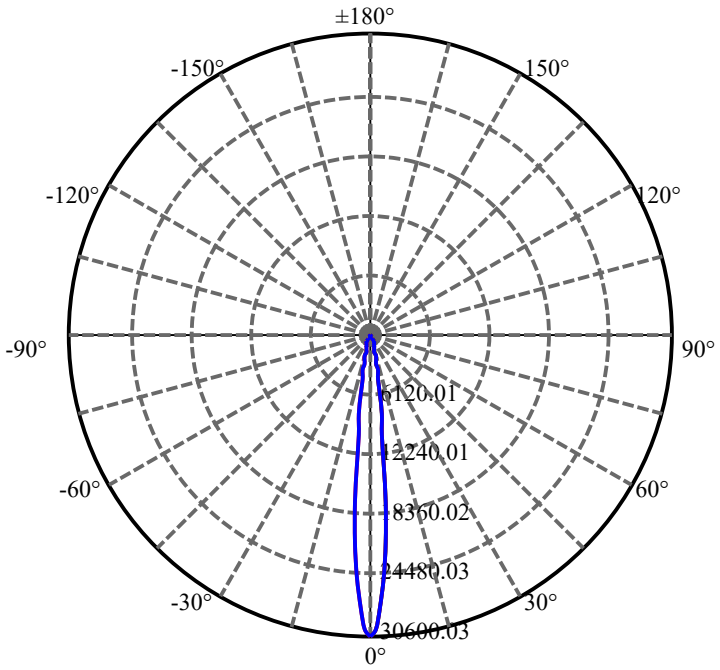
ZONAL LUMEN SUMMARY

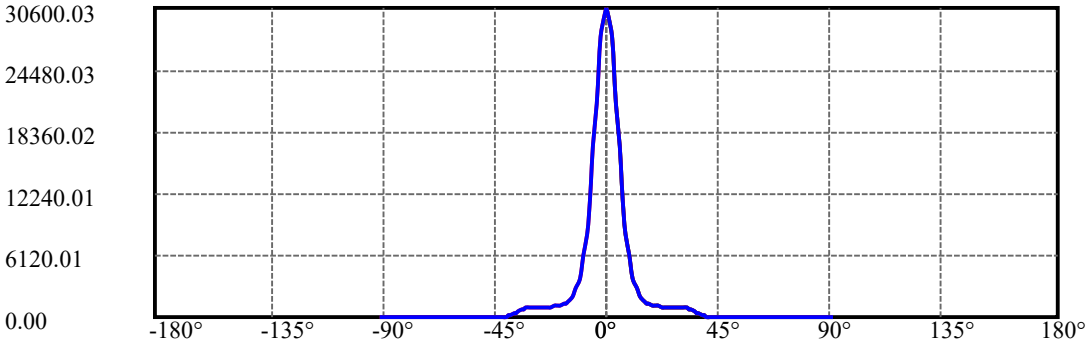
Zone	Lumens	%Lamp	%Fixt
0-30	2177.82	74.15%	84.88%
0-40	2509.03	85.43%	97.78%
0-60	2532.93	86.24%	98.72%
0-90	2564.76	87.33%	99.96%
0-120	2564.76	87.33%	99.96%
0-180	2565.88	87.36%	100.00%
60-90	32.87	1.12%	1.28%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-27.44	2052.70	69.89%	80.00%

ZONAL LUMEN SUMMARY

0-10	1199.73
10-20	522.67
20-30	455.42
30-40	331.20
40-50	13.56
50-60	10.35
60-70	10.65
70-80	11.04
80-90	10.13
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):

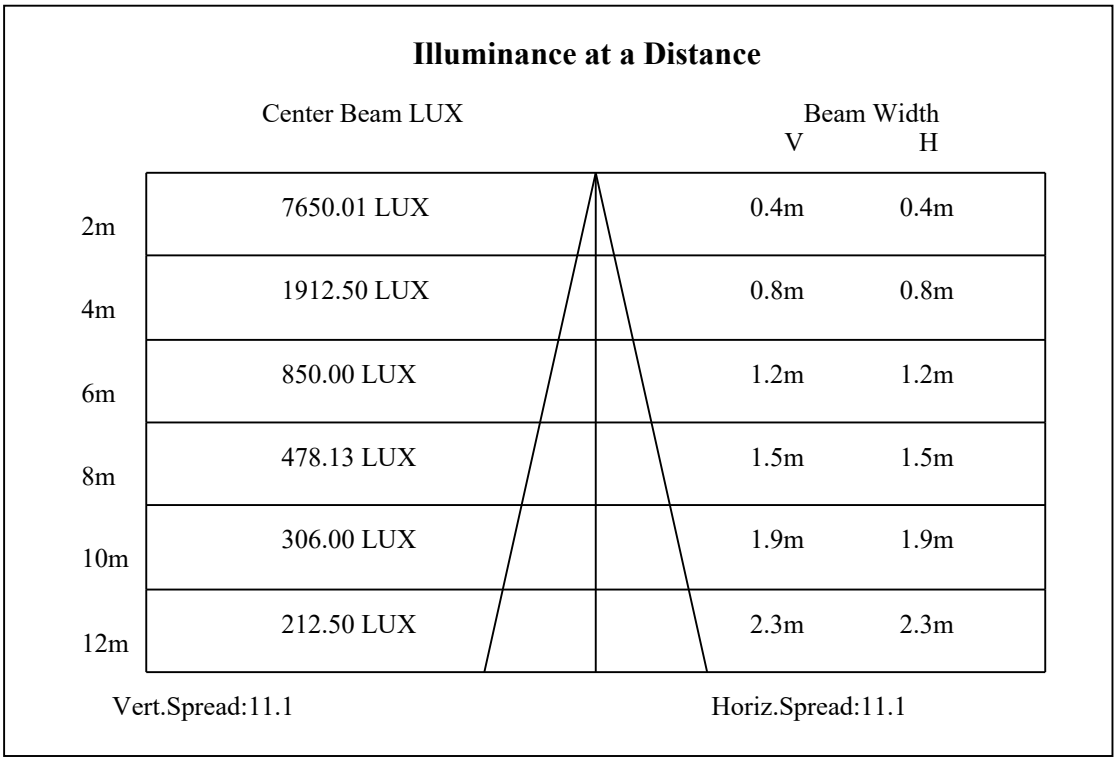
C0/C180:

C90/C270:

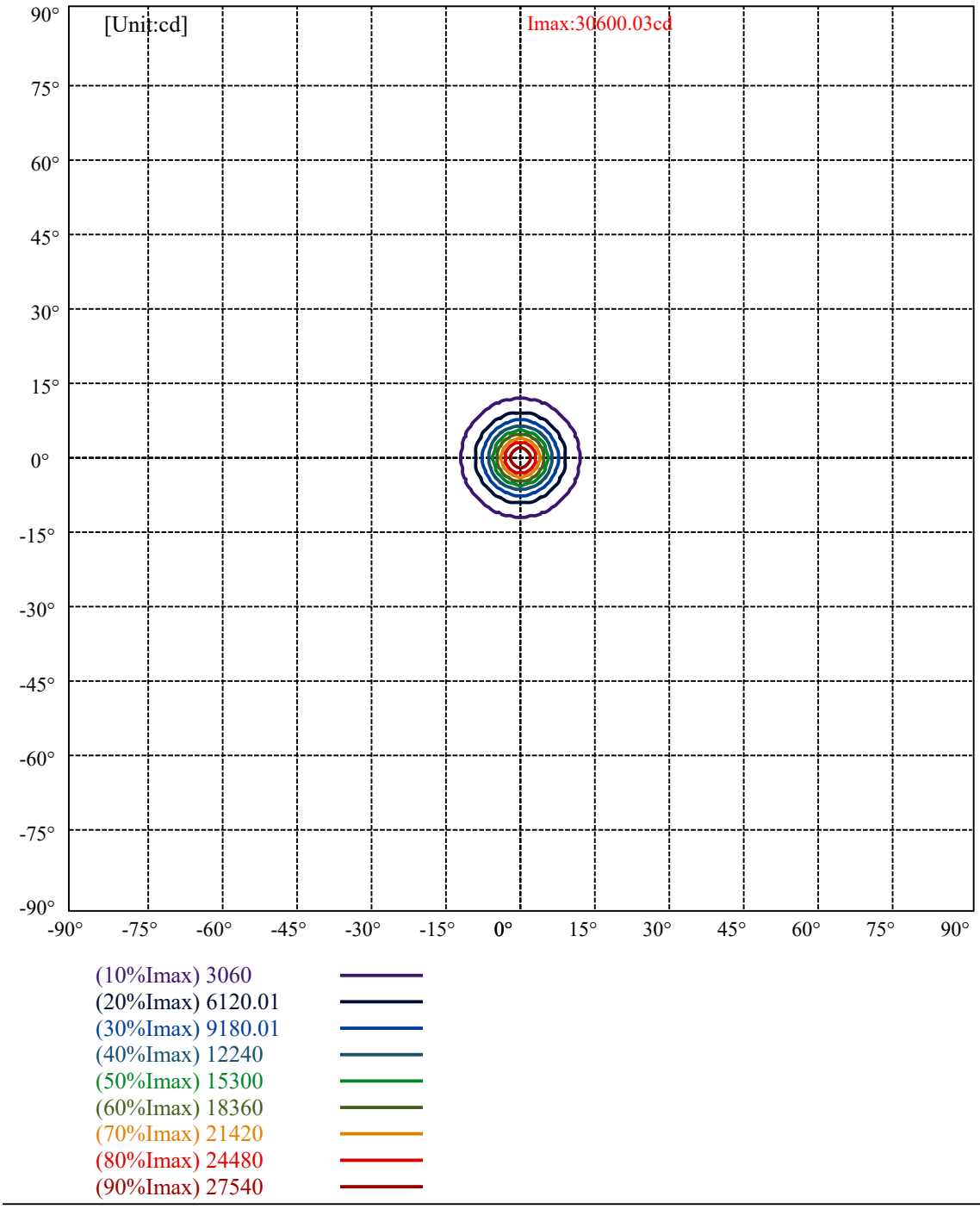
Field angle(10%Imax):C0/180Left:11.8 Right:11.8
:C90/270Left:11.8 Right:11.8

Beam Angle(50%Imax):C0/180Left:5.4 Right:5.4
:C90/270Left:5.4 Right:5.4

Lux distance Curve



ISO-Intensity(V-H)

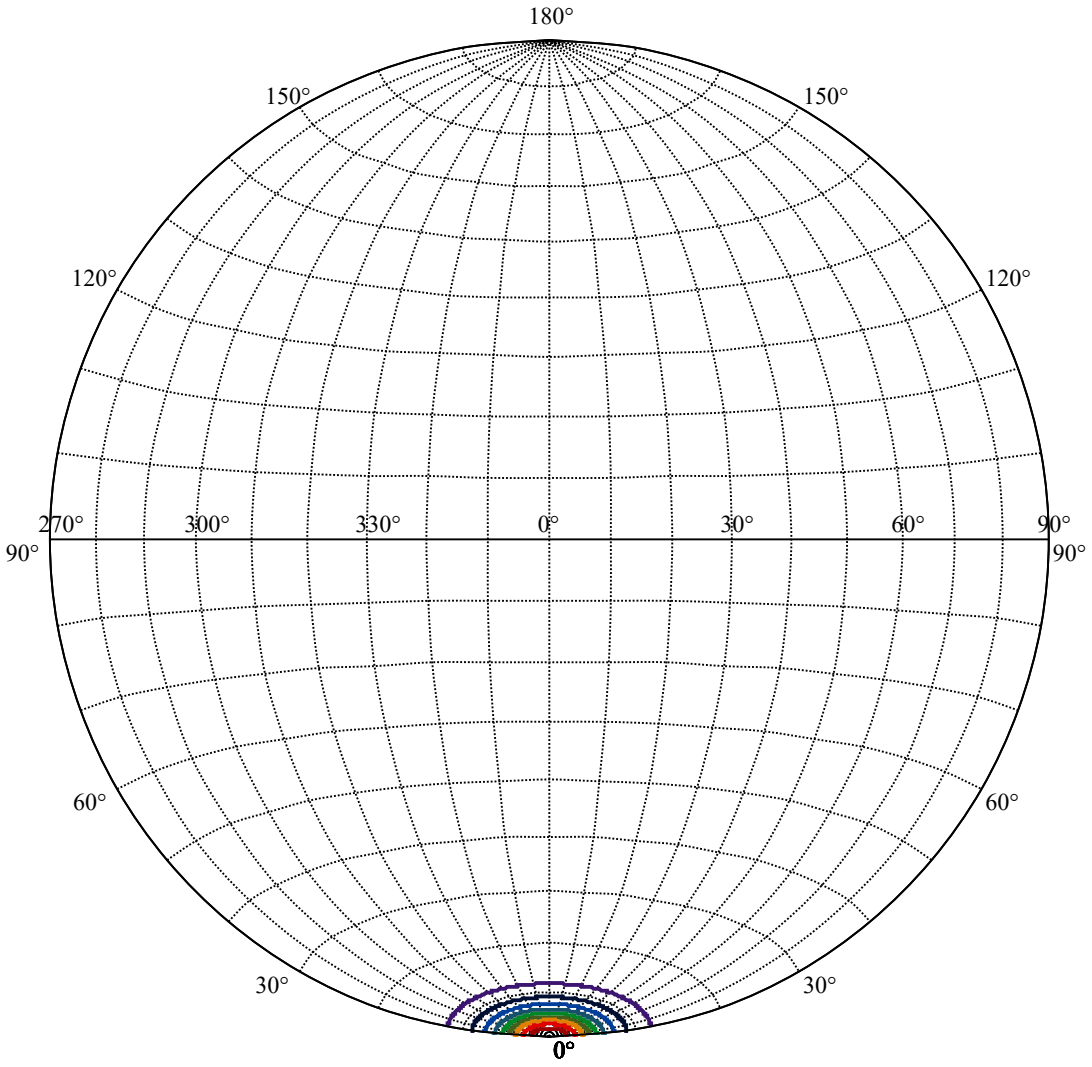


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2017/7/19
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.46

ISO candela diagram on circular web



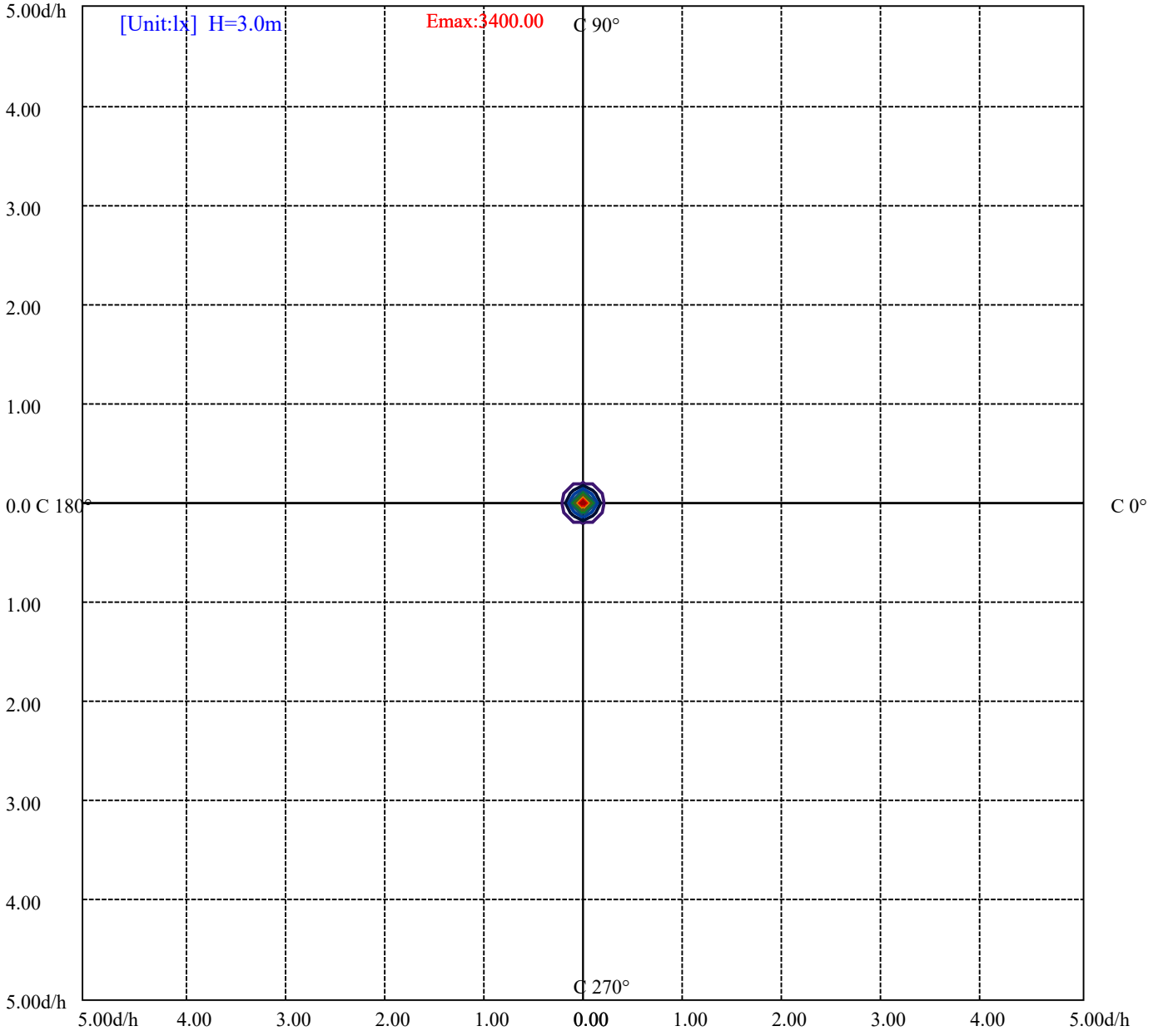
House [Unit:cd] Road

Imax:30600.03

(10%Imax) 3060
(20%Imax) 6120.01
(30%Imax) 9180.01
(40%Imax) 12240
(50%Imax) 15300
(60%Imax) 18360
(70%Imax) 21420
(80%Imax) 24480
(90%Imax) 27540

Equipment: GMS1980 Date: 2017/7/19 Operator: NT07
Temperature(°C): 25.0 Humidity(%): 60.0% Distance(m): 7.46

ISO illuminance diagram

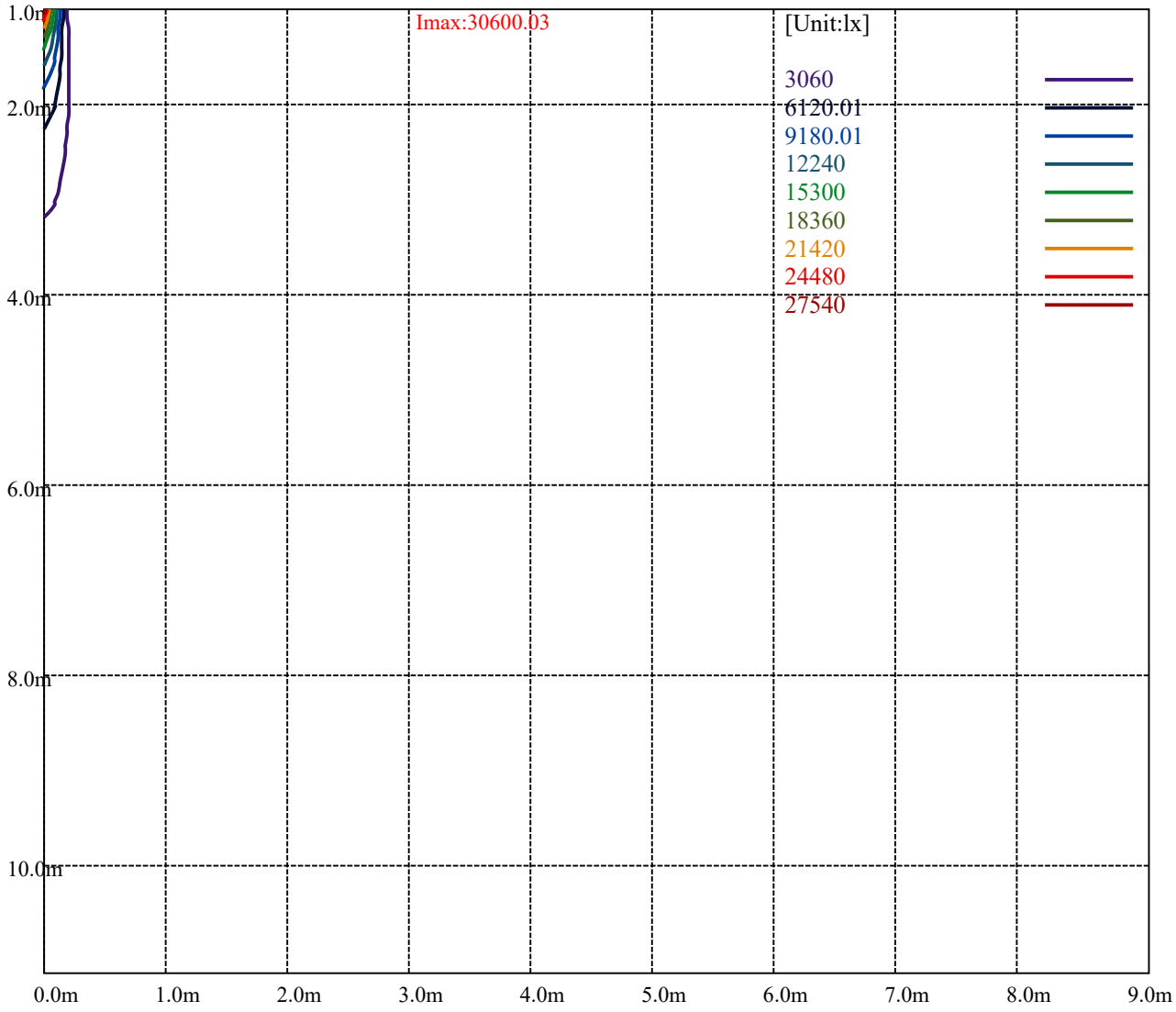


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2017/7/19
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.46

Space ISO Lux diagram



Equipment: GMS1980 Date: 2017/7/19 Operator: NT07
Temperature(°C): 25.0 Humidity(%): 60.0% Distance(m): 7.46

Luminance Limitting Curve(no luminous side)

Luminance Table

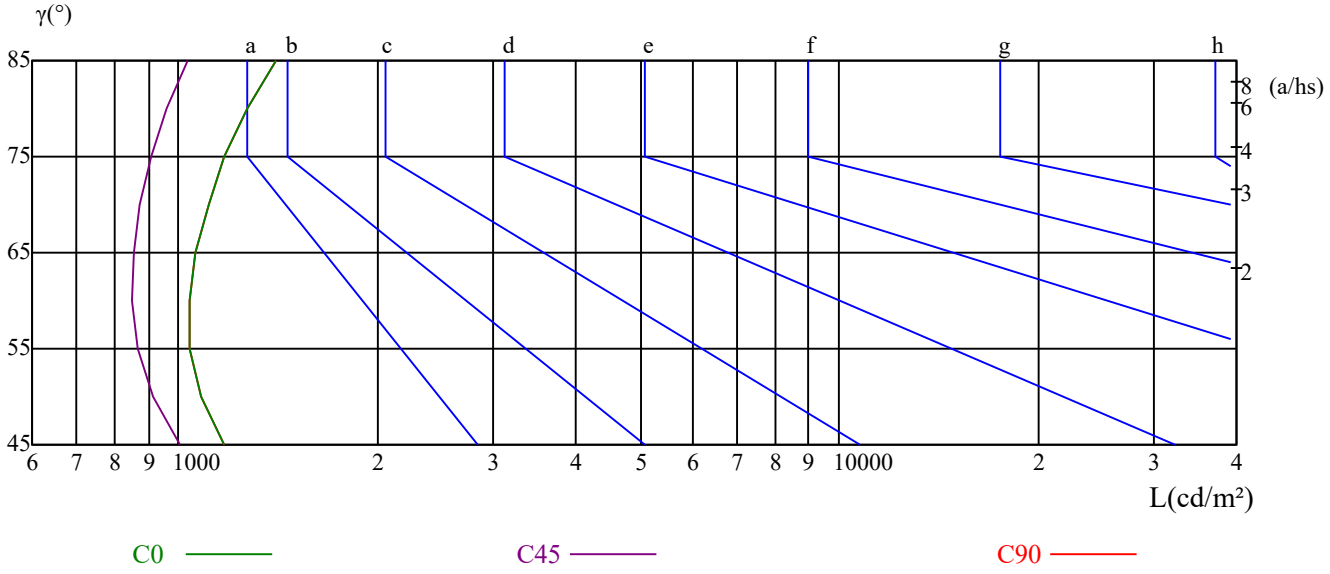
γ	45	50	55	60	65	70	75	80	85
C0	1173	1079	1038	1037	1059	1108	1176	1275	1406
C45	1008	914	865	850	853	875	909	961	1030
C90	1173	1079	1038	1037	1059	1108	1176	1275	1406

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
2535	2535	2535	4029	4029	4029	11853	11853	11853

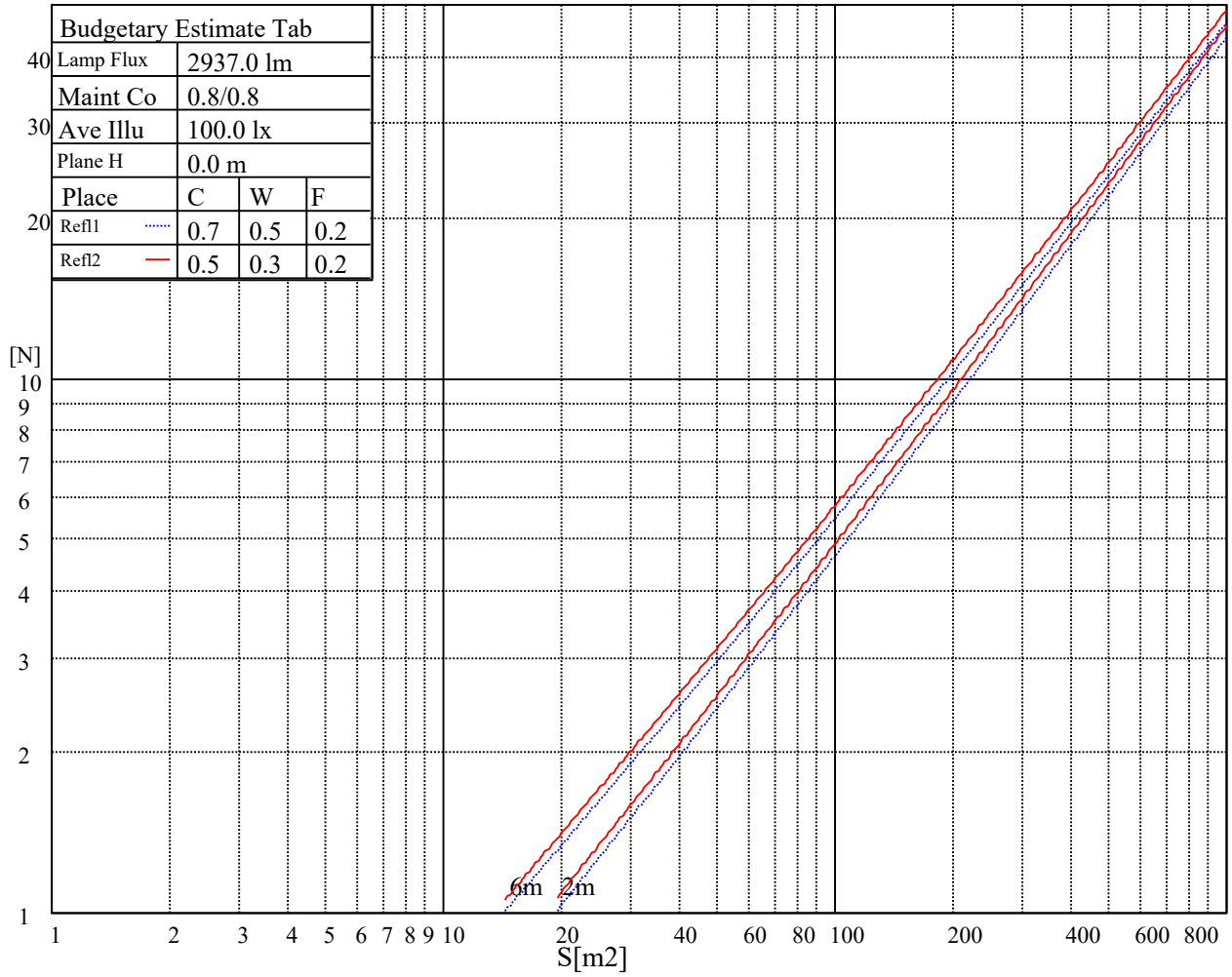
Glare Table

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

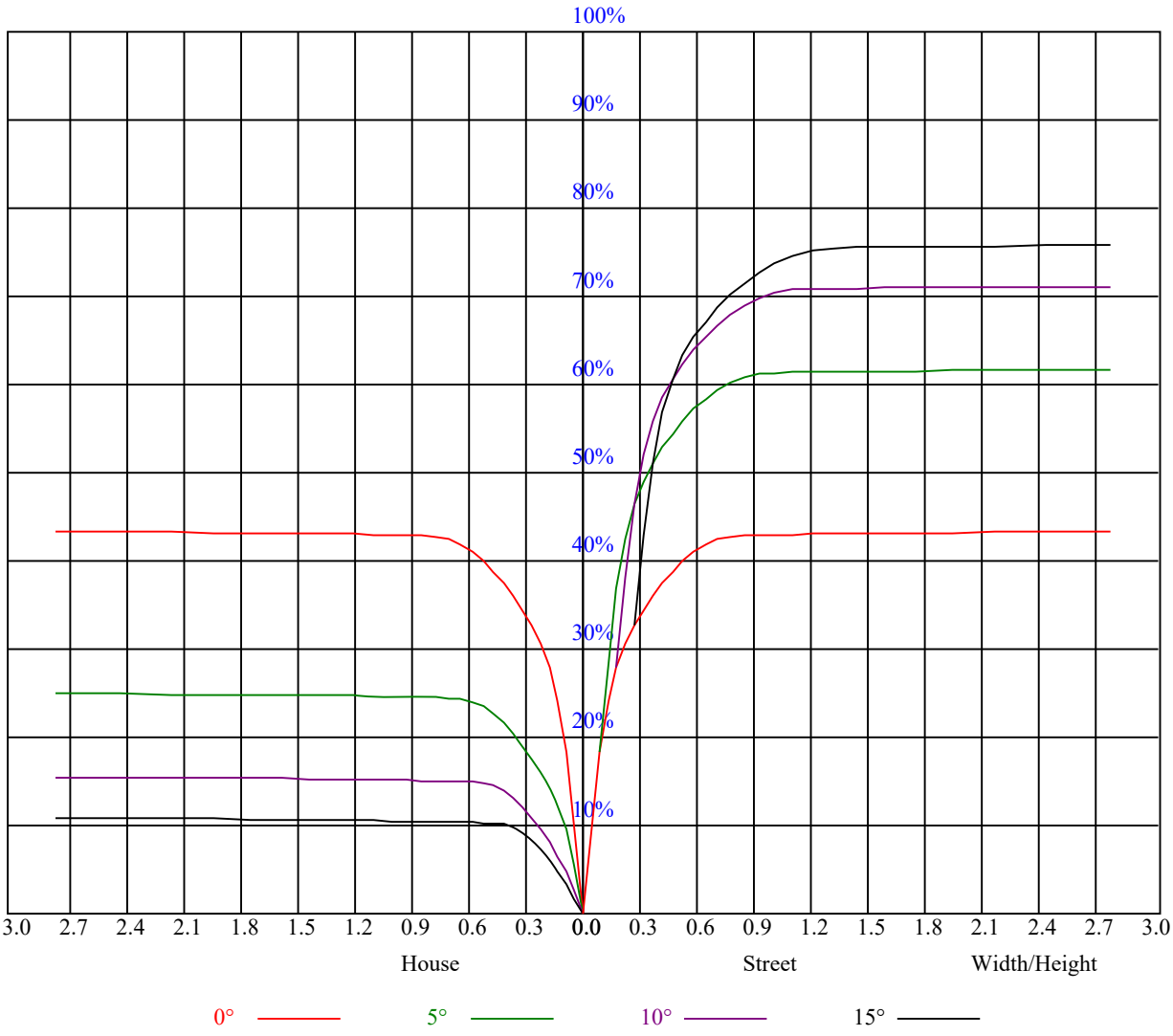


Equipment: GMS1980 Date: 2017/7/19 Operator: NT07
Temperature(°C): 25.0 Humidity(%): 60.0% Distance(m): 7.46

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	1.04	1.04	1.04	1.02	1.02	1.02	0.97	0.97	0.97	0.93	0.93	0.93	0.89	0.89	0.89	0.87
1	0.98	0.96	0.95	0.96	0.95	0.93	0.93	0.92	0.90	0.90	0.89	0.88	0.87	0.86	0.85	0.84
2	0.93	0.91	0.88	0.92	0.89	0.87	0.89	0.87	0.85	0.87	0.85	0.84	0.84	0.83	0.82	0.81
3	0.89	0.86	0.83	0.88	0.85	0.83	0.86	0.83	0.81	0.84	0.82	0.80	0.82	0.80	0.79	0.78
4	0.85	0.82	0.79	0.85	0.81	0.79	0.83	0.80	0.78	0.81	0.79	0.77	0.80	0.78	0.76	0.75
5	0.82	0.78	0.76	0.81	0.78	0.75	0.80	0.77	0.75	0.79	0.76	0.74	0.77	0.75	0.74	0.73
6	0.79	0.76	0.73	0.79	0.75	0.73	0.78	0.74	0.72	0.76	0.74	0.72	0.75	0.73	0.71	0.70
7	0.77	0.73	0.70	0.76	0.73	0.70	0.75	0.72	0.70	0.74	0.72	0.69	0.73	0.71	0.69	0.68
8	0.74	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.68	0.72	0.70	0.67	0.72	0.69	0.67	0.66
9	0.72	0.69	0.66	0.72	0.68	0.66	0.71	0.68	0.66	0.71	0.68	0.66	0.70	0.67	0.65	0.65
10	0.70	0.67	0.64	0.70	0.67	0.64	0.69	0.66	0.64	0.69	0.66	0.64	0.68	0.66	0.64	0.63

Coefficient Utilization Curve



Equipment: GMS1980	Date: 2017/7/19	Operator: NT07
Temperature(°C): 25.0	Humidity(%): 60.0%	Distance(m): 7.46

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	30864.38	29762.48	27113.46	23523.93	19973.36	15821.75	12187.70	9555.38	7435.05
45.0	30051.86	28688.40	26078.34	22477.68	18804.68	14719.85	11141.45	8614.87	6889.67
90.0	30691.86	29990.65	28209.80	25026.52	21086.39	17257.56	10870.98	9509.75	7393.32
135.0	30792.03	31526.63	30892.20	28799.70	26211.90	22650.20	18526.42	14914.63	11770.31
180.0	30864.38	30374.64	28677.27	25950.34	22666.90	19322.24	15871.84	10919.40	9369.50
225.0	30051.86	30001.78	28387.88	25694.34	22294.03	18693.37	14975.85	11096.37	8682.76
270.0	30691.86	30029.60	27642.15	24152.79	20574.40	16194.62	12204.40	9460.77	7362.71
315.0	30792.03	28315.53	25176.78	21103.09	16862.43	11002.32	10323.93	7307.61	5853.44
360.0	30864.38	29762.48	27113.46	23523.93	19973.36	15821.75	12187.70	9555.38	7435.05

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	5403.77	4179.44	3238.92	2860.49	1951.15	1652.30	1460.85	1312.26	1231.57
45.0	4908.47	3839.96	3083.10	2815.97	1871.01	1610.00	1416.89	1299.46	1224.34
90.0	5772.18	4391.47	3383.06	2696.32	2172.08	1743.56	1530.42	1386.84	1276.09
135.0	8575.91	6578.02	5080.99	3839.96	2927.27	2843.80	1895.49	1604.44	1437.48
180.0	7266.43	5278.00	4120.44	3235.58	2512.67	2021.82	1723.53	1477.55	1359.01
225.0	6744.42	5096.02	3883.93	3067.52	2468.70	1975.08	1709.06	1515.95	1361.79
270.0	5420.47	4251.78	3355.79	2832.67	2082.48	1765.27	1527.64	1369.59	1268.30
315.0	4532.82	3212.21	2601.16	2085.27	1695.15	1463.64	1334.53	1239.36	1176.47
360.0	5403.77	4179.44	3238.92	2860.49	1951.15	1652.30	1460.85	1312.26	1231.57

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1173.14	1125.28	1086.88	1059.05	1031.22	1011.19	992.27	976.69	963.89
45.0	1160.34	1120.27	1081.87	1047.36	1021.21	998.39	977.24	963.89	952.76
90.0	1195.40	1108.47	1099.68	1068.23	1044.25	1017.87	997.39	978.74	963.05
135.0	1307.81	1228.23	1159.78	1113.59	1082.42	1057.94	1029.55	1010.63	993.38
180.0	1250.49	1167.01	1107.02	1081.25	1050.70	1029.17	1010.35	992.66	976.52
225.0	1251.60	1183.71	1108.91	1088.04	1060.55	1035.62	1015.81	996.78	978.08
270.0	1186.49	1135.85	1092.44	1056.82	1033.45	1013.97	993.38	979.47	967.22
315.0	1110.19	1081.25	1048.42	1021.10	1002.40	984.64	970.51	957.71	947.47
360.0	1173.14	1125.28	1086.88	1059.05	1031.22	1011.19	992.27	976.69	963.89

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	949.42	934.39	918.81	907.68	890.43	869.83	815.85	686.18	548.72
45.0	939.96	926.60	912.13	896.55	880.41	834.77	734.04	612.72	491.96
90.0	950.14	935.95	914.86	901.33	887.98	864.94	804.83	704.38	580.84
135.0	973.90	962.22	946.08	930.49	912.13	897.10	879.85	841.45	776.34
180.0	963.72	950.08	935.06	918.64	904.62	885.19	866.88	817.52	704.94
225.0	963.72	950.92	930.44	915.36	902.67	885.42	861.77	782.52	650.34
270.0	953.31	939.40	923.82	908.79	890.98	870.39	789.70	673.38	557.63
315.0	935.89	919.03	901.89	888.48	872.78	818.25	718.35	601.87	449.16
360.0	949.42	934.39	918.81	907.68	890.43	869.83	815.85	686.18	548.72

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	429.63	283.27	134.40	58.77	29.22	24.15	18.59	15.69	13.91
45.0	347.27	284.38	116.92	42.96	28.55	22.37	17.47	14.30	13.97
90.0	442.43	318.38	192.50	80.97	35.06	26.27	20.15	16.81	13.91
135.0	668.38	517.00	367.30	282.71	114.98	50.59	28.05	21.31	17.81
180.0	572.71	443.10	301.35	170.24	78.97	31.44	24.82	18.20	14.91
225.0	534.26	412.32	265.68	155.82	69.23	29.66	24.32	18.70	16.03
270.0	418.50	293.84	164.78	70.07	30.05	24.49	18.81	15.42	14.08
315.0	298.52	176.75	79.41	33.45	25.10	19.53	16.36	13.80	13.41
360.0	429.63	283.27	134.40	58.77	29.22	24.15	18.59	15.69	13.91

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	13.47	13.08	12.74	12.52	12.30	12.13	11.97	11.74	11.52
45.0	13.52	13.25	13.02	12.86	12.63	12.41	12.24	12.02	11.85
90.0	13.63	13.36	13.08	12.86	12.63	12.30	12.13	11.97	11.85
135.0	14.02	13.58	13.30	13.02	12.80	12.58	12.41	12.19	11.97
180.0	13.86	13.52	13.08	12.86	12.63	12.47	12.24	12.08	11.85
225.0	14.30	13.91	13.41	13.13	12.86	12.58	12.41	12.24	12.02
270.0	13.58	13.25	12.91	12.69	12.41	12.19	12.08	11.80	11.69
315.0	13.08	12.80	12.41	12.24	12.02	11.85	11.69	11.58	11.41
360.0	13.47	13.08	12.74	12.52	12.30	12.13	11.97	11.74	11.52

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	11.35	11.30	11.24	11.13	11.02	10.91	10.85	10.85	10.80
45.0	11.74	11.69	11.52	11.46	11.30	11.24	11.24	11.19	11.13
90.0	11.74	11.58	11.41	11.30	11.24	11.19	11.13	11.02	10.96
135.0	11.80	11.63	11.52	11.41	11.30	11.24	11.07	11.02	10.91
180.0	11.63	11.46	11.35	11.24	11.19	11.07	10.96	10.85	10.85
225.0	11.80	11.69	11.52	11.41	11.30	11.30	11.19	11.07	10.96
270.0	11.52	11.35	11.24	11.19	11.07	11.02	10.91	10.85	10.80
315.0	11.19	11.13	11.07	11.02	10.96	10.85	10.80	10.69	10.69
360.0	11.35	11.30	11.24	11.13	11.02	10.91	10.85	10.85	10.80

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	10.74	10.63	10.57	10.52	10.57	10.52	10.46	10.41	10.41
45.0	11.07	10.96	10.91	10.85	10.85	10.85	10.80	10.80	10.74
90.0	10.85	10.80	10.80	10.74	10.69	10.63	10.63	10.63	10.52
135.0	10.85	10.85	10.80	10.74	10.63	10.57	10.57	10.57	10.57
180.0	10.74	10.69	10.63	10.63	10.52	10.46	10.52	10.46	10.46
225.0	10.91	10.85	10.80	10.80	10.74	10.69	10.69	10.63	10.63
270.0	10.74	10.74	10.69	10.63	10.57	10.52	10.52	10.52	10.52
315.0	10.63	10.57	10.52	10.46	10.46	10.41	10.46	10.41	10.41
360.0	10.74	10.63	10.57	10.52	10.57	10.52	10.46	10.41	10.41

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	10.41	10.41	10.35	10.30	10.30	10.24	10.30	10.24	10.24
45.0	10.69	10.63	10.63	10.63	10.63	10.63	10.57	10.52	10.52
90.0	10.52	10.46	10.52	10.46	10.46	10.41	10.41	10.41	10.41
135.0	10.52	10.46	10.46	10.41	10.41	10.41	10.41	10.35	10.35
180.0	10.35	10.35	10.35	10.35	10.35	10.24	10.24	10.24	10.30
225.0	10.57	10.57	10.52	10.57	10.57	10.57	10.52	10.57	10.52
270.0	10.52	10.41	10.41	10.41	10.41	10.41	10.41	10.35	10.35
315.0	10.30	10.30	10.30	10.30	10.35	10.24	10.24	10.24	10.30
360.0	10.41	10.41	10.35	10.30	10.30	10.24	10.30	10.24	10.24

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	10.18	10.24	10.18	10.24	10.18	10.18	10.13	10.18	10.13
45.0	10.46	10.57	10.52	10.46	10.46	10.41	10.41	10.30	10.35
90.0	10.41	10.41	10.41	10.35	10.35	10.35	10.35	10.30	10.24
135.0	10.30	10.35	10.30	10.30	10.30	10.30	10.30	10.30	10.24
180.0	10.30	10.24	10.24	10.18	10.18	10.24	10.18	10.18	10.13
225.0	10.46	10.52	10.46	10.52	10.52	10.41	10.35	10.35	10.30
270.0	10.35	10.41	10.35	10.30	10.35	10.30	10.30	10.35	10.30
315.0	10.30	10.24	10.30	10.18	10.30	10.30	10.24	10.24	10.13
360.0	10.18	10.24	10.18	10.24	10.18	10.18	10.13	10.18	10.13

Intensity data(cd)

C/γ(°)	90.0
0.0	10.18
45.0	10.35
90.0	10.30
135.0	10.24
180.0	10.13
225.0	10.35
270.0	10.24
315.0	10.18
360.0	10.18