NATA LIGHTING CO.,LTD.
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Tel:+86-750-3770000 Fax:+86-750-3771111
Address:380 JinOu Road,GaoXin Zone,Jiang Men City,Guangdong,China

Client:
LumCAT: 1497-E
Luminaire:
Report No: nata-0100
Test No:
LampCAT: XICATO XTM LES9
Lamp flux(lm): 1252.0
Number of Lamps: 1
Length(mm): 44
Phm Type: C

Voltage(V): 29.0000
Current(A): 0.9000
Power (W): 26.1000
PF: 0.0000
Ballast type: DC
Width(mm): 44
Height(mm): 0

Photometric Results

Lumens(lm): 1150.72, Efficiency(%): 91.91% , Luminous Efficacy(lm/W): 44.09
Central intensity(cd): 1168.710, Maximum intensity(cd): 1168.710
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=63.4
[C90/270]Total=63.4
Field angle(10%Imax): [C0/180]Total=87.0
[C90/270]Total=87.0
Maximum s/h(1/2): C0_180=0.97 C90_270=0.97
Maximum s/h(1/4): C0_180=0.94 C90_270=0.94
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 91.93%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.895%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	1168.710	0.280	0.28	.022%	.024%
1.0	1168.572	2.236	2.516	.179%	.219%
2.0	1167.402	4.468	6.984	.357%	.607%
3.0	1165.888	6.691	13.675	.534%	1.188%
4.0	1164.168	8.905	22.58	.711%	1.962%
5.0	1160.933	11.096	33.676	.886%	2.927%
6.0	1157.217	13.265	46.941	1.059%	4.079%
7.0	1152.606	15.404	62.345	1.230%	5.418%
8.0	1146.412	17.496	79.841	1.397%	6.938%
9.0	1141.044	19.574	99.415	1.563%	8.639%
10.0	1131.313	21.543	120.958	1.721%	10.512%
11.0	1125.601	23.552	144.511	1.881%	12.558%
12.0	1116.014	25.445	169.956	2.032%	14.770%
13.0	1105.911	27.281	197.237	2.179%	17.140%
14.0	1093.633	29.013	226.25	2.317%	19.662%
15.0	1081.301	30.690	256.94	2.451%	22.329%
16.0	1062.754	32.123	289.063	2.566%	25.120%
17.0	1044.874	33.500	322.564	2.676%	28.032%
18.0	1025.095	34.737	357.301	2.775%	31.050%
19.0	1001.331	35.750	393.051	2.855%	34.157%
20.0	975.207	36.576	429.627	2.921%	37.336%
21.0	949.716	37.323	466.95	2.981%	40.579%
22.0	923.041	37.918	504.868	3.029%	43.874%
23.0	892.499	38.242	543.11	3.054%	47.198%
24.0	862.706	38.479	581.589	3.073%	50.541%
25.0	834.194	38.660	620.25	3.088%	53.901%
26.0	803.404	38.621	658.871	3.085%	57.257%
27.0	770.886	38.379	697.25	3.065%	60.593%
28.0	736.214	37.902	735.152	3.027%	63.886%
29.0	699.258	37.176	772.328	2.969%	67.117%
30.0	661.613	36.277	808.604	2.897%	70.270%
31.0	616.762	34.834	843.439	2.782%	73.297%
32.0	573.502	33.327	876.766	2.662%	76.193%
33.0	533.848	31.884	908.65	2.547%	78.964%
34.0	492.197	30.182	938.832	2.411%	81.587%
35.0	444.223	27.941	966.774	2.232%	84.015%
36.0	403.405	26.002	992.776	2.077%	86.275%
37.0	363.703	24.003	1016.779	1.917%	88.360%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	322.734	21.789	1038.568	1.740%	90.254%
39.0	285.020	19.670	1058.237	1.571%	91.963%
40.0	247.485	17.445	1075.682	1.393%	93.479%
41.0	211.093	15.187	1090.869	1.213%	94.799%
42.0	170.338	12.499	1103.368	.998%	95.885%
43.0	134.709	10.075	1113.443	.805%	96.761%
44.0	100.196	7.633	1121.075	.610%	97.424%
45.0	67.754	5.254	1126.329	.420%	97.881%
46.0	39.847	3.143	1129.472	.251%	98.154%
47.0	21.362	1.713	1131.186	.137%	98.303%
48.0	12.298	1.002	1132.188	.080%	98.390%
49.0	9.511	0.787	1132.975	.063%	98.458%
50.0	7.887	0.663	1133.638	.053%	98.516%
51.0	6.689	0.570	1134.208	.046%	98.565%
52.0	6.029	0.521	1134.729	.042%	98.611%
53.0	5.574	0.488	1135.217	.039%	98.653%
54.0	5.182	0.460	1135.677	.037%	98.693%
55.0	4.962	0.446	1136.122	.036%	98.732%
56.0	4.797	0.436	1136.558	.035%	98.770%
57.0	4.659	0.428	1136.987	.034%	98.807%
58.0	4.508	0.419	1137.406	.033%	98.843%
59.0	4.425	0.416	1137.822	.033%	98.879%
60.0	4.349	0.413	1138.235	.033%	98.915%
61.0	4.267	0.409	1138.644	.033%	98.951%
62.0	4.205	0.407	1139.052	.033%	98.986%
63.0	4.150	0.405	1139.457	.032%	99.021%
64.0	4.109	0.405	1139.862	.032%	99.057%
65.0	4.074	0.405	1140.267	.032%	99.092%
66.0	4.040	0.405	1140.672	.032%	99.127%
67.0	4.040	0.408	1141.079	.033%	99.162%
68.0	4.026	0.409	1141.489	.033%	99.198%
69.0	4.033	0.413	1141.902	.033%	99.234%
70.0	4.033	0.416	1142.317	.033%	99.270%
71.0	4.019	0.417	1142.734	.033%	99.306%
72.0	4.026	0.420	1143.154	.034%	99.343%
73.0	4.019	0.421	1143.575	.034%	99.379%
74.0	4.026	0.424	1144	.034%	99.416%
75.0	4.012	0.425	1144.425	.034%	99.453%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	4.033	0.429	1144.854	.034%	99.490%
77.0	4.026	0.430	1145.284	.034%	99.528%
78.0	4.019	0.431	1145.715	.034%	99.565%
79.0	4.026	0.433	1146.148	.035%	99.603%
80.0	4.012	0.433	1146.582	.035%	99.641%
81.0	4.005	0.434	1147.016	.035%	99.678%
82.0	3.998	0.434	1147.45	.035%	99.716%
83.0	3.992	0.434	1147.884	.035%	99.754%
84.0	3.992	0.435	1148.32	.035%	99.792%
85.0	3.998	0.437	1148.756	.035%	99.830%
86.0	3.992	0.437	1149.193	.035%	99.868%
87.0	3.992	0.437	1149.63	.035%	99.906%
88.0	3.971	0.435	1150.065	.035%	99.943%
89.0	3.964	0.435	1150.5	.035%	99.981%
90.0	3.964	0.217	1150.717	.017%	100.000%

Zonal flux distribution table

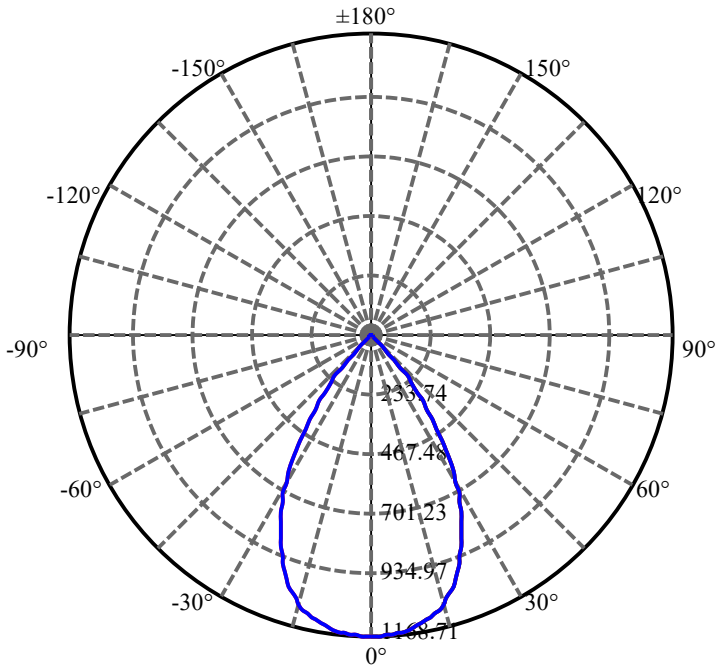
ZONAL LUMEN SUMMARY

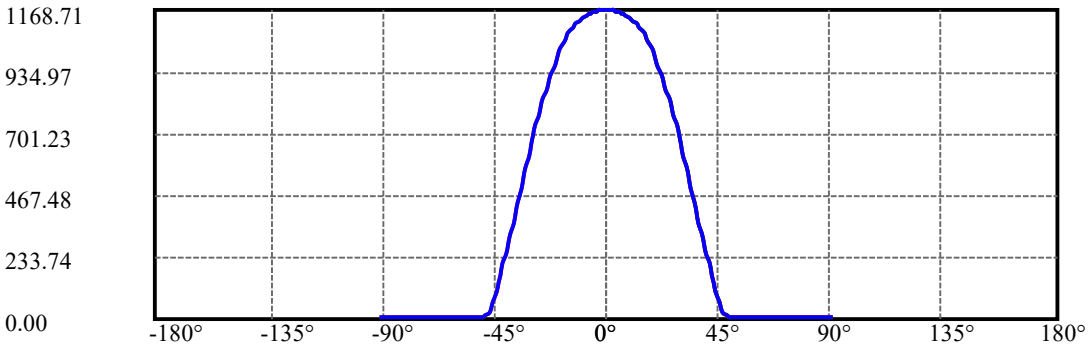
Zone	Lumens	%Lamp	%Fixt
0-30	808.60	64.59%	70.27%
0-40	1075.68	85.92%	93.48%
0-60	1138.24	90.91%	98.92%
0-90	1150.50	91.89%	99.98%
0-120	1150.50	91.89%	99.98%
0-180	1150.72	91.91%	100.00%
60-90	12.68	1.01%	1.10%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-33.40	920.57	73.53%	80.00%

ZONAL LUMEN SUMMARY

0-10	120.96
10-20	308.67
20-30	378.98
30-40	267.08
40-50	57.96
50-60	4.60
60-70	4.08
70-80	4.26
80-90	3.92
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:

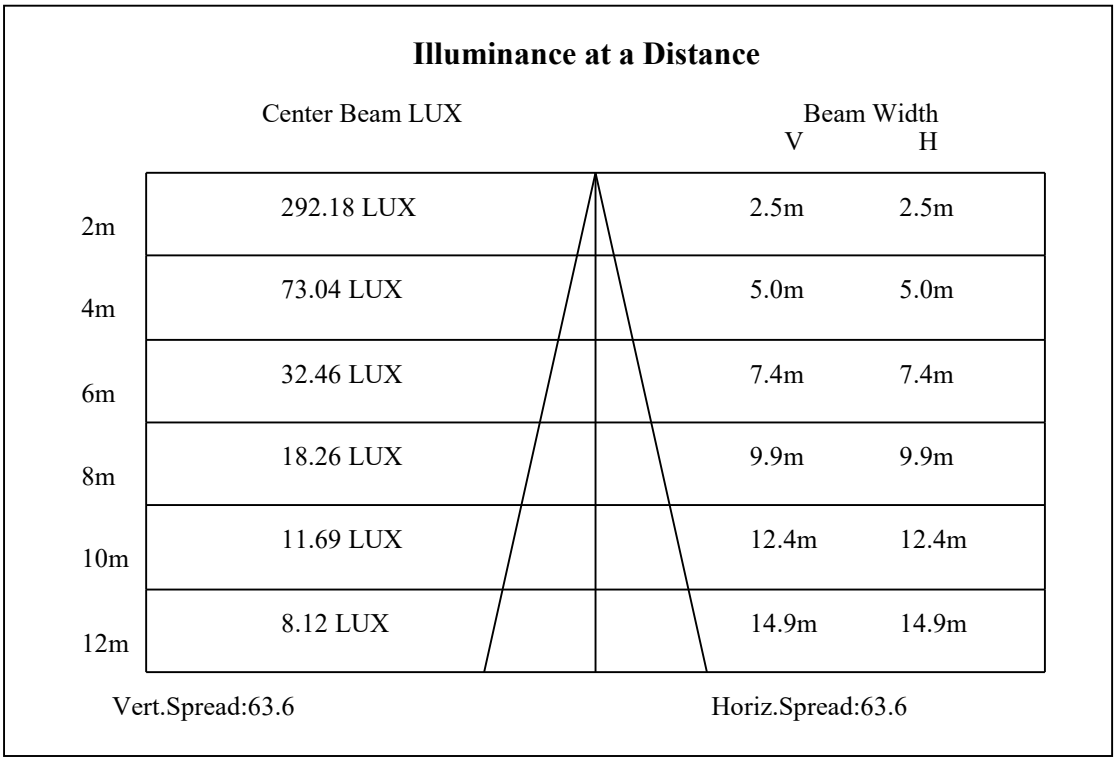
C90/C270:

Field angle(10%Imax):C0/180Left:43.5 Right:43.5
:C90/270Left:43.5 Right:43.5

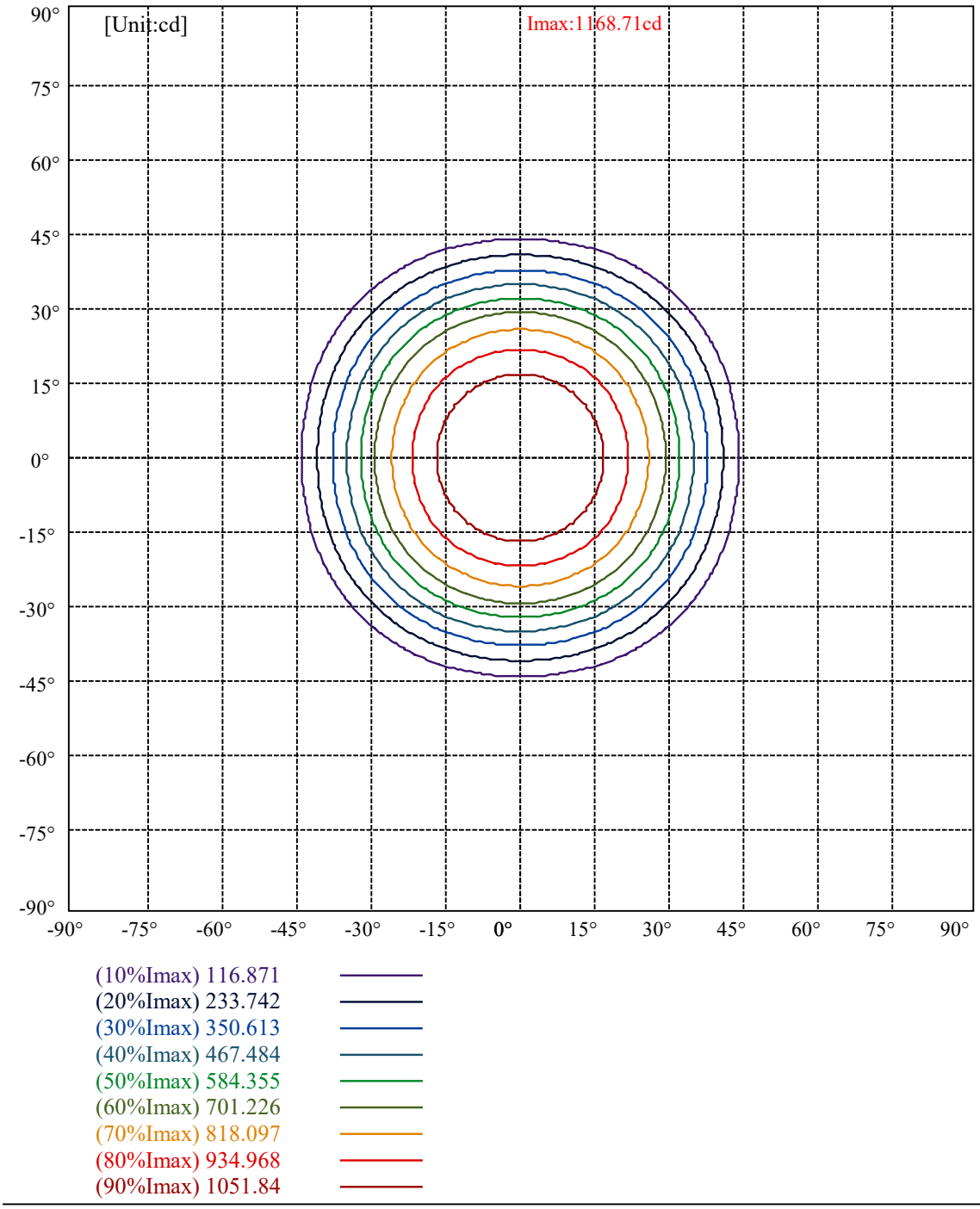
Beam Angle(50%Imax):C0/180Left:31.7 Right:31.7
:C90/270Left:31.7 Right:31.7

Equipment: GMS1980	Date: 2016-4-12	Operator: P
Temperature(°C): 25.0	Humidity(%): 80.0%	Distance(m): 7.42

Lux distance Curve



ISO-Intensity(V-H)

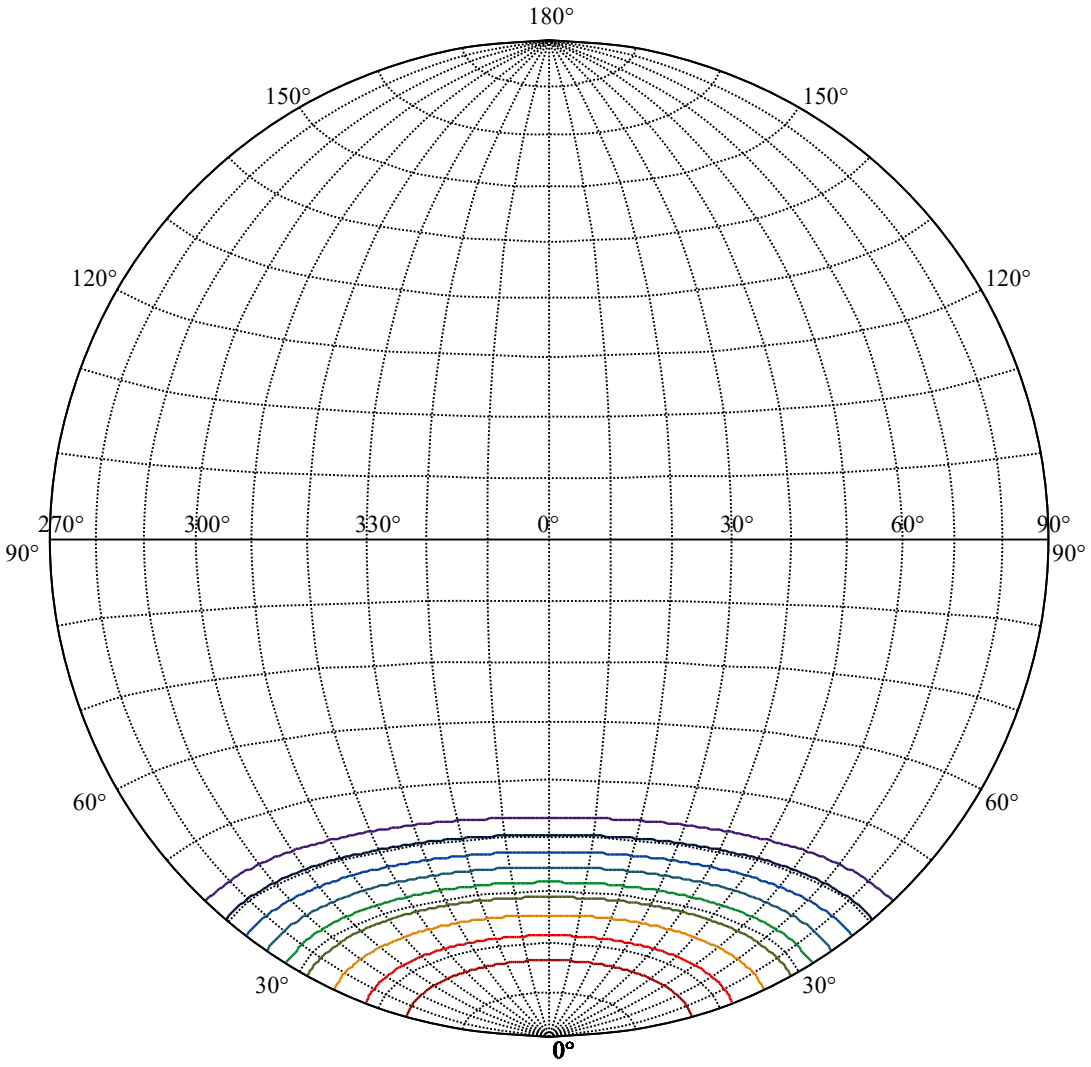


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2016-4-12
Humidity(%): 80.0%

Operator: P
Distance(m): 7.42

ISO candela diagram on circular web



House [Unit:cd] Road

Imax:1168.71

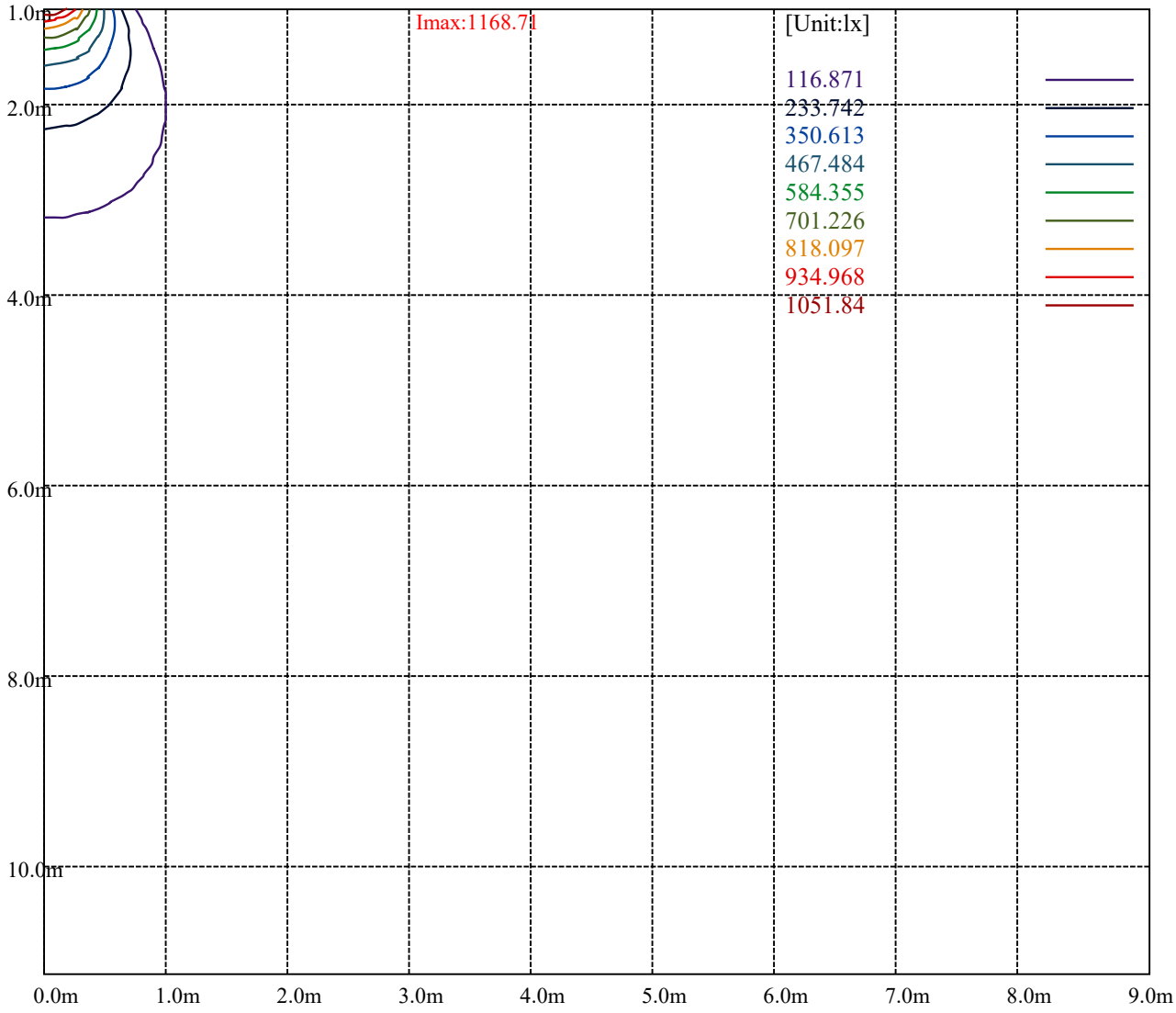
(10%Imax) 116.871
(20%Imax) 233.742
(30%Imax) 350.613
(40%Imax) 467.484
(50%Imax) 584.355
(60%Imax) 701.226
(70%Imax) 818.097
(80%Imax) 934.968
(90%Imax) 1051.84

Equipment: GMS1980
Temperature(°C): 25.0

Date: 2016-4-12
Humidity(%): 80.0%

Operator: P
Distance(m): 7.42

Space ISO Lux diagram



Equipment: GMS1980
Temperature(°C): 25.0

Date: 2016-4-12
Humidity(%): 80.0%

Operator: P
Distance(m): 7.42

1497-E

Luminance Limitting Curve(no luminous side)

Luminance Table

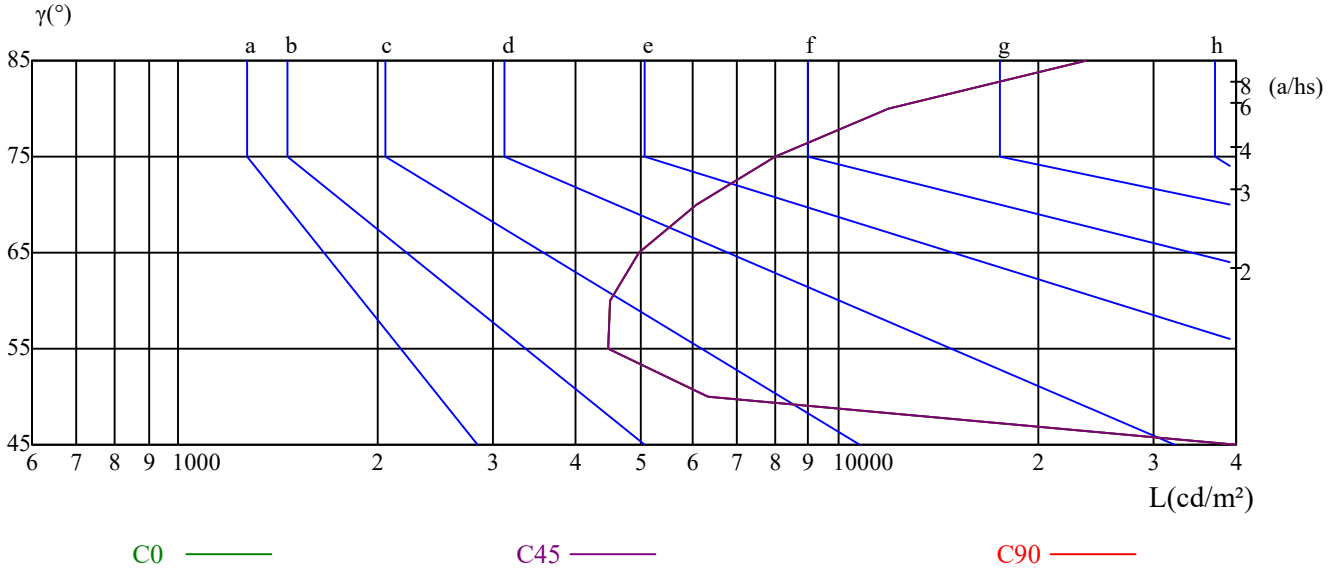
γ	45	50	55	60	65	70	75	80	85
C0	49493	6338	4468	4493	4980	6091	8007	11935	23697
C45	49493	6338	4468	4493	4980	6091	8007	11935	23697
C90	49493	6338	4468	4493	4980	6091	8007	11935	23697

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
4980	4980	4980	8007	8007	8007	23697	23697	23697

Glare Table

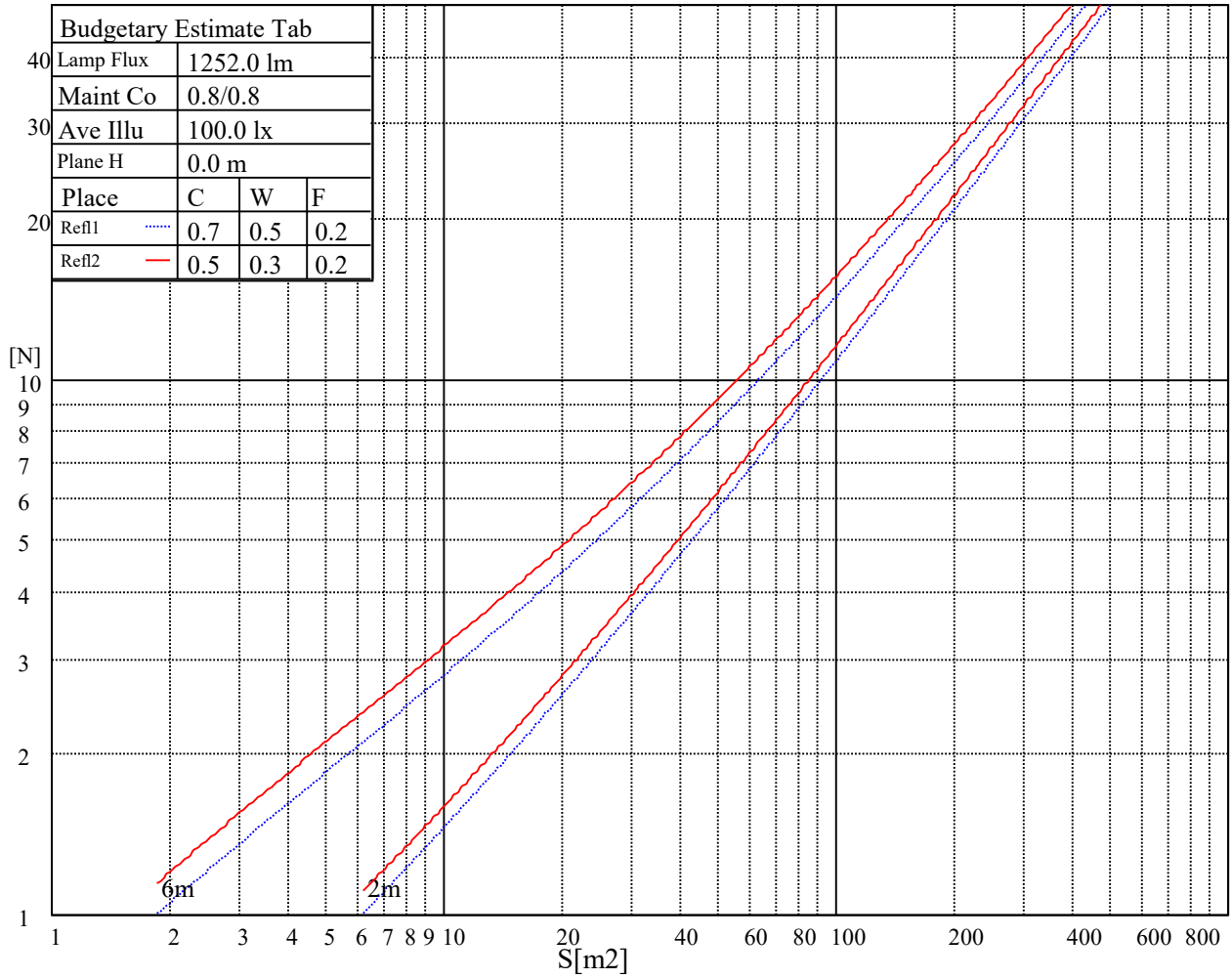
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

Luminance Limitting Curve



Equipment: GMS1980 Date: 2016-4-12 Operator: P
Temperature(°C): 25.0 Humidity(%): 80.0% Distance(m): 7.42

Budgetary Estimate Table

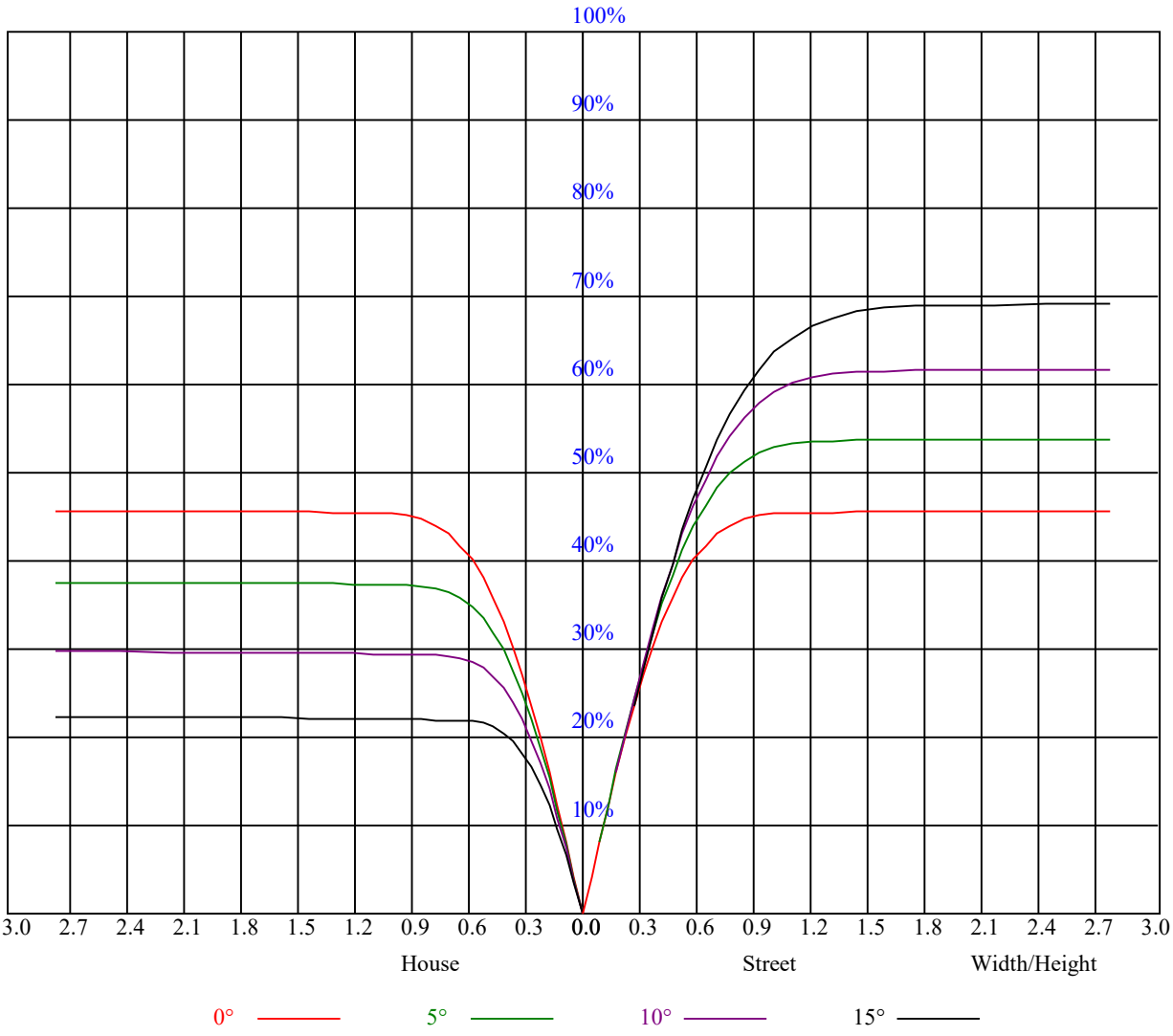


Equipment: GMS1980 Date: 2016-4-12 Operator: P
Temperature(°C): 25.0 Humidity(%): 80.0% Distance(m): 7.42

Utilization factor table for indoor luminaire

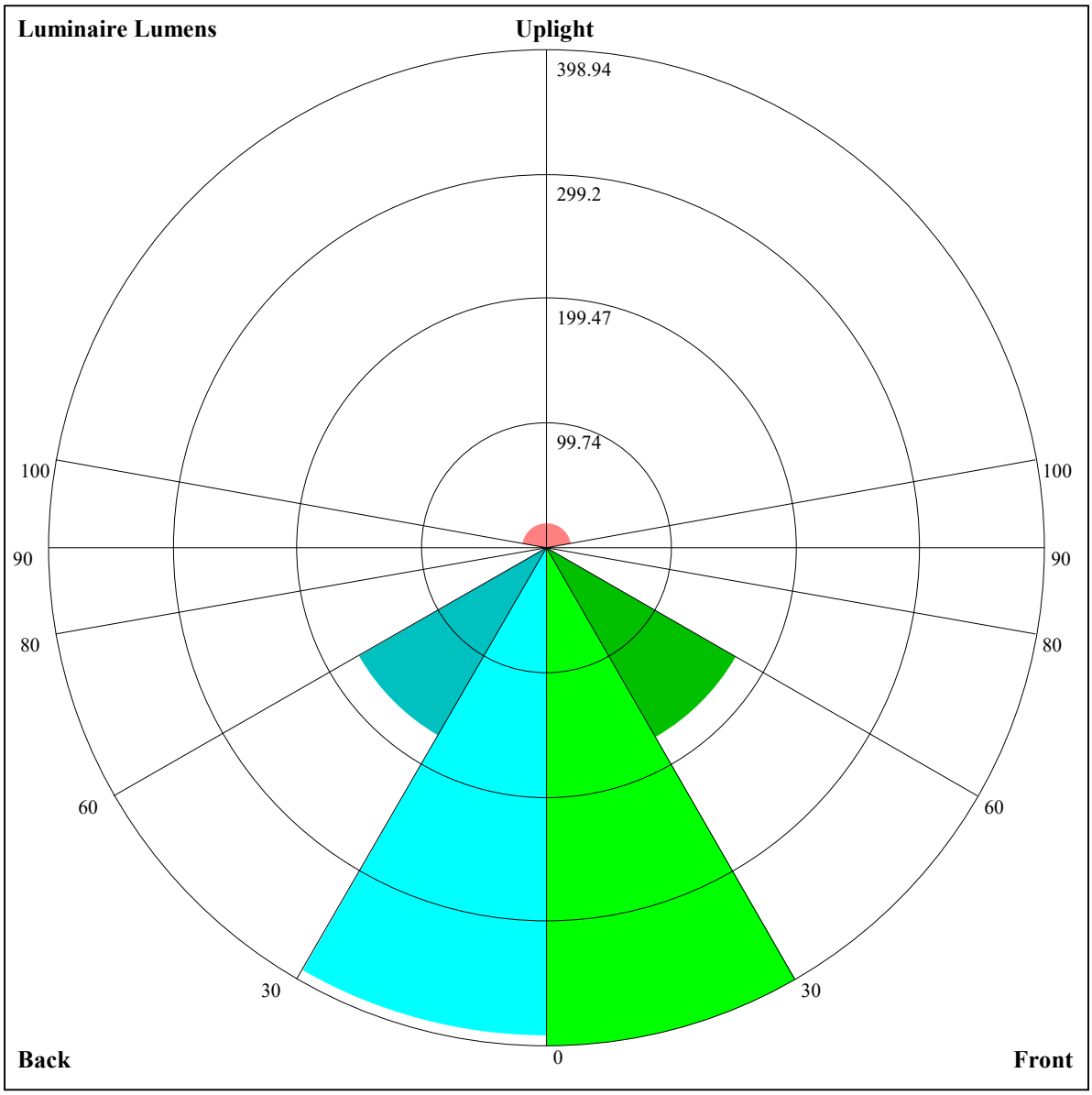
RHOCC	80			70			50			30			10			0
RHOW	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	COEFFCIENTS OF UTILIZATION RHOFC=20 CU															
0	1.09	1.09	1.09	1.07	1.07	1.07	1.02	1.02	1.02	0.98	0.98	0.98	0.94	0.94	0.94	0.92
1	1.02	0.99	0.97	1.00	0.97	0.96	0.96	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86
2	0.94	0.91	0.88	0.93	0.89	0.87	0.90	0.87	0.85	0.87	0.85	0.83	0.85	0.83	0.81	0.80
3	0.88	0.83	0.80	0.87	0.83	0.79	0.84	0.81	0.78	0.82	0.79	0.77	0.80	0.78	0.75	0.74
4	0.82	0.77	0.73	0.81	0.77	0.73	0.79	0.75	0.72	0.77	0.74	0.71	0.76	0.73	0.70	0.69
5	0.77	0.72	0.68	0.76	0.71	0.67	0.75	0.70	0.67	0.73	0.69	0.66	0.72	0.68	0.66	0.64
6	0.72	0.67	0.63	0.72	0.66	0.63	0.70	0.66	0.62	0.69	0.65	0.62	0.68	0.64	0.61	0.60
7	0.68	0.62	0.59	0.67	0.62	0.58	0.66	0.61	0.58	0.65	0.61	0.58	0.64	0.60	0.57	0.56
8	0.64	0.58	0.55	0.63	0.58	0.55	0.62	0.58	0.54	0.61	0.57	0.54	0.61	0.57	0.54	0.53
9	0.60	0.55	0.51	0.60	0.55	0.51	0.59	0.54	0.51	0.58	0.54	0.51	0.57	0.54	0.51	0.49
10	0.57	0.52	0.48	0.57	0.52	0.48	0.56	0.51	0.48	0.55	0.51	0.48	0.55	0.51	0.48	0.46

Coefficient Utilization Curve



Equipment: GMS1980	Date: 2016-4-12	Operator: P
Temperature(°C): 25.0	Humidity(%): 80.0%	Distance(m): 7.42

LCS Graph



Luminaire Lumens:

FL=398.94,FM=175.51,FH=4.16,FVH=2.17

BL=391.32,BM=173.86,BH=4.17,BVH=2.18

UL=4.33,UH=20.58

BUG Rating:B1-U2-G0

Equipment: GMS1980	Date: 2016-4-12	Operator: P
Temperature(°C): 25.0	Humidity(%): 80.0%	Distance(m): 7.42

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	1166.65	1167.75	1168.85	1168.85	1168.85	1167.20	1164.99	1161.69	1157.84
45.0	1172.70	1171.05	1168.85	1166.65	1163.34	1158.94	1153.98	1149.03	1141.87
90.0	1170.50	1166.65	1162.24	1157.29	1152.88	1146.27	1139.12	1131.96	1123.70
135.0	1164.99	1162.24	1157.84	1153.43	1147.93	1141.87	1135.81	1129.21	1120.40
180.0	1166.65	1164.44	1161.69	1157.29	1153.98	1148.48	1142.97	1136.36	1126.45
225.0	1172.70	1173.80	1173.25	1173.25	1172.15	1169.95	1167.20	1162.79	1157.29
270.0	1170.50	1173.80	1176.00	1178.21	1180.41	1180.96	1180.96	1179.31	1176.00
315.0	1164.99	1168.85	1170.50	1172.15	1173.80	1173.80	1172.70	1170.50	1167.75
360.0	1166.65	1167.75	1168.85	1168.85	1168.85	1167.20	1164.99	1161.69	1157.84

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	1154.53	1149.03	1142.97	1136.36	1126.45	1117.64	1107.18	1087.91	1070.85
45.0	1136.36	1129.76	1122.60	1112.69	1103.33	1090.12	1076.90	1059.29	1039.46
90.0	1116.54	1097.93	1094.74	1082.52	1071.73	1058.95	1042.99	1023.50	1004.56
135.0	1112.14	1104.43	1093.97	1083.51	1072.50	1059.29	1046.07	1029.00	1008.63
180.0	1119.30	1098.04	1096.83	1084.12	1072.44	1060.33	1045.03	1028.12	1007.92
225.0	1151.78	1143.52	1136.91	1126.45	1116.54	1097.16	1087.58	1066.55	1051.69
270.0	1173.25	1168.30	1162.79	1155.08	1145.72	1136.36	1126.45	1111.59	1096.72
315.0	1164.44	1159.49	1153.98	1147.38	1138.57	1129.21	1118.20	1096.06	1079.16
360.0	1154.53	1149.03	1142.97	1136.36	1126.45	1117.64	1107.18	1087.91	1070.85

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1051.58	1025.15	1002.58	977.25	947.52	916.14	884.21	854.48	823.64
45.0	1018.54	996.52	967.34	942.02	918.89	881.45	853.92	825.30	792.81
90.0	979.67	957.27	927.15	902.37	877.32	848.36	818.30	790.94	759.61
135.0	989.36	965.14	940.36	915.59	891.36	860.53	834.66	811.53	777.95
180.0	987.82	965.85	935.63	910.52	885.64	858.00	830.69	804.43	774.48
225.0	1032.91	1007.42	983.97	958.97	929.74	902.54	871.65	840.66	813.13
270.0	1080.21	1056.53	1035.06	1006.98	981.11	949.17	917.79	889.16	858.88
315.0	1060.66	1036.77	1009.57	984.02	952.75	923.79	890.43	857.06	826.73
360.0	1051.58	1025.15	1002.58	977.25	947.52	916.14	884.21	854.48	823.64

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	783.45	751.52	718.49	677.74	633.70	594.06	550.56	510.37	463.02
45.0	759.78	728.40	688.21	650.22	605.62	557.72	518.08	476.79	424.48
90.0	729.77	691.29	649.39	610.58	565.70	515.11	479.49	439.07	390.46
135.0	747.12	715.73	676.64	639.20	595.71	548.91	512.02	470.18	420.63
180.0	747.45	713.09	669.76	636.95	594.17	550.12	511.64	473.76	425.42
225.0	784.33	746.01	712.87	676.48	629.35	591.64	553.21	508.67	463.85
270.0	819.79	787.86	754.82	714.08	671.14	632.05	588.00	547.81	501.01
315.0	795.40	755.81	723.88	687.65	638.71	598.41	557.78	510.92	464.90
360.0	783.45	751.52	718.49	677.74	633.70	594.06	550.56	510.37	463.02

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	417.33	377.69	331.44	287.39	278.03	213.51	170.45	135.55	101.69
45.0	385.95	341.35	299.51	281.34	224.30	185.76	145.73	109.18	75.10
90.0	352.75	315.64	275.17	236.63	203.32	166.16	133.02	96.02	61.99
135.0	383.19	344.10	303.36	281.34	226.17	189.94	154.32	125.47	88.64
180.0	387.32	350.54	309.80	269.61	234.93	197.05	165.00	129.38	93.65
225.0	425.42	383.08	345.20	303.25	264.44	230.69	197.65	157.46	124.87
270.0	455.87	416.78	376.04	327.04	290.70	281.89	210.70	177.28	143.15
315.0	419.42	380.44	341.35	293.56	257.99	223.75	185.82	147.33	112.48
360.0	417.33	377.69	331.44	287.39	278.03	213.51	170.45	135.55	101.69

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	66.07	36.23	17.67	10.08	8.37	7.05	6.17	5.78	5.45
45.0	47.46	21.47	11.73	9.47	7.82	6.72	6.06	5.56	5.23
90.0	36.67	19.05	11.62	9.63	7.87	6.77	6.06	5.62	5.23
135.0	60.18	31.99	17.23	12.11	9.69	8.09	7.05	6.17	5.67
180.0	63.76	39.20	18.61	12.28	9.97	8.09	6.77	6.00	5.51
225.0	88.09	57.04	30.01	15.25	11.45	9.30	7.32	6.50	5.89
270.0	105.10	68.77	43.44	19.05	12.06	9.63	7.71	6.77	6.11
315.0	74.71	45.04	20.59	10.52	8.86	7.43	6.39	5.84	5.51
360.0	66.07	36.23	17.67	10.08	8.37	7.05	6.17	5.78	5.45

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	5.12	4.96	4.84	4.68	4.51	4.46	4.35	4.29	4.24
45.0	4.96	4.79	4.68	4.51	4.40	4.35	4.29	4.18	4.13
90.0	4.96	4.79	4.62	4.51	4.35	4.29	4.24	4.18	4.13
135.0	5.23	4.96	4.73	4.68	4.51	4.40	4.35	4.29	4.18
180.0	5.12	4.90	4.73	4.62	4.46	4.40	4.35	4.24	4.18
225.0	5.40	5.12	4.90	4.73	4.57	4.46	4.40	4.29	4.24
270.0	5.51	5.23	5.01	4.84	4.73	4.57	4.46	4.35	4.29
315.0	5.18	4.96	4.84	4.68	4.51	4.46	4.35	4.29	4.24
360.0	5.12	4.96	4.84	4.68	4.51	4.46	4.35	4.29	4.24

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	4.18	4.13	4.07	4.02	4.02	4.02	4.02	4.02	4.02
45.0	4.13	4.07	4.07	4.02	4.02	4.02	4.02	4.02	4.02
90.0	4.07	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02
135.0	4.18	4.13	4.07	4.07	4.07	4.07	4.07	4.07	4.02
180.0	4.13	4.13	4.07	4.07	4.07	4.02	4.02	4.02	4.02
225.0	4.18	4.13	4.07	4.02	4.02	4.02	4.07	4.07	4.02
270.0	4.18	4.18	4.13	4.07	4.07	4.02	4.02	4.02	4.02
315.0	4.13	4.07	4.07	4.02	4.02	4.02	4.02	4.02	4.02
360.0	4.18	4.13	4.07	4.02	4.02	4.02	4.02	4.02	4.02

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	4.07	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02
45.0	4.02	3.96	4.02	4.02	4.02	4.02	4.02	4.02	4.02
90.0	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02
135.0	4.02	4.07	4.07	4.02	4.07	4.02	4.02	4.02	4.02
180.0	4.02	4.02	4.07	4.02	4.07	4.07	4.02	4.07	4.02
225.0	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02
270.0	4.02	4.02	4.02	3.96	4.02	4.02	4.02	4.02	4.02
315.0	4.02	4.02	3.96	4.02	4.02	4.02	4.02	4.02	3.96
360.0	4.07	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	4.02	4.02	3.96	4.02	4.02	4.02	4.02	3.96	3.96
45.0	4.02	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
90.0	4.02	3.96	3.96	3.96	3.96	3.96	4.02	3.96	3.96
135.0	3.96	4.02	4.02	3.96	3.96	4.02	4.02	3.96	3.96
180.0	4.02	3.96	3.96	4.02	4.02	4.02	3.96	4.02	3.96
225.0	4.07	4.13	4.02	4.02	4.02	3.96	3.96	3.96	3.96
270.0	3.96	3.96	4.02	4.02	4.02	4.02	3.96	3.96	3.96
315.0	3.96	3.96	4.02	3.96	4.02	3.96	4.02	3.96	3.96
360.0	4.02	4.02	3.96	4.02	4.02	4.02	4.02	3.96	3.96

Intensity data(cd)

C/γ(°)	90.0
0.0	4.02
45.0	3.91
90.0	3.96
135.0	3.96
180.0	3.96
225.0	3.96
270.0	3.96
315.0	3.96
360.0	4.02