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NATA

LumCAT: 3-2054-A
Luminaire: 99.02.73.173+92.76.365.00

Report No: NATA0100	Voltage(V): 34.8000
Test No: GC2018101113	Current(A): 0.5000
LampCAT: CREE CXA3050	Power (W): 20.8800
Lamp flux(lm): 2641.0	PF: 0.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 78	Width(mm): 78
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 2345.07
Efficiency(%): 88.79%
Lumens(lm)/Power(W): 112.41
Central intensity(cd): 8912.391
Maximum intensity(cd): 8912.391
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=22.8
[C90/270]Total=22.8
Field angle(10%Imax): [C0/180]Total=59.5
[C90/270]Total=59.5
Maximum s/h(1/2): C0_180=0.39 C90_270=0.39
Maximum s/h(1/4): C0_180=0.39 C90_270=0.39
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 88.87%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.541%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	8912.391	2.132	2.132	.081%	.091%
1.0	8901.000	17.035	19.167	.645%	.817%
2.0	8838.914	33.827	52.995	1.281%	2.260%
3.0	8730.141	50.104	103.099	1.897%	4.396%
4.0	8556.188	65.451	168.55	2.478%	7.187%
5.0	8235.703	78.713	247.263	2.980%	10.544%
6.0	7864.734	90.151	337.414	3.414%	14.388%
7.0	7357.570	98.329	435.743	3.723%	18.581%
8.0	6743.391	102.917	538.66	3.897%	22.970%
9.0	6107.555	104.774	643.433	3.967%	27.438%
10.0	5409.000	103.000	746.434	3.900%	31.830%
11.0	4700.883	98.363	844.796	3.724%	36.024%
12.0	4092.117	93.299	938.096	3.533%	40.003%
13.0	3500.156	86.343	1024.439	3.269%	43.685%
14.0	2944.547	78.117	1102.556	2.958%	47.016%
15.0	2558.742	72.623	1175.179	2.750%	50.113%
16.0	2242.477	67.783	1242.961	2.567%	53.003%
17.0	1963.055	62.939	1305.9	2.383%	55.687%
18.0	1770.469	59.996	1365.896	2.272%	58.245%
19.0	1627.172	58.093	1423.989	2.200%	60.723%
20.0	1480.008	55.510	1479.499	2.102%	63.090%
21.0	1374.469	54.015	1533.514	2.045%	65.393%
22.0	1292.977	53.115	1586.629	2.011%	67.658%
23.0	1202.597	51.529	1638.158	1.951%	69.855%
24.0	1148.667	51.234	1689.392	1.940%	72.040%
25.0	1097.360	50.857	1740.249	1.926%	74.209%
26.0	1052.979	50.619	1790.868	1.917%	76.367%
27.0	1013.808	50.472	1841.34	1.911%	78.520%
28.0	977.105	50.304	1891.644	1.905%	80.665%
29.0	933.574	49.633	1941.277	1.879%	82.781%
30.0	878.358	48.161	1989.438	1.824%	84.835%
31.0	816.230	46.100	2035.538	1.746%	86.801%
32.0	741.825	43.108	2078.647	1.632%	88.639%
33.0	669.220	39.970	2118.617	1.513%	90.343%
34.0	594.759	36.472	2155.088	1.381%	91.899%
35.0	516.445	32.484	2187.572	1.230%	93.284%
36.0	433.603	27.949	2215.521	1.058%	94.476%
37.0	360.802	23.811	2239.332	.902%	95.491%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	289.716	19.560	2258.892	.741%	96.325%
39.0	217.230	14.991	2273.883	.568%	96.964%
40.0	144.724	10.201	2284.085	.386%	97.399%
41.0	94.563	6.803	2290.888	.258%	97.690%
42.0	49.887	3.661	2294.549	.139%	97.846%
43.0	25.917	1.938	2296.487	.073%	97.928%
44.0	15.694	1.196	2297.682	.045%	97.979%
45.0	12.945	1.004	2298.686	.038%	98.022%
46.0	11.707	0.923	2299.61	.035%	98.061%
47.0	11.419	0.916	2300.525	.035%	98.101%
48.0	11.236	0.916	2301.441	.035%	98.140%
49.0	11.081	0.917	2302.358	.035%	98.179%
50.0	10.990	0.923	2303.281	.035%	98.218%
51.0	10.898	0.929	2304.21	.035%	98.258%
52.0	10.835	0.936	2305.147	.035%	98.298%
53.0	10.765	0.943	2306.089	.036%	98.338%
54.0	10.695	0.949	2307.038	.036%	98.378%
55.0	10.645	0.956	2307.994	.036%	98.419%
56.0	10.575	0.961	2308.956	.036%	98.460%
57.0	10.547	0.970	2309.926	.037%	98.501%
58.0	10.484	0.975	2310.901	.037%	98.543%
59.0	10.434	0.981	2311.881	.037%	98.585%
60.0	10.378	0.986	2312.867	.037%	98.627%
61.0	10.350	0.993	2313.86	.038%	98.669%
62.0	10.343	1.001	2314.861	.038%	98.712%
63.0	10.385	1.015	2315.876	.038%	98.755%
64.0	10.420	1.027	2316.903	.039%	98.799%
65.0	10.463	1.040	2317.943	.039%	98.843%
66.0	10.540	1.056	2318.999	.040%	98.888%
67.0	10.589	1.069	2320.068	.040%	98.934%
68.0	10.645	1.082	2321.15	.041%	98.980%
69.0	10.680	1.093	2322.243	.041%	99.027%
70.0	10.695	1.102	2323.345	.042%	99.074%
71.0	10.723	1.112	2324.457	.042%	99.121%
72.0	10.723	1.118	2325.576	.042%	99.169%
73.0	10.716	1.124	2326.699	.043%	99.217%
74.0	10.709	1.129	2327.828	.043%	99.265%
75.0	10.688	1.132	2328.96	.043%	99.313%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	10.659	1.134	2330.094	.043%	99.361%
77.0	10.631	1.136	2331.23	.043%	99.410%
78.0	10.603	1.137	2332.368	.043%	99.458%
79.0	10.561	1.137	2333.505	.043%	99.507%
80.0	10.512	1.135	2334.64	.043%	99.555%
81.0	10.470	1.134	2335.774	.043%	99.604%
82.0	10.420	1.132	2336.905	.043%	99.652%
83.0	10.350	1.127	2338.032	.043%	99.700%
84.0	10.294	1.123	2339.154	.043%	99.748%
85.0	10.238	1.118	2340.273	.042%	99.795%
86.0	10.160	1.111	2341.384	.042%	99.843%
87.0	9.865	1.080	2342.465	.041%	99.889%
88.0	9.513	1.043	2343.507	.039%	99.933%
89.0	9.492	1.041	2344.548	.039%	99.978%
90.0	9.506	0.521	2345.069	.020%	100.000%

Zonal flux distribution table

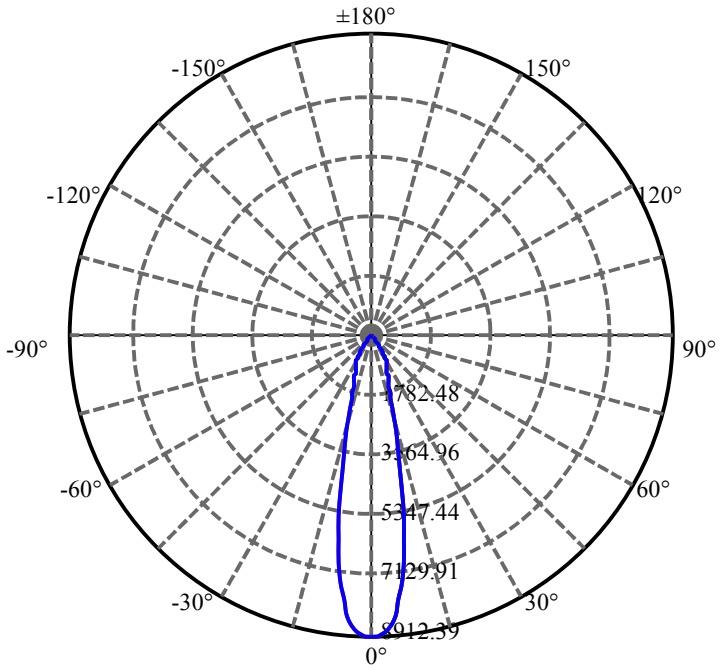
ZONAL LUMEN SUMMARY

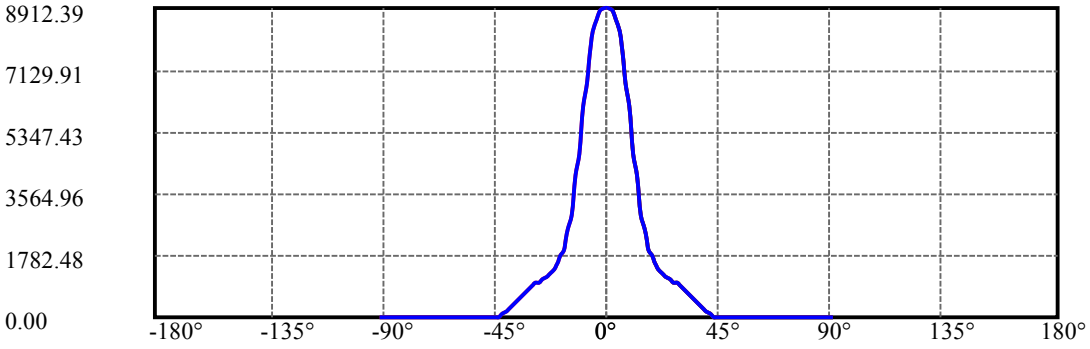
Zone	Lumens	%Lamp	%Fixt
0-30	1989.44	75.33%	84.83%
0-40	2284.08	86.49%	97.40%
0-60	2312.87	87.58%	98.63%
0-90	2344.55	88.78%	99.98%
0-120	2344.55	88.78%	99.98%
0-180	2345.07	88.79%	100.00%
60-90	32.67	1.24%	1.39%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-27.69	1876.06	71.04%	80.00%

ZONAL LUMEN SUMMARY

0-10	746.43
10-20	733.07
20-30	509.94
30-40	294.65
40-50	19.20
50-60	9.59
60-70	10.48
70-80	11.29
80-90	9.91
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):

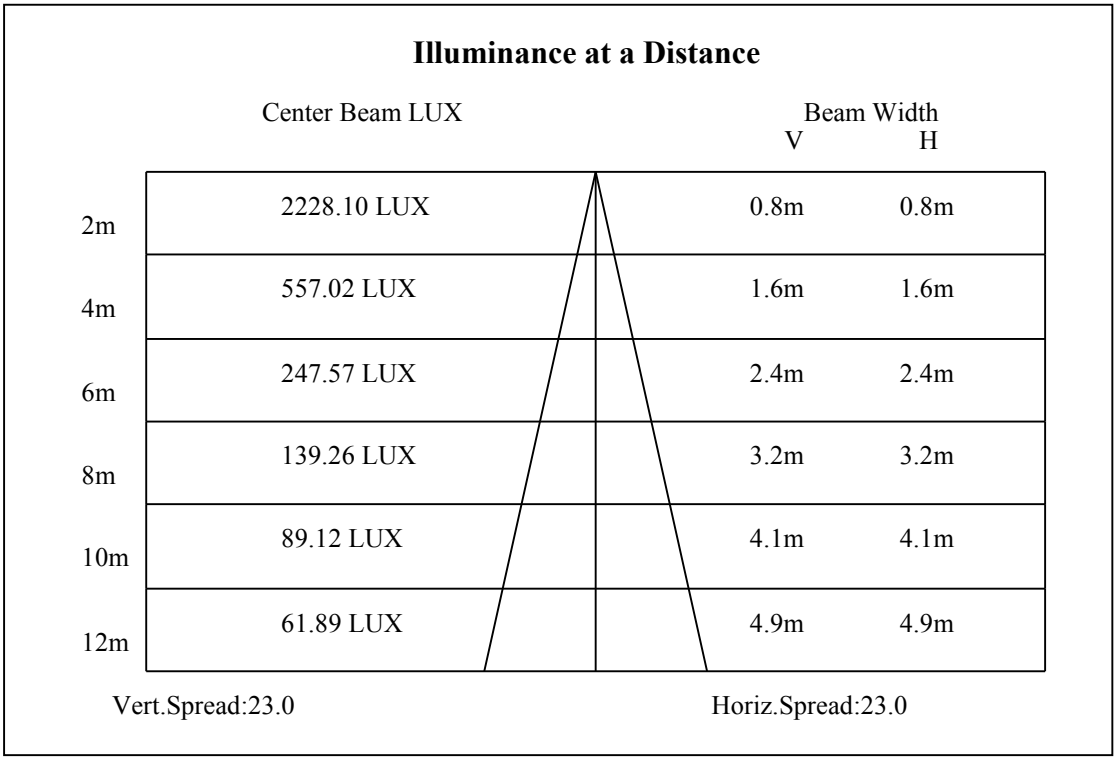
C0/C180:

C90/C270:

Field angle(10%Imax):C0/180Left:29.8 Right:29.8
:C90/270Left:29.8 Right:29.8

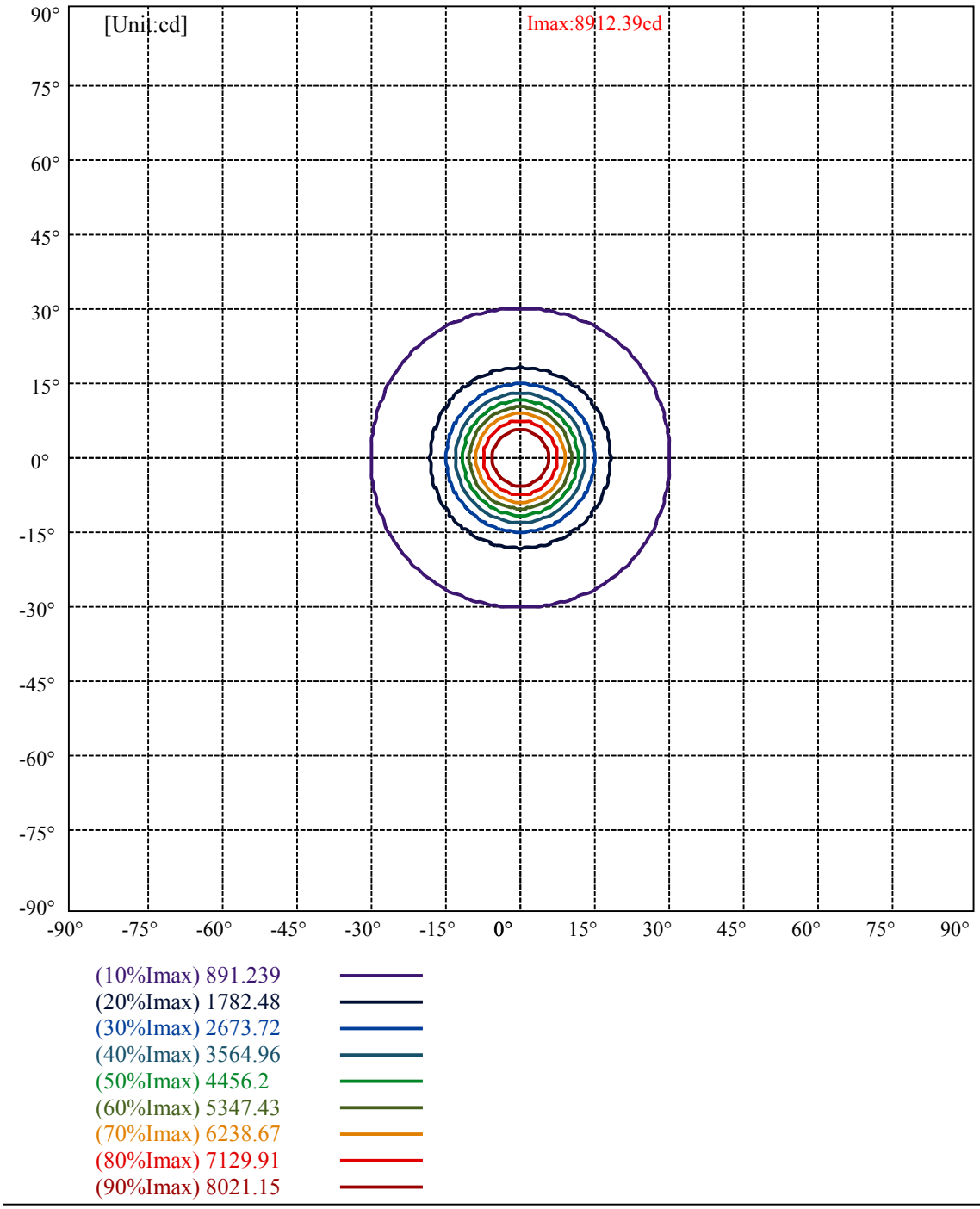
Beam Angle(50%Imax):C0/180Left:11.4 Right:11.4
:C90/270Left:11.4 Right:11.4

Lux distance Curve



Equipment:
Date: 2018/10/11
Operator: NT07
Temperature(°C): 25.0
Humidity(%): 60.0%
Distance(m): 7.50

ISO-Intensity(V-H)

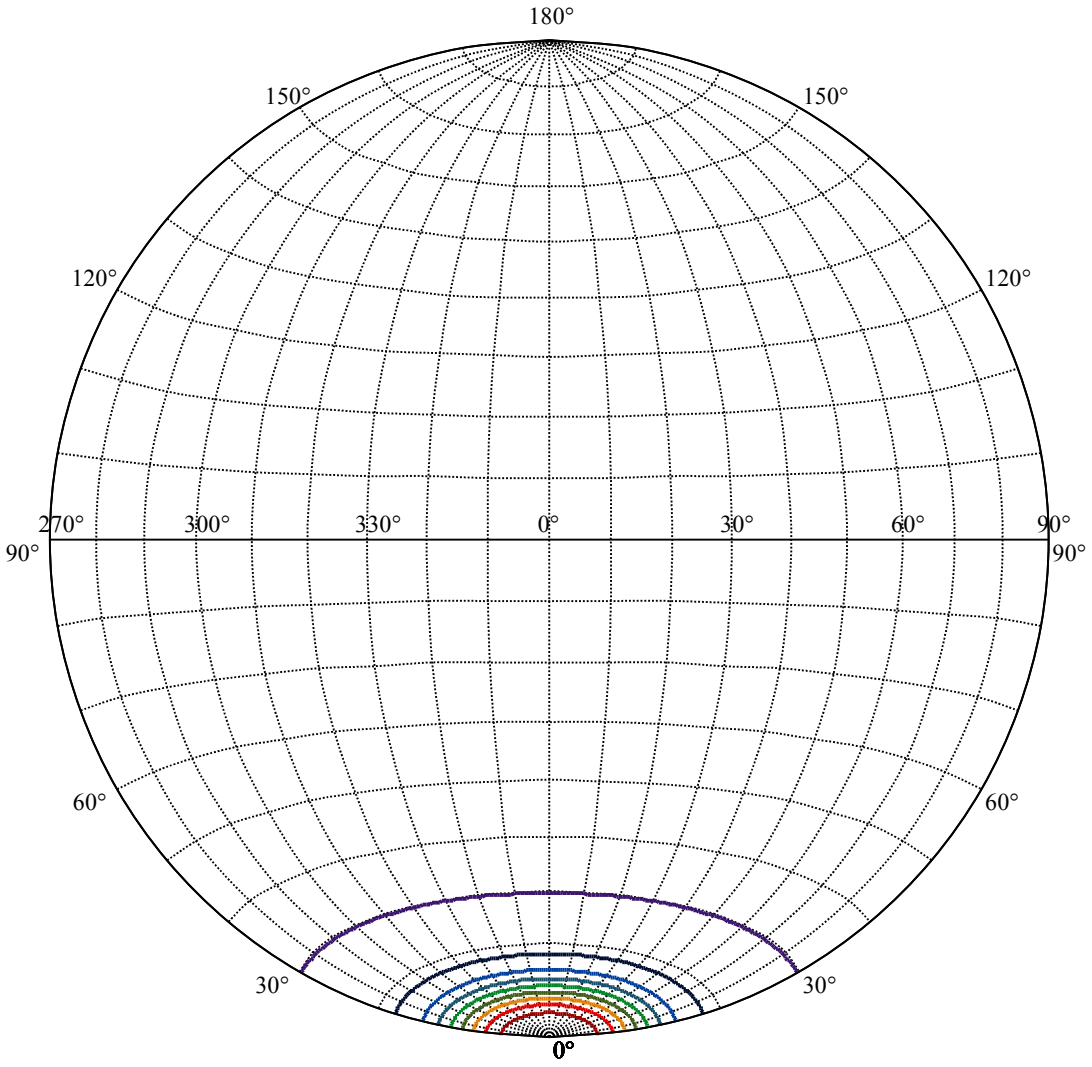


Equipment:
Temperature(°C): 25.0

Date: 2018/10/11
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.50

ISO candela diagram on circular web



House [Unit:cd] Road

Imax:8912.39

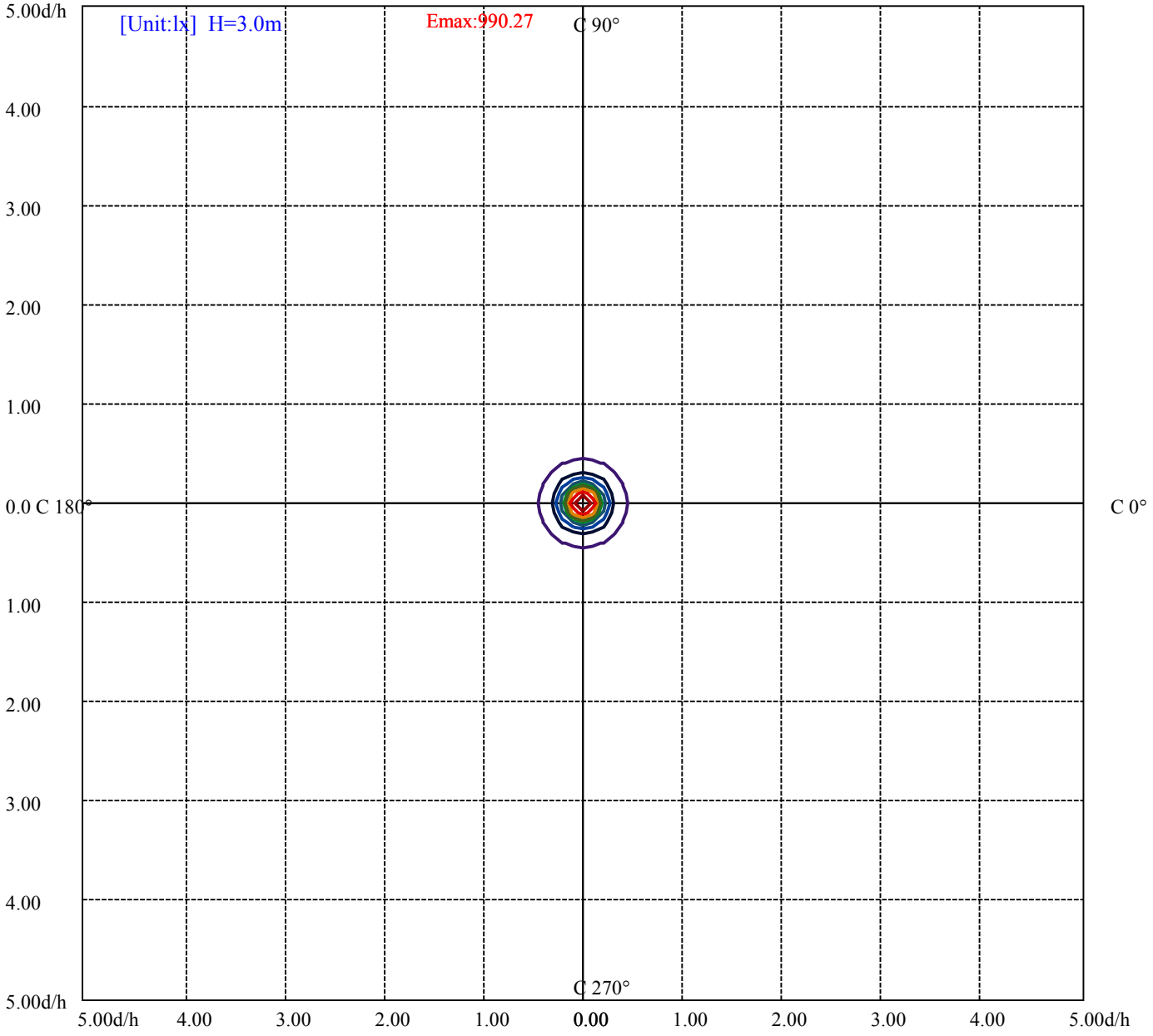
(10%Imax) 891.239
(20%Imax) 1782.48
(30%Imax) 2673.72
(40%Imax) 3564.96
(50%Imax) 4456.2
(60%Imax) 5347.43
(70%Imax) 6238.67
(80%Imax) 7129.91
(90%Imax) 8021.15

Equipment:
Temperature(°C): 25.0

Date: 2018/10/11
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.50

ISO illuminance diagram

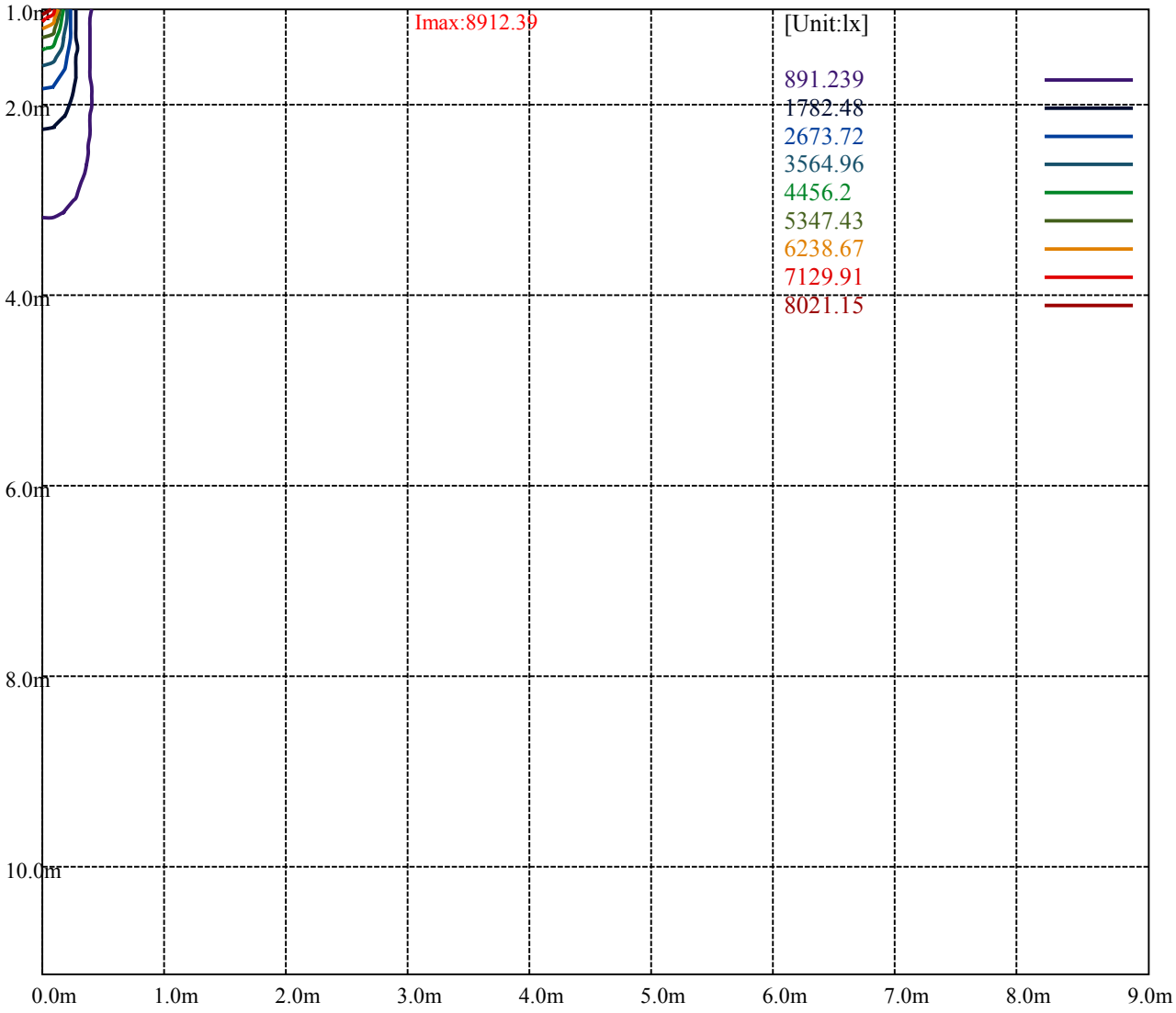


Equipment:
Temperature(°C): 25.0

Date: 2018/10/11
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.50

Space ISO Lux diagram



Equipment:
Temperature(°C): 25.0

Date: 2018/10/11
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.50

Luminance Limitting Curve(no luminous side)

Luminance Table

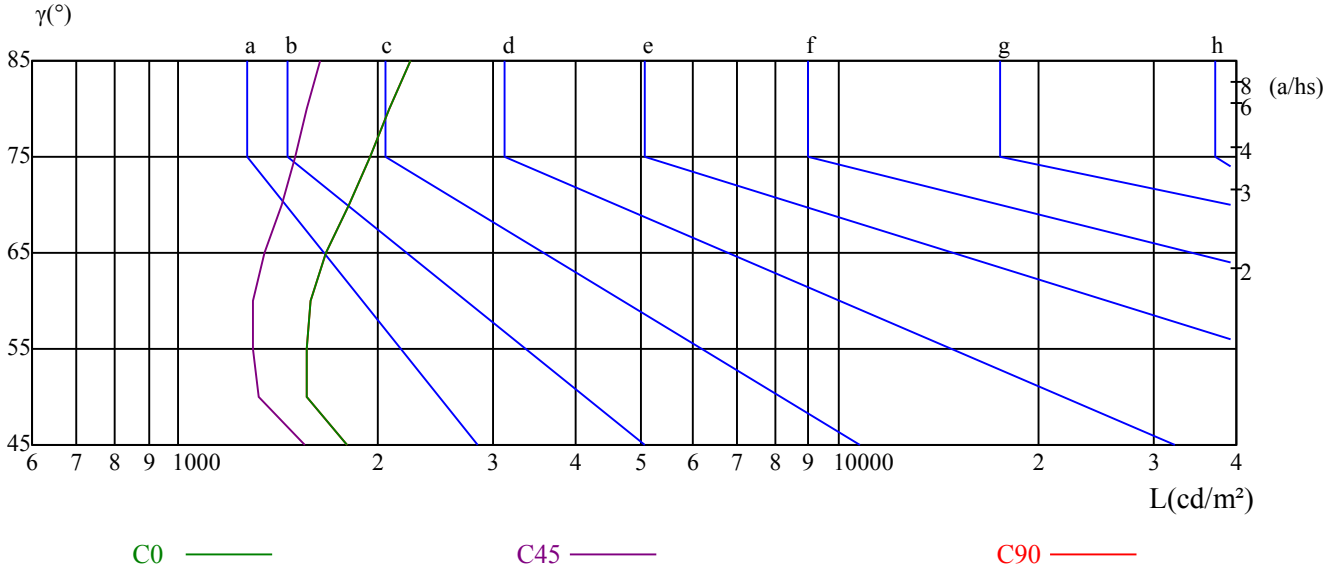
γ	45	50	55	60	65	70	75	80	85
C0	1805	1566	1563	1583	1675	1815	1946	2081	2240
C45	1549	1323	1300	1296	1347	1431	1502	1568	1639
C90	1805	1566	1563	1583	1675	1815	1946	2081	2240

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
4069	4069	4069	6787	6787	6787	19307	19307	19307

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

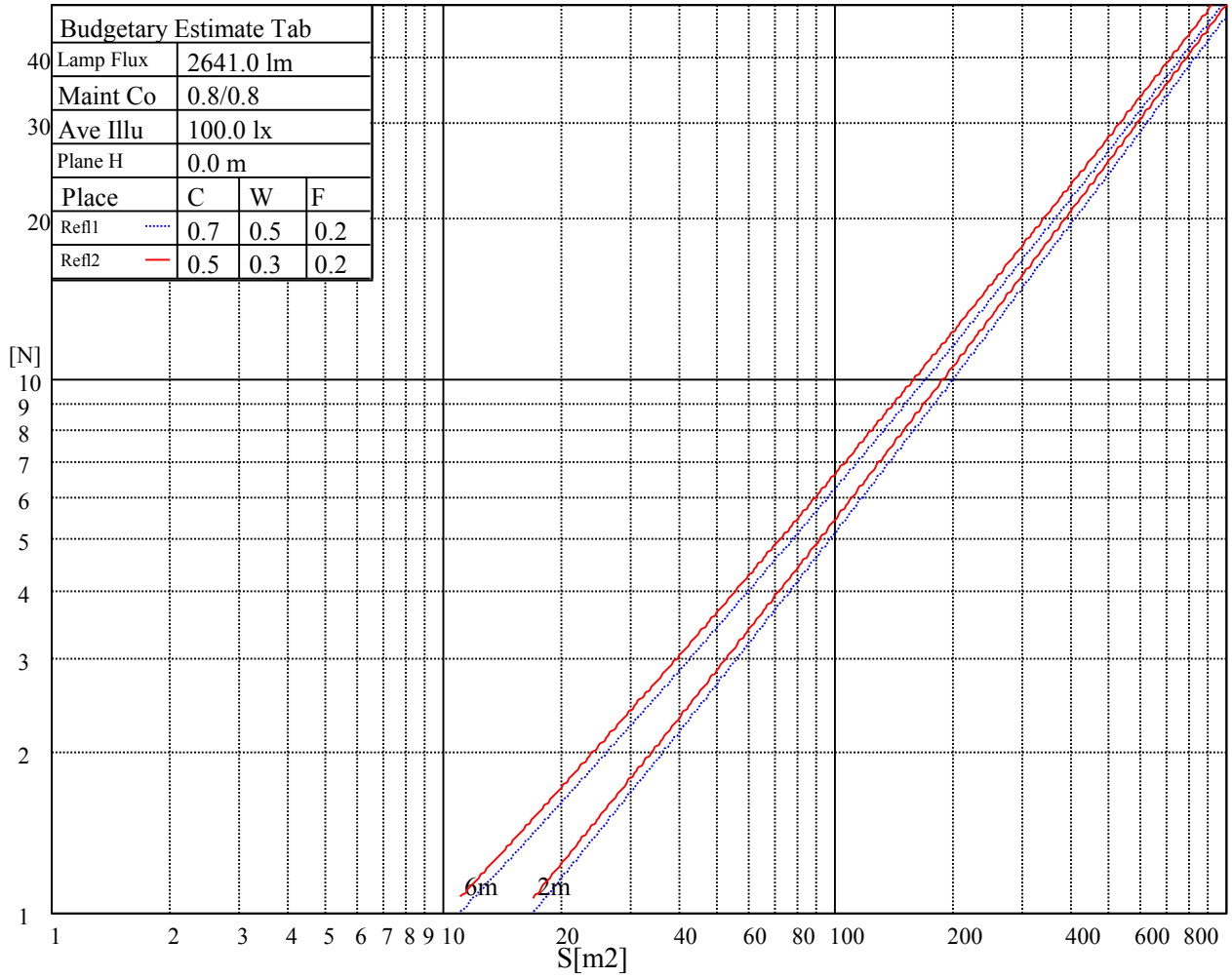


Equipment:
Temperature(°C): 25.0

Date: 2018/10/11
Humidity(%): 60.0%

Operator: NT07
Distance(m): 7.50

Budgetary Estimate Table



Equipment:
Temperature(°C): 25.0

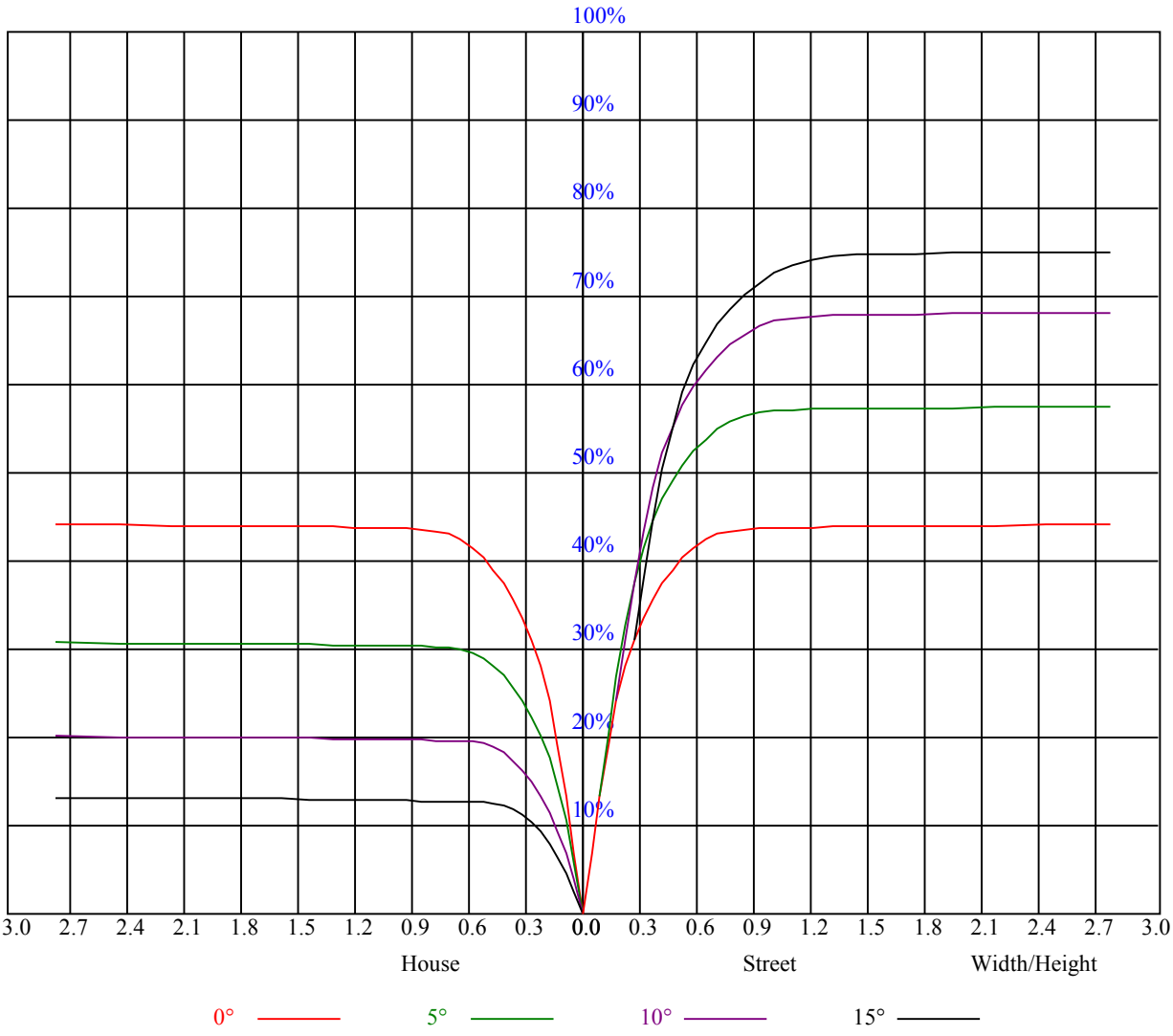
Date: 2018/10/11
Humidity(%): 60.0%

Operator: NT07
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	1.06	1.06	1.06	1.03	1.03	1.03	0.99	0.99	0.99	0.95	0.95	0.95	0.91	0.91	0.91	0.89
1	0.99	0.97	0.96	0.97	0.96	0.94	0.94	0.92	0.91	0.91	0.90	0.89	0.88	0.87	0.86	0.84
2	0.94	0.91	0.88	0.92	0.90	0.87	0.90	0.87	0.85	0.87	0.85	0.84	0.85	0.83	0.82	0.81
3	0.89	0.85	0.83	0.88	0.85	0.82	0.86	0.83	0.81	0.84	0.81	0.79	0.82	0.80	0.78	0.77
4	0.85	0.81	0.78	0.84	0.80	0.77	0.82	0.79	0.77	0.81	0.78	0.76	0.79	0.77	0.75	0.74
5	0.81	0.77	0.74	0.80	0.77	0.74	0.79	0.76	0.73	0.78	0.75	0.72	0.76	0.74	0.72	0.71
6	0.78	0.74	0.71	0.77	0.73	0.70	0.76	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.68
7	0.75	0.71	0.68	0.74	0.70	0.67	0.73	0.70	0.67	0.72	0.69	0.67	0.71	0.69	0.66	0.65
8	0.72	0.68	0.65	0.71	0.68	0.65	0.71	0.67	0.64	0.70	0.67	0.64	0.69	0.66	0.64	0.63
9	0.69	0.65	0.62	0.69	0.65	0.62	0.68	0.65	0.62	0.68	0.64	0.62	0.67	0.64	0.62	0.61
10	0.67	0.63	0.60	0.67	0.63	0.60	0.66	0.63	0.60	0.65	0.62	0.60	0.65	0.62	0.60	0.59

Coefficient Utilization Curve



Equipment:
Temperature(°C): 25.0

Date: 2018/10/11
Humidity(%): 60.0%

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	8908.31	8938.13	8924.63	8885.81	8800.31	8661.38	8397.00	8002.69	7558.31
45.0	8903.25	8912.25	8883.00	8813.81	8707.50	8476.88	8178.19	7785.56	7234.31
90.0	8906.63	8863.31	8775.56	8614.13	8385.19	8009.44	7569.00	6957.56	6265.13
135.0	8931.38	8897.63	8787.38	8646.19	8409.94	7961.06	7491.94	6936.19	6240.38
180.0	8908.31	8861.63	8728.31	8539.88	8254.69	7738.31	7290.56	6627.94	5898.38
225.0	8903.25	8871.19	8782.88	8619.19	8377.88	7972.88	7509.94	6904.13	6206.63
270.0	8906.63	8917.31	8895.94	8843.06	8728.88	8476.31	8168.63	7759.13	7193.25
315.0	8931.38	8946.56	8933.63	8879.06	8785.13	8589.38	8312.63	7887.38	7350.75
360.0	8908.31	8938.13	8924.63	8885.81	8800.31	8661.38	8397.00	8002.69	7558.31

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	7032.38	6275.81	5619.94	4952.81	4226.63	3561.19	3033.56	2647.13	2199.38
45.0	6590.81	5953.50	5203.69	4553.44	3862.13	3253.50	2800.69	2405.25	2103.75
90.0	5610.94	4878.00	4189.50	3629.81	3135.38	2643.75	2341.69	2097.00	1851.19
135.0	5517.56	4872.94	4182.75	3619.13	3074.06	2641.50	2341.13	2073.38	1858.50
180.0	5234.06	4526.44	3871.13	3350.25	2904.75	2468.25	2195.44	1971.56	1788.75
225.0	5561.44	4831.31	4127.63	3561.75	3063.94	2574.00	2273.63	2029.50	1814.63
270.0	6535.69	5888.25	5141.81	4480.31	3785.63	3174.19	2722.50	2331.00	2045.81
315.0	6777.56	6045.75	5270.63	4589.44	3948.75	3240.00	2761.31	2385.00	2042.44
360.0	7032.38	6275.81	5619.94	4952.81	4226.63	3561.19	3033.56	2647.13	2199.38

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1960.88	1791.56	1584.56	1468.69	1383.75	1279.69	1199.25	1148.63	1093.50
45.0	1879.31	1718.44	1548.00	1436.06	1346.06	1266.19	1180.13	1125.00	1080.00
90.0	1694.25	1563.75	1438.31	1330.31	1249.31	1166.63	1120.22	1071.28	1028.93
135.0	1691.44	1568.25	1432.69	1334.81	1257.19	1186.88	1123.88	1077.75	1035.56
180.0	1605.94	1487.81	1386.56	1278.56	1208.81	1111.84	1095.47	1050.86	1017.28
225.0	1647.00	1524.38	1405.13	1304.44	1230.75	1122.19	1110.15	1062.84	1022.06
270.0	1845.56	1688.06	1529.44	1424.81	1334.25	1247.06	1177.88	1126.69	1075.50
315.0	1839.38	1675.13	1515.38	1418.06	1333.69	1240.31	1182.38	1115.83	1071.00
360.0	1960.88	1791.56	1584.56	1468.69	1383.75	1279.69	1199.25	1148.63	1093.50

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	1055.81	1020.94	982.69	947.81	897.75	825.19	759.94	689.06	595.69
45.0	1032.19	998.44	966.94	916.31	855.00	795.94	718.31	644.63	563.06
90.0	994.61	956.93	901.07	836.49	773.94	689.18	620.89	550.63	480.04
135.0	998.44	964.13	910.13	852.19	780.75	706.50	632.81	547.88	469.69
180.0	980.89	940.05	891.28	823.50	756.56	675.68	592.65	517.67	442.97
225.0	989.61	950.12	902.25	838.01	774.17	689.63	618.13	544.28	468.68
270.0	1029.94	995.06	955.13	905.06	840.94	771.75	705.94	629.44	549.56
315.0	1028.98	991.18	959.12	907.48	850.73	780.75	705.09	634.50	561.88
360.0	1055.81	1020.94	982.69	947.81	897.75	825.19	759.94	689.06	595.69

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	521.44	444.94	358.31	292.50	200.64	132.41	78.69	41.96	20.14
45.0	486.00	409.50	332.44	286.88	182.48	124.43	67.11	33.58	17.33
90.0	392.51	323.61	256.22	175.73	120.99	74.93	35.72	16.54	12.94
135.0	396.56	322.88	286.31	168.92	114.86	74.48	29.31	16.37	12.94
180.0	349.93	278.04	210.04	135.00	86.96	48.04	22.33	14.74	11.98
225.0	375.24	304.26	234.11	153.73	102.54	60.69	28.29	16.48	13.39
270.0	477.56	405.00	315.00	288.00	175.89	122.18	68.18	35.27	18.73
315.0	469.58	398.19	325.29	237.09	173.42	119.36	69.47	32.40	18.11
360.0	521.44	444.94	358.31	292.50	200.64	132.41	78.69	41.96	20.14

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	15.47	12.66	11.81	11.64	11.48	11.31	11.19	11.14	11.03
45.0	13.16	11.42	11.25	11.08	10.91	10.80	10.69	10.63	10.52
90.0	11.36	11.19	11.03	10.86	10.69	10.63	10.52	10.46	10.41
135.0	11.36	11.14	11.03	10.86	10.80	10.69	10.63	10.52	10.52
180.0	11.64	11.48	11.36	11.03	10.74	10.74	10.63	10.58	10.52
225.0	11.70	11.53	11.14	10.91	10.80	10.74	10.69	10.63	10.58
270.0	14.23	12.09	11.87	11.81	11.64	11.59	11.53	11.48	11.42
315.0	14.63	12.15	11.87	11.70	11.59	11.42	11.31	11.25	11.14
360.0	15.47	12.66	11.81	11.64	11.48	11.31	11.19	11.14	11.03

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	10.97	10.91	10.80	10.74	10.69	10.63	10.52	10.52	10.46
45.0	10.46	10.41	10.35	10.35	10.29	10.24	10.18	10.18	10.13
90.0	10.35	10.29	10.29	10.24	10.18	10.13	10.13	10.13	10.13
135.0	10.41	10.35	10.29	10.24	10.24	10.24	10.18	10.18	10.18
180.0	10.46	10.41	10.35	10.35	10.29	10.29	10.24	10.24	10.24
225.0	10.52	10.52	10.46	10.46	10.41	10.35	10.35	10.35	10.35
270.0	11.31	11.25	11.14	11.08	10.97	10.86	10.74	10.63	10.63
315.0	11.08	11.03	10.91	10.91	10.80	10.74	10.69	10.58	10.63
360.0	10.97	10.91	10.80	10.74	10.69	10.63	10.52	10.52	10.46

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	10.41	10.41	10.35	10.41	10.52	10.58	10.69	10.74	10.80
45.0	10.13	10.13	10.07	10.13	10.13	10.18	10.18	10.18	10.18
90.0	10.18	10.18	10.18	10.18	10.18	10.24	10.18	10.18	10.18
135.0	10.24	10.24	10.18	10.24	10.24	10.24	10.24	10.24	10.24
180.0	10.24	10.24	10.24	10.29	10.29	10.29	10.35	10.35	10.35
225.0	10.41	10.46	10.58	10.58	10.63	10.69	10.69	10.74	10.80
270.0	10.74	10.86	11.03	11.19	11.31	11.42	11.53	11.53	11.59
315.0	10.74	10.86	11.08	11.31	11.42	11.53	11.59	11.59	11.64
360.0	10.41	10.41	10.35	10.41	10.52	10.58	10.69	10.74	10.80

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	10.80	10.80	10.74	10.74	10.69	10.69	10.74	10.69	10.69
45.0	10.18	10.18	10.24	10.24	10.24	10.24	10.24	10.24	10.18
90.0	10.18	10.18	10.13	10.13	10.13	10.13	10.07	10.07	10.01
135.0	10.24	10.24	10.18	10.18	10.13	10.13	10.07	10.07	10.01
180.0	10.41	10.41	10.46	10.46	10.46	10.46	10.46	10.41	10.35
225.0	10.80	10.80	10.86	10.80	10.80	10.69	10.69	10.58	10.52
270.0	11.53	11.48	11.42	11.36	11.31	11.25	11.19	11.14	11.08
315.0	11.64	11.64	11.64	11.59	11.53	11.48	11.36	11.31	11.25
360.0	10.80	10.80	10.74	10.74	10.69	10.69	10.74	10.69	10.69

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	10.69	10.63	10.52	10.52	10.46	10.35	10.24	9.56	9.56
45.0	10.13	10.07	10.07	10.01	9.96	9.90	9.79	9.51	9.45
90.0	10.01	10.01	9.96	9.96	9.90	9.84	9.56	9.45	9.45
135.0	10.01	9.96	9.96	9.90	9.90	9.84	9.79	9.56	9.51
180.0	10.29	10.24	10.18	10.07	10.01	9.90	9.68	9.56	9.56
225.0	10.46	10.41	10.29	10.24	10.13	10.07	9.62	9.45	9.45
270.0	11.03	10.97	10.86	10.80	10.74	10.63	10.41	9.51	9.45
315.0	11.14	11.08	10.97	10.86	10.80	10.74	9.84	9.51	9.51
360.0	10.69	10.63	10.52	10.52	10.46	10.35	10.24	9.56	9.56

Intensity data(cd)

C/γ(°)	90.0
0.0	9.56
45.0	9.45
90.0	9.51
135.0	9.56
180.0	9.56
225.0	9.45
270.0	9.45
315.0	9.51
360.0	9.56