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NATA

LumCAT: 3-2042-M	
Luminaire: 92.70.131.00	
Report No: NATA0100	Voltage(V): 36.1000
Test No: GC2018111217	Current(A): 0.5500
LampCAT: OSRAM SOLERIQ S15	Power (W): 19.8550
Lamp flux(lm): 2582.0	PF: 0.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 84	Width(mm): 84
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 2310.16
Efficiency(%): 89.47%
Lumens(lm)/Power(W): 116.62
Central intensity(cd): 22322.810
Maximum intensity(cd): 22322.810
Angle of maximum intensity: $C=0.0$ $\gamma=0.0$
Beam Angle(50%Imax): [C0/180]Total=13.1
[C90/270]Total=13.1
Field angle(10%Imax): [C0/180]Total=25.8
[C90/270]Total=25.8
Maximum s/h(1/2): C0_180=0.23 C90_270=0.23
Maximum s/h(1/4): C0_180=0.22 C90_270=0.22
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 89.68%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.491%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	22322.813	5.341	5.341	.207%	.231%
1.0	22114.688	42.324	47.665	1.639%	2.063%
2.0	21324.375	81.611	129.275	3.161%	5.596%
3.0	19871.719	114.048	243.323	4.417%	10.533%
4.0	17990.859	137.622	380.945	5.330%	16.490%
5.0	15291.773	146.152	527.098	5.660%	22.817%
6.0	12808.266	146.817	673.915	5.686%	29.172%
7.0	9815.414	131.176	805.091	5.080%	34.850%
8.0	7829.156	119.487	924.578	4.628%	40.022%
9.0	5822.016	99.875	1024.453	3.868%	44.346%
10.0	4342.148	82.685	1107.138	3.202%	47.925%
11.0	3427.031	71.708	1178.847	2.777%	51.029%
12.0	2639.531	60.181	1239.027	2.331%	53.634%
13.0	2188.477	53.986	1293.013	2.091%	55.971%
14.0	1773.211	47.042	1340.056	1.822%	58.007%
15.0	1538.789	43.674	1383.73	1.691%	59.898%
16.0	1354.999	40.957	1424.687	1.586%	61.670%
17.0	1232.944	39.530	1464.217	1.531%	63.382%
18.0	1138.029	38.564	1502.782	1.494%	65.051%
19.0	1076.491	38.433	1541.215	1.488%	66.715%
20.0	1029.305	38.605	1579.82	1.495%	68.386%
21.0	987.152	38.794	1618.614	1.502%	70.065%
22.0	954.415	39.207	1657.821	1.518%	71.762%
23.0	925.671	39.663	1697.484	1.536%	73.479%
24.0	901.139	40.194	1737.678	1.557%	75.219%
25.0	880.418	40.803	1778.481	1.580%	76.985%
26.0	861.841	41.431	1819.911	1.605%	78.779%
27.0	845.740	42.105	1862.016	1.631%	80.601%
28.0	830.025	42.732	1904.748	1.655%	82.451%
29.0	814.985	43.328	1948.077	1.678%	84.326%
30.0	801.485	43.946	1992.022	1.702%	86.229%
31.0	777.916	43.936	2035.959	1.702%	88.131%
32.0	737.494	42.857	2078.816	1.660%	89.986%
33.0	682.010	40.733	2119.549	1.578%	91.749%
34.0	594.527	36.457	2156.006	1.412%	93.327%
35.0	497.644	31.301	2187.308	1.212%	94.682%
36.0	389.967	25.136	2212.444	.974%	95.770%
37.0	300.178	19.810	2232.254	.767%	96.628%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	190.153	12.838	2245.092	.497%	97.183%
39.0	115.411	7.965	2253.057	.308%	97.528%
40.0	60.188	4.243	2257.3	.164%	97.712%
41.0	33.173	2.387	2259.686	.092%	97.815%
42.0	22.845	1.676	2261.362	.065%	97.888%
43.0	19.645	1.469	2262.832	.057%	97.951%
44.0	16.523	1.259	2264.09	.049%	98.006%
45.0	14.773	1.146	2265.236	.044%	98.055%
46.0	13.584	1.072	2266.307	.042%	98.102%
47.0	13.155	1.055	2267.363	.041%	98.147%
48.0	12.832	1.046	2268.408	.041%	98.193%
49.0	12.523	1.036	2269.445	.040%	98.238%
50.0	12.220	1.027	2270.471	.040%	98.282%
51.0	11.974	1.020	2271.492	.040%	98.326%
52.0	11.742	1.015	2272.506	.039%	98.370%
53.0	11.489	1.006	2273.513	.039%	98.414%
54.0	11.285	1.001	2274.514	.039%	98.457%
55.0	11.116	0.999	2275.512	.039%	98.500%
56.0	10.955	0.996	2276.508	.039%	98.543%
57.0	10.807	0.994	2277.502	.038%	98.586%
58.0	10.695	0.995	2278.497	.039%	98.629%
59.0	10.575	0.994	2279.491	.038%	98.672%
60.0	10.448	0.992	2280.483	.038%	98.715%
61.0	10.343	0.992	2281.475	.038%	98.758%
62.0	10.245	0.992	2282.467	.038%	98.801%
63.0	10.153	0.992	2283.459	.038%	98.844%
64.0	10.062	0.992	2284.451	.038%	98.887%
65.0	9.970	0.991	2285.442	.038%	98.930%
66.0	9.928	0.995	2286.436	.039%	98.973%
67.0	9.865	0.996	2287.432	.039%	99.016%
68.0	9.795	0.996	2288.428	.039%	99.059%
69.0	9.759	0.999	2289.427	.039%	99.103%
70.0	9.703	1.000	2290.427	.039%	99.146%
71.0	9.654	1.001	2291.428	.039%	99.189%
72.0	9.612	1.002	2292.43	.039%	99.233%
73.0	9.563	1.003	2293.433	.039%	99.276%
74.0	9.541	1.006	2294.439	.039%	99.319%
75.0	9.506	1.007	2295.446	.039%	99.363%

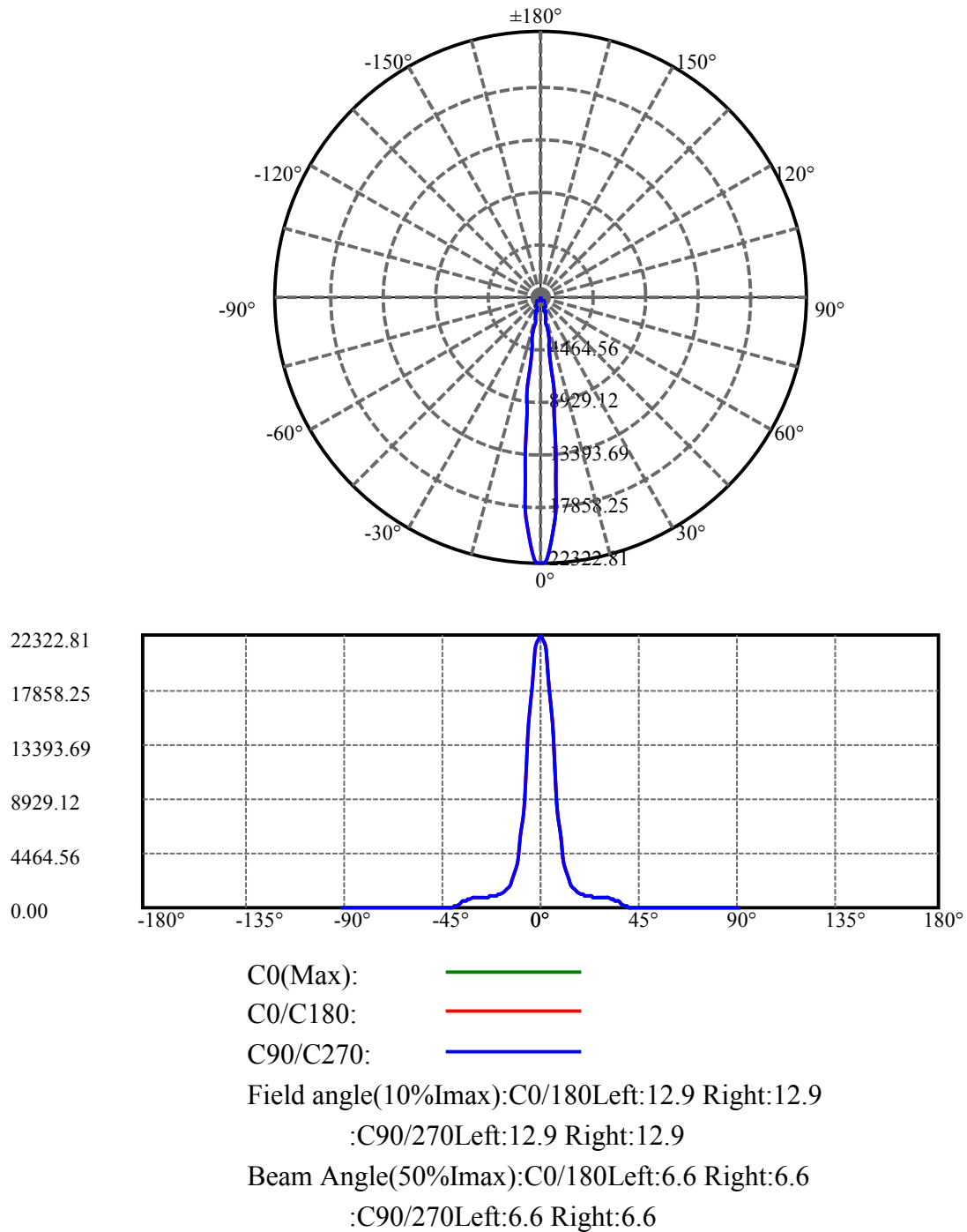
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	9.478	1.009	2296.454	.039%	99.407%
77.0	9.443	1.009	2297.463	.039%	99.450%
78.0	9.436	1.012	2298.476	.039%	99.494%
79.0	9.422	1.014	2299.49	.039%	99.538%
80.0	9.408	1.016	2300.506	.039%	99.582%
81.0	9.387	1.017	2301.522	.039%	99.626%
82.0	9.373	1.018	2302.54	.039%	99.670%
83.0	9.373	1.020	2303.56	.040%	99.714%
84.0	9.345	1.019	2304.58	.039%	99.758%
85.0	9.323	1.019	2305.598	.039%	99.803%
86.0	9.295	1.017	2306.615	.039%	99.847%
87.0	9.267	1.015	2307.63	.039%	99.890%
88.0	9.232	1.012	2308.642	.039%	99.934%
89.0	9.232	1.012	2309.654	.039%	99.978%
90.0	9.232	0.506	2310.16	.020%	100.000%

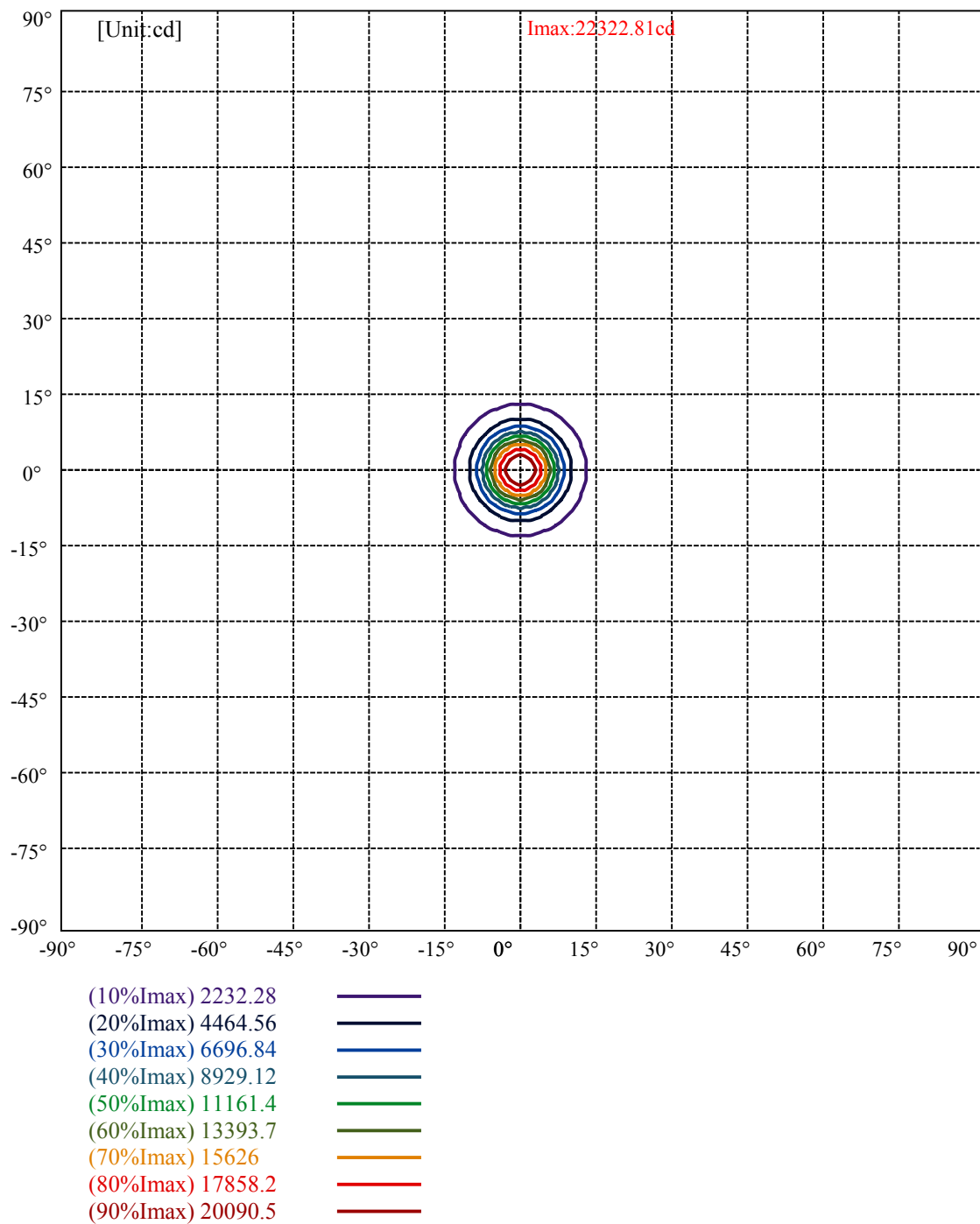
ZONAL LUMEN SUMMARY

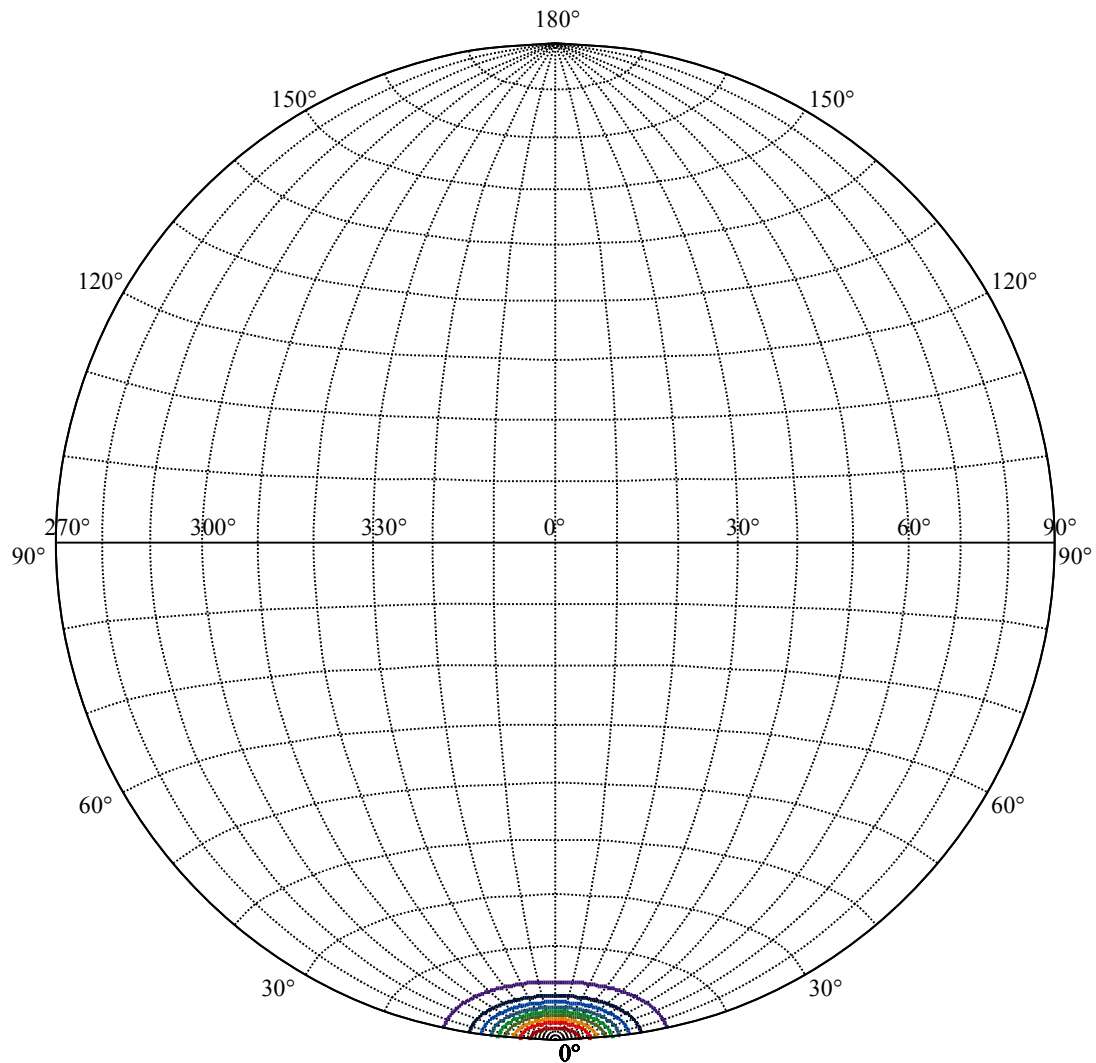
Zone	Lumens	%Lamp	%Fixt
0-30	1992.02	77.15%	86.23%
0-40	2257.30	87.42%	97.71%
0-60	2280.48	88.32%	98.72%
0-90	2309.65	89.45%	99.98%
0-120	2309.65	89.45%	99.98%
0-180	2310.16	89.47%	100.00%
60-90	30.16	1.17%	1.31%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.67	1848.13	71.58%	80.00%

ZONAL LUMEN SUMMARY

0-10	1107.14
10-20	472.68
20-30	412.20
30-40	265.28
40-50	13.17
50-60	10.01
60-70	9.94
70-80	10.08
80-90	9.15
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







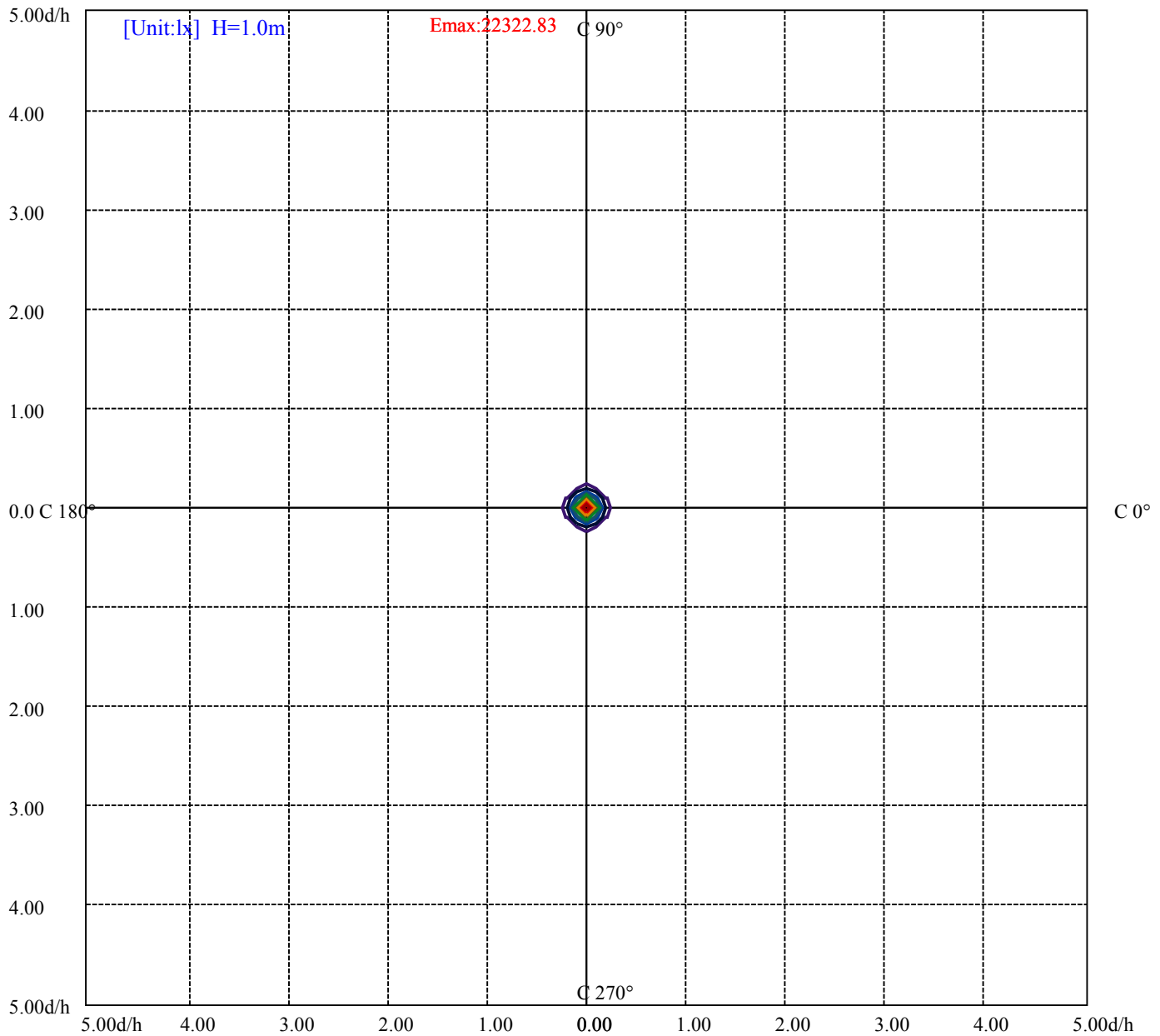
House

[Unit:cd]

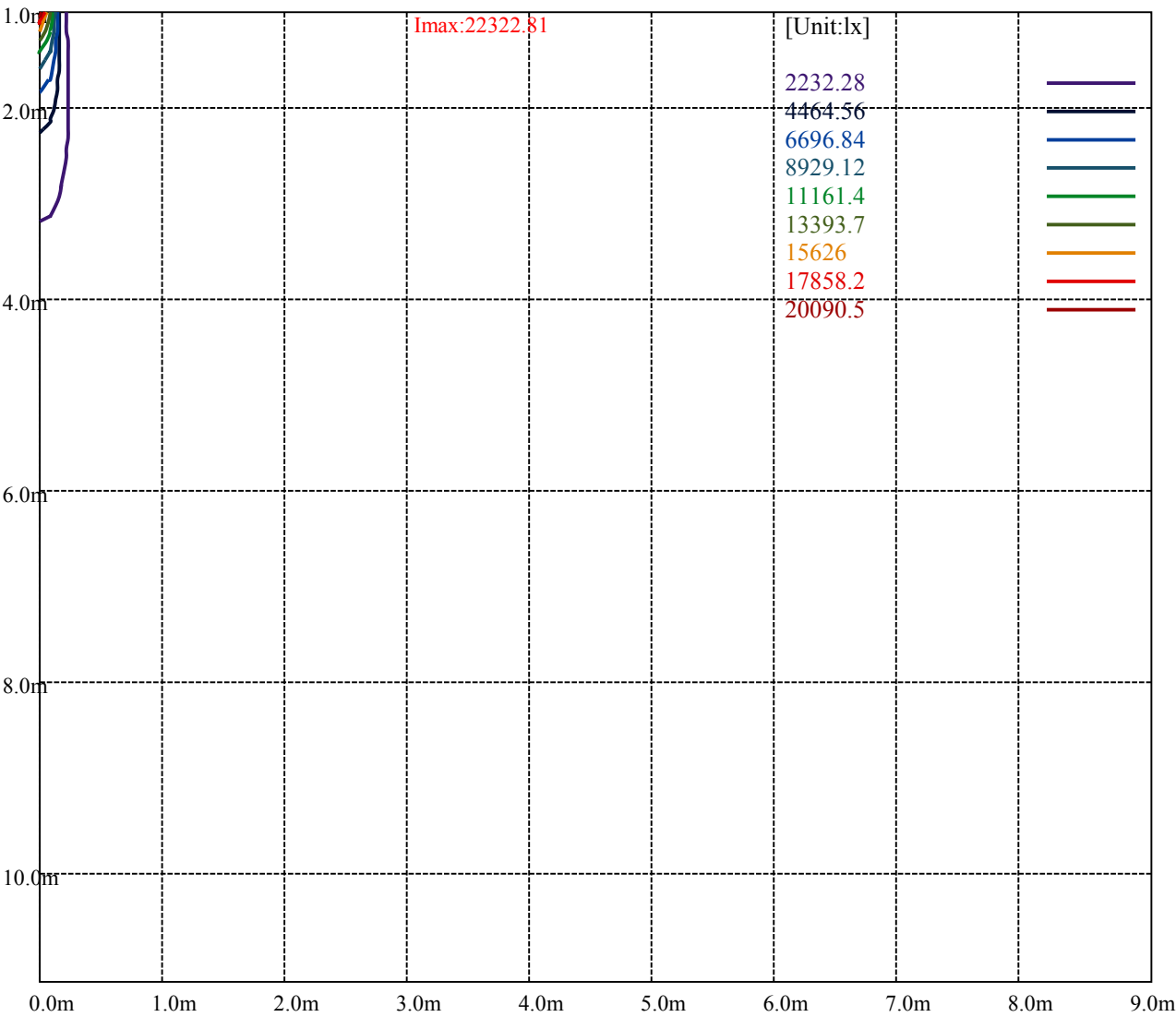
Road

Imax:22322.81

(10%Imax)	2232.28	—
(20%Imax)	4464.56	—
(30%Imax)	6696.84	—
(40%Imax)	8929.12	—
(50%Imax)	11161.4	—
(60%Imax)	13393.7	—
(70%Imax)	15626	—
(80%Imax)	17858.2	—
(90%Imax)	20090.5	—



(10%Emax) 2232.28	—
(20%Emax) 4464.56	—
(30%Emax) 6696.83	—
(40%Emax) 8929.11	—
(50%Emax) 11161.4	—
(60%Emax) 13393.7	—
(70%Emax) 15625.9	—
(80%Emax) 17858.2	—
(90%Emax) 20090.5	—



Luminance Table

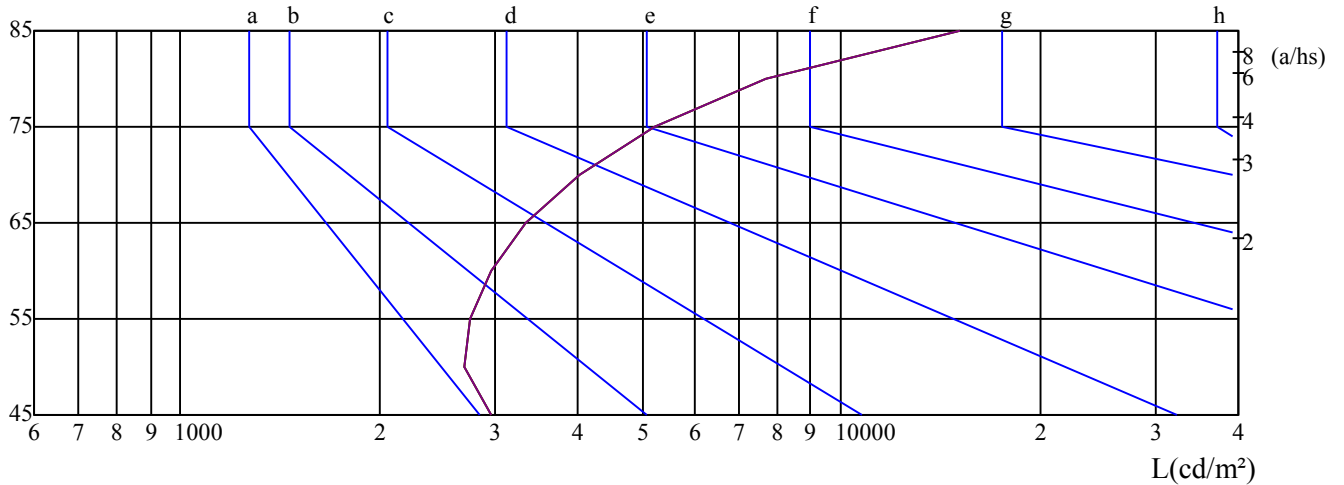
γ	45	50	55	60	65	70	75	80	85
C0	2961	2694	2747	2962	3344	4021	5205	7678	15161
C45	2961	2694	2747	2962	3344	4021	5205	7678	15161
C90	2961	2694	2747	2962	3344	4021	5205	7678	15161

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3344	3344	3344	5205	5205	5205	15161	15161	15161

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

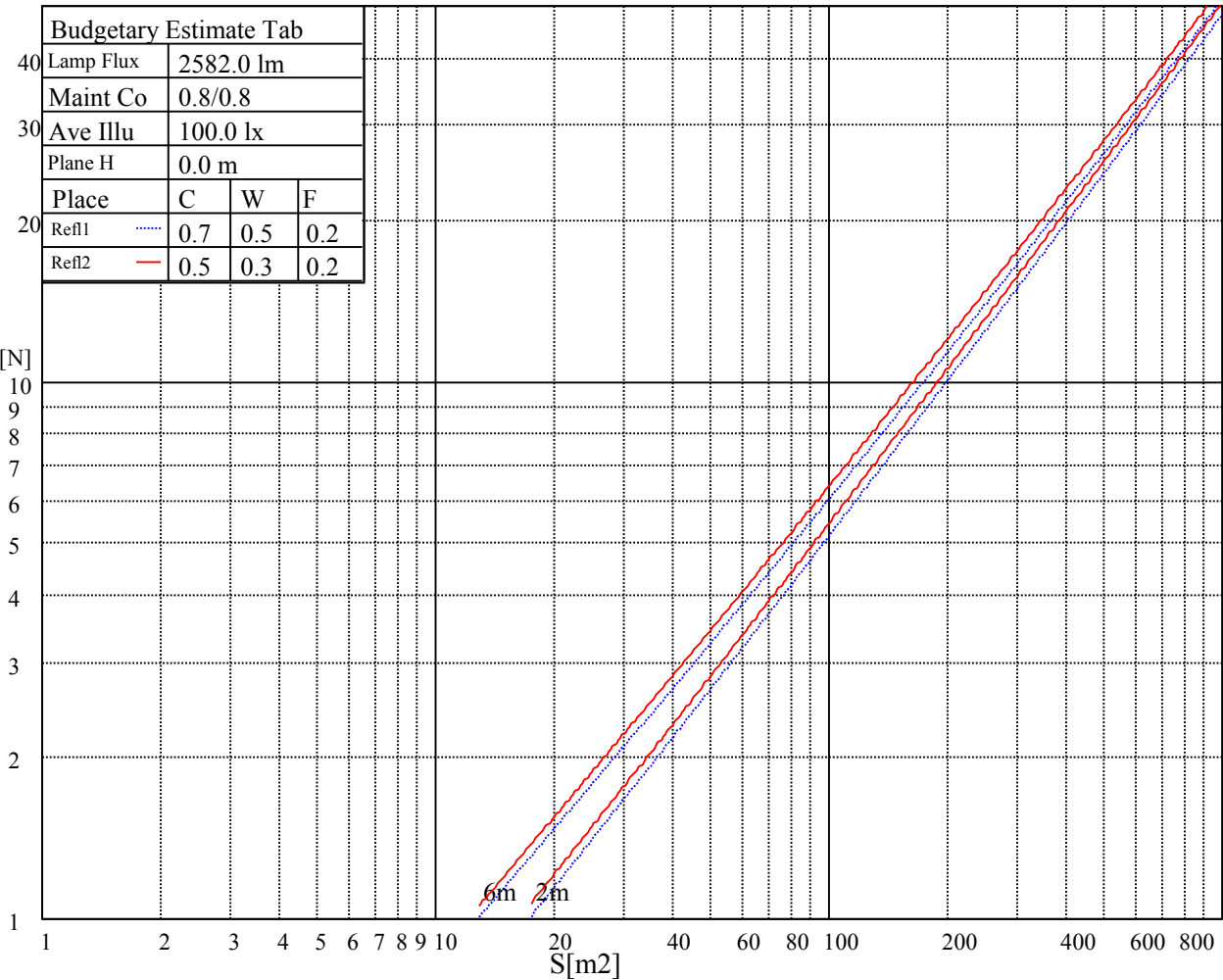
Luminance Limiting Curve

 $\gamma(^{\circ})$ 

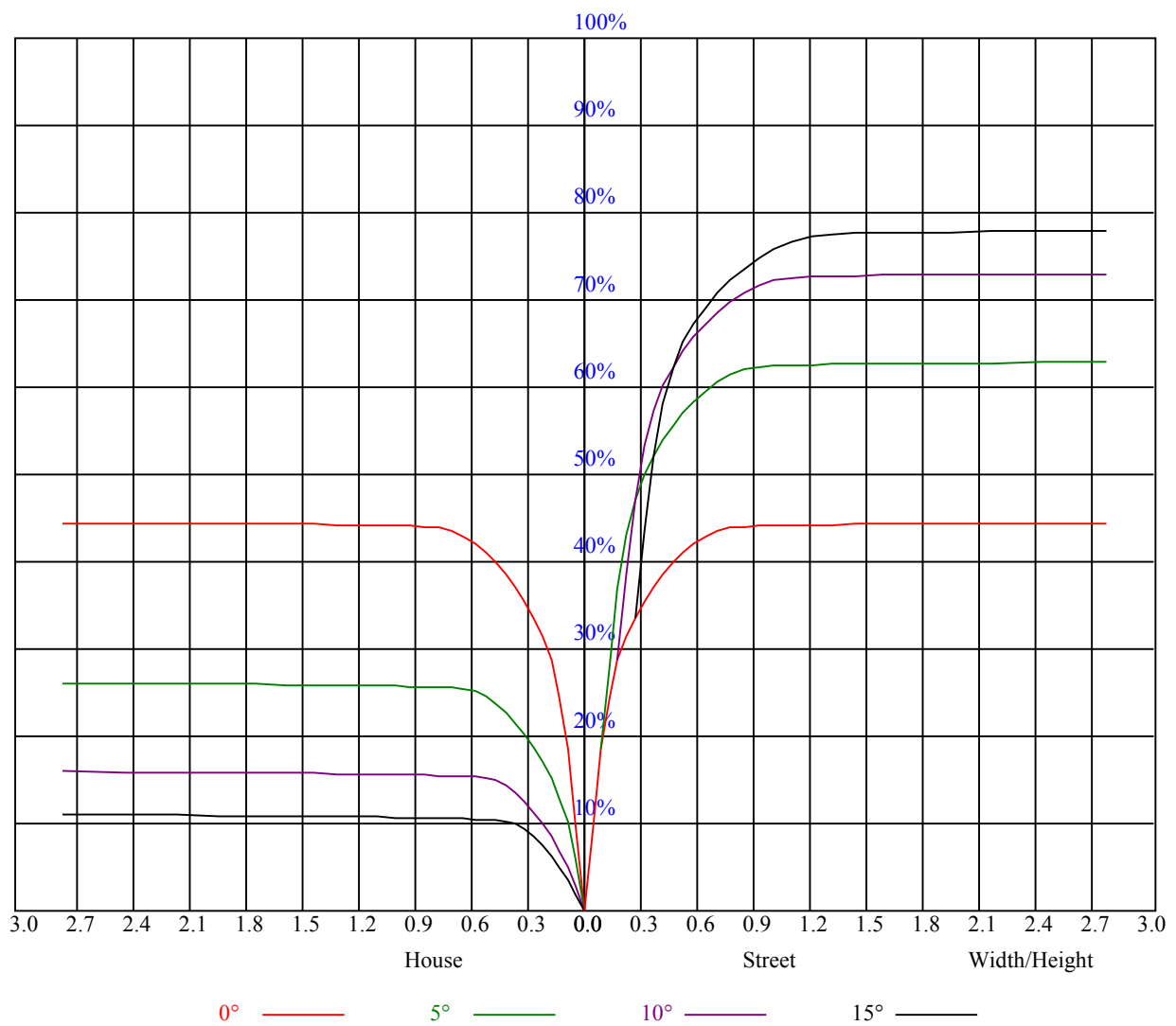
C0 ———

C45 ———

C90 ———



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	1.07	1.07	1.07	1.04	1.04	1.04	1.00	1.00	1.00	0.95	0.95	0.95	0.92	0.92	0.92	0.90
1	1.01	0.99	0.97	0.99	0.97	0.96	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86
2	0.96	0.93	0.90	0.94	0.92	0.89	0.91	0.89	0.87	0.89	0.87	0.86	0.86	0.85	0.84	0.83
3	0.91	0.88	0.85	0.90	0.87	0.85	0.88	0.85	0.83	0.86	0.84	0.82	0.84	0.82	0.81	0.80
4	0.88	0.84	0.81	0.87	0.83	0.81	0.85	0.82	0.80	0.83	0.81	0.79	0.82	0.80	0.78	0.77
5	0.84	0.81	0.78	0.84	0.80	0.77	0.82	0.79	0.77	0.81	0.78	0.76	0.80	0.77	0.76	0.75
6	0.82	0.78	0.75	0.81	0.77	0.75	0.80	0.77	0.74	0.79	0.76	0.74	0.78	0.75	0.73	0.72
7	0.79	0.75	0.72	0.78	0.75	0.72	0.77	0.74	0.72	0.77	0.74	0.72	0.76	0.73	0.71	0.70
8	0.77	0.73	0.70	0.76	0.73	0.70	0.75	0.72	0.70	0.75	0.72	0.70	0.74	0.71	0.69	0.68
9	0.75	0.71	0.68	0.74	0.71	0.68	0.73	0.70	0.68	0.73	0.70	0.68	0.72	0.70	0.68	0.67
10	0.73	0.69	0.67	0.72	0.69	0.66	0.72	0.68	0.66	0.71	0.68	0.66	0.71	0.68	0.66	0.65



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Intensity data(cd)										Appendix Page: 16 Total:18	
C/ γ (°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0		
0.0	22359.38	22539.38	22151.25	21358.13	20182.50	17375.63	14872.50	12555.00	9410.63		
45.0	22365.00	21605.63	20126.25	18163.13	15485.63	12498.75	9877.50	7312.50	5535.00		
90.0	22100.63	21240.00	19726.88	17083.13	14563.13	11161.69	8925.19	6494.06	4860.56		
135.0	22466.25	22033.13	20812.50	19125.00	16610.63	13708.13	11036.25	8555.63	6255.00		
180.0	22359.38	21853.13	20806.88	18613.13	16306.88	12746.25	10667.81	7940.25	5970.94		
225.0	22365.00	22601.25	22393.13	21628.13	20396.25	18523.13	15868.13	10953.56	10324.69		
270.0	22100.63	22545.00	22477.50	21965.63	20874.38	18922.50	16627.50	13741.88	11148.75		
315.0	22466.25	22500.00	22100.63	21037.50	19507.50	17398.13	14591.25	10970.44	9127.69		
360.0	22359.38	22539.38	22151.25	21358.13	20182.50	17375.63	14872.50	12555.00	9410.63		
C/ γ (°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0		
0.0	6991.88	5518.13	3960.00	3099.38	2846.25	1958.63	1665.00	1434.38	1276.31		
45.0	4044.38	3026.25	2851.88	1981.69	1617.19	1423.69	1287.00	1166.63	1095.19		
90.0	3463.88	2728.13	2219.63	1784.25	1574.44	1380.38	1245.94	1119.43	1089.96		
135.0	4545.00	3375.00	2902.50	2183.63	1836.00	1544.06	1386.00	1269.56	1161.56		
180.0	4362.75	3290.63	2636.44	2117.25	1793.25	1537.88	1362.38	1249.31	1120.78		
225.0	7972.88	5626.69	4294.69	3353.06	2622.94	2120.06	1805.06	1552.50	1391.63		
270.0	8437.50	6198.75	4719.38	3667.50	2846.25	2291.06	1931.63	1610.44	1428.75		
315.0	6757.88	4973.63	3831.75	2929.50	2371.50	1929.94	1627.31	1437.75	1299.38		
360.0	6991.88	5518.13	3960.00	3099.38	2846.25	1958.63	1665.00	1434.38	1276.31		
C/ γ (°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0		
0.0	1177.88	1107.56	1043.44	1005.19	972.56	941.63	916.31	897.19	879.75		
45.0	1042.31	997.88	961.88	933.75	907.31	886.50	869.63	853.31	837.00		
90.0	1029.77	991.52	958.89	924.19	901.74	882.11	865.35	844.59	829.41		
135.0	1100.25	1050.75	999.56	965.25	934.31	905.06	882.56	865.13	846.00		
180.0	1085.23	1039.22	1001.36	959.91	931.05	906.30	883.52	864.90	845.27		
225.0	1250.44	1116.73	1102.16	1046.81	1003.22	968.96	938.93	909.68	890.38		
270.0	1299.94	1205.44	1117.13	1063.13	1019.81	978.19	943.31	920.81	894.94		
315.0	1118.42	1102.84	1050.02	999.00	965.31	936.62	909.51	887.74	871.99		
360.0	1177.88	1107.56	1043.44	1005.19	972.56	941.63	916.31	897.19	879.75		
C/ γ (°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0		
0.0	864.00	848.81	834.19	822.94	807.75	794.25	766.13	694.69	596.81		
45.0	822.38	809.44	794.81	781.88	741.38	672.75	582.75	457.31	362.81		
90.0	816.75	803.25	787.44	770.96	718.14	631.29	538.71	427.56	327.04		
135.0	829.69	816.75	802.13	788.63	768.38	712.13	626.06	515.81	402.19		
180.0	827.61	813.21	801.28	786.21	768.04	711.17	624.83	527.63	422.38		
225.0	873.84	850.67	832.84	819.62	805.28	790.88	772.20	711.62	624.49		
270.0	876.38	858.94	840.94	828.00	812.81	799.88	786.38	740.81	659.25		
315.0	855.28	839.14	826.26	813.66	801.56	787.61	759.04	680.79	586.18		
360.0	864.00	848.81	834.19	822.94	807.75	794.25	766.13	694.69	596.81		
C/ γ (°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0		
0.0	495.00	387.00	292.50	154.46	81.79	37.63	27.51	23.68	19.29		
45.0	286.88	177.02	71.10	36.00	27.23	22.39	18.34	16.26	13.78		
90.0	218.81	122.68	60.19	27.90	23.18	19.80	16.99	14.96	13.56		
135.0	302.06	291.38	97.93	42.92	24.36	20.98	17.83	16.03	13.95		
180.0	277.48	192.66	112.56	40.61	26.04	22.84	18.79	16.59	14.40		
225.0	513.23	398.93	300.04	191.14	96.30	44.55	27.56	22.78	18.62		
270.0	566.44	477.00	331.88	293.06	137.14	62.33	29.36	24.92	20.31		
315.0	459.84	354.77	255.04	137.19	65.48	34.88	26.38	21.94	18.28		
360.0	495.00	387.00	292.50	154.46	81.79	37.63	27.51	23.68	19.29		

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	15.69	13.95	13.50	13.11	12.77	12.43	12.15	11.93	11.64
45.0	13.39	12.94	12.60	12.32	12.09	11.81	11.59	11.36	11.14
90.0	13.16	12.83	12.49	12.26	12.04	11.76	11.53	11.31	11.14
135.0	13.56	13.16	12.83	12.60	12.32	12.09	11.87	11.70	11.42
180.0	13.67	13.33	12.99	12.71	12.43	12.15	11.93	11.64	11.42
225.0	16.20	14.01	13.56	13.16	12.83	12.43	12.21	11.98	11.70
270.0	16.54	14.57	13.84	13.44	12.99	12.71	12.38	12.15	11.81
315.0	15.98	13.89	13.44	13.05	12.71	12.38	12.15	11.87	11.64
360.0	15.69	13.95	13.50	13.11	12.77	12.43	12.15	11.93	11.64
C/ γ (°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	11.36	11.19	11.03	10.86	10.74	10.63	10.46	10.41	10.29
45.0	10.97	10.86	10.69	10.58	10.46	10.35	10.24	10.18	10.13
90.0	10.97	10.86	10.74	10.58	10.52	10.41	10.35	10.18	10.13
135.0	11.25	11.08	10.97	10.80	10.74	10.58	10.46	10.35	10.24
180.0	11.19	11.08	10.91	10.74	10.63	10.52	10.41	10.29	10.18
225.0	11.48	11.25	11.08	10.97	10.80	10.69	10.52	10.41	10.29
270.0	11.64	11.42	11.19	11.03	10.91	10.80	10.63	10.52	10.41
315.0	11.42	11.19	11.03	10.91	10.74	10.63	10.52	10.41	10.29
360.0	11.36	11.19	11.03	10.86	10.74	10.63	10.46	10.41	10.29
C/ γ (°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	10.18	10.13	10.01	9.96	9.90	9.84	9.79	9.73	9.68
45.0	10.01	9.90	9.84	9.84	9.79	9.73	9.68	9.62	9.62
90.0	10.07	9.96	9.90	9.90	9.84	9.73	9.73	9.68	9.68
135.0	10.13	10.07	9.96	9.90	9.79	9.73	9.73	9.68	9.62
180.0	10.07	10.01	9.90	9.84	9.79	9.73	9.68	9.62	9.56
225.0	10.24	10.13	10.01	9.96	9.90	9.79	9.79	9.73	9.68
270.0	10.35	10.24	10.13	10.07	10.01	9.96	9.90	9.84	9.73
315.0	10.18	10.07	10.01	9.96	9.90	9.84	9.79	9.73	9.68
360.0	10.18	10.13	10.01	9.96	9.90	9.84	9.79	9.73	9.68
C/ γ (°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	9.62	9.62	9.56	9.51	9.51	9.45	9.45	9.45	9.39
45.0	9.56	9.51	9.51	9.45	9.45	9.39	9.39	9.39	9.39
90.0	9.62	9.56	9.62	9.56	9.56	9.51	9.51	9.51	9.51
135.0	9.56	9.51	9.51	9.51	9.45	9.39	9.39	9.39	9.39
180.0	9.56	9.51	9.45	9.45	9.39	9.39	9.39	9.34	9.34
225.0	9.62	9.56	9.51	9.51	9.45	9.45	9.39	9.39	9.34
270.0	9.73	9.68	9.62	9.56	9.56	9.51	9.51	9.51	9.51
315.0	9.62	9.56	9.56	9.51	9.45	9.45	9.45	9.39	9.39
360.0	9.62	9.62	9.56	9.51	9.51	9.45	9.45	9.45	9.39
C/ γ (°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	9.39	9.34	9.34	9.34	9.34	9.34	9.28	9.23	9.23
45.0	9.34	9.34	9.34	9.34	9.28	9.28	9.23	9.23	9.23
90.0	9.51	9.56	9.56	9.39	9.28	9.28	9.23	9.23	9.23
135.0	9.34	9.34	9.34	9.34	9.28	9.28	9.28	9.23	9.23
180.0	9.34	9.28	9.28	9.28	9.28	9.23	9.23	9.23	9.23
225.0	9.39	9.34	9.28	9.28	9.28	9.28	9.28	9.23	9.23
270.0	9.45	9.45	9.51	9.51	9.56	9.39	9.34	9.28	9.28
315.0	9.34	9.34	9.34	9.28	9.28	9.28	9.28	9.23	9.23
360.0	9.39	9.34	9.34	9.34	9.34	9.34	9.28	9.23	9.23

Intensity data(cd)

Appendix Page: 18 Total:18

C/ $\gamma(^{\circ})$	90.0
0.0	9.28
45.0	9.23
90.0	9.23
135.0	9.23
180.0	9.23
225.0	9.23
270.0	9.23
315.0	9.23
360.0	9.28