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Nata

LumCAT: 1657-S	
Luminaire: 92.70.126.00	
Report No: NATA0100	Voltage(V): 35.1000
Test No: GC2018090708	Current(A): 0.4100
LampCAT: LUMINUS CHM-9-XD20	Power (W): 14.3910
Lamp flux(lm): 1969.0	PF: 0.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 47	Width(mm): 47
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 1737.86
Efficiency(%): 88.26%
Lumens(lm)/Power(W): 120.76
Central intensity(cd): 6673.922
Maximum intensity(cd): 6673.922
Angle of maximum intensity: C=0.0 γ =0.0
Beam Angle(50%Imax): [C0/180]Total=23.7
[C90/270]Total=23.7
Field angle(10%Imax): [C0/180]Total=56.9
[C90/270]Total=56.9
Maximum s/h(1/2): C0_180=0.40 C90_270=0.40
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(%): 88.57%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.146%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	6673.922	6.387	6.387	.324%	.368%
2.0	6566.977	50.263	56.65	2.553%	3.260%
4.0	6217.875	95.124	151.774	4.831%	8.733%
6.0	5673.094	130.053	281.827	6.605%	16.217%
8.0	4946.906	150.992	432.819	7.668%	24.905%
10.0	4070.320	155.012	587.831	7.873%	33.825%
12.0	3273.891	149.282	737.113	7.582%	42.415%
14.0	2502.281	132.763	869.876	6.743%	50.054%
16.0	1881.984	113.768	983.643	5.778%	56.601%
18.0	1420.805	96.290	1079.934	4.890%	62.141%
20.0	1102.359	82.688	1162.621	4.199%	66.899%
22.0	896.351	73.641	1236.262	3.740%	71.137%
24.0	784.181	69.951	1306.213	3.553%	75.162%
26.0	718.713	69.098	1375.311	3.509%	79.138%
28.0	677.116	69.717	1445.028	3.541%	83.150%
30.0	635.498	69.687	1514.714	3.539%	87.160%
32.0	536.604	62.363	1577.078	3.167%	90.748%
34.0	403.404	49.473	1626.55	2.513%	93.595%
36.0	272.602	35.141	1661.691	1.785%	95.617%
38.0	137.623	18.582	1680.273	.944%	96.686%
40.0	50.238	7.082	1687.356	.360%	97.094%
42.0	26.663	3.913	1691.268	.199%	97.319%
44.0	18.218	2.775	1694.044	.141%	97.478%
46.0	15.363	2.424	1696.467	.123%	97.618%
48.0	14.449	2.355	1698.822	.120%	97.753%
50.0	13.591	2.283	1701.106	.116%	97.885%
52.0	12.909	2.231	1703.337	.113%	98.013%
54.0	12.255	2.174	1705.511	.110%	98.138%
56.0	11.637	2.116	1707.627	.107%	98.260%
58.0	10.990	2.044	1709.671	.104%	98.378%
60.0	10.463	1.987	1711.658	.101%	98.492%
62.0	10.013	1.939	1713.597	.098%	98.604%
64.0	9.619	1.896	1715.493	.096%	98.713%
66.0	9.323	1.868	1717.361	.095%	98.820%
68.0	9.070	1.844	1719.205	.094%	98.926%
70.0	8.859	1.826	1721.031	.093%	99.031%
72.0	8.677	1.810	1722.841	.092%	99.136%
74.0	8.550	1.802	1724.644	.092%	99.239%

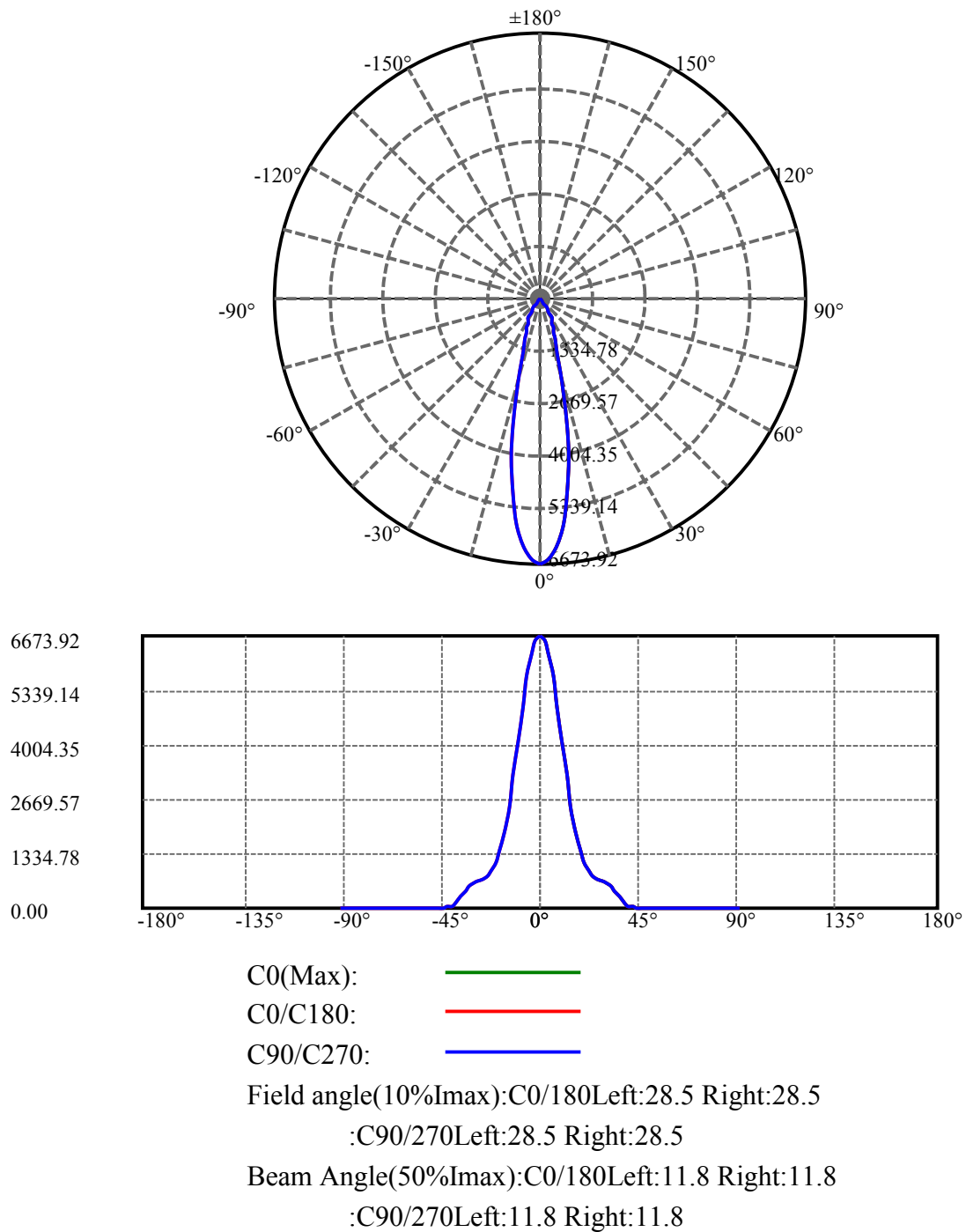
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	8.430	1.794	1726.438	.091%	99.342%
78.0	8.339	1.789	1728.226	.091%	99.445%
80.0	8.276	1.787	1730.014	.091%	99.548%
82.0	8.205	1.782	1731.796	.091%	99.651%
84.0	8.114	1.770	1733.566	.090%	99.753%
86.0	7.959	1.741	1735.307	.088%	99.853%
88.0	7.819	1.714	1737.021	.087%	99.951%
90.0	7.692	0.843	1737.864	.043%	100.000%

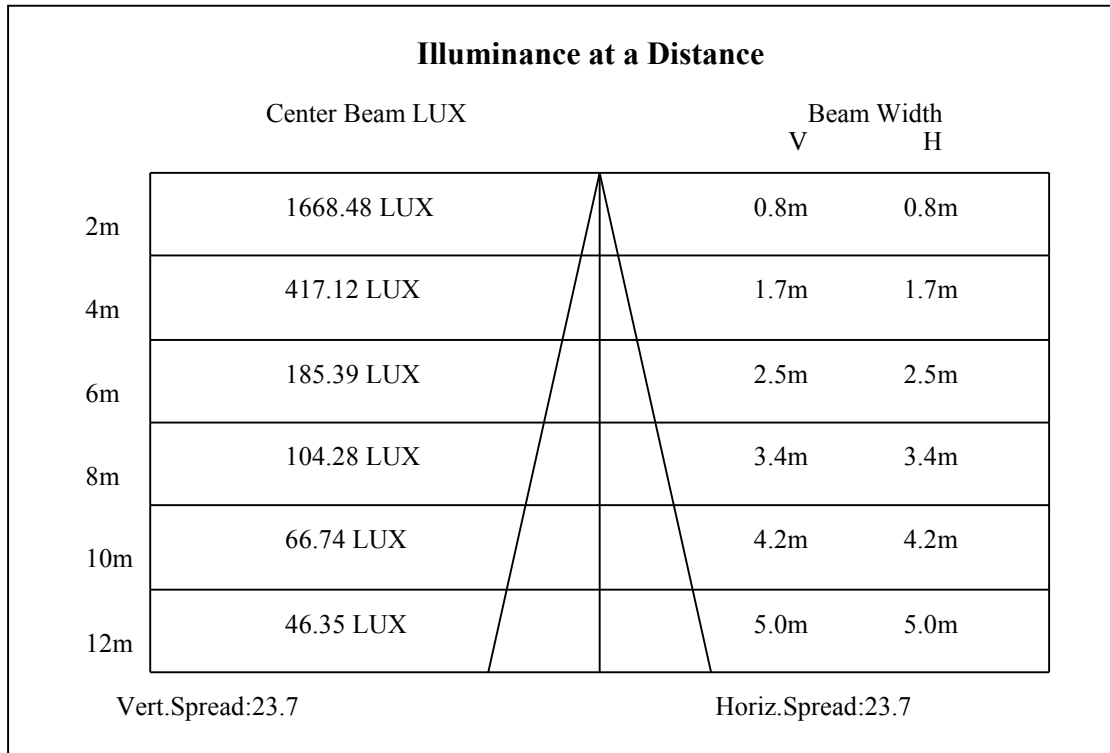
ZONAL LUMEN SUMMARY

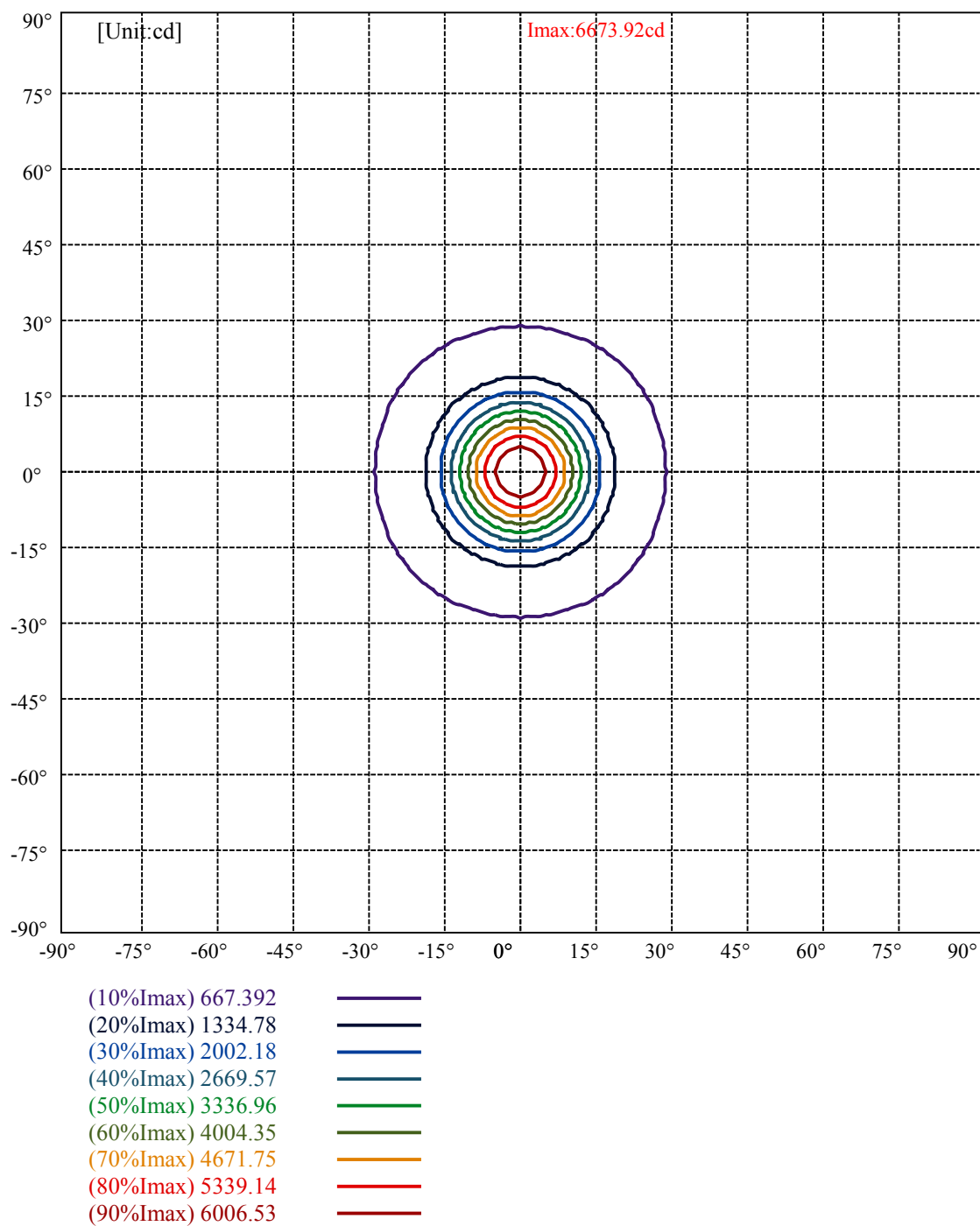
Zone	Lumens	%Lamp	%Fixt
0-30	1514.71	76.93%	87.16%
0-40	1687.36	85.70%	97.09%
0-60	1711.66	86.93%	98.49%
0-90	1737.02	88.22%	99.95%
0-120	1737.02	88.22%	99.95%
0-180	1737.86	88.26%	100.00%
60-90	27.35	1.39%	1.57%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.43	1390.29	70.61%	80.00%

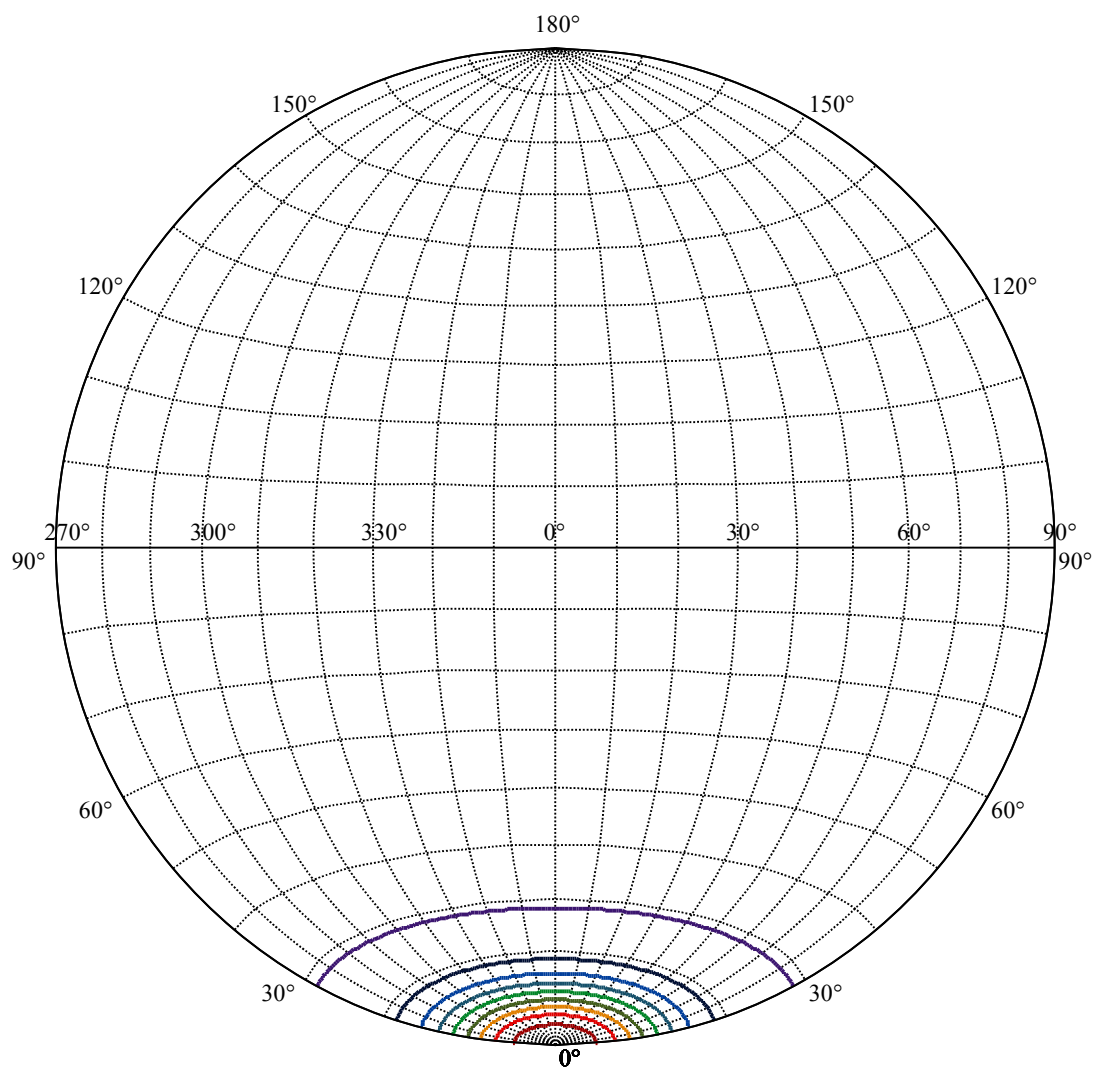
ZONAL LUMEN SUMMARY

0-10	587.83
10-20	574.79
20-30	352.09
30-40	172.64
40-50	13.75
50-60	10.55
60-70	9.37
70-80	8.98
80-90	7.01
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









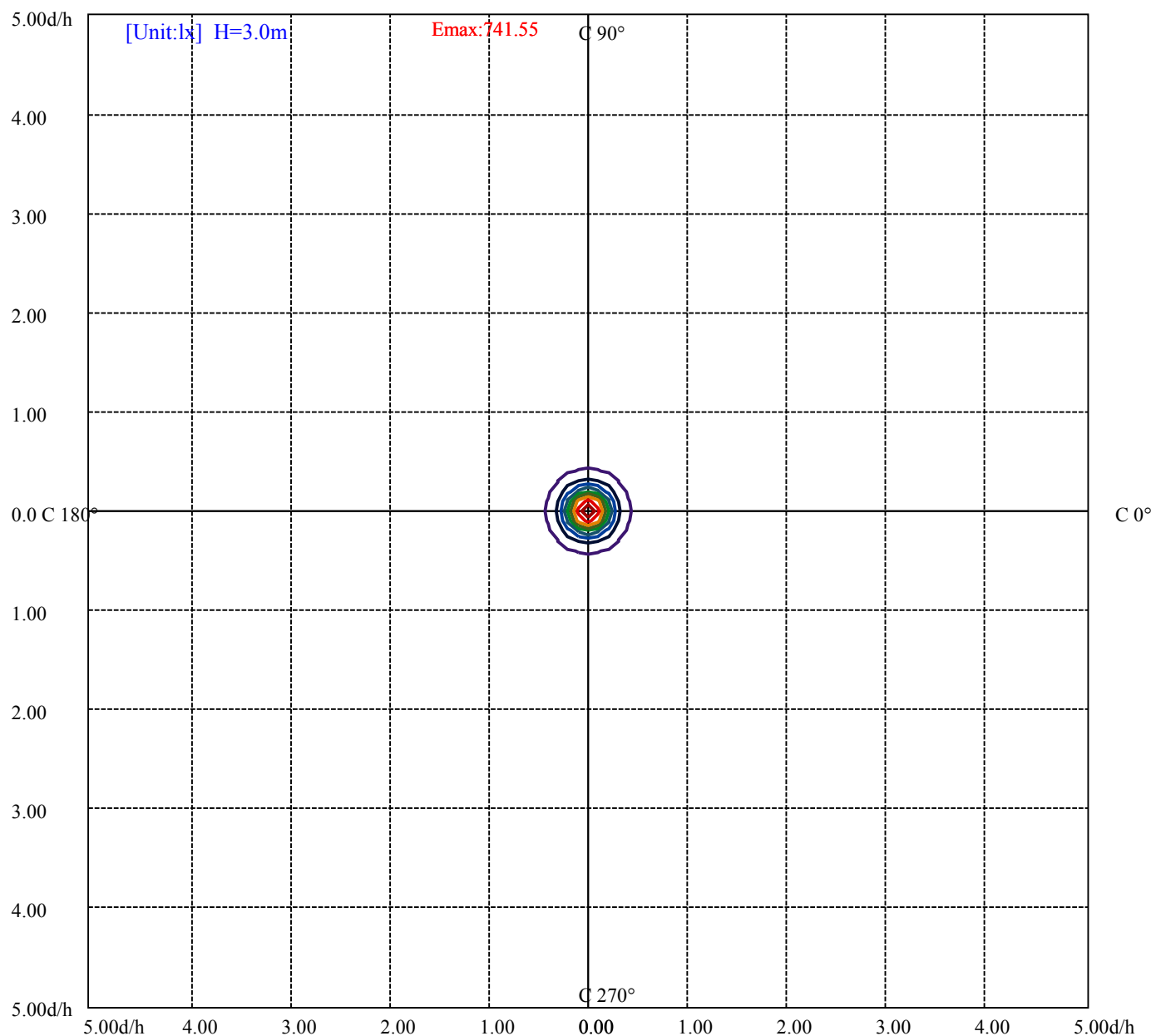
House

[Unit:cd]

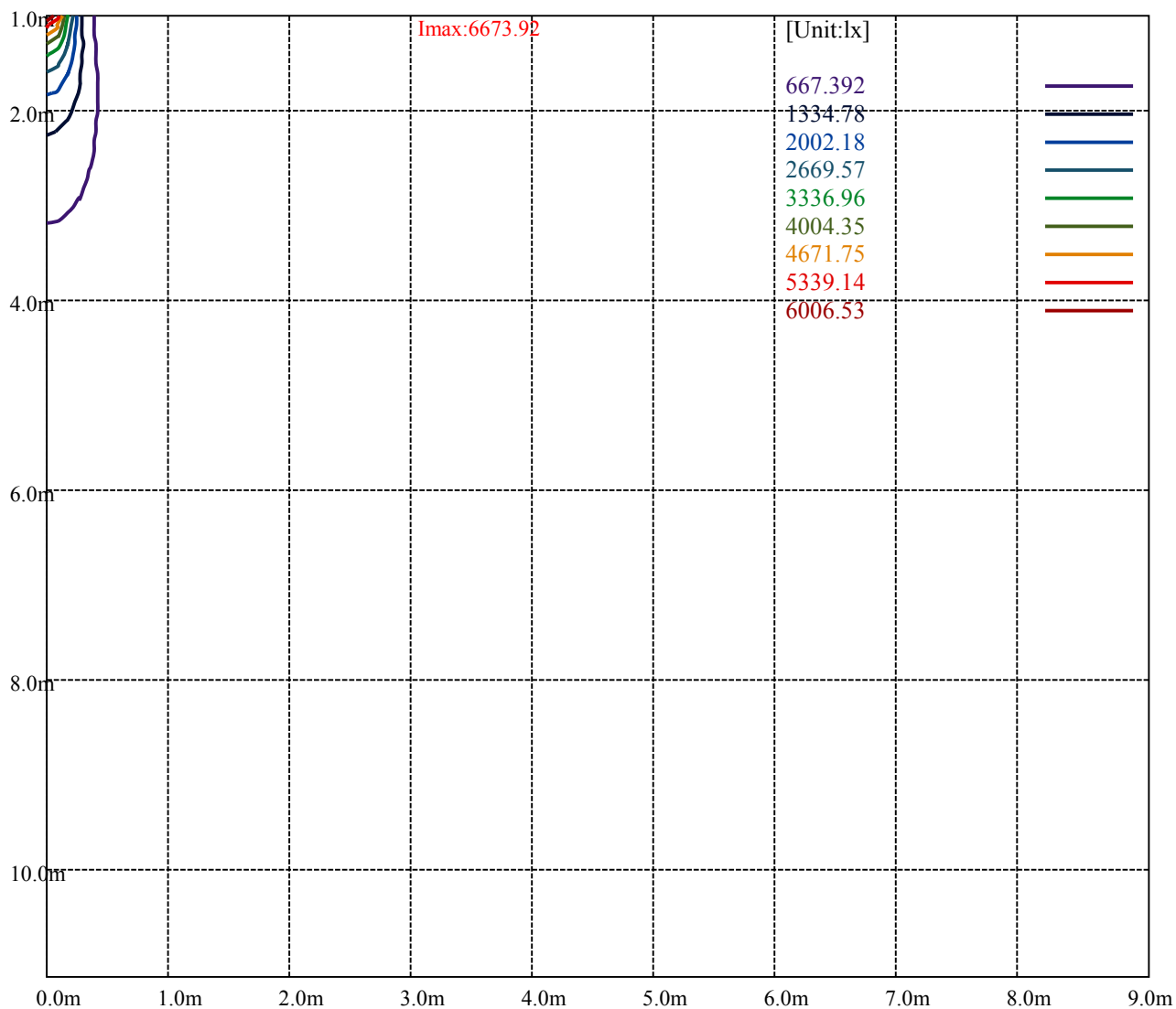
Road

Imax:6673.92

(10%Imax)	667.392	—
(20%Imax)	1334.78	—
(30%Imax)	2002.18	—
(40%Imax)	2669.57	—
(50%Imax)	3336.96	—
(60%Imax)	4004.35	—
(70%Imax)	4671.75	—
(80%Imax)	5339.14	—
(90%Imax)	6006.53	—



(10%Emax)	74.15456	—
(20%Emax)	148.3089	—
(30%Emax)	222.4633	—
(40%Emax)	296.6189	—
(50%Emax)	370.7733	—
(60%Emax)	444.9278	—
(70%Emax)	519.0823	—
(80%Emax)	593.2366	—
(90%Emax)	667.3911	—



Luminance Table

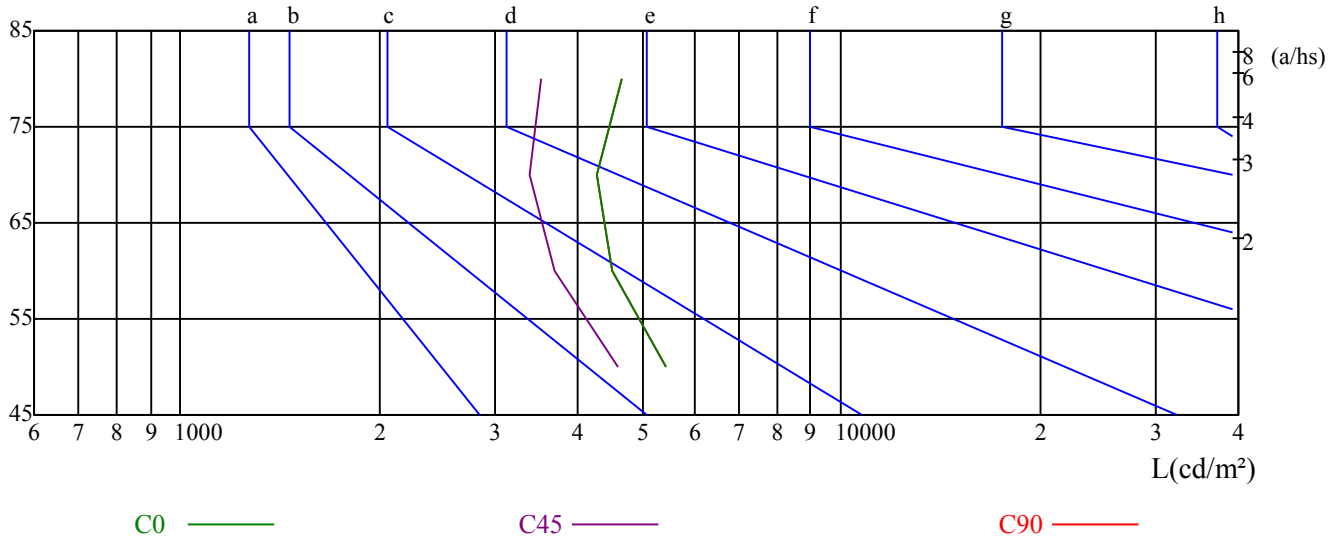
γ	45	50	55	60	65	70	75	80	85
C0	0	5436	0	4499	0	4258	0	4670	0
C45	0	4611	0	3695	0	3369	0	3526	0
C90	0	5436	0	4499	0	4258	0	4670	0

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
8729	8729	8729	13958	13958	13958	41086	41086	41086

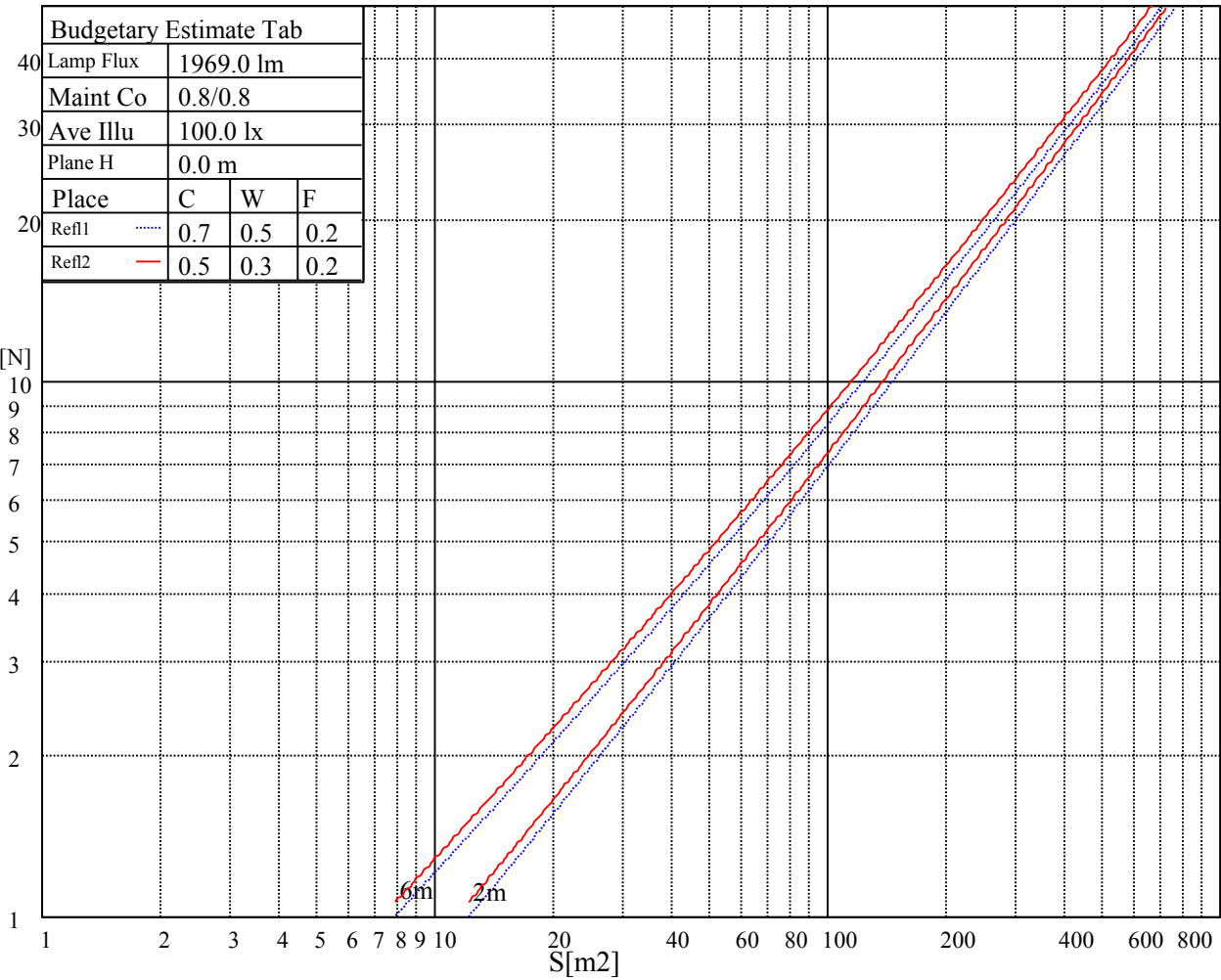
Glare Table

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

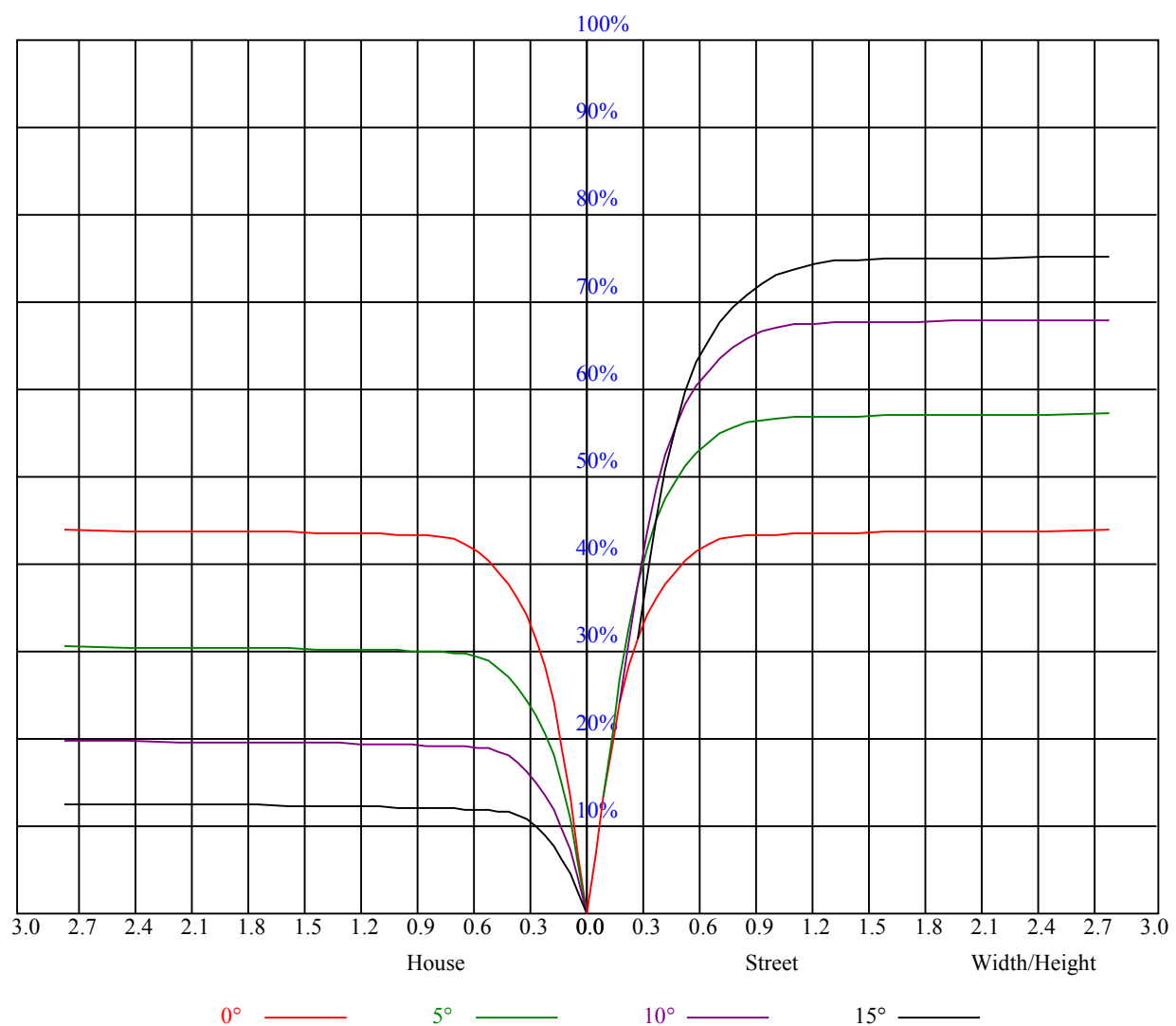
Luminance Limiting Curve

 $\gamma(^{\circ})$ 

Illumination assessment according UGR											
Rf of Ceiling		70	70	50	50	30	70	70	50	50	30
Rf of Wall		50	30	50	30	30	50	30	50	30	30
Rf of Floor		20	20	20	20	20	20	20	20	20	20
Room dimensions		Viewed crosswise					Viewed endwise				
X	Y										
2H	2H	5.95	6.88	6.32	7.19	7.50	5.29	6.21	5.65	6.52	6.84
	3H	7.66	8.47	8.04	8.80	9.17	7.20	8.01	7.58	8.35	8.72
	4H	8.63	9.38	9.04	9.73	10.13	8.27	9.02	8.68	9.38	9.77
	6H	9.71	10.39	10.13	10.77	11.17	9.42	10.11	9.84	10.49	10.88
	8H	10.26	10.90	10.69	11.29	11.71	10.00	10.65	10.44	11.04	11.45
	12H	11.13	11.74	11.56	12.13	12.56	10.91	11.53	11.35	11.91	12.35
4H	2H	6.25	7.00	6.66	7.36	7.75	5.70	6.46	6.11	6.81	7.20
	3H	8.26	8.88	8.68	9.29	9.69	7.90	8.52	8.31	8.93	9.33
	4H	9.42	9.97	9.85	10.39	10.84	9.14	9.69	9.58	10.12	10.57
	6H	10.60	11.07	11.07	11.52	11.99	10.38	10.85	10.85	11.31	11.78
	8H	11.27	11.71	11.75	12.16	12.64	11.08	11.52	11.56	11.97	12.45
	12H	12.17	12.55	12.66	13.04	13.52	12.01	12.39	12.50	12.88	13.35
8H	4H	9.75	10.19	10.23	10.64	11.12	9.51	9.95	9.99	10.41	10.88
	6H	11.17	11.51	11.68	12.02	12.51	10.99	11.34	11.50	11.84	12.33
	8H	12.00	12.30	12.53	12.83	13.33	11.84	12.15	12.38	12.67	13.17
	12H	13.06	13.32	13.58	13.82	14.40	12.92	13.18	13.44	13.68	14.26
12H	4H	9.81	10.19	10.30	10.68	11.16	9.59	9.97	10.08	10.45	10.93
	6H	11.52	11.62	11.85	12.09	12.64	11.35	11.45	11.68	11.92	12.47
	8H	12.23	12.49	12.75	12.99	13.57	12.09	12.35	12.61	12.85	13.43
Variation with the observer position at spacings:											
S = 1.0H		5.7/-6.6					5.7/-6.6				
S = 1.5H		8.0/-5.2					8.0/-5.2				
S = 2.0H		9.6/-4.1					9.6/-4.1				
Standard tables:		BK2					BK2				
Uncorrected UGR		-0.5					-0.5				



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	1.05	1.05	1.05	1.03	1.03	1.03	0.98	0.98	0.98	0.94	0.94	0.94	0.90	0.90	0.90	0.89
1	0.99	0.97	0.95	0.97	0.95	0.93	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.84
2	0.94	0.90	0.88	0.92	0.89	0.87	0.89	0.87	0.85	0.87	0.85	0.83	0.84	0.83	0.82	0.80
3	0.89	0.85	0.82	0.88	0.84	0.82	0.86	0.83	0.80	0.83	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	0.81	0.77	0.74	0.79	0.76	0.73	0.78	0.75	0.73	0.76	0.74	0.72	0.71
6	0.78	0.74	0.71	0.77	0.74	0.71	0.76	0.73	0.70	0.75	0.72	0.70	0.74	0.71	0.69	0.68
7	0.75	0.71	0.68	0.75	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.67	0.72	0.69	0.67	0.66
8	0.73	0.68	0.66	0.72	0.68	0.65	0.71	0.68	0.65	0.70	0.67	0.65	0.70	0.67	0.65	0.64
9	0.70	0.66	0.63	0.70	0.66	0.63	0.69	0.65	0.63	0.68	0.65	0.63	0.68	0.65	0.63	0.62
10	0.68	0.64	0.61	0.68	0.64	0.61	0.67	0.63	0.61	0.66	0.63	0.61	0.66	0.63	0.61	0.60



Nata 1657-S

Intensity data(cd)

Appendix Page: 16 Total:17

C/γ(°)	0.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0
0.0	6669.56	6665.06	6418.69	5903.44	5297.06	4464.00	3620.25	2838.94	2133.00
45.0	6686.44	6585.19	6261.75	5731.88	4991.63	4104.00	3295.69	2511.56	1877.06
90.0	6656.63	6501.38	6062.63	5456.25	4666.50	3760.31	2958.75	2260.69	1701.56
135.0	6683.06	6523.88	6161.63	5587.88	4851.00	3943.13	3205.13	2390.63	1775.25
180.0	6669.56	6450.75	5991.75	5416.88	4592.25	3710.25	2973.38	2257.88	1722.38
225.0	6686.44	6566.06	6211.69	5649.75	4938.19	4068.00	3230.44	2478.38	1885.50
270.0	6656.63	6628.50	6344.44	5847.19	5177.81	4334.63	3534.75	2708.44	2004.75
315.0	6683.06	6615.00	6290.44	5791.50	5060.81	4178.25	3372.75	2571.75	1956.38
360.0	6669.56	6665.06	6418.69	5903.44	5297.06	4464.00	3620.25	2838.94	2133.00
C/γ(°)	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0
0.0	1615.50	1239.19	990.56	840.38	761.63	704.81	666.00	600.19	474.19
45.0	1451.25	1114.31	912.94	797.06	734.06	689.63	652.50	550.13	409.50
90.0	1206.00	995.18	818.66	731.81	670.67	635.40	583.93	474.47	349.37
135.0	1347.75	1054.13	870.75	772.31	720.56	687.94	651.38	540.00	390.94
180.0	1319.06	1040.91	854.44	773.78	719.61	683.94	623.08	498.21	354.71
225.0	1413.56	1115.44	900.51	791.94	727.37	689.12	647.10	540.00	405.68
270.0	1532.25	1148.63	909.00	768.94	690.19	641.25	608.06	530.44	411.75
315.0	1481.06	1111.11	913.95	797.23	725.63	684.84	651.94	559.41	431.10
360.0	1615.50	1239.19	990.56	840.38	761.63	704.81	666.00	600.19	474.19
C/γ(°)	36.0	38.0	40.0	42.0	44.0	46.0	48.0	50.0	52.0
0.0	328.50	181.86	72.96	27.90	16.54	11.53	10.86	10.46	10.18
45.0	287.44	139.73	53.21	24.92	16.09	13.84	13.11	12.60	12.26
90.0	218.42	109.80	39.94	27.62	20.08	18.73	17.49	16.03	14.96
135.0	292.50	119.25	42.75	27.23	19.80	17.55	16.43	15.30	14.23
180.0	210.21	95.34	30.71	21.21	14.46	13.33	12.49	11.93	11.53
225.0	268.31	141.58	46.46	27.62	18.45	15.86	15.02	14.01	13.33
270.0	289.69	159.47	66.38	31.16	22.44	17.83	16.71	15.53	14.46
315.0	285.75	153.96	49.50	25.65	17.89	14.23	13.50	12.88	12.32
360.0	328.50	181.86	72.96	27.90	16.54	11.53	10.86	10.46	10.18
C/γ(°)	54.0	56.0	58.0	60.0	62.0	64.0	66.0	68.0	70.0
0.0	9.96	9.84	9.68	9.51	9.34	9.11	9.00	8.83	8.72
45.0	11.81	11.42	11.03	10.52	10.07	9.68	9.39	9.17	8.94
90.0	13.73	12.77	11.70	11.03	10.52	9.96	9.56	9.34	9.11
135.0	13.33	12.49	11.59	10.91	10.35	9.84	9.51	9.17	8.89
180.0	11.19	10.86	10.52	10.18	9.79	9.51	9.23	9.00	8.78
225.0	12.54	11.87	11.08	10.52	10.01	9.56	9.23	8.94	8.72
270.0	13.56	12.43	11.64	10.80	10.24	9.84	9.51	9.17	9.00
315.0	11.93	11.42	10.69	10.24	9.79	9.45	9.17	8.94	8.72
360.0	9.96	9.84	9.68	9.51	9.34	9.11	9.00	8.83	8.72
C/γ(°)	72.0	74.0	76.0	78.0	80.0	82.0	84.0	86.0	88.0
0.0	8.61	8.55	8.44	8.33	8.33	8.21	8.16	8.10	7.93
45.0	8.72	8.55	8.44	8.33	8.21	8.10	8.04	7.88	7.76
90.0	8.83	8.78	8.66	8.55	8.44	8.44	8.33	7.88	7.71
135.0	8.66	8.49	8.33	8.21	8.16	8.10	7.99	7.93	7.76
180.0	8.66	8.49	8.38	8.33	8.27	8.16	7.99	7.93	7.82
225.0	8.55	8.38	8.27	8.16	8.10	8.04	7.99	7.93	7.82
270.0	8.83	8.72	8.61	8.55	8.49	8.44	8.38	8.10	7.93
315.0	8.55	8.44	8.33	8.27	8.21	8.16	8.04	7.93	7.82
360.0	8.61	8.55	8.44	8.33	8.33	8.21	8.16	8.10	7.93

Intensity data(cd)

Appendix Page: 17 Total:17

C/ γ (°)	90.0
0.0	7.71
45.0	7.71
90.0	7.65
135.0	7.65
180.0	7.71
225.0	7.71
270.0	7.71
315.0	7.71
360.0	7.71