TEST REPORT

NAME OF SAMPLE	**LED TUBE**
TRADE MARK	**N/A**
MODEL/TYPE	**T8-120MW, 4000K**
CLIENT	
ADDRESS OF CLIENT	
INSPECTION CLASSIFICATION	**Commission Test**
TEST ITEM	**IES Test**

Test Report

Name or sample	LED TUBE	Report No.	LCS1411261126S
Client		ADDRESS OF CLIENT	
Name of receipt	Delivering	Inspection Classification	Commission test
Test Model	T8-120MW, 4000K	Test date	2014.11.24
Rating of sample	AC100-240V, 50/60Hz, 18W, 4000K, 1200*26*31		
Test standard	This test report presents the results of measurements performed on the solid lighting in accordance with LM-79-08 Electrical and Photometric Measurements of Solid-State Lighting Products.		
Test result	Measured data see report attached.		
Testing laboratory			
Ambient Temperature (°C)	25	Relative Humidity (%)	50
Test report Special-purpose seal	Test by:	Marine Wu	Marine Wu
	Approved by:	Hart Qiu	
	Date of issue	2014-11-27	

LumCAT: T8-120MW, 4000K
Luminaire: LED TUBE
Report No: LCS1411261126S
Test No: 1411240034
LampCAT: LED
Lamp flux(lm)
Number of Lamps: 1
Length(mm): 1200
Phm Type: C

Voltage(V): 230.400
Current(A): 0.082
Power (W): 18.400
PF: 0.972
Ballast type: -
Width(mm): 26
Height(mm): 31

Photometric Results

Lumens(lm): 1342.63
Lumens(lm)/Power(W): 72.97
Central intensity(cd): 352.548
Maximum intensity(cd): 352.548
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Left=52.3 Right=54.8
[C90/270]Left=71.1 Right=73.0
Field angle(10%Imax): [C0/180]Left=78.0 Right=80.6
[C90/270]Left=124.8 Right=123.5
Beam angle of C0plane: 107.16
Maximum s/h: C0_180=1.22 C90_270=1.36
Up flux rate of LUM(%): 10.47%
Down flux rate of LUM(%): 89.53%
CIE Type : Semidirect lighting
Output flux ratio in π solid angle : 61.525%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	352.263	.000	.000	.000%	.000%
5.0	350.770	8.405	8.405	.626%	.626%
10.0	346.312	24.937	33.341	1.857%	2.483%
15.0	338.990	40.652	73.993	3.028%	5.511%
20.0	328.856	55.040	129.033	4.099%	9.610%
25.0	316.308	67.666	196.699	5.040%	14.650%
30.0	301.420	78.174	274.873	5.822%	20.473%
35.0	284.623	86.299	361.172	6.428%	26.900%
40.0	266.124	91.888	453.060	6.844%	33.744%
45.0	246.198	94.860	547.920	7.065%	40.809%
50.0	225.656	95.345	643.265	7.101%	47.911%
55.0	204.193	93.464	736.729	6.961%	54.872%
60.0	182.269	89.329	826.058	6.653%	61.525%
65.0	160.608	83.354	909.412	6.208%	67.733%
70.0	139.221	75.919	985.330	5.654%	73.388%
75.0	118.790	67.440	1052.770	5.023%	78.411%
80.0	99.544	58.420	1111.190	4.351%	82.762%
85.0	82.516	49.470	1160.660	3.685%	86.447%
90.0	68.584	41.372	1202.032	3.081%	89.528%
95.0	38.030	29.192	1231.224	2.174%	91.702%
100.0	37.492	20.521	1251.745	1.528%	93.231%
105.0	33.200	18.915	1270.661	1.409%	94.639%
110.0	28.325	16.082	1286.742	1.198%	95.837%
115.0	24.351	13.338	1300.080	.993%	96.831%
120.0	20.486	10.900	1310.980	.812%	97.642%
125.0	16.797	8.618	1319.598	.642%	98.284%
130.0	13.515	6.591	1326.189	.491%	98.775%
135.0	10.693	4.892	1331.081	.364%	99.140%
140.0	8.607	3.574	1334.654	.266%	99.406%
145.0	6.960	2.597	1337.252	.193%	99.599%
150.0	5.665	1.859	1339.111	.138%	99.738%
155.0	4.754	1.319	1340.429	.098%	99.836%
160.0	4.040	.922	1341.352	.069%	99.905%
165.0	3.469	.619	1341.971	.046%	99.951%
170.0	3.030	.386	1342.356	.029%	99.979%
175.0	2.833	.210	1342.566	.016%	99.995%
180.0	2.876	.068	1342.634	.005%	100.000%

Zonal flux distribution table

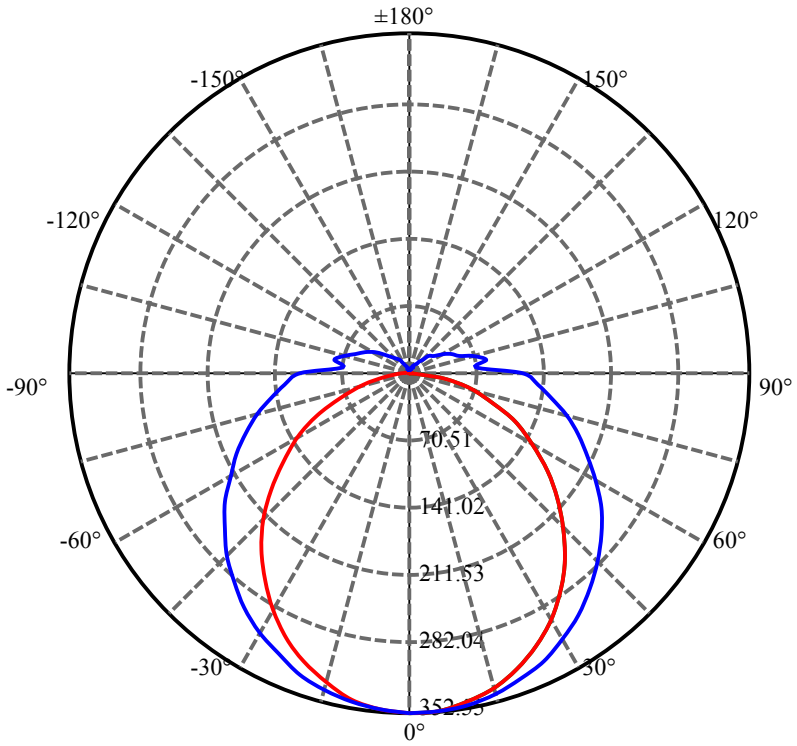
ZONAL LUMEN SUMMARY

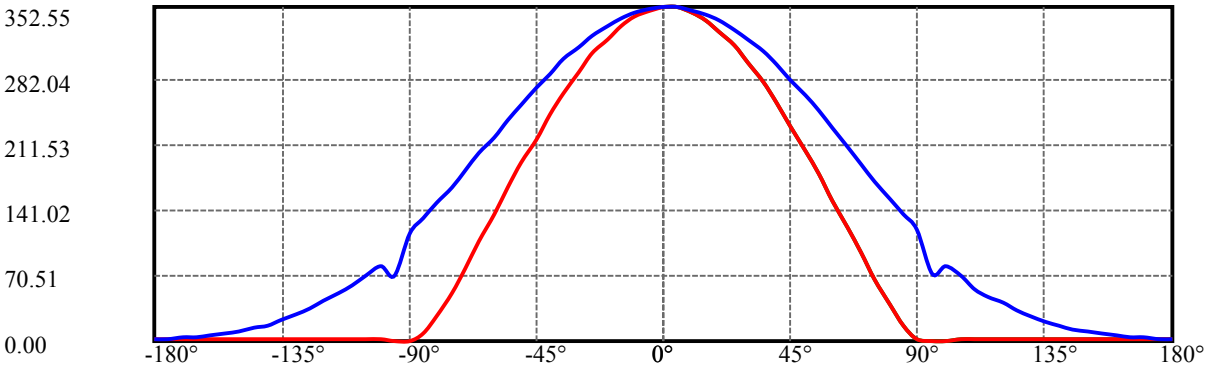
Zone	Lumens	%Fixt
0-30	274.87	20.47%
0-40	453.06	33.74%
0-60	826.06	61.53%
0-90	1202.03	89.53%
0-120	1310.98	97.64%
0-180	1342.63	100.00%
60-90	465.30	34.66%
90-120	150.32	11.20%
90-130	165.53	12.33%
90-150	178.45	13.29%
90-180	181.91	13.55%
0-76.83	1074.11	80.00%

ZONAL LUMEN SUMMARY

0-10	33.34
10-20	95.69
20-30	145.84
30-40	178.19
40-50	190.21
50-60	182.79
60-70	159.27
70-80	125.86
80-90	90.84
90-100	49.71
100-110	35.00
110-120	24.24
120-130	15.21
130-140	8.47
140-150	4.46
150-160	2.24
160-170	1.00
170-180	0.21

Light Distribution Curve [Unit:cd]





C0(Max):

C0/C180:

C90/C270:

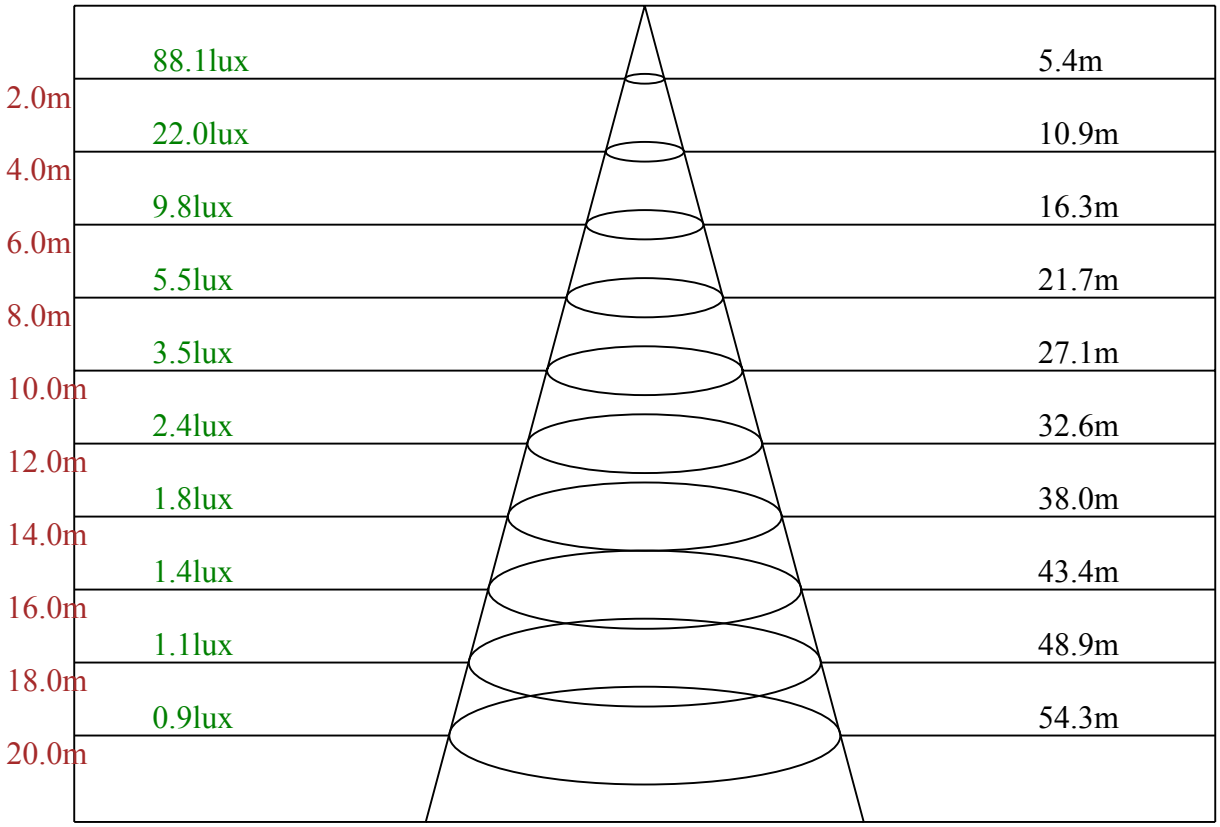
Field angle(10%Imax):C0/180Left:78.0 Right:80.6

:C90/270Left:124.8 Right:123.5

Beam Angle(50%Imax):C0/180Left:52.3 Right:54.8

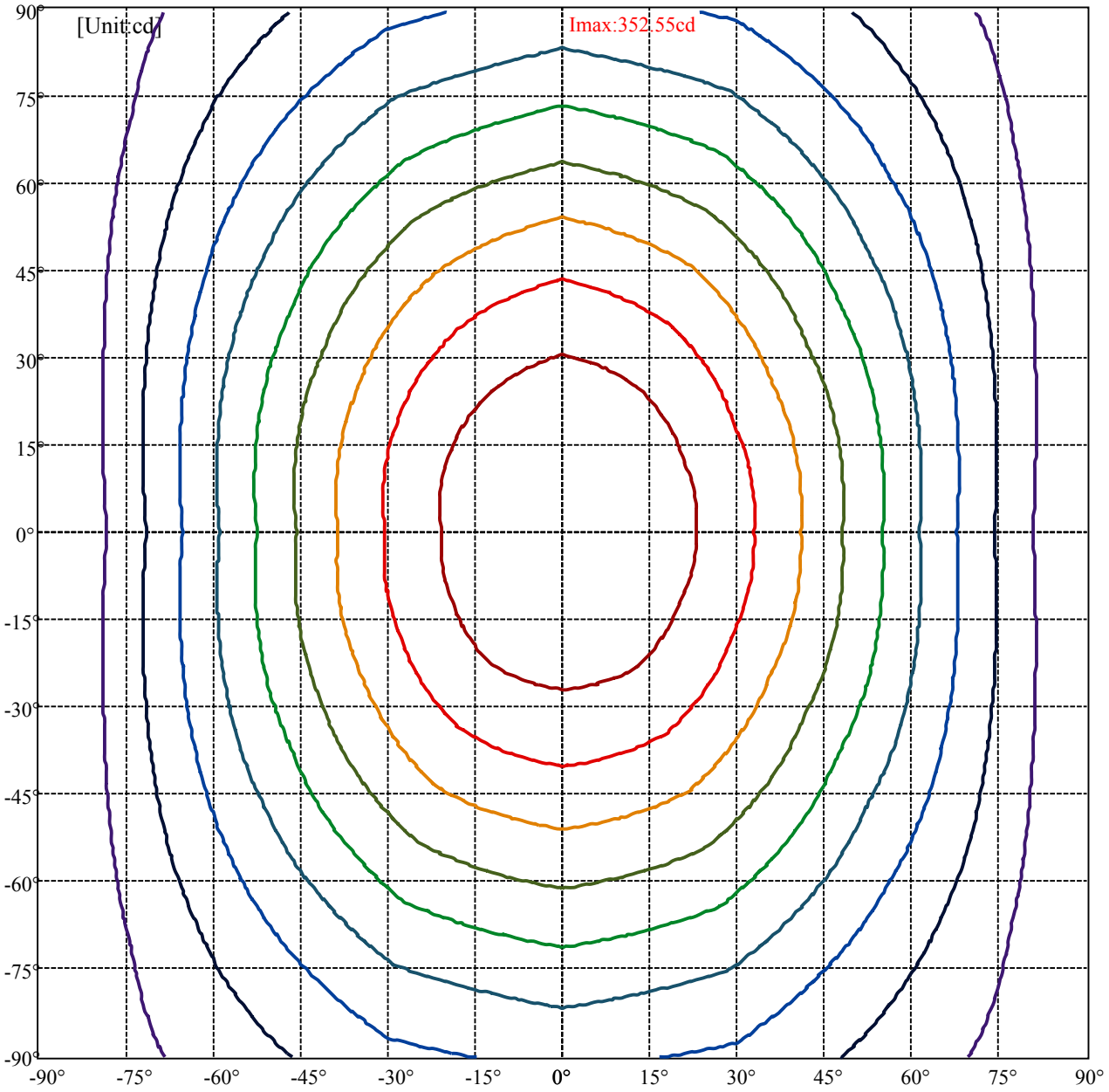
:C90/270Left:71.1 Right:73.0

Lux distance Curve



Beam angle of C0plane107.16

ISO-Intensity(V-H)



(10%Imax) 35.2416
(20%Imax) 70.4833
(30%Imax) 105.725
(40%Imax) 140.967
(50%Imax) 176.208
(60%Imax) 211.45
(70%Imax) 246.692
(80%Imax) 281.933
(90%Imax) 317.175

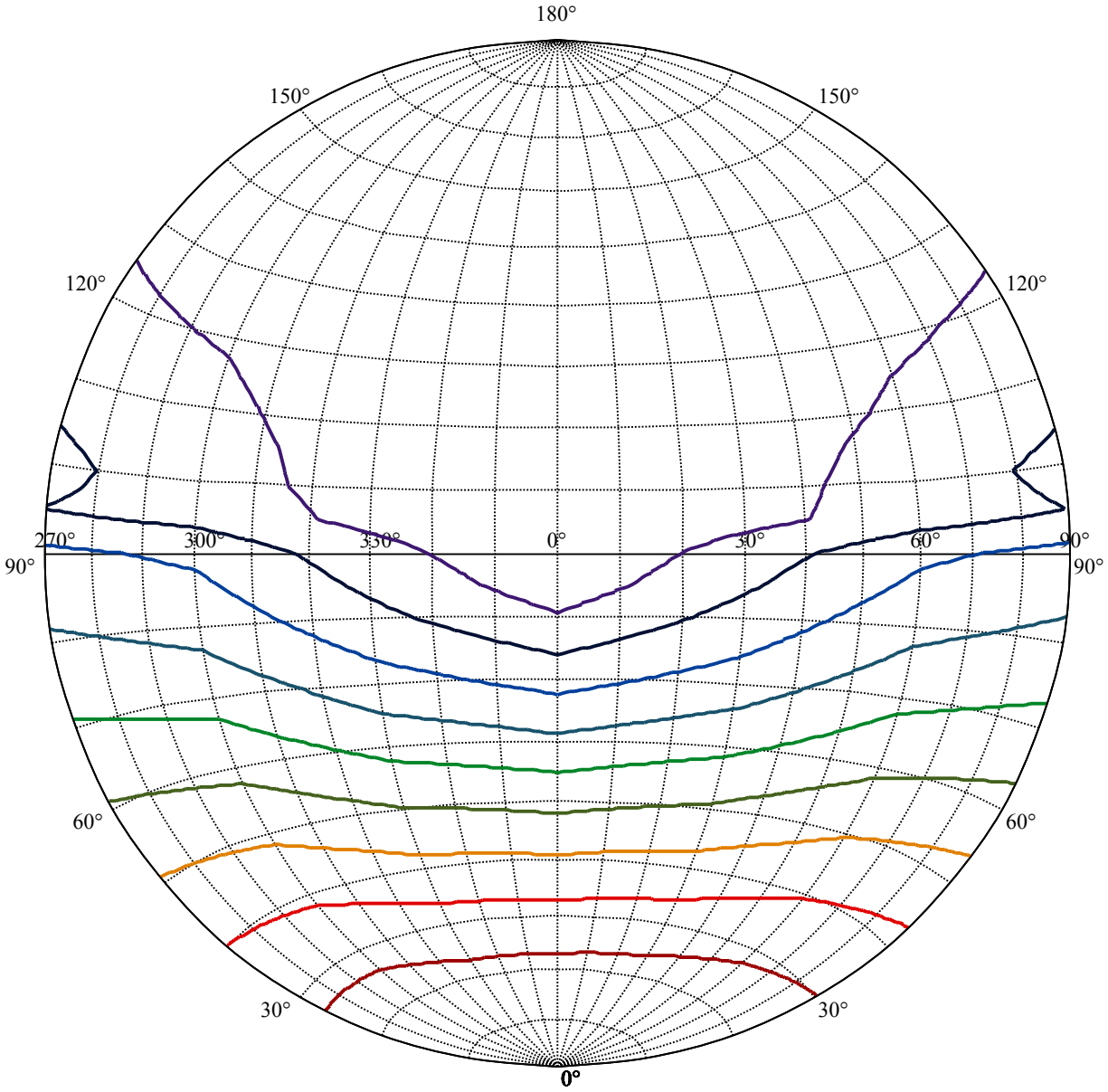
Equipment: GMS-1800B
Temperature(°C): 25.0

Date: 2014-11-24
Humidity(%): 50.0%

Operator: Marine
Distance(m): 11.48

T8-120MW, 4000K

ISO candela diagram on circular web



[Unit:cd]

Imax:352.55

(10%Imax) 35.2548

(20%Imax) 70.5097

(30%Imax) 105.764

(40%Imax) 141.019

(50%Imax) 176.274

(60%Imax) 211.529

(70%Imax) 246.784

(80%Imax) 282.039

(90%Imax) 317.293

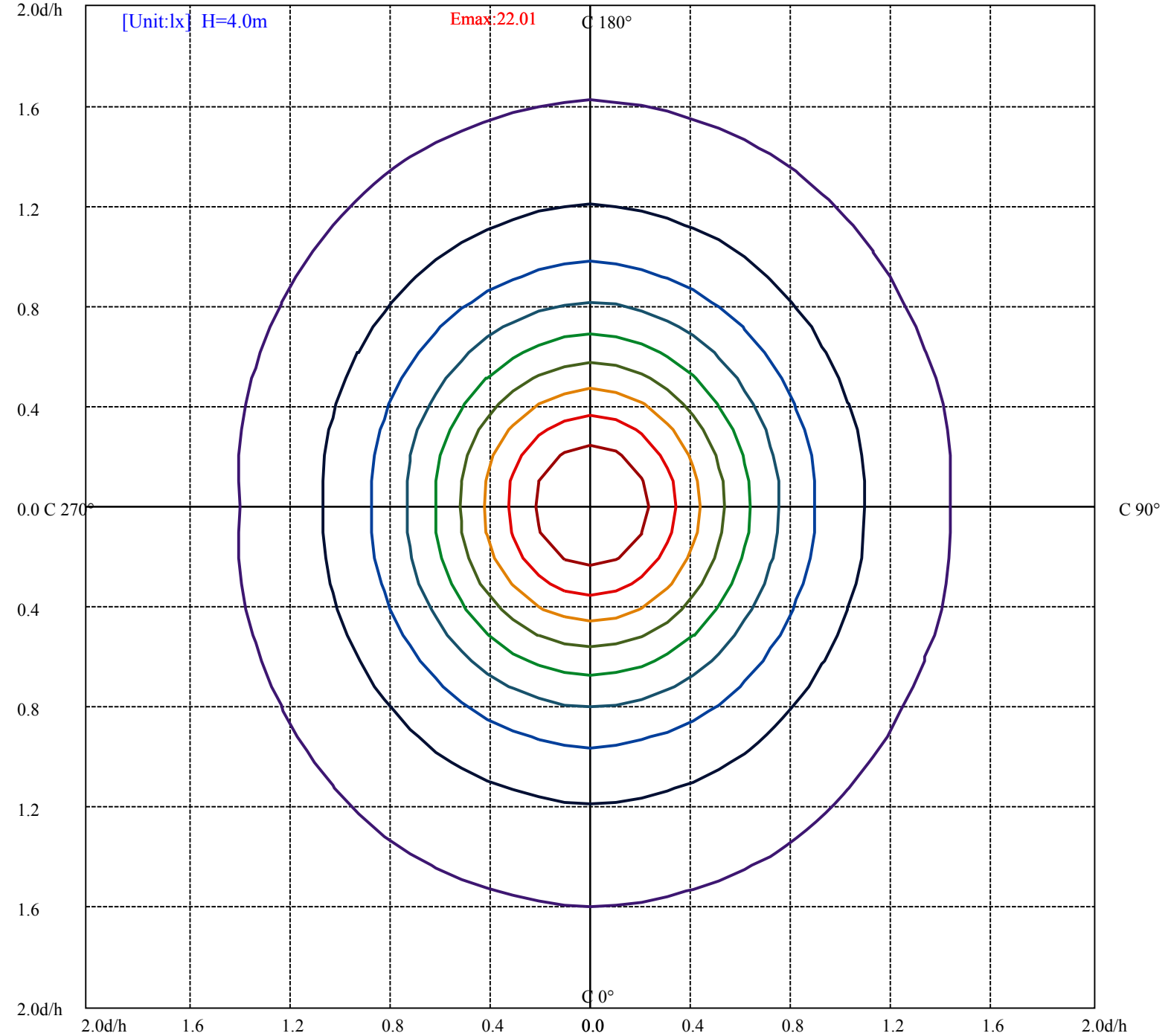
Equipment: GMS-1800B
Temperature(°C): 25.0

Date: 2014-11-24
Humidity(%): 50.0%

Operator: Marine
Distance(m): 11.48

T8-120MW, 4000K

ISO illuminance diagram



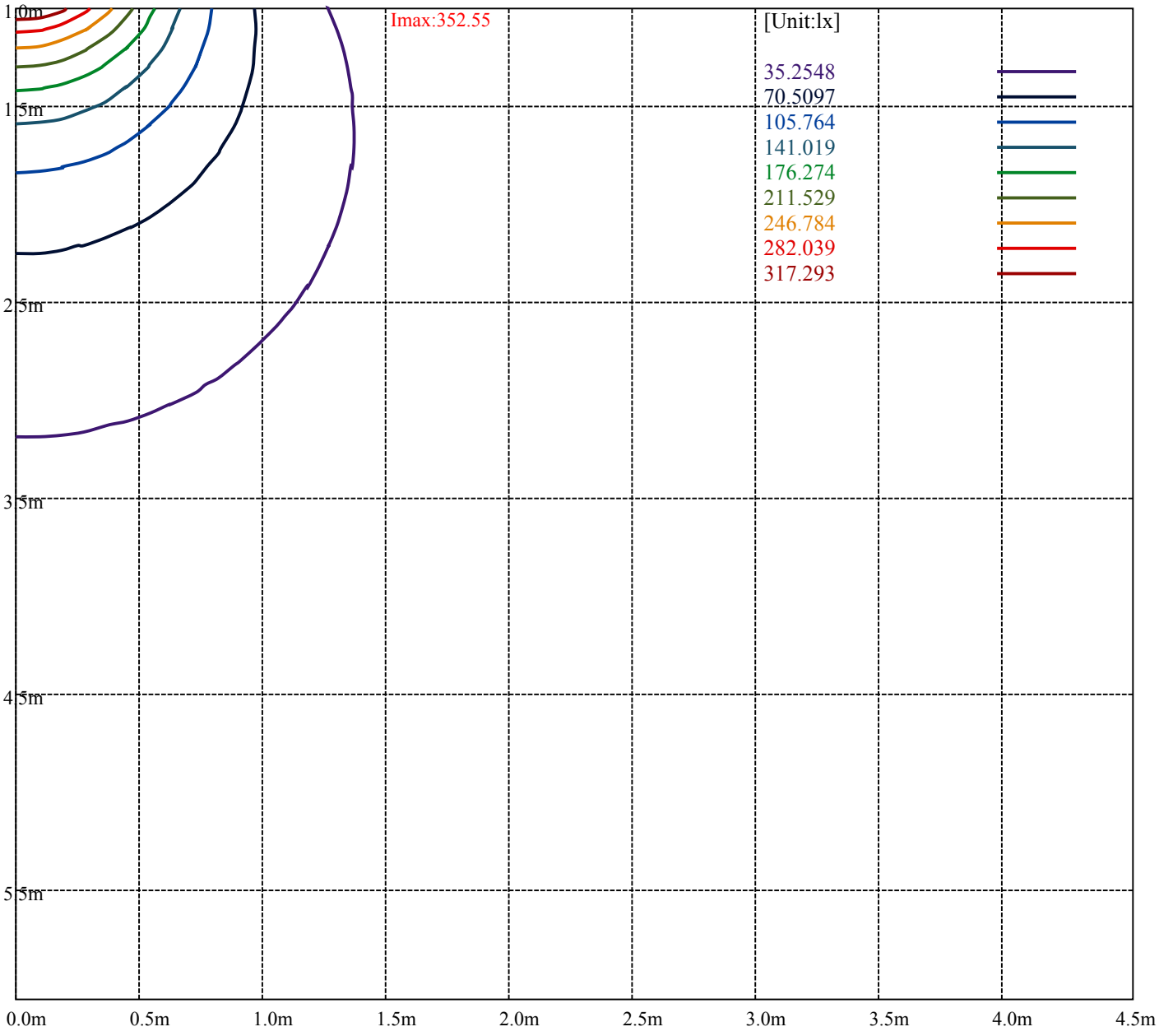
(10%Emax) 2.200544
(20%Emax) 4.401087
(30%Emax) 6.601625
(40%Emax) 8.802188
(50%Emax) 11.00275
(60%Emax) 13.20325
(70%Emax) 15.40381
(80%Emax) 17.60438
(90%Emax) 19.80487

Equipment: GMS-1800B
Temperature(°C): 25.0

Date: 2014-11-24
Humidity(%): 50.0%

Operator: Marine
Distance(m): 11.48

Space ISO Lux diagram



Equipment: GMS-1800B
Temperature(°C): 25.0

Date: 2014-11-24
Humidity(%): 50.0%

Operator: Marine
Distance(m): 11.48

Luminance Limitting Curve(no luminous side)

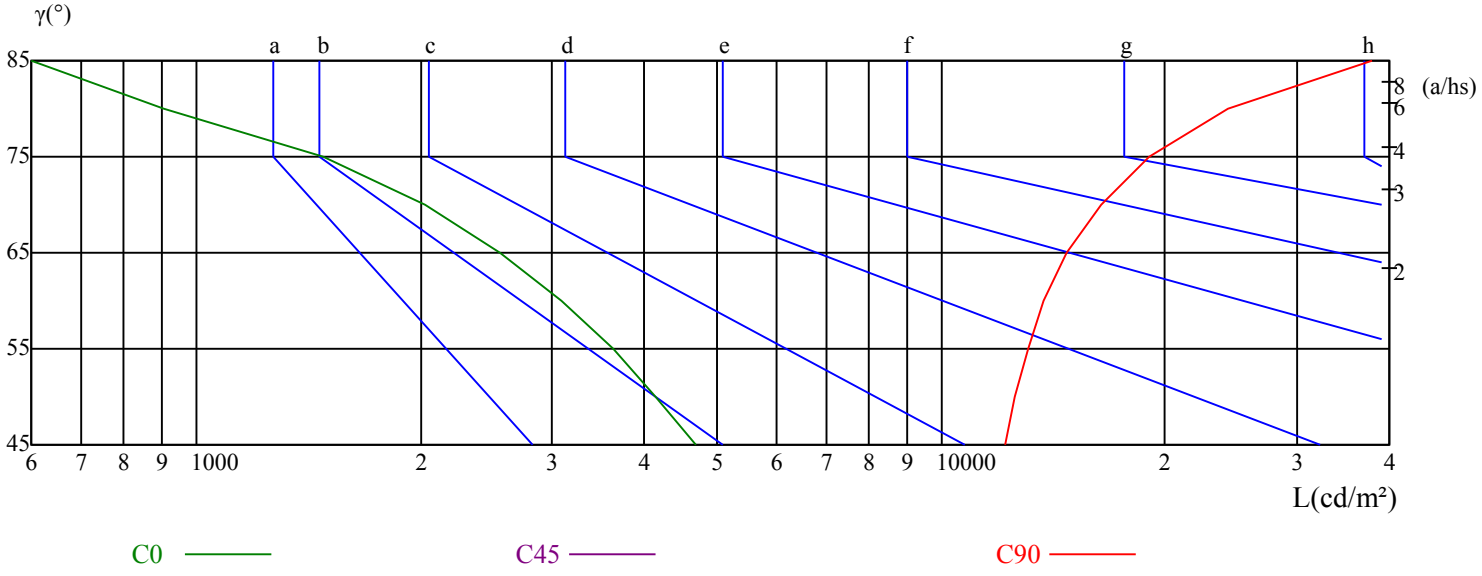
Luminance Table

γ	45	50	55	60	65	70	75	80	85
C0	4682	4146	3628	3089	2559	2027	1479	905	401
C45	0	0	0	0	0	0	0	0	0
C90	12213	12593	13071	13758	14750	16393	19091	24242	37965

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

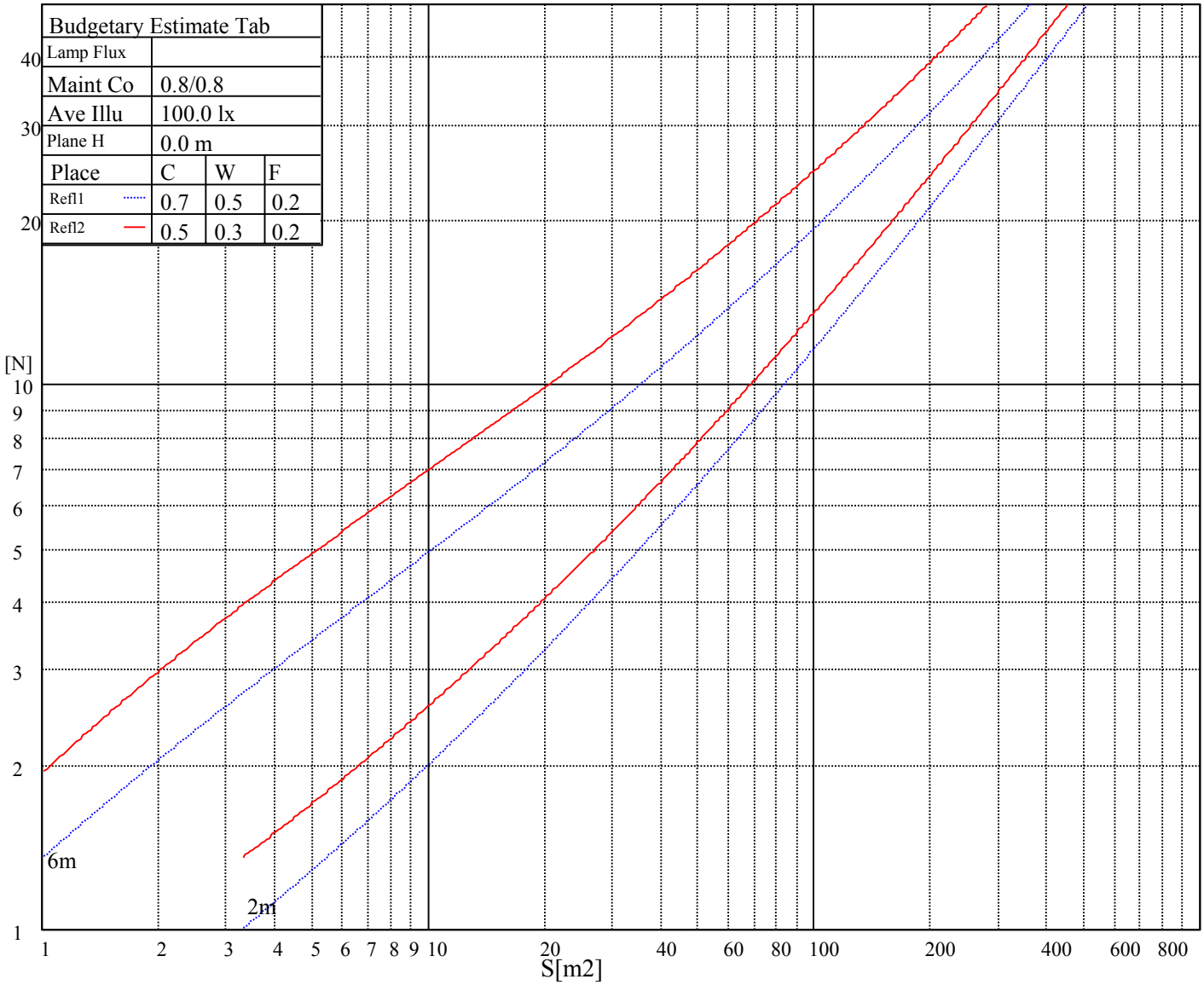
Luminance Limitting Curve



UGR Glare

Illuminatin assessment acconding 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	15.3	16.6	15.8	17.1	17.5	17.7	19.1	18.2	19.5	20.0
	3H	16.6	17.8	17.1	18.2	18.7	20.3	21.5	20.8	22.0	22.5
	4H	16.8	17.9	17.4	18.4	18.9	21.5	22.5	22.0	23.0	23.6
	6H	17.2	18.2	17.7	18.7	19.3	23.0	24.1	23.6	24.6	25.1
	8H	17.3	18.3	17.8	18.8	19.4	23.9	24.9	24.4	25.4	26.0
	12H	17.1	17.9	17.7	18.5	19.1	24.6	25.4	25.2	26.0	26.6
4H	2H	16.1	17.2	16.7	17.7	18.2	18.0	19.0	18.5	19.5	20.1
	3H	17.6	18.4	18.2	19.0	19.6	20.7	21.5	21.3	22.1	22.7
	4H	18.3	19.1	18.9	19.6	20.3	22.4	23.1	22.9	23.7	24.4
	6H	18.8	19.6	19.3	20.1	20.8	24.1	24.9	24.7	25.5	26.1
	8H	18.7	19.2	19.4	19.8	20.6	24.8	25.3	25.5	26.0	26.7
	12H	18.8	19.3	19.4	19.9	20.6	25.9	26.4	26.6	27.0	27.8
8H	4H	19.0	19.5	19.6	20.1	20.8	22.5	22.9	23.1	23.6	24.3
	6H	19.7	20.2	20.4	20.8	21.6	24.4	24.9	25.0	25.5	26.2
	8H	20.0	20.4	20.6	21.1	21.8	25.5	26.0	26.1	26.6	27.3
	12H	20.1	20.6	20.8	21.3	22.0	26.7	27.2	27.4	27.8	28.6
12H	4H	19.3	19.7	19.9	20.4	21.1	22.5	23.0	23.2	23.6	24.4
	6H	20.1	20.6	20.8	21.2	22.0	24.5	25.0	25.1	25.6	26.3
	8H	20.5	21.0	21.1	21.6	22.3	25.6	26.1	26.3	26.7	27.5
Variation with the observer position at spacings:											
S = 1.0H		0.2/-0.5					0.2/-1.1				
S = 1.5H		0.5/-0.7					0.4/-1.0				
S = 2.0H		0.8/-1.0					0.3/-0.8				
Standard tables:		BKFF					BKBF				
Uncorrected UGR		4.1					9.2				
According 1000lm											

Budgetary Estimate Table



Equipment: GMS-1800B
Temperature(°C): 25.0

Date: 2014-11-24
Humidity(%): 50.0%

Operator: Marine
Distance(m): 11.48

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	1.17	1.17	1.17	1.13	1.13	1.13	1.05	1.05	1.05	0.99	0.99	0.99	0.92	0.92	0.92	0.90
1	0.98	0.93	0.88	0.95	0.90	0.86	0.88	0.84	0.81	0.83	0.79	0.77	0.77	0.75	0.72	0.70
2	0.84	0.76	0.70	0.81	0.74	0.68	0.76	0.70	0.65	0.71	0.66	0.62	0.66	0.62	0.59	0.56
3	0.73	0.64	0.57	0.71	0.62	0.56	0.66	0.59	0.54	0.62	0.56	0.51	0.58	0.53	0.49	0.46
4	0.64	0.55	0.48	0.62	0.54	0.47	0.58	0.51	0.45	0.55	0.48	0.43	0.51	0.46	0.42	0.39
5	0.57	0.48	0.41	0.55	0.47	0.40	0.52	0.44	0.39	0.49	0.42	0.37	0.46	0.40	0.36	0.33
6	0.51	0.42	0.35	0.50	0.41	0.35	0.47	0.39	0.34	0.44	0.38	0.32	0.42	0.36	0.31	0.29
7	0.46	0.37	0.31	0.45	0.37	0.30	0.43	0.35	0.30	0.40	0.34	0.29	0.38	0.32	0.28	0.25
8	0.42	0.33	0.27	0.41	0.33	0.27	0.39	0.32	0.26	0.37	0.30	0.25	0.35	0.29	0.25	0.23
9	0.39	0.30	0.25	0.38	0.30	0.24	0.36	0.29	0.24	0.34	0.27	0.23	0.32	0.26	0.22	0.20
10	0.36	0.28	0.22	0.35	0.27	0.22	0.33	0.26	0.21	0.31	0.25	0.21	0.30	0.24	0.20	0.18
RCR	COEFFCIENTS OF UTILIZATION RHOFC=20 WLC															
1	0.38	0.21	0.07	0.36	0.21	0.07	0.35	0.20	0.06	0.33	0.19	0.06	0.31	0.18	0.06	
2	0.33	0.18	0.06	0.32	0.18	0.05	0.30	0.17	0.05	0.29	0.16	0.05	0.27	0.15	0.05	
3	0.29	0.16	0.05	0.29	0.15	0.05	0.27	0.15	0.04	0.25	0.14	0.04	0.24	0.13	0.04	
4	0.27	0.14	0.04	0.26	0.13	0.04	0.24	0.13	0.04	0.23	0.12	0.04	0.22	0.12	0.04	
5	0.24	0.12	0.04	0.23	0.12	0.04	0.22	0.12	0.03	0.21	0.11	0.03	0.20	0.11	0.03	
6	0.22	0.11	0.03	0.22	0.11	0.03	0.20	0.10	0.03	0.19	0.10	0.03	0.18	0.10	0.03	
7	0.20	0.10	0.03	0.20	0.10	0.03	0.19	0.10	0.03	0.18	0.09	0.03	0.17	0.09	0.03	
8	0.19	0.09	0.03	0.19	0.09	0.03	0.18	0.09	0.03	0.17	0.08	0.02	0.16	0.08	0.02	
9	0.18	0.09	0.02	0.17	0.08	0.02	0.16	0.08	0.02	0.16	0.08	0.02	0.15	0.08	0.02	
10	0.17	0.08	0.02	0.16	0.08	0.02	0.15	0.08	0.02	0.15	0.07	0.02	0.14	0.07	0.02	
RCR	COEFFCIENTS OF UTILIZATION RHOFC=20 CCLU															
0	0.27	0.27	0.27	0.23	0.23	0.23	0.16	0.16	0.16	0.09	0.09	0.09	0.03	0.03	0.03	
1	0.23	0.21	0.20	0.20	0.19	0.18	0.14	0.13	0.12	0.09	0.08	0.07	0.03	0.03	0.02	
2	0.20	0.18	0.16	0.18	0.16	0.14	0.13	0.12	0.10	0.08	0.07	0.06	0.03	0.02	0.02	
3	0.18	0.16	0.14	0.16	0.14	0.12	0.13	0.11	0.09	0.08	0.07	0.05	0.03	0.02	0.02	
4	0.17	0.14	0.13	0.15	0.13	0.11	0.12	0.10	0.08	0.08	0.06	0.05	0.03	0.02	0.02	
5	0.16	0.13	0.12	0.15	0.12	0.10	0.12	0.09	0.07	0.08	0.06	0.05	0.03	0.02	0.02	
6	0.15	0.13	0.11	0.14	0.11	0.10	0.11	0.09	0.07	0.07	0.06	0.04	0.03	0.02	0.01	
7	0.14	0.12	0.10	0.13	0.11	0.09	0.11	0.08	0.07	0.07	0.05	0.04	0.03	0.02	0.01	
8	0.14	0.11	0.10	0.13	0.11	0.09	0.10	0.08	0.07	0.07	0.05	0.04	0.03	0.02	0.01	
9	0.13	0.11	0.10	0.12	0.10	0.09	0.10	0.08	0.06	0.07	0.05	0.04	0.02	0.02	0.01	
10	0.13	0.11	0.10	0.12	0.10	0.08	0.10	0.08	0.06	0.07	0.05	0.04	0.02	0.02	0.01	

Intensity data(cd)

C/γ(°)	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
0.0	352.55	351.63	346.36	338.58	326.46	311.18	293.79	272.97	250.97
30.0	351.89	351.23	346.62	338.72	328.31	314.61	298.14	279.69	259.80
60.0	352.28	351.23	348.73	342.67	334.10	323.96	310.92	296.56	279.96
90.0	352.42	352.02	348.99	344.91	337.92	328.97	318.29	306.17	292.08
120.0	352.28	351.23	347.02	341.22	332.39	321.19	307.89	293.26	277.06
150.0	352.15	350.84	345.83	336.87	325.94	311.31	294.58	275.74	254.40
180.0	352.55	349.12	343.19	332.79	318.95	303.01	283.25	262.17	238.98
210.0	351.89	350.18	344.51	335.03	322.91	308.94	291.68	272.32	251.90
240.0	352.28	350.70	345.70	339.37	329.76	318.29	304.99	289.71	273.63
270.0	352.42	350.05	345.83	340.30	331.73	321.59	310.39	297.08	282.20
300.0	352.28	350.44	346.88	340.03	331.07	320.40	307.36	292.47	276.27
330.0	352.15	350.57	346.09	337.40	326.73	312.23	295.77	277.32	256.24
360.0	352.55	351.63	346.36	338.58	326.46	311.18	293.79	272.97	250.97

C/γ(°)	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0
0.0	226.47	201.31	175.48	147.69	120.02	92.48	65.08	38.07	15.94
30.0	237.93	215.14	192.48	168.50	145.31	122.52	102.10	83.26	66.14
60.0	262.57	244.65	225.15	205.52	186.68	167.45	148.61	131.35	114.75
90.0	276.40	260.33	242.54	224.23	205.26	187.34	169.03	150.58	133.72
120.0	259.14	240.30	221.59	201.57	182.07	163.63	145.05	127.27	111.06
150.0	232.79	209.34	185.63	162.57	138.73	116.33	96.04	77.33	60.73
180.0	213.69	188.39	161.65	133.33	105.66	76.94	49.93	25.56	7.11
210.0	229.37	207.63	183.78	161.12	138.20	115.94	96.04	77.07	61.26
240.0	255.98	238.19	218.83	199.72	181.41	162.57	144.66	127.53	111.85
270.0	266.78	249.52	232.79	215.01	198.01	180.09	162.31	145.97	129.50
300.0	258.22	240.70	221.59	202.10	183.65	165.08	146.63	130.03	113.96
330.0	235.03	212.37	188.79	165.87	142.28	120.28	99.99	80.50	64.16
360.0	226.47	201.31	175.48	147.69	120.02	92.48	65.08	38.07	15.94

C/γ(°)	90.0	95.0	100.0	105.0	110.0	115.0	120.0	125.0	130.0
0.0	2.63	0.79	0.92	1.05	1.19	1.45	1.58	1.71	1.84
30.0	52.43	25.03	19.50	17.00	14.62	11.59	9.35	7.38	5.93
60.0	98.94	53.62	53.75	48.22	40.58	35.04	30.04	23.85	18.71
90.0	117.25	70.88	79.97	67.98	54.41	47.56	40.97	32.80	26.48
120.0	95.25	51.12	52.83	43.87	39.00	34.52	27.40	22.66	18.44
150.0	47.16	22.13	18.44	15.81	11.99	10.80	9.22	7.77	6.59
180.0	0.66	0.79	1.05	1.05	1.32	1.45	1.58	1.71	1.84
210.0	47.95	23.19	19.10	17.13	14.76	11.86	9.88	8.56	7.38
240.0	97.10	54.28	52.83	49.27	43.61	37.28	31.62	26.35	20.29
270.0	113.96	69.82	79.18	69.43	59.15	50.19	42.16	34.91	28.33
300.0	99.20	59.02	52.57	49.93	44.27	38.07	32.15	26.61	20.42
330.0	50.46	25.69	19.76	17.65	15.02	12.38	9.88	7.25	5.93
360.0	2.63	0.79	0.92	1.05	1.19	1.45	1.58	1.71	1.84

C/γ(°)	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0
0.0	1.98	2.11	2.37	2.37	2.50	2.63	2.77	2.77	2.77
30.0	5.01	4.35	3.82	3.43	3.29	3.03	2.90	2.77	2.77
60.0	13.83	10.54	7.90	5.93	5.01	4.08	3.43	3.03	2.77
90.0	20.42	16.07	12.52	9.75	7.38	5.67	4.35	3.16	2.90
120.0	14.76	11.86	9.35	7.51	5.80	4.61	3.69	2.90	2.90
150.0	5.67	4.87	4.22	3.69	3.29	3.03	2.77	2.77	2.77
180.0	2.11	2.11	2.24	2.37	2.37	2.63	2.77	2.77	2.90
210.0	6.32	5.27	4.74	4.22	3.69	3.43	3.03	2.77	2.77
240.0	16.60	13.44	10.80	8.30	6.72	5.40	4.22	3.43	2.90
270.0	21.34	17.00	13.44	10.54	8.17	6.06	4.74	3.69	2.90
300.0	15.28	11.46	8.30	6.19	5.27	4.61	3.95	3.43	2.77
330.0	5.01	4.22	3.82	3.69	3.56	3.29	3.03	2.90	2.90
360.0	1.98	2.11	2.37	2.37	2.50	2.63	2.77	2.77	2.77

Intensity data(cd)

C/γ(°)	180.0
0.0	2.90
30.0	2.90
60.0	2.90
90.0	2.90
120.0	2.90
150.0	2.77
180.0	2.90
210.0	2.90
240.0	2.90
270.0	2.90
300.0	2.90
330.0	2.77
360.0	2.90