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## MSI Solid State Lighting

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LumCAT: UR78483521(ZT84835183E)(TEIJIN)

Luminaire: LED Tube

Report No: BSR1504100102-9

Voltage(V): 119.9400

Test No: BSR1504100102-9

Current(A): 0.1510

LampCAT:

Power (W): 17.8530

Lamp flux(lm)

PF: 0.9860

Number of Lamps: 1

Ballast type:

Length(mm): 1200

Width(mm): 30

Phm Type: C

Height(mm): 15

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## Photometric Results

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Lumens(lm): 2057.32

Lumens(lm)/Power(W): 115.24

Central intensity(cd): 457.552

Maximum intensity(cd): 457.552

Angle of maximum intensity: C=0.0  $\gamma$ =0.0

Beam Angle(50%Imax): [C0/180]Total=105.1

[C90/270]Total=166.9

Field angle(10%Imax): [C0/180]Total=158.7

[C90/270]Total=284.5

Maximum s/h(1/2): C0\_180=1.22 C90\_270=1.42

Maximum s/h(1/4): C0\_180=2.46 C90\_270=2.24

Up flux rate of LUM(%): 17.67%

Down flux rate of LUM(%): 82.33%

CIE Type : Semidirect lighting

Output flux ratio in  $\pi$  solid angle : 54.054%

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Zonal flux distribution table

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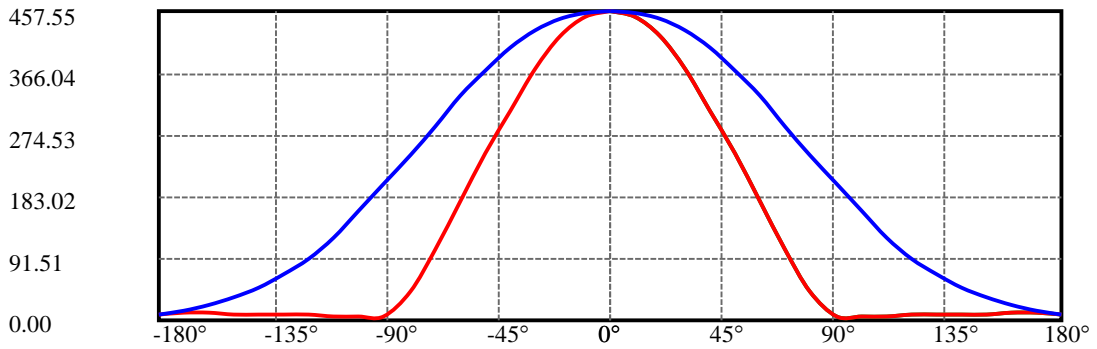
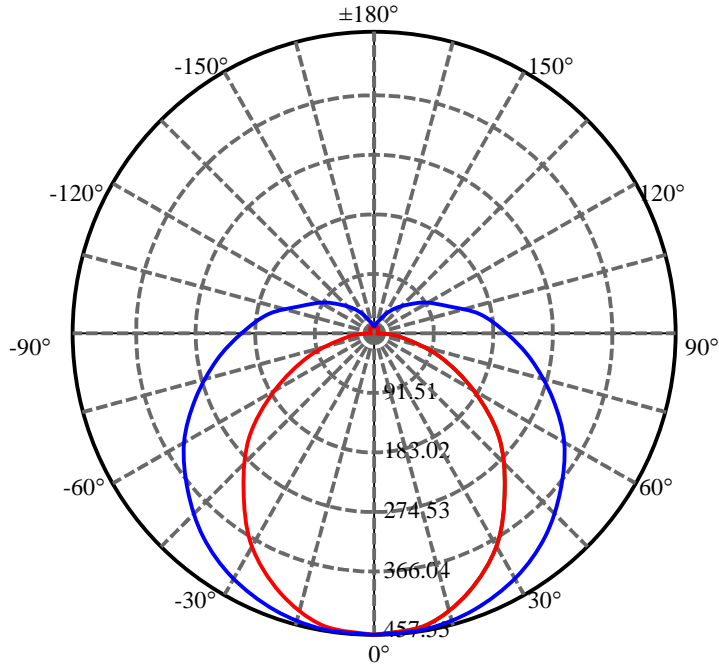
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	457.551	.000	.000	.000%	.000%
10.0	450.706	43.349	43.349	2.107%	2.107%
20.0	430.445	124.889	168.238	6.070%	8.177%
30.0	398.561	191.859	360.097	9.326%	17.503%
40.0	357.363	237.435	597.532	11.541%	29.044%
50.0	310.694	258.687	856.219	12.574%	41.618%
60.0	259.634	255.838	1112.057	12.435%	54.054%
70.0	208.369	232.274	1344.331	11.290%	65.344%
80.0	160.415	195.071	1539.402	9.482%	74.825%
90.0	122.429	154.301	1693.702	7.500%	82.325%
100.0	93.816	117.969	1811.671	5.734%	88.060%
110.0	68.856	86.046	1897.717	4.182%	92.242%
120.0	52.868	60.413	1958.130	2.936%	95.178%
130.0	40.522	41.893	2000.023	2.036%	97.215%
140.0	30.204	27.387	2027.409	1.331%	98.546%
150.0	21.840	16.347	2043.756	.795%	99.341%
160.0	15.783	8.707	2052.464	.423%	99.764%
170.0	11.395	3.852	2056.316	.187%	99.951%
180.0	9.733	1.008	2057.324	.049%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Fixt
0-30	360.10	17.50%
0-40	597.53	29.04%
0-60	1112.06	54.05%
0-90	1693.70	82.33%
0-120	1958.13	95.18%
0-180	2057.32	100.00%
60-90	837.48	40.71%
90-120	418.73	20.35%
90-130	460.62	22.39%
90-150	504.35	24.52%
90-180	516.91	25.13%
0-86.90	1645.86	80.00%

ZONAL LUMEN SUMMARY

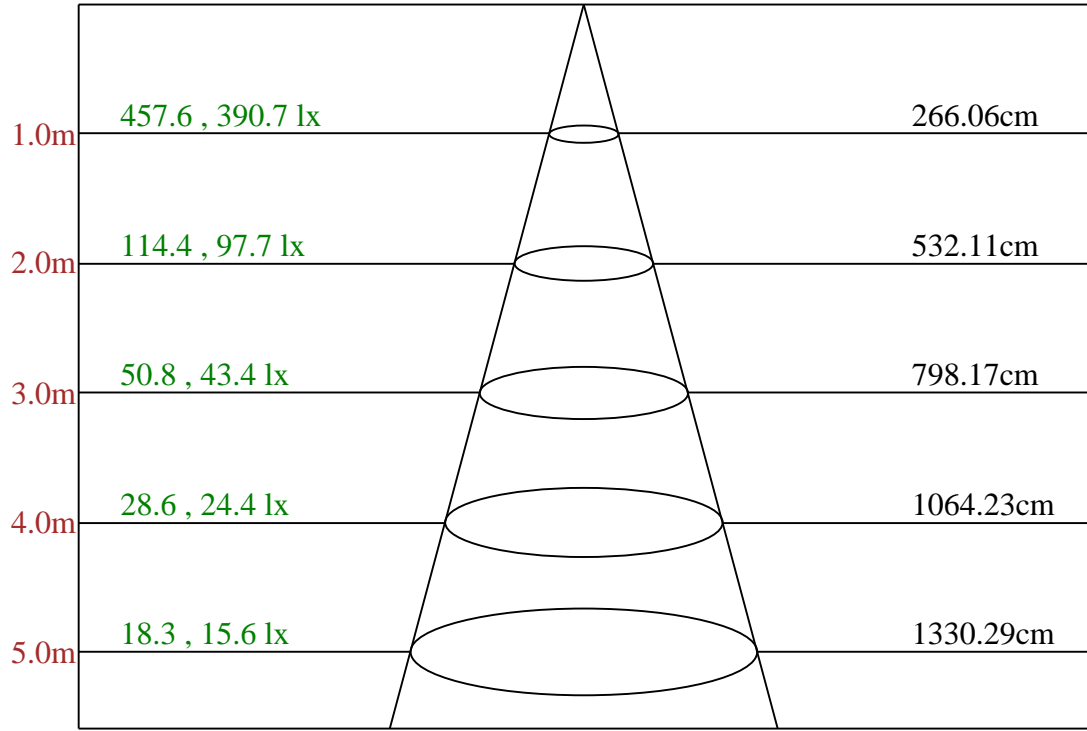
0-10	43.35
10-20	124.89
20-30	191.86
30-40	237.44
40-50	258.69
50-60	255.84
60-70	232.27
70-80	195.07
80-90	154.30
90-100	117.97
100-110	86.05
110-120	60.41
120-130	41.89
130-140	27.39
140-150	16.35
150-160	8.71
160-170	3.85
170-180	0.00



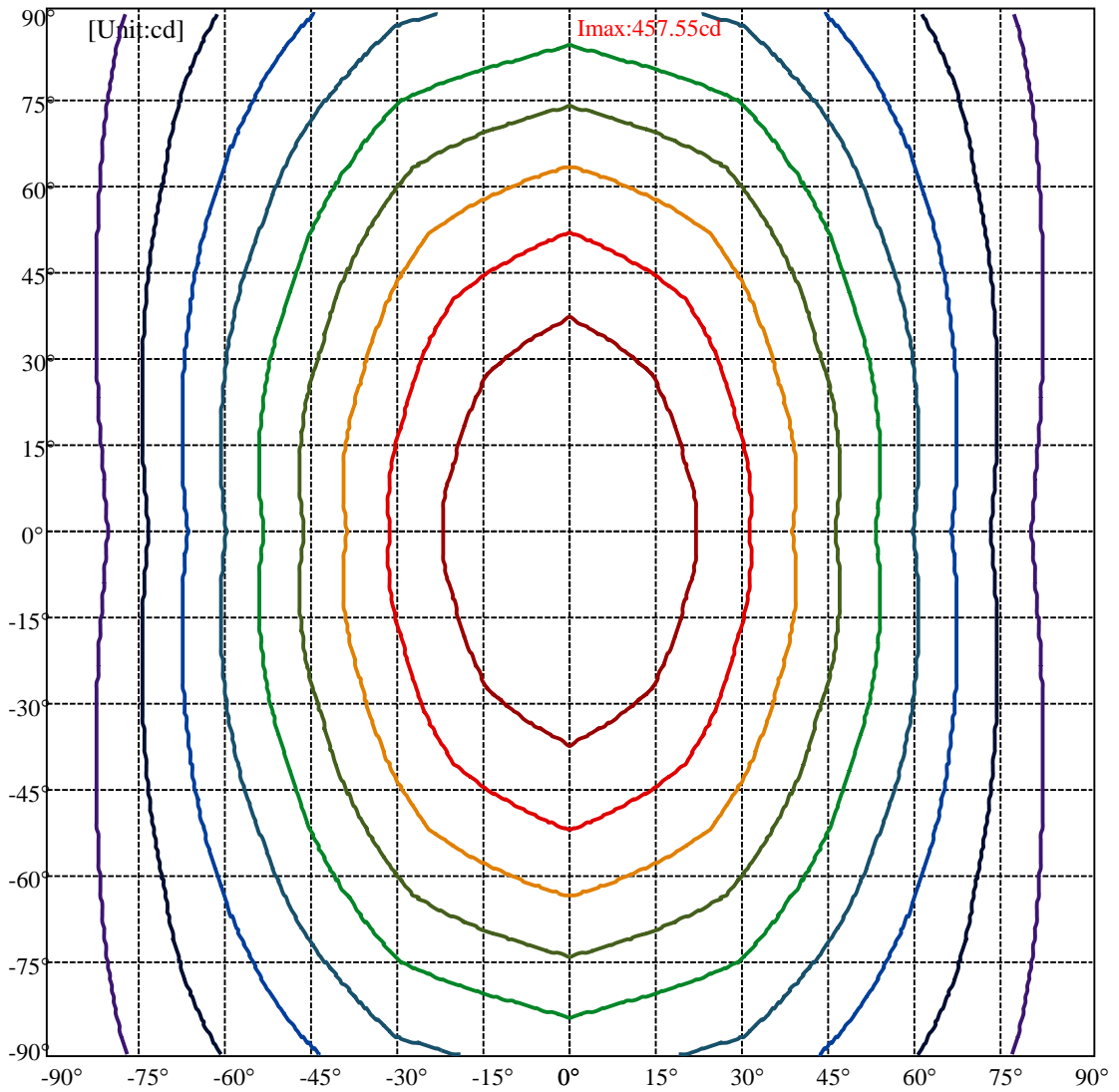
C0(Max): —  
 C0/C180: —  
 C90/C270: —

Field angle(10% I<sub>max</sub>):C0/180Left:79.4 Right:79.4  
 :C90/270Left:142.2 Right:142.2

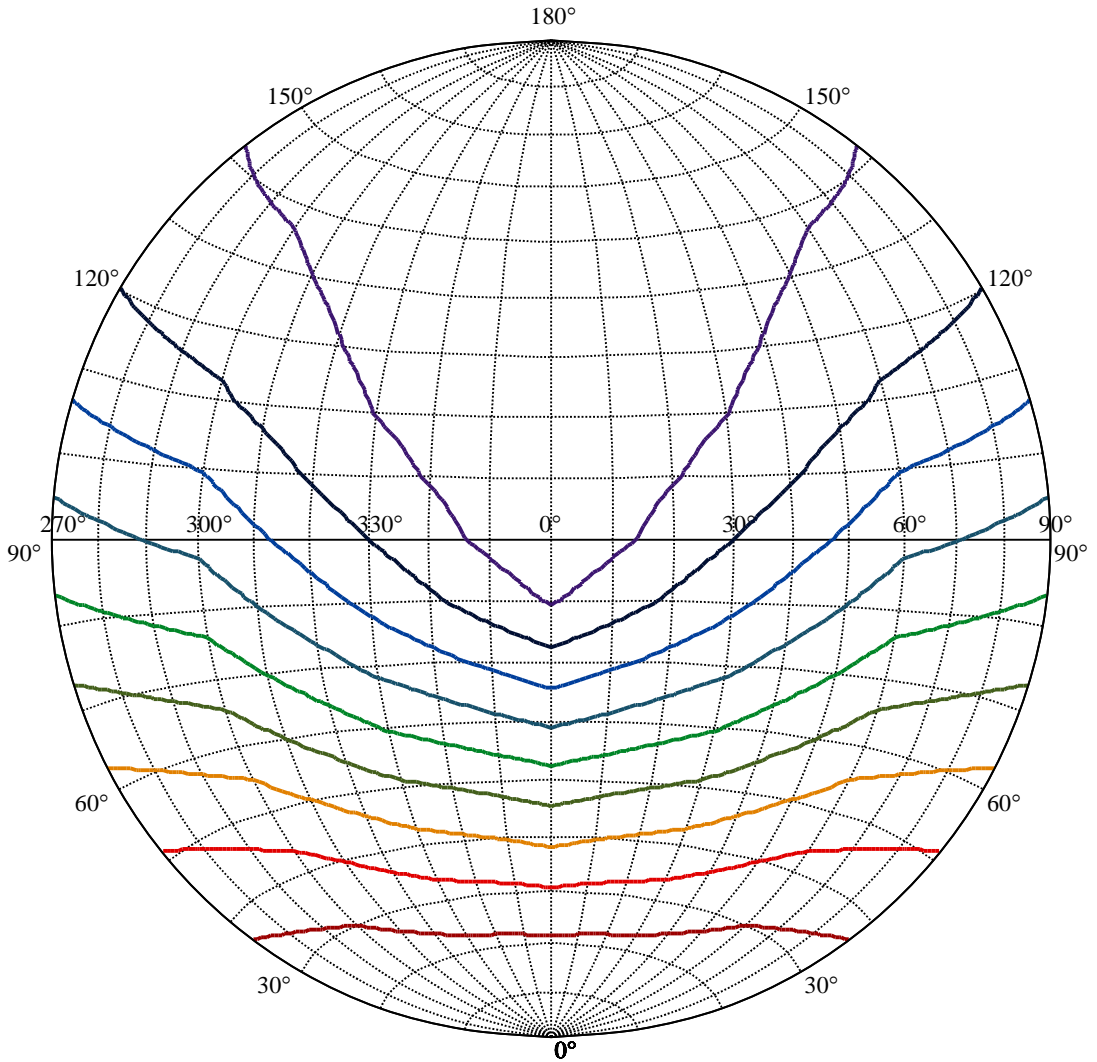
Beam Angle(50% I<sub>max</sub>):C0/180Left:52.5 Right:52.5  
 :C90/270Left:83.5 Right:83.5



Max , Ave      Beam angle of C0plane106.13



(10% I <sub>max</sub> ) 45.7551	—
(20% I <sub>max</sub> ) 91.5103	—
(30% I <sub>max</sub> ) 137.265	—
(40% I <sub>max</sub> ) 183.021	—
(50% I <sub>max</sub> ) 228.776	—
(60% I <sub>max</sub> ) 274.531	—
(70% I <sub>max</sub> ) 320.286	—
(80% I <sub>max</sub> ) 366.041	—
(90% I <sub>max</sub> ) 411.796	—



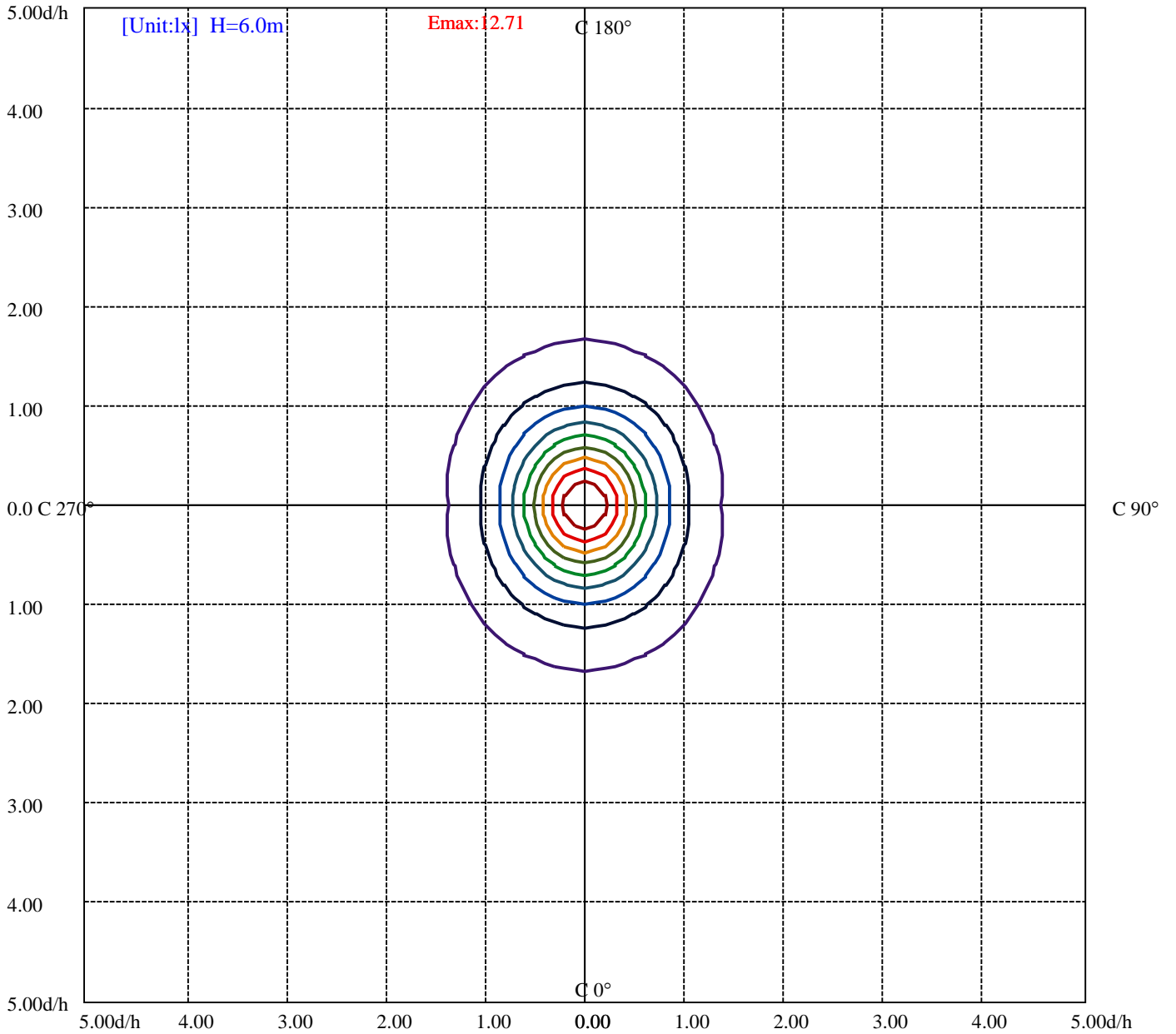
House

[Unit:cd]

Road

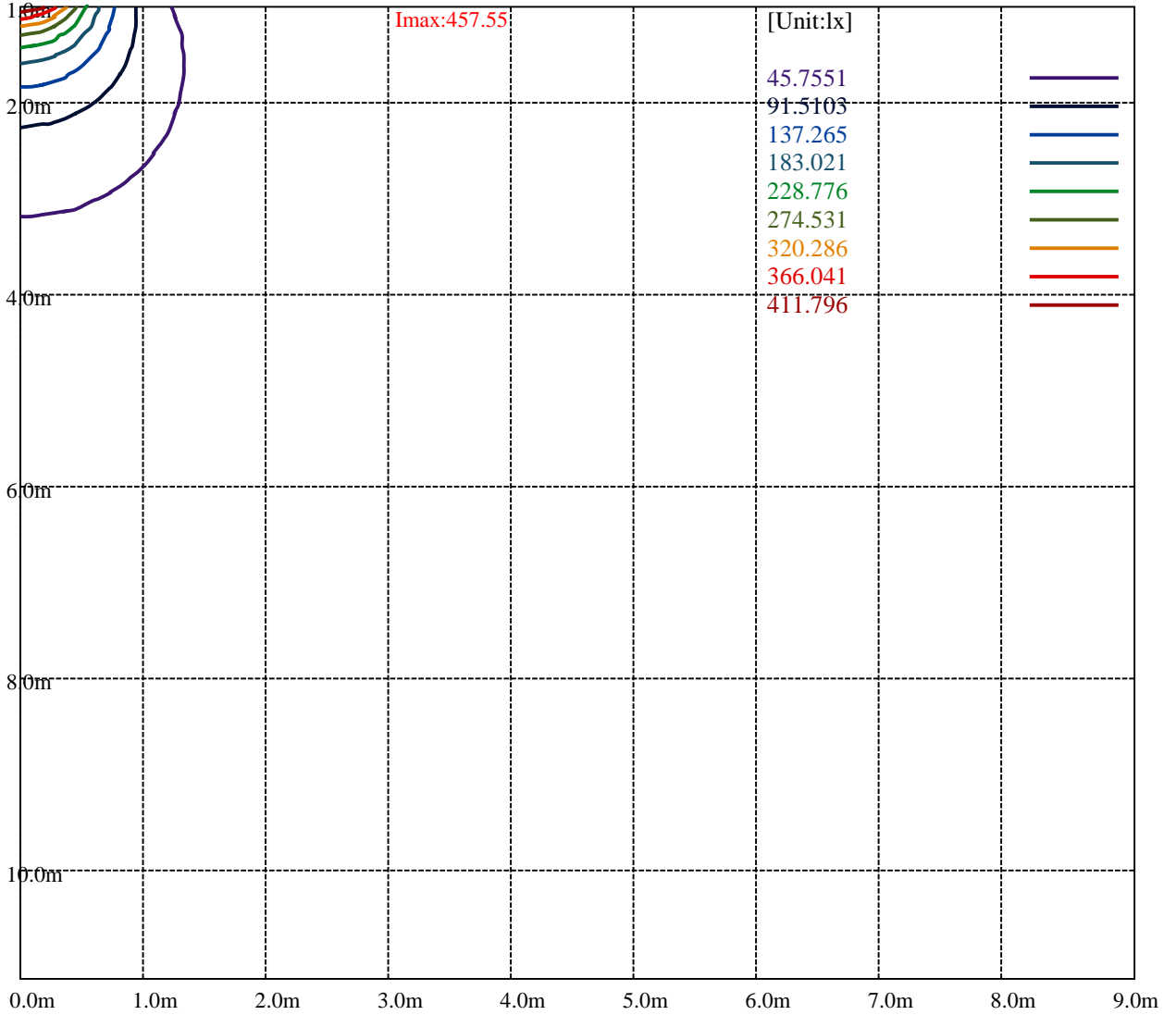
- Imax:457.55
- (10%Imax) 45.7551
- (20%Imax) 91.5103
- (30%Imax) 137.265
- (40%Imax) 183.021
- (50%Imax) 228.776
- (60%Imax) 274.531
- (70%Imax) 320.286
- (80%Imax) 366.041
- (90%Imax) 411.796





- (10%Emax) 1.270975 —
- (20%Emax) 2.541953 —
- (30%Emax) 3.812917 —
- (40%Emax) 5.083917 —
- (50%Emax) 6.354889 —
- (60%Emax) 7.625861 —
- (70%Emax) 8.896833 —
- (80%Emax) 10.1678 —
- (90%Emax) 11.43878 —





Luminance Table

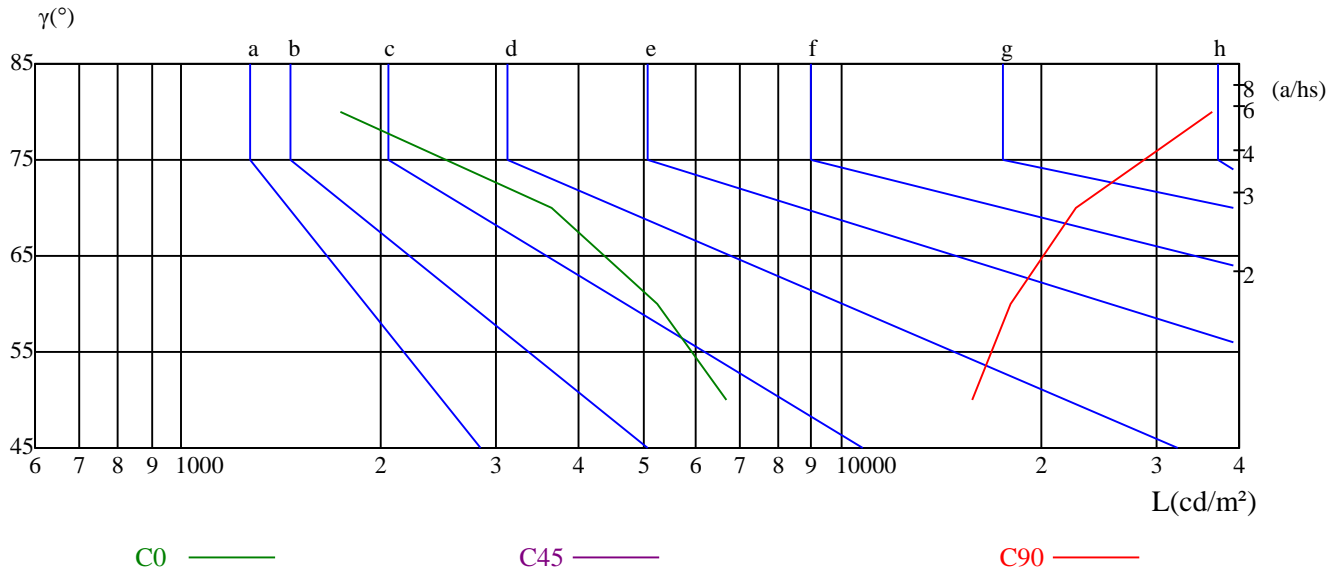
$\gamma$	45	50	55	60	65	70	75	80	85
C0	0	6683	0	5239	0	3637	0	1739	0
C45	0	0	0	0	0	0	0	0	0
C90	0	15789	0	18054	0	22635	0	36325	0

L横(65)	L纵(65)	L45(65)	L横(75)	L纵(75)	L45(75)	L横(85)	L纵(85)	L45(85)
0	0	0	0	0	0	0	0	0

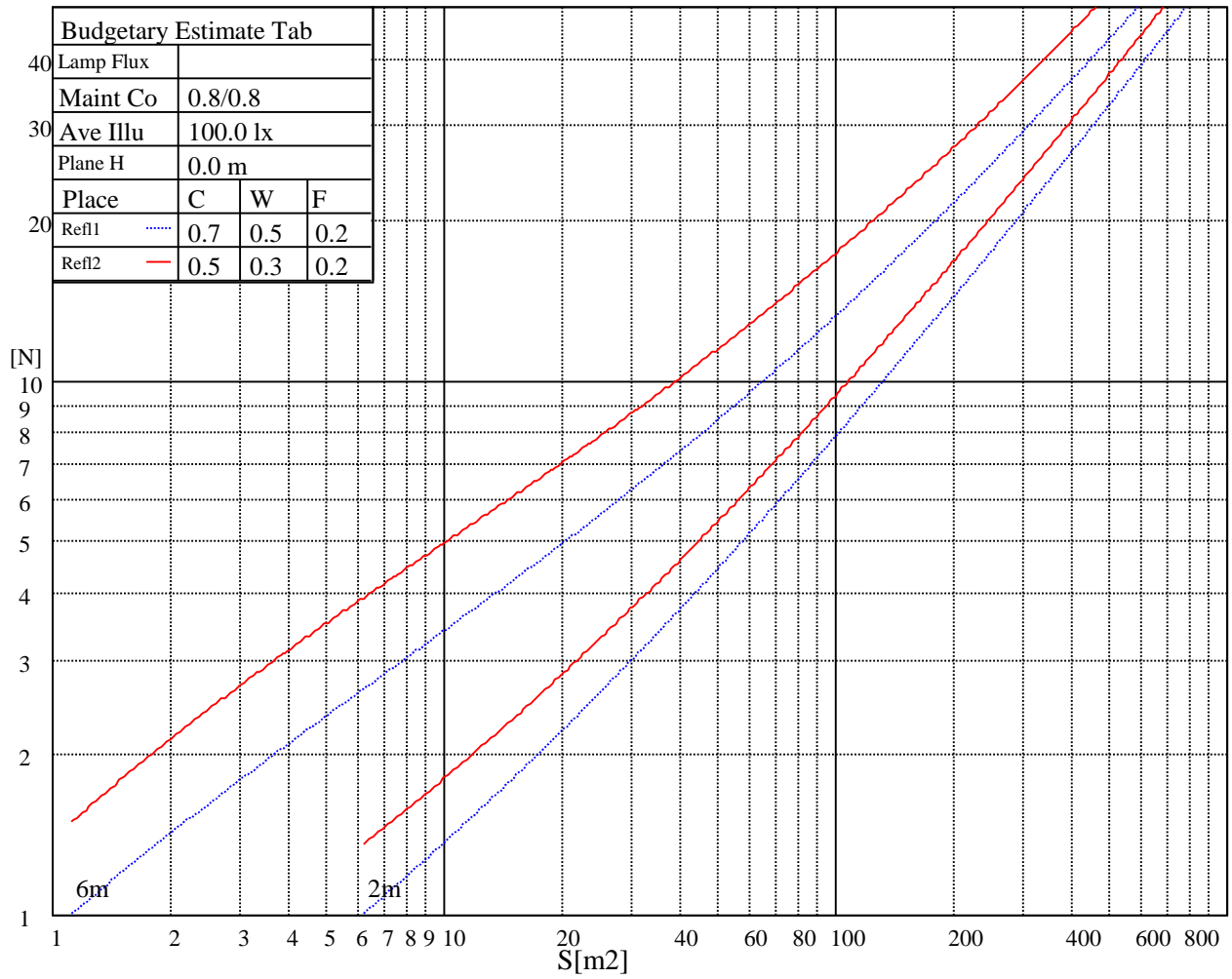
Glare Table

Glare	Quality	Service Values Illuminance(lx)							
		a	b	c	d	e	f	g	h
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



Illuminatin 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	14.8	16.1	15.4	16.6	17.2	11.9	13.1	12.4	13.7	14.3
	3H	17.6	18.7	18.2	19.3	19.9	13.2	14.3	13.8	14.9	15.5
	4H	18.9	19.8	19.5	20.4	21.2	13.5	14.5	14.1	15.1	15.8
	6H	20.6	21.5	21.2	22.2	22.9	13.9	14.8	14.5	15.5	16.2
	8H	21.6	22.5	22.2	23.1	23.8	14.0	15.0	14.6	15.6	16.3
4H	12H	22.3	23.1	23.0	23.8	24.5	13.8	14.6	14.5	15.2	16.0
	2H	15.1	16.1	15.7	16.7	17.4	12.9	13.9	13.5	14.5	15.2
	3H	18.1	18.8	18.7	19.5	20.3	14.5	15.2	15.1	15.9	16.7
	4H	19.8	20.6	20.5	21.2	22.0	15.2	16.0	15.9	16.6	17.4
	6H	21.7	22.5	22.4	23.2	23.9	15.8	16.5	16.5	17.2	18.0
8H	8H	22.6	23.0	23.3	23.7	24.6	15.7	16.2	16.5	16.9	17.8
	12H	23.7	24.2	24.5	24.9	25.8	15.9	16.3	16.6	17.1	17.9
	4H	20.0	20.4	20.7	21.2	22.0	16.2	16.7	16.9	17.4	18.3
	6H	22.1	22.6	22.8	23.3	24.2	17.1	17.5	17.8	18.3	19.1
	8H	23.3	23.8	24.1	24.5	25.4	17.4	17.9	18.2	18.6	19.5
12H	12H	24.7	25.2	25.5	25.9	26.8	17.7	18.1	18.4	18.9	19.7
	4H	20.0	20.5	20.8	21.2	22.1	16.6	17.0	17.3	17.8	18.6
	6H	22.2	22.7	22.9	23.4	24.3	17.6	18.1	18.4	18.8	19.7
	8H	23.5	24.0	24.2	24.7	25.6	18.1	18.6	18.8	19.3	20.2
Variation with the observer position at spacings:											
S = 1.0H		0.2/-1.2					0.2/-0.5				
S = 1.5H		0.3/-1.1					0.4/-0.6				
S = 2.0H		0.1/-0.9					0.6/-0.9				
Standard tables:		BKBF					BKFF				
Uncorrected UGR		12.5					6.7				



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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	COEFFICIENTS OF UTILIZATION RHOFC=20 CU															
0	1.15	1.15	1.15	1.10	1.10	1.10	1.01	1.01	1.01	0.93	0.93	0.93	0.86	0.86	0.86	0.82
1	0.96	0.90	0.86	0.92	0.87	0.82	0.84	0.80	0.77	0.77	0.74	0.71	0.71	0.68	0.66	0.62
2	0.82	0.74	0.67	0.78	0.71	0.65	0.72	0.66	0.61	0.66	0.61	0.57	0.60	0.57	0.53	0.50
3	0.71	0.62	0.55	0.68	0.60	0.53	0.62	0.56	0.50	0.57	0.52	0.47	0.53	0.48	0.44	0.41
4	0.62	0.53	0.46	0.60	0.51	0.44	0.55	0.48	0.42	0.51	0.44	0.39	0.46	0.41	0.37	0.34
5	0.55	0.46	0.39	0.53	0.44	0.38	0.49	0.42	0.36	0.45	0.39	0.34	0.42	0.36	0.32	0.29
6	0.50	0.40	0.34	0.48	0.39	0.33	0.44	0.37	0.31	0.41	0.34	0.29	0.38	0.32	0.28	0.25
7	0.45	0.36	0.29	0.43	0.35	0.29	0.40	0.33	0.27	0.37	0.31	0.26	0.34	0.29	0.24	0.22
8	0.41	0.32	0.26	0.39	0.31	0.25	0.36	0.29	0.24	0.34	0.28	0.23	0.31	0.26	0.22	0.20
9	0.37	0.29	0.23	0.36	0.28	0.23	0.33	0.26	0.22	0.31	0.25	0.21	0.29	0.23	0.20	0.17
10	0.34	0.26	0.21	0.33	0.25	0.20	0.31	0.24	0.19	0.29	0.23	0.19	0.27	0.22	0.18	0.16

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Intensity data(cd)

C/γ(°)	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0
0.0	457.55	450.16	419.30	371.42	309.49	246.81	175.96	106.31	41.69
30.0	457.55	449.56	423.91	383.90	335.67	281.69	225.54	172.64	127.27
60.0	457.55	450.05	435.19	411.85	379.89	341.58	299.38	255.18	211.55
90.0	457.55	454.85	445.17	428.45	403.57	370.81	332.01	288.28	243.18
120.0	457.55	450.05	435.19	411.85	379.89	341.58	299.38	255.18	211.55
150.0	457.55	449.56	423.91	383.90	335.67	281.69	225.54	172.64	127.27
180.0	457.55	450.16	419.30	371.42	309.49	246.81	175.96	106.31	41.69
210.0	457.55	449.56	423.91	383.90	335.67	281.69	225.54	172.64	127.27
240.0	457.55	450.05	435.19	411.85	379.89	341.58	299.38	255.18	211.55
270.0	457.55	454.85	445.17	428.45	403.57	370.81	332.01	288.28	243.18
300.0	457.55	450.05	435.19	411.85	379.89	341.58	299.38	255.18	211.55
330.0	457.55	449.56	423.91	383.90	335.67	281.69	225.54	172.64	127.27
360.0	457.55	450.16	419.30	371.42	309.49	246.81	175.96	106.31	41.69
C/γ(°)	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0
0.0	6.63	6.04	6.60	7.51	8.35	8.85	9.21	10.49	10.63
30.0	91.13	61.58	44.37	34.20	27.64	21.20	16.21	13.45	10.64
60.0	172.02	135.50	98.11	74.64	55.26	40.44	27.57	17.55	11.26
90.0	201.64	162.68	121.58	92.02	68.99	49.09	34.27	22.22	13.94
120.0	172.02	135.50	98.11	74.64	55.26	40.44	27.57	17.55	11.26
150.0	91.13	61.58	44.37	34.20	27.64	21.20	16.21	13.45	10.64
180.0	6.63	6.04	6.60	7.51	8.35	8.85	9.21	10.49	10.63
210.0	91.13	61.58	44.37	34.20	27.64	21.20	16.21	13.45	10.64
240.0	172.02	135.50	98.11	74.64	55.26	40.44	27.57	17.55	11.26
270.0	201.64	162.68	121.58	92.02	68.99	49.09	34.27	22.22	13.94
300.0	172.02	135.50	98.11	74.64	55.26	40.44	27.57	17.55	11.26
330.0	91.13	61.58	44.37	34.20	27.64	21.20	16.21	13.45	10.64
360.0	6.63	6.04	6.60	7.51	8.35	8.85	9.21	10.49	10.63
C/γ(°)	180.0								
0.0	9.73								
30.0	9.73								
60.0	9.73								
90.0	9.73								
120.0	9.73								
150.0	9.73								
180.0	9.73								
210.0	9.73								
240.0	9.73								
270.0	9.73								
300.0	9.73								
330.0	9.73								
360.0	9.73								