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Nata

LumCAT: 2-2180-M
Luminaire: BJB 47.360.1010

Report No: NATA0100	Voltage(V): 34.8000
Test No: GC2020021317	Current(A): 0.5970
LampCAT: TRIDONIC SLE G7 15MM	Power (W): 20.8000
Lamp flux(lm): 2640.0	PF: 0.0000
Number of Lamps: 1	Ballast type: DC
Length(mm): 0	Width(mm): 0
Phm Type: C	Height(mm): 0

Photometric Results

Lumens(lm): 1997.28
Efficiency(%): 75.65%
Lumens(lm)/Power(W): 96.02
Central intensity(cd): 13030.310
Maximum intensity(cd): 13030.310
Angle of maximum intensity: C=0.0 γ=0.0
Beam Angle(50%Imax): [C0/180]Total=17.9
[C90/270]Total=17.9
Field angle(10%Imax): [C0/180]Total=41.7
[C90/270]Total=41.7
Maximum s/h(1/2): C0_180=0.30 C90_270=0.30
Maximum s/h(1/4): C0_180=0.35 C90_270=0.35
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 75.65%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.292%

Equipment: GMS1980	Date: 2020/2/13	Operator: NT07
Temperature(°C): 25.0	Humidity(%): 65.0%	Distance(m): 7.50

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	13030.313	0.000	0	.000%	.000%
1.0	12920.625	12.417	12.417	.470%	.622%
2.0	12494.531	36.478	48.895	1.382%	2.448%
3.0	11799.211	58.103	106.998	2.201%	5.357%
4.0	11098.055	76.644	183.642	2.903%	9.195%
5.0	10158.469	91.444	275.087	3.464%	13.773%
6.0	9199.266	101.730	376.817	3.853%	18.867%
7.0	8285.555	108.528	485.345	4.111%	24.300%
8.0	7305.047	111.579	596.924	4.226%	29.887%
9.0	6465.234	111.601	708.524	4.227%	35.475%
10.0	5722.664	110.296	818.821	4.178%	40.997%
11.0	5011.242	107.254	926.074	4.063%	46.367%
12.0	4462.664	103.563	1029.638	3.923%	51.552%
13.0	3942.914	99.753	1129.391	3.779%	56.547%
14.0	3443.344	94.543	1223.934	3.581%	61.280%
15.0	3069.070	89.405	1313.339	3.387%	65.757%
16.0	2761.172	85.429	1398.769	3.236%	70.034%
17.0	2417.414	80.644	1479.413	3.055%	74.072%
18.0	2075.625	74.080	1553.494	2.806%	77.781%
19.0	1819.125	67.761	1621.254	2.567%	81.173%
20.0	1539.422	61.471	1682.725	2.328%	84.251%
21.0	1268.445	53.917	1736.642	2.042%	86.950%
22.0	1083.424	47.262	1783.904	1.790%	89.317%
23.0	872.051	41.031	1824.935	1.554%	91.371%
24.0	659.257	33.480	1858.415	1.268%	93.047%
25.0	484.629	26.009	1884.424	.985%	94.350%
26.0	338.520	19.431	1903.855	.736%	95.323%
27.0	216.028	13.567	1917.422	.514%	96.002%
28.0	121.760	8.552	1925.974	.324%	96.430%
29.0	48.347	4.450	1930.424	.169%	96.653%
30.0	21.248	1.879	1932.303	.071%	96.747%
31.0	17.571	1.080	1933.384	.041%	96.801%
32.0	16.538	0.977	1934.361	.037%	96.850%
33.0	15.638	0.948	1935.309	.036%	96.897%
34.0	14.984	0.927	1936.236	.035%	96.944%
35.0	14.435	0.914	1937.149	.035%	96.990%
36.0	13.915	0.903	1938.052	.034%	97.035%
37.0	13.584	0.897	1938.949	.034%	97.080%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	13.310	0.898	1939.846	.034%	97.125%
39.0	13.029	0.899	1940.745	.034%	97.170%
40.0	12.860	0.903	1941.648	.034%	97.215%
41.0	12.727	0.911	1942.559	.035%	97.260%
42.0	12.607	0.920	1943.48	.035%	97.306%
43.0	12.509	0.930	1944.41	.035%	97.353%
44.0	12.466	0.943	1945.353	.036%	97.400%
45.0	12.417	0.956	1946.309	.036%	97.448%
46.0	12.375	0.970	1947.279	.037%	97.497%
47.0	12.340	0.983	1948.262	.037%	97.546%
48.0	12.354	0.998	1949.26	.038%	97.596%
49.0	12.361	1.015	1950.275	.038%	97.647%
50.0	12.431	1.034	1951.309	.039%	97.698%
51.0	12.502	1.055	1952.363	.040%	97.751%
52.0	12.614	1.078	1953.441	.041%	97.805%
53.0	12.748	1.103	1954.544	.042%	97.860%
54.0	12.923	1.131	1955.676	.043%	97.917%
55.0	13.106	1.162	1956.838	.044%	97.975%
56.0	13.331	1.195	1958.032	.045%	98.035%
57.0	13.598	1.231	1959.264	.047%	98.097%
58.0	13.830	1.268	1960.532	.048%	98.160%
59.0	14.041	1.303	1961.835	.049%	98.225%
60.0	14.210	1.335	1963.17	.051%	98.292%
61.0	14.358	1.363	1964.533	.052%	98.361%
62.0	14.435	1.387	1965.921	.053%	98.430%
63.0	14.505	1.408	1967.328	.053%	98.501%
64.0	14.463	1.421	1968.75	.054%	98.572%
65.0	14.280	1.423	1970.172	.054%	98.643%
66.0	13.915	1.407	1971.579	.053%	98.713%
67.0	13.514	1.379	1972.958	.052%	98.782%
68.0	13.177	1.352	1974.31	.051%	98.850%
69.0	12.938	1.332	1975.642	.050%	98.917%
70.0	12.572	1.310	1976.952	.050%	98.982%
71.0	11.988	1.269	1978.222	.048%	99.046%
72.0	11.503	1.221	1979.443	.046%	99.107%
73.0	11.109	1.182	1980.626	.045%	99.166%
74.0	10.948	1.160	1981.785	.044%	99.224%
75.0	10.779	1.148	1982.933	.043%	99.282%

Zonal flux distribution table

γ(°)	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	10.357	1.122	1984.055	.042%	99.338%
77.0	9.956	1.083	1985.138	.041%	99.392%
78.0	9.584	1.046	1986.184	.040%	99.445%
79.0	9.274	1.013	1987.198	.038%	99.495%
80.0	9.042	0.987	1988.185	.037%	99.545%
81.0	8.803	0.965	1989.15	.037%	99.593%
82.0	8.634	0.946	1990.096	.036%	99.640%
83.0	8.508	0.932	1991.028	.035%	99.687%
84.0	8.430	0.923	1991.95	.035%	99.733%
85.0	8.318	0.914	1992.864	.035%	99.779%
86.0	8.205	0.903	1993.768	.034%	99.824%
87.0	8.156	0.895	1994.663	.034%	99.869%
88.0	7.959	0.883	1995.546	.033%	99.913%
89.0	7.875	0.868	1996.414	.033%	99.957%
90.0	7.868	0.863	1997.277	.033%	100.000%

Zonal flux distribution table

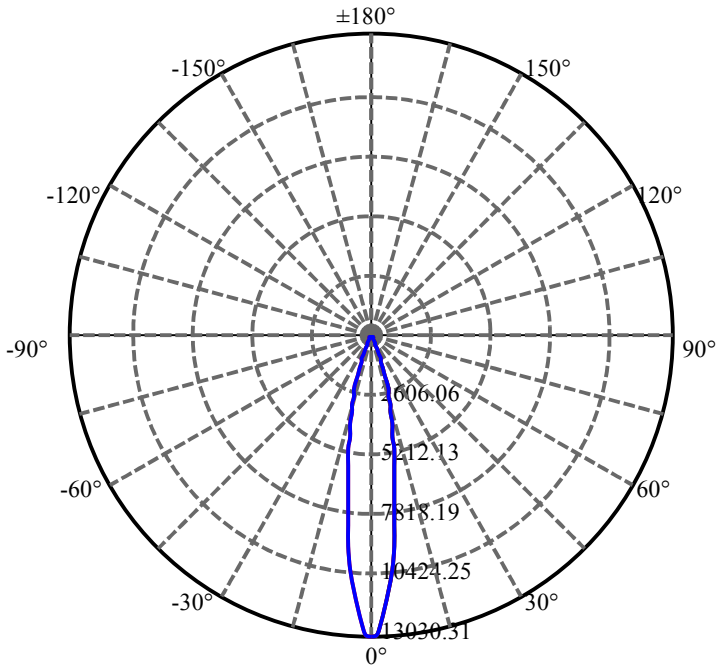
ZONAL LUMEN SUMMARY

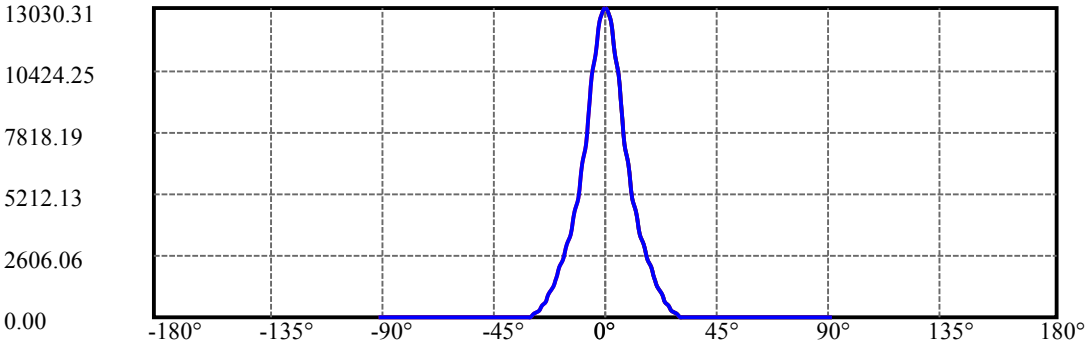
Zone	Lumens	%Lamp	%Fixt
0-30	1932.30	73.19%	96.75%
0-40	1941.65	73.55%	97.21%
0-60	1963.17	74.36%	98.29%
0-90	1996.41	75.62%	99.96%
0-120	1996.41	75.62%	99.96%
0-180	1997.28	75.65%	100.00%
60-90	34.58	1.31%	1.73%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-18.65	1597.82	60.52%	80.00%

ZONAL LUMEN SUMMARY

0-10	818.82
10-20	863.90
20-30	249.58
30-40	9.34
40-50	9.66
50-60	11.86
60-70	13.78
70-80	11.23
80-90	8.23
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:20.9 Right:20.9
:C90/270Left:20.9 Right:20.9

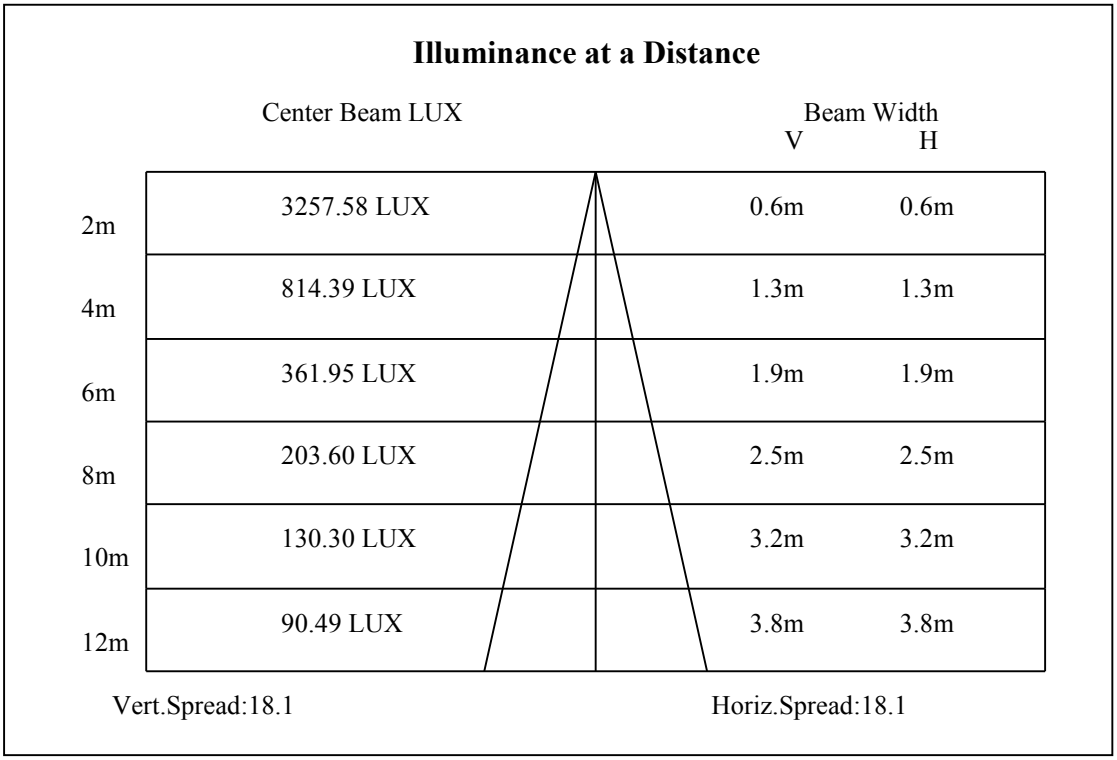
Beam Angle(50%Imax):C0/180Left:8.9 Right:8.9
:C90/270Left:8.9 Right:8.9

Equipment: GMS1980
Temperature(°C): 25.0

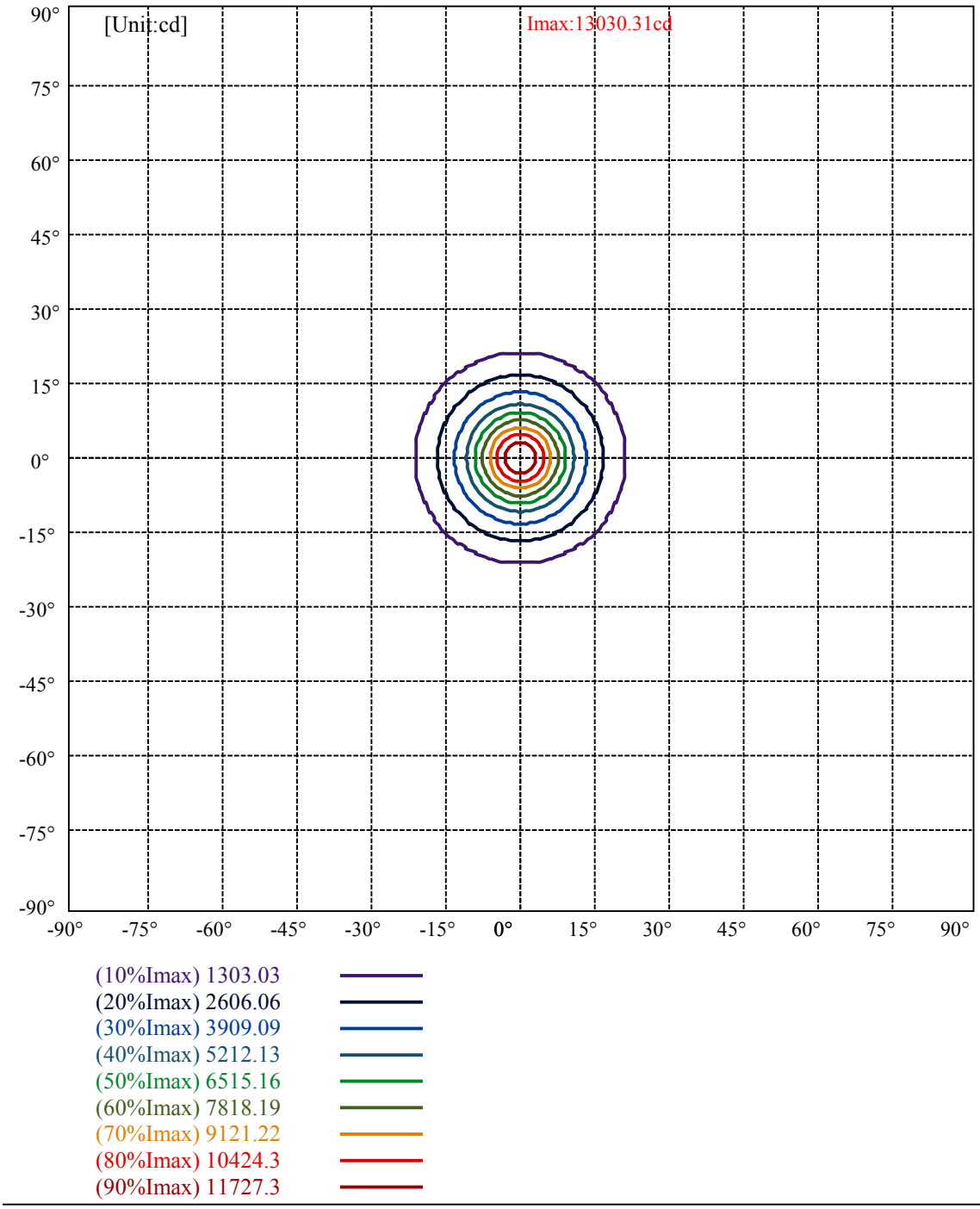
Date: 2020/2/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Lux distance Curve



ISO-Intensity(V-H)



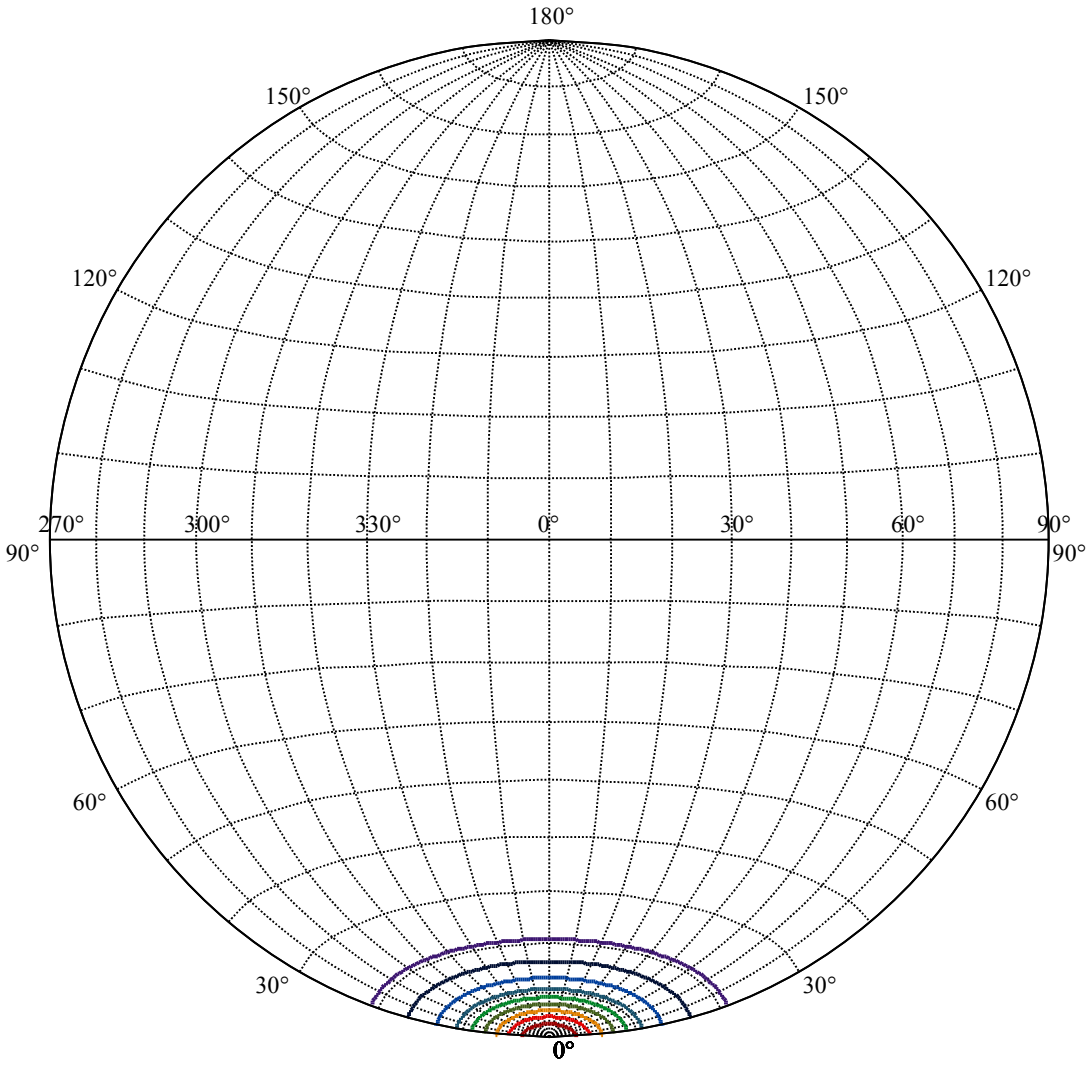
(10%Imax) 1303.03
(20%Imax) 2606.06
(30%Imax) 3909.09
(40%Imax) 5212.13
(50%Imax) 6515.16
(60%Imax) 7818.19
(70%Imax) 9121.22
(80%Imax) 10424.3
(90%Imax) 11727.3

Equipment: GMS1980
Temperature(°C): 25.0

Date: 2020/2/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

ISO candela diagram on circular web



House [Unit:cd] Road

Imax:13030.31

(10%Imax) 1303.03
(20%Imax) 2606.06
(30%Imax) 3909.09
(40%Imax) 5212.13
(50%Imax) 6515.16
(60%Imax) 7818.19
(70%Imax) 9121.22
(80%Imax) 10424.3
(90%Imax) 11727.3

Equipment: GMS1980
Temperature(°C): 25.0

Date: 2020/2/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

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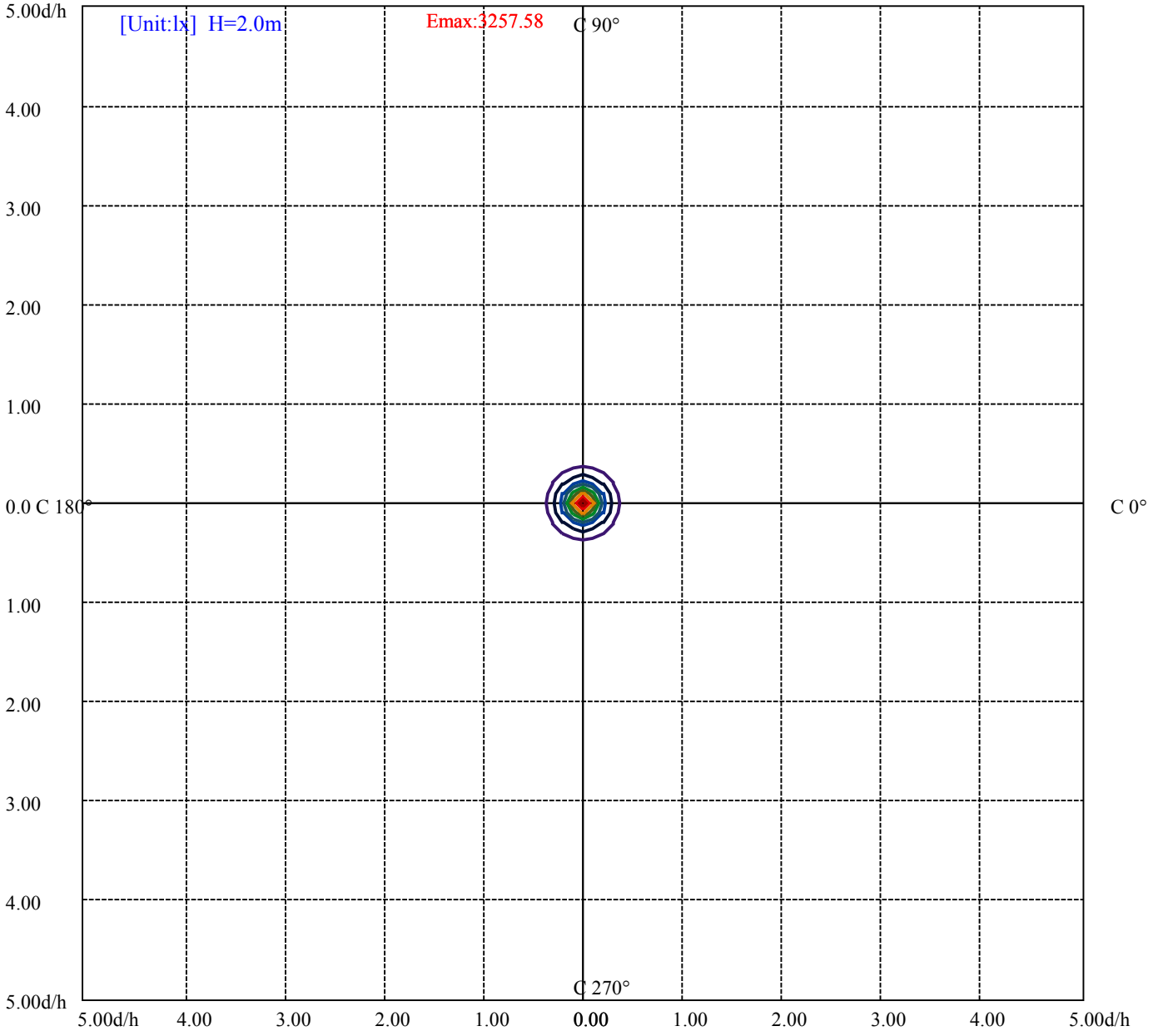
ISO illuminance diagram

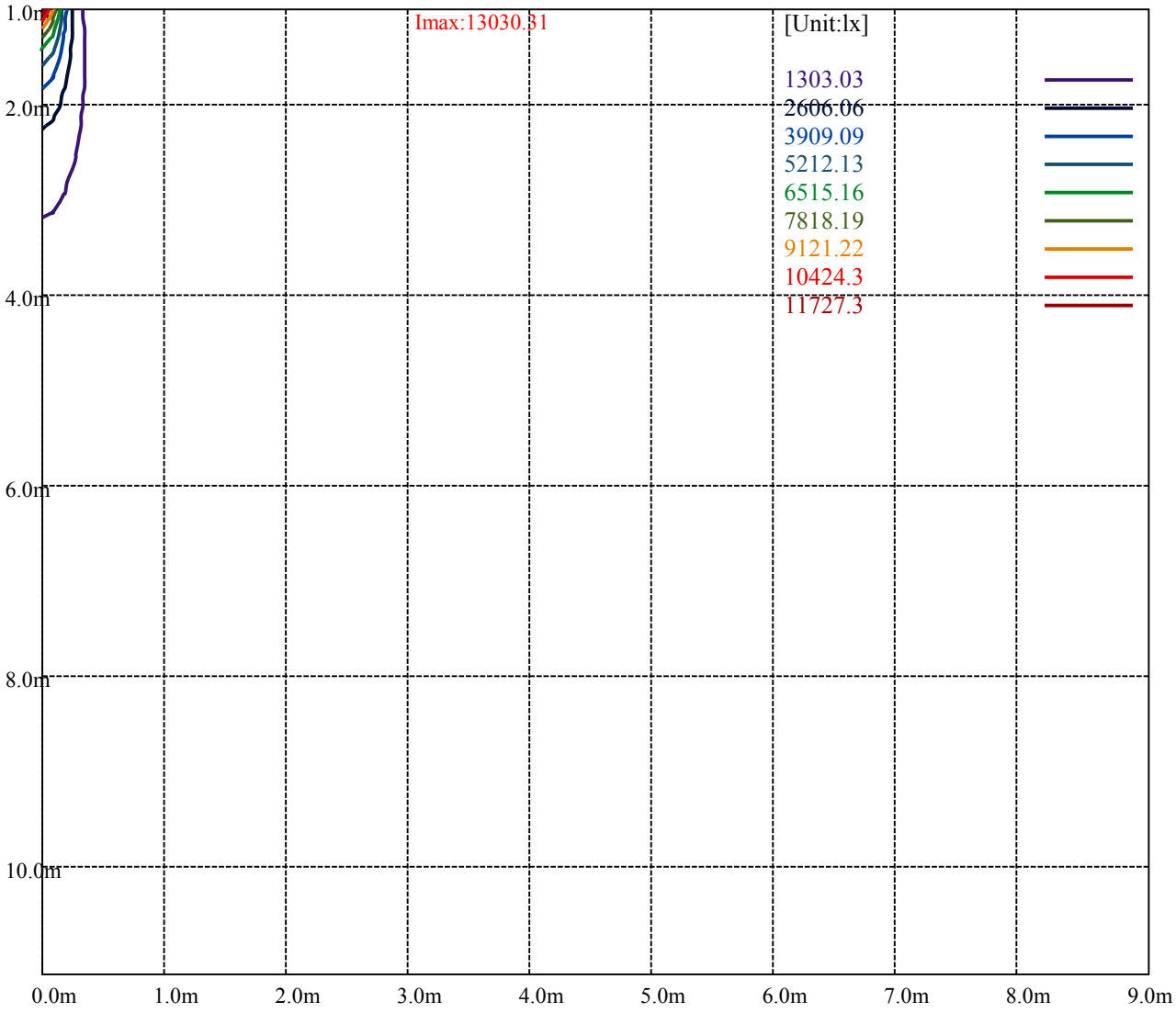


Equipment: GMS1980
Temperature(°C): 25.0

Date: 2020/2/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Space ISO Lux diagram



Equipment: GMS1980
Temperature(°C): 25.0

Date: 2020/2/13
Humidity(%): 65.0%

Operator: NT07
Distance(m): 7.50

Luminance Limitting Curve(no luminous side)

Luminance Table

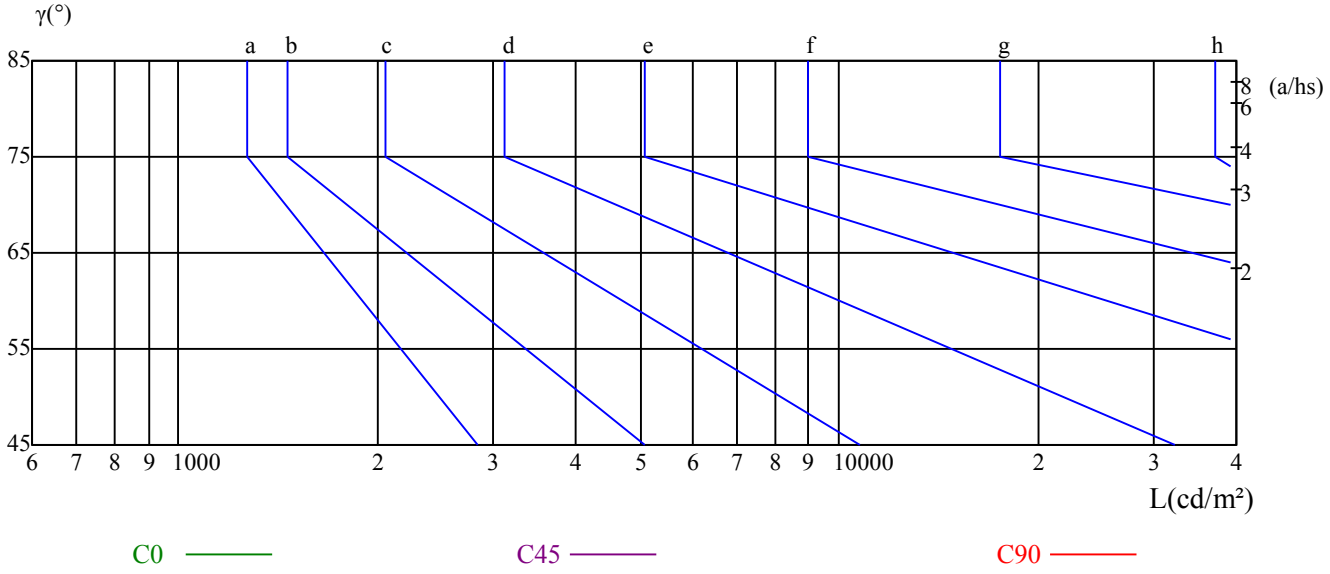
γ	45	50	55	60	65	70	75	80	85
C0	0	0	0	0	0	0	0	0	0
C45	0	0	0	0	0	0	0	0	0
C90	0	0	0	0	0	0	0	0	0

L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
0	0	0	0	0	0	0	0	0

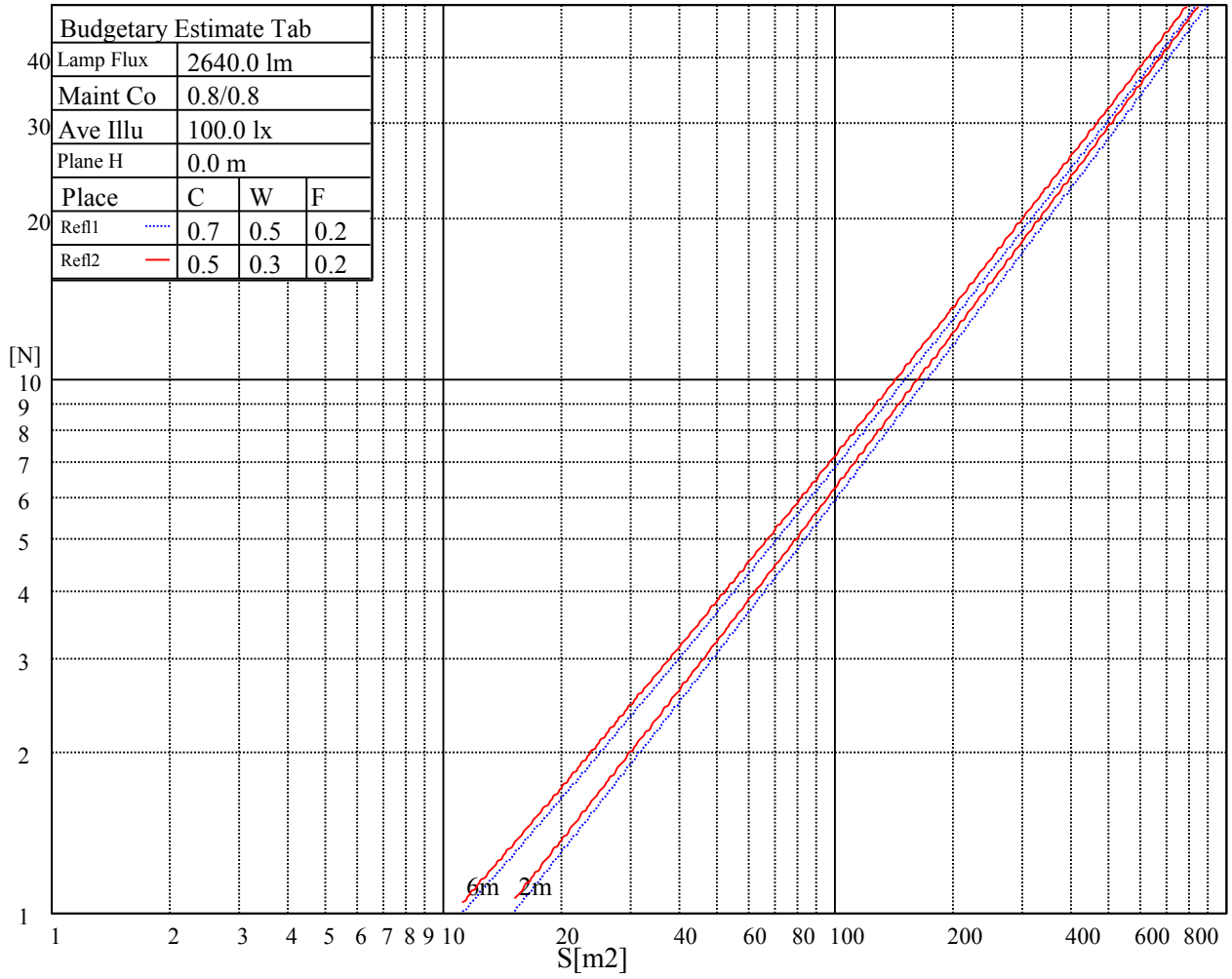
Glare Table

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



Budgetary Estimate Table

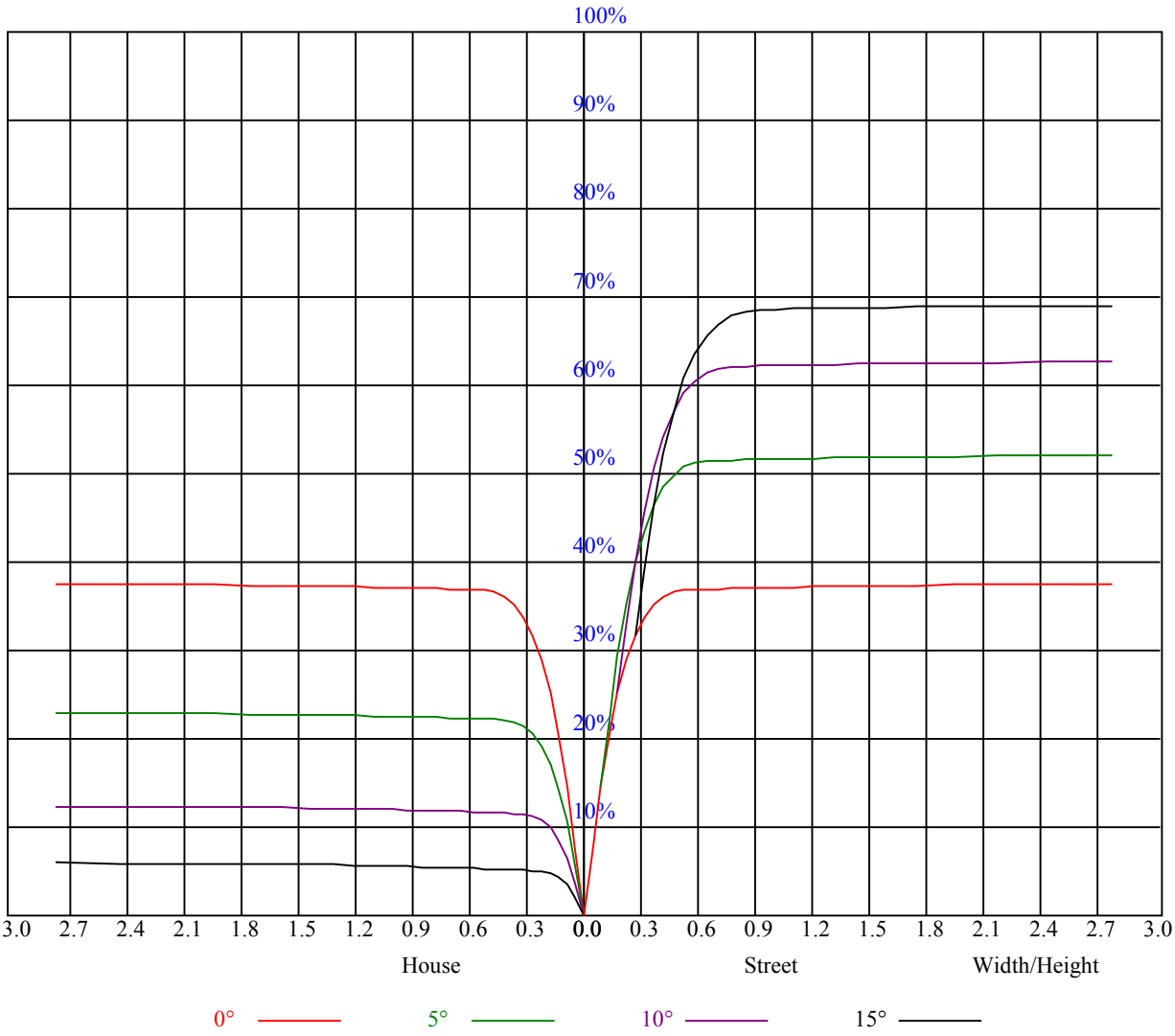


Equipment: GMS1980 Date: 2020/2/13 Operator: NT07
Temperature(°C): 25.0 Humidity(%): 65.0% Distance(m): 7.50

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	0.90	0.90	0.90	0.88	0.88	0.88	0.84	0.84	0.84	0.80	0.80	0.80	0.77	0.77	0.77	0.76
1	0.85	0.84	0.82	0.84	0.82	0.81	0.81	0.80	0.79	0.78	0.77	0.76	0.75	0.75	0.74	0.73
2	0.81	0.79	0.77	0.80	0.78	0.76	0.78	0.76	0.75	0.76	0.74	0.73	0.74	0.73	0.72	0.71
3	0.78	0.75	0.73	0.77	0.75	0.73	0.75	0.73	0.72	0.74	0.72	0.70	0.72	0.71	0.69	0.68
4	0.75	0.72	0.70	0.74	0.72	0.70	0.73	0.71	0.69	0.72	0.70	0.68	0.70	0.69	0.67	0.67
5	0.73	0.70	0.68	0.72	0.69	0.67	0.71	0.69	0.67	0.70	0.68	0.66	0.69	0.67	0.66	0.65
6	0.71	0.68	0.65	0.70	0.67	0.65	0.69	0.67	0.65	0.68	0.66	0.64	0.67	0.65	0.64	0.63
7	0.69	0.66	0.63	0.68	0.65	0.63	0.67	0.65	0.63	0.67	0.64	0.63	0.66	0.64	0.62	0.62
8	0.67	0.64	0.62	0.66	0.64	0.62	0.66	0.63	0.61	0.65	0.63	0.61	0.64	0.62	0.61	0.60
9	0.65	0.62	0.60	0.65	0.62	0.60	0.64	0.62	0.60	0.64	0.61	0.60	0.63	0.61	0.60	0.59
10	0.63	0.61	0.59	0.63	0.60	0.59	0.63	0.60	0.59	0.62	0.60	0.58	0.62	0.60	0.58	0.58

Coefficient Utilization Curve



Equipment: GMS1980
Temperature(°C): 25.0

Date: 2020/2/13
Humidity(%): 65.0%

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	12976.88	13134.38	12965.63	12577.50	11970.00	11092.50	10091.25	9191.25	8178.75
45.0	13027.50	13044.38	12706.88	12211.88	11615.63	10625.63	9646.88	8825.63	7711.88
90.0	13021.88	12751.88	12195.00	11172.38	10647.56	9675.00	8757.00	7746.75	6809.63
135.0	13095.00	12847.50	12251.25	11610.00	10805.63	9720.00	8814.38	7920.00	6980.63
180.0	12976.88	12622.50	11981.25	11147.63	10305.00	9303.75	8276.63	7391.81	6485.63
225.0	13027.50	12785.63	12262.50	11138.06	10720.13	9822.94	8681.06	7797.94	6967.69
270.0	13021.88	13066.88	12780.00	12290.63	11587.50	10546.88	9646.88	8752.50	7756.88
315.0	13095.00	13111.88	12813.75	12245.63	11133.00	10481.06	9680.06	8658.56	7549.31
360.0	12976.88	13134.38	12965.63	12577.50	11970.00	11092.50	10091.25	9191.25	8178.75

C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	7200.00	6412.50	5630.63	5011.88	4393.13	3853.13	3420.00	3043.13	2868.75
45.0	6795.00	6142.50	5321.25	4747.50	4246.88	3684.38	3290.63	2941.88	2684.81
90.0	6072.19	5340.94	4702.50	4208.06	3768.19	3273.75	2921.63	2603.81	2312.44
135.0	6153.75	5490.00	4831.88	4314.38	3808.13	3352.50	2998.13	2868.75	2313.00
180.0	5773.50	5067.00	4453.31	3974.63	3504.94	3083.63	2751.19	2445.75	2098.13
225.0	6108.19	5350.50	4752.56	4164.19	3650.06	3252.38	2858.63	2538.00	2210.63
270.0	6811.88	6041.25	5293.13	4691.25	4106.25	3588.75	3189.38	2874.38	2435.63
315.0	6807.38	5936.63	5104.69	4589.44	4065.75	3458.25	3123.00	2773.69	2415.94
360.0	7200.00	6412.50	5630.63	5011.88	4393.13	3853.13	3420.00	3043.13	2868.75

C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	2326.50	2057.06	1774.69	1510.88	1290.94	1106.44	836.44	650.81	501.19
45.0	2261.25	1989.00	1686.94	1447.88	1222.31	984.38	772.31	584.44	399.94
90.0	1974.38	1722.38	1488.94	1098.96	998.55	805.84	602.49	418.95	284.34
135.0	2036.25	1776.94	1486.69	1257.75	1036.13	792.56	605.81	433.13	300.38
180.0	1834.88	1590.75	1253.81	1086.92	884.19	698.12	491.06	344.42	228.66
225.0	1916.44	1675.13	1447.88	1117.18	963.23	772.59	546.75	391.67	266.23
270.0	2152.69	1894.50	1595.81	1373.63	1157.06	906.19	718.88	545.06	369.56
315.0	2102.63	1847.25	1580.63	1254.38	1114.99	910.29	700.31	508.56	357.86
360.0	2326.50	2057.06	1774.69	1510.88	1290.94	1106.44	836.44	650.81	501.19

C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	316.69	284.06	94.33	31.56	17.72	16.26	14.91	13.95	13.11
45.0	299.25	149.29	61.71	22.33	17.89	16.88	16.09	15.41	14.79
90.0	162.62	82.41	27.56	19.13	18.00	17.10	16.37	15.86	15.41
135.0	158.85	80.66	34.43	17.21	15.98	15.30	14.57	14.12	13.78
180.0	125.89	50.23	18.39	15.58	14.46	13.50	12.71	12.15	11.64
225.0	154.86	69.92	27.17	19.29	18.11	17.04	16.09	15.47	14.85
270.0	288.00	132.64	70.31	23.96	20.19	19.07	18.06	17.21	16.76
315.0	222.08	124.88	52.88	20.93	18.23	17.16	16.31	15.69	15.13
360.0	316.69	284.06	94.33	31.56	17.72	16.26	14.91	13.95	13.11

C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	12.38	11.87	11.42	10.97	10.74	10.46	10.29	10.13	10.07
45.0	14.34	14.01	13.78	13.50	13.33	13.22	13.05	12.94	12.88
90.0	15.02	14.74	14.57	14.34	14.18	14.06	14.01	13.95	13.95
135.0	13.39	13.11	12.88	12.66	12.54	12.43	12.32	12.21	12.15
180.0	11.19	10.91	10.69	10.46	10.29	10.18	10.07	9.96	9.90
225.0	14.34	14.06	13.78	13.50	13.33	13.22	13.11	13.05	12.94
270.0	16.14	15.81	15.53	15.24	15.08	15.02	14.91	14.91	14.96
315.0	14.51	14.18	13.84	13.56	13.39	13.22	13.11	12.94	12.88
360.0	12.38	11.87	11.42	10.97	10.74	10.46	10.29	10.13	10.07

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	9.96	9.90	9.90	9.84	9.79	9.79	9.79	9.79	9.79
45.0	12.77	12.71	12.60	12.60	12.49	12.43	12.38	12.38	12.32
90.0	13.84	13.84	13.78	13.89	14.01	14.18	14.34	14.63	14.96
135.0	12.15	12.04	11.98	11.93	11.87	11.81	11.81	11.76	11.70
180.0	9.90	9.84	9.84	9.79	9.79	9.79	9.79	9.84	9.84
225.0	12.88	12.83	12.77	12.77	12.66	12.71	12.71	12.71	12.77
270.0	15.08	15.13	15.24	15.47	15.81	16.26	16.76	17.38	18.23
315.0	12.77	12.71	12.60	12.54	12.49	12.49	12.43	12.43	12.38
360.0	9.96	9.90	9.90	9.84	9.79	9.79	9.79	9.79	9.79

C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	9.79	9.79	9.79	9.79	9.79	9.79	9.73	9.73	9.73
45.0	12.21	12.15	12.09	12.04	12.04	11.98	11.93	11.93	11.87
90.0	15.53	16.14	16.88	17.78	18.68	19.52	20.31	21.09	21.66
135.0	11.64	11.64	11.59	11.59	11.53	11.48	11.42	11.36	11.36
180.0	9.84	9.79	9.79	9.84	9.84	9.84	9.79	9.84	9.79
225.0	12.77	12.83	12.88	12.94	13.05	13.22	13.33	13.44	13.44
270.0	19.18	20.14	21.21	22.39	23.29	24.08	24.75	25.03	25.20
315.0	12.43	12.38	12.43	12.43	12.43	12.43	12.43	12.43	12.43
360.0	9.79	9.79	9.79	9.79	9.79	9.79	9.73	9.73	9.73

C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	9.73	9.79	9.73	9.73	9.79	9.79	9.79	9.84	9.90
45.0	11.87	11.81	11.81	11.76	11.70	11.70	11.59	11.48	11.31
90.0	22.16	22.05	21.38	19.86	18.45	17.49	16.65	15.02	13.22
135.0	11.36	11.36	11.36	11.36	11.36	11.48	11.81	12.09	12.09
180.0	9.79	9.79	9.73	9.73	9.79	9.84	9.96	10.07	10.18
225.0	13.50	13.44	13.44	13.33	13.22	13.05	12.83	12.49	12.21
270.0	25.14	24.98	24.36	23.18	21.43	19.69	18.34	17.10	14.91
315.0	12.49	12.49	12.43	12.38	12.38	12.38	12.54	12.49	12.09
360.0	9.73	9.79	9.73	9.73	9.79	9.79	9.79	9.84	9.90

C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	9.96	10.01	10.07	10.24	10.29	10.35	9.79	9.28	9.06
45.0	11.14	10.91	10.69	10.41	10.18	10.07	9.79	9.56	9.39
90.0	12.04	10.63	10.24	9.96	9.73	9.45	9.23	9.06	8.89
135.0	12.21	12.26	12.43	12.26	11.08	10.18	9.68	9.39	9.11
180.0	10.41	10.69	10.69	10.80	10.07	9.45	9.06	8.72	8.55
225.0	11.76	11.36	10.97	10.58	10.29	10.01	9.68	9.34	9.06
270.0	12.71	11.14	10.69	10.46	10.13	9.79	9.45	9.17	8.94
315.0	11.81	11.87	11.81	11.53	11.08	10.35	10.01	9.68	9.34
360.0	9.96	10.01	10.07	10.24	10.29	10.35	9.79	9.28	9.06

C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	8.78	8.55	8.44	8.38	8.27	8.21	8.16	8.10	7.99
45.0	9.06	8.83	8.66	8.55	8.44	8.33	8.27	8.21	7.93
90.0	8.72	8.61	8.49	8.38	8.38	8.27	8.27	7.88	7.82
135.0	8.83	8.61	8.44	8.38	8.33	8.21	8.16	7.88	7.82
180.0	8.44	8.38	8.33	8.21	8.16	8.04	7.99	7.93	7.93
225.0	8.83	8.72	8.55	8.49	8.38	8.33	7.99	7.93	7.88
270.0	8.78	8.66	8.61	8.55	8.21	7.88	8.21	7.82	7.82
315.0	9.00	8.72	8.55	8.49	8.38	8.38	8.21	7.93	7.82
360.0	8.78	8.55	8.44	8.38	8.27	8.21	8.16	8.10	7.99

Intensity data(cd)

C/γ(°)	90.0
0.0	7.93
45.0	7.93
90.0	7.82
135.0	7.82
180.0	7.88
225.0	7.93
270.0	7.82
315.0	7.82
360.0	7.93