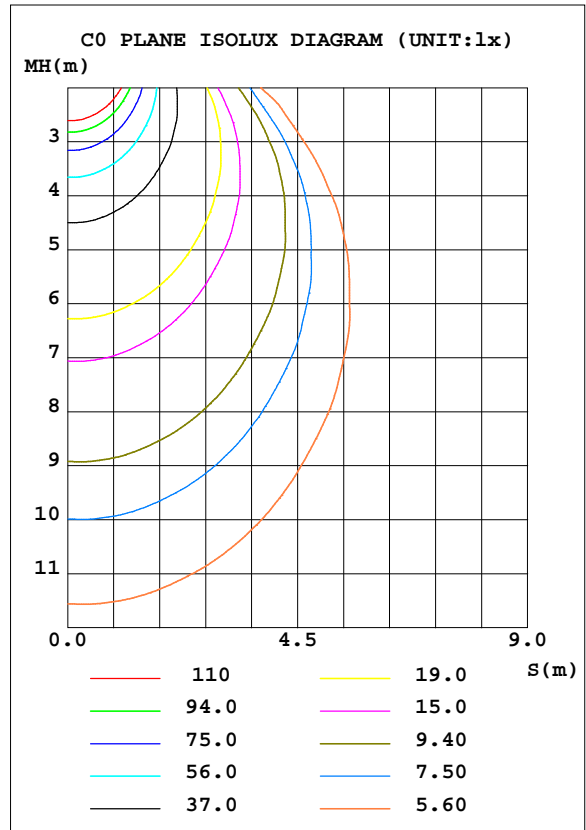
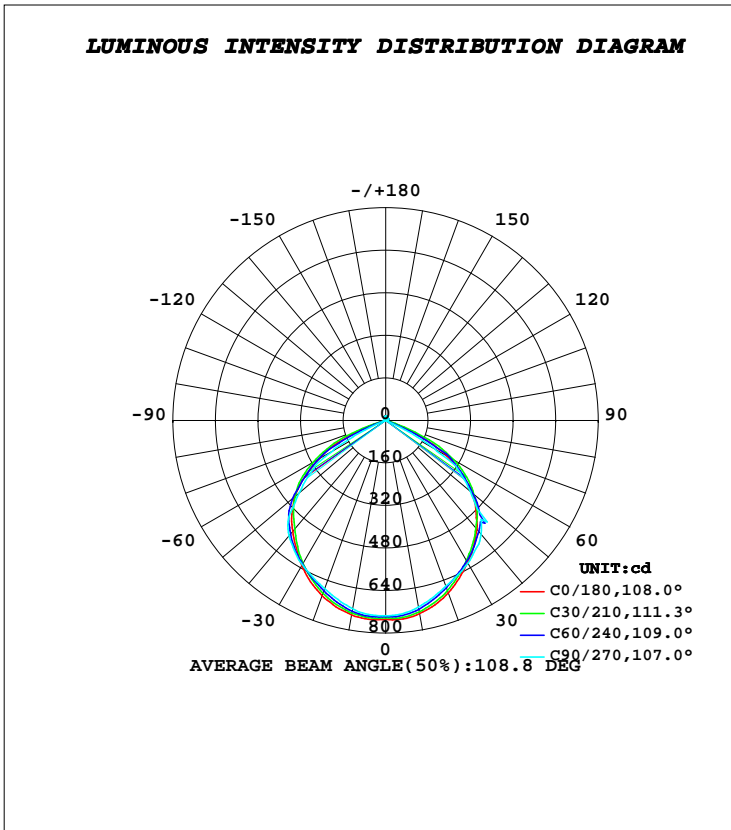


LUMINAIRE PHOTOMETRIC TEST REPORT

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

DATA OF LAMP		PHOTOMETRIC DATA				Eff: 97.18 lm/W
MODEL	DFL-20W	I _{max} (cd)	750.8	S/MH(C0/180)		1.23
NOMINAL POWER(W)	20	LOR(%)	100.0	S/MH(C90/270)		1.26
RATED VOLTAGE(V)	220	TOTAL FLUX(lm)	1865.9	η UP, DN(C0-180)		1.4, 47.5
NOMINAL FLUX(lm)	1865.87	CIE CLASS	DIRECT	η UP, DN(C180-360)		1.5, 49.6
LAMPS INSIDE	1	η up(%)	2.9	CIBSE SHR NOM		1.25
TEST VOLTAGE(V)	220.2	η down(%)	97.1	CIBSE SHR MAX		1.35



C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2018-05-17

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity: 65.0%
Test Distance: 8.000m [K=0.7063]
Remarks:

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	737.6	725.9	712.6	716.8	742.7	732.4	719.3	722.5	0- 10	70.00	70.00	3.75,3.75
20	689.7	674.5	663.0	665.9	700.6	686.7	672.2	676.5	10- 20	198.7	268.7	14.4,14.4
30	616.5	609.6	619.6	602.8	630.4	623.4	627.7	612.9	20- 30	298.9	567.5	30.4,30.4
40	534.3	536.4	558.4	529.8	544.2	544.8	565.7	539.8	30- 40	363.5	931.1	49.9,49.9
50	424.1	430.4	416.7	425.1	448.8	451.4	424.3	444.3	40- 50	381.8	1313	70.4,70.4
60	265.3	286.4	212.9	283.8	288.3	303.4	231.1	299.1	50- 60	322.6	1636	87.7,87.7
70	30.44	42.11	5.582	49.46	72.20	82.50	7.976	62.33	60- 70	159.4	1795	96.2,96.2
80	3.210	3.390	2.911	3.259	5.046	5.414	4.850	5.384	70- 80	13.84	1809	96.9,96.9
90	2.706	2.777	2.519	2.666	4.108	4.133	3.842	4.108	80- 90	3.956	1813	97.1,97.1
100	4.043	4.093	3.795	3.943	5.047	5.092	4.880	5.094	90-100	4.230	1817	97.4,97.4
110	5.940	5.985	5.656	5.811	6.803	6.819	6.623	6.826	100-110	5.697	1823	97.7,97.7
120	7.935	7.954	7.750	7.753	8.755	8.690	8.577	8.659	110-120	7.236	1830	98.1,98.1
130	9.669	9.702	9.565	9.496	10.41	10.30	10.20	10.25	120-130	8.176	1838	98.5,98.5
140	11.28	11.26	11.05	11.12	11.80	11.68	11.41	11.49	130-140	8.244	1846	98.9,98.9
150	12.94	12.87	12.67	12.78	13.21	13.09	12.72	12.78	140-150	7.601	1854	99.4,99.4
160	14.37	14.35	14.34	14.23	14.52	14.42	14.19	14.10	150-160	6.277	1860	99.7,99.7
170	15.64	15.65	15.61	15.45	15.63	15.51	15.39	15.22	160-170	4.212	1864	99.9,99.9
180	16.33	16.31	16.29	16.03	16.44	16.29	16.22	16.03	170-180	1.508	1866	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

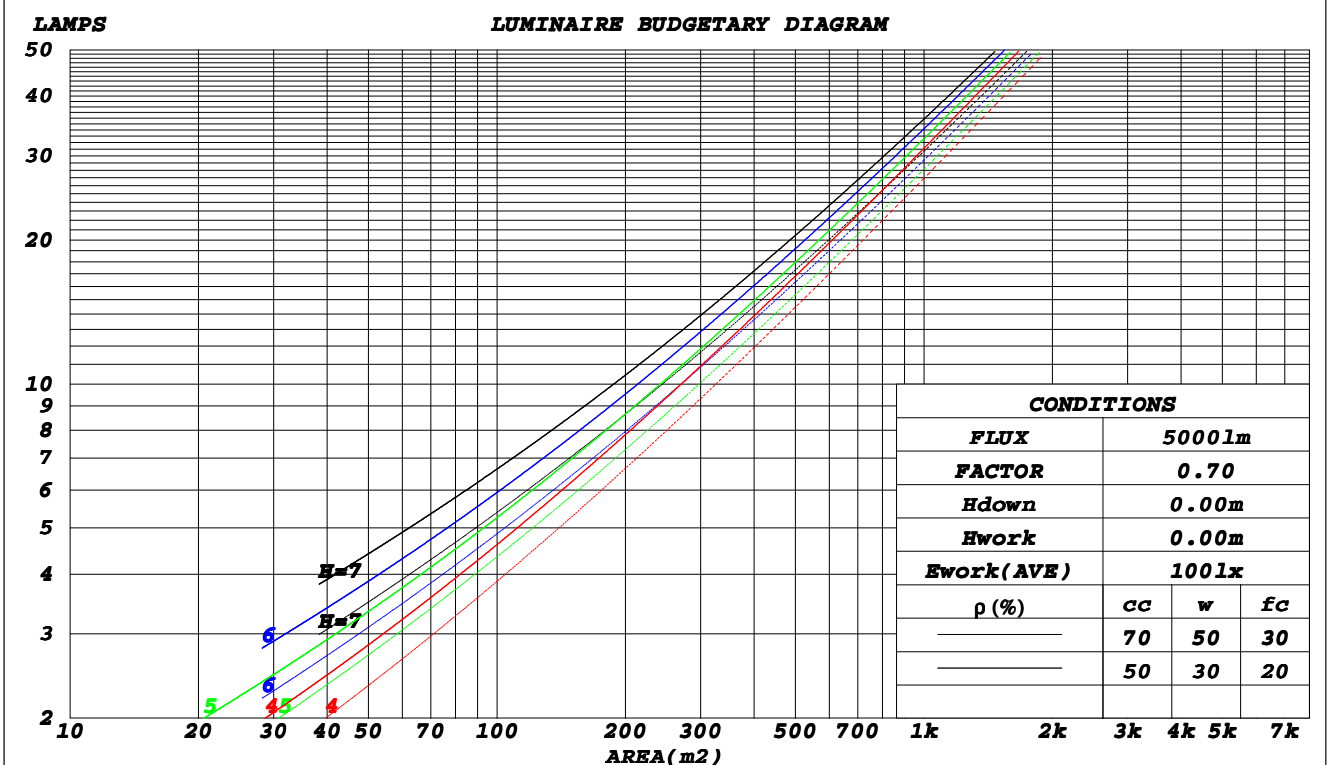
C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2018-05-17

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:8.000m [K=0.7063]
Remarks:

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

ρ_{cc}	80%			70%			50%			30%			10%			0
ρ_w	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ_{fc}	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Coefficients of Utilization(CU)									
0.0	1.18	1.18	1.18	1.15	1.15	1.15	1.10	1.10	1.10	1.04	1.04	1.04	.99	.99	.99	.97
1.0	1.06	1.03	.99	1.04	1.00	.98	.99	.96	.94	.95	.93	.91	.91	.89	.87	.85
2.0	.94	.88	.83	.92	.87	.82	.88	.84	.80	.85	.81	.78	.81	.78	.76	.73
3.0	.84	.76	.71	.82	.75	.70	.79	.73	.68	.76	.71	.67	.73	.69	.65	.63
4.0	.75	.67	.60	.73	.66	.60	.70	.64	.59	.68	.62	.58	.65	.61	.57	.55
5.0	.67	.59	.52	.66	.58	.52	.63	.56	.51	.61	.55	.50	.59	.54	.50	.48
6.0	.60	.52	.46	.59	.51	.46	.57	.50	.45	.55	.49	.44	.53	.48	.44	.42
7.0	.55	.46	.41	.54	.46	.40	.52	.45	.40	.50	.44	.39	.49	.43	.39	.37
8.0	.50	.42	.36	.49	.41	.36	.48	.41	.36	.46	.40	.35	.45	.39	.35	.33
9.0	.46	.38	.33	.45	.38	.32	.44	.37	.32	.43	.36	.32	.41	.36	.32	.30
10.0	.42	.35	.30	.42	.34	.29	.40	.34	.29	.39	.33	.29	.38	.33	.29	.27



C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature: 25.3DEG
 Operators: DAMIN
 Test Date: 2018-05-17

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
 Humidity: 65.0%
 Test Distance: 8.000m [K=0.7063]
 Remarks:

WEC AND CCEC

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

ρ_{cc}	80%			70%			50%			30%			10%			0
ρ_w	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ_{fc}	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)									
0.0																
1.0	.253	.144	.046	.246	.140	.045	.231	.133	.042	.218	.126	.040	.205	.119	.038	
2.0	.249	.137	.042	.243	.134	.041	.230	.128	.040	.218	.122	.038	.207	.117	.037	
3.0	.238	.127	.038	.232	.124	.037	.221	.120	.036	.210	.115	.035	.201	.111	.034	
4.0	.225	.117	.034	.220	.115	.034	.210	.111	.033	.200	.108	.032	.192	.104	.032	
5.0	.212	.108	.031	.207	.106	.031	.198	.103	.030	.190	.100	.030	.182	.097	.029	
6.0	.199	.100	.029	.195	.098	.028	.187	.096	.028	.179	.093	.027	.172	.091	.027	
7.0	.187	.093	.026	.183	.091	.026	.176	.089	.026	.169	.087	.025	.163	.084	.025	
8.0	.176	.086	.024	.173	.085	.024	.166	.083	.024	.160	.081	.023	.154	.079	.023	
9.0	.166	.080	.022	.163	.079	.022	.157	.078	.022	.151	.076	.022	.146	.074	.021	
10.0	.157	.075	.021	.154	.074	.021	.149	.073	.021	.143	.071	.020	.139	.070	.020	

ρ_{cc}	80%			70%			50%			30%			10%			0
ρ_w	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρ_{fc}	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0																
1.0	.212	.212	.212	.181	.181	.181	.124	.124	.124	.071	.071	.071	.023	.023	.023	
2.0	.198	.179	.161	.170	.153	.138	.116	.105	.096	.067	.061	.056	.021	.020	.018	
3.0	.189	.154	.125	.162	.133	.108	.111	.092	.075	.064	.053	.044	.020	.017	.014	
4.0	.181	.136	.101	.155	.118	.088	.106	.082	.061	.061	.048	.036	.020	.015	.012	
5.0	.173	.123	.084	.149	.106	.073	.102	.074	.051	.059	.043	.030	.019	.014	.010	
6.0	.166	.112	.072	.143	.097	.063	.098	.068	.044	.057	.040	.026	.018	.013	.009	
7.0	.160	.104	.064	.137	.090	.055	.095	.063	.039	.055	.037	.023	.018	.012	.008	
8.0	.153	.097	.057	.132	.084	.050	.091	.059	.035	.053	.035	.021	.017	.011	.007	
9.0	.148	.091	.052	.127	.079	.046	.088	.056	.032	.051	.033	.019	.017	.011	.006	
10.0	.142	.086	.049	.122	.075	.042	.085	.053	.030	.049	.031	.018	.016	.010	.006	
10.0	.137	.082	.046	.118	.071	.040	.082	.050	.028	.048	.030	.017	.015	.010	.006	

C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2018-05-17

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000B_V1 SYSTEM V2.0.267
 Humidity:65.0%
 Test Distance:8.000m [K=0.7063]
 Remarks:

Uncorrected UGR Table

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

ceiling/cavity	0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
walls	0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimensions	Viewed crosswise					Viewed endwise				
x = 2H y = 2H	26.0	27.4	26.3	27.6	27.9	25.5	26.9	25.8	27.1	27.4
3H	26.3	27.5	26.6	27.8	28.1	25.4	26.6	25.7	26.9	27.2
4H	26.2	27.3	26.5	27.6	27.9	25.3	26.5	25.6	26.8	27.1
6H	26.1	27.2	26.4	27.5	27.8	25.2	26.3	25.5	26.6	26.9
8H	26.0	27.1	26.4	27.4	27.7	25.1	26.2	25.5	26.5	26.9
12H	25.9	27.0	26.3	27.3	27.7	25.1	26.1	25.5	26.4	26.8
4H 2H	26.3	27.5	26.7	27.8	28.1	25.9	27.1	26.2	27.4	27.7
3H	26.6	27.6	27.0	28.0	28.3	25.8	26.8	26.1	27.1	27.5
4H	26.5	27.4	26.9	27.8	28.2	25.7	26.6	26.1	26.9	27.3
6H	26.4	27.2	26.8	27.6	28.0	25.6	26.4	26.0	26.8	27.2
8H	26.4	27.1	26.8	27.5	28.0	25.5	26.3	26.0	26.7	27.1
12H	26.3	27.0	26.8	27.4	27.9	25.5	26.1	25.9	26.6	27.0
8H 4H	26.4	27.1	26.8	27.5	28.0	25.5	26.3	26.0	26.7	27.1
6H	26.3	26.9	26.8	27.3	27.8	25.4	26.1	25.9	26.5	27.0
8H	26.2	26.8	26.7	27.2	27.7	25.4	25.9	25.9	26.4	26.9
12H	26.2	26.6	26.7	27.1	27.7	25.4	25.8	25.9	26.3	26.8
12H 4H	26.3	27.0	26.8	27.4	27.9	25.5	26.2	26.0	26.6	27.1
6H	26.2	26.8	26.7	27.2	27.7	25.4	25.9	25.9	26.4	26.9
8H	26.2	26.6	26.7	27.1	27.7	25.4	25.8	25.9	26.3	26.8
Variations with the observer position at spacings:										
S = 1.0H	+ 0.4 / - 0.7					+ 0.3 / - 0.3				
1.5H	+ 0.7 / - 1.2					+ 0.8 / - 1.5				
2.0H	+ 0.7 / - 0.9					+ 1.0 / - 2.0				

CIE Pub.117 Corrected 1866 lm Total Lamp Luminous Flux.(8log(F/F0) = 2.2)

C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2018-05-17

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-2000B_V1 SYSTEM V2.0.267
 Humidity:65.0%
 Test Distance:8.000m [K=0.7063]
 Remarks:

UTILIZATION FACTORS TABLE

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

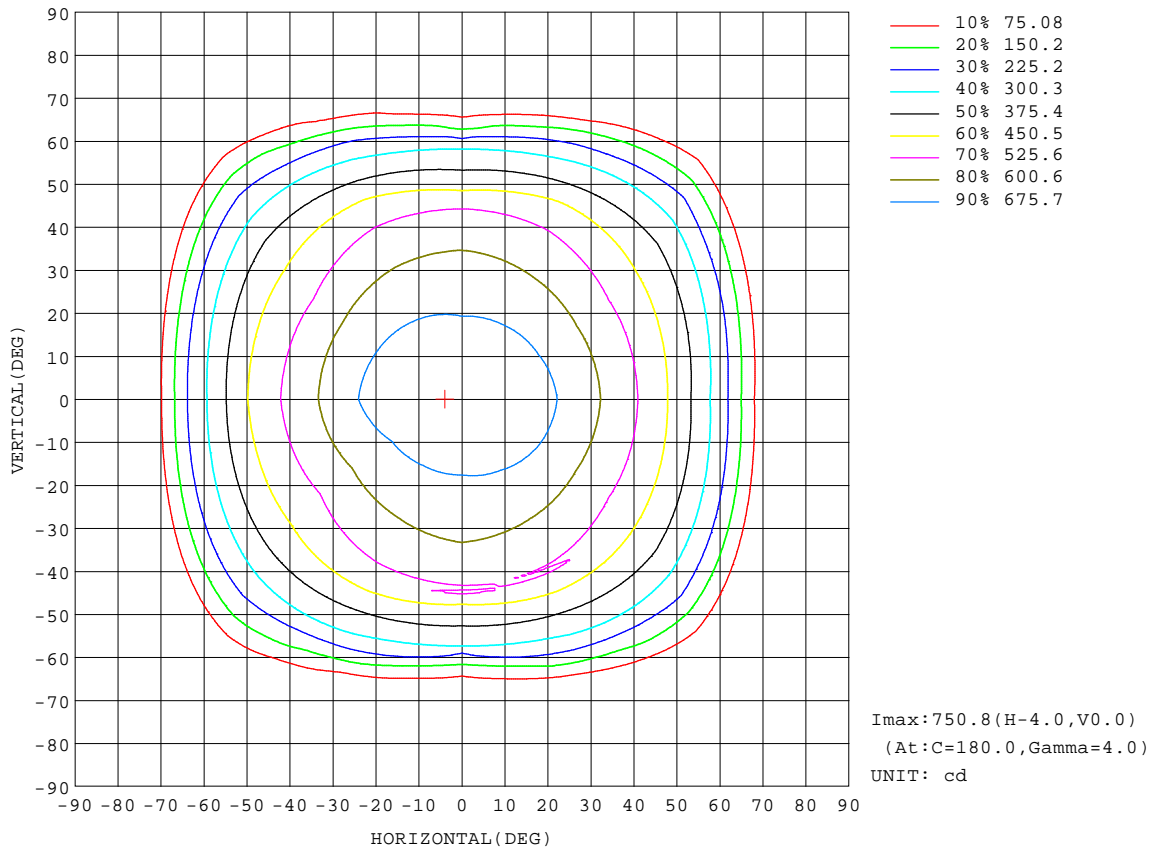
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	60	48	42	59	48	42	57	48	41	35
0.80	70	60	53	69	59	52	67	58	52	45
1.00	80	69	63	78	69	62	76	70	62	55
1.25	87	77	71	85	77	71	82	75	70	63
1.50	92	83	77	90	82	76	87	80	75	68
2.00	98	91	85	96	89	84	93	87	83	75
2.50	101	95	90	99	93	89	95	90	86	78
3.00	104	99	94	102	97	93	98	94	90	82
4.00	108	103	99	105	101	98	101	97	94	85
5.00	110	106	102	107	104	100	102	100	97	87
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended					SHRNOM = 1.25		

C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2018-05-17

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity:65.0%
Test Distance:8.000m [K=0.7063]
Remarks:

ISOCANDELA DIAGRAM

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		



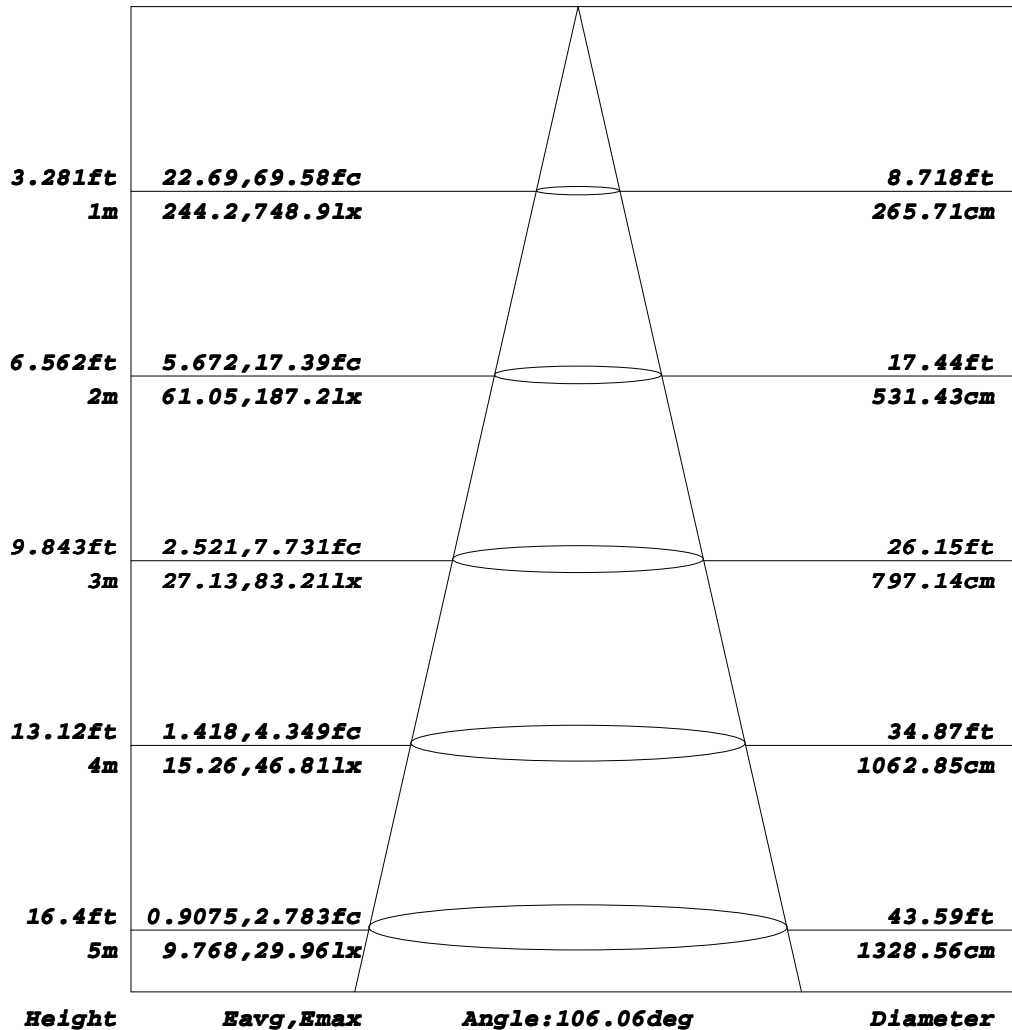
C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2018-05-17

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity: 65.0%
Test Distance: 8.000m [K=0.7063]
Remarks:

AAI Figure

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

Flux out:1453 lm



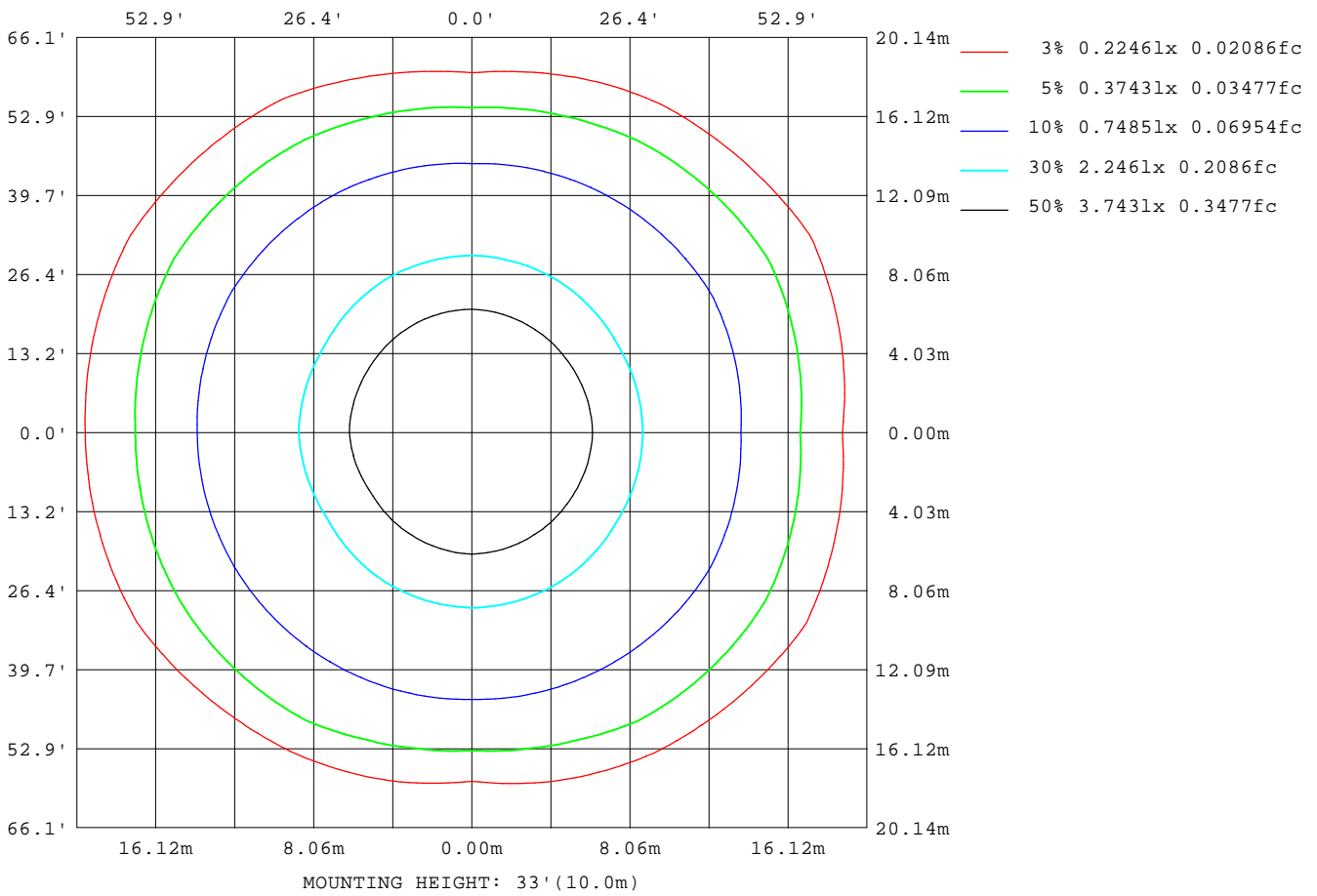
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
 C Interval: 30.0DEG
 Test Speed: HIGH
 Temperature: 25.3DEG
 Operators: DAMIN
 Test Date: 2018-05-17

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
 Humidity: 65.0%
 Test Distance: 8.000m [K=0.7063]
 Remarks:

ISOLUX DIAGRAM

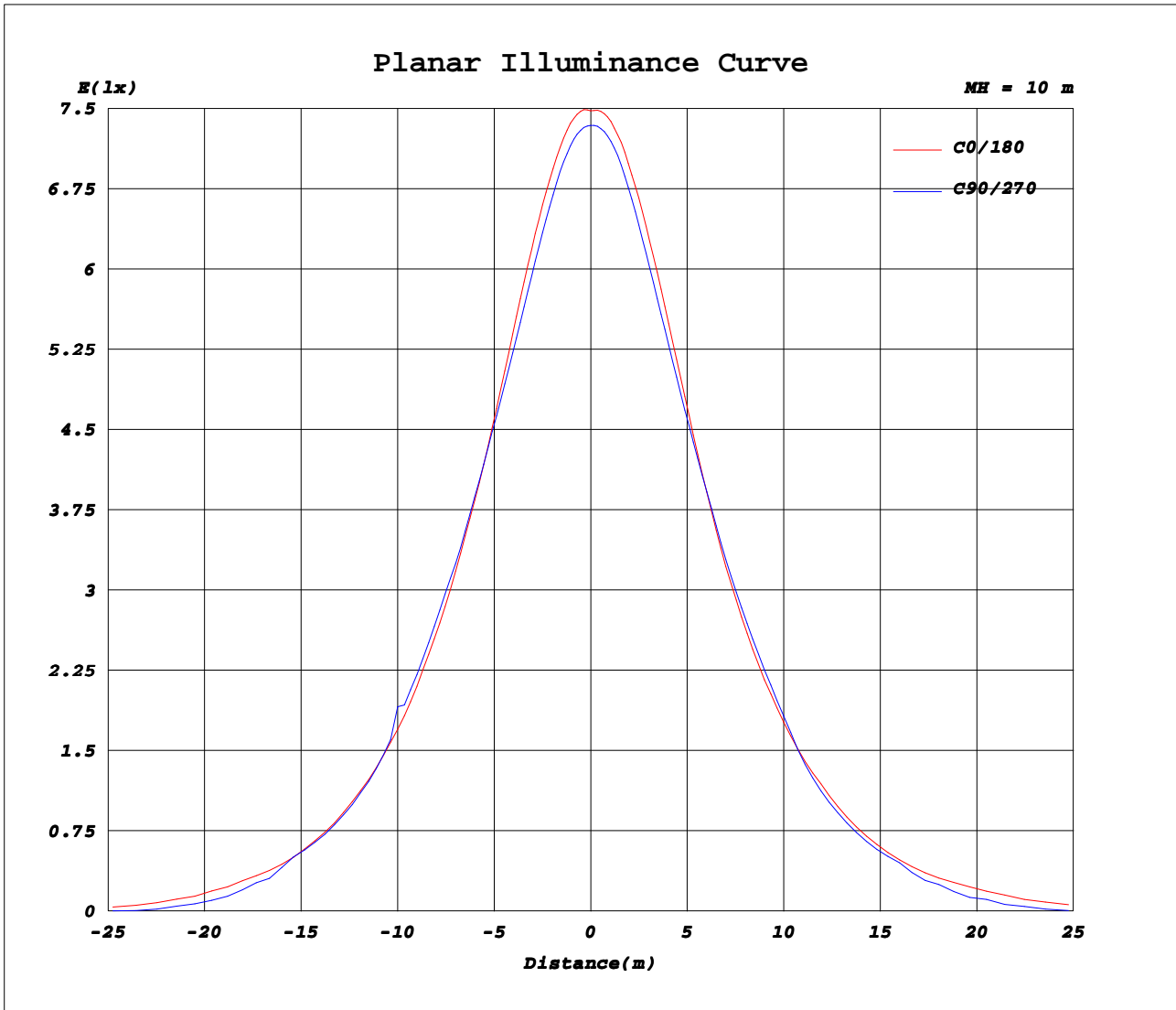
Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		



C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2018-05-17

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity: 65.0%
Test Distance: 8.000m [K=0.7063]
Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2018-05-17

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity: 65.0%
Test Distance: 8.000m [K=0.7063]
Remarks:

LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:220.2V I:0.1630A P:19.20W PF:0.5350 Lamp Flux:1865.87x1 lm		
NAME: DFL-20W	TYPE:LED	
MFR.: GRANDOL INDUSTRY LTD		

Table--1

UNIT: cd

C (DEG) \ γ (DEG)	0	30	60	90	120	150	180	210	240	270	300	330							
0	748	742	738	734	732	729	748	742	738	734	732	729							
5	749	743	736	730	729	729	751	744	739	733	732	731							
10	738	731	721	713	715	719	743	736	729	719	723	722							
15	718	709	697	689	691	698	726	717	708	697	701	704							
20	690	680	668	663	663	669	701	691	682	672	674	679							
25	655	646	639	642	634	637	670	658	654	650	645	646							
30	616	608	611	620	606	600	630	622	625	628	615	611							
35	578	570	580	591	576	558	586	579	594	598	586	571							
40	534	528	545	558	542	518	544	533	557	566	550	529							
45	481	488	501	541	498	489	499	491	517	516	511	486							
50	424	433	428	417	426	424	449	444	458	424	451	437							
55	349	372	353	341	351	366	372	389	372	346	364	382							
60	265	295	278	213	277	290	288	316	291	231	287	311							
65	149	198	125	63.3	117	206	201	230	182	84.8	171	223							
70	30.4	73.8	10.5	5.58	9.51	89.4	72.2	116	48.6	7.98	27.1	97.6							
75	4.21	4.68	4.37	3.85	4.18	4.63	6.45	10.9	6.82	5.97	6.55	9.27							
80	3.21	3.53	3.25	2.91	3.17	3.35	5.05	5.46	5.37	4.85	5.24	5.53							
85	2.63	2.74	2.69	2.55	2.68	2.65	4.40	4.54	4.49	4.20	4.39	4.51							
90	2.71	2.84	2.72	2.52	2.68	2.65	4.11	4.12	4.14	3.84	4.07	4.15							
95	3.29	3.43	3.29	3.07	3.24	3.22	4.45	4.53	4.47	4.17	4.41	4.57							
100	4.04	4.16	4.03	3.79	3.96	3.93	5.05	5.12	5.07	4.88	5.04	5.15							
105	4.95	5.06	4.93	4.66	4.86	4.81	5.89	5.93	5.90	5.71	5.89	5.95							
110	5.94	6.03	5.94	5.66	5.86	5.76	6.80	6.82	6.82	6.62	6.83	6.83							
115	6.96	7.02	6.97	6.74	6.86	6.75	7.78	7.76	7.78	7.60	7.77	7.73							
120	7.94	7.95	7.96	7.75	7.81	7.70	8.76	8.70	8.68	8.58	8.70	8.62							
125	8.83	8.83	8.90	8.69	8.70	8.60	9.63	9.56	9.52	9.45	9.60	9.43							
130	9.67	9.65	9.75	9.56	9.56	9.43	10.4	10.3	10.3	10.2	10.4	10.1							
135	10.5	10.5	10.5	10.3	10.4	10.2	11.1	11.0	10.9	10.8	11.0	10.8							
140	11.3	11.3	11.2	11.1	11.2	11.1	11.8	11.7	11.7	11.4	11.6	11.4							
145	12.1	12.1	12.0	11.8	12.0	11.9	12.5	12.4	12.4	12.0	12.2	12.1							
150	12.9	12.9	12.8	12.7	12.9	12.7	13.2	13.1	13.1	12.7	12.8	12.7							
155	13.7	13.7	13.6	13.5	13.6	13.4	13.9	13.8	13.8	13.5	13.5	13.4							
160	14.4	14.4	14.3	14.3	14.3	14.1	14.5	14.4	14.5	14.2	14.2	14.0							
165	15.0	15.1	15.0	15.0	15.0	14.8	15.1	15.0	15.1	14.8	14.8	14.6							
170	15.6	15.7	15.6	15.6	15.6	15.3	15.6	15.5	15.6	15.4	15.3	15.1							
175	16.1	16.2	16.1	16.1	16.0	15.8	16.1	15.9	16.0	15.8	15.7	15.6							
180	16.3	16.4	16.3	16.3	16.1	16.0	16.4	16.3	16.3	16.2	16.1	15.9							

C Range: 0 - 360DEG
C Interval: 30.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2018-05-17

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-2000B_V1 SYSTEM V2.0.267
Humidity: 65.0%
Test Distance: 8.000m [K=0.7063]
Remarks: