

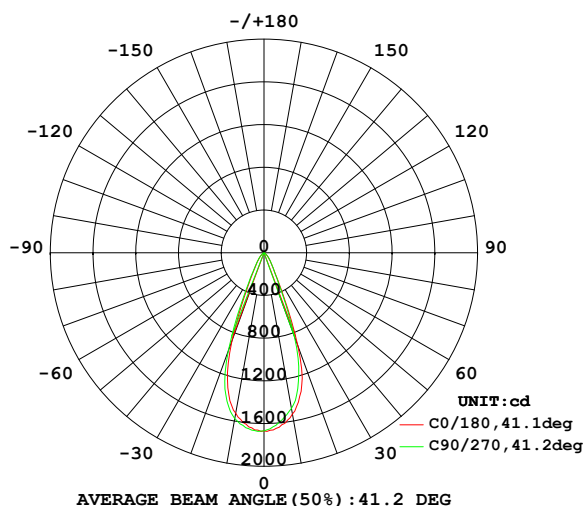
WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

LUMINAIRE PHOTOMETRIC TEST REPORT

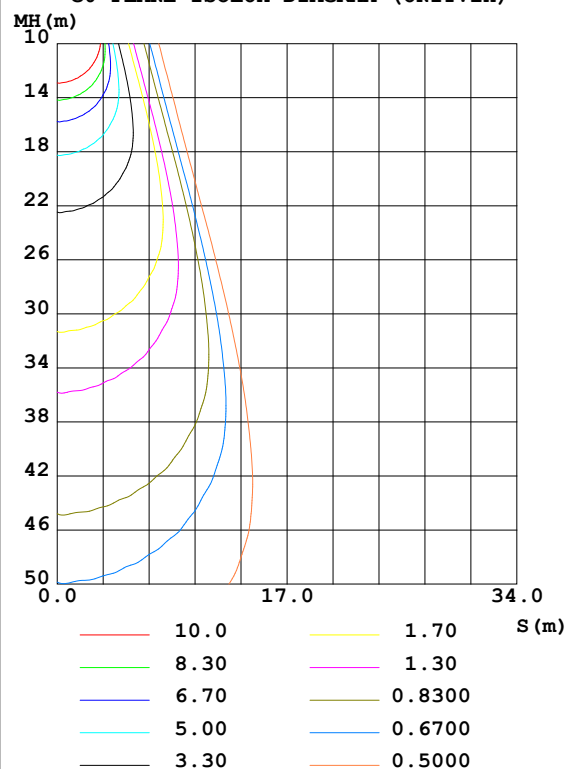
Test:U:120.0V I:0.1235A P:14.68W PF:0.9905 Lamp Flux:894.946x1-lm		
NAME: HR3S-S	TYPE:DOWNLIGHT	WEIGHT:
SPEC.:	DIM.:	SERIAL No.:
MFR.: WAC Lighting	SUR.:	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 60.95 lm/W			
MODEL	EDL-47C-15W-930-120V	I _{max} (cd)	1680	S/MH (C0/180)	0.61
NOMINAL POWER (W)	15	LOR (%)	100.0	S/MH (C90/270)	0.63
RATED VOLTAGE (V)	120	TOTAL FLUX (lm)	894.95	η UP,DN (C0-180)	0.0,48.3
NOMINAL FLUX (lm)	894.946	CIE CLASS	DIRECT	η UP,DN (C180-360)	0.1,51.6
LAMPS INSIDE	1	η up (%)	0.1	CIBSE SHR NOM	0.50
TEST VOLTAGE (V)	120	η down (%)	99.9	CIBSE SHR MAX	0.65

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.4DEG
 Operators:Vito
 Test Date:2015-08-07

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:50%
 Test Distance:2.448m [K=1.0000]
 Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	$\%lum$
10	1534	1501	1482	1488	1527	1558	1578	1575	0- 10	152.4	152.4	17
20	924.5	904.7	835.9	857.2	877.3	955.1	978.0	1007	10- 20	357.5	509.9	57
30	185.0	227.6	183.4	226.4	189.4	257.2	211.4	274.6	20- 30	215.9	725.8	81.1
40	76.29	88.83	80.81	87.90	78.28	92.75	82.92	90.60	30- 40	83.67	809.5	90.5
50	31.58	40.22	34.01	39.87	32.02	40.00	32.13	39.06	40- 50	44.47	854.0	95.4
60	13.00	15.62	13.60	15.66	12.99	14.96	12.70	14.81	50- 60	20.66	874.6	97.7
70	8.125	8.766	8.770	8.730	8.241	8.279	7.936	8.204	60- 70	10.91	885.5	98.9
80	3.620	3.928	4.081	4.015	3.862	3.733	3.582	3.631	70- 80	6.516	892.1	99.7
90	0.2569	0.2104	0.0825	0.0992	0.1826	0.0968	0.0003	0.0894	80- 90	1.988	894.1	99.9
100	0.0634	0.0336	0	0	0.0426	0.0104	0	0.0046	90-100	0.0996	894.2	99.9
110	0.0138	0	0	0	0	0	0	0	100-110	0.0081	894.2	99.9
120	0.0083	0.0037	0	0	0.0034	0	0	0	110-120	0.0010	894.2	99.9
130	0.0634	0.0649	0.0619	0.0652	0.0545	0.0477	0.0418	0.0449	120-130	0.0176	894.2	99.9
140	0.1979	0.2004	0.2058	0.2046	0.2242	0.2075	0.2005	0.2003	130-140	0.0940	894.3	99.9
150	0.3811	0.3812	0.3897	0.3928	0.4326	0.4158	0.4054	0.4037	140-150	0.1872	894.5	99.9
160	0.5493	0.5507	0.5541	0.5656	0.6585	0.6535	0.6401	0.6384	150-160	0.2287	894.7	100
170	0.6629	0.6603	0.6563	0.6722	0.7824	0.7782	0.7746	0.7975	160-170	0.1904	894.9	100
180	0.6951	0.6924	0.7084	0.7099	0.6950	0.6933	0.7006	0.7164	170-180	0.0681	894.9	100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

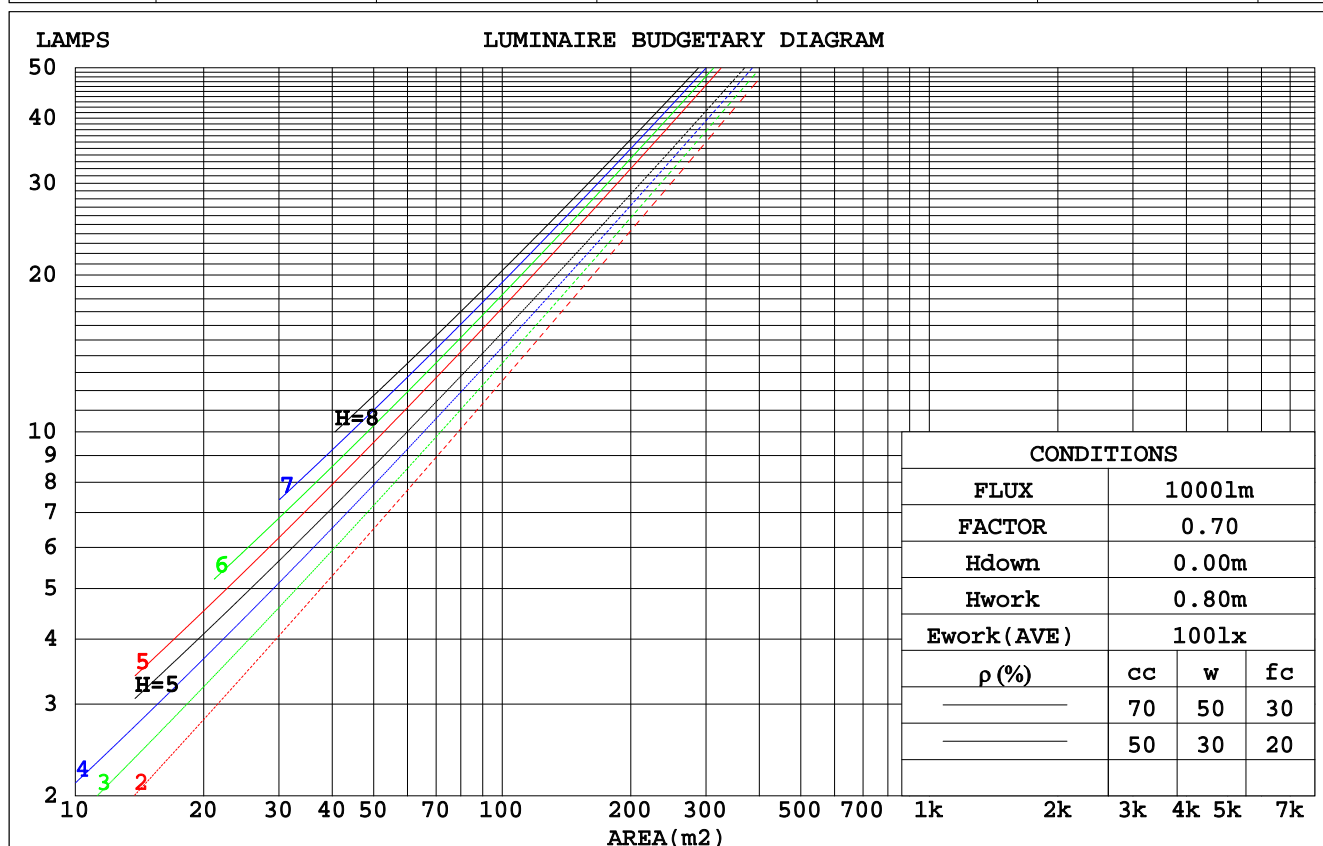
C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:25.4DEG
 Operators:Vito
 Test Date:2015-08-07

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 γ Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity:50%
 Test Distance:2.448m [K=1.0000]
 Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

pcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Coefficients of Utilization(CU)									
0.0	1.19	1.19	1.19	1.16	1.16	1.16	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	.00
1.0	1.11	1.09	1.06	1.09	1.07	1.05	1.05	1.03	1.02	1.01	.00	.99	.98	.97	.96	.94
2.0	1.04	1.00	.97	1.02	.99	.96	.99	.96	.94	.96	.94	.92	.93	.91	.90	.88
3.0	.98	.93	.89	.96	.92	.89	.94	.90	.87	.91	.88	.86	.89	.87	.84	.83
4.0	.92	.87	.83	.91	.86	.83	.89	.85	.82	.87	.83	.81	.85	.82	.80	.78
5.0	.87	.82	.78	.86	.81	.78	.84	.80	.77	.83	.79	.76	.81	.78	.76	.74
6.0	.83	.77	.73	.82	.77	.73	.80	.76	.73	.79	.75	.72	.78	.74	.72	.70
7.0	.79	.73	.69	.78	.73	.69	.77	.72	.69	.76	.72	.69	.75	.71	.68	.67
8.0	.75	.70	.66	.75	.69	.66	.73	.69	.66	.72	.68	.65	.72	.68	.65	.64
9.0	.72	.66	.63	.71	.66	.63	.70	.66	.63	.70	.65	.62	.69	.65	.62	.61
10.0	.69	.63	.60	.68	.63	.60	.68	.63	.60	.67	.63	.60	.66	.62	.59	.58



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 25.4DEG
 Operators: Vito
 Test Date: 2015-08-07

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 50%
 Test Distance: 2.448m [K=1.0000]
 Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

WEC AND CCEC

pcc	80%			70%			50%			30%			10%			0	
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0	
pfc	20%			20%			20%			20%			20%			0	
RCR	RCR:Room Cavity Ratio						Wall Exitance Coefficients(WEC)										
0.0																	
1.0	.172	.098	.031	.165	.094	.030	.153	.088	.028	.141	.081	.026	.130	.076	.024		
2.0	.162	.089	.027	.157	.086	.027	.146	.081	.025	.136	.076	.024	.127	.072	.023		
3.0	.153	.081	.024	.148	.079	.024	.139	.075	.023	.131	.072	.022	.123	.068	.021		
4.0	.144	.075	.022	.140	.073	.022	.132	.070	.021	.125	.067	.020	.118	.064	.020		
5.0	.136	.069	.020	.133	.068	.020	.126	.066	.019	.120	.063	.019	.114	.061	.018		
6.0	.129	.065	.019	.126	.064	.018	.120	.062	.018	.115	.060	.018	.110	.058	.017		
7.0	.123	.061	.017	.120	.060	.017	.115	.058	.017	.110	.056	.016	.105	.055	.016		
8.0	.117	.057	.016	.115	.056	.016	.110	.055	.016	.106	.054	.015	.102	.052	.015		
9.0	.112	.054	.015	.110	.053	.015	.105	.052	.015	.102	.051	.015	.098	.050	.014		
10.0	.107	.051	.014	.105	.051	.014	.101	.050	.014	.098	.049	.014	.095	.048	.014		

pcc	80%			70%			50%			30%			10%			0
ρw	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0
ρfc	20%			20%			20%			20%			20%			0
RCR	RCR:Room Cavity Ratio						Ceiling Cavity Exitance Coefficients(CCEC)									
0.0	.191	.191	.191	.163	.163	.163	.112	.112	.112	.064	.064	.064	.020	.020	.020	
1.0	.172	.158	.146	.147	.136	.126	.100	.093	.087	.058	.054	.051	.019	.017	.016	
2.0	.156	.133	.114	.133	.115	.099	.091	.079	.069	.053	.046	.040	.017	.015	.013	
3.0	.143	.114	.092	.122	.099	.079	.084	.068	.056	.048	.040	.033	.016	.013	.011	
4.0	.132	.099	.075	.113	.086	.065	.078	.060	.046	.045	.035	.027	.014	.011	.009	
5.0	.122	.088	.062	.105	.076	.054	.072	.053	.038	.042	.031	.023	.014	.010	.007	
6.0	.114	.078	.052	.098	.068	.045	.068	.047	.032	.039	.028	.019	.013	.009	.006	
7.0	.107	.070	.044	.092	.061	.039	.064	.043	.027	.037	.025	.016	.012	.008	.005	
8.0	.101	.064	.038	.087	.055	.033	.060	.039	.024	.035	.023	.014	.011	.008	.005	
9.0	.096	.059	.033	.083	.051	.029	.057	.036	.021	.033	.021	.012	.011	.007	.004	
10.0	.091	.054	.029	.079	.047	.026	.055	.033	.018	.032	.020	.011	.010	.006	.004	

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 25.4DEG
 Operators: Vito
 Test Date: 2015-08-07

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 50%
 Test Distance: 2.448m [K=1.0000]
 Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

UGR(Unified Glare Rating) Table

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	9.2	10.1	9.4	10.2	10.4	9.4	10.3	9.6	10.4	10.6
3H	9.6	10.4	9.8	10.6	10.8	9.8	10.6	10.1	10.8	11.0
4H	9.8	10.6	10.1	10.8	11.0	10.1	10.8	10.3	11.0	11.3
6H	10.0	10.7	10.3	10.9	11.2	10.3	11.0	10.6	11.2	11.5
8H	10.0	10.7	10.3	11.0	11.2	10.3	11.0	10.6	11.3	11.5
12H	10.0	10.7	10.4	11.0	11.2	10.4	11.0	10.7	11.3	11.6
4H 2H	9.3	10.0	9.6	10.3	10.5	9.5	10.2	9.8	10.5	10.7
3H	9.9	10.5	10.2	10.8	11.1	10.1	10.8	10.4	11.0	11.3
4H	10.2	10.8	10.5	11.1	11.4	10.4	11.0	10.8	11.3	11.7
6H	10.5	11.0	10.8	11.3	11.7	10.8	11.3	11.1	11.6	12.0
8H	10.6	11.1	11.0	11.4	11.8	10.9	11.4	11.3	11.7	12.1
12H	10.6	11.1	11.0	11.4	11.8	11.0	11.4	11.4	11.8	12.2
8H 4H	10.3	10.8	10.7	11.1	11.5	10.5	11.0	10.9	11.4	11.7
6H	10.7	11.1	11.1	11.5	11.9	11.0	11.4	11.4	11.8	12.2
8H	10.8	11.2	11.3	11.6	12.1	11.1	11.5	11.6	11.9	12.4
12H	10.9	11.3	11.4	11.7	12.2	11.3	11.6	11.8	12.0	12.5
12H 4H	10.3	10.7	10.7	11.1	11.5	10.5	11.0	10.9	11.3	11.7
6H	10.7	11.1	11.1	11.5	11.9	11.0	11.3	11.4	11.7	12.2
8H	10.9	11.2	11.3	11.6	12.1	11.2	11.5	11.7	11.9	12.4
Variations with the observer position at spacings:										
S = 1.0H	+ 1.0 / - 1.4					+ 1.0 / - 1.4				
1.5H	+ 1.2 / - 1.3					+ 1.2 / - 1.2				
2.0H	+ 2.0 / - 1.4					+ 2.0 / - 1.4				

CIE Pub.117 Corrected 894.9 lm Total Lamp Luminous Flux.(8log(F/F0) = -0.4)

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.4DEG
Operators:Vito
Test Date:2015-08-07

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
Humidity:50%
Test Distance:2.448m [K=1.0000]
Remarks:

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UTILIZATION FACTORS TABLE

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	86	79	75	85	79	75	84	78	75	71
0.80	93	87	83	92	87	83	91	86	83	79
1.00	98	92	88	97	91	88	95	91	87	83
1.25	102	97	93	101	96	92	99	95	92	87
1.50	105	100	96	104	99	96	101	98	95	90
2.00	108	103	100	106	102	99	104	100	98	92
2.50	110	106	102	108	104	101	105	102	100	93
3.00	111	108	105	109	106	104	106	103	101	95
4.00	113	110	108	111	109	107	108	106	104	97
5.00	115	112	110	112	110	109	108	107	106	98
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended					SHRNOM = 1.25		

C Range: 0 - 360DEG
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γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 50%
 Test Distance: 2.448m [K=1.0000]
 Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

ISOCANDELA DIAGRAM

Conical surface Flux(90deg):

835.34 lm

%lum = 93.3%

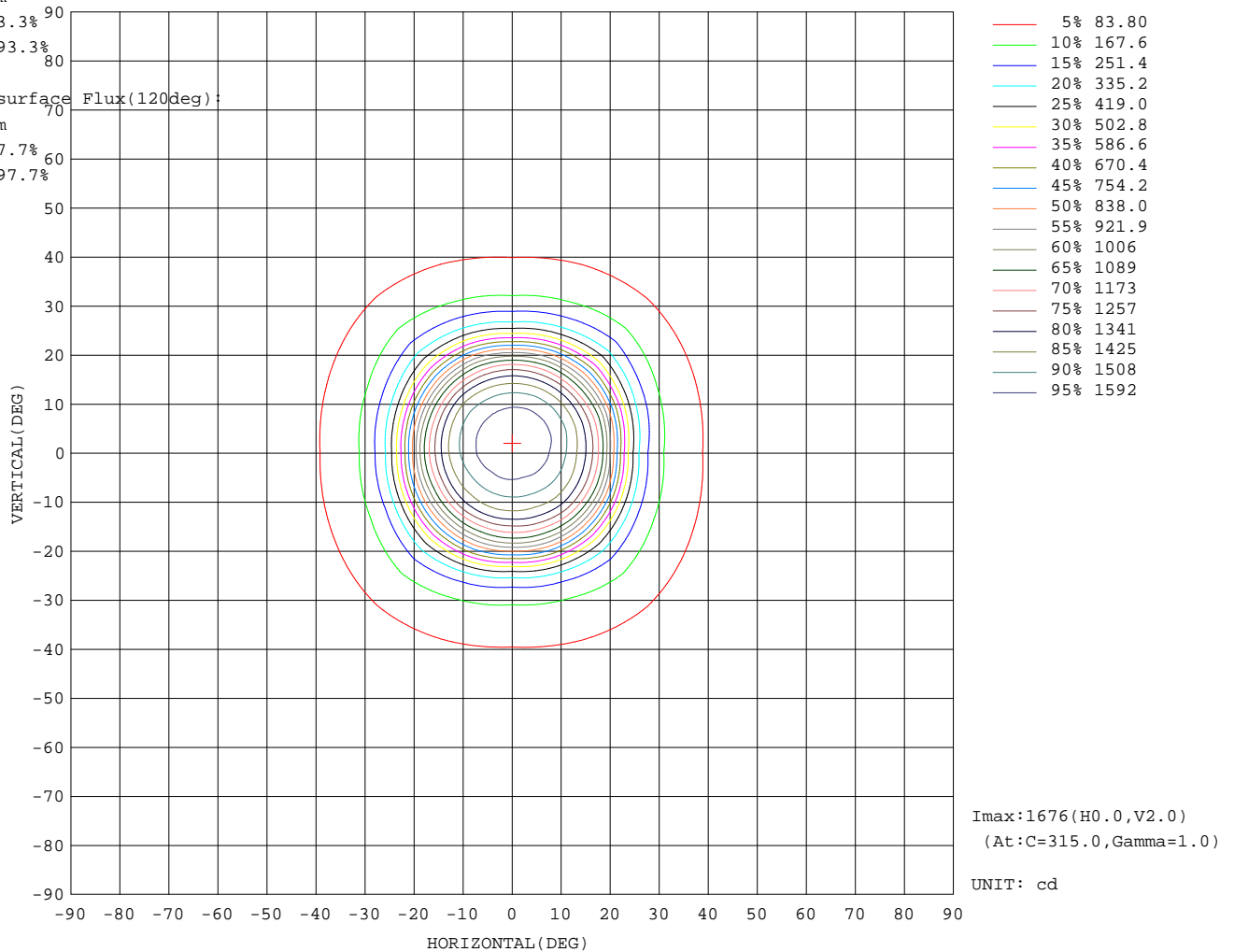
%lamp = 93.3%

Conical surface Flux(120deg):

874.64 lm

%lum = 97.7%

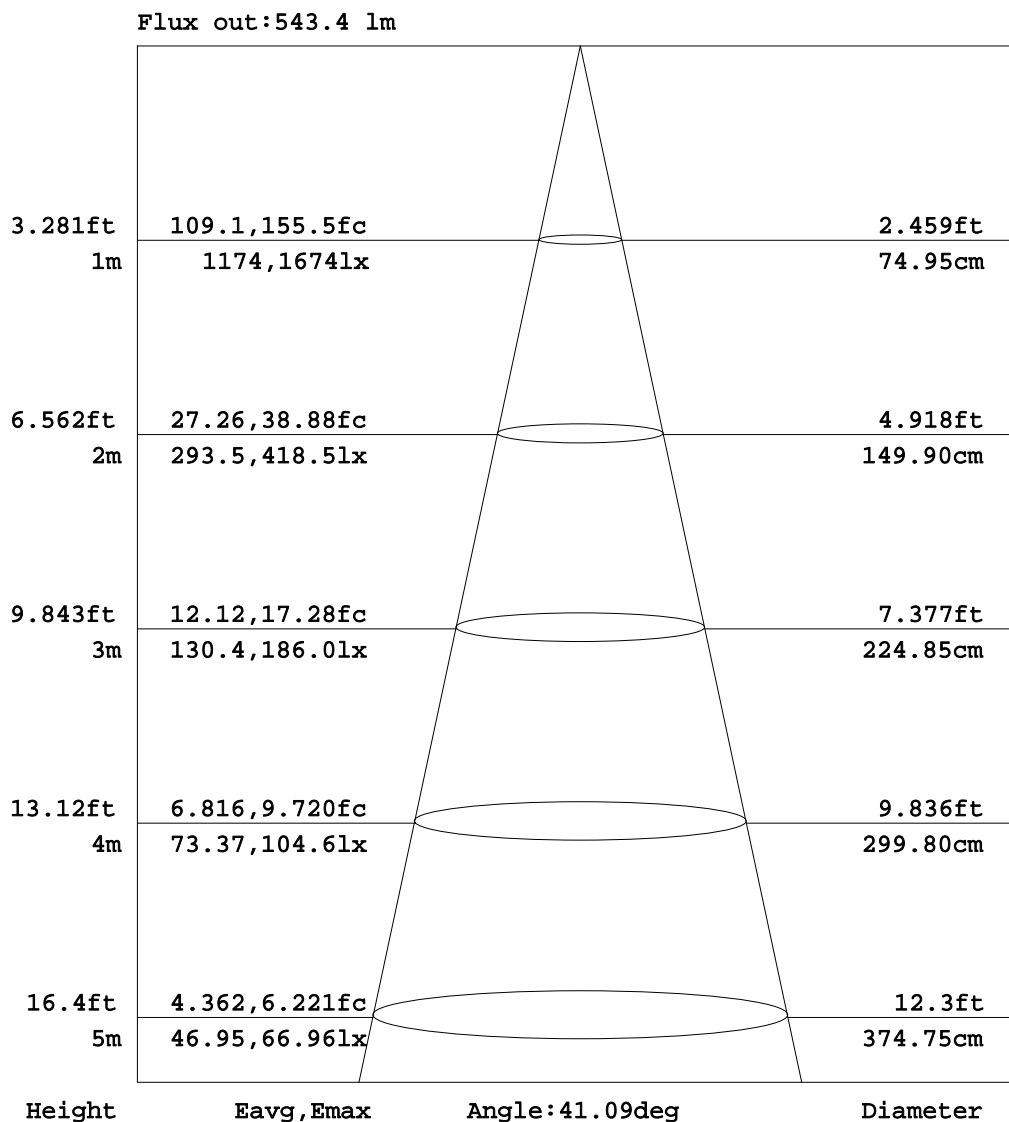
%lamp = 97.7%



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:25.4DEG
Operators:Vito
Test Date:2015-08-07

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.287
Humidity:50%
Test Distance:2.448m [K=1.0000]
Remarks:

AAI Figure



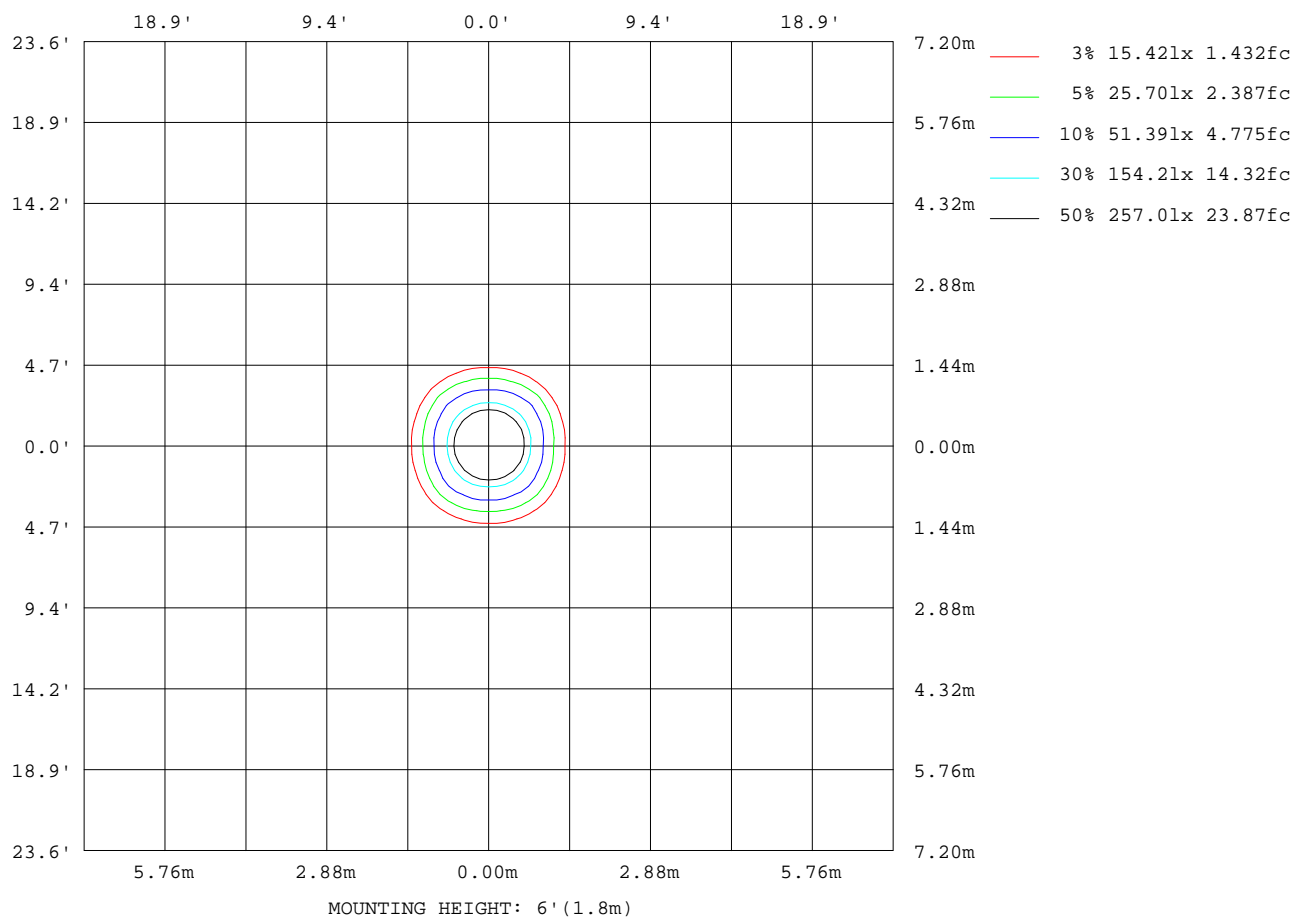
Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.4DEG
Operators: Vito
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γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
Humidity: 50%
Test Distance: 2.448m [K=1.0000]
Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

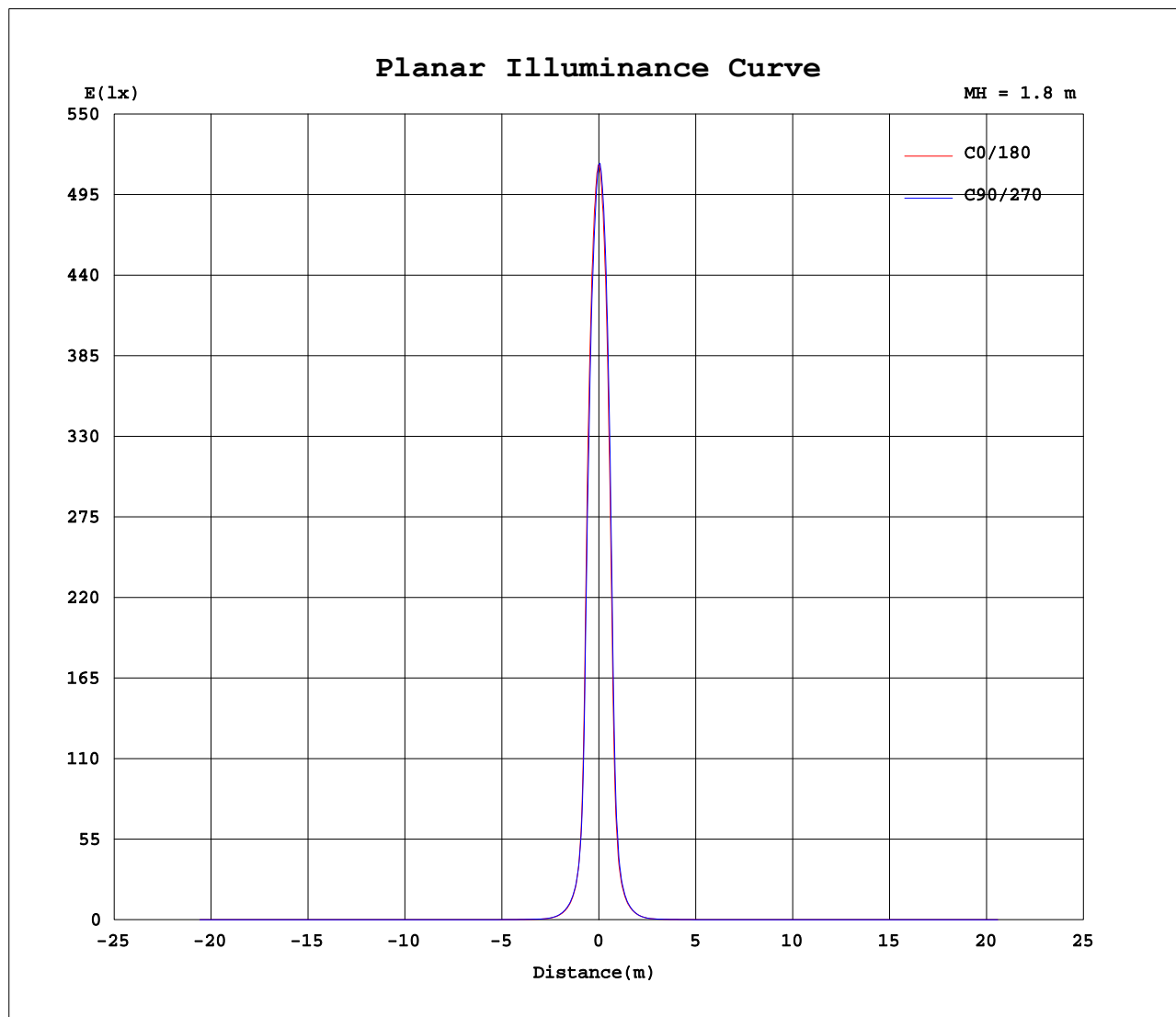
ISOLUX DIAGRAM



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.4DEG
Operators: Vito
Test Date: 2015-08-07

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
Humidity: 50%
Test Distance: 2.448m [K=1.0000]
Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
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 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
 Humidity: 50%
 Test Distance: 2.448m [K=1.0000]
 Remarks:

WAC Lighting GONIOPHOTOMETERS SYSTEM TEST REPORT

LUMINOUS DISTRIBUTION INTENSITY DATA

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	23	45	68	90	113	135	158	180	203	225	248	270	293	315	338			
0	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668	1668			
5	1640	1618	1610	1608	1596	1601	1616	1613	1637	1634	1643	1657	1654	1657	1663	1645			
10	1534	1519	1501	1487	1482	1484	1488	1498	1527	1544	1558	1571	1578	1581	1575	1560			
15	1345	1322	1309	1277	1245	1249	1276	1271	1310	1333	1374	1387	1380	1388	1399	1366			
20	924	928	905	880	836	857	857	860	877	917	955	993	978	1007	1007	1004			
25	392	418	444	401	356	397	435	400	387	433	495	487	448	499	547	478			
30	185	200	228	198	183	199	226	197	189	212	257	237	211	239	275	219			
35	114	121	136	125	117	123	136	120	118	128	149	137	127	135	149	126			
40	76.3	82.2	88.8	86.0	80.8	84.9	87.9	82.0	78.3	84.9	92.8	89.1	82.9	88.0	90.6	83.2			
45	51.0	55.7	60.0	58.9	54.4	57.8	59.5	55.5	52.0	56.4	61.1	59.0	53.6	58.2	59.7	55.5			
50	31.6	36.7	40.2	38.7	34.0	38.3	39.9	36.4	32.0	36.7	40.0	37.5	32.1	37.1	39.1	36.3			
55	18.2	22.5	25.9	23.8	19.3	23.5	25.8	22.3	18.3	22.2	25.4	22.3	17.6	21.9	25.0	22.3			
60	13.0	13.7	15.6	14.3	13.6	14.1	15.7	13.4	13.0	13.5	15.0	13.3	12.7	13.2	14.8	13.6			
65	10.6	11.3	11.2	11.7	11.2	11.6	11.2	11.1	10.6	11.0	10.6	10.9	10.2	10.8	10.6	11.0			
70	8.12	8.73	8.77	9.22	8.77	9.15	8.73	8.70	8.24	8.59	8.28	8.41	7.94	8.32	8.20	8.49			
75	5.82	6.25	6.27	6.69	6.38	6.64	6.33	6.34	6.00	6.21	5.95	6.08	5.69	5.98	5.87	6.05			
80	3.62	3.89	3.93	4.21	4.08	4.24	4.01	4.03	3.86	3.96	3.73	3.79	3.58	3.72	3.63	3.78			
85	1.60	1.73	1.78	1.94	1.93	1.98	1.90	1.88	1.85	1.82	1.68	1.67	1.57	1.62	1.59	1.66			
90	0.26	0.26	0.21	0.14	0.08	0.06	0.10	0.15	0.18	0.15	0.10	0.03	0.00	0.01	0.09	0.17			
95	0.17	0.17	0.13	0.08	0.02	0.00	0.04	0.09	0.13	0.12	0.08	0.02	0.00	0.01	0.07	0.13			
100	0.06	0.06	0.03	0.01	0.00	0.00	0.00	0.02	0.04	0.04	0.01	0.00	0.00	0.00	0.00	0.04			
105	0.03	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01			
110	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
115	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
120	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
125	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01			
130	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.05			
135	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.11	0.11	0.11	0.11	0.11			
140	0.20	0.20	0.20	0.20	0.21	0.20	0.20	0.21	0.22	0.22	0.21	0.21	0.20	0.20	0.20	0.20			
145	0.29	0.29	0.29	0.30	0.30	0.30	0.30	0.30	0.32	0.31	0.31	0.30	0.30	0.30	0.30	0.30			
150	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.43	0.42	0.42	0.41	0.41	0.40	0.40	0.41			
155	0.46	0.46	0.46	0.47	0.47	0.47	0.48	0.48	0.55	0.54	0.54	0.53	0.52	0.52	0.53	0.52			
160	0.55	0.55	0.55	0.56	0.55	0.56	0.57	0.56	0.66	0.65	0.65	0.64	0.64	0.63	0.64	0.63			
165	0.63	0.63	0.63	0.64	0.63	0.64	0.64	0.64	0.74	0.74	0.74	0.74	0.73	0.73	0.73	0.72			
170	0.66	0.65	0.66	0.67	0.66	0.66	0.67	0.68	0.78	0.78	0.78	0.78	0.77	0.79	0.80	0.78			
175	0.67	0.66	0.66	0.67	0.67	0.68	0.68	0.67	0.75	0.74	0.74	0.75	0.74	0.75	0.76	0.76			
180	0.70	0.70	0.69	0.70	0.71	0.71	0.71	0.70	0.70	0.69	0.69	0.70	0.70	0.71	0.72	0.71			

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 25.4DEG
Operators: Vito
Test Date: 2015-08-07

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.287
Humidity: 50%
Test Distance: 2.448m [K=1.0000]
Remarks: