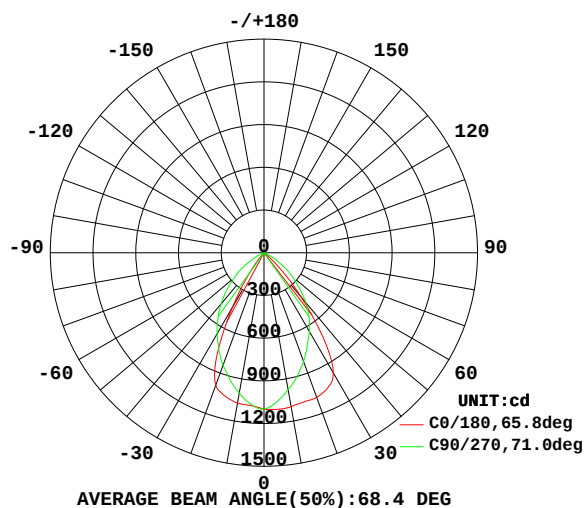


LUMINAIRE PHOTOMETRIC TEST REPORT

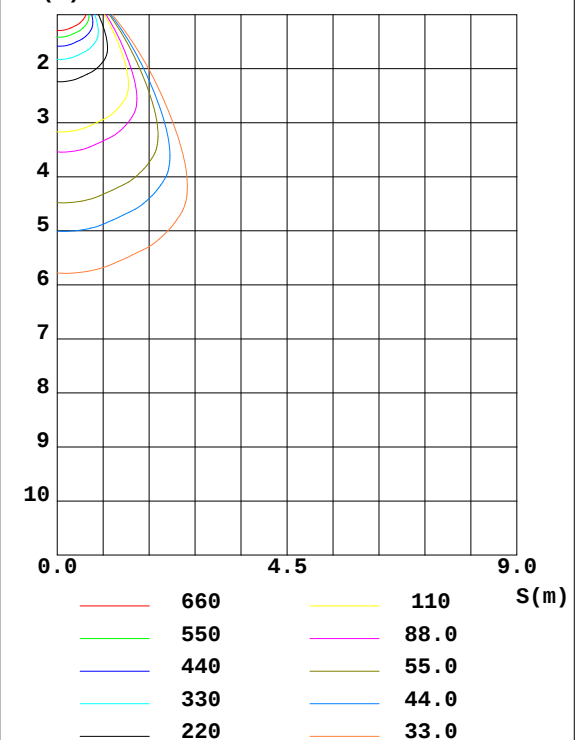
Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm		
NAME: 169-311	TYPE:16W	WEIGHT:
DIM.:	SPEC.:3000K	SERIAL No.:1
MFR.: Tronix Lighting	SUR.:0.55X0.030	PROTECTION ANGLE:

DATA OF LAMP		PHOTOMETRIC DATA Eff: 85.50 lm/W			
MODEL	169-311	I _{max} (cd)	1104	S/MH(C0/180)	1.09
NOMINAL POWER(W)	18	LOR(%)	100.0	S/MH(C90/270)	0.92
RATED VOLTAGE(V)	240	TOTAL FLUX(lm)	1444.9	η UP, DN(C0-180)	0.8, 50.9
NOMINAL FLUX(lm)	1444.95	CIE CLASS	DIRECT	η UP, DN(C180-360)	0.9, 47.3
LAMPS INSIDE	1	η up(%)	1.7	CIBSE SHR NOM	1.00
TEST VOLTAGE(V)	240.1	η down(%)	98.3	CIBSE SHR MAX	1.15

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



C Range: 0 - 360DEG
 C Interval: 45.0DEG
 Test Speed: HIGH
 Temperature: 25.3DEG
 Operators: DAMIN
 Test Date: 2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE G0-2000A_V1 SYSTEM V2.0.276
 Humidity: 65.0%
 Test Distance: 9.443m [K=1.0000]
 Remarks:

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	1098	1027	976.5	1000	1073	1020	1001	1048	0- 10	101.1	101.1	7,7
20	1082	909.0	814.0	875.5	991.6	896.9	840.9	928.9	10- 20	274.9	376.0	26,26
30	974.0	790.0	638.5	706.0	445.2	726.5	659.4	809.2	20- 30	380.0	756.0	52.3,52.3
40	408.6	672.0	456.6	293.7	53.22	319.4	468.7	693.6	30- 40	354.3	1110	76.8,76.8
50	46.72	295.0	259.1	34.21	1.392	42.57	273.4	345.6	40- 50	217.9	1328	91.9,91.9
60	1.306	30.27	87.02	2.315	0.7617	1.870	100.5	44.30	50- 60	78.16	1406	97.3,97.3
70	0.6796	2.594	4.007	1.151	0.3328	0.7494	1.241	1.555	60- 70	12.30	1419	98.2,98.2
80	0.2092	1.129	2.875	0.3356	0	0.0599	0	0.4149	70- 80	1.028	1420	98.2,98.2
90	0	0.1734	0	0.3123	0	0	0.0191	0	80- 90	0.3150	1420	98.3,98.3
100	0	0.3051	0.5156	0.9607	0.2330	0.6872	0.6967	0	90-100	0.2170	1420	98.3,98.3
110	0	1.042	1.671	2.106	1.520	1.925	1.914	0.8323	100-110	0.9065	1421	98.3,98.3
120	1.042	2.261	3.266	3.769	3.542	3.676	3.534	2.219	110-120	2.075	1423	98.5,98.5
130	3.019	3.750	5.108	5.741	5.827	5.752	5.424	4.076	120-130	3.452	1427	98.7,98.7
140	5.309	5.622	7.115	7.672	7.974	7.773	7.457	6.039	130-140	4.515	1431	99,99
150	7.412	7.477	9.282	9.608	9.487	9.706	9.561	7.848	140-150	4.901	1436	99.4,99.4
160	9.051	9.581	11.21	11.47	11.35	11.53	11.42	9.919	150-160	4.480	1440	99.7,99.7
170	11.38	11.75	12.61	12.98	13.17	12.88	12.73	11.97	160-170	3.263	1444	99.9,99.9
180	13.24	13.19	13.31	13.33	13.29	13.15	13.32	13.28	170-180	1.223	1445	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

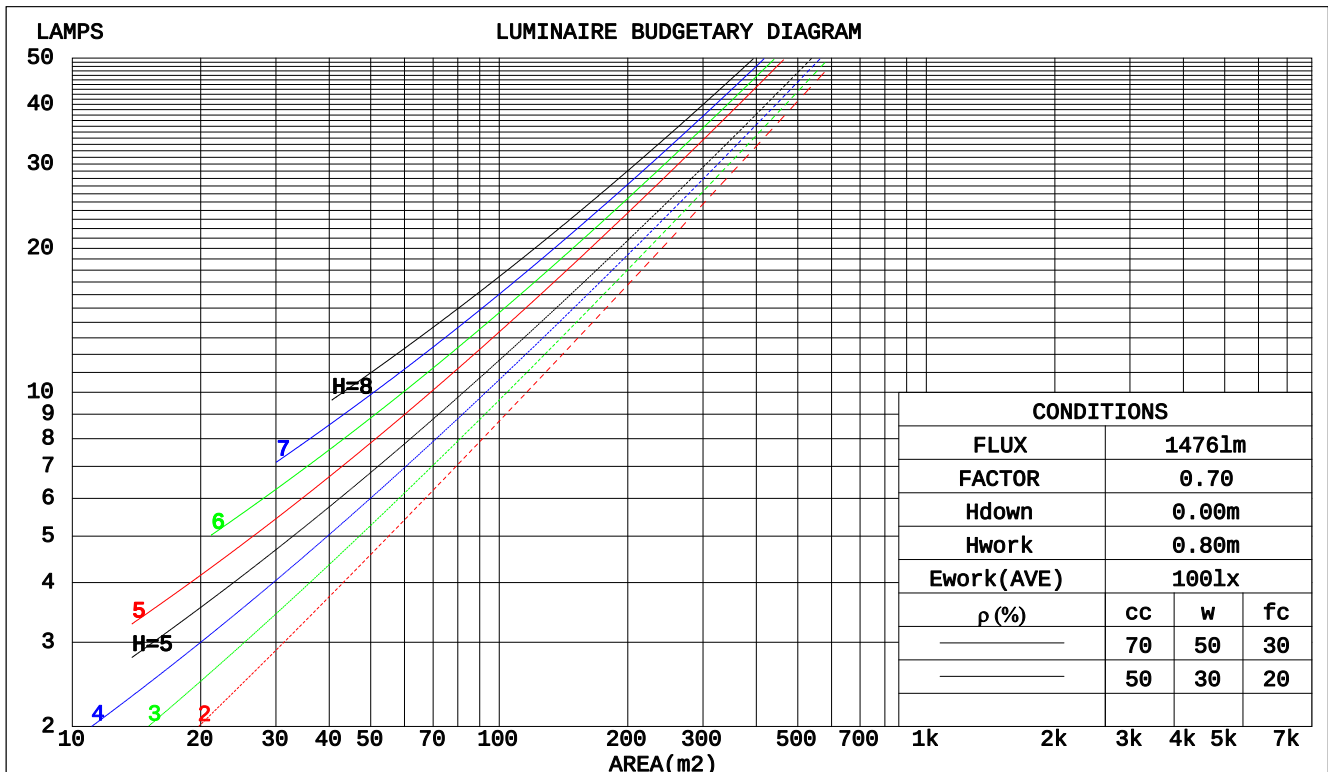
C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

CU AND LUMINAIRE BUDGETARY ESTIMATE DIAGRAM

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm		
NAME: 169-311	TYPE:16W	WEIGHT:
DIM.:	SPEC.:3000K	SERIAL No.:1
MFR.: Tronix Lighting	SUR.:0.55X0.030	PROTECTION ANGLE:

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	Coefficients of Utilization(CU)															
0.0	1.19	1.19	1.19	1.16	1.16	1.16	1.10	1.10	1.10	1.05	1.05	1.05	1.00	1.00	1.00	.98
1.0	1.09	1.06	1.04	1.07	1.04	1.02	1.02	1.00	.99	.98	.97	.95	.95	.93	.92	.90
2.0	1.00	.95	.92	.98	.94	.90	.95	.91	.88	.91	.88	.86	.88	.86	.84	.82
3.0	.92	.86	.81	.90	.85	.81	.87	.83	.79	.84	.81	.78	.82	.79	.76	.74
4.0	.84	.78	.73	.83	.77	.72	.81	.75	.71	.78	.74	.70	.76	.72	.69	.68
5.0	.78	.71	.66	.77	.70	.66	.74	.69	.65	.73	.68	.64	.71	.67	.63	.62
6.0	.72	.65	.60	.71	.64	.60	.69	.63	.59	.67	.62	.59	.66	.61	.58	.56
7.0	.66	.60	.55	.66	.59	.55	.64	.58	.54	.63	.58	.54	.61	.57	.53	.52
8.0	.62	.55	.50	.61	.55	.50	.60	.54	.50	.59	.53	.49	.57	.53	.49	.48
9.0	.58	.51	.46	.57	.51	.46	.56	.50	.46	.55	.49	.46	.54	.49	.45	.44
10.0	.54	.47	.43	.53	.47	.43	.52	.47	.43	.51	.46	.42	.50	.46	.42	.41



C Range: 0 - 360DEG
 C Interval: 45.0DEG
 Test Speed: HIGH
 Temperature:25.3DEG
 Operators:DAMIN
 Test Date:2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
 Humidity:65.0%
 Test Distance:9.443m [K=1.0000]
 Remarks:

WEC AND CCEC

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm								
NAME: 169-311				TYPE:16W			WEIGHT:	
DIM.:				SPEC.:3000K			SERIAL No.:1	
MFR.: Tronix Lighting				SUR.:0.55X0.030			PROTECTION ANGLE:	

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	.201	.114	.036	.194	.111	.035	.180	.103	.033	.168	.097	.031	.156	.090	.029	
2.0	.196	.107	.033	.190	.104	.032	.178	.099	.031	.167	.094	.029	.157	.089	.028	
3.0	.188	.100	.030	.183	.098	.029	.172	.093	.028	.163	.089	.027	.154	.085	.026	
4.0	.180	.093	.027	.175	.092	.027	.166	.088	.026	.158	.085	.026	.150	.081	.025	
5.0	.171	.087	.025	.167	.086	.025	.159	.083	.024	.152	.080	.024	.145	.077	.023	
6.0	.163	.082	.023	.159	.080	.023	.152	.078	.023	.146	.076	.022	.139	.073	.022	
7.0	.155	.077	.022	.152	.076	.022	.146	.074	.021	.140	.072	.021	.134	.070	.020	
8.0	.148	.072	.020	.145	.071	.020	.139	.070	.020	.134	.068	.020	.129	.066	.019	
9.0	.141	.068	.019	.139	.068	.019	.133	.066	.019	.129	.064	.018	.124	.063	.018	
10.0	.135	.065	.018	.133	.064	.018	.128	.063	.018	.123	.061	.017	.119	.060	.017	

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	.204	.204	.204	.174	.174	.174	.119	.119	.119	.068	.068	.068	.022	.022	.022	
1.0	.186	.170	.156	.159	.146	.134	.109	.101	.093	.063	.058	.054	.020	.019	.017	
2.0	.173	.146	.123	.148	.125	.106	.101	.087	.074	.059	.051	.043	.019	.016	.014	
3.0	.162	.127	.099	.139	.110	.086	.095	.076	.060	.055	.045	.036	.018	.014	.012	
4.0	.153	.113	.082	.131	.098	.071	.090	.068	.050	.052	.040	.030	.017	.013	.010	
5.0	.146	.102	.070	.125	.088	.060	.086	.062	.043	.050	.036	.025	.016	.012	.008	
6.0	.139	.093	.060	.119	.080	.052	.082	.056	.037	.048	.033	.022	.015	.011	.007	
7.0	.133	.086	.053	.114	.074	.046	.079	.052	.033	.046	.031	.019	.015	.010	.006	
8.0	.127	.080	.047	.109	.069	.041	.076	.049	.029	.044	.029	.017	.014	.009	.006	
9.0	.122	.075	.043	.105	.065	.037	.073	.046	.026	.042	.027	.016	.014	.009	.005	
10.0	.117	.070	.039	.101	.061	.034	.070	.043	.024	.041	.025	.015	.013	.008	.005	

C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

Uncorrected UGR Table

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm											
NAME: 169-311					TYPE:16W			WEIGHT:			
DIM.:					SPEC.:3000K			SERIAL No.:1			
MFR.: Tronix Lighting					SUR.:0.55X0.030			PROTECTION ANGLE:			
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	2H	21.1	22.2	21.4	22.5	22.7	22.4	23.5	22.7	23.7	24.0
	3H	21.0	22.0	21.2	22.2	22.4	22.3	23.3	22.6	23.5	23.7
	4H	20.9	21.8	21.2	22.1	22.3	22.2	23.1	22.5	23.4	23.6
	6H	20.8	21.6	21.1	21.9	22.2	22.1	23.0	22.4	23.2	23.5
	8H	20.7	21.6	21.1	21.9	22.2	22.0	22.9	22.4	23.2	23.5
	12H	20.7	21.5	21.0	21.8	22.1	22.0	22.8	22.3	23.1	23.4
4H	2H	21.0	21.9	21.3	22.2	22.4	22.2	23.1	22.5	23.4	23.7
	3H	20.8	21.6	21.1	21.9	22.2	22.0	22.8	22.4	23.1	23.4
	4H	20.7	21.4	21.0	21.7	22.1	21.9	22.6	22.3	23.0	23.3
	6H	20.6	21.2	21.0	21.6	22.0	21.8	22.5	22.2	22.8	23.2
	8H	20.5	21.1	20.9	21.5	21.9	21.8	22.4	22.2	22.8	23.2
	12H	20.5	21.0	20.9	21.4	21.8	21.7	22.3	22.2	22.7	23.1
8H	4H	20.5	21.1	20.9	21.5	21.9	21.8	22.4	22.2	22.7	23.2
	6H	20.4	20.9	20.9	21.3	21.8	21.7	22.2	22.1	22.6	23.0
	8H	20.4	20.8	20.8	21.2	21.7	21.6	22.0	22.1	22.5	23.0
	12H	20.3	20.7	20.8	21.1	21.7	21.6	21.9	22.1	22.4	22.9
12H	4H	20.5	21.0	20.9	21.4	21.8	21.7	22.3	22.2	22.7	23.1
	6H	20.4	20.8	20.8	21.2	21.7	21.6	22.0	22.1	22.5	23.0
	8H	20.3	20.7	20.8	21.1	21.7	21.6	21.9	22.1	22.4	22.9
Variations with the observer position at spacings:											
S = 1.0H		+ 2.9 / -15.7					+ 2.7 / - 4.2				
1.5H		+ 2.7 / -12.6					+ 1.2 / - 3.3				
2.0H		+ 5.0 / -20.2					+ 4.0 / -10.9				

CIE Pub.117 Corrected 1445 lm Total Lamp Luminous Flux.(8log(F/F0) = 1.3)

C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

UTILIZATION FACTORS TABLE

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm		
NAME: 169-311	TYPE:16W	WEIGHT:
DIM.:	SPEC.:3000K	SERIAL No.:1
MFR.: Tronix Lighting	SUR.:0.55X0.030	PROTECTION ANGLE:

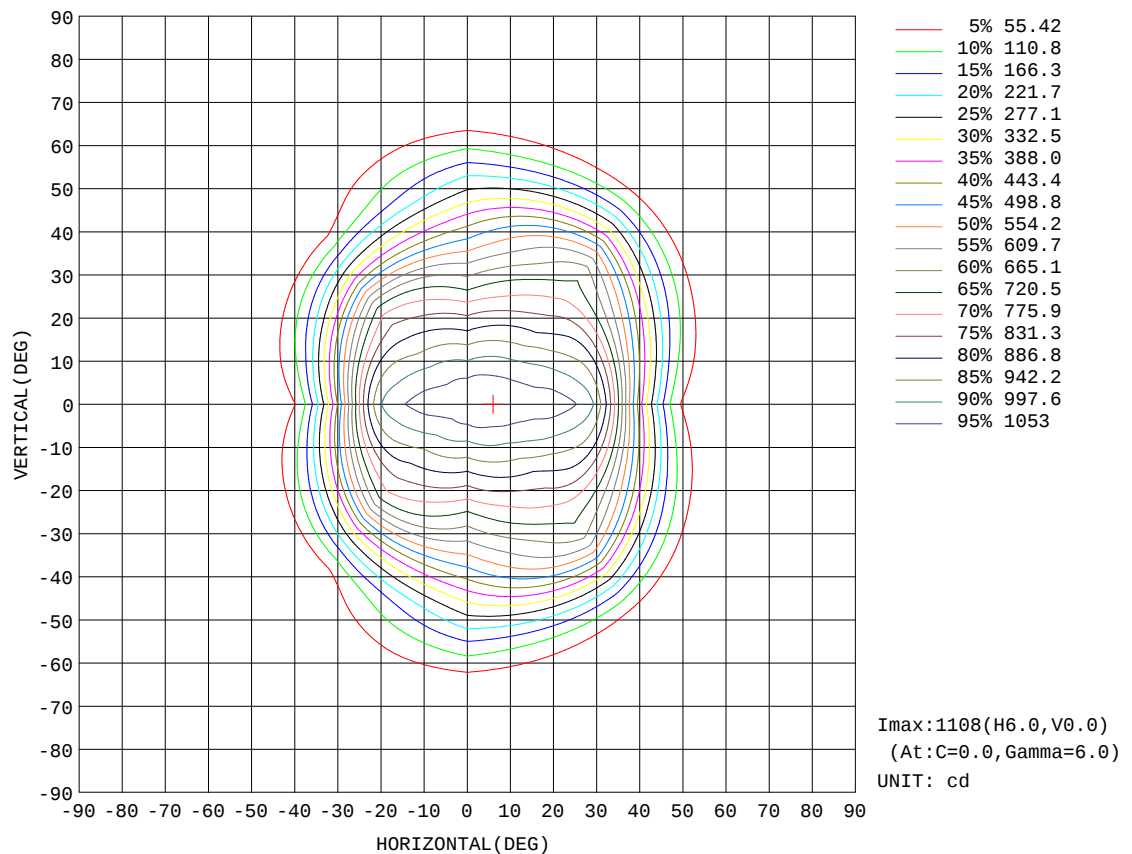
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
$k = 0.60$	77	68	64	76	68	63	75	68	63	59
0.80	86	78	73	85	78	73	83	77	73	68
1.00	92	85	81	91	85	80	89	85	80	75
1.25	98	91	87	96	90	86	94	89	85	80
1.50	101	95	91	100	94	90	97	93	89	84
2.00	105	100	96	104	99	95	100	97	94	87
2.50	107	103	99	105	101	98	102	99	96	89
3.00	109	105	102	107	104	101	103	101	98	91
4.00	112	108	105	109	106	104	105	103	101	93
5.00	113	110	108	111	108	106	106	104	103	94
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended					SHRNOM = 1.25		

C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

ISOCANDELA DIAGRAM

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm		
NAME: 169-311	TYPE:16W	WEIGHT:
DIM.:	SPEC.:3000K	SERIAL No.:1
MFR.: Tronix Lighting	SUR.:0.55X0.030	PROTECTION ANGLE:



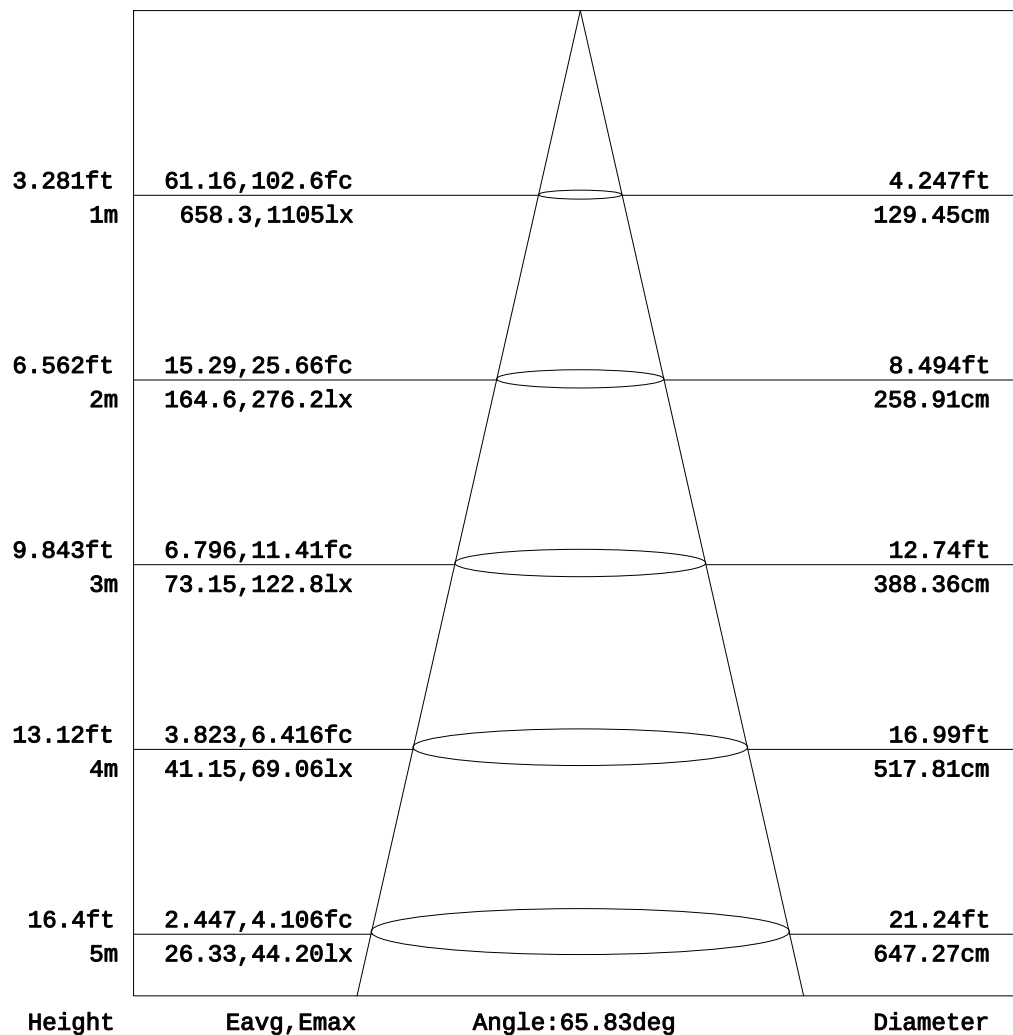
C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

AAI Figure

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm		
NAME: 169-311	TYPE:16W	WEIGHT:
DIM.:	SPEC.:3000K	SERIAL No.:1
MFR.: Tronix Lighting	SUR.:0.55X0.030	PROTECTION ANGLE:

Flux out:872.2 lm



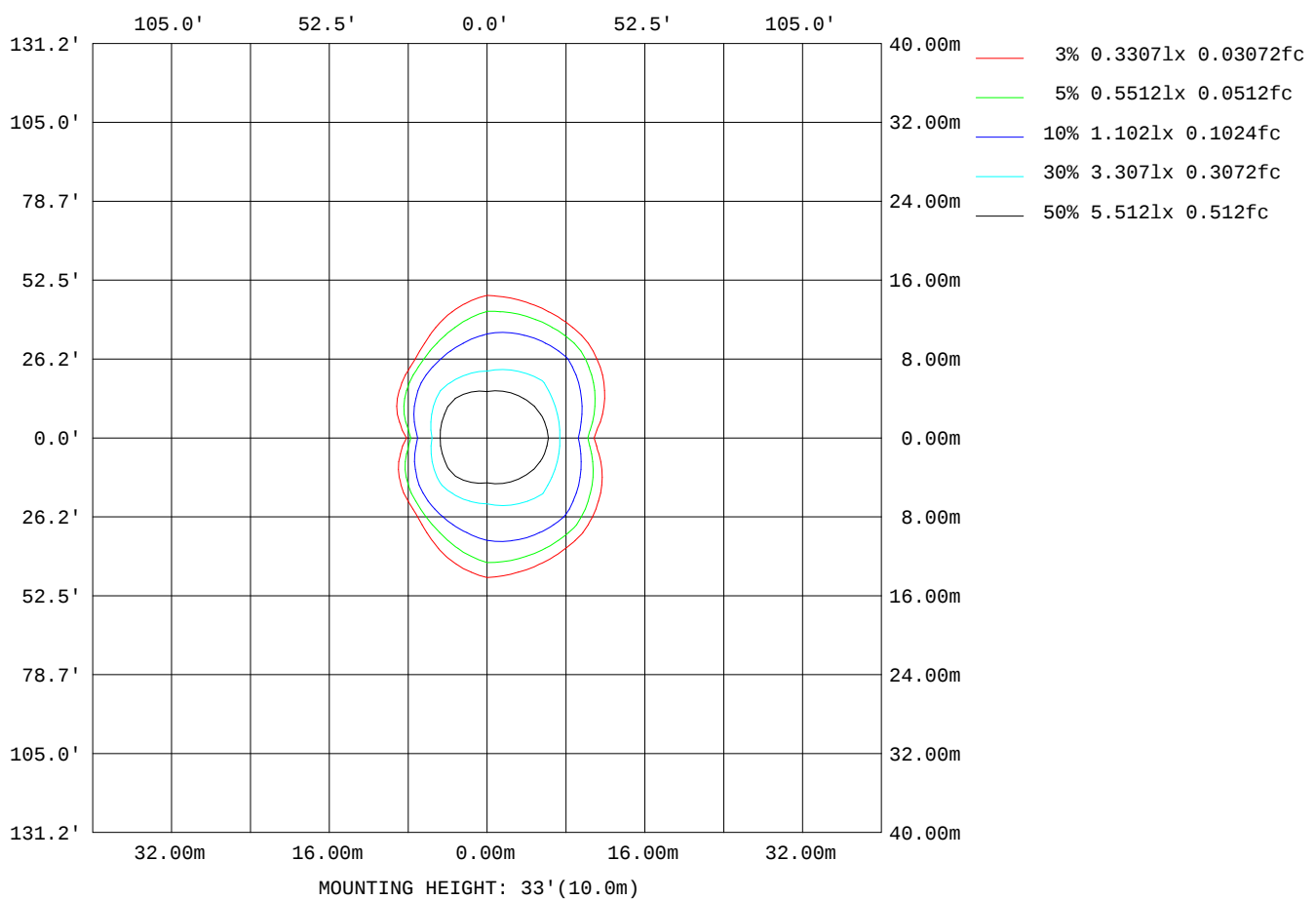
Note:The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

ISOLUX DIAGRAM

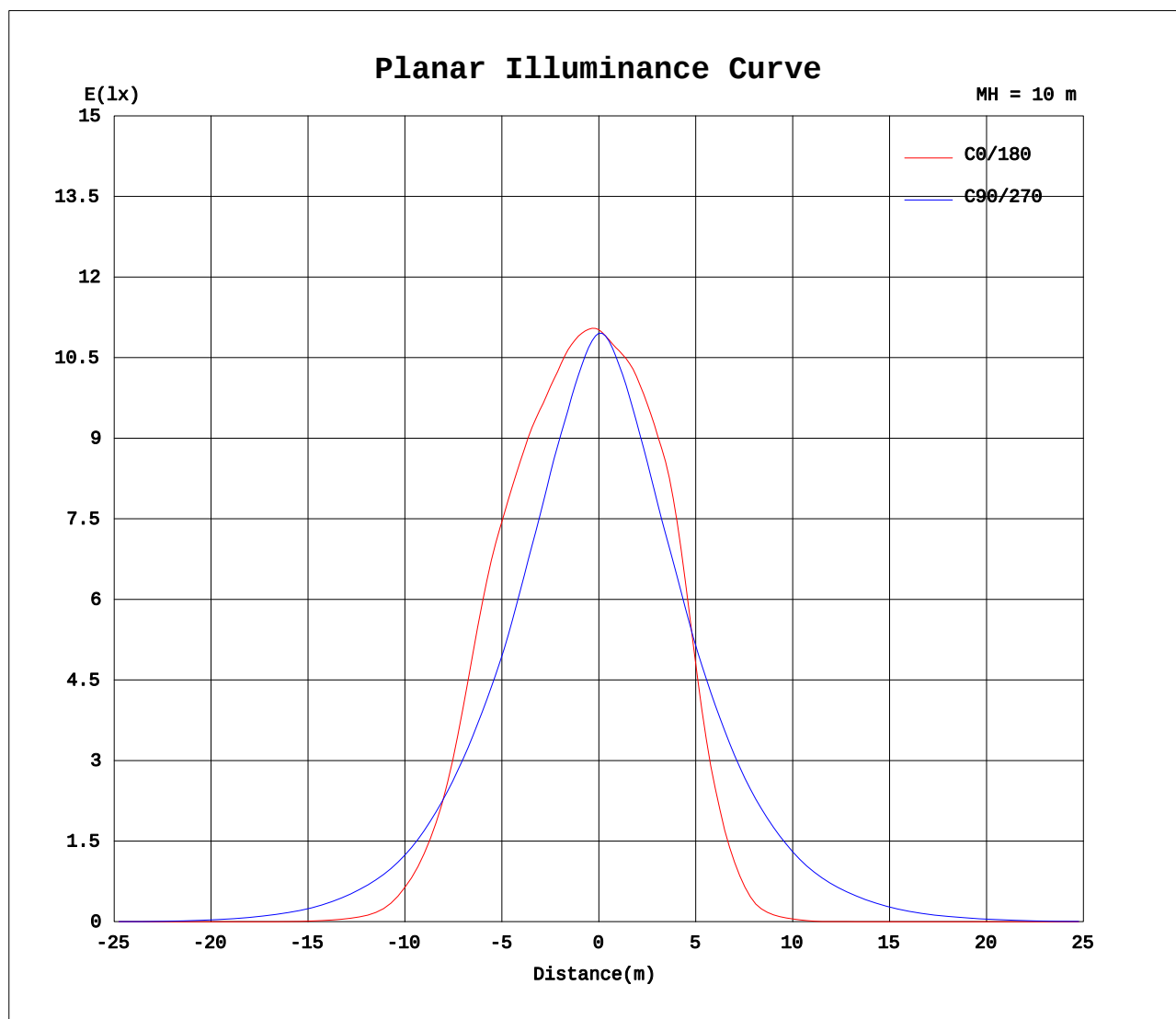
Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm		
NAME: 169-311	TYPE:16W	WEIGHT:
DIM.:	SPEC.:3000K	SERIAL No.:1
MFR.: Tronix Lighting	SUR.:0.55X0.030	PROTECTION ANGLE:



C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 γ Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature: 25.3DEG
Operators: DAMIN
Test Date: 2019-09-02

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System: EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity: 65.0%
Test Distance: 9.443m [K=1.0000]
Remarks:

LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:240.1V I:0.0740A P:16.90W PF:0.9450 Lamp Flux:1444.95x1 lm									
NAME: 169-311					TYPE:16W			WEIGHT:	
DIM.:					SPEC.:3000K			SERIAL No.:1	
MFR.: Tronix Lighting					SUR.:0.55X0.030			PROTECTION ANGLE:	

Table--1

UNIT: cd

C(DEG) γ (DEG)	0	45	90	135	180	225	270	315										
0	1098	1098	1098	1098	1098	1098	1098	1098										
5	1104	1075	1050	1054	1077	1066	1067	1090										
10	1098	1027	976	1000	1073	1020	1001	1048										
15	1084	972	899	937	1045	960	923	994										
20	1082	909	814	876	992	897	841	929										
25	1052	846	719	815	772	833	750	863										
30	974	790	638	706	445	727	659	809										
35	721	733	552	509	201	533	565	748										
40	409	672	457	294	53.2	319	469	694										
45	181	511	352	130	14.7	151	369	559										
50	46.7	295	259	34.2	1.39	42.6	273	346										
55	12.3	125	167	8.39	1.01	11.0	186	163										
60	1.31	30.3	87.0	2.31	0.76	1.87	100	44.3										
65	1.01	6.31	24.9	1.69	0.51	1.25	37.2	9.20										
70	0.68	2.59	4.01	1.15	0.33	0.75	1.24	1.56										
75	0.42	1.70	3.28	0.71	0.16	0.36	0.00	0.88										
80	0.21	1.13	2.87	0.34	0.00	0.06	0.00	0.41										
85	0.01	0.63	1.57	0.19	0.00	0.00	0.00	0.10										
90	0.00	0.17	0.00	0.31	0.00	0.00	0.02	0.00										
95	0.00	0.13	0.12	0.59	0.00	0.27	0.31	0.00										
100	0.00	0.31	0.52	0.96	0.23	0.69	0.70	0.00										
105	0.00	0.61	1.03	1.48	0.75	1.24	1.24	0.35										
110	0.00	1.04	1.67	2.11	1.52	1.93	1.91	0.83										
115	0.35	1.60	2.42	2.88	2.47	2.74	2.68	1.47										
120	1.04	2.26	3.27	3.77	3.54	3.68	3.53	2.22										
125	1.96	3.06	4.17	4.74	4.67	4.71	4.46	3.15										
130	3.02	3.75	5.11	5.74	5.83	5.75	5.42	4.08										
135	4.18	4.70	6.08	6.72	6.96	6.79	6.44	5.08										
140	5.31	5.62	7.11	7.67	7.97	7.77	7.46	6.04										
145	6.43	6.53	8.17	8.63	8.79	8.74	8.51	6.98										
150	7.41	7.48	9.28	9.61	9.49	9.71	9.56	7.85										
155	8.24	8.48	10.3	10.6	10.3	10.6	10.6	8.87										
160	9.05	9.58	11.2	11.5	11.4	11.5	11.4	9.92										
165	10.2	10.7	12.0	12.3	12.4	12.3	12.2	11.0										
170	11.4	11.8	12.6	13.0	13.2	12.9	12.7	12.0										
175	12.5	12.6	13.0	13.3	13.5	13.2	13.1	12.7										
180	13.2	13.2	13.3	13.3	13.3	13.2	13.3	13.3										

C Range: 0 - 360DEG
C Interval: 45.0DEG
Test Speed: HIGH
Temperature:25.3DEG
Operators:DAMIN
Test Date:2019-09-02

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE G0-2000A_V1 SYSTEM V2.0.276
Humidity:65.0%
Test Distance:9.443m [K=1.0000]
Remarks: