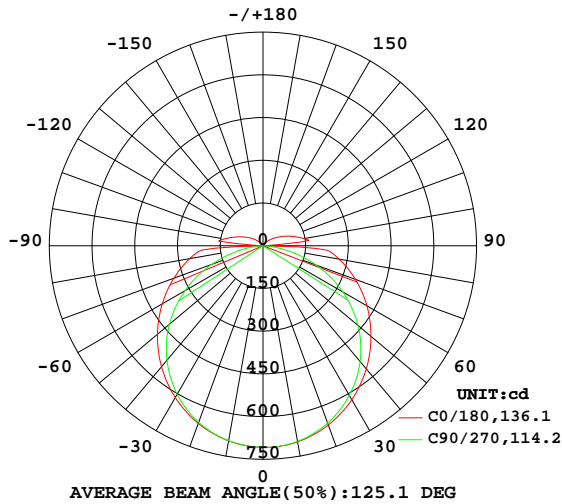


LUMINAIRE PHOTOMETRIC TEST REPORT

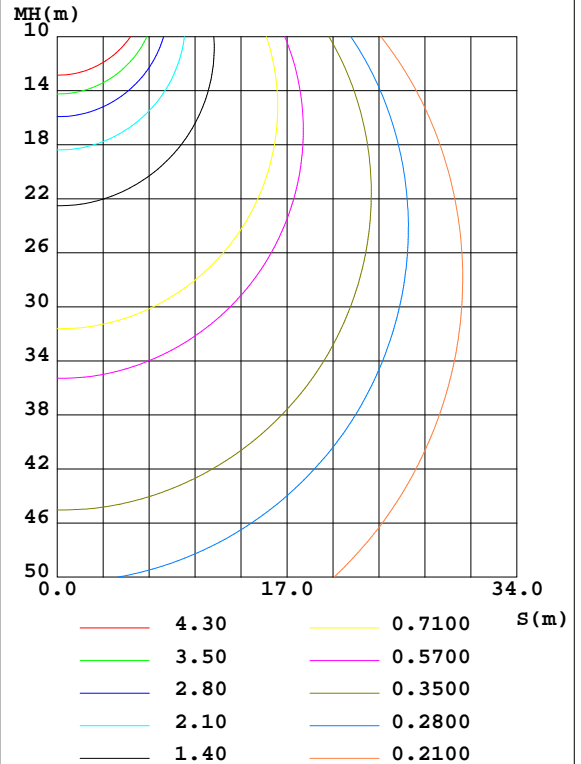
Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm		
NAME: Titan	TYPE:LED	WEIGHT:N/A
SPEC.:N/A	DIM.:	SERIAL No.:N/A
MFR.: Astera LED Technology GmbH	SUR.:	Shielding Angle:N/A

DATA OF LAMP		PHOTOMETRIC DATA			
MODEL	FP1	Imax(cd)	707.9	S/MH(C0/180)	1.30
NOMINAL POWER(W)	48	LOR(%)	100.0	S/MH(C90/270)	1.26
RATED VOLTAGE(V)	24	TOTAL FLUX(lm)	2541.0	η UP,DN(C0-180)	3.5,46.8
NOMINAL FLUX(lm)	2541.01	CIE CLASS	DIRECT	η UP,DN(C180-360)	3.5,46.2
LAMPS INSIDE	1	η up(%)	6.9	CIBSE SHR NOM	1.50
TEST VOLTAGE(V)		η down(%)	93.1	CIBSE SHR MAX	1.50

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



C0 PLANE ISOLUX DIAGRAM (UNIT:lx)



C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:24.5DEG
 Operators:William
 Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
 Humidity:56.4%
 Test Distance:26.000m [K=1.3952]
 Remarks:

ZONAL FLUX DIAGRAM

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum, lamp
10	699.1	699.1	697.7	696.4	695.5	694.8	695.1	697.6	0- 10	67.05	67.05	2.64,2.64
20	669.9	668.2	662.6	662.5	663.8	661.2	659.8	665.9	10- 20	192.9	259.9	10.2,10.2
30	624.0	616.9	606.3	608.5	615.7	607.3	602.7	613.9	20- 30	295.2	555.1	21.8,21.8
40	564.1	548.9	530.6	538.7	554.5	535.6	524.7	543.8	30- 40	362.2	917.3	36.1,36.1
50	494.9	468.3	435.5	456.6	483.5	452.2	429.0	462.4	40- 50	387.8	1305	51.4,51.4
60	421.2	378.7	323.1	366.3	408.6	362.3	316.3	372.6	50- 60	371.0	1676	66,66
70	345.3	285.5	198.3	275.9	333.0	269.6	191.4	282.3	60- 70	317.4	1994	78.5,78.5
80	271.3	198.3	74.15	190.5	261.3	184.0	67.72	197.6	70- 80	239.0	2233	87.9,87.9
90	4.133	5.479	0.8931	2.557	3.060	2.431	0.8100	2.519	80- 90	132.1	2365	93.1,93.1
100	146.5	74.57	0.5160	70.13	138.7	66.97	1.254	77.50	90-100	48.51	2413	95,95
110	98.73	47.33	0.5160	42.72	92.39	40.68	1.917	48.87	100-110	61.13	2474	97.4,97.4
120	61.44	26.58	0.5160	23.04	56.53	21.50	1.917	27.40	110-120	35.57	2510	98.8,98.8
130	34.31	14.02	1.179	11.21	30.30	9.941	2.364	13.91	120-130	18.20	2528	99.5,99.5
140	17.11	6.871	1.399	5.047	13.79	3.977	2.433	5.911	130-140	8.061	2536	99.8,99.8
150	7.184	2.065	1.401	1.926	4.691	1.474	3.170	1.481	140-150	3.086	2539	99.9,99.9
160	1.717	1.916	1.620	1.926	1.418	1.621	2.579	1.704	150-160	1.047	2540	100,100
170	1.642	1.916	3.684	1.926	1.418	1.769	2.433	1.704	160-170	0.5434	2541	100,100
180	1.642	1.916	3.981	1.926	1.418	1.769	2.433	1.704	170-180	0.2004	2541	100,100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

Conical surface Flux(90deg): 1110.7 lm

%lum = 43.7%

%lamp = 43.7%

Conical surface Flux(120deg): 1676.1 lm

%lum = 66.0%

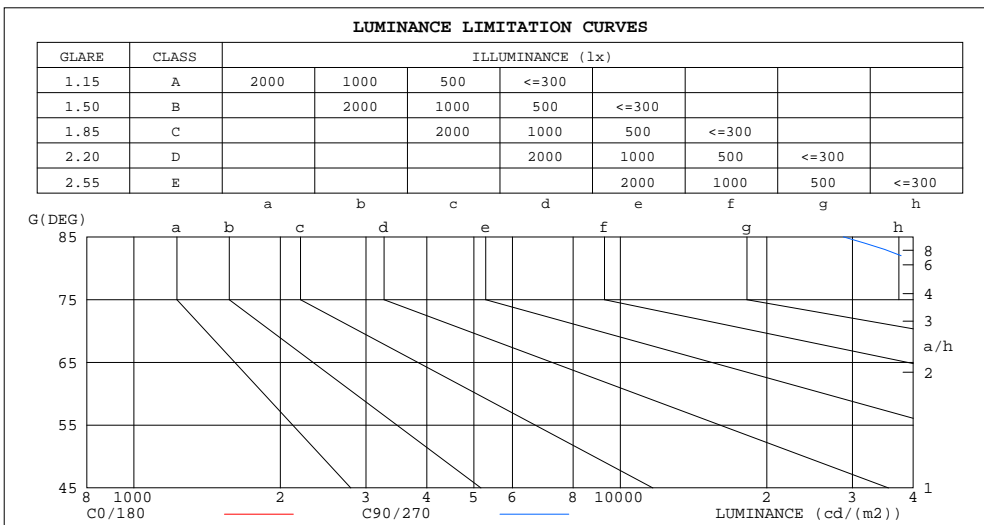
%lamp = 66.0%

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:24.5DEG
Operators:William
Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
Humidity:56.4%
Test Distance:26.000m [K=1.3952]
Remarks:

LUMINANCE LIMITATION CURVES

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm		
NAME: Titan	TYPE:LED	WEIGHT:N/A
SPEC.:N/A	DIM.:	SERIAL No.:N/A
MFR.: Astera LED Technology GmbH	SUR.:	Shielding Angle:N/A



LUMINANCE cd/(m2)		
G(DEG)	C0/180	C90/270
85	271781	28742
80	156668	42695
75	119293	51973
70	101253	57982
65	90989	61969
60	84472	64607
55	80152	66437
50	77215	67745
45	75210	68621

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:24.5DEG
 Operators:William
 Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
 Humidity:56.4%
 Test Distance:26.000m [K=1.3952]
 Remarks:

WEC AND CCEC

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm									
NAME: Titan				TYPE:LED			WEIGHT:N/A		
SPEC.:N/A				DIM.:			SERIAL No.:N/A		
MFR.: Astera LED Technology GmbH				SUR.:			Shielding Angle:N/A		

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	.360	.205	.065	.351	.200	.064	.333	.191	.061	.317	.183	.059	.302	.175	.057		
2.0	.322	.176	.054	.313	.173	.053	.298	.166	.051	.283	.159	.050	.270	.153	.048		
3.0	.290	.154	.046	.283	.151	.046	.269	.146	.044	.256	.140	.043	.244	.135	.042		
4.0	.263	.137	.040	.257	.134	.040	.244	.129	.039	.232	.125	.038	.222	.120	.037		
5.0	.241	.123	.036	.235	.120	.035	.223	.116	.034	.213	.112	.033	.203	.109	.033		
6.0	.221	.111	.032	.216	.109	.031	.206	.105	.031	.196	.102	.030	.187	.099	.029		
7.0	.205	.101	.029	.200	.100	.028	.191	.096	.028	.182	.093	.027	.174	.090	.027		
8.0	.190	.093	.026	.186	.092	.026	.178	.089	.025	.170	.086	.025	.162	.083	.024		
9.0	.178	.086	.024	.174	.085	.024	.166	.082	.023	.159	.080	.023	.152	.077	.022		
10.0	.166	.080	.022	.163	.079	.022	.156	.076	.022	.149	.074	.021	.143	.072	.021		

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						Ceiling Cavity Exitance Coefficients(CCEC)										
0.0	.243	.243	.243	.208	.208	.208	.142	.142	.142	.082	.082	.082	.026	.026	.026		
1.0	.237	.209	.184	.203	.179	.158	.139	.123	.109	.080	.071	.064	.026	.023	.021		
2.0	.230	.185	.148	.197	.160	.128	.135	.110	.089	.078	.064	.052	.025	.021	.017		
3.0	.222	.168	.125	.191	.145	.109	.131	.101	.076	.076	.059	.045	.024	.019	.015		
4.0	.215	.156	.110	.184	.134	.096	.127	.094	.068	.073	.055	.040	.024	.018	.013		
5.0	.207	.145	.100	.178	.126	.087	.122	.088	.061	.071	.052	.036	.023	.017	.012		
6.0	.199	.137	.093	.171	.119	.081	.118	.083	.057	.069	.049	.034	.022	.016	.011		
7.0	.192	.130	.087	.165	.113	.076	.114	.079	.054	.066	.047	.032	.021	.015	.011		
8.0	.186	.125	.083	.160	.108	.072	.111	.076	.051	.064	.045	.031	.021	.015	.010		
9.0	.179	.120	.080	.155	.104	.069	.107	.073	.049	.062	.043	.029	.020	.014	.010		
10.0	.173	.116	.077	.150	.100	.067	.104	.071	.048	.061	.042	.029	.020	.014	.009		

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:24.5DEG
 Operators:William
 Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
 Humidity:56.4%
 Test Distance:26.000m [K=1.3952]
 Remarks:

UGR(Unified Glare Rating) Table

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm										
NAME: Titan					TYPE:LED			WEIGHT:N/A		
SPEC.:N/A					DIM.:			SERIAL No.:N/A		
MFR.: Astera LED Technology GmbH					SUR.:			Shielding Angle:N/A		
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	28.0	29.5	28.3	29.8	30.1	26.9	28.4	27.3	28.7	29.1
3H	30.3	31.7	30.7	32.1	32.5	28.4	29.8	28.8	30.2	30.6
4H	31.6	32.9	32.0	33.3	33.7	29.0	30.4	29.5	30.7	31.2
6H	33.0	34.3	33.4	34.7	35.1	29.4	30.7	29.9	31.1	31.5
8H	33.8	35.0	34.2	35.4	35.8	29.6	30.8	30.0	31.2	31.6
12H	34.7	35.8	35.1	36.3	36.7	29.6	30.8	30.0	31.2	31.6
4H 2H	28.6	29.9	29.0	30.3	30.7	27.8	29.1	28.2	29.5	29.9
3H	31.2	32.3	31.6	32.8	33.2	29.6	30.7	30.0	31.1	31.6
4H	32.6	33.7	33.1	34.2	34.6	30.3	31.4	30.8	31.8	32.3
6H	34.2	35.2	34.8	35.7	36.2	30.9	31.9	31.4	32.3	32.9
8H	35.1	36.0	35.7	36.5	37.1	31.1	32.0	31.6	32.5	33.0
12H	36.2	37.0	36.7	37.5	38.1	31.2	32.0	31.7	32.5	33.1
8H 4H	33.0	33.9	33.5	34.4	34.9	31.1	32.0	31.6	32.5	33.0
6H	34.9	35.6	35.4	36.2	36.7	32.0	32.7	32.5	33.2	33.8
8H	36.0	36.6	36.5	37.2	37.8	32.3	33.0	32.9	33.5	34.1
12H	37.3	37.9	37.9	38.4	39.0	32.6	33.1	33.1	33.7	34.3
12H 4H	33.0	33.8	33.5	34.3	34.9	31.3	32.1	31.8	32.6	33.2
6H	35.0	35.7	35.6	36.2	36.8	32.4	33.0	32.9	33.6	34.2
8H	36.2	36.8	36.8	37.3	38.0	32.8	33.4	33.4	34.0	34.6
Variations with the observer position at spacings:										
S = 1.0H	+ 0.1 / - 0.1					+ 0.1 / - 0.2				
1.5H	+ 0.2 / - 0.3					+ 0.2 / - 0.3				
2.0H	+ 0.2 / - 0.3					+ 0.2 / - 0.4				

CIE Pub.117, 2541 lm Total Lamp Luminous Flux Corrected ($8\log(F/F_0) = 3.2$)

C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:24.5DEG
Operators:William
Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
Humidity:56.4%
Test Distance:26.000m [K=1.3952]
Remarks:

UTILIZATION FACTORS TABLE

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm		
NAME: Titan	TYPE:LED	WEIGHT:N/A
SPEC.:N/A	DIM.:	SERIAL No.:N/A
MFR.: Astera LED Technology GmbH	SUR.:	Shielding Angle:N/A

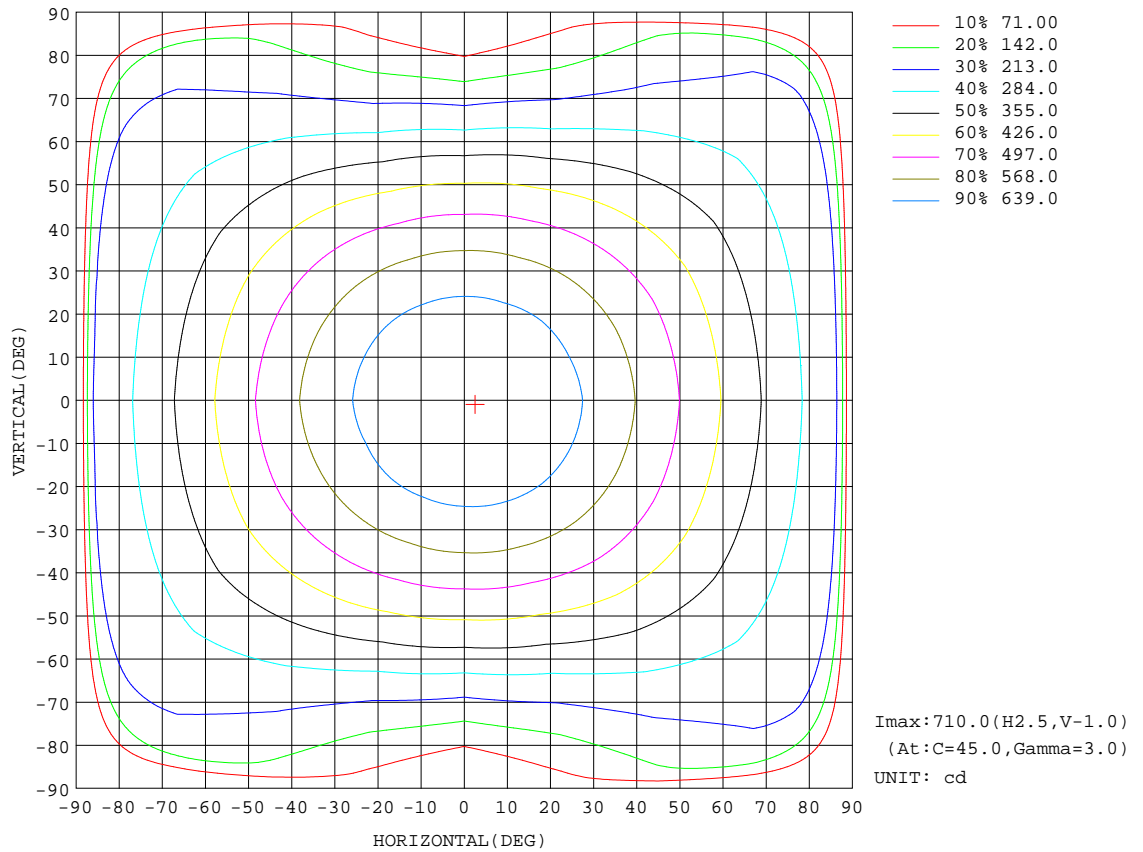
REFLECTANCE										
Ceiling	0.8	0.8	0.8	0.7	0.7	0.7	0.5	0.5	0.5	0
Walls	0.7	0.5	0.3	0.7	0.5	0.3	0.7	0.5	0.3	0
Working plane	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0
ROOM INDEX	UTILIZATION FACTORS(PERCENT) $k(RI) \times RCR = 5$									
k = 0.60	52	40	33	52	40	33	50	39	33	26
0.80	62	50	42	61	49	41	59	48	41	34
1.00	70	58	50	69	57	50	66	58	49	41
1.25	77	65	57	75	64	57	72	63	56	47
1.50	82	71	63	80	70	62	76	67	61	52
2.00	89	79	72	87	78	71	83	75	69	59
2.50	94	84	77	91	83	76	86	79	74	63
3.00	97	89	82	94	87	81	89	83	78	68
4.00	102	95	89	99	92	87	93	88	84	73
5.00	104	99	93	101	96	91	96	91	87	76
ROOM INDEX	UF(total)									Direct
According to DIN EN 13032-2 2004			Suspended					SHRNOM = 1.25		

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:24.5DEG
 Operators:William
 Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
 Humidity:56.4%
 Test Distance:26.000m [K=1.3952]
 Remarks:

ISOCANDELA DIAGRAM

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm		
NAME: Titan	TYPE:LED	WEIGHT:N/A
SPEC.:N/A	DIM.:	SERIAL No.:N/A
MFR.: Astera LED Technology GmbH	SUR.:	Shielding Angle:N/A

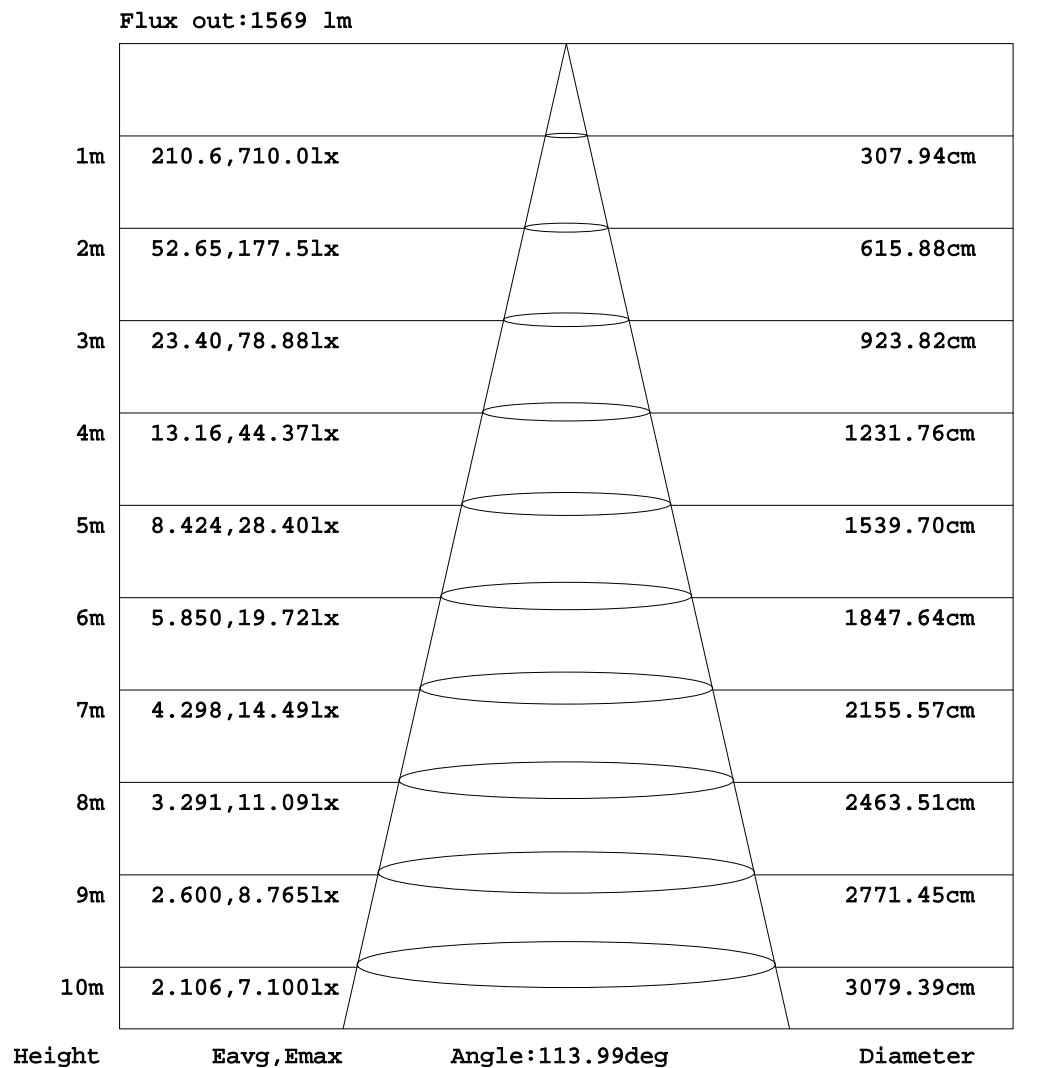


C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature:24.5DEG
Operators:William
Test Date:2020-04-09

γ Range: 0 - 180DEG
γ Interval: 1.0DEG
Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
Humidity:56.4%
Test Distance:26.000m [K=1.3952]
Remarks:

AAI Figure

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm		
NAME: Titan	TYPE:LED	WEIGHT:N/A
SPEC.:N/A	DIM.:	SERIAL No.:N/A
MFR.: Astera LED Technology GmbH	SUR.:	Shielding Angle:N/A

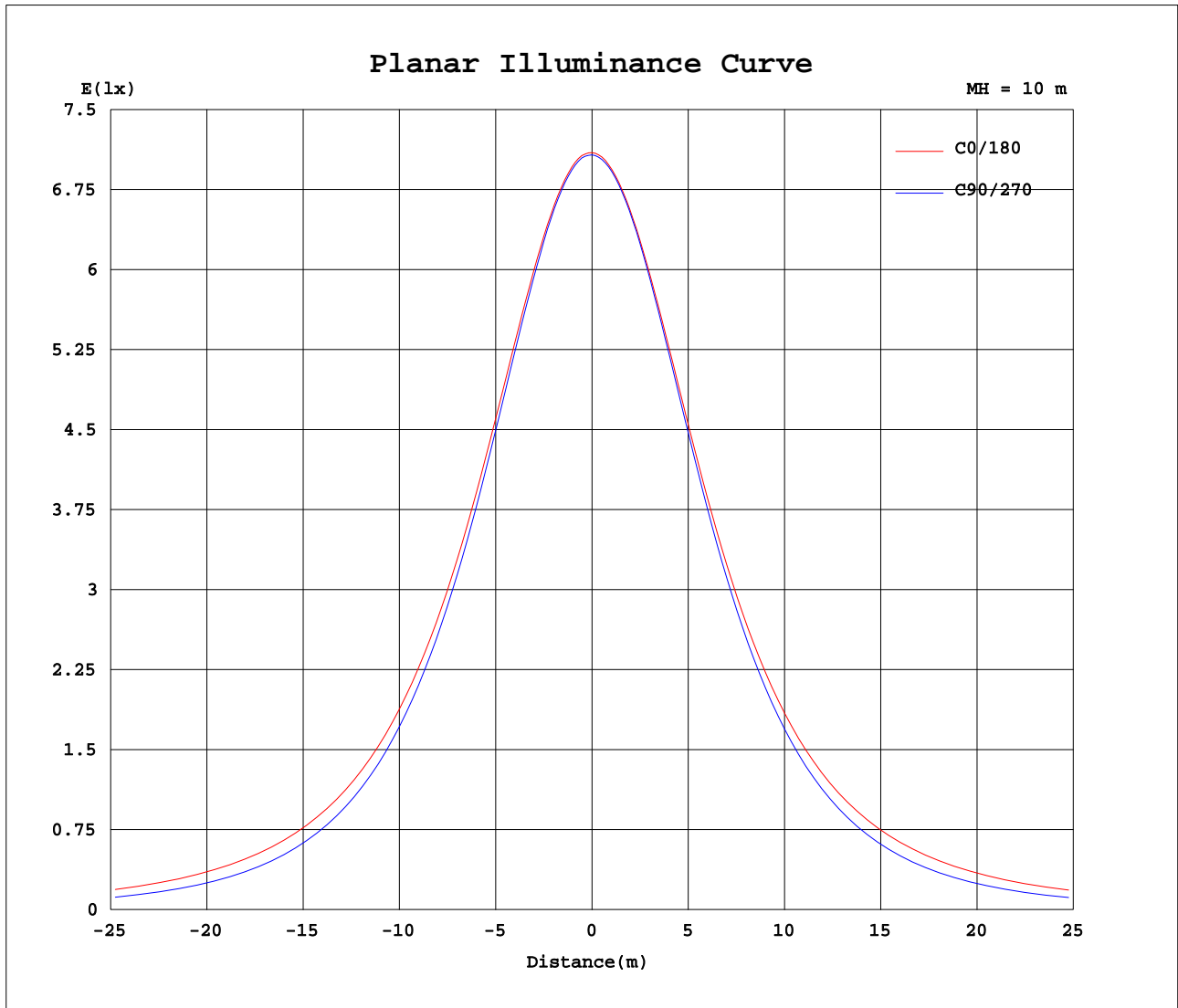


Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature: 24.5DEG
 Operators: William
 Test Date: 2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.366
 Humidity: 56.4%
 Test Distance: 26.000m [K=1.3952]
 Remarks:

Planar Illuminance Curve



C Range: 0 - 360DEG
C Interval: 22.5DEG
Test Speed: HIGH
Temperature: 24.5DEG
Operators: William
Test Date: 2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
Test System: EVERFINE GO-R5000_V2 SYSTEM V2.0.366
Humidity: 56.4%
Test Distance: 26.000m [K=1.3952]
Remarks:

LUMINOUS DISTRIBUTION INTENSITY DATA

Test:U:0.1202V I:0A P:0W PF:0.0000 Freq:0Hz Lamp Flux:2541.01x1 lm																		
NAME: Titan									TYPE:LED					WEIGHT:N/A				
SPEC.:N/A									DIM.:					SERIAL No.:N/A				
MFR.: Astera LED Technology GmbH									SUR.:					Shielding Angle:N/A				

Table--1

UNIT: cd

C(DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5			
0	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708			
5	707	707	707	706	706	706	705	705	704	704	704	704	704	705	705	705			
10	699	699	699	699	698	697	696	696	695	695	695	695	695	696	698	698			
15	687	686	686	685	683	682	682	682	682	680	681	680	680	682	684	686			
20	670	669	668	665	663	662	663	663	664	661	661	660	660	662	666	668			
25	649	647	645	640	637	637	638	640	642	638	637	634	634	637	642	647			
30	624	620	617	611	606	606	608	612	616	610	607	603	603	606	614	621			
35	595	590	585	576	571	571	575	582	586	579	573	566	566	571	581	591			
40	564	557	549	537	531	532	539	548	554	545	536	525	525	531	544	558			
45	530	521	510	493	485	488	499	513	520	508	495	481	479	488	504	523			
50	495	485	468	445	436	440	457	476	484	470	452	432	429	440	462	486			
55	458	446	424	394	381	389	412	437	446	430	408	381	375	390	418	447			
60	421	406	379	340	323	335	366	397	409	391	362	327	316	336	373	408			
65	383	366	332	285	262	281	321	357	371	351	316	271	255	282	327	368			
70	345	326	285	230	198	225	276	317	333	312	270	216	191	226	282	328			
75	308	287	241	176	135	172	232	278	297	272	225	163	127	173	239	289			
80	271	248	198	127	74.2	123	191	240	261	235	184	115	67.7	123	198	250			
85	236	209	154	82.6	25.1	79.5	146	199	226	196	141	71.9	20.9	80.3	154	211			
90	4.13	4.32	5.48	6.05	0.89	1.68	2.56	3.20	3.06	3.01	2.43	1.26	0.81	1.56	2.52	3.55			
95	62.8	61.1	75.3	24.1	0.52	23.9	76.4	121	95.6	108	72.1	21.8	1.03	27.9	83.9	70.0			
100	146	123	74.6	19.6	0.52	18.0	70.1	116	139	113	67.0	15.2	1.25	21.2	77.5	126			
105	121	103	60.7	13.4	0.52	11.9	55.8	95.6	114	94.9	53.4	10.0	1.55	14.0	62.6	106			
110	98.7	84.2	47.3	9.30	0.52	7.90	42.7	76.9	92.4	76.3	40.7	6.70	1.92	9.58	48.9	86.0			
115	78.7	66.6	35.9	6.57	0.52	5.21	31.8	60.1	73.2	59.7	30.1	4.56	1.92	6.53	37.2	68.0			
120	61.4	51.4	26.6	4.72	0.52	3.72	23.0	45.7	56.5	45.4	21.5	2.93	1.92	4.53	27.4	52.4			
125	46.7	38.5	19.6	3.47	1.18	2.75	16.4	33.6	42.3	33.2	15.1	1.62	1.92	2.90	20.1	39.3			
130	34.3	28.3	14.0	2.88	1.18	2.24	11.2	24.2	30.3	23.6	9.94	1.55	2.36	2.15	13.9	28.4			
135	24.8	20.2	9.82	1.84	1.25	1.49	7.48	16.8	21.4	16.1	6.41	1.62	2.51	1.04	9.10	20.1			
140	17.1	13.8	6.87	1.77	1.40	1.49	5.05	11.1	13.8	10.3	3.98	1.77	2.43	1.34	5.91	13.1			
145	11.3	9.25	4.86	1.77	1.40	1.49	3.56	7.21	8.43	6.59	2.50	1.84	2.95	1.49	3.33	8.30			
150	7.18	6.03	2.06	1.77	1.40	1.49	1.93	4.46	4.69	3.81	1.47	1.84	3.17	1.94	1.48	4.52			
155	4.41	2.08	1.92	1.77	1.47	1.49	1.93	1.78	2.54	2.26	1.47	1.84	2.80	2.08	1.63	1.41			
160	1.72	1.76	1.92	1.77	1.62	1.49	1.93	1.63	1.42	1.39	1.62	1.84	2.58	2.68	1.70	1.63			
165	1.64	1.76	1.92	1.77	2.51	1.49	1.93	1.63	1.49	1.55	1.70	1.92	2.43	3.50	1.70	1.78			
170	1.64	1.76	1.92	2.35	3.68	1.56	1.93	1.63	1.42	1.62	1.77	1.92	2.43	4.02	1.70	1.78			
175	1.64	1.76	1.92	2.43	3.98	1.64	1.93	1.63	1.42	1.62	1.77	1.92	2.43	4.02	1.70	2.00			
180	1.64	1.76	1.92	2.43	3.98	1.93	1.93	1.63	1.42	1.62	1.77	1.92	2.43	4.02	1.70	1.93			

C Range: 0 - 360DEG
 C Interval: 22.5DEG
 Test Speed: HIGH
 Temperature:24.5DEG
 Operators:William
 Test Date:2020-04-09

γ Range: 0 - 180DEG
 γ Interval: 1.0DEG
 Test System:EVERFINE GO-R5000_V2 SYSTEM V2.0.366
 Humidity:56.4%
 Test Distance:26.000m [K=1.3952]
 Remarks: