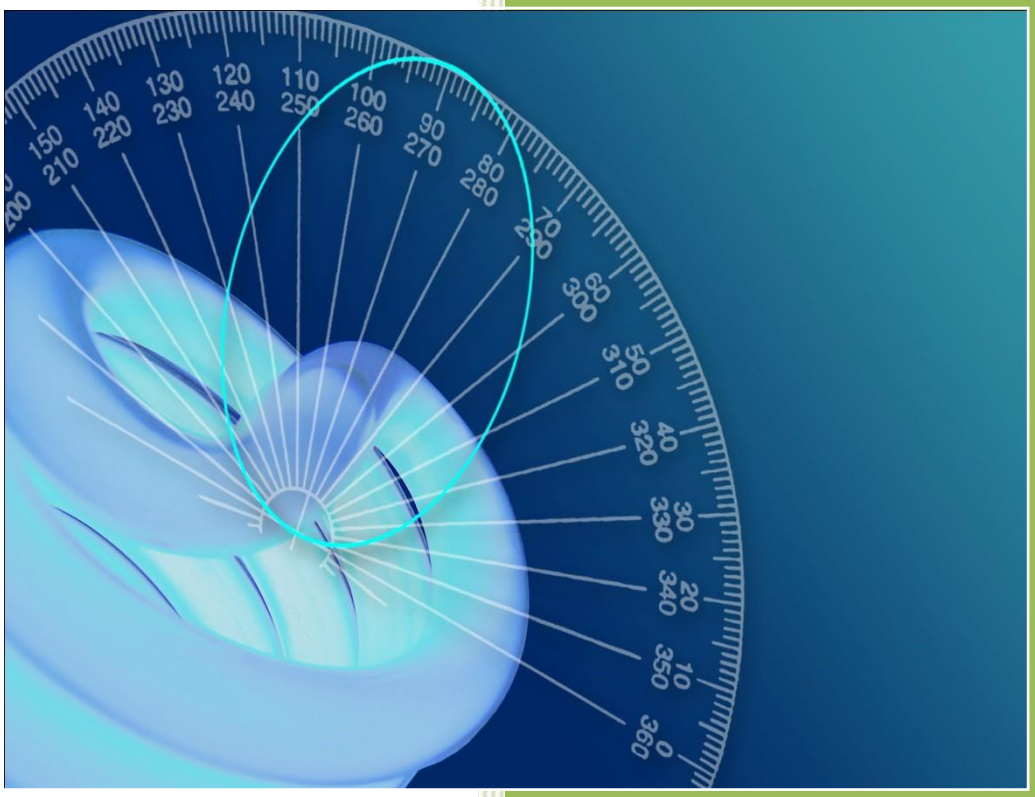
PHOTOMETRIC
& OPTICAL TESTING

Photometric Test Report



Photometric and Optical Testing Services
Cheltenham Film and Photographic Studios
Hatherley Lane
Cheltenham
Gloucestershire
GL51 6PN
UK
Tel: 01242 701300

Photometric Test Report

Report Number: POTS/DC17034	Report Date: 11/05/2017	Prepared By: D CHAMBERS
Test Laboratory: Photometric and Optical Testing Services, Cheltenham Film and Photographic Studios, Hatherley Lane, Cheltenham, Gloucestershire, GL51 6PN		
Company Registration Number: Registered in England & Wales No. OC352911		
Registered Address: Harwood House, Park Road, Melton Mowbray, Leicestershire LE13 1TX		

Client Details

Company: Air Supplies Nederland BV	Contact: Ronald van de Oudeweetering
Address: Amsterdam	Tel: 0207766006

Test Method(s) Used

POTS Standard Operating Procedure:	INTEGRATING SPHERE PROCEDURE POTS016
POTS Standard Operating Procedure:	NFMS OPERATION GUIDE
Standard:	LM79 08

Details of Product Tested

Manufacturer: Air Supplies Nederland BV	Source Type: High Pressure Sodium
Model: DIMLUX 1000W DE EL UHF (wide)	Luminaire Type: DE Lamp
Power Supply Used: Mains	Power Meter Used: WT210 Digital Power Meter
Voltage(AC V) = 235.23	Current (mA)= 4521
Power (Watts)= 1051	Power factor= 0.9887

Integrating Sphere Test

Date of Test: 20/04/2017	Ambient Temperature:25°C
Measurement Filename: DIMLUX UPPER CLOSED EXTERNAL POWER	
Instrument Used: Labsphere model 2m integrating sphere spectroradiometer AS-02949-012	
Integrating Sphere Size: 2m	Measurement Geometry (2π / 4π): 2π
Sample Orientation: Facing sideways into sphere	Auxiliary Correction Applied: YES
Comments:	
Date of Last Calibration (Operating Hours): 12-04-2017 (1:52)	Spectral Flux Standard Lamp Used: SCL-600
Standard Lamp Serial Number: L123	Traceable: to NIST standards
Calibration Certificate Number: SCL-600-L123	Calibration Certificate Date: 29/01/2014
Calibration Lamp Uncertainty: ± 0.67% (*k=2)*	

Results

Flux (lumens): 164700	PAR (µmol/s): 2245
Efficiency (lumen/watt): 156.7	Efficiency (µmol/J): 2.14
CIE 1931 Chromaticity Cx: 0.5200	CIE 1931 Chromaticity Cy: 0.4107
CRI (%):35.36	CCT (K): 2039
Reflector efficiency (%): 98	

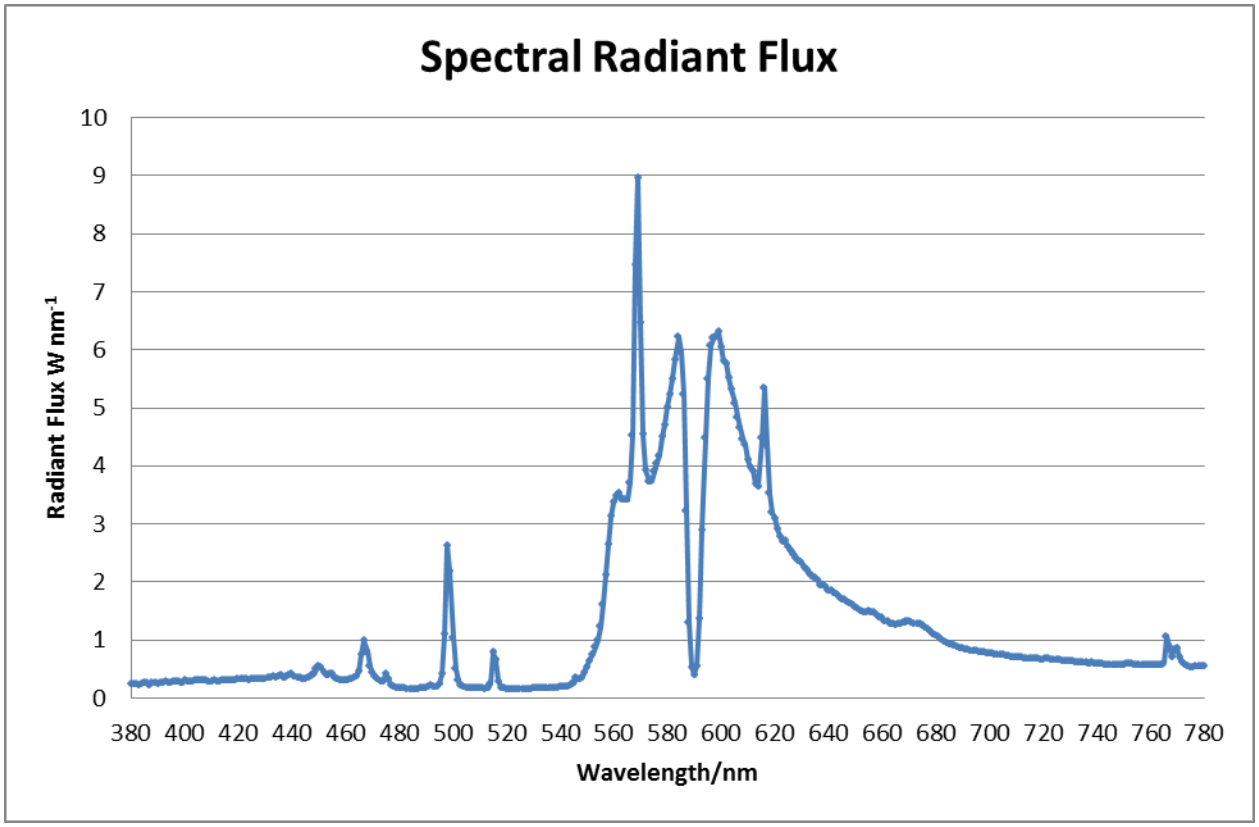


Figure 1: Spectral Flux

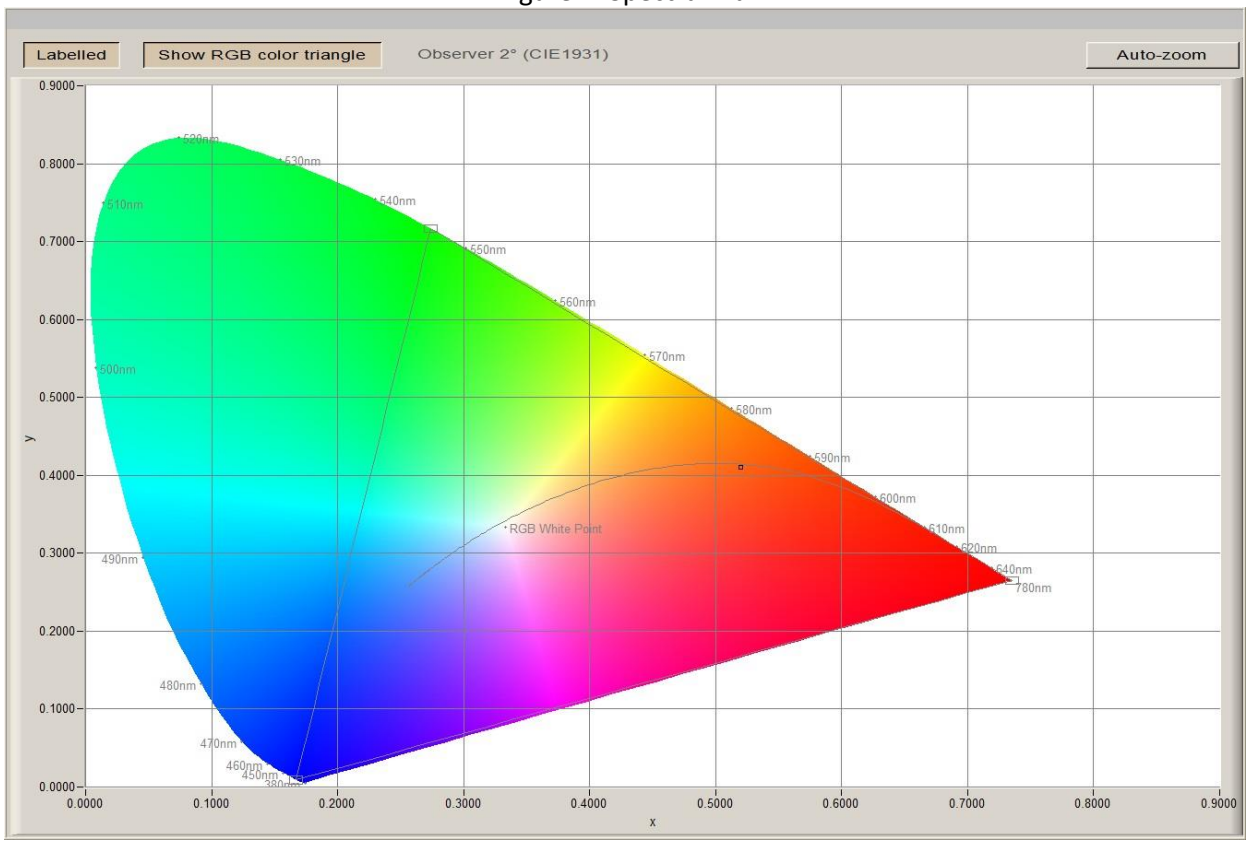


Figure 2: CIE 1931 diagram.

Goniophotometer Test	
Date of Test: 11/11/2016	Ambient Temperature: 25°C
Measurement Filename: DIMLUX UPPER CLOSED	
Instrument Used: Radiant Imaging NFMS0800 Goniometer with ProMetric PM-1200N-1 Imaging Photometer	
Photometer Working Distance: 3m	Measurement Geometry: Near-Field
Comments:	
Reference Photometer Used: Specbos1211	Reference Photometer Serial Number: 2014754
Traceable: to NIST standards	
Calibration Certificate Date: 28 September 2016	Sample Stabilisation Time (minutes): 30
Reference Photometer Calibration Uncertainty: ± 2.4% (*k=2*, 20-200 lux, CIE illuminant A source)	

Scan Set Up		
Direction	**Range**	**Increment**
Inclination Zone 1	0-90°	3°
Azimuth	0-360°	10°
Results		
Integrated Luminous Flux (lumens):164700	Peak Intensity (3° Spot, candelas): 72059	Efficacy (lumens/Watt): 156.7
Beam Angle (50% of max intensity C0-180, degrees): 80.4		
Photometric Filename (IES LM-63-2002): DIMLUX UPPER CLOSED EXTERNAL POWER		
IES File – Absolute or Relative Format? ABSOLUTE		
Photometric Filename (EULUMDAT): DIMLUX UPPER CLOSED EXTERNAL POWER		
EULUMDAT File – Absolute or Relative Format? ABSOLUTE		

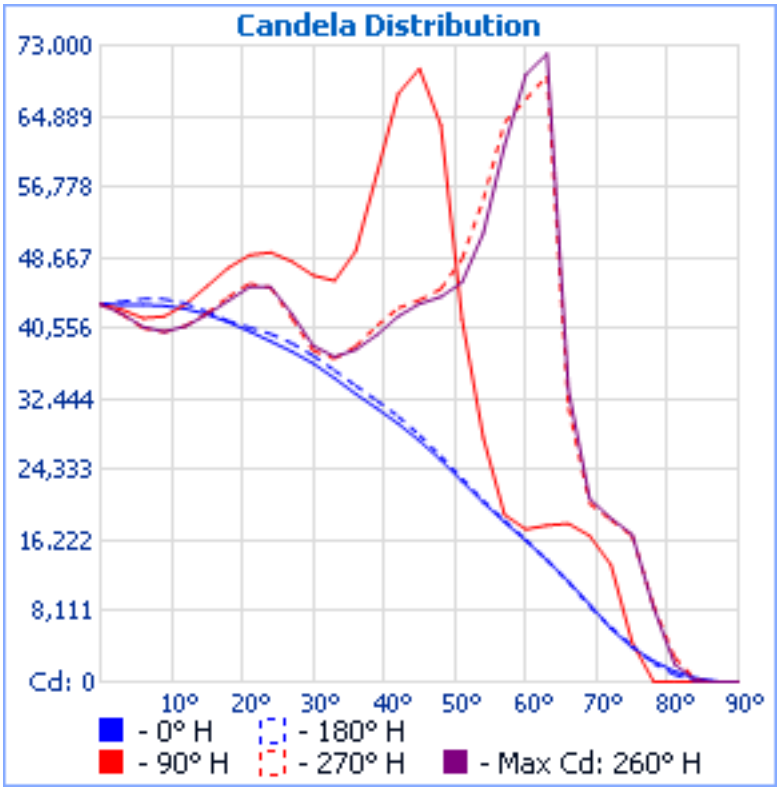


Figure 3: Far-Field Luminous Intensity (C0-180, Cartesian Coordinates)

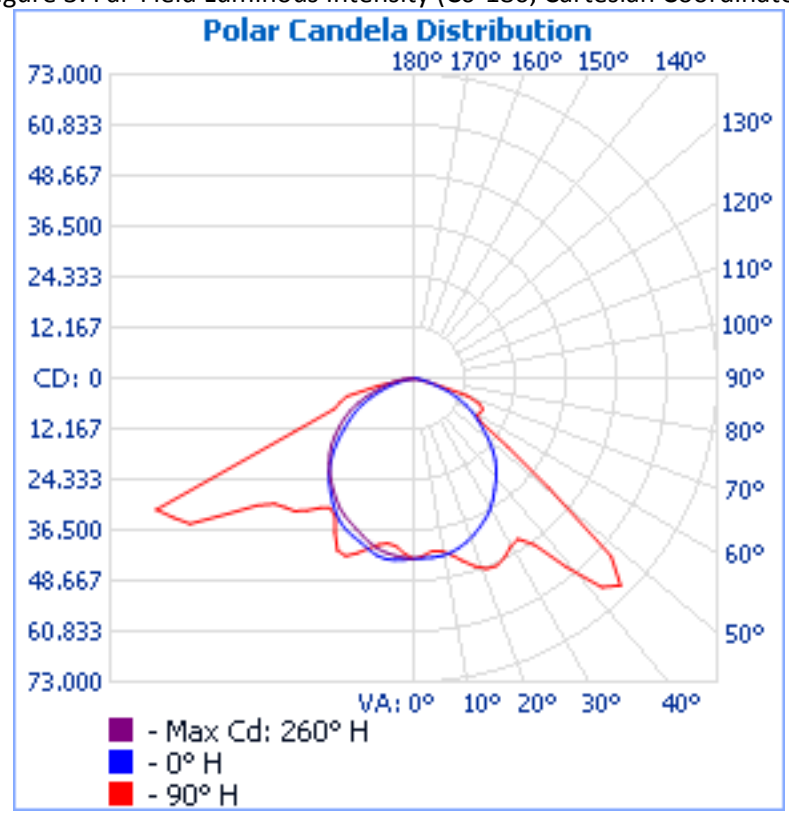


Figure 4: Far-Field Luminous Intensity (C0-180, C90-270, Polar Coordinates)

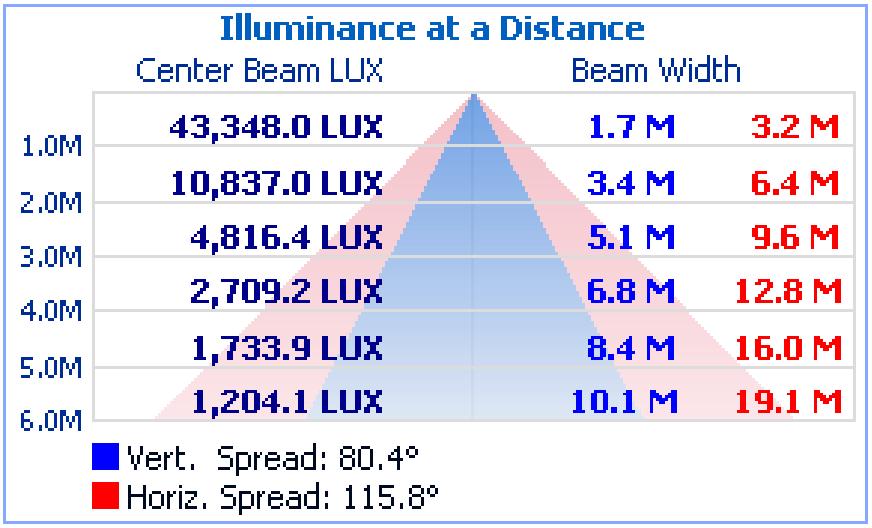


Figure 5. Cone diagram for mounting height of 6 metres.

Reflectance of Ceiling		0.7	0.7	0.5	0.5	0.3	0.7	0.7	0.5	0.5	0.3
Wall		0.5	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3
Floor Cavity		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Room dimension				View endwise (C0)					View crosswise (C90)		
x	y										
2H	2H	34.6	36.3	35.0	36.7	37.0	40.1	41.9	40.5	42.2	42.5
	3H	35.9	37.5	36.3	37.8	38.1	41.2	42.8	41.6	43.1	43.5
	4H	36.2	37.7	36.6	38.1	38.4	41.6	43.1	42.0	43.4	43.8
	6H	36.4	37.8	36.8	38.1	38.5	41.7	43.1	42.1	43.5	43.9
	8H	36.4	37.7	36.8	38.1	38.5	41.7	43.0	42.1	43.4	43.8
	12H	36.3	37.6	36.8	38.0	38.4	41.6	42.9	42.1	43.3	43.7
4H	2H	36.9	38.4	37.3	38.7	39.1	40.9	42.4	41.3	42.7	43.1
	3H	38.6	39.9	39.1	40.3	40.7	42.1	43.4	42.5	43.8	44.2
	4H	39.3	40.4	39.8	40.9	41.3	42.6	43.7	43.0	44.1	44.6
	6H	39.8	40.8	40.2	41.2	41.6	42.7	43.7	43.2	44.2	44.6
	8H	39.8	40.7	40.3	41.2	41.6	42.7	43.7	43.2	44.1	44.6
	12H	39.8	40.7	40.3	41.1	41.6	42.7	43.6	43.2	44.0	44.5
8H	4H	39.7	40.7	40.2	41.1	41.6	42.9	43.8	43.3	44.2	44.7
	6H	40.3	41.1	40.8	41.6	42.1	43.0	43.8	43.5	44.3	44.8
	8H	40.5	41.2	41.0	41.7	42.2	43.1	43.8	43.6	44.3	44.8
	12H	40.5	41.1	41.1	41.6	42.1	43.1	43.6	43.6	44.1	44.6
12H	4H	39.8	40.6	40.2	41.0	41.5	42.9	43.8	43.4	44.2	44.7
	6H	40.4	41.1	40.9	41.6	42.1	43.1	43.8	43.7	44.3	44.8
	8H	40.5	41.1	41.1	41.6	42.1	43.1	43.7	43.6	44.2	44.7

Distance between luminaires: 0.25

Due to missing symmetry characteristics the values apply only to the indicated line of sight.

Table 1. UGR values

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348
3	43278	43361	43390	43335	43272	43139	43008	42886	42785	42742	42710	42750	42836	42968	43168	43329	43520	43614	43641
6	43288	43501	43506	43339	43090	42814	42502	42181	41941	41733	41605	41578	41668	41873	42246	42748	43320	43762	43929
9	43160	43391	43317	42954	42672	42479	42303	42161	42045	41942	41818	41646	41410	41212	41284	41817	42587	43523	43915
12	42803	43369	42606	42192	42097	42203	42507	42911	43203	43336	43322	43067	42429	41644	41045	40971	41688	42746	43433
15	42175	43049	42130	41682	41727	42373	43383	44442	45243	45410	45274	44728	43952	42771	41444	40560	40619	41541	42468
18	41300	43308	42006	41627	41977	43247	44917	46483	47328	47508	47025	46361	45512	44092	42289	40716	39782	40441	41431
21	40236	43042	42021	41707	42712	44530	46341	48008	48883	48968	48622	47843	46901	45249	43206	41286	39539	39624	40681
24	39086	42310	41037	41638	43735	45914	47467	48802	49307	49277	49387	48869	47894	46146	43964	41876	39527	39000	39941
27	37910	41094	40350	41618	44853	46912	47914	48505	48391	48226	48550	48655	48257	47026	44979	42410	39286	38227	38863
30	36542	40194	39613	41528	45394	46929	47218	47429	46875	46644	46983	47751	47481	47078	45449	42437	38891	37246	37433
33	34851	39164	38346	41436	45611	45930	45536	45492	45848	46032	46198	46513	45541	45601	45032	41897	38123	36126	35748
36	33053	37890	36899	41793	46006	44638	44517	44965	48090	49426	48970	47029	44854	44055	44643	41563	37373	34927	33989
39	31365	36285	36318	42050	44777	43035	45083	49856	56131	58411	57194	52308	46841	42961	43281	41405	36835	33492	32284
42	29644	34540	36383	41116	41540	43499	49851	60264	65636	67490	66420	62539	52119	43971	40344	39761	36360	31951	30460
45	27695	32826	36625	38858	38911	49222	60002	66946	71665	70353	68950	67543	60789	50162	38273	37582	36126	30535	28328
48	25472	30956	36036	36734	39010	55937	66207	62401	63969	63861	61844	61805	65111	57905	39336	34198	35683	29011	25916
51	23025	28731	33832	35045	41061	59451	63956	48782	43066	41642	44186	47926	58727	60111	45753	33200	33827	27162	23337
54	20587	26074	30845	33553	45545	58284	41123	33512	29637	27988	30627	33356	39091	54497	48159	33341	30678	24846	20821
57	18358	23561	27441	32312	45357	53367	27769	23817	19887	19190	20078	22862	25593	41425	45152	37529	26871	22706	18538
60	16217	21339	25410	34220	41322	32342	20034	18704	17554	17532	17635	17958	18678	26620	33877	38850	24892	20827	16326
63	13974	19399	24352	33554	34016	19905	16893	17714	18097	17974	17879	17048	16749	17573	25078	34588	24773	19129	13982
66	11540	17137	21739	29184	23717	15560	17283	18427	18246	18188	17934	17520	17310	15208	17186	24360	23637	16995	11475
69	8919	14042	18030	20596	15361	15481	16920	17582	16517	16780	16660	17004	16548	14945	13483	17496	20186	13672	8667
72	6131	10539	14473	13809	13006	15076	15798	15347	14147	13451	14148	14365	15498	13508	12488	11440	11319	9780	6312
75	3952	7311	11611	10691	11944	13268	10908	7438	5306	4542	4832	5817	8350	10930	10730	8904	7500	6952	4188
78	2405	4744	7227	7869	8816	6845	2378	118	112	84	30	67	810	3567	6421	7117	5293	4951	2158
81	1229	2964	4555	5082	3952	2159	805	57	36	0	8	6	151	562	1795	3296	3024	2703	846
84	440	2154	1707	1294	396	92	19	38	4	38	2	51	29	70	120	543	1082	873	162
87	82	717	209	22	2	8	11	32	36	66	29	37	28	7	11	11	66	68	8
90	2	20	0	0	0	1	0	0	3	1	2	0	0	0	0	0	0	0	5

Table 2a. Luminous intensity values, azimuth 0-180°

	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350
0	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348	43348
3	43594	43477	43240	43046	42778	42568	42393	42257	42199	42140	42162	42225	42333	42534	42744	42946	43139
6	43865	43307	42674	42076	41575	41203	40899	40724	40603	40523	40517	40602	40769	41134	41647	42279	42854
9	44195	42767	41758	40904	40480	40307	40246	40201	40154	40103	40010	39852	39726	39866	40481	41417	42453
12	43530	41989	40828	40208	40121	40407	40704	40822	40858	40884	40781	40353	39760	39404	39600	40560	41819
15	42776	41233	40148	39736	40220	41044	41680	42163	42318	42239	41878	41319	40342	39348	39008	39589	40881
18	41598	40637	39789	39785	40946	42191	42990	43728	44159	43693	43083	42511	41272	39753	38847	38672	39828
21	41756	40186	39556	40322	42122	43477	44330	45318	45721	45202	44411	43811	42275	40400	39105	38210	38728
24	40559	39489	39140	41010	43033	44013	44749	45319	45248	45204	45009	44526	42856	40919	39423	37901	37773
27	40079	37405	39015	41841	43325	43278	42818	42242	41719	42149	43314	43926	43071	41661	39730	37232	36870
30	39324	36669	38997	41891	42324	40996	39969	38597	38006	38494	40537	41437	42198	41855	39761	36271	35771
33	38036	35522	38733	40870	39905	37802	37436	37304	37095	37181	38062	37483	39422	40578	39317	35209	34408
36	36229	33609	38402	39544	37731	36191	36519	38118	38511	38172	37261	35628	36621	38283	38421	34418	33017
39	34402	32635	37837	37625	36152	36818	37804	39845	40885	40212	38400	36454	35051	35952	37123	33754	31690
42	32652	32322	36796	34984	35404	37693	40555	41959	42897	42549	40793	37948	34635	33310	35921	32972	30290
45	30822	31847	34650	32778	36570	38591	42370	43379	43814	44118	42687	39234	35216	31851	33681	32232	28805
48	28732	30644	31970	32590	38491	39810	43273	44191	45078	45460	44127	40593	36705	31257	30572	31166	27215
51	26393	28554	29870	33329	38949	40833	44472	45843	48537	47904	46109	41726	37447	32048	28182	29122	25508
54	23786	26360	28572	33900	38930	42757	47117	51512	55369	53343	49018	43771	37485	31977	27098	26731	23450
57	21301	23760	28221	34443	39984	46616	52216	61561	64164	61805	54206	47697	39123	31999	26834	23847	21410
60	19016	21531	27708	35637	42436	50412	62029	69691	66872	66247	60564	53380	43811	33226	25935	21271	19396
63	17005	20125	27301	37084	44321	54887	64922	72059	69512	67716	60161	55146	48379	37209	25598	19543	17231
66	14948	18521	27531	38919	44326	56565	50808	33557	31496	36579	45871	52659	54543	42539	27689	17574	14722
69	12541	17091	27894	39321	39381	31267	21609	21046	20482	22097	24182	28478	36712	49353	30876	16268	12137
72	10047	16199	27426	37555	24687	19182	17512	18802	18614	19522	17607	17837	18229	34419	32710	16674	9747
75	7954	15452	23552	22801	16862	16423	16915	16947	16765	17040	16097	15305	14325	15037	23459	17520	7656
78	6104	13240	17509	14013	12912	11645	9876	8579	8819	8547	9561	10419	11410	10673	11121	19939	6122
81	3631	8920	8553	6897	6894	4226	3029	2037	2826	2343	2749	3346	6400	6326	7492	9496	4149
84	1499	3313	3264	1702	1141	385	197	201	197	261	111	255	1203	1691	3717	2808	2504
87	280	394	335	127	21	1	0	0	0	0	0	0	30	79	498	359	663
90	5	4	0	1	0	0	1	0	0	0	1	0	0	0	1	0	24

Table 2b. Luminous intensity values, azimuth 190-350°

Zone	Lumens	% Total
0-5	1,027.90	0.60%
05-10	2,984.60	1.80%
10-15	4,963.90	3.00%
15-20	7,012.70	4.20%
20-25	9,042.10	5.40%
25-30	10,784.00	6.50%
30-35	12,009.80	7.20%
35-40	13,314.30	8.00%
40-45	15,504.60	9.30%
45-50	16,976.90	10.20%
50-55	16,358.80	9.80%
55-60	15,728.60	9.40%
60-65	15,341.10	9.20%
65-70	11,973.20	7.20%
70-75	8,201.50	4.90%
75-80	4,452.10	2.70%
80-85	1,171.60	0.70%
85-90	91	0.10%

Table 3. Zonal Flux Table

Effective Floor Cavity Reflectance: 20%																		
RCC %:	***80***				***70***				***50***			***30***			***10***			***0***
RW %:	70	50	30	0	70	50	30	0	50	30	20	50	30	20	50	30	20	0
RCR: 0	1.19	1.19	1.19	1.19	1.16	1.16	1.16	1	1.11	1.11	1.11	1.06	1.06	1.06	1.02	1.02	1.02	1
1	1.08	1.03	0.99	0.95	1.06	1.01	0.97	0.84	0.97	0.94	0.91	0.93	0.9	0.88	0.89	0.87	0.85	0.83
2	0.98	0.89	0.82	0.76	0.95	0.87	0.8	0.69	0.83	0.78	0.73	0.8	0.75	0.71	0.77	0.73	0.7	0.68
3	0.88	0.77	0.68	0.62	0.86	0.75	0.67	0.57	0.72	0.66	0.6	0.7	0.64	0.59	0.67	0.62	0.58	0.55
4	0.8	0.67	0.58	0.51	0.78	0.66	0.57	0.48	0.63	0.56	0.5	0.61	0.54	0.49	0.59	0.53	0.48	0.46
5	0.73	0.6	0.5	0.43	0.71	0.58	0.49	0.41	0.56	0.48	0.42	0.54	0.47	0.42	0.52	0.46	0.41	0.39
6	0.67	0.53	0.44	0.37	0.65	0.52	0.43	0.35	0.5	0.42	0.36	0.49	0.41	0.36	0.47	0.41	0.36	0.33
7	0.62	0.48	0.38	0.32	0.6	0.47	0.38	0.31	0.45	0.37	0.32	0.44	0.37	0.31	0.42	0.36	0.31	0.29
8	0.57	0.43	0.34	0.28	0.56	0.43	0.34	0.27	0.41	0.33	0.28	0.4	0.33	0.28	0.39	0.32	0.27	0.25
9	0.53	0.39	0.31	0.25	0.52	0.39	0.31	0.24	0.38	0.3	0.25	0.37	0.3	0.25	0.35	0.29	0.24	0.23
10	0.5	0.36	0.28	0.22	0.49	0.36	0.28	0.22	0.35	0.27	0.22	0.34	0.27	0.22	0.33	0.26	0.22	0.2

Table 4. Utilisation Factor Table

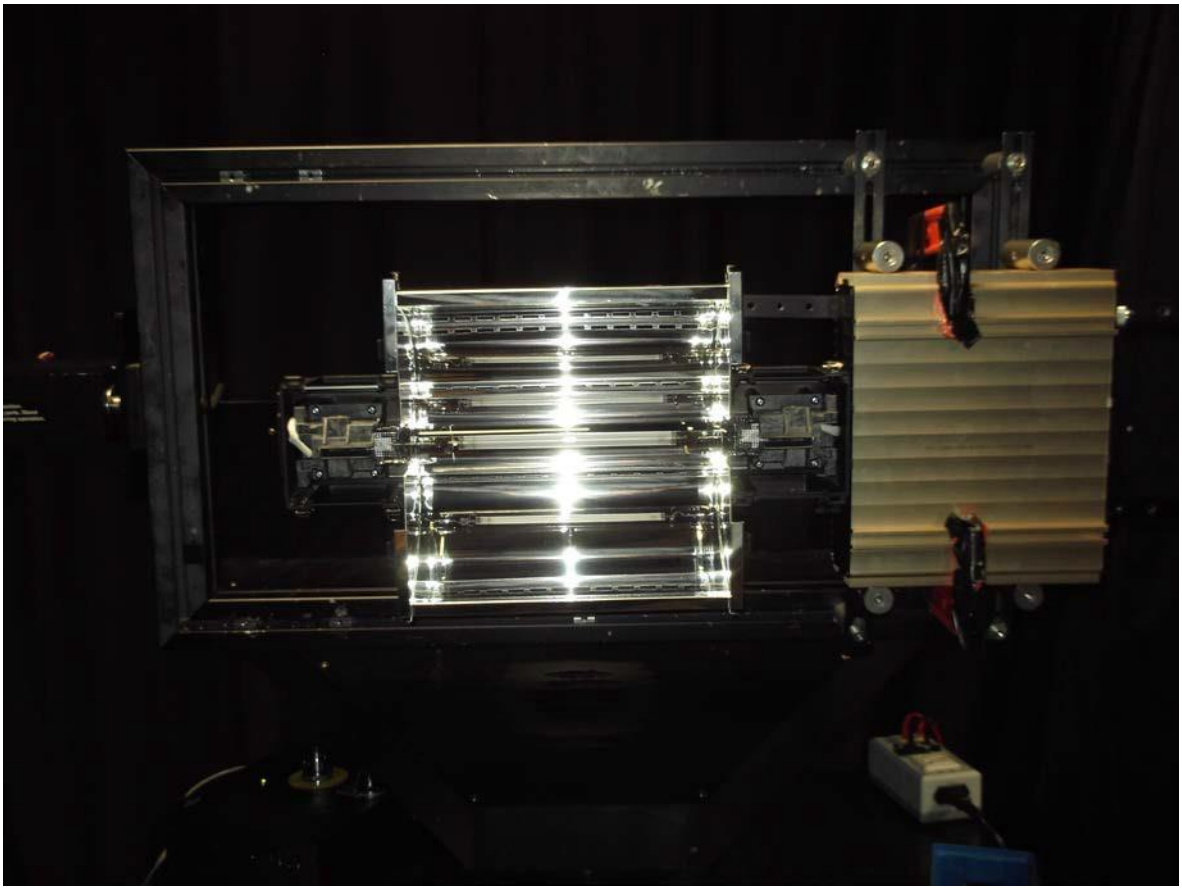


Photo 1: Luminaire on goniometer mount

Signature:

_____

Print Name:

D CHAMBERS

_____

Date:
11/05/2017

_____

Technical Manager
Duly authorised to sign on behalf of:
Photometric and Optical Testing Services LLP