Report of Test

LL14745-R02

This test report supercedes test report number LL14745-R01

PCO Lite Electrical 2 x 14 W T5 Troffer. Product ID: Liscio VDU 214/T5/9T-P1.
Folded/welded gloss white metal body, 585 x 585 x 66 mm deep. Semi-spec. al. louvre comprising 2 x 12 cells with punched, closed-top 25mm deep cross blades. Perforated inset panels between louvres. Semi-spec. curved reflector above each lamp. Luminous opening comprises 2 off 90 mm x 529 mm. 2 x Philips MASTER TL5 HE 14W/840 centred 229 mm apart and 35 mm above luminous opening. One Philips HF-P 2 14TL5 HE Ill IDC electronic ballast 220~240V/50/60/0Hz. Tested at 240V/50Hz.

Performance Summary

Light Output Ratio	94.1 %
Luminaire Power	30.9 W
SHR Nominal	1.00
SHR Maximum	1.19

PREPARED FOR : PCO Lite Electrical Sdn. Bhd, Malaysia.

LightLab International
50 Redcliffe Gardens Drive
Clontarf, Queensland, 4019, Australia
A.C.N. 079 575 367
A.B.N. 68 079 575 367

Telephone +61 7 3283 7862
Facsimile +61 7 3283 8751
Email lightlab@LSA.com.au
Web Site www.LSA.com.au

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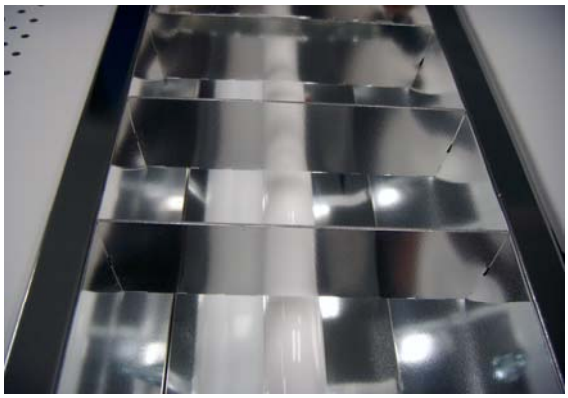

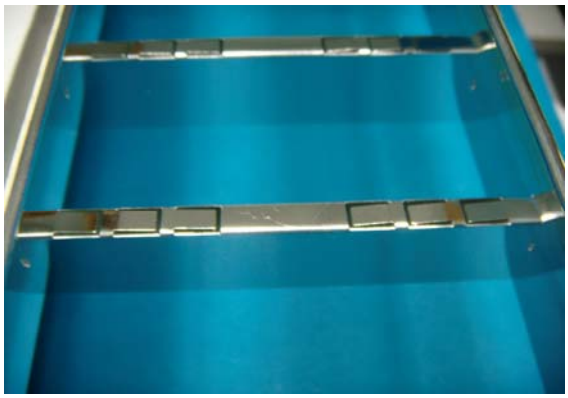

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LightLab INTERNATIONAL

NATA Accreditation 2258

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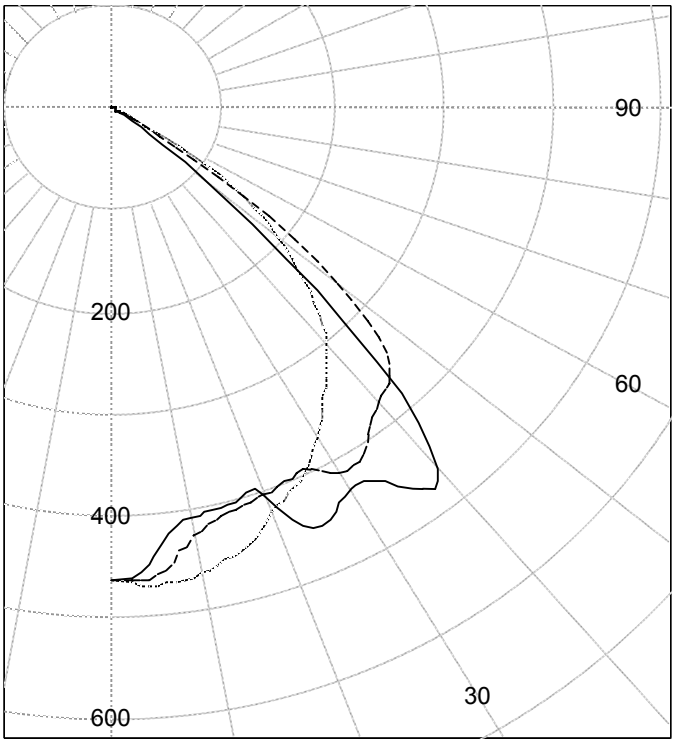
Legend: C0-Solid, C45-Dashed, C90-Grey (cd / klm)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd / klm)

	C-Plane					Flux
Gamma	C0	C22.5	C45	C67.5	C90	(lm / klm)
0.0	464	464	464	464	464	
5.0	442	449	461	469	471	43
10.0	408	417	428	452	464	
15.0	404	412	411	428	450	118
20.0	403	408	404	397	422	
25.0	453	450	396	371	404	188
30.0	434	445	414	346	373	
35.0	455	441	402	328	336	245
40.0	461	451	377	318	300	
45.0	296	350	356	294	254	238
50.0	107	160	266	248	196	
55.0	22	40	117	176	130	96
60.0	5	10	26	62	49	
65.0	2	6	7	8	6	10
70.0	1	4	3	1	1	
75.0	1	1	1	1	1	1
80.0	0	0	0	0	0	
85.0	0	0	0	0	0	0
90.0	0	0	0	0	0	

AVERAGE LUMINANCE (cd / sq.m / klm)

Gamma	C0	C45	C90
45.0	4389	5287	3773
55.0	407	2148	2374
65.0	58	183	154
75.0	30	26	28
85.0	27	38	23

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm / klm)	% Lamp	% Luminaire
0-30	350	35.0	37.2
0-40	595	59.5	63.2
0-60	930	93.0	98.8
0-90	941	94.1	100.0
40-90	346	34.6	36.8
60-90	11	1.1	1.2
90-180	0	0.0	0.0
0-180	941	94.1	100.0

Light Output Ratio = 94.1 %

SHR-NOM = 1.00
SHR-MAX = 1.19

Calculated using the TM5 fine grid method.

CERTIFIED BY:

Eric Southgate
Authorised Signatory

Date of test 26-Jul-2011
Date of report 16-Aug-2011

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Clontarf, Queensland, 4019, Australia
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Intensity data (cd / klm)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
0.0	464	464	464	464	464
2.5	461	462	465	468	469
5.0	442	449	461	469	471
7.5	418	428	446	463	468
10.0	408	417	428	452	464
12.5	406	414	417	441	458
15.0	404	412	411	428	450
17.5	399	410	407	415	439
20.0	403	408	404	397	422
22.5	441	427	400	382	412
25.0	453	450	396	371	404
27.5	443	454	401	358	389
30.0	434	445	414	346	373
32.5	434	438	413	335	356
35.0	455	441	402	328	336
37.5	474	451	387	325	318
40.0	461	451	377	318	300
42.5	397	419	369	309	281
45.0	296	350	356	294	254
47.5	198	258	322	273	225
50.0	107	160	266	248	196
52.5	50	86	193	216	169
55.0	22	40	117	176	130
57.5	8	17	60	122	91
60.0	5	10	26	62	49
62.5	3	8	12	23	20
65.0	2	6	7	8	6
67.5	2	5	5	3	2
70.0	1	4	3	1	1
72.5	1	2	1	1	1
75.0	1	1	1	1	1
77.5	1	1	1	1	1
80.0	0	0	0	0	0
82.5	0	0	0	0	0
85.0	0	0	0	0	0
87.5	0	0	0	0	0
90.0	0	0	0	0	0

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Calculations of Luminaire VDT Categories in accordance with CIBSE LG3 : 1996

Parameter description for average luminance	Symbol	Value	Unit
Luminance in Azimuth Plane	Bc	refer Table 2	cd/sq.m.
Intensity at angle Gamma in given azimuth plane	I	from data	cd/klm
Number of lamps	N	2	
Output of each lamp (initial flux as specified)	F	1200	lm
Multiplying factor	K	1	
Luminous area in horizontal plane used in calculations	A*	0.0932	sq.m.
Angle to the downward vertical from light centre	γ	from data	°

Table 1 - *Calculation parameters for determination of CIBSE LG3 : 1996 Average Luminance*

γ	C plane (°)																		
(°)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
55	941	1237	1586	1989	4013	6004	7961	8008	7294	5818	6952	7709	8088	6365	4431	2287	1762	1351	1055
60	246	421	504	493	1029	1783	2755	3321	3250	2543	3315	3383	2748	1824	1086	533	515	424	259
65	<200	292	373	389	423	440	439	469	448	376	445	463	431	447	442	416	392	301	<200
70	<200	<200	273	322	239	<200	<200	<200	<200	<200	<200	<200	<200	<200	251	314	277	205	<200
75	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
80	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
85	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200

Table 2 - *Average Luminance (cd/sq.m.) for defined C plane, Gamma angle*

CIBSE Category	γ (°)	Average Luminance		Patch Luminance	
		maximum calculated	specified maximum**	maximum measured	specified maximum**
Category 1	55 to 90	8088	500	10776	1500
Category 2	65 to 90	469	500	1298	1500
Category 3	75 to 90	<200	500	62.3	1500

Table 3 - *Tabulation of Average and Patch luminance (cd/sq.m.) for defined CIBSE categories*

Category 2 : The luminaire satisifies the specified luminance criteria for 'Positive VDU Screens'.

Notes: Measurement method and calculations in accordance with Publications CIBSE LG3:1996 and BS5225:Part 1:1975.
* The parameter 'Area' is used in calculations. It is derived from 'Length x Width' as specified in CIBSE LG3:1996 for rectangular luminous openings.
** Limits are applicable to 'Positive VDU Screens'.
Due to the sampling method of the CIBSE specification it is possible for the Average Luminance to exceed the Patch Luminance over a range of Gamma angles
The laboratory uncertainty in measurement for luminance is +/- 6% at the 95% confidence interval.

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Calculations of luminaire VDT Categories in accordance with CIBSE LG3 : 1996 & LG3 2001 Addendum

Parameter description for average luminance	Symbol	Value	Unit
Luminance in Azimuth Plane	Bc	refer Table 2	cd/m^2
Intensity at angle Gamma in given azimuth plane	I	from data	cd/klm
Number of lamps	N	2	
Output of each lamp (initial flux as specified)	F	1200	lm
Multiplying factor	K	1	
Luminous area in horizontal plane used in calculations	A*	0.0932	sq.m.
Angle to the downward vertical from light centre	γ	from data	°

Table 1 - *Calculation parameters for determination of Average Luminance*

γ	C plane (°)												
(°)	0	15	30	45	60	75	90	105	120	135	150	165	180
55	941	1384	1989	5025	7961	8032	5818	7519	8088	5503	2287	1499	1055
60	246	509	493	1297	2755	3604	2543	3701	2748	1362	533	506	259
65	<200	366	389	440	439	484	376	479	431	456	416	380	<200
70	<200	249	322	<200	<200	<200	<200	<200	<200	220	314	258	<200
75	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
80	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
85	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200

Table 2 - *Average Luminance (cd/m^2) for defined C plane, Gamma angle*

γ range (°)	Average Luminance (cd/m^2)				
	Maximum measured	Maximum limit for screen type & software category used **			
		Type I, II screen Some neg. s'ware	Type I, II screen Only pos. s'ware	Type III screen Some neg. s'ware	Type III screen Only pos. s'ware
55 to 90	8088	1000	1500	200	500
65 to 90	484	1000	1500	200	500

Table 3 - Tabulation of Average Luminance (cd/m^2) and luminance limits for gamma ranges

Notes:

* The parameter 'Area' is derived from 'Length x Width' as specified in CIBSE LG3:1996 for rectangular luminous openings. For non-rectangular openings, 'Area' is determined by summing the regions of the opening that contribute to the luminous intensity.

** Type I & II screens have 'Good or moderate screen treatment', Type III screens have 'No screen treatment' as specified in the LG3 2001 addendum. Positive and negative software categories are described briefly in the addendum.

The limits in Table 3 above are specified in Table 8.1 of the LG3 2001 addendum and its accompanying notes.
Measurement method and calculations in accordance with Publications CIBSE LG3:1996 (2001 Addendum) and BS5225:Part 1:1975.
The laboratory uncertainty in measurement for luminance is +/- 6% at the 95% confidence interval.

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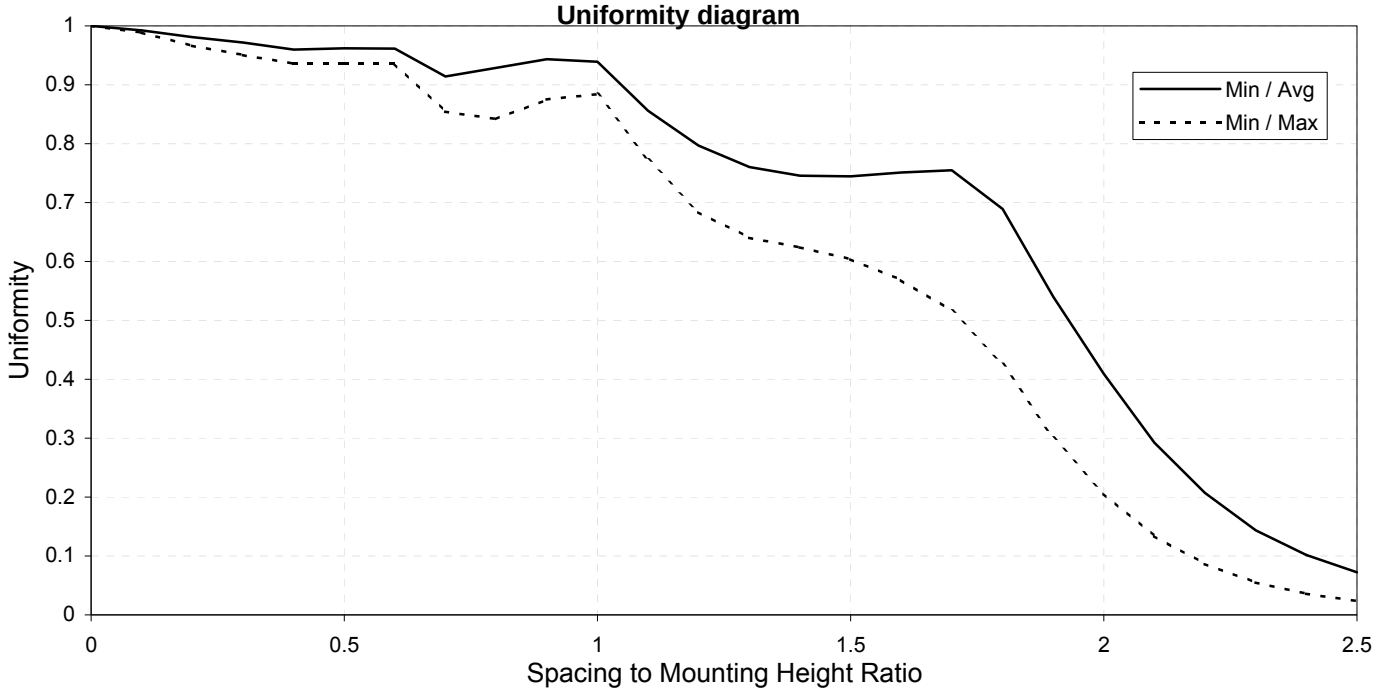
Utilization factors UF(F)

SHR NOM = 1.00										
Room Reflectance.			Room Index							
C	W	F	0.75	1.00	1.25	1.50	2.00	2.50	3.00	4.00	5.00
0.70	0.50	0.20	0.62	0.72	0.79	0.84	0.89	0.93	0.96	0.99	1.01
		0.30	0.55	0.67	0.74	0.78	0.85	0.89	0.92	0.96	0.99
		0.10	0.51	0.62	0.69	0.74	0.81	0.86	0.89	0.94	0.96
0.50	0.50	0.20	0.60	0.71	0.77	0.81	0.87	0.90	0.92	0.95	0.97
		0.30	0.55	0.66	0.72	0.77	0.83	0.87	0.90	0.93	0.95
		0.10	0.51	0.62	0.68	0.73	0.80	0.84	0.87	0.91	0.93
0.30	0.50	0.20	0.59	0.69	0.75	0.79	0.84	0.87	0.89	0.92	0.94
		0.30	0.55	0.65	0.71	0.75	0.81	0.85	0.87	0.90	0.92
		0.10	0.51	0.61	0.68	0.72	0.78	0.82	0.85	0.89	0.91
0.00	0.00	0.00	0.48	0.59	0.65	0.70	0.75	0.79	0.81	0.84	0.86

Rating : Photometrically tested without ceiling board.
Multiply values by service correction factors.
Calculated in accordance with CIBS Technical Memorandum No. 5 1980 using the fine grid method.
Luminaire discretisation employed. Ceiling/Wall/Floor reflectances not used in calculations.



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Test Distance: 8.0 metres

Test Temperature: 24.8 degrees Celsius

Significance: This laboratory has no control over the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

Special Notes: The Intensity values contained in this report are based on the lamp(s) delivering 1000.0 lumens. When using these values in calculations the appropriate Ballast Factor and Manufacturer's rated lumens MUST be taken into account.
It should also be noted that prorating the lumen output for the use of other lamp/ballast combinations, or for use in different environmental conditions, than that tested may produce erroneous results.
The generic term "LOR" is used in this report, it denotes the "Light Output Ratio Luminaire" as defined in Australian Standard AS1680, Part 3, 1991, Section 1.3.9.
This report is free of erasures and corrections.
Photometric intensity values are reported using the CIE Cgamma coordinate system as described in CIE Publication number 121.

Uncertainties: At the 95% confidence interval with a factor k = 2, the uncertainties for this report are :-

Temperature	+/- 1 degree Celsius
Light Output Ratio	+/- 8%
Luminous Intensity	+/- 8%
Angular displacement	+/- 0.25 degrees.

Testing Procedure: Tested in accordance with the applicable sections of CIE Publication Number 121; and with reference to Australian Standard AS1680, Part 3, 1991.

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