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Brisbane QLD 4019.

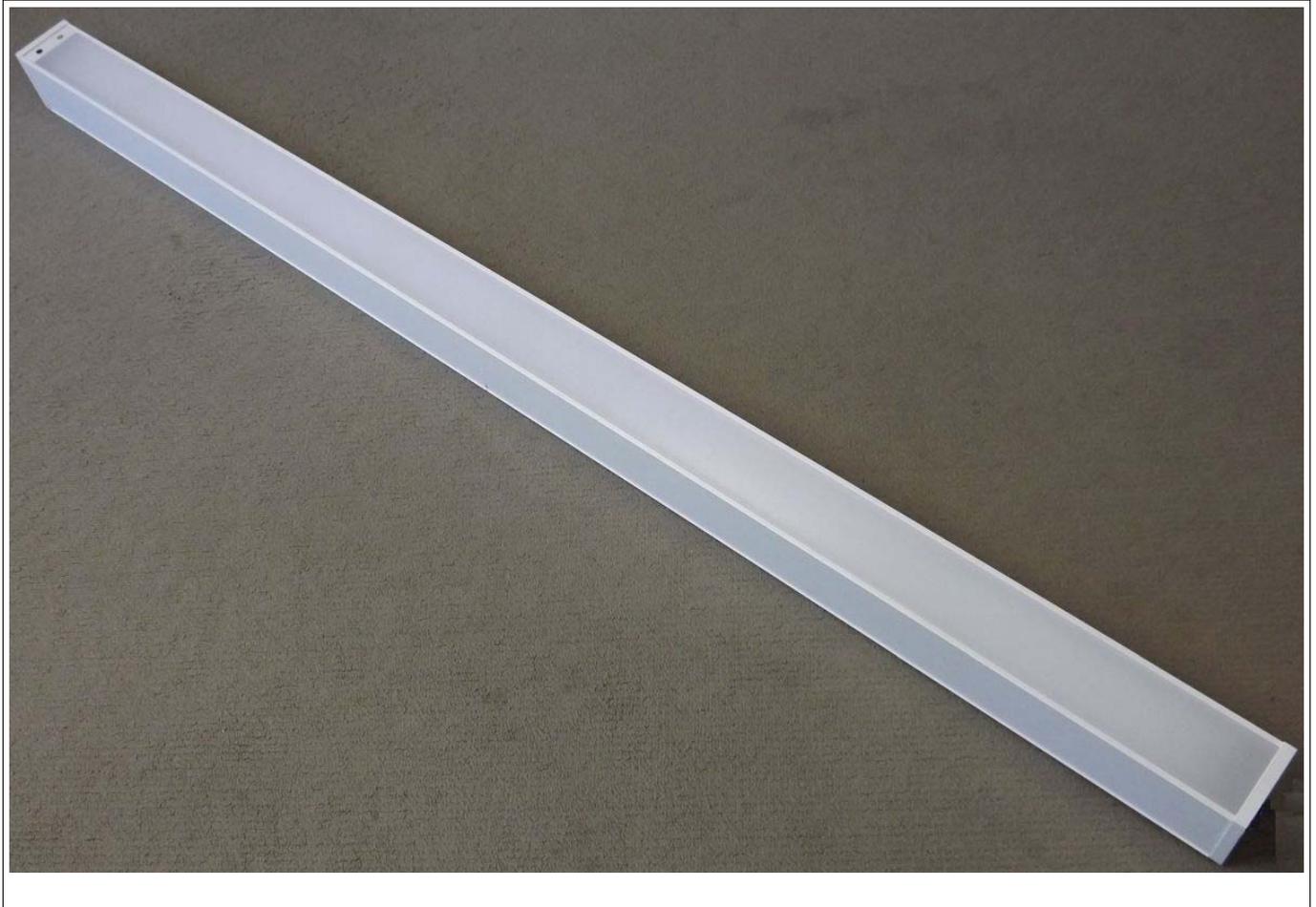


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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accreditation No. 2258.

Test Report No LL1914405T

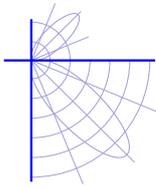
# AS2293.3-2005 Appendix D1 Endurance (Thermal) Test Report



**Cat No. : HIP/1445/SM/WHT/OV/HE G5/450mA/4K/DIM**  
**1500 mm Emergency LED Luminaire**  
*Prepared for: Darkon Pty. Ltd.*



Page 1 of 7



## Test Report No LL1914405T

<b>Client</b>	Jeffrey Lawson Darkon Pty. Ltd. 110 Cromwell Street, Collingwood, VIC 3066.
<b>Luminaire Tested</b>	HIP/1445/SM/WHT/OV/HE G5/450mA/4K/DIM (Standalone Maintained) 1500 mm emergency LED luminaire Maintained
<b>Represented Luminaires</b>	-
<b>Notes</b>	Lamps used for test were as supplied.
<b>Nature of tests</b>	To measure the minimum discharge duration, and other quantities (refer Tables 1 & 2), when operated in accordance with the conditions specified in appendix D1 of the reference standard, comprising AS2293.3-2005 and AS2293.3-2005/Amdt 1-2010.
<b>Procedure</b>	TP-AS2293AppD(2005)-A0. Briefly, the luminaire was mounted onto a simulated ceiling/wall in a thermal test chamber. Fine wire thermocouples were attached to the batteries. Battery temperature, voltage, current and lamp state sensing were logged using a 6½ digit data acquisition unit connected to a PC. Luminaire power was supplied by a stabilised ac source.
<b>Sampling</b>	The laboratory has not participated in 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.
<b>Applicability</b>	The data presented in this report is applicable only to the sample tested.
<b>Uncertainties</b>	Uncertainties available on request
<b>Min. duration achieved</b>	03:12:53 (cold cycle No. 1)
<b>Min. voltage at initial duration</b>	3.627 Vdc @ 897 mA (hot cycle No. 1)
<b>Max. battery temperature</b>	49.6 °C
<b>Compliance Summary</b>	Results for all test cycles, when tested to the following requirements of appendix D1 of the reference standard: <ul style="list-style-type: none"> <li>* Minimum discharge duration - complies</li> <li>* Minimum voltage at initial duration - complies</li> <li>* Minimum voltage at cutoff - complies</li> <li>* Maximum battery temperature - complies</li> <li>* Maximum charge current - complies</li> <li>* Maximum discharge current - complies</li> <li>* Maximum charge voltage - complies</li> <li>* Maximum drain current - complies</li> </ul>

### Authorised Signatory

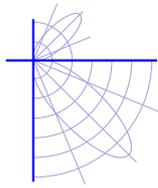
Toby Southgate

**Date of test commencement** 24<sup>th</sup> May, 2019.

**Date of report** 21<sup>st</sup> June, 2019.

B3002 - Report version 2.5, 20 Apr 2017





## Test Report No LL1914405T

### Luminaire details

#### Hot Cycle

Mains lamp operation. On  
Mounting Ceiling / Surface  
Diffuser Opal

#### Cold Cycle

Mains lamp operation. Off  
Mounting Wall / Surface  
Diffuser Opal

**Luminaire rated Voltage** 240V 50Hz

#### Inverter/control pack

Manufacturer Tridonic  
Catalogue No. EMconverterLED BASIC 203 NiCd 90V

#### Lamp(s)

Manufacturer Tridonic  
Catalogue No. LLE 24x280mm 650lm 840 HV ADV5 (PCBs x 5)  
Quantity 60  
Description LED

#### Battery pack / cells **(Information supplied by the client, document ID: DARK002 )**

Cell type	Ni-mh		
IEC Compliance	Evidence cited: Document no. GNRL103		
Cell manufacturer	GP Battery		
Cell cat. no.	GP400LALHT		
Battery pack manufacturer	Tridonic		
Battery pack cat. no.	89 800 441		
Number of cells	3	per string	
Number of strings	1		String max. charge current 400 mA
Cell capacity	4000	mAhr	String Max. discharge current 1800 mA
Cell nominal voltage	1.2	V	Cell max. charge voltage 1.8 V
Cell max. surface temperature	70	°C	Cell min. discharge voltage 0.8 V

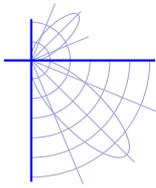
#### Ballast(s)

Manufacturer Tridonic  
Catalogue No. LC 75W 350-1050mA one4all Ip PRE  
Quantity One  
Description Electronic

#### P.F Capacitor

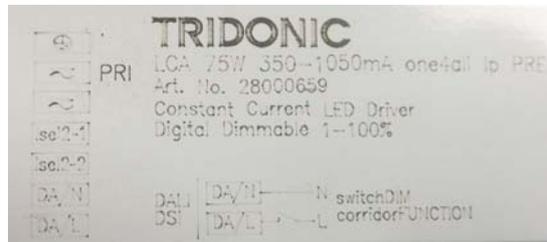
Not present  
Manufacturer -  
Catalogue No. -  
Quantity -  
Description -

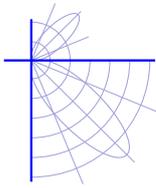




# Test Report No LL1914405T

## Photographs showing components

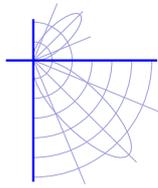




## Test Report No LL1914405T

### Photographs showing component layout





## Test Report No LL1914405T

**Table 1 - High Temperature Test Results**

Test Conditions <sup>(1)</sup>	Unit	Requirement	Hot cycle 1 (72 h charge)	Hot Cycle 2 (16 h charge)	Hot cycle 3 (16 h charge)	Compliance
Ambient temperature	°C					
- average measured			40.5	40.5	40.5	
- instantaneous		40 ± 2	C	C	C	
Supply voltage	Vac					
- average measured			225.4	225.2	225.3	
- instantaneous		(106 ± 1)% of value <sup>(2a)</sup> (94 ± 1)% of value <sup>(2b)</sup>	C n/a	n/a C	n/a C	
Supply frequency	Hz					
- average measured			50.0	50.0	50.0	
- instantaneous		(100 ± 1)% of value <sup>(3)</sup>	C	C	C	
<b>Charge Cycle <sup>(1)</sup></b>						
Max. charge voltage	Vdc	< 5.400	4.228	4.118	4.128	C
Max. charge current	mA	< 400	196	196	196	C
Max. battery temperature	°C	< 70.0	49.6	48.8	48.6	C
Charge amp hours	Ah	n/a	7.6	3.1	3.1	n/a
Emergency lamp status		On	On	On	On	n/a
<b>Discharge Cycle <sup>(1)</sup></b>						
Discharge duration	hh:mm:ss	≥ 01:59:42	04:45:53	03:27:23	03:24:23	C
Voltage at initial duration <sup>(4)</sup>	Vdc	> 2.400	3.627	3.628	3.639	C
Current at initial duration <sup>(4)</sup>	mA	< 1800	897	897	898	C
Amp hours to cut-off	Ah	n/a	4.3	3.1	3.1	n/a
Voltage at cutoff	Vdc	> 2.400	3.120	3.118	3.117	C
Max. discharge current	mA	< 1800	900	899	899	C
Emergency lamp status <sup>(5)</sup>		On	On	On	On	C
Battery drain current after cutoff <sup>(6)</sup>	mA	< 6.0	0.0	0.1	0.1	C

### Notes for Table 1

\* In the case where the sample tested was a maintained emergency escape luminaire or a combined emergency escape luminaire, all lamps that provide normal lighting: were illuminated during each charge cycle and were switched off during each discharge cycle.

<sup>(1)</sup> Compliance tested to specifications in Table D1 of the reference standard.

### Notes common to Tables 1 and 2

\* Uncertainties of measurement are taken into account when comparing measured values against limits in accordance with NATA guidelines.

Namely, when comparing against a limit, a value in the passing region, or lying on the limit is deemed to comply.

\* "n/a" means not applicable, "C" means complies with requirement, "DNC" means does not comply with requirement

<sup>(2a)</sup> "Value" is the rated voltage or the highest marked voltage where a voltage range is given.

<sup>(2b)</sup> "Value" is the rated voltage or the lowest marked voltage where a voltage range is given.

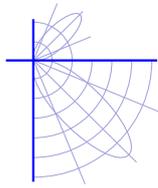
<sup>(3)</sup> "Value" is the rated frequency or the frequency that results in the most onerous condition where: a frequency range is stated and if the frequency can have an effect on battery performance.

<sup>(4)</sup> Initial duration is specified in AS2293.1-2005 Clause 2.2, being 1.33 \* 90 minutes

<sup>(5)</sup> "On" represents all emergency lighting lamps were illuminated throughout the discharge until cutoff

<sup>(6)</sup> Value of limit is calculated from either: C \* 0.0015 (where C is the charge capacity of a cell in mAh), or the value submitted by the client. The battery drain current is measured 15 minutes after cutoff.





## Test Report No LL1914405T

**Table 2 - Low Temperature Test Results**

Test Conditions <sup>(1)</sup>	Unit	Requirement	Cold cycle 1 (16 h charge)	Cold Cycle 2 (16 h charge)	Cold cycle 3 (16 h charge)	Compliance
Ambient temperature	°C					
- average measured			10.3	10.4	10.4	
- instantaneous		10 ± 2	C	C	C	
Supply voltage	Vac					
- average measured			225.9	225.9	225.9	
- instantaneous		(94 ± 1)% of value <sup>(2b)</sup>	C	C	C	
Supply frequency	Hz					
- average measured			50.0	50.0	50.0	
- instantaneous		(100 ± 1)% of value <sup>(3)</sup>	C	C	C	
<b>Charge Cycle <sup>(1)</sup></b>						
Max. charge voltage	Vdc	< 5.400	4.182	4.206	4.207	C
Max. charge current	mA	< 400	195	195	195	C
Max. battery temperature	°C	< 70.0	13.3	13.0	13.4	C
Charge amp hours	Ah	n/a	3.1	3.1	3.1	n/a
Emergency lamp status		Off	Off	Off	Off	n/a
<b>Discharge Cycle <sup>(1)</sup></b>						
Discharge duration	hh:mm:ss	≥ 01:59:42	03:12:53	03:27:38	03:28:23	C
Voltage at initial duration <sup>(4)</sup>	Vdc	> 2.400	3.638	3.658	3.660	C
Current at initial duration <sup>(4)</sup>	mA	< 1800	897	897	896	C
Amp hours to cut-off	Ah	n/a	2.9	3.1	3.1	n/a
Voltage at cutoff	Vdc	> 2.400	3.096	3.098	3.093	C
Max. discharge current	mA	< 1800	899	899	899	C
Emergency lamp status <sup>(5)</sup>		On	On	On	On	C
Battery drain current after cutoff <sup>(6)</sup>	mA	< 6.0	0.1	0.1	0.1	C

**Notes for Table 2**

\* In the case where the sample tested was a maintained emergency escape luminaires or a combined emergency escape luminaire, all lamps that provide normal lighting: were switched off during each charge cycle and were switched off during each discharge cycle.

<sup>(1)</sup> Compliance tested to specifications in Table D2 of the reference standard.

