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Brisbane QLD 4019.



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Test Report No LL1931504T

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



Cat No. :

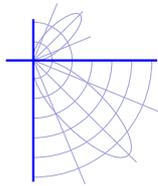
MRS T/1445/SM/WHT/OV FLUSH/HE/450mA/EMERGENCY/STANDALONE MAINTAINED

**Emergency LED Profile**

*Prepared for: Darkon Pty. Ltd.*



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<b>Client</b>	Jeffrey Lawson Darkon Pty. Ltd. 110 Cromwell Street, Collingwood, VIC 3066.
<b>Luminaire Tested</b>	MRS T/1445/SM/WHT/OV FLUSH/HE/450mA/EMERGENCY/STANDALONE MAINTAINED 1445 mm emergency LED profile. 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>	03:21:38 (hot cycle No. 3)
<b>Min. voltage at initial duration</b>	3.640 Vdc @ 905 mA (hot cycle No. 2)
<b>Max. battery temperature</b>	50.5 °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

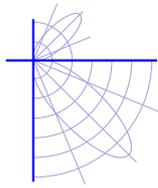
Toby Southgate

**Date of test commencement** 11<sup>th</sup> November, 2019

**Date of report** 12<sup>th</sup> December, 2019

B3002 - Report version 2.5, 20 Apr 2017





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### 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/NiMH 90V

#### Lamp(s)

Manufacturer Tridonic  
Catalogue No. LLE 24x560mm 1300lm 840 HV ADV5 (PCBs x2)  
LLE 24x140mm 325lm 840 HV ADV5 (PCBs x 2)  
Quantity 60  
Description LED

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

Cell type NiMH  
IEC Compliance Evidence cited: Document no. GNRL103  
Cell manufacturer GP Battery  
Cell cat. no. GP400LALHT  
Battery pack manufacturer Tridonic  
Battery pack cat. no. 89800441  
Number of cells 3 per string  
Number of strings 1 String max. charge current 400 mA  
Cell capacity 4000 mAh 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

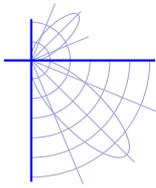
#### Ballast(s)

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

#### P.F Capacitor Not present

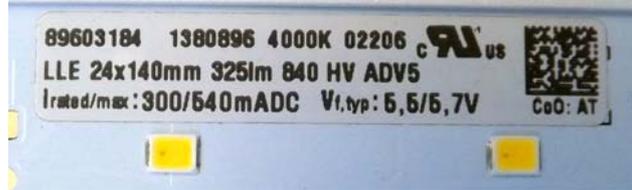
Manufacturer -  
Catalogue No. -  
Quantity -  
Description -

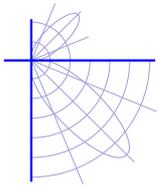




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## Photographs showing components

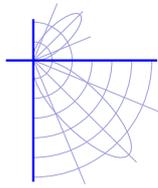




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### Photographs showing component layout





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**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			40.0	40.0	40.0	
- instantaneous		40 ± 2	C	C	C	
Supply voltage	Vac					
- average measured			254.5	226.3	226.3	
- 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	4.205	4.105	4.116	C
Max. charge current	mA	< 400	195	195	195	C
Max. battery temperature	°C	< 70.0	50.5	49.0	49.0	C
Charge amp hours	Ah	n/a	9.4	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	04:48:53	03:23:24	03:21:38	C
Voltage at initial duration <sup>(4)</sup>	Vdc	> 2.400	3.652	3.640	3.653	C
Current at initial duration <sup>(4)</sup>	mA	< 1800	904	905	904	C
Amp hours to cut-off	Ah	n/a	4.4	3.1	3.0	n/a
Voltage at cutoff	Vdc	> 2.400	3.105	3.102	3.103	C
Max. discharge current	mA	< 1800	907	906	906	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	0.2	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.

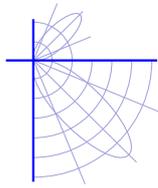
<sup>(3)</sup> "Value" is the rated frequency or the frequency that results in the most onerous condition where: a frequency range is stated and if the frequency can have an effect on battery performance.

<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.





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**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			9.3	9.3	9.7	
- instantaneous		10 ± 2	C	C	C	
Supply voltage	Vac					
- average measured			226.0	226.0	226.0	
- 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	4.188	4.189	4.189	C
Max. charge current	mA	< 400	195	195	195	C
Max. battery temperature	°C	< 70.0	12.4	12.3	13.1	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	03:26:53	03:26:53	03:27:23	C
Voltage at initial duration <sup>(4)</sup>	Vdc	> 2.400	3.677	3.678	3.682	C
Current at initial duration <sup>(4)</sup>	mA	< 1800	901	902	902	C
Amp hours to cut-off	Ah	n/a	3.1	3.1	3.1	n/a
Voltage at cutoff	Vdc	> 2.400	3.082	3.083	3.081	C
Max. discharge current	mA	< 1800	905	904	904	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 luminaire 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.

