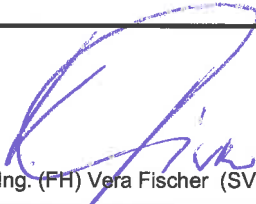


Prüfbericht <i>Test report</i>		Auftragsnr. / order no.: E6.077 / 3064204 Berichtsnr. / report no.: 21195754-001	
Auftraggeber <i>client:</i>	Heinz Walz GmbH Meß- und Regeltechnik Eichenring 6 D-91090 Effeltrich	Auftragsdatum / <i>date of order:</i>	15.11.2012
Inhalt des Auftrags <i>content of order:</i>		AG-Referenz-Nr. / <i>client reference no.:</i>	
Lithium-Ion Battery			
Prüfgrundlagen <i>test specifications:</i>		UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.5 Part 3 - 38.3 Lithium Batteries	
Prüfgegenstand <i>test item:</i>	Lithium-Battery	EAN-Nr. / no.: J.	
Bezeichnung <i>identification:</i>	3025-A	Produktfoto / product picture 	
Eingang Prüfgegenstand <i>receipt of test item:</i>	16.11.2012		
Prüfgegenstands- Nr. <i>test item no.:</i>	J.		
Prüfzeitraum und - ort <i>period of test and</i> <i>location:</i>	19.11.2012 – 20.01.2013 Nürnberg		
Prüflaboratorium <i>testing laboratory:</i>	TÜV Rheinland LGA Products GmbH		
Prüfergebnis <i>test result:</i>	PASS		
Sonstiges / other <i>aspects:</i>	Re-certifying-test's 3,4,5,& 7 (statet by paragraph 38-3.3f)		
geprüft / tested by:		kontrolliert / reviewed by:	
			
07.02.2013	Dipl.-Ing. (FH) Vera Fischer (SV)	07.02.2013	Dipl.-Ing. (FH) Matthias Baumann (TK)
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
			Name/Stellung <i>Name/Position</i>
			Unterschrift <i>Signature</i>
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i></p>			

Report No. 21195754-001

Content

- 1 Indication of used measuring equipment**
- 2 Test Result**
- 3 Detailed test result**

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1 Liste verwendeter Prüfmittel / <i>Indication of used measuring equipment</i>	Nummer / <i>number</i>
Prüfmittel / <i>measuring equipment</i> Shaker RMS 3“ Acceleration Sensor B&K 4383 Battery Test System FuelCon Evaluator B	6000 11616 70468

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2. Test result

The Lithium Battery was tested in accordance to: *UN Manual of Tests and Criteria ST/SG/AC.10/11/Rev.5 Part 3 - 38.3.3f*

Condition	Test result						
			T3: Vibration	T4: Shock	T5: External short	T7: Overcharge	
After 25 cycles			Passed	Passed	Passed		
						Passed	

3. Detailed test results

3.1 Test T3: Vibration

The Battery was firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration was a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle was repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the battery.

From 7 Hz a peak acceleration of 1 g_n was maintained until 18 Hz was reached. The amplitude was then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8 g_n occurs (50 Hz). The peak acceleration of 8 g_n was then maintained until the frequency was increased to 200 Hz.

UN Manual of Tests and Criteria evaluation:

Sample : Walz 3025-A	Before test		After test		Change quantity		Evaluation	Verdict
Condition: After 25 Cycles	OCV [V]		OCV [V]		OCV [V]		Leakage, venting, disassembly, rupture, fire, mass loss occurred	
Sample 1	16,427		16,427		0,000		NO	Pass

3.2 Test T4: Shock

The Battery was secured to the testing machine by means of a rigid mount which supported the mounting surface of the test battery. The battery was subjected to a half-sine shock of peak acceleration of 50g_n and pulse duration of 6 milliseconds. The battery was subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the battery for a total of 18 shocks.

UN Manual of Tests and Criteria evaluation:

Sample : Walz 3025-A	Before test		After test		Change quantity		Evaluation	Verdict
Condition: After 25 Cycles	OCV [V]		OCV [V]		OCV [V]		Leakage, venting, disassembly, rupture, fire, mass loss occurred	
Sample 1	16,427		16,425		-0,0002		NO	Pass

3.3 Test T5: External short circuit

The battery to be tested was temperature stabilized so that its external case temperature reached $55 \pm 2^\circ\text{C}$ and then it was subjected to a short circuit condition with a total external resistance of less $100\text{m}\Omega$ at $55 \pm 2^\circ\text{C}$. This short circuit condition was continued for at least one hour after the Battery external case temperature returned to $55 \pm 2^\circ\text{C}$. The Battery was observed for a further six hours for the test to be concluded.

UN Manual of Tests and Criteria evaluation:

Sample : Walz 3025-A	Evaluation	Verdict
Condition: After 25 Cycles	Leakage, venting, disassembly, rupture, fire occurred	
Sample 1	NO	Pass

3.4 Test T7: Overcharge

The charge current was set to 31,2A; twice the manufacturers recommended maximum continuous charge current.

UN Manual of Tests and Criteria evaluation:

Sample : Walz 3025-A	Evaluation	
Condition: After 25 Cycles	Leakage, venting, disassembly, rupture, fire occurred	Verdict
Sample 2	NO	Pass

-- End of test report --