



Test report for primary battery testing for ALDI Stores Australia

Per Lindström

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Summary:

ALDI Stores Australia: David Dimovski



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Test report for primary battery testing for ALDI Stores Australia

Alkaline primary batteries have been tested in Ed. 11.0, 2006-12. Test conditions are according Discharge time to specified voltage levels has	ng to IEC 60086-1 Ed. 10, 2006-12.
Brands	Sizes
Ultracell Max Energizer Max	LR6 LR6
The test results apply only to the tested sample	es.
Electronic copy of original report is marked wit	h RE in "Report No R11-021".
Project leader:	Approved by:
Per Lindström	Johny Jonsson
Distribution:	



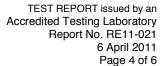


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App	endix A: Test results for individual batteries.	.1-6







1. CLIENT

ALDI Stores Australia Att. David Dimovski 1 Sargents Road Minchinbury NSW, 2770 Australia

2. COMMISSION

Testing of alkaline primary batteries according to accredited methods in IEC 60086-2, Ed.11.0, 2006-12.

Project number: 419.101
Project leader: Per Lindström
Operator: Per Lindström

3. TEST SAMPLES

Table 3.1 Test samples

Brand	Туре	Delivery date	ES number	
Ultracell Max	LR6	2011-03-11	ES11-32	
Energizer Max	LR6	2011-03-11	ES11-33	

4. TEST PROGRAM

The method in Table 4.1 is according to IEC 60086-2, Ed. 11.0, 2006-12. This method is accredited by SWEDAC.

Table 4.1 Test program

Battery	Application	Load	Daily period	End point (V)
LR6	Photo flash	1000 mA	10 s/min, 1 h/day	0,9
	Electronic game	250 mA	1 h/day	0,9
	Digital camera	1500 mW/650 mW	2 s/28 s, 5 min/h, 24 h/day	1,05

9 samples/test

Determination of discharge time to end voltage.





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5. TEST CONDITIONS

Test conditions are according to IEC 60086-1, Ed 10.0, 2006-12.

Testing was performed on a PEC test system BDT1012 for primary batteries. The batteries were connected to the discharge circuits by pressure contacts.

Room temperature: 20 ± 2 °C Humidity: 45 - 65 %

The time to voltage levels / cut-off voltage was determined by scanning every 25-200 msec and registration with ΔV and Δt . The values for ΔV and Δt are dependent on test regime.

6. TEST RESULTS

Test results are summarized in Table 6.1 below.

Tables showing life of individual batteries, discharged to specified end voltages are compiled in Appendix A.

The time to end voltage is in some tests expressed as pulses. The averages presented in the result tables are calculated from the number of fully completed pulses of each individual test sample.

The test results apply only to the tested samples.

Uncertainty of load resistance, voltage measurement and load current:

The uncertainty of load resistance is calculated to be less than ± 0.5 % based on calibrations. The requirement according to IEC 60086-1, Ed. 10.0, 2006-12 is ± 0.5 %.

The uncertainty of voltage measurement is calculated to be \leq 0,25 % based on calibrations. The requirement according to IEC 60086-1, Ed. 10.0, 2006-12 is \leq 0,25 %.

The uncertainty of load current is calculated to be less than ±0,5 % based on calibrations.

Measurement uncertainty is reported in accordance with the EA publication EA-4/16 "EA guidelines on the expression of uncertainty in quantitative testing", December 2003.





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Table 6.1 Summary of test results size LR6.

				Ultracell Max		Energizer Max			
		End			Time or pulses to end voltage		Time or pulses to end voltage		
Туре	Load	voltage	Unit	Average	Max	Min	Average	Max	Min
LR6	Photo flash 1000 mA, 10 s/min, 1 h/day Electronic game	0,9 V 0,9 V	(pulses)	574 8,24	584 8,35	540 7,93	403 8,28	467 8,49	276 7,88
	250 mA, 1 h/day Digital camera 1500 mW/650 mW, 2 s/28 s, 5 min/h, 24 h/day	1,05 V	(pulses)	99	117	89	70	77	64

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Ultracell Max LR6

Date code: 10-2017 Made in: China

Test No. 13003

Test No.	13003							
1000 mA, 10 sec/min, 1 h/d								
Test starting	date:	2011-03-23						
Battery	1,3 V	1,2 V	1,1 V	1,0 V	0,9 V	0,8 V		
	(pulses)	(pulses)	(pulses)	(pulses)	(pulses)	(pulses)		
1	56	120	274	408	577	638		
2	57	148	276	410	576	645		
3	57	148	275	408	540	636		
4	57	152	279	413	581	651		
5	56	119	276	411	578	639		
6	57	149	277	414	579	649		
7	60	153	282	419	584	654		
8	54	116	238	403	571	627		
9	58	150	279	416	581	644		
Average	57	139	273	411	574	643		
Std. Dev.	1,62	15,95	13,31	4,80	13,31	8,44		
Max. value	60	153	282	419	584	654		
Min. value	54	116	238	403	540	627		





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Ultracell M	lax			LR6		
Date code:	10-2017	Made in:	China			
Test No.	13004					
250 mA, 1 h/c	d					
Test starting		2011-03-23				
_						
Battery	1,3 V	1,2 V	1,1 V	1,0 V	0,9 V	0,8 V
	(h)	(h)	(h)	(h)	(h)	(h)
1	1,56	3,57	5,76	7,50	8,35	8,76
2	1,54	3,55	5,73	7,48	8,35	8,81
3	1,53	3,55	5,74	7,47	8,32	8,81
4	1,54	3,54	5,71	7,48	8,32	8,70
5	1,54	3,54	5,72	7,48	8,31	8,73
6	1,47	3,51	5,72	7,41	8,28	8,76
7	1,49	3,54	5,71	7,47	7,99	8,68
8	1,54	3,54	5,68	6,96	7,93	8,64
9	1,50	3,56	5,74	7,48	8,34	8,79
Average	1,52	3,54	5,73	7,41	8,24	8,74
Std. Dev.	0,03	0,02	0,02	0,17	0,16	0,06
Max. value	1,56	3,57	5,76	7,50	8,35	8,81
Min. value	1,47	3,51	5,68	6,96	7,93	8,64





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Ultracell Max LR6

Date code: 10-2017 Made in: China

Test No. 13002

1500 mW/650 mW, 2 s/28 s, 5 min/h, 24 h/day
Test starting date: 2011-03-23

Test starting date:		2011-03-23				
Battery	1,3 V (pulses)	1,2 V (pulses)	1,05 V (pulses)	1,0 V (pulses)	0,9 V (pulses)	0,8 V (pulses)
1	26	49	97	116	137	156
2	26	49	98	116	139	158
3	27	49	98	117	139	159
4	25	47	89	107	129	149
5	26	48	97	109	137	156
6	27	49	97	109	137	156
7	27	49	97	109	137	149
8	26	49	98	116	139	159
9	34	57	117	128	148	168
Average	27	50	99	114	138	157
Std. Dev.	2,7	2,9	7,4	6,5	4,8	5,7
Max. value	34	57	117	128	148	168
Min. value	25	47	89	107	129	149





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Energizer Max LR6

03-2017 Date code: Made in: Singapore

Test No. 13006

1000 mA, 10 sec/min, 1 h/d							
Test starting	date:	2011-03-23					
Battery	1,3 V (pulses)	1,2 V (pulses)	1,1 V (pulses)	1,0 V (pulses)	0,9 V (pulses)	0,8 V (pulses)	
1	37	87	151	239	402	519	
2	38	89	154	272	400	513	
3	37	86	147	226	342	477	
4	46	97	162	282	456	540	
5	34	81	116	170	276	415	
6	44	95	161	275	414	529	
7	47	99	173	295	467	571	
8	44	96	173	292	453	569	
9	40	90	160	278	413	536	
Average	41	91	155	259	403	519	
Std. Dev.	4,60	5,99	17,17	40,48	60,71	48,28	
Max. value	47	99	173	295	467	571	
Min. value	34	81	116	170	276	415	





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Energizer	Max			LR6		
Date code:	03-2017	Made in:	Singapore			
Test No.	13007					
250 mA, 1 h/c	k					
Test starting	date:	2011-03-23				
_						
Battery	1,3 V	1,2 V	1,1 V	1,0 V	0,9 V	0,8 V
	(h)	(h)	(h)	(h)	(h)	(h)
1	1,40	2,86	5,71	7,58	8,45	8,86
2	1,39	2,77	5,64	7,46	8,34	8,65
3	1,35	2,71	5,63	7,46	8,35	8,74
4	1,38	2,81	5,78	7,59	8,49	8,91
5	1,35	2,65	5,63	7,46	8,33	8,72
6	1,36	2,73	5,70	7,52	8,41	8,85
7	1,31	2,48	4,65	6,83	7,88	8,52
8	1,26	2,44	4,67	6,89	7,94	8,62
9	1,37	2,76	5,57	7,45	8,32	8,68
Average	1,35	2,69	5,44	7,36	8,28	8,73
Std. Dev.	0,04	0,14	0,45	0,29	0,22	0,13
Max. value	1,40	2,86	5,78	7,59	8,49	8,91
Min. value	1,26	2,44	4,65	6,83	7,88	8,52





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Energizer Max LR6

Date code: 03-2017 Made in: Singapore

Test No. 13005

1500 mW/650 mW, 2 s/28 s, 5 min/h, 24 h/day

Test starting	date:	2011-03-23				
Battery	1,3 V (pulses)	1,2 V (pulses)	1,05 V (pulses)	1,0 V (pulses)	0,9 V (pulses)	0,8 V (pulses)
1	16	36	65	76	89	107
2	19	44	69	86	108	127
3	18	39	76	87	107	126
4	19	45	76	88	115	128
5	15	36	64	68	98	117
6	24	46	67	78	98	108
7	24	45	68	86	106	117
8	25	47	77	88	108	127
9	17	38	66	77	95	107
Average	20	42	70	82	103	118
Std. Dev.	3,7	4,5	5,1	7,1	8,1	9,1
Max. value	25	47	77	88	115	128
Min. value	15	36	64	68	89	107