



TEST REPORT IEC 60086-1 & IEC 60086-2 Primary Battery - Part 1: General Primary Battery - Part 2: Physical and electrical specifications	
Report Number.:	SZES230600370501
Date of issue	2023-07-03
Total number of pages	22 pages
Name of Testing Laboratory preparing the Report	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Applicant's name	Zhaoqing New Leader Battery Industry Co., Ltd.
Address	New Leader Industry Building, Tenth Area Chuangye Road, Dinghu New Town, Zhaoqing, Guangdong, China
Test specification: Standard: IEC 60086-1:2021 in conjunction with IEC 60086-2:2021 Test procedure.....: SGS-CSTC Non-standard test method.....: N/A	
TRF template used: IEC EE OD-2020-F1:2021, Ed.1.4 Test Report Form No.....: IEC60086_1&2B Test Report Form(s) Originator.....: DEKRA Certification B.V. Master TRF: Dated 2022-01-06	
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Test item description..... :	Alkaline Zinc Manganese Dioxide Battery (Product name: Alkaline Battery)
Trade Mark (s)..... :	NEW LEADER
Manufacturer	Same as applicant
Model/Type reference..... :	LR03
Ratings	Rated Voltage: 1,5 V Rated Capacity: 1200 mAh

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	Testing Laboratory:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
	Testing location/ address.....:	No.2, Jianghao Industrial Factory Area, No.430, Jinhua Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China
	Tested by (name, function, signature).....:	Rachel Long / Project Engineer
	Approved by (name, function, signature)....:	Sunny Guan / Report Reviewer



List of Attachments (including a total number of pages in each attachment):

Attachment 1: 1 page of Photos.

Summary of testing:

All test data are copied from original test report ref. No.: SZES201100727201 dated 2020-12-21 with following changes:

- Upgrade standard version from IEC 60086-1:2015 in conjunction with IEC 60086-2:2015 to IEC 60086-1:2021 in conjunction with IEC 60086-2:2021;

After comparison, no additional was considered necessary.

Remark: Only cell was considered and tested according to standard in this report.

Tests performed (name of test and test clause):

IEC60086-1: 2021

- ☒ 4.1.2 & 5.7 Dimensions
- ☒ 4.1.3 Terminals
- ☐ 4.1.3.2 Contact pressure resistance
- ☐ 4.1.3.9 Snap fasteners
- ☐ 4.1.3.10 Wire
- ☐ 4.1.3.11 Other spring contacts of clips
- ☒ 4.1.6 Marking
- ☒ 4.2.2 Dimensional stability
- ☒ 4.2.3 Leakage
- ☒ 4.2.4 Open-circuit voltage limits
- ☒ 4.2.5 Service output
- ☒ 5.3 Conformance check to a specified minimum average duration
- ☐ 5.8 Leakage and deformation

IEC 60086-2: 2021

- ☐ 3.1.1 Application tests
- ☒ Clause 8 Physical and electrical specifications

Testing location:

SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

No.2, Jianghao Industrial Factory Area, No.430,
Jihua Road, Bantian Street, Longgang District,
Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):
EU Group difference

- ☒ The product fulfils the requirements of EN IEC 60086-1:2021 & EN IEC 60086-2:2021.

Use of uncertainty of measurement for decisions on conformity (decision rule):

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

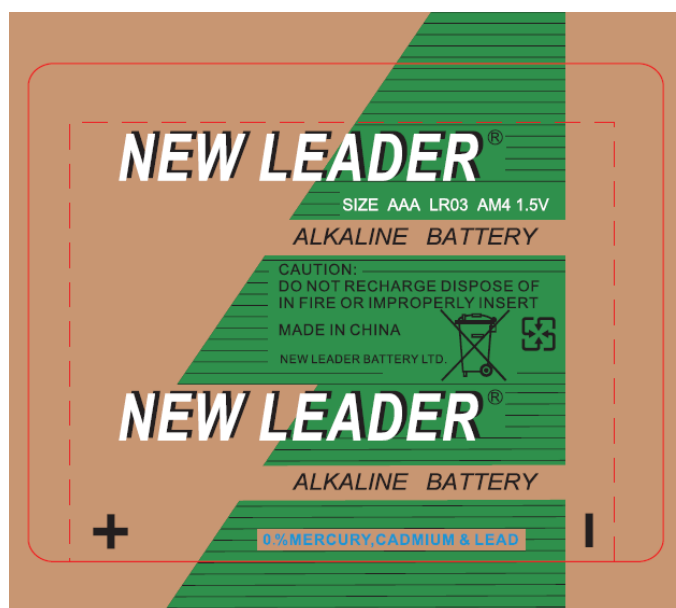
☐ Other:(to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

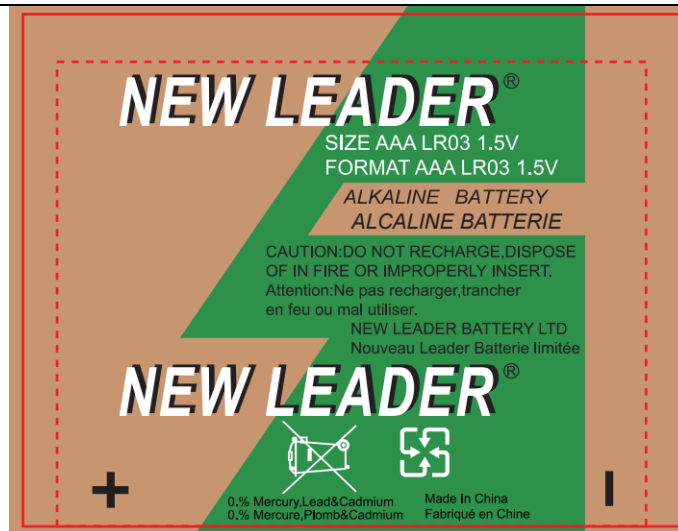
Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:



Test item particulars.....:	--
Classification of installation and use.....:	--
Supply Connection	--
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item	Original receipt date: 2020-11-06
Date (s) of performance of tests	Original test date: 2020-11-10 to 2020-11-23
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a ☒ comma / ☐ point is used as the decimal separator.</p> <p>This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.</p>	

Name and address of factory (ies)	Same as applicant
General product information and other remarks:	
Product description:	Alkaline Zinc Manganese Dioxide Battery (Product name: Alkaline Battery)
Systems:	Zinc / Manganese Dioxide
Model of cell:	LR03
Designation of cell:	LR03
Rated voltage of cell:	1,5 V
Rated capacity of cell:	1200 mAh

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	REQUIREMENTS		P
4.1	General		P
4.1.1	Design		P
	Additionally, information on equipment design can be found in Annex B		P
4.1.2	Battery dimensions	See appended table	P
	The dimensions for individual types of batteries are given in IEC 60086-2 and IEC 60086-3		P
4.1.3	Terminals		P
4.1.3.1	General		P
	Terminals are in accordance with Clause 6 of IEC 60086-2		P
	Their physical shape is designed in such a way that they ensure that the batteries make and maintain good electrical contact at all times		P
	They are made of materials that provide adequate electrical conductivity and corrosion protection		P
4.1.3.2	Contact pressure resistance		N/A
	Where stated in the battery specification tables or the individual specification sheets in IEC 60086-2, the following applies		N/A
	A force of 10 N applied through a steel ball of 1 mm diameter at the centre of each contact area for a period of 10 s does not cause any apparent deformation which might prevent satisfactory operation of the battery		N/A
4.1.3.3	Cap and base		P
	This type of terminal is used for batteries which have their dimensions specified according to Figures 1 and 7 of IEC 60086-2 and which have the cylindrical side of the battery insulated from the terminals		P
4.1.3.4	Cap and case		N/A
	This type of terminal is used for batteries which have their dimensions specified according to Figures 8, 9, 10, 14, 15 and 16 of IEC 60086-2, but in which the cylindrical side of the battery forms part of the positive terminal		N/A
4.1.3.5	Screw terminals		N/A
	This contact consists of a threaded rod in combination with either a metal or insulated metal nut		N/A
4.1.3.6	Flat contacts		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	These are essentially flat metal surfaces adapted to make electrical contact by suitable contact mechanisms bearing against them		N/A
4.1.3.7	Flat or spiral springs		N/A
	These contacts comprise flat metal strips or spirally wound wires which are in a form that provides pressure contact		N/A
4.1.3.8	Plug-in-sockets		N/A
	These are made up of a suitable assembly of metal contacts, mounted in an insulated housing or holding device and adapted to receive corresponding pins of a mating plug		N/A
4.1.3.9	Snap fasteners		N/A
4.1.3.9.1	General		N/A
	These contacts are composed of a combination comprising a stud (non-resilient) for the positive terminal and a socket (resilient) for the negative terminal		N/A
	They are suitable metal so as to provide efficient electrical connection when joined to the corresponding parts of an external circuit		N/A
4.1.3.9.2	Snap fastener		N/A
	This type of terminal consists of a stud for the positive terminal and a socket for the negative terminal. These are made from nickel plated steel or other suitable material		N/A
	They are designed to provide a secure physical and electrical connection, when fitted with similar corresponding parts for connection to an electrical circuit		N/A
4.1.3.10	Wire		N/A
	Wire leads are single or multi-strand flexible insulated tinned copper		N/A
	The positive terminal wire covering is red and the negative black		N/A
4.1.3.11	Other spring contacts or clips		N/A
	These contacts are generally used on batteries when the corresponding parts of the external circuit are not precisely known		N/A
	They are made of spring brass or of other material having similar properties		N/A
4.1.4	Classification (electrochemical system)		P
	Primary batteries are classified according to their electrochemical system		P

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Each system, with the exception of the zinc-ammonium chloride, zinc chloride-manganese dioxide system, has been allocated a letter denoting the particular system		P
	The electrochemical systems that have been standardized up to now are given in Table 1		P
4.1.5	Designation		P
	The designation of primary batteries is based on their physical parameters, their electrochemical system as well as modifiers, if needed		P
	A comprehensive explanation of the designation system (nomenclature) can be found in Annex C		P
4.1.6	Marking		P
4.1.6.1	General		N/A
	With the exception of small batteries too small to mark with all items (see 4.1.6.2), each battery is marked with the following information		N/A
	a) designation, IEC or common		N/A
	b) expiration of a recommended usage period or year and month or week of manufacture		N/A
	The year and month or week of manufacture may be in code		N/A
	c) polarity of the positive (+) terminal		N/A
	d) nominal voltage		N/A
	e) name or trade mark of the manufacturer or supplier		N/A
	f) cautionary advice		N/A
4.1.6.2	Marking of smaller batteries		P
	a) Some batteries, mainly category 3 and category 4 batteries have a surface too small to accommodate all markings shown in 4.1.6.1		P
	For these batteries the designation 4.1.6.1a) and the polarity 4.1.6.1c) are marked on the battery	See marking plate	P
	All other markings shown in 4.1.6.1 are given on the immediate packing instead of on the battery		P
	b) For P-system batteries	Not P-system	N/A
	4.1.6.1a) are on the battery, the sealing tab or the package		N/A
	4.1.6.1c) are marked on the sealing tab and/or on the battery		N/A
	4.1.6.1b), 4.1.6.1d) and 4.1.6.1e) are given on the immediate packing instead of on the battery		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The nominal voltage is marked either 1,4 V or 1,45 V		N/A
	c) Caution for ingestion of swallowable batteries are given.....		P
4.1.6.3	Marking of batteries regarding method of disposal		N/A
	Marking of batteries with respect to the method of disposal is in accordance with local legal requirements		N/A
4.1.7	Interchangeability: battery voltage		N/A
	Voltage range 1, $U_r = 1,4$ V: Batteries having a standard discharge voltage $m \times U_s$ equal to or within the range of $n \times 1,19$ V to $n \times 1,61$ V		N/A
	Voltage range 2, $U_r = 3,2$ V: Batteries having a standard discharge voltage $m \times U_s$ equal to or within the range of $n \times 2,72$ V to $n \times 3,68$ V		N/A
4.2	Performance		P
4.2.1	Discharge performance		P
	Discharge performance of primary batteries is specified in IEC 60086-2	Only initial discharge was considered in this report.	P
4.2.2	Dimensional stability		P
	The dimensions of batteries are conform with the relevant specified dimensions as given in IEC 60086-2 and IEC 60086-3 at all times during discharge testing under the standard conditions	Only initial discharge was considered in this report.	P
4.2.3	Leakage		P
	When batteries are stored and discharged under the standard conditions given in this specification, no leakage occur		P
4.2.4	Open-circuit voltage limits		P
	The maximum open-circuit voltage of batteries does not exceed the values given in Table 1	Max. OCV: 1,630 V	P
4.2.5	Service output		P
	Discharge durations, initial and delayed, of batteries are meet the requirements given in IEC 60086-2	Only initial discharge was considered in this report.	P
4.2.6	Safety	Test report was submitted. Report No. SZES201100727301 issued by SGS-CSTC.	P
	When designing primary batteries, safety under conditions of intended use and foreseeable mis-use as prescribed in IEC 60086-4 and IEC 60086-5 are considered		P
4.2.7	Validity of testing		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Portable primary batteries are subjected to the tests, as required in the 60086 series. Test results remain valid until a design change or requirement revision has been made		N/A
5	PERFORMANCE – TESTING		P
5.1	Capacity testing versus application and service output testing		P
	For the preparation of standard methods of measuring performance (SMMP) of consumer goods, refer to Annex E		P
	A capacity of a primary battery is established by electrical discharge tests as detailed in D.2.3		N/A
	However, under consumer usage conditions, the capacities realised from electrical discharge test methods can vary		N/A
	The following factors/variables dramatically impact on optimum capacity realisation	Shall be consider for end-user.	N/A
	a) The current demand from the external electrical circuit/device		N/A
	b) The frequency of current demand		N/A
	c) The minimum voltage at which the device will satisfactorily operate		N/A
	d) The temperature of operation		N/A
5.2	Discharge testing		P
5.2.1	General		P
	The discharge tests in this standard fall into two categories		P
	– application tests		P
	– service output tests		N/A
5.2.2	Application tests		N/A
5.2.2.1	General		N/A
	Application tests are accelerated by discharge load, daily period duty cycle, or both. The specified values for load and time intermittency are take the following factors into consideration		N/A
	– discharge efficiency of the battery relative to the application		N/A
	– typical duty cycle use patterns for the application		N/A
	– total time to conduct the test typically not to exceed 30 days		N/A
5.2.2.2	Application tests with multiple loads		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	For application test with multiple loads, the load order during a cycle starts with the heaviest load and move to the lightest load unless otherwise specified		N/A
5.2.3	Service output tests		N/A
	For service output tests, the value of the load resistor are selected such that the service output approximates 30 days		N/A
5.3	Conformance check to a specified minimum average duration		P
	In order to check the conformance of a battery to any discharge tests specified in IEC 60086-2 and 60086-3, the test is carried out		P
5.4	Guidance for considering proposed value of minimum average duration		N/A
5.5	OCV testing		P
	Open-circuit voltage is measured with the voltage measuring equipment specified in 6.8.1		P
5.6	Insulation resistance		N/A
	For batteries with insulating labels, cases or jackets, the resistance between externally exposed surfaces of the battery and either terminal is equal to or greater than 5 MΩ :		N/A
5.7	Battery dimensions		P
	Dimensions are measured with the measuring equipment specified in 6.8.2		P
5.8	Leakage and deformation		N/A
	After the service output has been determined under the specified environmental conditions, the discharge is continued in the same way until the closed circuit voltage drops for the first time below 40 % of the nominal voltage of the battery		N/A
	The requirements of 4.1.3, 4.2.2 and 4.2.3 are met		N/A
6	PERFORMANCE – TEST CONDITIONS		P
6.1	Storage and discharge conditions		P
	Storage before discharge testing and the actual discharge test are carried out under well-defined conditions. Unless otherwise specified, the conditions given in Table 3 are apply :	Discharge condition (only Initial discharge test) was considered in this report.	P
6.2	Commencement of discharge tests after storage	Only Initial discharge test was considered in this report.	N/A
	The period between the completion of storage and the start of a delayed discharge test is not exceed 14 days		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	During this period the batteries are kept at $(20 \pm 2) ^\circ\text{C}$ and $(55 \pm 20 / -40) \% \text{RH}$ (except for P-system batteries where the relative humidity is $(55 \pm 10) \% \text{RH}$)		N/A
	At least one day in these conditions is allowed for normalization before starting a discharge test after storage at high temperature		N/A
6.3	Discharge test conditions		P
6.3.1	General		P
	In order to test a battery it is discharged as specified in IEC 60086-2 or IEC 60086-3 until the voltage on load drops for the first time below the specified end-point		P
6.3.2	Compliance		P
	When IEC 60086-2 or IEC 60086-3 specify service outputs for more than one discharge test, batteries are meet all of these requirements in order to comply with this specification		P
6.4	Load resistance		N/A
	When formulating new tests, the resistive load is, whenever possible, be as shown in Table 4 together with their decimal multiples or sub-multiples		N/A
6.5	Time periods		P
	The periods on-discharge and off-discharge are as specified in IEC 60086-2		P
	When formulating new tests, whenever possible, one of the following daily periods is adopted from Table 5	Not formulating new test.	N/A
	Other cases are specified in IEC 60086-2, if necessary		N/A
6.6	Test condition tolerances		P
	Unless otherwise specified, the tolerances given in Table 6 are apply		P
6.7	Activation of 'P'-system batteries	Not 'P' -system batteries	N/A
	A period of at least 10 min is elapse between activation and the commencement of electrical measurement		N/A
6.8	Measuring equipment		P
6.8.1	Voltage measurement		P
6.8.2	Mechanical measurement		P
7	SAMPLING AND QUALITY ASSURANCE		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The use of production and incoming inspection sampling plans or product quality indices are agreed between the manufacturer and the purchaser		N/A
8	BATTERY PACKAGING		N/A
	A code of practice for battery packaging, shipment, storage, use and disposal can be found in Annex G		N/A
A	ANNEX A (NORMATIVE) CRITERIA FOR THE STANDARDIZATION OF BATTERIES		P
	Batteries and electrochemical systems are meet the following requirements to justify their initial inclusion or ongoing retention in the IEC 60086 series		P
	a) The battery or batteries of this electrochemical system are in mass production		P
	b) The battery or batteries of this electrochemical system are available in several market places of the world		P
	c) Patent items are conform to the requirements contained in 2.14 of the ISO/IEC Directives, Part 1		P
	d) The battery is produced in at least two different countries or, alternatively, if produced in only one country, the battery is purchased by other international and independent battery manufacturers and sold under their company label		P
B	ANNEX B (INFORMATIVE) RECOMMENDATIONS FOR EQUIPMENT DESIGN		N/A
B.1	Technical liaison		N/A
	It is recommended that companies producing battery-powered equipment maintain close liaison with the battery industry. The capabilities of existing batteries are taken into account at design inception. Whenever possible, the battery type selected are one included in IEC 60086-2		N/A
	The equipment is permanently marked with the IEC designation, grade and size of battery which give optimum performance		N/A
B.2	Battery compartment		N/A
B.2.1	General		N/A
	The dimensions and design of compartments and contacts are such that batteries complying with this standard are accepted		N/A
	The design of the negative contact are make allowance for any recess of the battery terminal		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Clearly indicate the type of battery to use, the correct polarity alignment and directions for insertion		N/A
	Use the shape and/or the dimensions of the positive (+) and negative (-) battery terminals in compartment designs to prevent the reverse connection of batteries		N/A
	Positive (+) and negative (-) battery contacts are visibly different in form to avoid confusion when inserting batteries		N/A
	Battery compartments are electrically insulated from the electric circuit and positioned so as to minimize possible damage and/or risk of injury		N/A
	Battery compartments with parallel connections are not recommended since a wrongly placed battery result in charging conditions		N/A
	Equipment designed to be powered by air-depolarized batteries of either the "A" or "P" system are provide for adequate air access		N/A
	When the battery compartment cannot be completely isolated from the equipment, it are positioned so as to minimize possible damage		N/A
	The battery compartment are clearly and permanently marked to show the correct orientation of the batteries		N/A
	Battery compartments are designed so that a reversed battery will result in no electrical circuit		N/A
	The associated circuitry do not make physical contact with any part of the battery except at the surfaces intended for this purpose		N/A
	Designers are strongly advised to refer to IEC 60086-4 and IEC 60086-5 for comprehensive safety considerations		N/A
B.2.2	Limiting access by children		N/A
	Apparatus are designed to prevent children from removing the battery		N/A
B.3	Voltage cut-off		N/A
	The equipment voltage cut-off is not below the battery manufacturers' recommendation		N/A
C	ANNEX C (NORMATIVE) DESIGNATION SYSTEM (NOMENCLATURE)		P
C.1	General		P
C.2	Designation system in use up to October 1990		P
C.2.1	General		P
C.2.2	Cells		P

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
C.2.3	Electrochemical system		P
C.2.4	Batteries		N/A
C.2.5	Modifiers		N/A
C.2.6	Examples		N/A
C.3	Designation system in use since October 1990		N/A
C.3.1	General		N/A
C.3.2	Round batteries		N/A
C.3.3	Non-round batteries		N/A
C.3.4	Ambiguity		N/A
D	ANNEX D (INFORMATIVE) STANDARD DISCHARGE VOLTAGE US – DEFINITION AND METHOD OF DETERMINATION		N/A
D.1	Definition		N/A
D.2	Determination		N/A
D.2.1	General considerations: the C/R-plot		N/A
D.2.2	Determination of the standard discharge resistor Rs		N/A
D.2.3	Determination of the standard discharge capacity Cs and standard discharge time ts		N/A
D.3	Experimental conditions to be observed and test results		N/A
E	ANNEX E (INFORMATIVE) PREPARATION OF STANDARD METHODS OF MEASURING PERFORMANCE (SMMP) OF CONSUMER GOODS		N/A
E.1	General		N/A
E.2	Performance characteristics		N/A
E.3	Criteria for the development of test methods		N/A
F	ANNEX F (INFORMATIVE) GUIDANCE FOR PROPOSING VALUE OF MINIMUM AVERAGE DURATION		N/A
F.1	General		N/A
F.2	Sampling		N/A
F.3	Calculation method		N/A
G	ANNEX G (NORMATIVE) CODE OF PRACTICE FOR PACKAGING, SHIPMENT, STORAGE, USE AND DISPOSAL OF PRIMARY BATTERIES		N/A
G.1	General		N/A
G.2	Packaging		N/A

IEC 60086-1			
Clause	Requirement + Test	Result - Remark	Verdict
G.3	Transport and handling		N/A
G.4	Storage and stock rotation		N/A
G.5	Displays at sales points		N/A
G.6	Selection, use and disposal		N/A
G.6.1	Purchase		N/A
G.6.2	Installation		N/A
G.6.3	Use		N/A
G.6.4	Replacement		N/A
G.6.5	Disposal		N/A
H	ANNEX H (INFORMATIVE) COMPLIANCE CHECKLIST		N/A

IEC 60086-2			
Clause	Requirement + Test	Result - Remark	Verdict

8.1.3 Category 1 – Specifications: LR03

Initial discharge test			P
Lot code / date of manufacture	- / yyyy-mm-dd	/	
Storage conditions / duration	20 ± 5 °C, (55 + 20 / - 40) % RH / ≤ 60 d	/	
Discharge conditions (°C, % RH)	20 ± 2 °C, (55 + 20 / - 40) % RH	/	
Date(s) of performance of tests / period	yyyy-mm-dd / -	/	
OCV max. (V)	1,68	1,630	

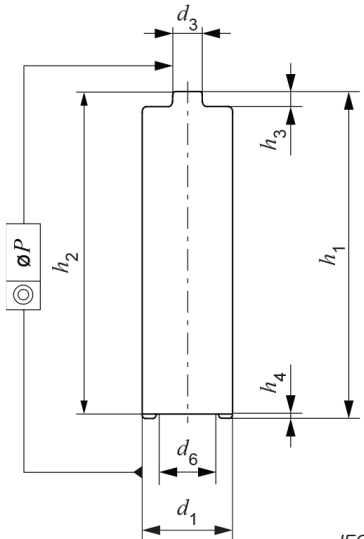
Dimensions (mm)			Initial	After Discharge						
				a)	b)	c)	d)	e)	f)	g)
h ₁	max.	44,5	44,29	-	44,22	44,24	44,25	44,28	-	-
h ₂	min.	43,5	43,94	-	43,95	43,99	43,92	43,97	-	-
h ₃	min.	0,8	1,32	-	1,35	1,33	1,33	1,36	-	-
h ₄	max.	0,5	0,35	-	0,33	0,32	0,33	0,36	-	-
d ₁	max.	10,5	10,38	-	10,33	10,33	10,32	10,37	-	-
	min.	9,8	10,32	-	10,33	10,33	10,32	10,37	-	-
d ₃	max.	3,8	3,35	-	3,36	3,39	3,33	3,40	-	-
d ₆	min.	4,3	5,97	-	5,97	5,94	5,99	5,95	-	-
∅P	max.	0,25	0,201	-	0,212	0,210	0,221	0,212	-	-
Leakage			No	-	No	No	No	No	-	-

Figure 3 – Dimensional drawing: LR03, FR10G445, R03

Applications	Load	Daily Period	EV (V)	MAD ^a (Initial)		Leakage
a) Digital still camera	1 200 mW 650 mW	b	1,05	No Test	-	-
b) Portable lighting	5,1 Ω	4 min on, 56 min off for 8 h per day	0,9	130 min	(See appended table)	No
c) Toy	5,1 Ω	1 h	0,8	120 min	(See appended table)	No
d) Digital audio	50 mA	1 h on, 11 hr off for 24	0,9	12 h	(See appended table)	No

IEC 60086-2						
Clause	Requirement + Test			Result - Remark		Verdict
e) Remote control	24 Ω	15 s per min 8 h per day	1,0	14,5 h	(See appended table)	No
f) Radio	75 Ω	4 h	0,9	No Test	-	-
g) High intensity lighting	400 mW	4 min on, 22 min off 8 h per day	1,0	No Test	-	-
a Standard conditions (see IEC 60086-1, Table 3, Initial discharge test).						
b Repeat 10 times per hour: 1 200 mW for 2 s, then 650 mW for 28 s, then 0 mW for 55 min.						

Delayed discharge test			N/A
Lot code / date of manufacture	- / yyyy-mm-dd		/
Storage conditions / duration	20 $\pm$ 5 $^{\circ}$ C, (55 + 20 / - 40) % RH / = 12 months		/
	45 $\pm$ 2 $^{\circ}$ C, (55 $\pm$ 20) RH % / = 4 weeks (high temperature)		/
Discharge conditions ($^{\circ}$ C, % RH)	20 $\pm$ 2 $^{\circ}$ C, (55 + 20 / - 40) % RH		/
Date(s) of performance of tests / period	yyyy-mm-dd / -		/
OCV max. (V)	1,68		-

 <p>Figure 3 – Dimensional drawing: LR03, FR10G445, R03</p>	Dimensions (mm)			Initial	After Discharge						
					a)	b)	c)	d)	e)	f)	g)
	h 1	max.	44,5	-	-	-	-	-	-	-	-
	h 2	min.	43,5	-	-	-	-	-	-	-	-
	h 3	min.	0,8	-	-	-	-	-	-	-	-
	h 4	max.	0,5	-	-	-	-	-	-	-	-
	d 1	max.	10,5	-	-	-	-	-	-	-	-
		min.	9,8	-	-	-	-	-	-	-	-
	d 3	max.	3,8	-	-	-	-	-	-	-	-
	d 6	min.	4,3	-	-	-	-	-	-	-	-
	ø P	max.	0,25	-	-	-	-	-	-	-	-
	Leakage			-	-	-	-	-	-	-	-

Applications	Load	Daily Period	EV (V)	MAD ^a (Delayed)		Leakage
a) Digital still	1 200 mW	b	1,05	No Test	-	-

IEC 60086-2						
Clause	Requirement + Test			Result - Remark		Verdict
camera	650 mW					
b) Portable lighting	5,1 Ω	4 min on, 56 min off for 8 h per day	0,9	130 min x 90 %	-	-
c) Toy	5,1 Ω	1 h	0,8	120 min x 90 %	-	-
d) Digital audio	50 mA	1 h on, 11 hr off for 24	0,9	12 h x 90 %	-	-
e) Remote control	24 Ω	15 s per min 8 h per day	1,0	14,5 h x 90 %	-	-
f) Radio	75 Ω	4 h	0,9	No Test	-	-
g) High intensity lighting	400 mW	4 min on, 22 min off 8 h per day	1,0	No Test	-	-
a Standard conditions (see IEC 60086-1, Table 3, Initial discharge test).						
b Repeat 10 times per hour: 1 200 mW for 2 s, then 650 mW for 28 s, then 0 mW for 55 min.						

Marking				P
a) Designation, IEC or common	LR03 or AAA	A	P	
b) Expiration of a recommended usage period or year and month or week of manufacture. The year and month or week of manufacture may be in code	09-2025	A	P	
c) Polarity of the positive (+) terminal	+	A	P	
d) Nominal voltage	1,5 V	A	P	
e) Name or trade mark of the manufacturer or supplier	NEW LEADER	A	P	
f) Cautionary advice	See marking for detail.	A	P	
A: shall be marked on the battery				
B: may be marked on the immediate packing instead on the battery				
C: may be marked on the battery, the sealing tab or the immediate packing				
D: may be marked on the sealing tab and/or on the battery				
a Caution for ingestion of swallowable batteries shall be given. Refer to IEC 60086-4 and IEC 60086-5 for details.				

IEC 60086-2			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 8.1.3	Category 4 – Specifications: LR03					P
Condition 1						
Designation (model No.)	Discharge conditions			MAD	Applications	Result
	Load	Daily period	EV (V)			
LR03	5,1 Ω	4 min on, 56 min off for 8 h per day	0,9	130 min	Portable lighting	P
Test data						
Sample No.	Initial discharge duration (min)			Result		
(initial #1)	226,6			Pass		
(initial #2)	234,2			Pass		
(initial #3)	227,7			Pass		
(initial #4)	227,6			Pass		
(initial #5)	227,0			Pass		
(initial #6)	226,4			Pass		
(initial #7)	234,8			Pass		
(initial #8)	234,7			Pass		
Average	229,9			Pass		

TABLE 8.1.3	Category 4 – Specifications: LR03					P
Condition 2						
Designation (model No.)	Discharge conditions			MAD	Applications	Result
	Load	Daily period	EV (V)			
LR03	5,1 Ω	1 h	0,8	120 min	Toy	P
Test data						
Sample No.	Initial discharge duration (min)			Result		
(initial #9)	273,1			Pass		
(initial #10)	273,1			Pass		
(initial #11)	274,1			Pass		
(initial #12)	312,0			Pass		
(initial #13)	273,1			Pass		
(initial #14)	273,1			Pass		
(initial #15)	275,1			Pass		
(initial #16)	273,1			Pass		
Average	278,3			Pass		

IEC 60086-2			
Clause	Requirement + Test	Result - Remark	Verdict

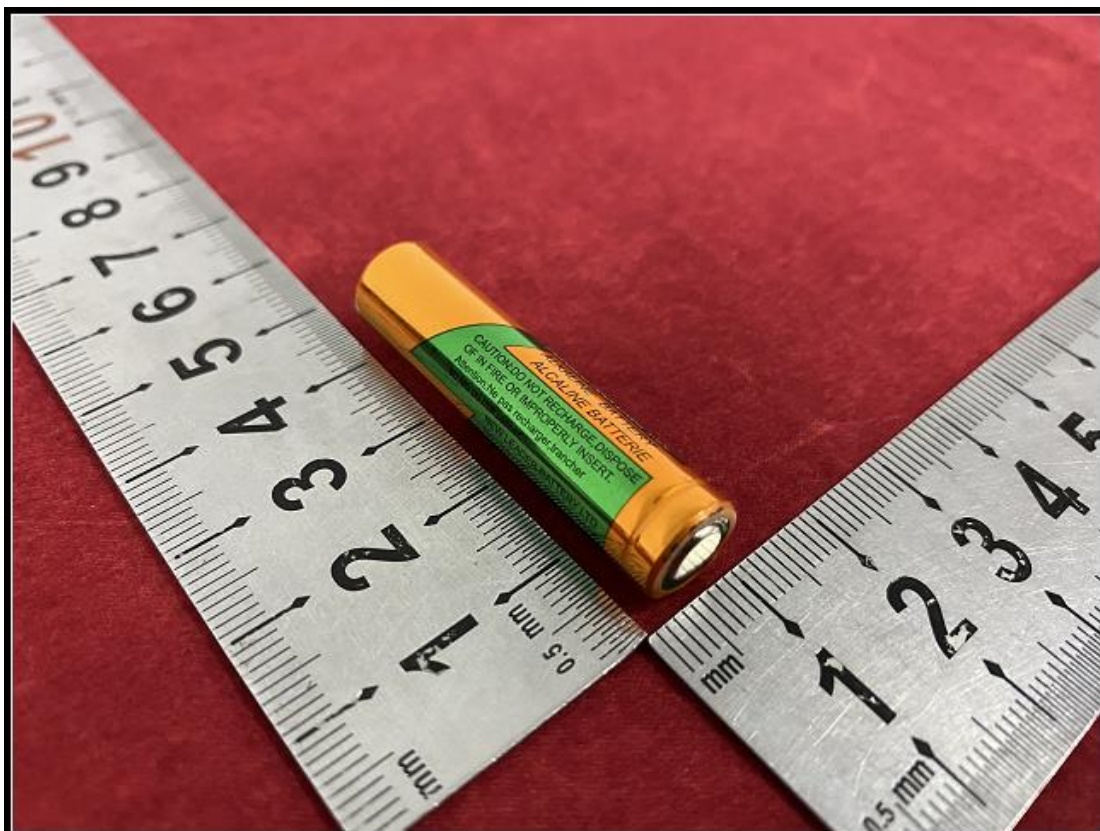
TABLE 8.1.3	Category 4 – Specifications: LR03					P
Condition 3						
Designation (model No.)	Discharge conditions			MAD	Applications	Result
	Load	Daily period	EV (V)			
LR03	50 mA	1 h on, 11 hr off for 24 h	0,9	12 h	Digital audio	P
Test data						
Sample No.	Initial discharge duration (h)			Result		
(initial #17)	22,9			Pass		
(initial #18)	23,0			Pass		
(initial #19)	22,9			Pass		
(initial #20)	22,9			Pass		
(initial #21)	23,0			Pass		
(initial #22)	22,9			Pass		
(initial #23)	23,1			Pass		
(initial #24)	23,0			Pass		
Average	22,9			Pass		

TABLE 8.1.3	Category 4 – Specifications: LR03					P
Condition 4						
Designation (model No.)	Discharge conditions			MAD	Applications	Result
	Load	Daily period	EV (V)			
LR03	24 Ω	15 s per min 8 h per day	1,0	14,5 h	Remote control	P
Test data						
Sample No.	Initial discharge duration (h)			Result		
(initial #25)	19,3			Pass		
(initial #26)	19,5			Pass		
(initial #27)	19,2			Pass		
(initial #28)	19,4			Pass		
(initial #29)	19,5			Pass		
(initial #30)	19,6			Pass		
(initial #31)	19,7			Pass		
(initial #32)	19,5			Pass		
Average	19,4			Pass		

--End report--

Attachment 1 Photo documentation

Whole unit



--- End of Attachment 1 ---