IEC 60086-4

Edition 3.0 2007-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Primary batteries –
Part 4: Safety of lithium batteries

Piles électriques –
Partie 4: Sécurité des piles au lithium

IEC 60086-4:2007

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PRIMARY BATTERIES –

Part 4: Safety of lithium batteries

FOREWORD

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International Standard IEC 60086-4 has been prepared by technical committee 35: Primary cells and batteries.

This third edition cancels and replaces the second edition published in 2000. It is the result of a reformatting initiative aimed at making this part more user-friendly, less ambiguous and, from a cross-reference point of view, fully harmonized with other parts of IEC 60086.

The major technical changes, with regard to the previous edition, concern:

a) Harmonisation with IEC 62281 [11][1]
b) The tests were renumbered and partly revised or deleted. One test (F: Impact) was added for compliance with IEC 62281. The table shows the old and new test numbers as well as tests that were added. The test number in brackets indicates major changes of the test procedure.

[1] Figures in square brackets refer to the Bibliography.

Old	New	Test designation
C-3	A	Altitude
(C-1)	B	Thermal cycling
B-1	C	Vibration
B-2	D	Shock
D-1	E	External short circuit
	F	Impact
E-2	G	Crush
	H	Forced discharge
D-4	I	Abnormal charging
E-1	J	Free fall
F-1	K	Thermal abuse
D-3	L	Incorrect installation
D-6	M	Overdischarge

The text of this standard is based on the following documents:

CDV	Report on voting
35/1240/CDV	35/1250/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60086 series, under the general title *Primary batteries*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

The concept of safety is closely related to safeguarding the integrity of people and property. This standard specifies tests and requirements for lithium batteries and has been prepared in accordance with ISO/IEC guidelines, taking into account all relevant national and international standards which apply.

Lithium batteries are different from conventional primary batteries using aqueous electrolyte in that they contain flammable materials.

Consequently, it is important to carefully consider safety during design, production, distribution, use, and disposal of lithium batteries. Based on such special characteristics, lithium batteries for consumer applications were initially small in size and had low power output. There were also lithium batteries with high power output which were used for special industrial and military applications and were characterized as being “technician replaceable”. The first edition of this standard was drafted to accommodate this situation.

However, from around the end of the 1980s, lithium batteries with high power output started to be widely used in the consumer replacement market, mainly as a power source in camera applications. Since the demand for such lithium batteries with high power output significantly increased, various manufacturers started to produce these types of lithium batteries. As a consequence of this situation, the safety aspects for lithium batteries with high power output were included in the second edition of this standard.

The major target of the third edition of this standard was to harmonize it with the transport tests for lithium batteries that were published in IEC 62281 [11].

Guidelines addressing safety issues during the design of lithium batteries are provided in Annex A. Annex B provides guidelines addressing safety issues during the design of equipment where lithium batteries are installed. Both Annex A and B reflect experience with lithium batteries used in camera applications and are based on document[18] of the bibliography.

Safety is freedom from unacceptable risk. There can be no absolute safety: some risk will remain. Therefore a product, process or service can only be relatively safe. Safety is achieved by reducing risk to a tolerable level determined by the search for an optimal balance between the ideal of absolute safety and the demands to be met by a product, process or service, and factors such as benefit to the user, suitability for purpose, cost effectiveness, and conventions of the society concerned.

As safety will pose different problems, it is impossible to provide a set of precise provisions and recommendations that will apply in every case. However, this standard, when followed on a judicious “use when applicable” basis, will provide reasonably consistent standards for safety.