



## European Commission DG ENV

Establishing harmonised methods to determine the capacity of all portable and automotive batteries and rules for the use of a label indicating the capacity of these batteries

[TENDER NO. ENV.G.A/ETU/2007/0080r]

**Questionnaire to Manufacturers**

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## 1. INTRODUCTION

### 1.1. OBJECTIVES OF THE QUESTIONNAIRE

This document provides a brief background to a study on **Battery Capacity Labelling** conducted for the European Commission. It also contains a list of questions to supplement our understanding and additional data request.

In particular, we are seeking information from you on the following aspects:

- **Capacity of batteries and existing capacity measurement methods:** to understand what exactly is defined as “battery capacity” and to collect data on existing harmonised methods to measure battery capacity. The objective is also to identify the common practice measurement methods used by the industry.
- **Parameters influencing capacity:** to identify potential barriers when trying to define harmonised capacity measurement methods for batteries and the challenges represented by the definition of a capacity label
- **Use of a Label:** to identify the possible labelling options that might already exist or that could be proposed

### 1.2. BACKGROUND

Directive 2006/66/EC, covering batteries and accumulators and waste batteries and accumulators aims at minimising the negative impacts of batteries and accumulators on the environment, and also at harmonising requirements for the smooth functioning of the internal market. The main features of this Directive are, placing batteries on the market, end of life, end-user information, and product-specific information (labelling requirements). For further details on the Directive, please visit the European Commission’s website:

<http://ec.europa.eu/environment/waste/batteries/index.htm>

By 26 September 2009, the capacity of all portable and automotive batteries will have to be labelled on them (article 21). The Commission is striving to ensure that clear and transparent information be provided and that end-users be informed about the capacity of the batteries at the time of their purchase. Detailed rules, including harmonised capacity determination methods, will be decided latest by 26 March 2009. **This issue is the focus of the study and of the present questionnaire.**

The objective of this study on Battery Capacity Labelling is to set out harmonised methods to determine the capacity of batteries and accumulators and to suggest options for a label (capacity label). It constitutes the first step in considering which labelling requirements could be set for the batteries and accumulators covered by this Directive.

## 2. COMPANY AND PRODUCTS

### 2.1. CONTACT DETAILS

- Organisation RECHARGE aisbl
- Name Wiaux Jean Pol
- Position/Department General Manager
- Telephone + 32 2 777 05 60 & + 41 79 689 32 19
- E-mail jpwiaux@rechargebatteries.org

## 2.2. ACTIVITY

What type of batteries do you manufacture?

- Primary batteries
- Single cell secondary batteries (rechargeable)
- Pack rechargeable batteries
- Automotive batteries

You may provide more details here (also see section 2.4. )

Box 1

The Association Membership is made of rechargeable batteries manufacturers and Original Equipment Manufacturers incorporating rechargeable batteries and packs batteries in their equipment.

## 2.3. CONFIDENTIALITY

Please state explicitly if you prefer to provide some information only under terms of confidentiality.

Confidential data: Yes  No

**Note:** We ensure complete confidentiality; however, it is also possible to sign a non-disclosure agreement (NDA). Please do not hesitate to contact us for such an agreement.

## 2.4. TYPE OF PRODUCTS

Kindly provide the list of batteries/accumulator you manufacture

IEA Product designation (e.g. IEC-LR14)	Product category description (cylindrical primary battery, primary button cell battery, automotive battery, etc.)	Number of models in this category
_____	<u>Individual cells placed on the market including standard sizes (AAA,AA,C,D,etc...) and others such as button cells, prismatic and non standard cylindrical cells.</u>	_____
_____	<u>Power Packs placed on the market have an infinite variety of shape and sizes depending of their final application : laptops, mobile phones, cordless tools, video and digital cameras, etc</u>	_____
_____	_____	_____
_____	_____	_____

_____	_____	_____
_____	_____	_____

### 3. CAPACITY OF BATTERIES AND EXISTING MEASUREMENT METHODS

- Do you measure the capacity of the different batteries you produce (through sample)?
  - a)  Yes, for some categories of products (*please specify which and explain why*)
  - b)  Yes, for all categories of products manufactured
  - c)  No (*please explain why (e.g. no measurement method available)*)

Box 2

For rechargeable batteries and battery packs, the specification is usually fixed by the original equipment manufacturer (OEM) and the battery technical characteristics respond to the OEM's specifications.

The data can also be used as information for replacement parts together with serial number.

**If answered Yes, please also answer the 4 following questions:**

- What type of capacity measurement method(s) do you use?
  - a)  IEC standard (*please specify below*)
  - b)  In-house measurement methods (*please specify below*)
  - c)  Other method (*please specify below*)

Please provide further details on the capacity measurement method used here:

Box 3

The following international standards exist for the evaluation of the capacity of a cell.

Nickel-Cadmium : prismatic, cylindrical and button cells

IEC Standard N° 61951- IEC 2003 & A 1. 2005

Nickel-Metal Hydride : cylindrical and button cells

IEC Standard N° 61951-2 – IEC 2003

Lithium-Ion : single cell and cells assembly in a battery

IEC Standard N° 61960 –IEC 2003

A copy is supplied in Annex 1, where the standard test procedures are described.

The Rechargeable Battery Industry wants to maintain those international standards which are specific to rechargeable batteries and recognized on an international basis.

- In what format do you express the capacity of your batteries? (e.g. mAh, hours of service per type of application, number of energy pulses (e.g. photo flash), cranking cold amperes for automotive batteries, colour code, etc.)

Box 4

In general, the information is supplied in mAh and sometimes together with the (pack) voltage. For certain categories of products, the run time is used as communication tool.

- Do you use the same format for all battery types you produce?

Box 5

In most applications (portable appliances) it is rated in mAh.

- Do you provide information to customers on the capacity of the batteries you produce?
  - a)  Yes, for some types of products (*please specify below*)
  - b)  Yes, for all types of products
  - c)  No (*please explain why*)

Box 6

Digital CAmeras (Still & movie), Audio Equipment, Personal Digital Assistant, Cordless phones, Mobile phones, Cordless Tools, LapTops ,...

**If answered Yes, please also answer the 3 following question**

- What type of capacity measurement method(s) do you use?
  - a)  IEC standard (*please specify below*)
  - b)  In-house measurement methods (*please specify below*)
  - c)  Other method (*please specify below*)

Please provide further details on the capacity measurement method used here (if different than in Box 3):

Box 7

As mentioned in Box 3 above

- In what format do you express the capacity of your batteries when you communicate to your customers? (e.g. mAh, hours of service per type of application, number of energy pulses (e.g. photo flash), cranking cold amperes for automotive batteries, colour code, etc.) (if different than in Box 5)?

Box 8

- Do you use the same format for all types of batteries when communicating capacity data to your customers?

Box 9

See Box 4. In most applications (portable appliances) it is rated in mAh. For certain categories of products, the run time is used as communication tool..

- Do you use any other parameter, other than battery capacity, for providing battery-performance information?
  - Yes
  - No

Please comment your answer.

Box 10

See last slide of attached ppt presentation in Annex 2.

- Have you identified types of batteries for which normalised capacity measurement methods are currently not available? What type of measurement methods do you use for these batteries? (e.g. in house measurement methods)

Box 11

For certain categories of rechargeable batteries, other parameters than capacity are more appropriate and useful to end user such as : run time, self-discharge, cycling performances....

Pictograms to indicate the type/range of applications where a cell could be used while delivering its best performances is also an appropriate communication tool.

- Please provide any additional comment you may have related to battery capacity. Also, do not hesitate to send us technical datasheets, or any other material you may

think could be useful for our study (e.g. in house measurement methods) (see contact details at the end of the questionnaire).

Box 12

List of criteria for “Capacity Marking”.

1. The criteria for capacity marking should correspond to internationally adopted standards (Typically IEC standards).
2. The criteria should be applicable to and representative of a specific range of applications for a given battery size and chemistry. In other words, there is not a single capacity value (number) for one given battery size.
3. The mark indicated on the battery/pack should be informative to ensure its appropriate use.
4. The correspondence between the declared (and labelled) capacity and the achieved technical performance should be controllable and enforceable.

Annex II gives also some illustrative explanation about the potential misleading information supplied by a single number for rating the capacity of a given battery.

- For some types of batteries (e.g. primary batteries) more than one single test method is defined to measure the capacity. However, the labelling requirements from the battery directive state the need for identifying harmonised capacity determination methods. The capacity data provided by these harmonised methods should give useful and comparable information for consumers when purchasing batteries.

If you had to choose one specific test among existing methods for each sub category of batteries (for which more than one single test method currently exists), which one would you suggest as being the most relevant when testing the battery's performance? (e.g. for primary batteries: one suggestion could be to test the performance of all primary batteries with a discharge rate corresponding to “medium” discharge conditions, i.e. to test it for a remote control)).

Please comment your answer and specify for which type of battery you provide information (e.g. primary batteries designed for one specific application (i.e. button cells), non specific primary and rechargeable batteries, rechargeable pack batteries, etc.)

Box 13

See attachments on IEC standards referred to in Box 3

On the contrary, do you think that there are no normalised test methods currently available to provide the basis to define such harmonised methods?

Box 14

The following question is specific to general purpose batteries. Please answer this question if you are a manufacturer of such batteries.

- Do you provide information to help the customer to better select a battery according to its application?

Yes

No

If answered Yes,

Please describe the format in which you provide the information (e.g. pictogram, mAh, etc.):

Box 15

See Annex II to this document.

#### 4. PARAMETERS INFLUENCING CAPACITY

The actual delivered capacity of a battery is dependent on several factors: load of the device it is used for (drain rate), operating temperature, cut off voltage, frequency of use, and length of time during which the device is used.

Standards allow setting test conditions in which the operating temperature, the frequency of use and the time of use can be defined. Moreover, in the case of batteries designed for a specific application (e.g. button cells) service output standards allow to assess a meaningful rated capacity. In the case of pack batteries, and lithium based designs which are also application-specific batteries, independent testing programs can be defined to provide meaningful rated capacity data. However, for some other types of batteries (e.g. general purpose primary batteries) the service variability due to changing equipments and devices may make it difficult to provide single capacity information.

Preliminary research shows that this variation of the capacity depending on the end use device is more or less significant regarding the type of battery:

- For primary saline batteries the variation of the capacity in mAh depending on the end use device is "high"
- For primary alkaline and rechargeable batteries, this variation is less important (about 600 mAh for alkaline batteries, when excluding high drain devices such as photo flash)
- Do you agree with these two statements? Please comment your answer and provide capacity variability ranges if possible. Also, we would greatly appreciate if you could send us some data to illustrate this phenomenon.

Box 16

No comment

For a single **alkaline/saline primary battery**, the IEC 60086 standard defines several end use applications for which the capacity is measured.

- When comparing two primary batteries of the same size and same electrochemical composition (e.g. two LR6 batteries “A” and “B”) and excluding high drain devices (e.g. photo flash), can we consider that, if battery “A” has a higher measured capacity in one device compared to battery “B”, then battery “A” will have a higher measured capacity in all other devices compared to battery “B”; or can we consider that no direct conclusion can be drawn as the capacity variability depending on the end use device could reverse the ranking in some cases?

Please comment your answer (specify for which type of battery saline or alkaline, you provide data for). We would greatly appreciate if you could send us some data to illustrate your answer.

Box 17

No comment

Some manufacturers of batteries (e.g. general purpose primary batteries) provide performance information by specifying a list of the most adapted devices on their packaging.

- Do you think this provides a good indication on the capacity of a battery?

Box 18

Certainly pictograms help consumers choice when selecting a rechargeable battery. They avoid unfair competition created by a "printed number" that cannot be neither fully understood nor controlled by the end-user....

- The common measurement methods used provide a quantification of the rated capacity of a battery under set conditions. Is there generally a significant variation between the rated capacity of a battery and the delivered capacity of this same battery? Please comment your answer.

Box 19

Indeed a battery of a given size and a given chemistry will deliver a wide range of capacity depending of the application where it is used.

- Do you think the existing normalised measurement methods provide a good basis for the comparison of products in terms of capacity? I.e. some measurement methods might provide a rated capacity that is not meaningful of the delivered capacity, however, the rated capacity data provided might still be useful to compare Battery “A” with Battery ”B”. Please comment your answer.

Box 20

For rechargeable battery packs, the specification is usually fixed by the equipment manufacturer and the battery supplied responds to the OEM's specifications.  
The current IEC standards for individual should be maintained as they have received an international acceptance.

Any new type of European Standard different from the current IEC standard would put the EU Exporting Industry in a critical commercial position as its products could not be compared with others on an harmonized basis.

## 5. USE OF A LABEL

According to the Directive, by 26 September 2009, the capacity of all portable and automotive batteries will have to be labelled on them.

- Have you already taken action to provide the most appropriate capacity-related information to your customers?

Yes

No

**If answered Yes**, please describe your approach (e.g. data is marked on the battery, on the packaging, on a website, the data is expressed as rated capacity measured in mAh, data is available through technical sheets, etc.)

Box 21

RECHARGE would like to bring to the Consultant the following request for exemptions to the capacity labelling requirements:

3.1. Exemption for incorporated and embedded rechargeable button cells and memory back-up batteries.

An exemption to the application of the capacity marking is requested for rechargeable button cells and memory back-up batteries and batteries packs when those batteries/packs are supplied incorporated in equipment and/or are embedded in the equipment.

For certain system-critical purposes such as memory backup, products have been designed so that “embedded” small batteries or button cells are inaccessible to the end-user. Here, access to the pack or cell is meant only for qualified service personnel. These systems can be identified by statements in the user manual and/or by the obvious need for a specialized tool to gain access to the pack or cell. These tools are generally not available and are not made available by the vendor to the end user. For these reasons, producers should be exempted from the labeling requirement for embedded batteries.

When rechargeable button cells or memory back-up batteries are sold individually, the capacity marking should be printed on the packaging/blister.

Justification.

The end user has not access to a memory back-up battery installed on a printed circuit board.

In other cases, the size of the button cell does not allow the printing/engraving of the capacity on the cell external structure.

It is advisable to have a general rule requiring the printing on the packaging only when those cells are sold on the consumer market.

### 3.2. The case of marking requirements for battery packs.

The capacity data for power pack applies to the cells assembly and not on individual cells. Marking applies accordingly on the external of the pack casing and not on each individual cell.

### 3.3. The case of incorporated batteries with a longer life than the equipment.

In this case, an exemption to the capacity marking is required as the end-user will not have an opportunity to replace the battery.

Please provide any additional comments you may have on the issue of battery capacity labelling

Box 22

#### 1. Annex 1 IEC Capacity Standards

2. Annex 2 Illustration of capacity marking for incorporated rechargeable packs and of pictograms indicating the recommended use for a rechargeable battery.

#### 3. ADDITIONAL COMMENT and WARNING.

Compliance and enforcement of capacity marking.

Should the Commission recommend a marking of the capacity for a battery, it is more than appropriate to remind the Commission that this will be a legally binding requirement.

This requires a careful control of the implementation of the marking requirements, not only at a visual level (appropriate labelling/markings) but also at the technical level (conformity between the labelled capacity and the delivered capacity).

This conformity will require a kind of control mechanism that batteries placed on the market are delivering the capacity shown by the producer.

Failure to respect such conformity would expose manufacturers/importers to penalties.

There should be a set of basic criteria that should be respected if any specific proposal is recommended by the Consultant to the Commission. Such criteria are listed below.

List of criteria for "Capacity Marking".

1. The criteria for capacity marking should correspond to internationally adopted standards (Typically IEC standards).
2. The criteria should be applicable to and representative of a specific range of applications for a given battery size and chemistry. In other words, there is not a single capacity value for one given battery size.
3. The correspondence between the declared (and labelled) capacity and the achieved technical performance should be controllable and enforceable.
4. The marked value should be informative to ensure its appropriate use.

This in turn raises several questions:

#### A: CONTROL.

1. What will be the National Authority in charge of controlling the correspondence between the "printed" marking and the effective capacity delivered by the battery?
2. What will be the sampling procedure adopted in all Member States (number of units, standard test protocols,...)?

#### B. ENFORCEMENT.

3. Who will be the enforcement body?
4. What will be the power of the enforcement body.

When a product is placed on the market and has to be re-called, the chances of a significant return are low. Ideally, conformity tests should be performed before the placing the battery on the market...but this is probably not feasible! It can only be performed by individual producers.

An alternative would be the development by industry of a "Quality Certificate" that would be used as an internal industry standard by all manufacturers.

The Quality Certificate would be represented by a label that could be controlled and that would ensure to the end user the purchase of a product in conformity with the standard.

Thank you for spending your precious time to provide this useful information. We are at your disposition for any clarification and information.

**Kindly send you response to BIO Intelligence Service by February 8th, 2008**  
**Please send to Ms. Sanaée Iyama at [sanaee.iyama@biois.com](mailto:sanaee.iyama@biois.com) or by fax**  
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