

# BATSO Technical Committee



## *Status, Challenge, Outlook (Basics)*

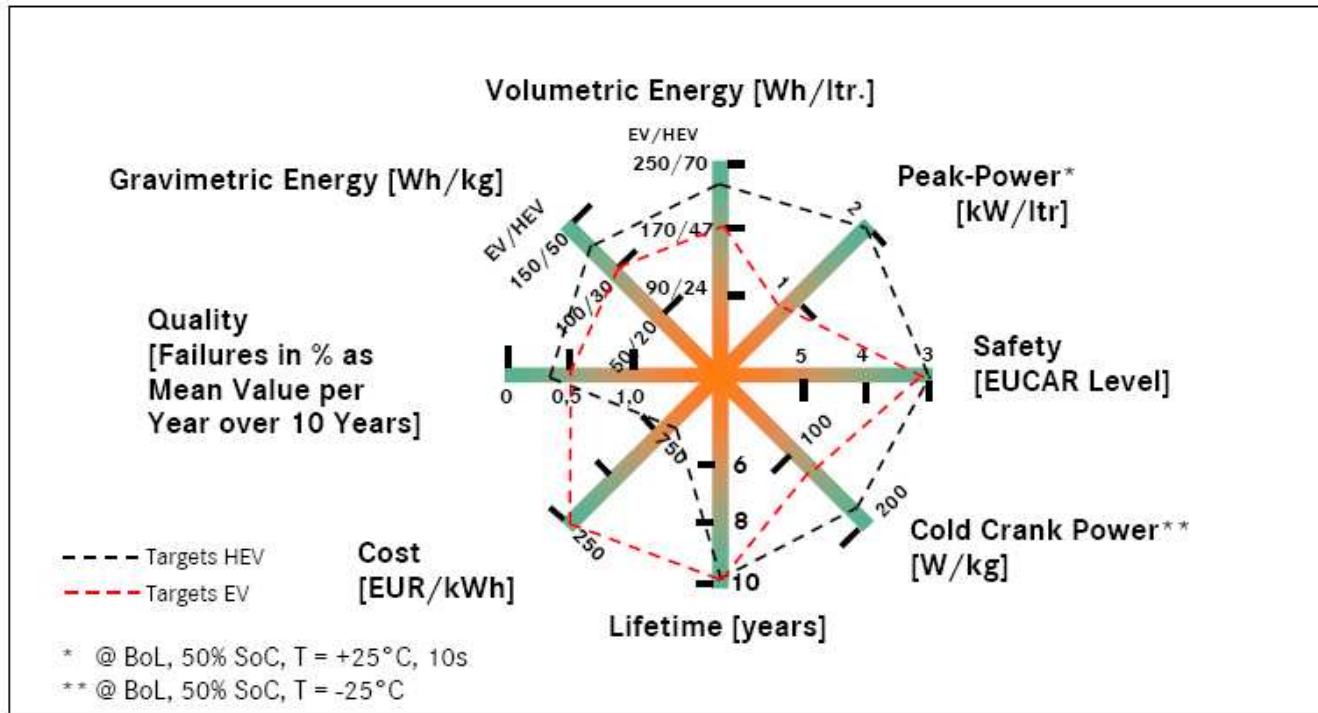
*by Tim Schäfer / Li-Tec Battery (Germany)\_ws Lithium Ion*

March 6th, 2012 TD HiTech Energy Inc.,  
Taipei City, Taiwan, R.O.C.



# 2<sup>nd</sup> edition of BATSO 01

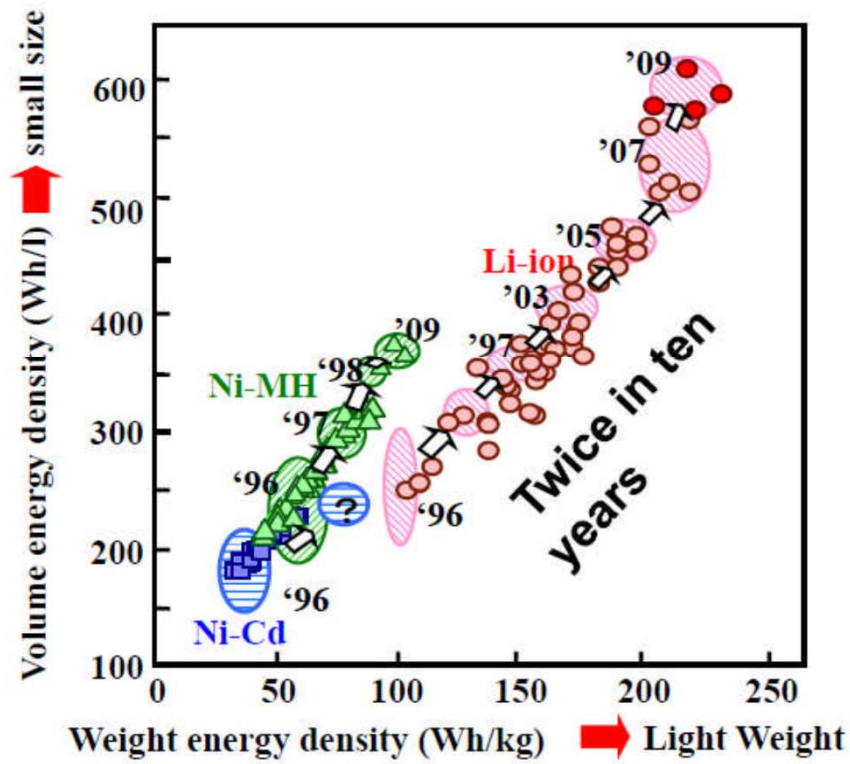
During development of HEV/EV batteries 8 requirements has to be fulfilled.



Requirements for (H)EV Batteries; Source: Daimler AG, 2011, Dr. A. Lamm

## 2<sup>nd</sup> edition of BATSO 01

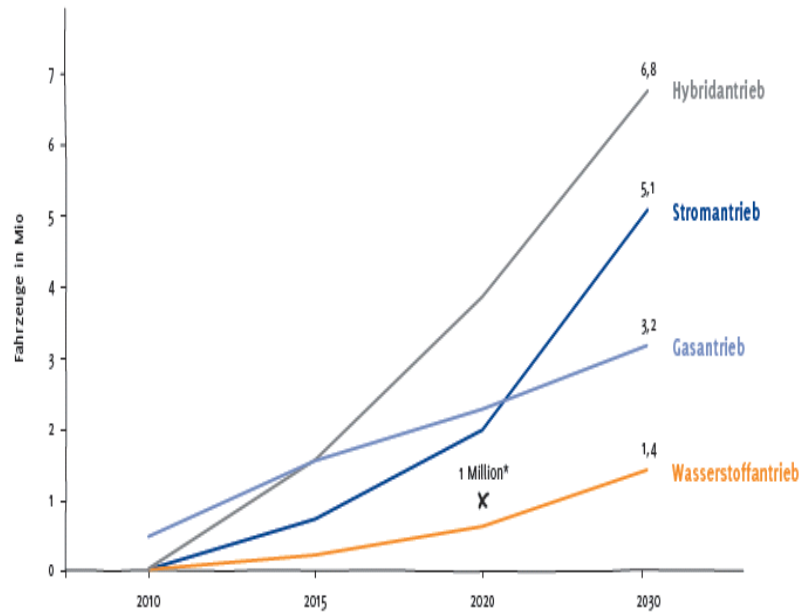
The change of battery performances during the past 10 years



Source: Yari „Twice in ten years“ Li-Ion Batteries

# 2<sup>nd</sup> edition of BATSO 01

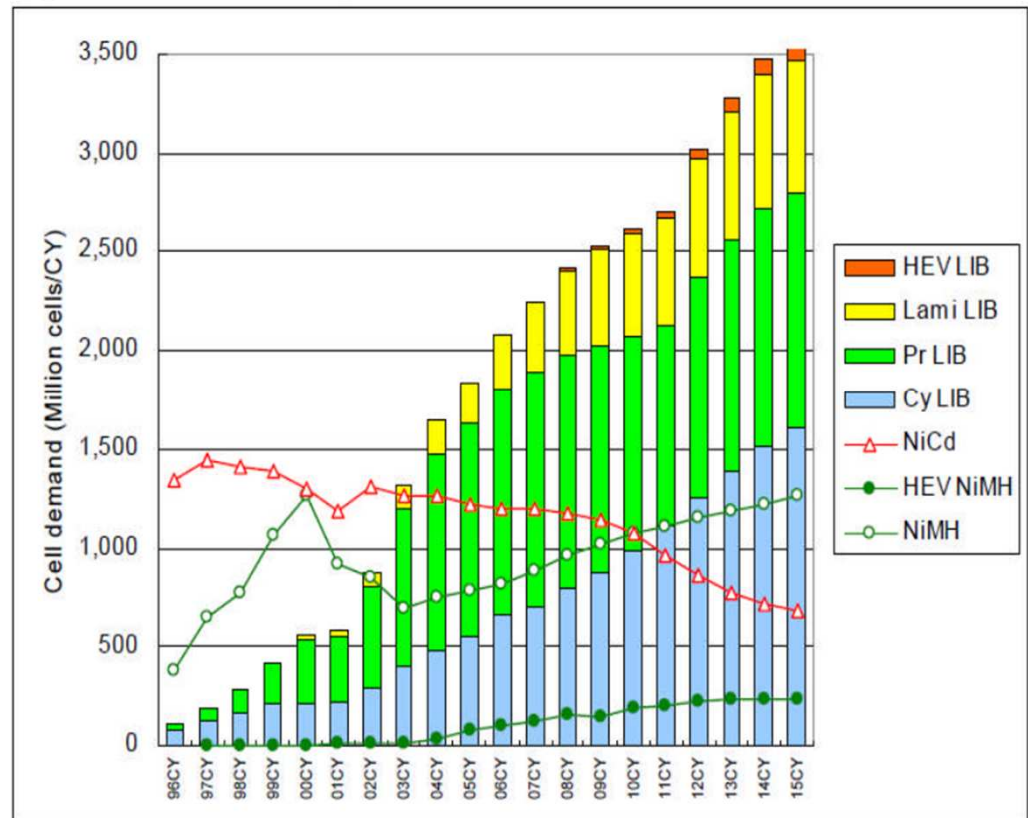
Electromobility is booming faster!



N = 236; \*Anzahl der E-Mobile 2020: Ziel der Bundesregierung

Abbildung 3: Entwicklung der alternativen Fahrzeugantriebe in Deutschland

(a) LIBとNiMH/NiCdの比較



Source: YARI, EBS 2012



## 2<sup>nd</sup> edition of BATSO 01

### Introduction

Safety is a Key Feature

Sony Recalls Notebook Computer Batteries Due to Previous Fires



# BATSO – Testing and certification of Ion- batteries

## A new industrial standard: BATSO 01

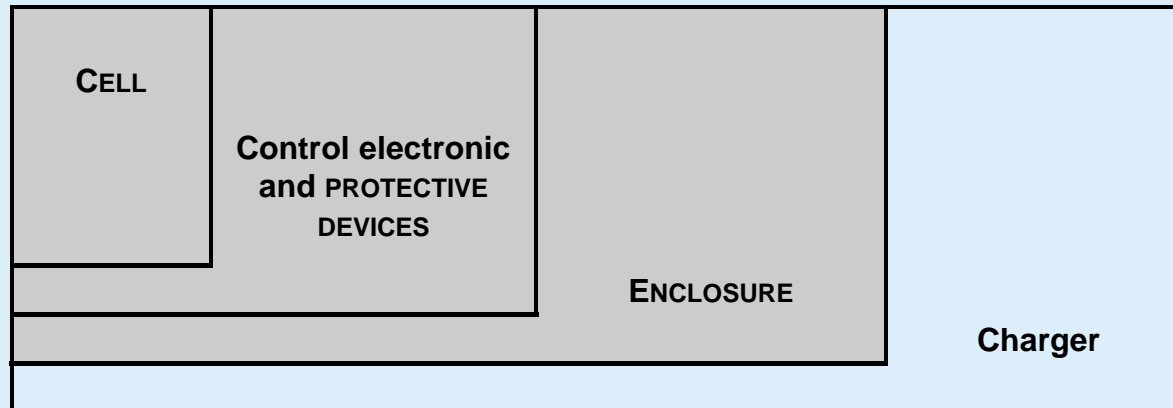
- Test methods and requirements for secondary lithium batteries for the safe use in Light Electric Vehicles (LEV), such as:
  - Electric bicycles or Pedelecs
  - Electric scooters
  - Electric wheelchairs
- Transport safety tests are specified in addition corresponding to requirements outlined in a United Nations Test Manual for the transport of dangerous goods.
- Performance and functional characteristics of batteries are not covered.



## The goal of BATSO

Is to increase safety of existing and new battery technologies.

Testing methods of this manual will support a economic way of battery testing. The BATSO test seal will help all parties involved in the Light Electric Vehicle business to find and utilize safer batteries.



# BATS0 01

## Second edition

### 2011-03



Tim Schäfer TC Chairman BATS0

[www.batso.org](http://www.batso.org)

Manual for Evaluation of Energy Systems  
for Light Electric Vehicle (LEV)  
– Secondary Lithium Batteries



## 2<sup>nd</sup> edition of BATSO 01

### Important dates

Publication of 2<sup>nd</sup> edition: March 2011

Availability for certification: March 2011


Expiry of 1<sup>st</sup> edition: February 2012 \*

\* Acceptance of UN-T 4<sup>th</sup> edition (basis for 1<sup>st</sup> edition of BATSO 01) depends on local authorities!


# BATSO – Testing and certification of LEV batteries

## Documentation


- **BATSO test report (including photo documentation and test results)**

 Test Report issued under the responsibility of:

<b>TEST REPORT</b> BATSO 01 (1 <sup>st</sup> Edition) Manual for Evaluation of Energy Systems for Light Electric Vehicle (LEV) – Secondary Lithium Batteries	
Report Reference No. ....:	
Date of issue .....	
Total number of pages .....	
BATSO Testing Laboratory .....	
Address .....	
Applicant's name .....	
Address .....	
<b>Test specification:</b>	
Standard .....	BATSO 01: 2008 (1 <sup>st</sup> Edition)
Test Report Form No. ....:	BATSO 01_1A
Test Report Form(s) Originator .....	TÜV Rheinland
Master TRF .....	Dated 2008-08-28
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<small>This publication may be reproduced in whole or in part for non-commercial purposes as long as BATSO Organisation is acknowledged as copyright owner and source of the material. BATSO Organisation takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.</small>	
<b>This report is not valid as a BATSO Test Report unless signed by an approved BATSO Testing Laboratory and appended to a BATSO Test Certificate issued by a BATSO Certification Body.</b>	
Test item description .....	
Trade Mark .....	
Manufacturer .....	
Model/Type reference .....	
Ratings .....	

<b>ATTACHMENT</b>	<b>Photo Documentation</b>	
Page 1 of 7		Report No.:
Part 1: Photos of representative sample(s) – Before testing		

<b>ATTACHMENT</b>	<b>Test Records</b>	
Page 1 of 8		Report No.:
Part 1: Temperature chart of subclause 5.1.1a) – (record with maximum readings)		

## ■ Future concept of technical work in BATSO

New structure of BATSO 01:2011 into a general part, application parts and a certification part is recommended:

**Part 1: General Requirements : Basic Testing Guideline for secondary batteries**

**Part 2: Requirement& Measurements for Applications**

**2.1 batteries in building applications (solar buffer etc.)**

In order to enable a long-term and sustainable energy supply based on renewable energies, efficient & safe storage-technologies are a key function.

**2.2 batteries in HV(LEV)**

**2.3 batteries in light electric vehicle application (E-Bike, Pedelec)**

**2.4...**

**Part 3: Certification & Labeling**

## 2<sup>nd</sup> edition of BATSO 01

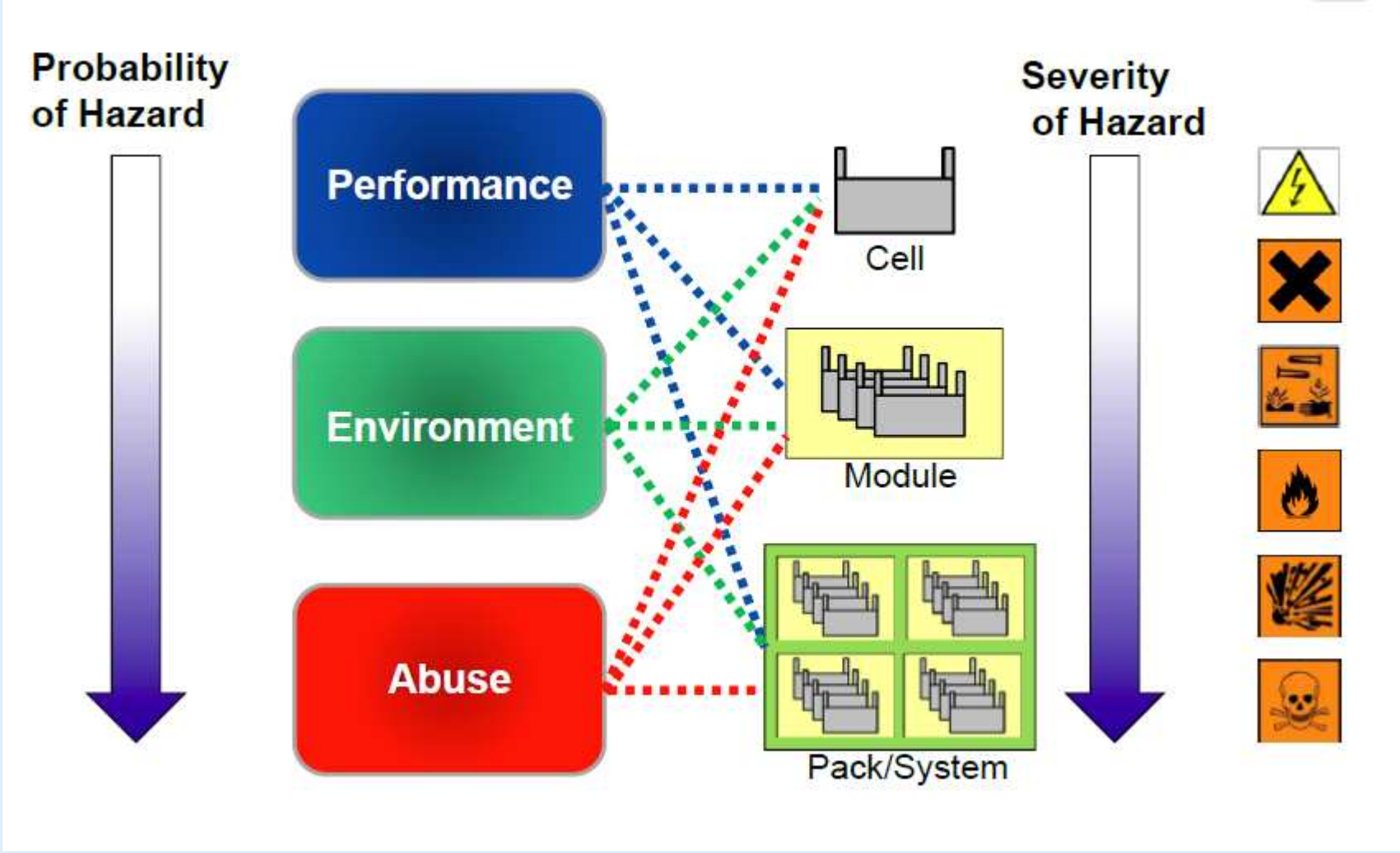
### Requirements Standards for Safe Systems

**Definition of safety (IEC61508, ISO26262):**

Absence of unreasonable risk due to hazards caused by malfunctioning behavior of E/E systems

Source: IEC, ISO

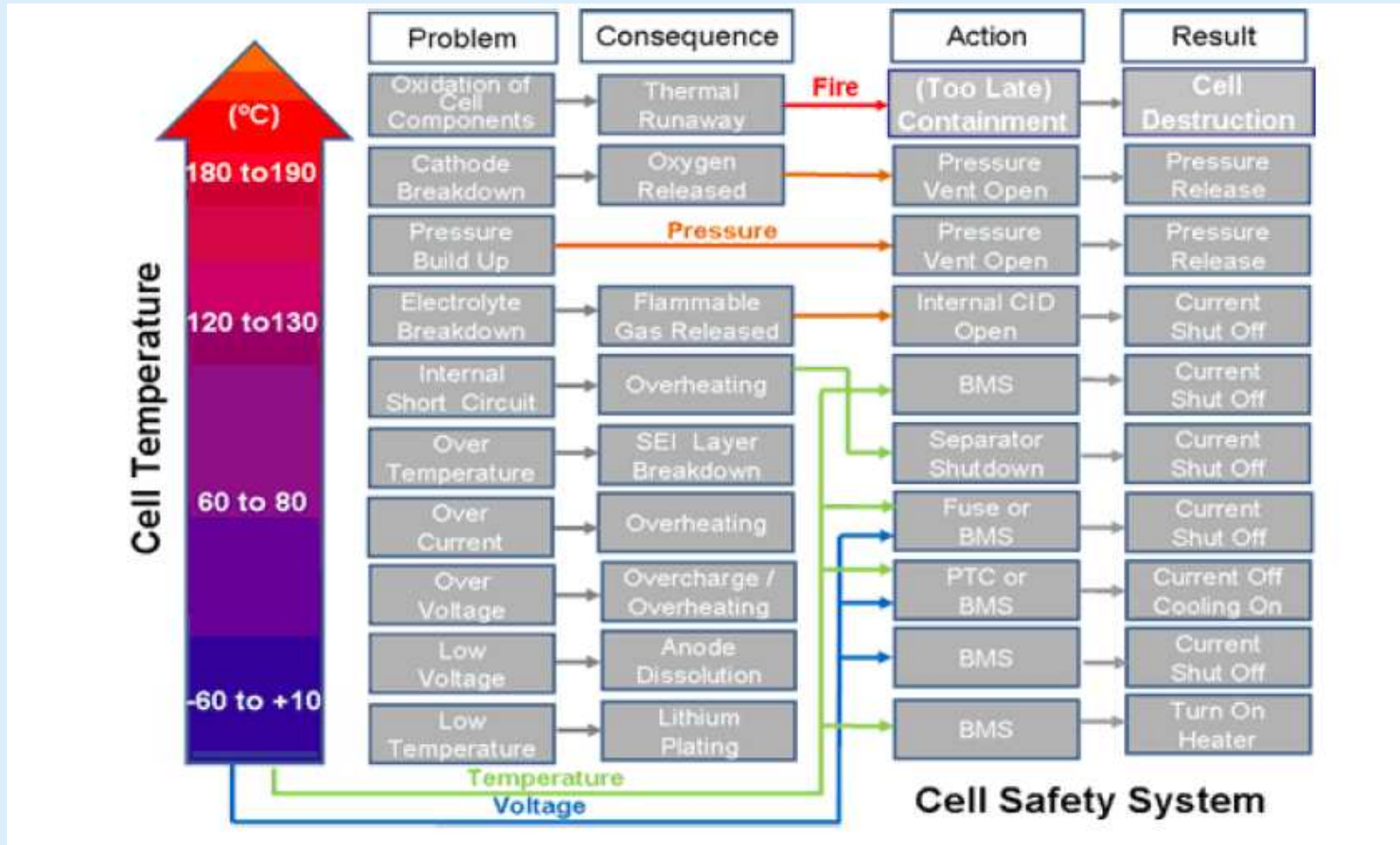
# Future concept of technical work in BATSO



Source: rep. /Battery Safety Conference



# Future concept of technical work in BATSO



Source: Ineris Study 2011 (Report of Prof. J . Garche)



## ■ Selected other basic requirements & distinction

<p>Pedelec: im Sinne 2002/24/EG Art. 1.1.h</p>		<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> 2006/95 (LVD &gt; 75VDC)</li> <li><input checked="" type="checkbox"/> 2002/24 (Zweiräder)</li> <li><input checked="" type="checkbox"/> 1999/5/EC (R&amp;TTE)</li> <li><input checked="" type="checkbox"/> 2004/108 (EMV)</li> <li><input type="checkbox"/> 2006/42 (Maschinen)</li> <li><input checked="" type="checkbox"/> ProdHaftG</li> <li><input checked="" type="checkbox"/> GPSG</li> </ul>	<ul style="list-style-type: none"> <li>- ECE R-100 (KBA)</li> <li>- DIN EN 15194</li> </ul>
<p>Elektro- zweiräder: im Sinne 2002/24/EG Art. 1.1.</p>		<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> 2006/95 (LVD &gt; 75VDC)</li> <li><input checked="" type="checkbox"/> 2002/24 (Zweiräder)</li> <li><input checked="" type="checkbox"/> 1999/5/EC (R&amp;TTE)</li> <li><input checked="" type="checkbox"/> 97/24 Kap. 8 (EMV)</li> <li><input type="checkbox"/> 2006/42 (Maschinen)</li> <li><input checked="" type="checkbox"/> ProdHaftG</li> <li><input checked="" type="checkbox"/> GPSG</li> </ul>	<ul style="list-style-type: none"> <li>- ECE R-100 (KBA)</li> </ul>

# Future concept of technical work in BATSO

## What is acceptable?

- **Electrical Safety**

Overcharge  
Nail Penetration  
Short Circuit  
....

- **Mechanical Safety**

Vibration / Shock  
Crush / Drop  
....

- **Thermal/Environmental Safety**

Thermal Cycling  
Thermal Shock Cycling  
Humidity / Dewing  
Altitude Simulation  
Chemical Safety  
....

- **Functional Safety**

....



## Evaluation?



EUCAR 0



EUCAR 1



EUCAR 2



EUCAR 3



>= EUCAR 4



# Future concept of technical work in BATSO

**INTERNATIONAL STANDARD** **ISO 16750-1**

Second edition  
2006-09-01

**Road vehicles — Environmental conditions and testing for electrical and electronic equipment —**  
**Part 1:**  
**General**

*Véhicules routiers — Spécifications d'environnement et essais de*

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**38.3 Lithium metal and lithium ion batteries**

**38.3.1 Purpose**

This section presents the procedures to be followed for the classification of lithium metal and lithium ion cells and batteries (see UN Nos. 3090, 3091, 3480 and 3481, and the applicable special provisions of Chapter 3.3 of the Model Regulations).

**38.3.2 Scope**

**DRAFT INTERNATIONAL STANDARD ISO/DIS 12405-2**

**DRAFT INTERNATIONAL STANDARD ISO/DIS 12405-1**

ISO/TC 22/SC 21 Secretariat: DIN

Voting begins on: 2009-12-10 Voting terminates on: 2010-08-10

ORGANISATION INTERNATIONALE DE NORMALISATION - MEMBERSHIP ORGANISATION TO STANDARDIZATION - ORGANISATION INTERNATIONALE DE NORMALISATION

es shall be subjected to the tests, as required  
odal Regulations prior to the transport of a  
in a tested type by)

age of more than 0.1 g or 20% by mass,  
e anode, or to the electrolyte)

ange in Watt-hours of more than 20% or an

test results,

ected to the required tests.

e of the test requirements, steps shall be taken  
efore such cell or battery type is retested.

definitions apply:

**Electrically propelled road vehicles — Test specification for lithium-ion traction battery systems —**  
**Part 1:**  
**High power applications**

*Véhicules routiers à propulsion électrique — Spécifications d'essai pour des installations de batterie de traction aux ions lithium —*  
*Partie 1: Applications à haute puissance*

ICS 43.120

# BATSO – Testing and certification of LEV batteries

## Quality control measure: Factory Inspection

- **First inspection** (for each factory manufacturing the certified battery, prior to issuing the certificate): CIG 022 / 023 plus BATSO requirements
- **Annual inspection**: CIG 022 / 023 plus BATSO requirements
- **Check items**: (examples, in addition to CIG 022 / 023)
  - Incoming Quality Control of critical components and materials
  - Handling and storage of components and materials
  - In-process Quality
  - Control of critical operations
  - Packaging for (air) transport
  - Outgoing Quality Control
  - Regular production tests and control of records
  - Test items:           a) Weight check                           b) Visual inspection  
                                  c) Short-circuit test                       d) Overcharge test

## ■ BATSO TC work outlook

### Tasks and Duties

- Maintenance of standard(s)
- Proposal of new projects
- Interpretations of test requirements outlined in the standard(s), and making those available publicly
- Proposal for inter-laboratory comparison program(s)
- Proposal for quality assurance methods
- Proposal of requirements for factory inspections
- The BATSO Technical Committee may establish working groups for specific tasks

## **Future concept of technical work in BATSO**

- **BATSO TC as part of BATSO e.V.**
- **New Standard Structure**
- **Working Groups**
- **Standard proposal to IEC: IEC TC will develop safety standards in the future**



# Member Benefits

## Technical Work

- Contribute input to requirements documents
- Provide input into the specification evolution
- Gain early access to BATSO specifications and manuals
- Receive access to final, approved BATSO specifications and manuals
- Propose committee and work items
- Vote on proposed specifications
- Right to elect Chairman and Secretary of the BATSO Technical Committee