International Compliance for Portable Device Batteries – What the heck do I have to do to ship my battery to...

Cynthia Millsaps
Energy Assurance, LLC
May 17, 2016
What are we going to cover?

• Small

• Li Ion (including Lithium Polymer)/rechargeable

• Batteries and their component cells

• For use in portable devices/applications

• Safety - Not covering recycling, chemical content, EMC/EMI or industry specific requirements
Normal End Device ICM path

IEC standard

- Test to existing IEC standards with internationally harmonized country deviations

CB report and certificate

- Receive a single CB Scheme certificate with specified national deviations included

National certifications

- Use CB report to obtain various national certifications

Performance - Compliance - Success
Why this doesn’t work with batteries

• Batteries are relatively young technology
  – Standards are not yet harmonized
  – Standards are rapidly changing
  – Knowledge is sketchy

• Batteries are usually a component of a larger product
  – End device standards can drive confusion
  – End device use can drive component battery and cell requirements

• Highly publicized issues with Li ion batteries
  – Fear leads many countries to develop their own requirements
  – In country testing
Why this doesn’t work with batteries

IEC/CB
Non-harmonized
In country - non-harmonized
In country - harmonized
Shipping regulations
What is required?

Shipping
- Transportation regulations
- UN 38.3

Mandatory
- India
- Russia
- Korea
- Thailand
- Japan
- European Union

Voluntary
- USA/Canada
- China??
Li Ion cells and batteries are Dangerous Goods/Hazardous Materials

- Shipped alone
- Shipped with equipment
- Shipped contained in equipment

Controlled by international, regional, and carrier regulations

UN 38.3 battery testing:
- Requires 8 or 16 batteries
- Cells must be separately tested
- 5-7 weeks
- Self declaration
Things to be aware of:
Testing is only 1 piece
- Air transport – IATA DGR- IATA annually
- Vessel shipments – IMDG Code – IMO – 2 years
- Ground – each country/region –
- Carriers – may have specific limitations
Packaging, markings, labels, documentation
China is a subject all its own

Lithium Ion batteries shipped alone are forbidden on passenger aircraft
What is required?

**Shipping**
- Transportation regulations
- UN 38.3

**Mandatory**
- India
- Russia
- Korea
- Thailand
- Japan
- European Union

**Voluntary**
- USA/Canada
- China??

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## India Registration

<table>
<thead>
<tr>
<th>Mandatory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In country testing required</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard applied</td>
<td>IS 16046 (based on IEC 62133) First edition allowed until September 14, 2016</td>
</tr>
<tr>
<td>Component cell compliance method</td>
<td>CB certificate until June 1, 2016; separate certification after June 1, 2016</td>
</tr>
<tr>
<td>In country representative required</td>
<td>For registration process</td>
</tr>
<tr>
<td>Mark required</td>
<td>Yes</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>25 batteries – up to 5 months</td>
</tr>
<tr>
<td>Other notes</td>
<td>Factory based – no factory inspection</td>
</tr>
<tr>
<td></td>
<td>Authorized India Representative required</td>
</tr>
</tbody>
</table>

- Test and issue Report
- Submit to BIS for Registration
- Add additional models – renew 2 years

*Performance - Compliance - Success*
India Registration

Things to be aware of:

- Every factory is a new submittal (manufacturer=factory=applicant)
- Very detailed factory information required
- Branding matters
- Limits on allowed models by similarity without testing
- AIR – Factory Rep – Brand Holder Rep
- Limited test labs in country – limited battery knowledge
- EVER CHANGING...
- Communication is difficult
## Russian GOST Certification

<table>
<thead>
<tr>
<th>Mandatory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In country testing required</td>
<td>No</td>
</tr>
<tr>
<td>Standard applied</td>
<td>GOST 62133-2004 (based on IEC 62133:2002)</td>
</tr>
<tr>
<td>Cell compliance method</td>
<td>N/A</td>
</tr>
<tr>
<td>In country representative required</td>
<td>If battery will be imported and sold stand alone in Russia</td>
</tr>
<tr>
<td>Mark required</td>
<td>Yes</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>No samples – 2 weeks to 1 month</td>
</tr>
<tr>
<td>Other notes</td>
<td>Based on HS code</td>
</tr>
</tbody>
</table>

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**Provide CB report**

**Provide in country agent and agreement if required**

**1 or 3 year certificate can be issued**

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Performance - Compliance - Success
Russian GOST Certification

Things to be aware of:

- Russia typically works like a normal CB Scheme certification
- If you are shipping a stand alone battery into Russia, you will need evidence of in country importer with a signed agreement
# South Korean KC Certification

<table>
<thead>
<tr>
<th>Mandatory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In country testing required</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard applied</td>
<td>KC 62133 (based on IEC 62133 second edition)</td>
</tr>
<tr>
<td>Cell compliance method</td>
<td>CB, separate certification or testing with battery</td>
</tr>
<tr>
<td>In country representative required</td>
<td>No</td>
</tr>
<tr>
<td>Mark required</td>
<td>Yes</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>21 batteries 10-12 weeks</td>
</tr>
<tr>
<td>Other notes</td>
<td>No factory inspection</td>
</tr>
<tr>
<td></td>
<td>Detailed Korean marking requirements</td>
</tr>
</tbody>
</table>

**Complete in country testing**

**Submit report for certification**

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South Korean KC Certification

Things to be aware of:

• Label will need specific details in Korean language
  – Product name
  – Model name
  – Designation (IEC designation)
  – Nominal voltage
  – Rated Capacity
  – Manufacturer (factory)
  – Customer service number
  – Country of manufacture

• Shipping units for testing can be tricky
• Alternate factories = new factory samples
# Thailand Certification

<table>
<thead>
<tr>
<th>Mandatory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In country testing required</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard applied</td>
<td>TIS 2217-2548 (based on IEC 62133:2002)</td>
</tr>
<tr>
<td>Cell compliance method</td>
<td>N/A</td>
</tr>
<tr>
<td>In country representative required</td>
<td>Yes – can be provided by test lab</td>
</tr>
<tr>
<td>Mark required</td>
<td>Yes</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>31 batteries 10-12 weeks</td>
</tr>
</tbody>
</table>
| Other notes                                    | Factory inspection required  
In country representative is required |

- **Complete factory audit**
- **Complete in country testing**
- **Grant Certification**

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Thailand Certification

Things to be aware of:

• Factory inspection
  – Required prior to any work starting on testing typically
  – Expensive – 1 week with up to 4 people traveling from Asia for the inspection

• Shipping of batteries into Thailand for certification will require coordination with local authority

• Slow and lengthy process
# Japan (DENAN) Certification

<table>
<thead>
<tr>
<th>Mandatory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In country testing required</td>
<td>No – self certification with registration</td>
</tr>
<tr>
<td>Standard applied</td>
<td>Revision of the Ministerial Ordinance for Determining Technical Standards for Electrical Appliances (Lithium Ion Secondary Batteries)”</td>
</tr>
<tr>
<td>Cell compliance method</td>
<td>C of C or tested with battery</td>
</tr>
<tr>
<td>In country representative required</td>
<td>Registration by in country rep required</td>
</tr>
<tr>
<td>Mark required</td>
<td>Yes</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>33 batteries, 1 host device, 6-8 weeks</td>
</tr>
<tr>
<td>Other notes</td>
<td>Not harmonized with IEC 62133 even with national deviations – not required for embedded batteries or &lt;400Wh/l</td>
</tr>
</tbody>
</table>

**Complete testing and report**

**In country importer or end device registration**

**No renewal period or expiration**

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Japan (DENAN) Certification

Things to be aware of:

- Label will need specific details in Japanese language
  - Importer in Japan
  - Electrical ratings
  - Label can be affixed in Japan – not a customs clearance concern

- Japanese deviations in the IEC standard do not equal compliance with DENAN regulations.
# European Union

<table>
<thead>
<tr>
<th>Mandatory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>In country testing required</td>
<td>No – self declared</td>
</tr>
<tr>
<td>Standard applied</td>
<td>Typically EN 62133 (can include end device specific requirement)</td>
</tr>
<tr>
<td>Cell compliance method</td>
<td>EN 62133</td>
</tr>
<tr>
<td>Mark required</td>
<td>Yes</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>21 samples, 6 weeks</td>
</tr>
<tr>
<td>Other notes</td>
<td>IEC 62133 is being revised</td>
</tr>
<tr>
<td></td>
<td>End device standards may have additional requirements</td>
</tr>
</tbody>
</table>

**Complete testing**

**Generate Declaration of Compliance**

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European Union

Things to be aware of:

• Cell level - Forced Internal Short Circuit (FISC)
  – France
  – Switzerland

• Other directives/standard may need to be applied
  – Battery Directive (chemical content, recycling, capacity rating)
  – EMC directive (smart batteries)
  – End device directives may apply to the component cell or battery
  – End device standards may have additional battery requirements
What is required?

- Shipping
  - Transportation regulations
  - UN 38.3
- Mandatory
  - India
  - Russia
  - Korea
  - Thailand
  - Japan
  - European Union
- Voluntary
  - USA/Canada
  - China??
## United States and Canada

<table>
<thead>
<tr>
<th>Voluntary or end device driven</th>
<th>End device determined – typically UL 2054 or UL/CSA 62133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard applied</td>
<td>End device determined</td>
</tr>
<tr>
<td>Cell compliance method</td>
<td>UL 1642 or UL 62133</td>
</tr>
<tr>
<td>Mark required</td>
<td>End device determined</td>
</tr>
<tr>
<td>Samples and timeline</td>
<td>UL 2054 – 55 samples, 12 weeks</td>
</tr>
<tr>
<td></td>
<td>UL 62133 – 21 samples, 6 weeks</td>
</tr>
<tr>
<td>Other notes</td>
<td>UL/CSA 62133 is currently being harmonized</td>
</tr>
<tr>
<td></td>
<td>End device standards may have additional requirements</td>
</tr>
</tbody>
</table>
United States and Canada

Things to be aware of:

– UL 2054 versus UL 62133

**UL 2054**
- Well established standard
- No Canadian equivalent (60950)
- Referenced in many US device standards
- VERY stringent standard
  - Faulting of batteries
  - Run below trip point of the batteries
- Cells tested to UL 1642
- Expensive and potentially long process
  - 12+ weeks in some cases

**UL 62133**
- Very new standard (01-2015)
- Referenced in some US standards (ITE and ProAV)
- Harmonized with IEC 62133:2012
- Cells tested to UL 1642 or UL 62133
- Batteries tested as received
- Limited test program
- Less expensive
- Shorter process
- Few samples required
China

- GB 31241 – Mandatory standard as of August 15, 2015
- Enforcement – Li ion batteries not on CCC Mandatory product list

<table>
<thead>
<tr>
<th>Option</th>
<th>Mark</th>
<th>Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>China Entrusted Test Report GB 31241-2014</td>
<td>No CQC Mark, No CQC certificate, test report only</td>
<td>Based on current CQC implementation rules</td>
</tr>
<tr>
<td>Type testing only</td>
<td>No Mark applied to product, only CQC certificate</td>
<td>1 year, can extend to include IFI and Follow up services or 1 year with retest</td>
</tr>
<tr>
<td>Type testing + initial factory inspection + follow-up services</td>
<td>CQC mark and CQC certificate</td>
<td>No expiration</td>
</tr>
</tbody>
</table>
China

Things to be aware of:

- New shipping regulations – very difficult to ship to into China
  - FedEx and UPS will not ship Fully Regulated DG into Mainland China
  - Coordinated effort with extensive documentation
- Specific marking requirements
  - Product name and model
  - Rated capacity, limited charge voltage
  - Positive electrode and negative electrode, represented by “Positive, Negative”, “+, -” symbol or different colors (such as red and black)
  - Manufacturer or brand
  - Warnings – can be on smallest unit box
- EVERYTHING MUST MATCH EXACTLY
- Standard is totally different from any other standard globally
- New factory = new submittal
Other Considerations

USA – CTIA
• cellular use with Verizon and AT&T

Brazil – ANATEL
• Cellular applications

Taiwan – BSMI (RPC)
• Power banks and batteries used with 3C products

Australia and New Zealand - RCM
• Currently only EMC based

EAC Mark of Conformity (Russia, Kazakhstan and Belarus)
• Includes devices currently
IEC 62133

IEC 62133-1 – Nickel based cells and batteries,
IEC 62133-2 – Li ion cells and batteries
• New edition set to be released in 2016/2017
  – Nickel – not much
  – Li ion –
    • Putting back in some mechanical testing
    • Moving many items from Shall to Should
      – Could lead to further country specific deviations/separate non-harmonized standards

Harmonization
  – UL 62133 and CSA/CAN E62133 – soon to be harmonized into UL/CSA 62133
  – UL acceptance of either UL 1642 or UL 62133 Recognized cells for UL 62133 certification of a battery
Thank you!

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