Korean Agency for Technology & Standards
Comments for OMB's Review of Proposed Lithium Battery Transport Regulations
Nov. 23, 2010

While demands for lithium cells and batteries are increasing worldwide, there have been several incidents during transportation of lithium cells and batteries. Therefore, the Government of Korea supports the U.S. Government's efforts to reduce the risk of accidents, especially in aircraft. However, under the WTO/TBT Agreement, governments should rationalize the purpose and method of their regulations. Having reviewed the evidence given in the U.S. Dept. of Transportation notice of proposed rulemaking (NPRM) for lithium battery and lithium ion battery transport including the Federal Aviation Administration report, "Fire Protection for the Shipment of Lithium Batteries in Aircraft Cargo Compartments," we are not certain that the proposed regulation would reduce the possibility of such accidents. If the rationale is not clearly proven, the regulation will only create a major burden to industry and consumers without corresponding improvement in safety.

In March of this year, Korean industry—Korea International Trade Association (KITA), Korea Electronic Association (KEA), and Battery R&D Association of Korea (KORBA)—submitted joint comments on the proposed rule. The Korean Agency for Technology & Standards (KATS), as the official Korean enquiry point and TBT coordinator on WTO/TBT and FTA/TBT issues, raised specific trade concerns about the proposed rule in the WTO/TBT committee several times. KATS also raised the issue in Korea-U.S. joint meetings in May, July and September. However, we have not received any response or addendum regarding to the issue.

At this time, the Korean Government is still concerned about the regulation, including the very short 75-day schedule for implementation. Without major changes, the regulation will severely burden Korean industries. Therefore, we would like to propose that PHMSA and DOT reinforce the education and enforcement system for battery transport instead of adopting the new regulation. In addition, because battery transport is a worldwide issue not limited to the United States, we urge the U.S. Government to harmonize its regulations with the related international standards from the United Nations International Civil Aviation Organization (ICAO).

The Korean Agency for Technology & Standards, Ministry of Knowledge Economy, At this time, KATS urges the Office of Management and Budget to send the U.S. Dept. of Transportation's proposed lithium battery transport rule back to the Pipeline and Hazardous Materials Safety Administration (PHMSA) for further consideration and to correct apparent flaws in the rulemaking process to date. Our analysis follows.

1. PHMSA underestimated the cost of the proposed rule.
According to its Notice of Proposed Rulemaking (NPRM), PHMSA estimated the proposed rule's cost at $9.3 million per year, based solely on "packaging, hazard communication, cargo stowage, and training requirements." Industry's estimate, reflected in numerous comments responding to the NPRM, is more than 100 times higher.

Aside from understating the costs that it mentioned, PHMSA disregarded two other, overwhelming cost factors:

- First, PHMSA improperly discounted any increased cost of air freight in response to the rule, stating that "the net cost of the handling fee is zero; cash is transferred from one affected industry group—shippers—to another industry group—carriers." This observation displays a basic misunderstanding of economics. Costs are passed to consumers, even in a competitive market. Under the proposed rule, air carriers would incur and pass along significant costs for training, special handling, cargo hold upgrades, etc. (For example, UPS estimated its cost at $264M in the first year and $185M each subsequent year.) Moreover, the limited availability of cargo aircraft with fire suppression equipment–especially within the very short 75 day proposed timetable for implementation–would constrain air freight capacity and cause shipping costs to rise. American consumers would bear these costs.
- Second, PHMSA acknowledged in the NPRM that some shippers might shift from air to sea transport, but it proceeded to ignore the resulting costs of delayed delivery of products to the U.S. market. Shipments from Asia by sea take approximately three weeks to one month. This delay would burden Korean and other manufacturers with the cost of maintaining extra inventory to replace equipment in transit. Moreover, the U.S. market would receive vital high technology products such as smart phones, notebook computers, and Internet tablets later than other parts of the world—a hindrance on the U.S. innovation economy that PHMSA failed to acknowledge.

2. PHMSA overestimated the benefits of the proposed rule.

In the NPRM, PHMSA identified 44 air shipment incidents related to lithium batteries over a twenty year period. However, PHMSA did not justify its conclusion that the proposed rule would have prevented all—or in fact, any—of these incidents.

- The incidents cited by PHMSA could have been prevented through better education of shippers and freight carriers and stronger enforcement of existing rules. PHMSA did not demonstrate the necessity of new rules.
- Adopting rules that are not harmonized with international standards, as PHMSA proposed, would work against safety by increasing the complexity of global supply chain management, increasing the risk of errors by shippers and carriers and making education and enforcement more complex and difficult.

3. PHMSA rejected superior alternatives to the proposed rule.

In the NPRM, PHMSA acknowledged but rejected two alternatives which would improve safety and reduce costs in comparison to the proposed rule.

- First, Korean industry associations and most other commenting parties have proposed harmonization of U.S. rules with United Nations ICAO standards as the best means of improving the safety of battery transport. International harmonization will simplify training, hazard labeling, and responsible supply chain management so as to increase global consistency of implementation of these important safety measures. PHMSA rejected this alternative with insufficient justification.

- Second, as an alternative which would significantly reduce the costs of the proposed rule without compromising safety, Korean industry and others have also proposed harmonization with ICAO standards while narrowing the exemption for small batteries to lithium ion batteries shipped at a State of Charging below 50 percent. As the NPRM stated, lithium ion batteries' fire characteristics are very different from those of lithium metal batteries. Shipping Permitting shipment of lithium ion rechargeable batteries in this stateat below 50 percent charge sharply mitigates any fire risk. The NPRM requested public comments on this option, but since receiving industry's support for it, PHMSA has given no indication of its intention to adopt this superior alternative in its final rule.

For these reasons, the Government of Korea respectfully urges the Office of Management and Budget to deny approval of the proposed rule unless and until the rule is modified accordingly.

Standard for Cell and Battery

Lithium ion cells and batteries are tested according to about 20 standards.
Especially, over 100 models for every year in Korean companies are tested by UN manual of tests and criteria, Part III, subsection 38.3 which simulates condition of their transport.

Target Countries	Standard		Explanation
IEC Members	IEC 61959		Secondary cells and batteries containing alkaline or other non-acid electrolytes- mechanical tests for sealed portable secondary cells and batteries
	IEC 61960		Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications
	IEC 62133		Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications
	IEC 62281		Safety of primary and secondary lithium cells and batteries during transport
IEC Members	60950-1	CB	Safety for information technology equipment
EU		CE	
US/Canada		UL	
Germany		TUV S	
		TUV GS	
Russia		GOST	
IEC Members	IEC 61000-4-2~6		Electromagnetic compatibility (EMC)
EU	EN 55022,55024		
Australia/ New Zealand	AS/NZC CISPR22(C-Tick)		
All	UN 38.3		Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria
US/ Canada	UL 1642		UL Standard for Safety for Lithium Batteries
	UL 2054		UL standard for safety for household and commercial batteries
US	IEEE1725		IEEE Standard for Rechargeable Batteries for Cellular Telephones
	IEEE1625		IEEE Standard for Rechargeable Batteries for Multi-Cell Mobile Computing Devices
Korea	KC		Safety requirements for portable lithium secondary cells, and for batteries made from them, for use in portable applications
China	GB/T 18287-2000		General specification of lithium-ion cells and batteries for cellular phone
Japan	JIS 8712/8714 (PSE)		Japanese safety Standard
Thailand	TIS 2217-2548 (TISI)		Thai Industrial Standard for Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications

UN Manual of Tests and Criteria, Part III, Subsection 38.3

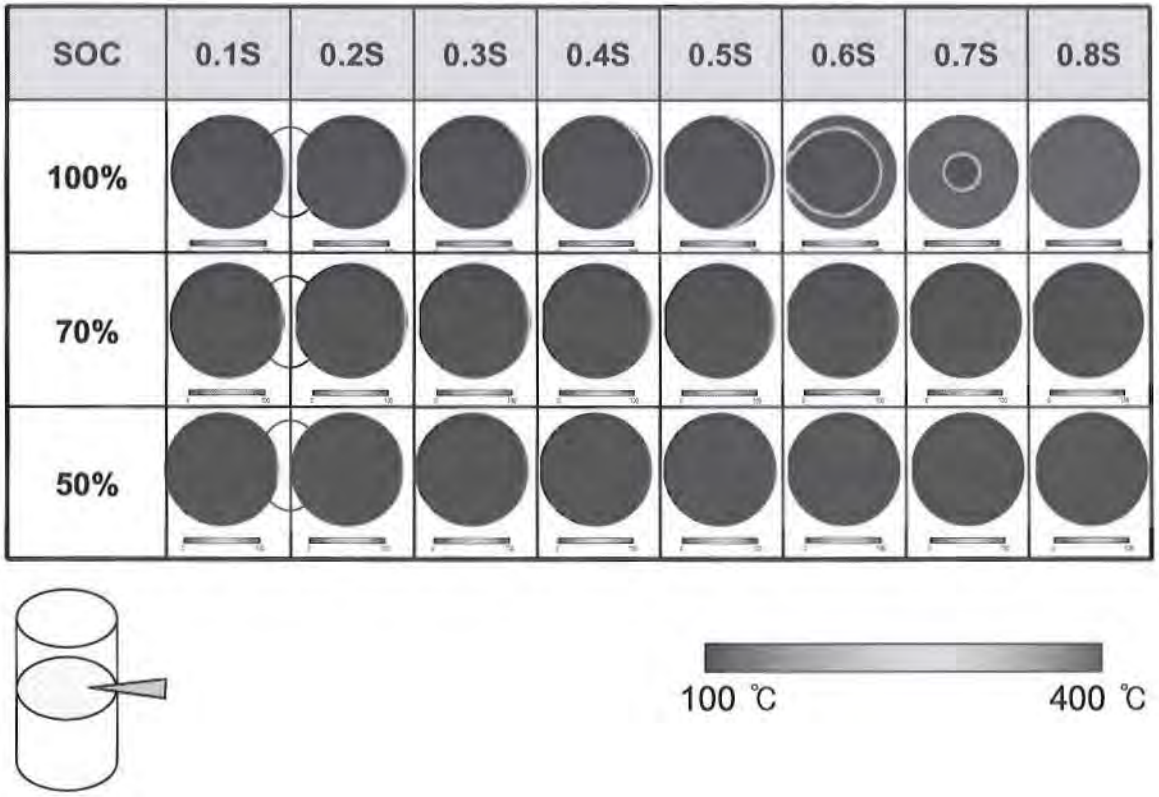
UN Test consists of 8 kinds of test Items and simulates situations that can occur during transport.

Test Item	Test Procedure	Purpose
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5℃	This test simulates air transport under low pressure conditions.
Test 2. Thermal Test	[75±2℃,6hr ↔ -40±2℃,6hr,interval max. 30min] x 10cycle , storing at 20±5℃ for 24h	This test assesses cell and battery seal integrity and internal electrical connections. The test is conducted using rapid and extreme temperature changes
Test 3. Vibration	[7Hz↔200Hz↔7Hz, in 15min] x 12 times x 3 direction 1) sinusoidal waveform with a logarithmic sweep 2) 7Hz 18Hz (maintaining 1gn) app. 50Hz (until 8gn) 200Hz (maintaining 8gn), 1.6mm total excursion	This test simulates vibration during transport.
Test 4. Shock	Half sine shock (peak acceleration : 150gn, pulse duration : 6msec) x 6 (±x, y, z) , direction x 3 cycle	This test simulates possible impacts (Drop) during transport.
Test 5. External Short Circuit	100mΩ ext. short-circuit at 55±2℃ 1hr continue after returning at 55±2℃	This test simulates an external short circuit.
Test 6. Impact	Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height	This test simulates an external impact.
Test 7. Overcharge	Current = Manufacturer's recommended max. continuous charge current X 2 Voltage 1.If charge voltage ≤ 18V, V (min.) = 2 x (max. charge voltage) or V (min.) = 22V. 2.If charge voltage > 18V, V (min.) = 1.2 x (max. charge voltage)	This test evaluates the ability of a rechargeable battery to withstand an overcharge condition.
Test 8. Forced Discharge	Discharge at max. discharge current (with 12V DC power supply), Duration time = rated capacity/initial test current	This test evaluates the ability of a rechargeable cell to withstand a forced discharge condition.

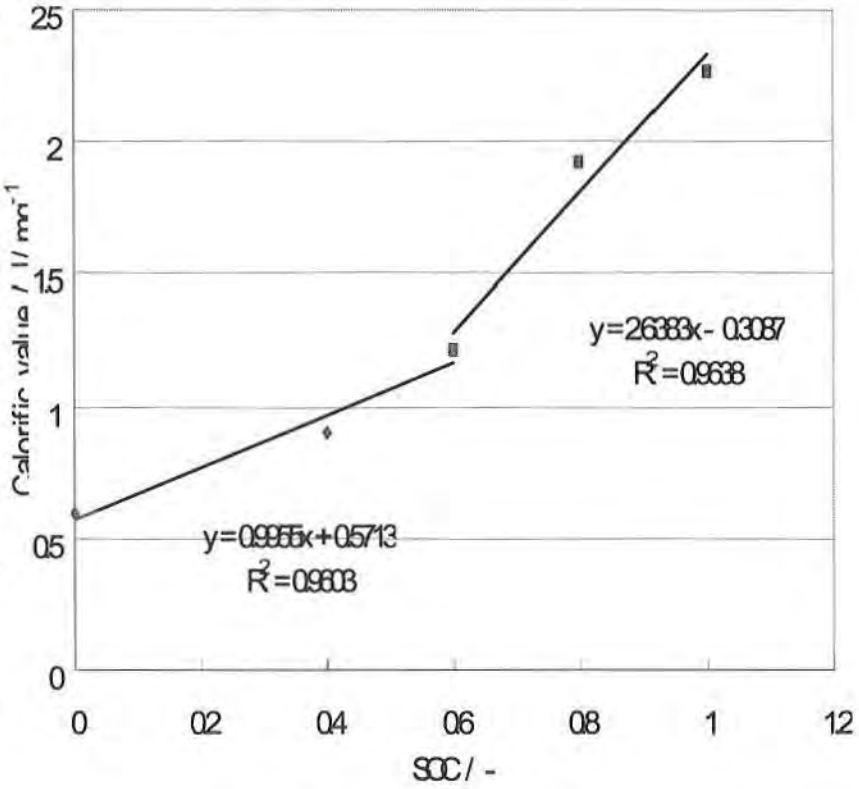
Relationship Between SOC and Safety

Safety of lithium ion cells and batteries increases with decreasing *SOC.
(In other words, SOC and Safety are the inverse relationship.)

*** Difference of Heat Spread Between Each SOC (at 100℃)**



*** Relationship Between SOC and Calorific Value**



* SOC : State of charge

Sourced by Battery Association of Japan