

A close-up photograph of several metal washers or spacers, arranged in a grid-like pattern. The washers are dark in color, possibly black or dark grey, and have a metallic sheen. They are set against a dark background, and the lighting creates highlights on their edges and central holes, giving them a three-dimensional appearance.

SafeCASE Shipping

November 2023



Shipping Information

Overview

Training

- It is the responsibility of each employer to train their employees, as applicable. KULR is unable to certify employees of other companies.
- KULR is providing this material to inform product end users of certain US DOT requirements applicable to US highway shipments of end-of-life and damaged lithium-ion batteries. If shipping other transport modes (i.e., ocean), additional requirements will apply.
 - However, other companies may choose to use the materials provided to assist them in building a transportation training program in accordance with 49 CFR Part 172, Subpart H ([link to regulations](#)).

Compliant Hazmat Transportation Training

- May Include:
 - General Awareness of HazMat Regulations
 - Safety & Security Awareness
 - Function Specific Instructions
 - A test
 - A record of training meeting 49 CFR 172.704(d)
- For more information on US DOT hazardous materials requirements, please visit: <https://www.phmsa.dot.gov/standards-rulemaking/hazmat/hazardous-materials-information-center>



Dangerous Goods (HazMat)

Hazardous Materials

- Articles or substances that pose a risk to health, safety, property, or the environment in transport.
Lithium-ion batteries are **Class 9**.

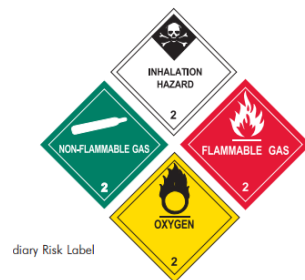
Class 1

Explosives



Class 2

Gases



Class 3

Flammable Liquids



Class 4

Flam Solid, SC, DWW



Class 5

Oxidizers & Org Peroxide



Class 6

Poisons & Infect. Subs



Class 7

Radioactive



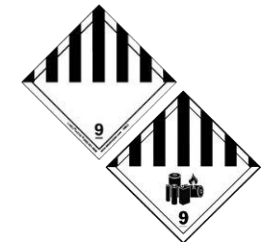
Class 8

Corrosive



Class 9

Miscellaneous



Training Provisions

Hazmat Training

- Required for staff involved in:
 - Packaging & loading hazardous materials
 - Applying hazard marks and labels
 - Completing shipping paperwork
 - Transporting hazardous materials
 - The Department of Transportation and the couriers transporting SafeCASE, both require that the person packing batteries and shipping SafeCASE be properly trained.
- Training certification is valid for 3 years (2 years international), then recurrent training is required.
 - Training records must be maintained on-site.



Shipper's Responsibility

Who is the Shipper?

- It is the shipper's responsibility to comply with applicable hazmat regulations.
- The shipper is the company that:
 - Performs any pre-transportation function (e.g. filling package, applying mark, product classification)
 - Tenders a hazardous material to a carrier for transport
- ***You are a shipper***, since you are preparing the SafeCASE for shipping.

From: Address ?	Ship Date: 30APR15 ActWgt: 1.0 LB CAD: 169523/FXRS1501
TO Address (US) 	(123) 456-7890
Ref: HAZ DSR Ground INV: PO: Dept	
	
	
(9612302) 7889722 700000039	
GND Prepaid	Hazmat DIRECT SIGN HAZ Emergency Contact# 9012639811

Enforcement

Largest Financial Penalties

- If proper shipping procedures are not followed, then you could face **enforcement**. Enforcement is handled on a case-by-case basis.
- Example of Possible Penalties:
 - Frequent violators
 - Companies with no HazMat program or training
 - Undeclared shipment

Press Release – FAA Proposes \$1.1 Million Civil Penalty Against Braille Battery Inc. For Alleged HazMat Violations



4. Offering for transportation a lithium battery, without shipping papers, package markings, labels, or placards (when required):	
a. For air transport	\$40,000.
b. For ground transport	\$20,000.

Common Violations Cited

Most Common Violations Cited in Enforcement

- **Failure to train, improper training records**
- Undeclared shipments
- Hazmat improperly declared on shipping paper
- Failure to use authorized package
- Labels and marks not properly applied
- No emergency response number



Matter of Public Record!

Lang's Standard Solution Inc. Baton Rouge, LA Ticket #: 18T-0376-SH-SO	Transported a hazardous material while failing to provide a hazardous materials shipping paper, allowed employees to perform a function subject to the requirements of the federal hazardous materials regulations while failing to document initial training provided to hazmat employees (general awareness, function-specific, safety and security awareness); transported a hazardous material in UN certified fiberboard box 1x5-gallon and 1x1-gallon combination packaging, marked UN 4G, while failing to close the UN specification packaging in accordance with the closure notification, thereby failing to bring the package into compliance with the manufactures test report.	172.200; 172.201(d); 172.202(a); 172.604(a); 172.702(a) & (b); 172.704(a)(1), (2), (3), (4), (c), & (d); 173.22(a)(4)(i); 173.24(f)(2)	\$5,280
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Safety and Security

Battery Safety

- Handle all batteries carefully
- Know fire response procedures
- Understand battery hazards

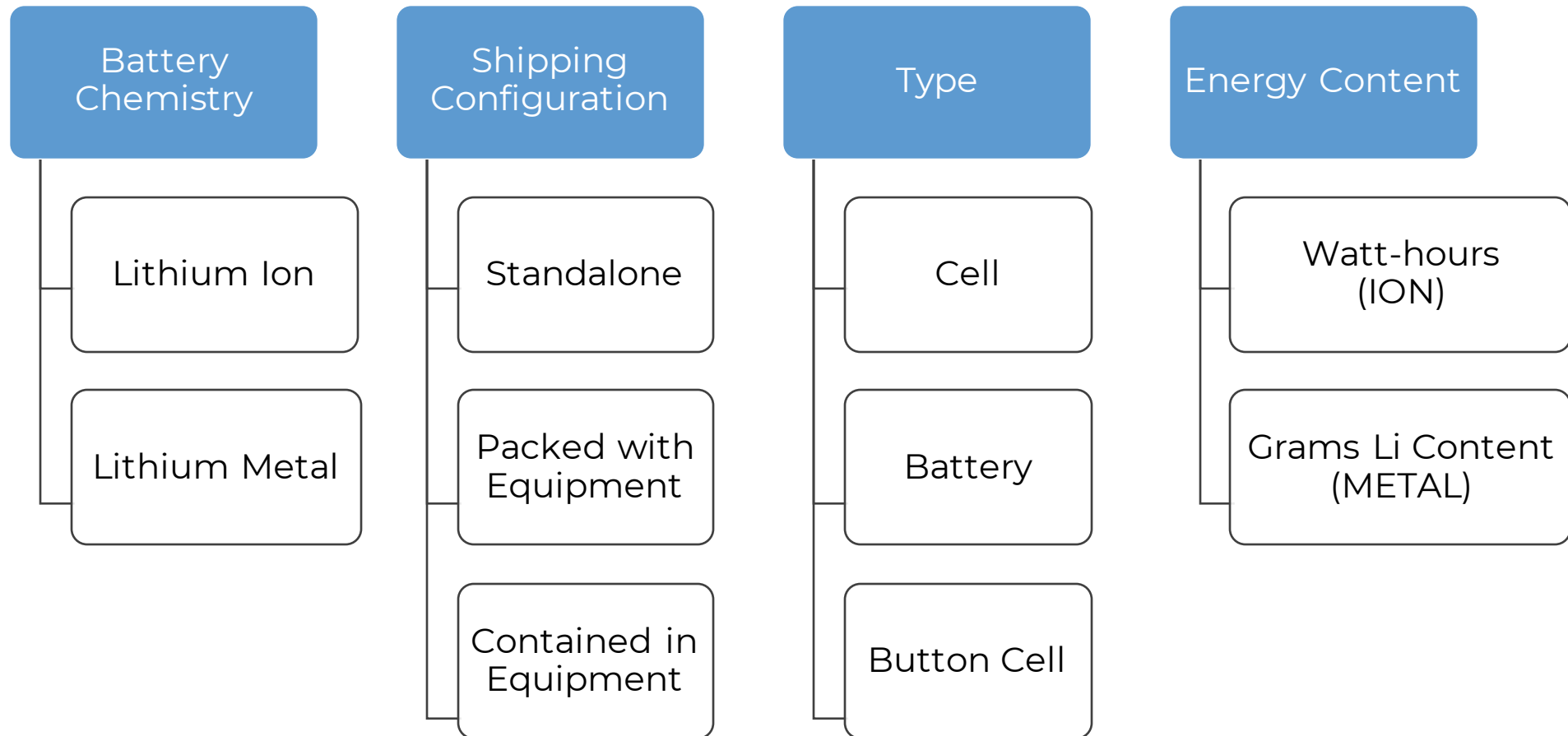
Security Awareness

- In the wrong hands, hazmat can be weaponized
- Secure all hazmat and batteries at the facility



Lithium Battery Classification

- The following are lithium battery classifications. Note, SafeCASE is for transporting lithium-ion batteries only, not lithium-metal batteries. Your batteries will be labeled for their type.

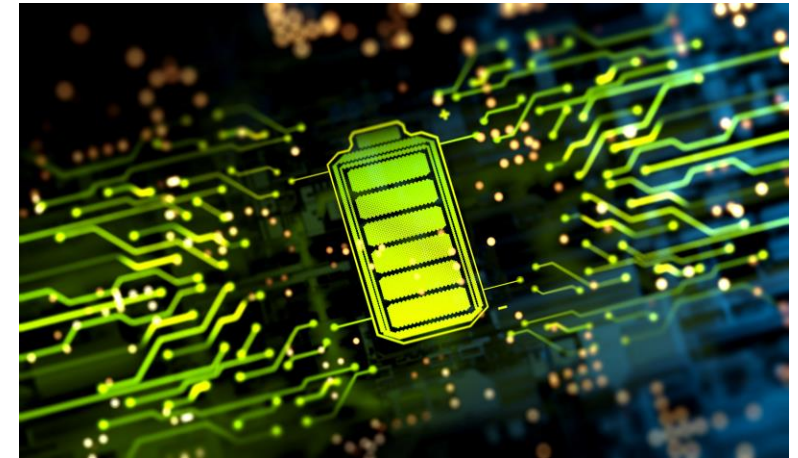


Hazard Classification

HazMat Descriptions

- Based on battery chemistry and shipping configuration, the 6 hazmat descriptions for lithium cells and batteries are:
 - UN 3480: Lithium-ion batteries
 - UN 3481: Lithium-ion batteries packed with equipment
 - UN 3481: Lithium-ion batteries contained in equipment
 - UN 3090: Lithium metal batteries
 - UN 3091: Lithium metal batteries packed with equipment
 - UN 3091: Lithium metal batteries contained in equipment
- When ordering your SafeCASE, you must indicate if the batteries are packed with other **equipment** or **contained in equipment** (example – a laptop containing a lithium-ion battery). Your OEM or shipping partner will then determine the proper **UN labels**.

Remember, only lithium-ion batteries can be shipped within SafeCASE. Not lithium-metal.

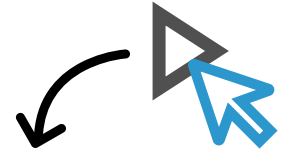


Lithium Batteries – Why the Concern?

Lithium Battery Dangers

- Lithium batteries are particularly dangerous because they can enter thermal runaway, which is uncontrolled energy release.
- Lithium batteries are a unique hazard because they can be both an ignition source of fire and a fuel for an existing fire. Please handle, store, and ship them carefully.
- Possible Dangers Include:
 - Overheat & self-ignition fire
 - Overpressure - rapid disassembly
 - Venting of toxic or flammable gas

Watch to see the potential dangers that lithium batteries can cause.



Transport and Storage Incidents

Lithium Fire Incidents

- Please follow proper shipping requirements to protect employees at other facilities and your shipping partner.



ESS Station in South Korea
Lithium battery fire



UPS Flight 6 Crash – Dubai
Autoignition of lithium batteries

Damaged Defective Recalled Batteries (DDR)

Signs of a DDR Battery

- Damaged, defective, or recalled (DDR) lithium batteries pose a higher risk of thermal runaway.
- Can Include:
 - Known manufacturer defect
 - Swelling
 - Hot to the touch
 - Significant dents in case
 - Punctured case

*Note, it is forbidden to transport DDR batteries via air transport.

AIR TRANSPORT PROHIBITED



(f) *Damaged, defective, or recalled cells or batteries.* Lithium cells or batteries, that have been damaged or identified by the manufacturer as being defective for safety reasons, that have the potential of producing a dangerous evolution of heat, fire, or short circuit (e.g., those being returned to the manufacturer for safety reasons) may be transported by highway, rail or vessel only...

Lithium-Ion Batteries

Shipping Batteries

- Only rechargeable lithium-**ION** cells and batteries (including those packed with or contained in equipment) are allowed to be shipped in SafeCASE!
- *NO LITHIUM METAL CELLS AND BATTERIES ALLOWED!**



Ground Transport Only



Never ship DDR batteries by air

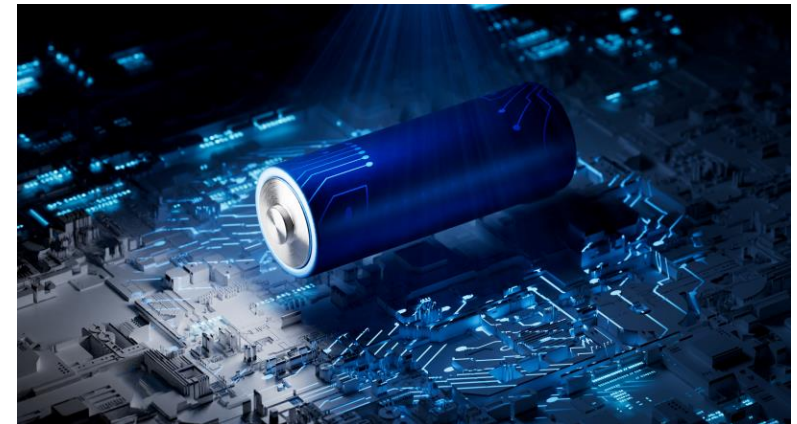
Shipping DDR Batteries

Special Permit 21193*

- PHMSA (DOT) issued Special Permit 21193 to facilitate DDR shipments:
 - KULR CASE contains thermal runaway hazards (limit: 2.5 kWh)
 - *Packages may contain more than 1 cell or battery***
 - Outer box is a UN 4G fiberboard box, PG I-rated
 - Emergency response info (including phone number) printed on box
 - Cells/batteries must originally have been UN 38.3 tested
 - Not to be used internationally

*Link to DOT SP 21193 on KULR Website.

**Allowed if under the watt hour and weight limit. Regulated shipping paperwork must accompany these shipments if shipping larger batteries.



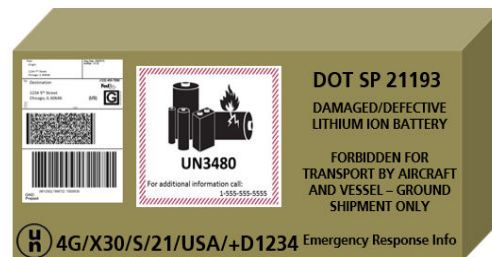
Shipping Labels – DDR Labeling

Low Energy

- Load cannot exceed 66 lbs. and/or 2500 Wh
- Box marked:
 - DOT SP 21193
 - “Damaged/Defective Lithium Ion Battery”
 - “Forbidden for Transport by Aircraft and Vessel – Ground Shipment Only”
 - **Lithium Battery Mark**
- No shipping paper or training needed
 - BOL is needed
 - “(6) A bill of lading used in association with a package offered for transportation or transported in accordance with this special permit must include the description “Lithium batteries intended for recycling in accordance with DOT-SP 21139” accompanies the shipment

High Energy

- Load cannot exceed 66 lbs. and/or 2500 Wh
- Box marked:
 - DOT SP 21193
 - “Damaged/Defective Lithium Ion Battery”
 - “Forbidden for Transport by Aircraft and Vessel – Ground Shipment Only”
 - **Class 9 label with UN No & PSN**
- Shipping paper & training required
 - BOL is needed
 - “(6) A bill of lading used in association with a package offered for transportation or transported in accordance with this special permit must include the description “Lithium batteries intended for recycling in accordance with DOT-SP 21139” accompanies the shipment”



DDR labeling based upon your description of your batteries.

Recycling Batteries

Special Permit 21139*

- PHMSA(DOT) issued Special Permit 21139 to facilitate shipments of batteries to recycling:
 - KULR CASE contains thermal runaway hazards (limit: 2.5 kWh)
 - Outer box is “strong outer package”
 - Not to be used internationally
 - Training & shipping papers not needed!

*Link to DOT SP 21139 on KULR Website.



Shipping Labels - Recycling Batteries

Low Energy

- Package cannot exceed 66 lbs.
- Maximum energy rating cannot exceed 300 Wh
- Box marked:
 - DOT SP 21139
 - “Lithium-Ion Batteries - Forbidden for Transport Aboard Passenger Aircraft”
 - **Lithium Battery Mark**
- No shipping paper or training needed
 - BOL is needed (bill of lading)

High Energy

- Package cannot exceed 66 lbs.
- Energy rating: >300 Wh and <2500 Wh
 - 2500 Wh is the maximum energy allowed under the limit of the SafeCASE
- Box marked:
 - DOT SP 21139
 - “Lithium-Ion Batteries - Forbidden for Transport Aboard Passenger Aircraft”
 - **Class 9 label with UN No & PSN**
- No shipping paper or training needed
 - BOL is needed (bill of lading)



Your recycling labeling is based upon your description of your batteries.

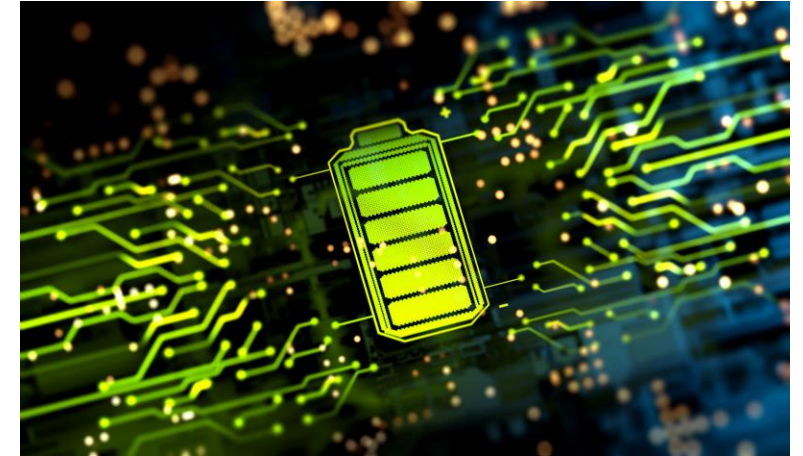
Shipping Prototypes (Low Production)*

Special Permit 21167**

- PHMSA(DOT) issued Special Permit 21167 to facilitate shipments of batteries to recycling:
 - KULR CASE contains thermal runaway hazards (limit: 2.5 kWh)
 - Outer box is “strong outer package”
 - **“For transportation aboard aircraft, the aggregate energy content of each inner package may not exceed 2.5 kWh.”**
 - Not to be used internationally
 - Training & shipping papers not needed!

* “Low production” is defined as a production run of not more than 100 cells or batteries annually of a particular type.

** Link to DOT SP 21167 on KULR Website.



Shipping Matrix – Quick Guide

	A-DDR	B-Prototype	C-Recycling
High Energy (>300 Wh)	UN 4G Corrugated Box	UN 4G Corrugated Box	Corrugated Box
	Class 9 – Lithium-ion UN3480 or UN3481	Class 9 – Lithium-ion UN3480 or UN3481	Class 9 – Lithium-ion UN3480 or UN3481
	DOT SP#21193	DOT SP#21167	DOT SP#21139
	Forbidden for transport by any aircraft or vessel – Ground shipment only label	Cargo aircraft only label	Forbidden for transport by any aircraft or vessel – Ground shipment only label
Low Energy (<300 Wh)	UN 4G Corrugated Box	UN 4G Corrugated Box	Corrugated Box
	Class 9 – Lithium-ion UN3480 or UN3481	Class 9 – Lithium-ion UN3480 or UN3481	Class 9 – Lithium-ion UN3480 or UN3481
	DOT SP#21193	DOT SP#21167	DOT SP#21139
	Forbidden for transport by any aircraft or vessel – Ground shipment only label	Cargo aircraft only label	Forbidden for transport by passenger aircraft

Documentation

Shipping Paper Contents

- Shipments of hazmat must be accompanied by a shipping paper that contains:
 - Basic Description of Hazardous Material
 - UN Number, Proper Shipping Name, Hazard Class, PG
 - Number and Type of Packages
 - Net Quantity (Weight) of Hazmat Shipped
 - Emergency Response Phone Number
 - Emergency Response Information
 - Shipper's certification

SHIPPING DECLARATION FOR HAZARDOUS GOODS (Please print in black ink on one side of the paper.)

Shipper: _____ To: _____
Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Email: _____

HAZARDOUS MATERIAL

UN Number: _____ Proper Shipping Name: _____
Hazard Class: _____ PG: _____
Net Quantity (Weight): _____

SHIPPER'S CERTIFICATION

I hereby certify that the contents of this declaration are true and accurate, and that the material is properly packaged, labeled, and secured for transport in accordance with the applicable regulations. I declare that the material is not a prohibited substance under the applicable regulations.

EMERGENCY RESPONSE

Emergency Response Phone Number: _____

SHIPPER'S INFORMATION

Signature: _____ Title: _____
Date: _____

*Note: You must maintain a copy of each shipping paper at least two (2) years.

Shipping Papers - Example

SHIP FROM				Bill of Lading Number:			
Company A 123 Main Street Milwaukee, WI 53201							
SHIP TO				Carrier Name:			
Company B 1234 Fake St. Minneapolis, MN 55404				Trailer number: Serial number(s):			
Special Instructions:							
EMERGENCY CONTACT PHONE NUMBER: +1 (414) 555-1231							
CARRIER INFORMATION							
Package					LTL Only		
Qty	Type	Weight	HM (X)	Commodity Description		NMFC No.	Class
1	Fiberboard Box (4G)	15 lbs.	X	UN3480, Lithium ion batteries, 9			
				ERG Page 147			
Shipper Signature/Date				Carrier Signature/Pickup Date			
John Smith							
This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation				Carrier acknowledges receipt of packages and required placards. Carrier certifies emergency response information was made available and/or carrier has the DOT emergency response guidebook or equivalent documentation in the vehicle. Property described above is received in good order, except as noted.			

Total Weight of Battery

Number & Type of Packages

Shipper's Certification

Emergency Response Phone

Basic Description

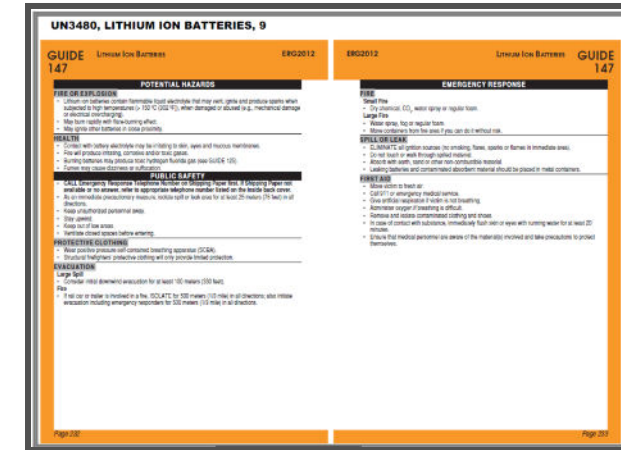
Emergency Response Info

Emergency Response Information

Emergency Response

- Information is required whenever a shipping paper (e.g. Shipper's Declaration) is needed:
 - Written Form (SDS, ERG Page, Other). Refer to figure 1 for example.
 - Must include a Emergency Response Telephone Number. Refer to figure 2 for example.

1



ERG Page 147

2



+1 (800)255-3924

Facility Management

Best practices for managing your facility for safely preparing batteries for shipping:

Entry/Exits/Plan

- Keep exits clear of any obstructions, allowing easy egress.
- Store batteries away from any exits or exit doors, minimum of 5 feet.
- Have a fire safety plan with emergency response actions to be taken upon detection of a fire or possible lithium fire.

Safety Equipment

- Your indoor area should be protected by a fire alarm system, utilizing air-aspirating smoke detectors or radiant energy-sensing fire equipment.
- Your facility should have an automatic sprinkler system, with fire detection.

Storing Batteries

- No more than 15 cubic feet of lithium-ion batteries should be stored in containers.
- Containers should be open-topped and constructed of noncombustible materials or approved for battery collection.
- Individual containers or group of containers shall be separated by not less than 3 feet of open space, or 10 feet of space that contains combustible materials.
- Containers shall be located not less than 5 feet from exits or exit access doors.
- Where feasible, reduce the state of charge of batteries to 30% or less.

Permissions

- Permits may be required for sites that store more than 15 cubic feet of lithium-ion batteries. (NFPA Regulation 322).

Handling a Hot Battery

Hot Battery Situation

- Lithium-ion batteries can become hot. As soon as it has been determined that a hot battery situation exists:
 - Completely evacuate all personnel from the area.
 - The area should be secured so that no unnecessary persons enter.
 - If it is safe to do, before evacuating the area, quickly determine if an external short-circuit is present and remove it as quickly as possible.
 - Note that some cell chemistries may enter a thermal runaway reaction above a certain temperature; thus, a cell may continue to gain heat and there may be a cascade to other cells.
 - The area should remain evacuated until the cell has cooled to room temperature.
 - Using appropriate personal protective equipment and after the hot battery has cooled to normal temperature, the cell should be removed from the work area and disposed of appropriately.

Emergency Response

Guidelines for Emergency Response

- The Lithium-ion batteries may be flammable, especially if damaged, abused, short circuited, overcharged, or left at high temperatures, and may release dangerous gases.
- The following are some guidelines for emergency response:
 - Lithium-ion battery fires are some of the most difficult fires to suppress.
 - Lithium-ion batteries may ignite other batteries in close proximity.
 - Fumes may cause damage to respiratory tract, eyes, and skin, and may likewise be flammable and explosive.
 - In the event of a lithium-ion battery leak or overheating, isolate the battery or place in a metal receptacle filled with sand or water.
 - Do not approach a battery that is leaking or overheating unless properly protected.
 - Burning batteries may vent violently or emit projectiles. If a battery is burning, do not attempt to handle it.
 - Batteries can usually be isolated in a metal receptacle, with the use of protected fire resistant and heat insulated gloves or tongs. Always wear eye protection when approaching.
 - Keep unauthorized personnel away. Ventilate closed spaces before entering.
 - Evacuate as needed to protect employees from hazardous fumes and smoke.
 - Small lithium-ion battery fires can be extinguished with ordinary extinguishing agents (ABC extinguishers).
 - Small lithium-ion fires can be extinguished with Halon or CO2 extinguishes as recommended agents.
 - Dry chemical or water-based extinguishers are not as effective but may also be used.
 - Cold water can be used to cool the fire to avoid re-ignition.
 - Gel-based extinguishers such as Fire Ice are effective at cooling and suppressing fires. If other combustibles catch fire as a result of the lithium-ion battery, then use the appropriate extinguishing agent to douse these secondary fires.
 - It's important to address each type of fire with the appropriate extinguishing agent.

Cleanup Procedures – Leaking Lithium-Ion Batteries

Protocol

- Only trained/qualified personnel should cleanup from lithium-ion battery incidents:
 - Contact the battery's Original Equipment Manufacturer (OEM) to request any cleanup protocols.
 - Wear appropriate personal protective equipment (e.g., gloves, safety glasses).
 - Place leaking cell in a sealable plastic bag and cover with a mixture of neutralizing agent (soda ash or baking soda) and absorbent material (vermiculite). Double-bag the leaking cell and seal the bag.
 - Absorb/neutralize any spilled electrolyte with absorbent material and neutralizing agent.
 - Collect the contaminated absorbent into a sealable bag.
 - After removing the cells and any absorbent/neutralizing materials, the areas can be cleaned with water or an ammonia-based cleaner.
 - Place all waste materials in an appropriate container.

First Aid

What To Do

- In case of contact with lithium-ion battery electrolyte, gases, or combustion byproducts, the following should be considered:
 - Warn others and report the emergency.
 - Evacuate to a safe area.
 - Attend to any person that has been exposed to the material, if safe to do so.
 - Wait for further instructions from the Emergency Coordinator.
 - Move victim to fresh air.
 - Call 911 or emergency medical service.
 - Give artificial respiration if victim is not breathing.
 - Administer oxygen if breathing is difficult.
 - Remove and isolate contaminated shoes and clothing.
 - In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
 - Ensure that medical personnel are aware of the material(s) involved and take precautions to protect them.

Thank You!

Thank you for safely shipping your batteries using SafeCASE. If you have additional questions, please **contact KULR**.

www.kulrtechnology.com
contact@kulrtechnology.com
(858) 866-8478

