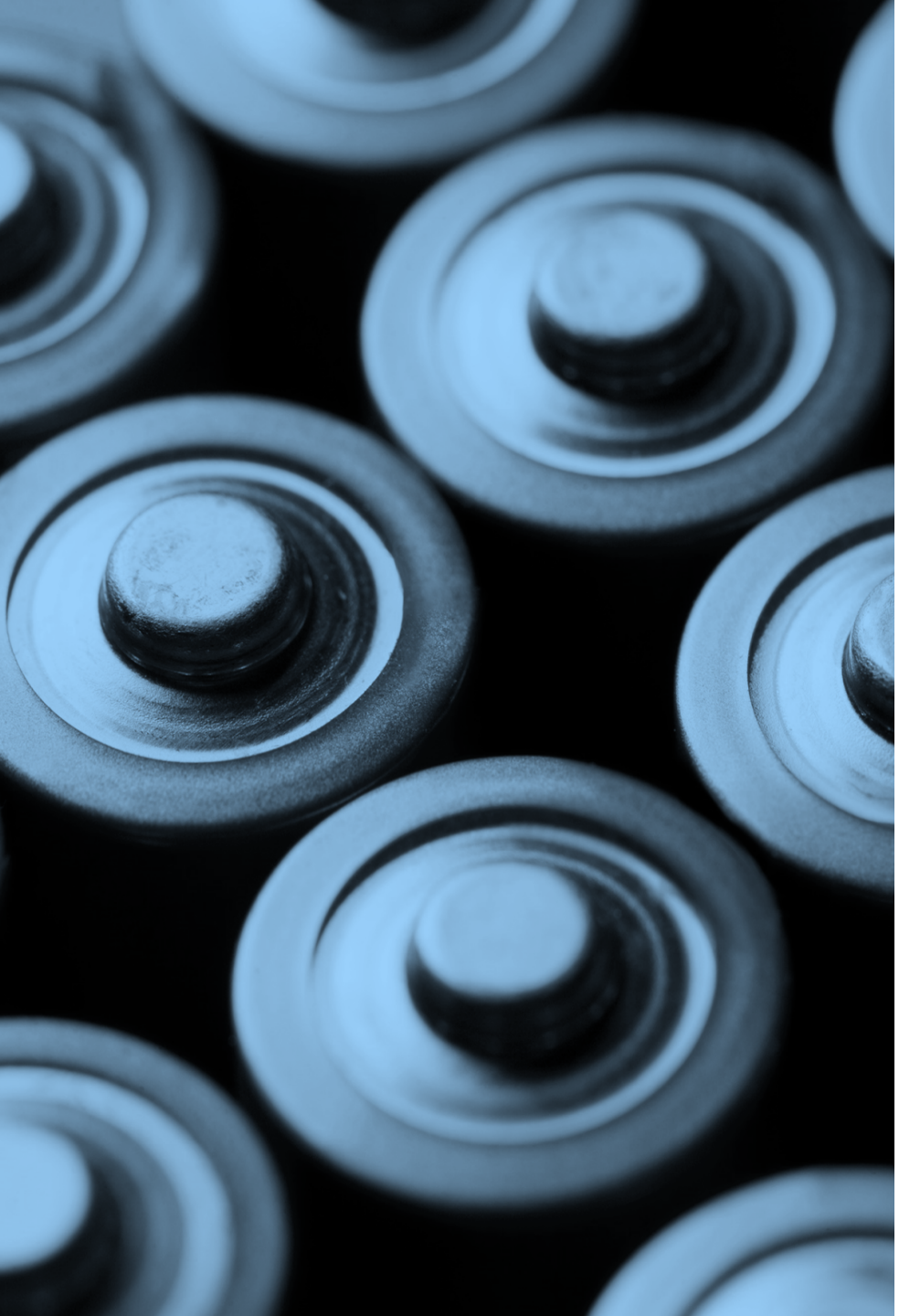


KULR

SafeSLEEVE Training

July 2024


Thank you for safely transporting your batteries using KULR's SafeSLEEVE.
This training will teach you its **proper use** and **shipping requirements**.

KULR – Accelerating the Transition to a Circular Electrification Economy

The **SafeSLEEVE** technology featured in these training slides has been used by NASA since 2019 for securing batteries on the Space Station and is now accelerating a global transition to a circular electrification economy.

Ordering Your SafeSLEEVE

Ready for Shipment

- When you are ready to ship batteries, you will order your SafeSLEEVE from your OEM (original equipment manufacturer) or shipping partner.

Defective Batteries

- When you place your order, you will need to determine if any of your batteries are DDR (damaged-defective-recalled).
  - Damaged - If the battery appears cracked, swollen, leaking, hot, or any other problems, then it is damaged.
  - Defective – If the battery has any apparent defects from its manufacturing process, then it is defective.
  - Recalled – If the OEM has issued a nationwide recall for the battery, then they have determined it has an issue requiring it be pulled from the market.

Remember	
DDR	Damaged, defective, recalled.
Boxes and Labeling	DDR batteries require special boxes and labels for shipping, provided to you by your OEM or shipping partner.

Why SafeSLEEVE?

Maximum Energy Storage

- SafeSLEEVE is for transporting lithium-ion batteries up to 300 watt-hours (Wh), or 0.3 kilowatt-hours (kWh). This is the maximum energy allowed under the Department of Transportation permits.
  - You can place multiple batteries in one SafeSLEEVE, but their total energy cannot exceed 300 watt-hours, or 0.3 kWh.

Remember	
Total Energy Permitted	Up to 300 watt-hours (0.3 kWh)
Total Batteries Permitted	Any amount, but total energy of all batteries cannot exceed 300 watt-hours (0.3 kWh)

Example

- 4 batteries at 70 watt-hours each = 280 watt-hours (0.28 kWh)
- All 4 batteries can ship in the SafeSLEEVE, since the total energy is under the 300 watt-hour (0.3 kWh) limit.

Voltage

Calculating Voltage

- If your battery's label does not provide watt-hours (Wh) or kilowatt-hours (kWh), you can calculate as follows:
  - ***Volts x Amp-Hours = Watt-Hours***
  - **Note*, there are 1000 watt-hours in 1 kilowatt-hour.

Example

- 40 volts x 10 amp-hours = 400 watt-hours or 0.4 kilowatt-hours

Remember	
Watt-Hours	Volts x Amp-Hours = Watt-Hours
Kilowatt-Hours	There are 1000 watt-hours (Wh) in 1 kilowatt-hour (kWh)

Permit

- SafeSLEEVE has 5 permits from Department of Transportation:
  - Recycling – For shipping batteries that have finished their life and ready to be retired/recycled. (DoT-SP 21704)
    - 300 Wh = SP 21704 (UPS accepted)
  - DDR – For shipping batteries that are damaged-defective-recalled. (DoT-SP 21693)
    - 300 Wh = SP 21693 (UPS accepted)
  - Prototype – For shipping prototype batteries, that are not sold in the marketplace yet. This is uncommon. (DoT-SP 21167)

Remember	
Recycling Permit	For batteries at end-of-life.
DDR Permit	For damaged, defective, recalled batteries.
Prototype Permit	For shipping prototype batteries.

Proper Shipping Labels

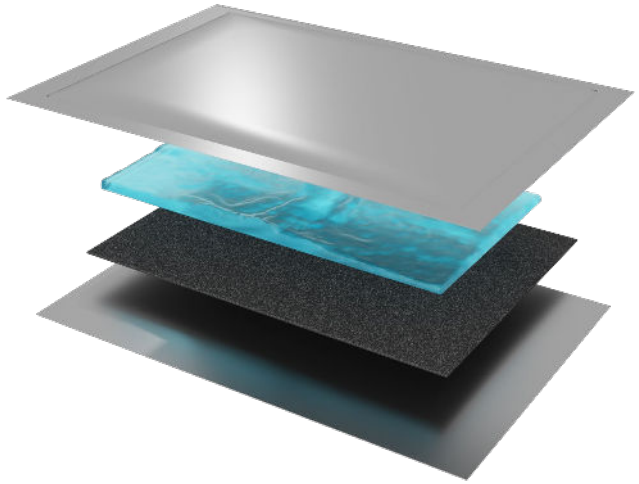
- *Once you have selected the correct DoT SP, please review the KULR Shipping checklists and the text of the DoT Special Permit selected to confirm you have the correct labeling and placarding*
  - 49 CFR 171-185 Regulation: Governs Hazardous Material Transport

Thermal Runaway Shield® (TRS)

Product Description

- In the walls of the SafeSLEEVE are 2 pouches, called Thermal Runaway Shield® (TRS). Within each pouch is a liquid. During a lithium-ion battery fire, a pouch will rupture liquid onto battery cells to stop the heat propagation.
- Always inspect all TRS pouches in your SafeSLEEVE, to see if any liquid has leaked, or if the pouches are degraded. Contact your shipping partner or KULR if you need new pouches or an entire new SafeSLEEVE. Do not ship a faulty SafeSLEEVE.

Remember	
2 Pouches	Inspect each pouch before shipping your SafeSLEEVE
If Leaking/Damaged	Contact KULR or your shipping partner.



How to Use SafeSLEEVE

SafeSLEEVE

Packaging of SafeSLEEVE

- Each SafeSLEEVE comes with a printed card containing a QR code to scan with your phone for digital instructions. This code is also fixed onto the SafeSLEEVE. If you do not receive instructions, please contact KULR Technology.

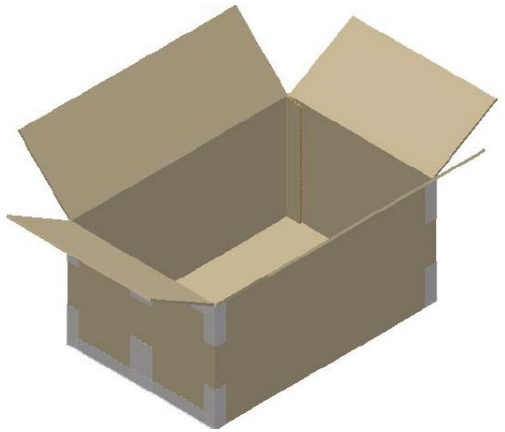
- **WARNING: It is not recommended to use a box cutter to open the boxes, or you may slice the SafeSLEEVE.**

- Follow the instructions in the checklist and the special permit to label the box accordingly before shipping your battery back to your recycling provider.

- Link to SafeSLEEVE Assembly & Use Instructions
  - https://www.kulrtechnology.com/wp-content/uploads/2024/07/SafeSLEEVE-Assembly-Use-Instructions-July-2024.pdf

SafeSLEEVE

Outer Box



SafeSLEEVE Instructions

Step One

Open SafeSLEEVE's velcro flap, remove inner pouch, TRS pouches, and visually inspect all contents for damages before and after every use.

SafeSLEEVE Instructions

Step Two

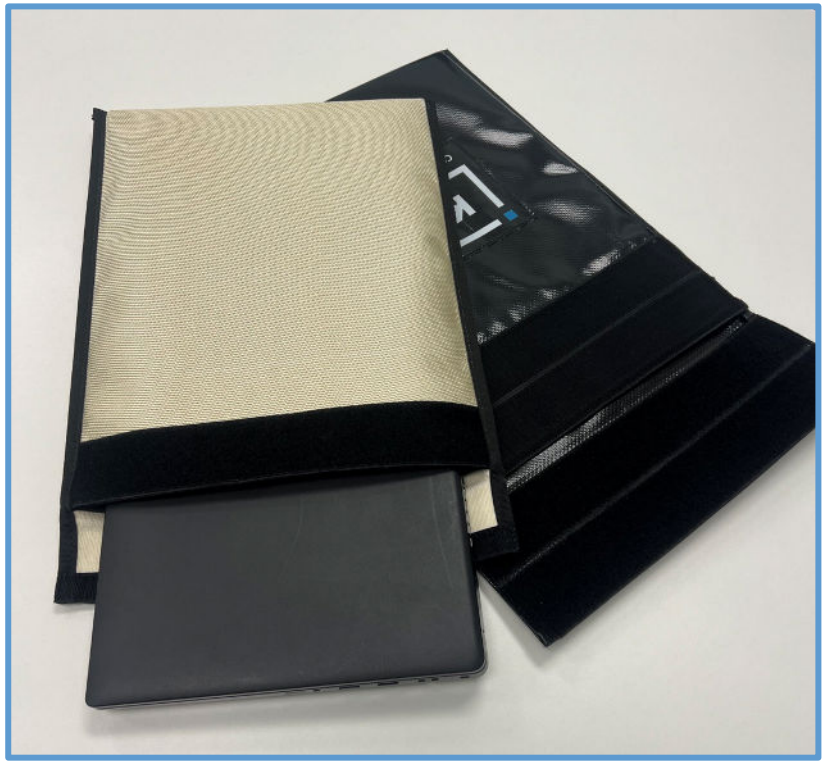
Open velcro flap on Inner Pouch and identify all three inner sections.

Step Three

Ensure TRS Pouches are in each inner & outer sections of the Inner Pouch.

SafeSLEEVE Instructions

Step Five



Insert laptop or battery to be enclosed inside SafeSLEEVE. Tape down and/or wrap sharp edges to protect TRS if needed.

Step Six

Close velcro flap to Inner Pouch with battery and TRS inside. Then place Inner Pouch inside of the SafeSLEEVE and secure velcro.

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. Shipper is responsible for complying with the regulations of their applicable transport modes.
  - 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
  - Training record per 49 CFR 172.704(d) retained at least 2 years
- For more information on US DOT hazardous materials requirements, please visit: https://www.phmsa.dot.gov/standards-rulemaking/hazmat/hazardous-materials-information-center

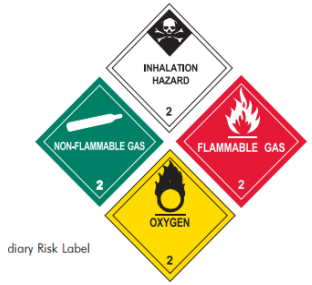
Dangerous Goods (HazMat)

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

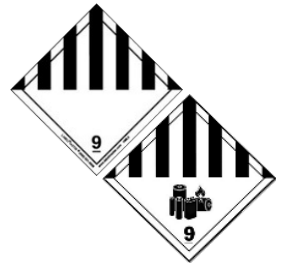
Class 5
Oxidizers & Org Peroxide

Class 6
Poisons & Infect. Subs

Class 7
Radioactive Material

Class 8
Corrosive

Class 9
Miscellaneous



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 SafeSLEEVE for shipping.

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 SafeSLEEVE, both require that the person packing batteries and shipping SafeSLEEVE be properly trained.
  - This certification is valid for 3 years (2 years international), then recurrent training is required.
    - *Please keep a copy of your training email. Training records must be maintained on-site.

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

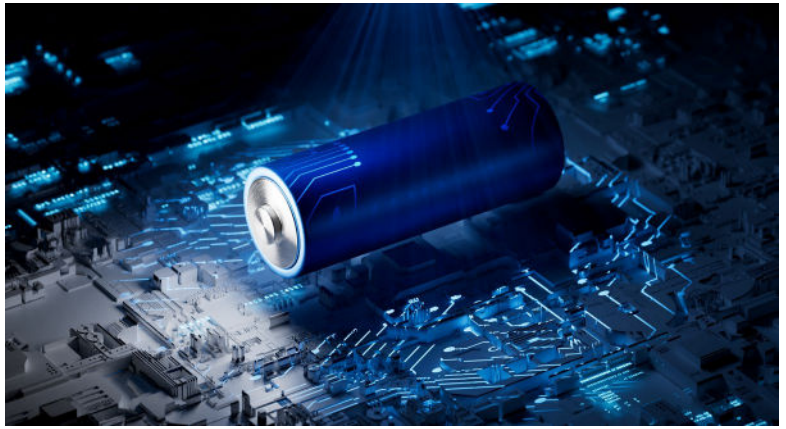
Safety and Security

Battery Safety

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

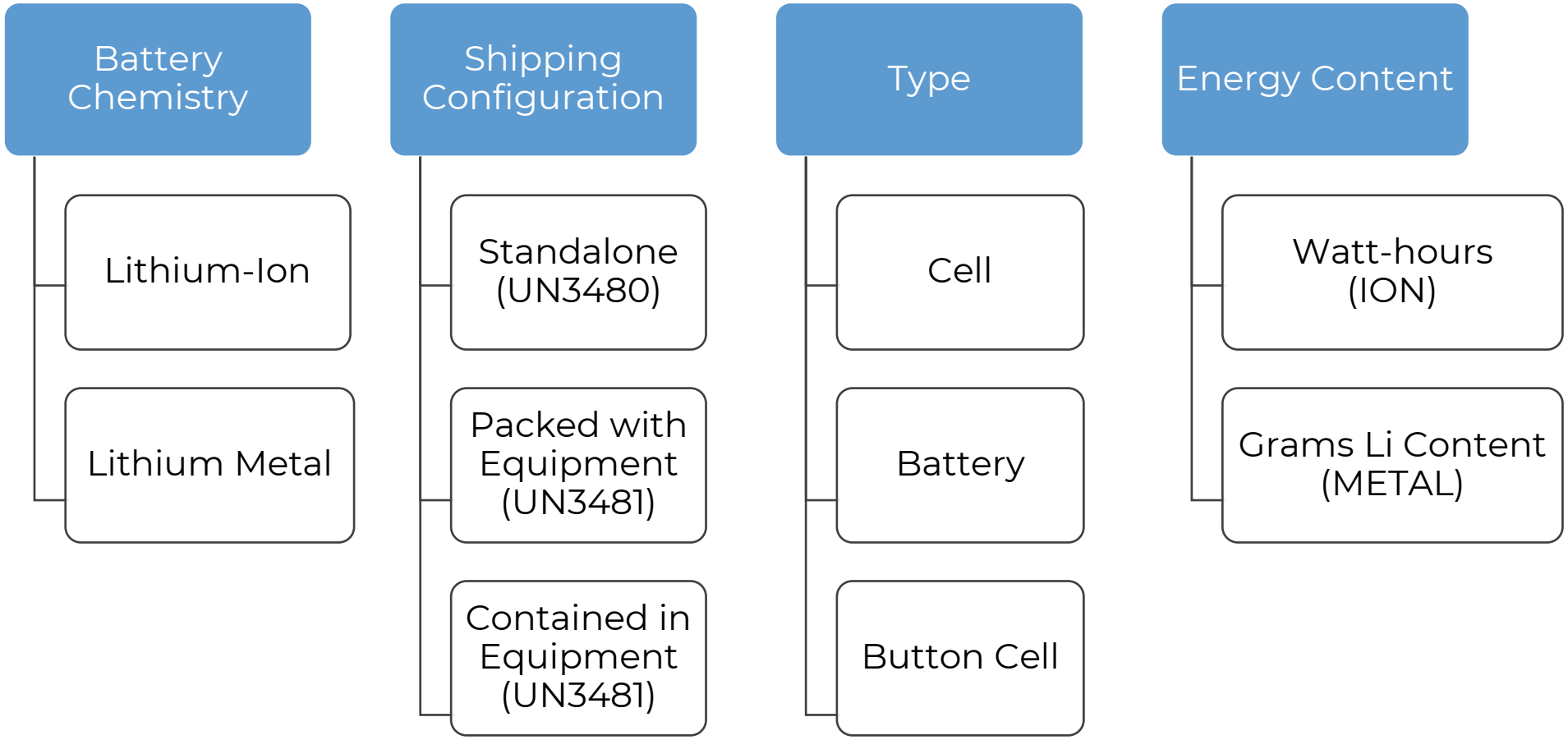
Security Awareness

- 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, SafeSLEEVE is for transporting lithium-ion batteries only, not lithium-metal batteries. Your batteries will be labeled for their type.



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

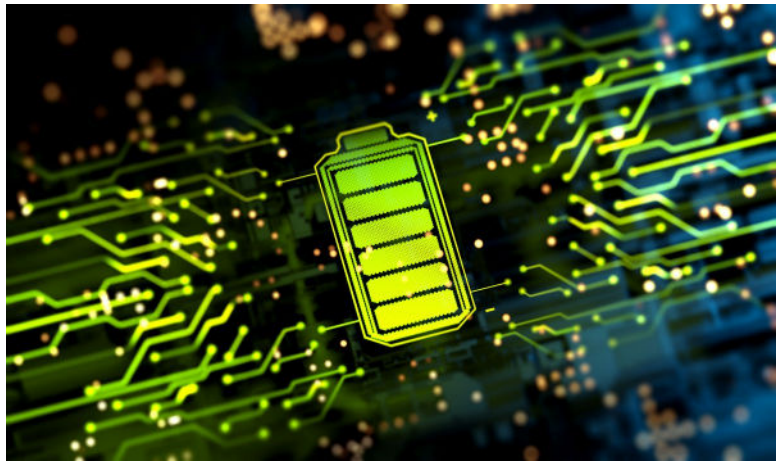
Watch to see the potential dangers that lithium batteries can cause.

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

- Complete the labeling of the outer box based on the configuration of cells you are shipping at time of shipment. Refer to shipping instruction checklist.



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

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

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 SafeSLEEVE!

***NO LITHIUM METAL CELLS AND BATTERIES ALLOWED!**

Ground Transport Only

Never ship DDR batteries by air

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
- If a cell is showing signs of active disassembly or thermal runaway, it cannot be shipped via any method and should be stored safely until energy content has dissipated.

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

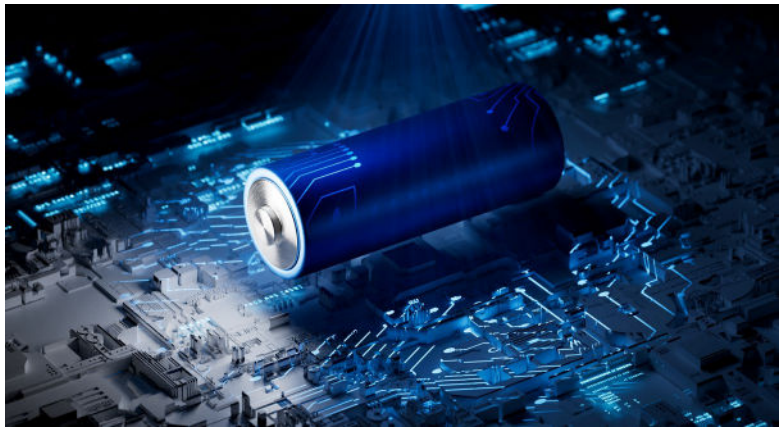
AIR TRANSPORT PROHIBITED

(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…

Shipping DDR Batteries

Special Permit 21693 Low Energy

- PHMSA (DoT) issued Special Permit 21693 to facilitate DDR shipments:
  - KULR SLEEVE contains thermal runaway hazards (limit: 300 Wh)
  - *Packages may contain more than 1 cell or battery up to 300 Wh***
  - Outer box is a fiberboard box unless single piece is >30 kg*
  - Emergency response info (including phone number) printed on box
  - Cells/batteries must originally have been UN 38.3 tested
  - Not to be used internationally



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

UPS accepted.

Shipping Labels – DDR Labeling

Low Energy (21693)

- Load cannot exceed 30 kg *(For UPS)*.
- Maximum energy rating cannot exceed 300 Wh
- Box marked:
  - "DoT SP 21693"
  - Copy of permit attached
  - "Damaged/Defective Lithium Ion Battery"
  - "For Ground Transportation Only - Forbidden for Transport By Aircraft and Vessel"
  - Low Energy Sticker
    - **Lithium Battery Mark (3480 or 3481)**
  - Emergency Response Info
- Training required

Your shipping partner will provide you with the following DDR labeling based upon your description of your batteries.

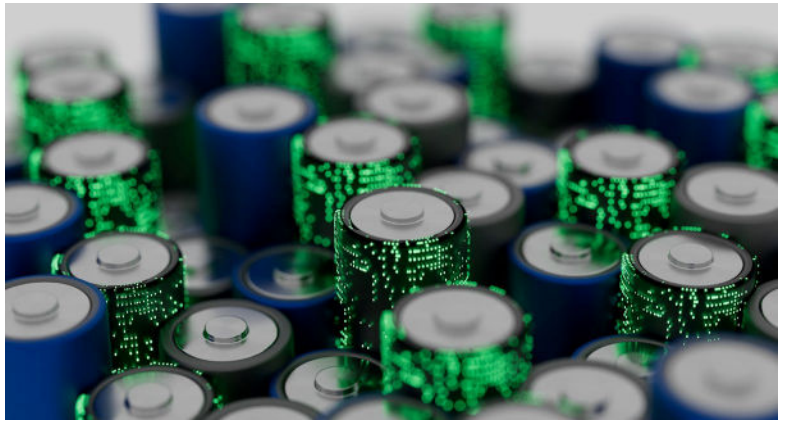
Refer to shipping instruction checklists for complete requirements.

Recycling Batteries

Special Permit 21704 Low Energy

- PHMSA (DoT) issued Special Permit 21704 to facilitate shipments of batteries to recycling:
  - KULR SLEEVE contains thermal runaway hazards (limit: 300 Wh)
  - *Packages may contain more than 1 cell or battery up to 300 Wh***
  - Outer box is a fiberboard box unless single piece is >30 kg*
  - Emergency response info (including phone number) printed on box
  - Cells/batteries must originally have been UN 38.3 tested
  - Not to be used internationally

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



UPS accepted.

Shipping Labels – EOL/Recycling Labeling

Low Energy (21704)

- Load cannot exceed 30 kg *(For UPS)*.
- Maximum energy rating cannot exceed 300 Wh
- Box marked:
  - "DoT SP 21704"
  - Copy of permit attached
  - "Recycled Lithium Batteries"
  - "For Ground Transportation Only - Forbidden for Transport By Aircraft and Vessel"
  - Low Energy Sticker
    - **Lithium Battery Mark (3480 or 3481)**
  - Emergency Response Info
- Training required

Your shipping partner will provide you with the following DDR labeling based upon your description of your batteries.

Refer to shipping instruction checklists for complete requirements.

UPS Accepted Permits - Shipping Label Requirements

If you shipping via UPS, you need to call the HMSC at 800-554-9964 to get details on the agreement. Having a hazmat or DG contract with UPS is not sufficient, as it is a separate program.

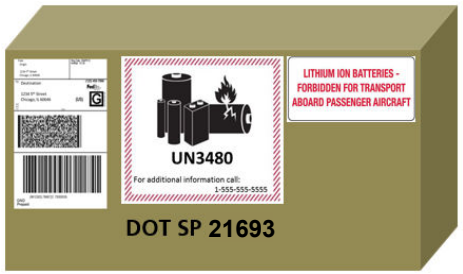
Low Energy (21704)

- Load cannot exceed 30 kg *(For UPS)*.
- Maximum energy rating cannot exceed 300 Wh
- Box marked:
  - "DoT SP 21704"
  - Copy of permit attached
  - "Recycled Lithium Batteries"
  - "For Ground Transportation Only - Forbidden for Transport By Aircraft and Vessel"
  - Low Energy Sticker
    - **Lithium Battery Mark (3480 or 3481)**
  - Emergency Response Info
- Training required

Low Energy (21693)

- Load cannot exceed 30 kg *(For UPS)*.
- Maximum energy rating cannot exceed 300 Wh
- Box marked:
  - "DoT SP 21693"
  - Copy of permit attached
  - "Damaged/Defective Lithium Ion Battery"
  - "For Ground Transportation Only - Forbidden for Transport By Aircraft and Vessel"
  - Low Energy Sticker
    - **Lithium Battery Mark (3480 or 3481)**
  - Emergency Response Info
- Training required

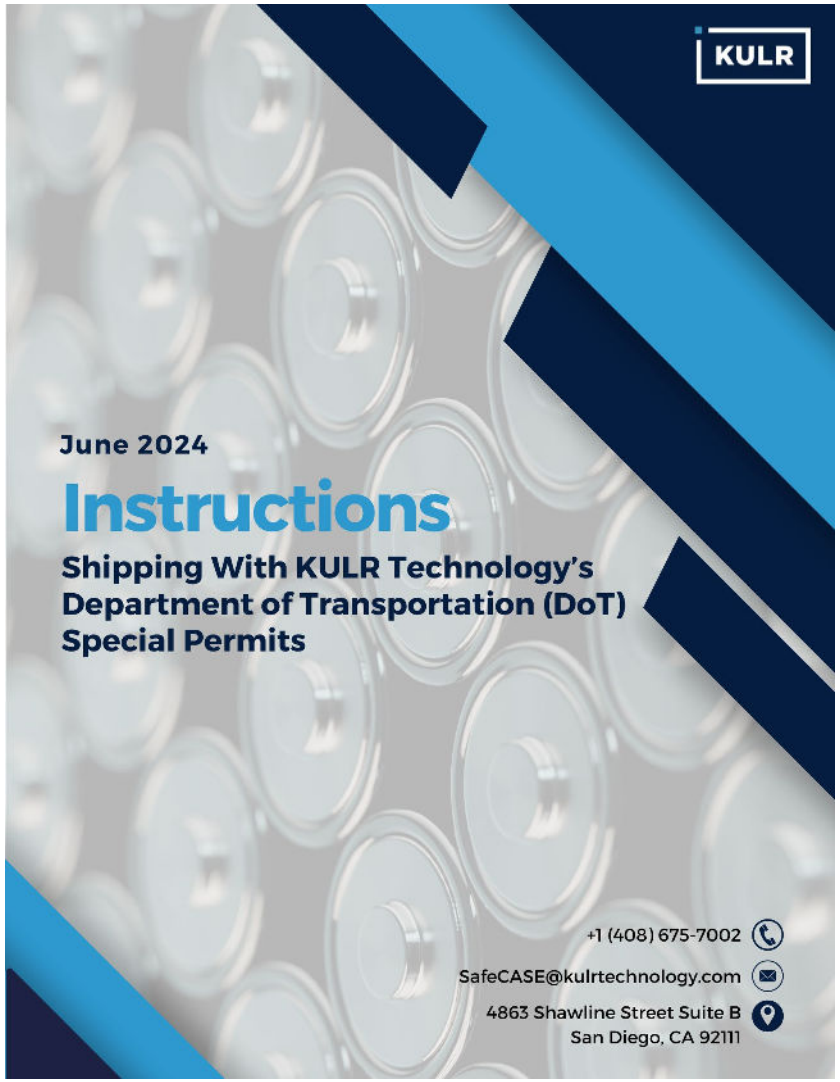
Your shipping partner will provide you with the following labeling based upon your description of your batteries.



Refer to shipping instruction checklists for complete requirements.

Shipping Matrix – Quick Guide

Click here →



Hazmat Trainings By Tier

Tier 1: Shipping, Handling & Closure Training

- https://www.kulrtechnology.com/wp-content/uploads/2024/06/Tier-1-Shipping-Handling-Closure-Training-SafeX.pdf

Tier 2: Online Training and Quiz Handling & Closure

- https://hazmatsafety.com/

Tier 3: Fully Regulated Hazmat Training

- https://hazmatsafety.com/

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.

Emergency FAQs SafeX Training

These FAQs provide a quick reference guide to managing lithium-ion battery fires and related emergencies, ensuring safety and compliance with best practices and regulations.

- https://www.kulrtechnology.com/wp-content/uploads/2024/06/Emergency-FAQ-SafeX-Training.pdf

KULR

Thank You!

Thank you for safely shipping your batteries using SafeSLEEVE. You should be **emailed** a copy of these slides upon completion of this training. If you do not receive them, please **contact KULR**, and we will email them to you. We look forward to partnering for battery safety.

www.kulrtechnology.com
contact@kulrtechnology.com
(408) 675-7002