



## **Risk Disclosure of Lithium Battery and Recommendation for Fire Safety**

Dear Customers,

According to “Recommendations on the Transport of Dangerous Goods” of UN and “List of Dangerous Goods” of China (GB 12268), when the lithium content or watt-hour or number of a package of lithium batteries exceeds a certain amount, it belongs to the 9<sup>th</sup> Category of Dangerous goods in the area of transportation. Based on a deep understanding of lithium batteries, our company adopted a variety of Safety Designs. The product has passed relevant safety tests and conforms to UL1642, UL2054, UN38.3, IEC60086, GB31241, GB38031-2020 and other product safety and transportation safety standards. However, lithium batteries belong to high energy density products that contain hazardous chemicals. There are still risks of heating, thermal runaway, smoking, and catching fire under any influence of complex factors, such as environmental changes, external impact, incorrect storage and incorrect use. If there are loopholes in fire safety management, these risks may turn into an incident.

At present, there are relatively complete and strict safety standards in domestic and foreign countries in the field of lithium batteries transportation. In the field of lithium battery production, the industrial standards, “Safety of Lithium Primary Batteries During Production”, mainly edited by EVE, has been formed for approval. “Design-standard for lithium-ion battery factories” (GB 51377), “Safety requirements for lithium-ion cell and battery production” (SJ/T 11798) and “Specification of Lithium-ion battery enterprise safety production” (T/CIAPS0002) have been published and implemented.

However, at present, there are only general fire safety laws, regulations and standards in the field of lithium battery applications, such as EN13501, VDI3564 Blatt1, ISO 7240 and NFPA 855. There is a lack of special fire safety standards in this field.

To prevent risks and incidents, safeguard your company as well as possible and promote the



sustainable development of our cooperation, we solemnly make the following suggestions to your company regarding the key contents of fire safety in the field of lithium battery application, please pay attention to. Meanwhile, EVE will also offer to inspect fire safety about lithium battery application and storage.

1. According to relevant laws and regulations about fire safety, the plants and warehouses should conduct fire control design and be qualified upon acceptance. The plant for lithium battery application, warehouses for lithium battery storage, and the place for safety and environmental test should use non-flammable and fire-retardant construction materials and should not use construction materials that the State formally prohibits, such as EPS Colored Steel to interior decorations.

2. In the following sites: plant for lithium battery application, warehouse for lithium battery storage, the place for safety and environmental test, should install the automatic sprinkler system, fire hydrant system, automatic fire alarm system, smoke management system, fire water pool, and fire pump that would start up automatically and set up a round-the-clock fire control room with qualified staff. In the High Racked Storage Warehouse of lithium battery, the automatic sprinkler system is recommended to adopt ESFR Sprinkler.

3. Purchase property for essential assets.

4. Lithium batteries should be stored separately from chemicals and flammable materials, and defect lithium batteries separately from those in good condition. If conditions allow, it is better to build single buildings or set fire compartments in places where lithium batteries are stored and where lithium batteries' safety and environmental tests are made.

5. When applying, transferring and storing lithium batteries, the original packaging should be used to fix and isolate lithium batteries one by one to eliminate energy concentration. Lithium batteries should not be used in dense storage in contact with each other. The temperature and



humidity conditions of the lithium battery storage site should meet the requirements of the product specification.

The lithium batteries should be stored classified, in stacks, and with a limited amount. The area which each stack covers should be less than 150 m<sup>2</sup>. The width of the main channel inside the storage place should be more than 2m. The 5 kinds of spaces in the storage place for lithium batteries should meet the requirements of “General rules for fire safety management of storage occupancies” (GA 1131). The requirements are following:

- a. The space between stack’s upper surface and the ceiling is not less than 0.3m.
- b. The space between goods and lights is not less than 0.5m.
- c. The space between goods and walls is not less than 0.5m.
- d. The space between stack and pillars is not less than 0.3m.
- e. The space between each stack is not less than 1m.

6. For storage, processing, in-plant transportation, land transportation and sea transportation, the SOC of the lithium-ion battery should not exceed 30%, the SOC of lithium iron phosphate battery and consumer battery should not exceed 70%. The lithium-ion battery SOC shall not exceed 30% when transported by air.

7. The storage, transfer, processing and use of lithium batteries should be taken to prevent the unintended use of the battery. Including, but not limited to:

- a. During the test, secondary process, and assembly of lithium batteries, should avoid short circuit, external impact, crushing, high temperature, direct soldering, damaging batteries isolation, damaging wiring isolation, bad thermal design, and other factors that may damage the lithium batteries.
- b. Operators are prohibited from wearing metal jewelry, watches, etc. Special attention should be paid to prevent sharp objects from piercing the aluminum-plastic film of the pouch battery.
- c. Lithium batteries used in groups, should be installed with effective voltage, current,



temperature and other protection devices.

- d. When the lithium batteries, used for energy storage or traction, are assembled to pack, should install the battery management system (BMS). The control policy of BMS should ensure that the energy storage and power battery system meet the expected functional requirements during the full life cycle. It is recommended to carry out BMS functional safety management to meet the corresponding ASIL level of ISO 26262.
- e. For voltage greater than 60V and not greater than 1000V battery system, the operator should have low-voltage electrical work skills or qualifications.
- f. The reworked or repaired lithium batteries should be re-tested and confirmed to be qualified before secondary processing or assembly.
- g. Regularly confirm that the software functions of the lithium batteries charging and discharging equipment meet the expected requirements
- h. Keep away from high temperature, fire and heat sources.
- i. For details, please refer to the operation and use safety section of the product specification

8. The lithium battery with an intact can be disposed of in accordance with local laws and regulations after the discharge is complete. Lithium batteries with damaged bodies, or heating up, can be immersed in a 5% sodium bicarbonate aqueous solution or sodium chloride aqueous solution until a complete discharge reaction. The residue is drained and disposed of by the requirements of local laws and regulations. The soaking liquid should be drained into the industrial wastewater station or outsourced to a qualified company directly.

9. Establish the safety management department, appoint the full-time or part-time safety manager.

10. The place, where lithium batteries are used and stored, should be inspected for fire prevention at least once a day. At night and mealtimes, on weekends, holidays, and other

special periods, should strengthen and increase the safety watch and patrol in sites where lithium batteries are used and stored.

11. Establish the mini fire department and voluntary fire brigade. Train all employees to be proficient in the operation of the standard fire-fighting equipment and facilities, such as fire sand, fire blankets, fire extinguishers, and fire hydrants, so that employees can put on the initial lithium battery fire.

12. Establish rescue agreements with local fire and rescue agencies and organize joint fire drills.

13. When a few lithium batteries are hot, smoking, or on fire, it can be covered with fire sand, fire blanket, water-based fire extinguisher and dry chemical powder fire extinguisher; When a lithium battery module, a lithium battery pack or a large number of lithium batteries are on fire and larger scale fire occurs in the lithium battery warehouse, the emergency plan should be started immediately to evacuate people. After cutting off the power supply and determining items cannot be touched by water at the accident site, a large number of jets of fire water can be considered to cool down and extinguish the fire. (The firefighting method comes from Emergency Field Guide of Alternative Fuel Vehicles Safety Training Program of NFPA, 2018 Edition)

14. Due to the potential for a reignite after putting off the battery system's fire, please store the damaged battery system 15 meters away from the structure, vehicle, or other flammable things.

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