Date: May 28, 2025
To: SAE Battery Transportation and Storage Committee
Subject: Transportation of EV batteries - safe handling factors

Here are some of the considerations specific to transportation related factors for containerization of batteries. The fall into several areas independent of the general considerations for testing end evaluation of containers intended to safe storage of batteries that are already under discussion by the committee.

The additional issues in many cases cannot be written as specification requirements because the appropriateness of a container for shipping will substantially depend upon the type of vehicle or other mode of transport, so as a starting point I'd like to focus on the requirements from the transport side of the equation without regard for any specific fire safety testing that is already under considerable review by this committee and other standards bodies.

The main bulk factors that must be considered for shipping include:

1) Weight limitations. This will obviously vary on the capacities of the loading and transport vehicles. As a result, this cannot be predetermined in a standard, however a gross weight limitation can be specified for a container. In addition, for the specific load, the actual gross container weight will also be relevant.
2) Balance considerations. Improperly balanced containers have been routinely a source of stability problems even when the overall weight limits for a transport has not been exceeded. Center of balance issues can either occur from a significant offset laterally, front to back or vertically. Address this can be done through a combination of external marking and design, and guidelines for how to place batteries into a storage unit.
3) Tie-down/secure anchor points properly designed and positioned for the application.
4) External dimensions of container packaging. This is relevant for ordering of compatible containers and for load optimization by volume.
5) Risk factors for flammable gas buildup as an interaction between the containerized battery storage units and the type of appropriate transportation. As an example, flat-bed open trailers will not have a problem with combustible gas build-up when driven on the road with storage containers properly designed and supporting venting. The same containers when shipped in sealed unvented battery storage containers will have that combustion risk.

Mitigating these risks, and helping to support proper selection of containers, battery placement in the containers for three axis balance, proper placement of the container on the shipping vehicle for balance, load lockdown, venting considerations, stacking related issues and other such factors related to shipping compatibility.

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