



*THE WILLIAM STATES LEE
COLLEGE OF ENGINEERING*

Engineering Safety Policy (ESP)

ESP-001a: Lithium-Ion Battery Research ADDENDUM FOR FSAE



IN CASE OF EMERGENCY:

Police/Fire/EMS: (704) 687-2200

University Environmental Health and Safety: (704) 687-1111

Revision: A

Revision Date: June 20th, 2024

Questions? Contact the Facility and Laboratory Safety Engineer

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1. Scope

In addition to ESP-001 for general work involving li-ion batteries, the nature of the Formula SAE EV competition creates unique situations and challenges that are addressed in this addendum.

This document is intended for students, faculty, and staff who are involved in the development of FSAE (EV) vehicles.

2. Hazards



All students, faculty, and staff must acknowledge that, despite electric vehicles being on the road for many decades, OEMs still struggle with making EVs immune from battery failures; some of which have resulted in catastrophic fires. Students, faculty, and staff must remain vigilant that good engineering practices are followed, and that safety must be prioritized over all else. All accumulator work must be methodical and un-rushed at all times.

3. Accumulator Design Considerations

- 3.1. It is the preference of the College that all accumulator segments be less than 50V. If segment voltage is 50V or greater it **shall** be handled with all high-voltage precautions as outlined in ESP-001.
- 3.2. It is the preference of the College that the first structural layer in direct contact with the accumulator cells be made of a non-conductive material. This is to help prevent accidental shorting between the modules and the accumulator container.
- 3.3. Accumulator design must consider that high-voltage gloves must be worn for work on any component/system/assembly with an electrical potential of 50V or greater (design value). High-voltage gloves are bulky and wearers will have reduced dexterity. The ability to handle small parts is greatly inhibited.
- 3.4. Consider how the accumulator is installed and removed from the vehicle. The accumulator, with the maintenance plugs installed, is always a high-voltage assembly. Installation **must** occur with personnel wearing high-voltage gloves and no other part of the body can touch the vehicle.

4. Vehicle Design Considerations

- 4.1. It is the preference of the College that all components that may need to be manipulated in case of emergency be able to be reached without reaching over, under, or around another part of the vehicle. Examples of such components are TSMPs, MSD, GLV Master Switch, TS Master Switch, etc.
- 4.2. It is the preference of the College that all status lights for AMS and IMD be easily visible in direct sunlight from 3m (10ft) away, and the TSAL be visible in direct sunlight from 25m (82ft) away.

5. Handling and Transportation

- 5.1. The accumulator **must** be transported at 30% state of charge with all maintenance plugs removed.