

At the 2018 SCCA National Convention, The RallyCross Board (RXB) voted to start the process for a rule set that will allow modifications of the vehicles with hybrid or all electric drive trains. Currently, hybrid and all electric vehicles can run under SCCA RX rules. The new ruleset will allow modifications of batteries and controls as well as building an all-electric power plant swap.

The time line is as follows-

Member comment, Rules and Safety Committees review till March 1, 2018

RXB voting on final ruleset March RXB phone call on March 6, 2018

BOD, Insurance, Risk Management review

BOD approval May meeting(tentative)

July 1, 2018 to December 31, 2018 available as regional class only.

January 1, 2019 available as national class and RXNC eligible.

The following pages are the rules proposed for electric/hybrid vehicle allowances.

SCCA Rallycross Electric Class

Proposed Ruleset for 2018

- Rule:** Battery chemistry shall be limited to the following: LiFePO₄, LTO, NiCd, NiMH, lead-acid, gel-cell

Verification: Competitor provides datasheet in tech inspection package

Purpose: Limit to the safest, least volatile cell chemistries. These chemistries perform well in high power applications (horsepower) but have lower energy density (range) for a given volume/mass than the more volatile chemistries.
- Rule:** Maximum voltage across any two terminals in the vehicle or during charging shall not exceed 650 VDC at any time.

Verification: Competitor responsible for providing voltage gauge

Purpose: 600 VDC is a common system voltage for high performance EVs, with 50 VDC additional margin for charging. 600 VDC is also the limit for the international student Electric FSAE competition.
- Rule:** The traction system power path must include an in-line fuse OR circuit breaker rated to 650V or higher at the POSITIVE and NEGATIVE terminals of the traction accumulator [specify location/distance from battery terminals?]

Verification: Competitor provides datasheet in tech inspection package

Purpose: Interrupt current path in the event of a short of the high voltage battery pack
- Rule:** All joints in the traction system wiring path must be bolted, welded, or crimped. No soldering of joints allowed

Verification: Visual verification in tech inspection

Purpose: Increased reliability of the high voltage power path
- Rule:** Rated wire ampacity must exceed the max performance current at 90C. Wire insulation must be rated to 100C or higher.

Verification: Competitor provides datasheet in tech inspection package

Purpose: Increased reliability of the high voltage power path
- Rule:** All high voltage wires must have fluorescent orange insulation for easy visual recognition

Verification: Visual at tech inspection

Purpose: Increased safety for course workers and safety stewards
- Rule:** All parallel wires must be of the same gauge and the same length ($\pm 5\%$) to ensure current sharing

Verification: None

Purpose: Ensure wires are correctly rated for ampacity for increased reliability
- Rule:** All high voltage wires that route between vehicle compartments must be routed through a non-conductive fluorescent orange conduit

Purpose: Increased reliability for high voltage harness routing

Verification: Visual at tech inspection

9. **Rule:** Both the POSITIVE and NEGATIVE terminal of the traction battery shall be isolated from vehicle chassis.
Verification: Tech inspection isolation test
Purpose: Operator and safety steward safety.
10. **Rule:** Both the POSITIVE and NEGATIVE terminal of the traction battery shall have relays/contactors that must open in the event of either terminal shorting to chassis
Verification: Tech inspection isolation test
Purpose: Operator and safety steward safety
11. **Rule:** Relays/contactors must be Normally-Open (NO) when not-powered
Verification: Tech inspection isolation test
Purpose: Default to isolating high voltage power state if power is interrupted
12. **Rule:** The vehicle shall have an externally accessible series-wired disconnect switch to interrupt coil power to the Normally-Open (NO) traction battery relay/contactors. This switch shall be clearly labeled with an SCCA "OFF" decal for the switch.
Verification: Tech inspection isolation test
Purpose: Easy access to isolating the high voltage battery pack
13. **Rule:** The battery cells must have a shield between the battery and ground made of the equivalent or thicker of the following: 18 gauge steel, 0.100" aluminum, or 22 gauge titanium
Verification: Visual at tech inspection
Purpose: Puncture protection from road debris
14. **Rule:** If the battery is an enclosure, the enclosure shall vent to the outside of the vehicle. It may not be pressure sealed and or vent into internal compartments.
Verification: Visual at tech inspection
Purpose: Safety in the event of cell run-away
15. **Rule:** The separation between the driver and the battery system must be made of the equivalent or thicker of the following: 0.5mm thick aluminum
Verification: Visual at tech inspection
Purpose: Protection for the driver in the event of battery hazard condition. This rule is identical to the Electric FSAE requirement
16. **Rule:** The battery cells.pack must be mounted positively and security and employ a redundant mounting mechanism (eg, strap(s))
Verification: Visual at tech inspection
Purpose: Reliability of the high-voltage system
17. **Rule:** Charging of the traction battery can only occur in a designated area at the competition site.
Verification: Clearly marked battery charging area.
Purpose: Contain potential battery hazards to a pre-cleared safe area.
18. **Rule:** High-voltage gloves must be worn when connecting/disconnecting non-OEM chargers to the traction battery
Verification: Competitor must bring high-voltage gloves, verified at tech inspection
Purpose: High voltage safety for operators