

**Washington DC Region (WDCR),
Mid Atlantic Road Racing Series (MARRS)
2021 EM1 and EM2 Car Preparation Specification
(Last updated on 03/07/21 for the 2021 Race Season)**

The Electric Modified Classes are intended to provide competitive, inclusive racing for all non-production electrically powered cars which are based on the general requirements stated in the GCR and specific requirements stated in the Spec Line for the Sports Racing Category (GCR 9.1.8.A and 9.1.8.E) and modified or augmented by the following specific items. These rules are intentionally broad with regard to: mechanical construction; configuration; and design, with the specific intent to allow for innovation and increased participation. This class is for electric cars made for, or modified for, wheel to wheel racing. The EM 1 and EM 2 classes are restricted to a specific battery chemistry (LFP/LiFePO4). LFP is the only lithium chemistry that does not require special training or equipment for fire suppression. Venting or fire suppression incidents can be addressed with relatively small amounts of suppressant (water, CO2, and all other classes of extinguishers). This is to ensure safety for the drivers, track officials, and workers as well as minimizing potential damage to the racing facilities themselves

Electric Modified

- Electric Modified 1 (EM-1) – Over 200KW
- Electric Modified 2 (EM-2) – up to and including 200KW (~268 bhp)
- Power measured as the maximum/peak output of the combined powerplant(s).

(1) The vehicle must be totally powered by electric motor(s) driven by battery power (including regenerated power from braking and flywheel energy created and stored by electric motor(s) or braking); no other fuel or power source may be used.

(2) All batteries must be structurally secured to the chassis and contained in such a way as to minimize battery structural damage, electrical and mechanical hazard in the event of a crash or incident.

(3) Unless otherwise approved by SCCA the ONLY lithium chemistry that may be used in Electric Modified classes is Lithium Ferrous Phosphate (LiFePO4/LFP). This is the only readily available Lithium chemistry that does not require external cooling and is both thermally and chemically stable. Non-lithium batteries chemistry batteries are not allowed as a power source.

(4) Material Safety Data Sheets or Safety Data Sheets must be available upon request by safety and tech officials.

(5) Any electric cables in the system must be the proper size to safely carry the current from the batteries without overheating past design limits. Solid core wire may NOT be used in any part of the system. Stranded copper wire of at least 2/0 gauge with a temp rating of no less than 90C shall be used for applications of 1000A or less. Any application where the current shall exceed 1000A shall require 3/0 or larger stranded copper wire with a temperature rating of a 90c or better. Buss bars may be of solid or braided material made of either copper or aluminum.

(6) Any conductor or non-insulated area that is exposed must be properly insulated and prominently labeled as “high voltage” with proper warning signs to indicate High Voltage. Bodywork of a non-conductive material is considered an adequate covering for conductors, batteries and other high voltage

components. When bodywork is of conductive material, a nonconductive barrier will be secured between the bodywork and high voltage components.

(7) A fuse, not a circuit breaker, must be in series with the main power source and cannot exceed 200 % of the expected battery draw at full load of the system.

(8) Vehicle must have a High Voltage (“HV”) master disconnect switch that will completely disconnect the vehicle from the HV power source. A Low Voltage (“LV”) switch is also required and is recommended to be located as close to the HV switch as possible. It is required that de-activating the LV kill switch will also disable the HV circuit under normal operating circumstances.

– These switches must be clearly marked for both on and off positions.

– These switches must be accessible by the driver as well as safety personnel from outside the vehicle.

(9) Minimum weight for vehicle plus driver is 1600 pounds for both EM1 and EM2.

(10) Wheels and Tires. Wheels must be no smaller than 13” diameter and no larger than 17” diameter. EM2 has a maximum wheel width of 7” while EM-1 is unrestricted as to wheel width. EM-2 must use a DOT approved racing radial while EM-1 has no tire restrictions.

(11) These vehicles may have custom made frames and bodies. All wheels must be fully covered by the bodywork.

(12) The driver of the vehicle shall be seated between the front and rear axles.

(13) All flywheels must be covered with an NHRA approved scatter shield/blanket and labeled with proper SFI label or equivalent as specified in GCR 9.3.40 The presence of a flywheel, and its location, will be identified on the outside of the car.

(14) Any EM car that does not utilize a conventional transmission with a functioning reverse gear must have an electronic reverse and a “neutral” position.

(15) The driver must be shielded from any rotating parts.

(16) EM-1 and EM-2 require a roll cage as specified in the GCR 9.3.39 as relates to Formula and Sports Racing cars both in terms of material, thickness, and construction design.

(17) EM-1 and EM-2 require a minimum of one operational brake light and one rear facing rain light, as they are typically grouped with cars that require brake lights.

(18) Hand-Held Fire Extinguisher Requirements. 1) a single 2LB minimum as per GCR for vehicles not requiring a fire system. 2) All fire bottles shall incorporate a functional pressure gauge. 3) The fire extinguisher shall be securely mounted in the cockpit and readily accessible to the driver. All mounting brackets shall be metal and of the quick release type.

(19) All EM-1 and EM-2 cars must have a clear marking on all 4 sides of the car indicating that it is electric powered. Currently a black circle with an orange lightning bolt is the decal used. This is in addition to markings required by GCR 9.3.29.

(20) Any EM-1 or EM-2 competitor may be required by officials to provide a written safety manual that details the chemistry, mechanicals and emergency response required that is not typical of a conventional internal combustion racing car. Additionally, officials may require an in-person safety briefing to better inform safety crews and emergency responders as to the specific responses and procedures needed in the event of an emergency.

(21) Fire suppression access to the batteries must be provided in the form of a port, duct or opening to allow for access by emergency crews in the event of a fire. These ports should be large enough and positioned in such a manner as to allow direct application of water, or suppressant to as large an area of the batteries as feasible.

References for Safety:

A. Emergency Services – EVSR High Voltage Safety and First Responder Information Guide:
<https://my.scca.com/eweb/DynamicPage.aspx?Site=SCCA&WebKey=23bbf17a-6ef2-440e-b147-f9161c928b67>

B. Emergency Services – EVSR Safety Quick Reference Guide:
<https://my.scca.com/eweb/DynamicPage.aspx?Site=SCCA&WebKey=23bbf17a-6ef2-440e-b147-f9161c928b67>

Change log:

01-22-2021 SUBMITTED TO WDCR SCCA

01-29-2021 UPDATES MADE BY EVSR & AS REQUESTED by SCCA

02-15-2021 MODIFIED CLASS DESCRIPTOR

02-22-2021 Some items have been expanded with additional information