

## **Straightliners with UK & ITA.**

### **Electric Vehicles (EVs) taking part in drag, top speed and record events.**

*Competitors who wish to compete with bespoke EVs or Hybrid EVs will need to provide comprehensive vehicle construction details and the method used for the recharging procedure details of rechargeable energy storage systems to Straightliners HQ, well in advance of the date of an event.*

There have been electric vehicles contesting land speed records ever since the timing of motor cars to determine their speed over a known length of course became important. These first records were achieved well over 100 years ago. Many, if not most, early outright or absolute land speed records were achieved by electric powered cars. These were some of the earliest constructions by manufacturers, who would then produce road going vehicles for sale.

As the 21<sup>st</sup> Century progresses it is anticipated that newcomers to speed sports, conscious of the need to use more 'sustainable' power systems, as well as some existing motorsport enthusiasts who can see the power benefits of motor drive systems, will take to running electric powered vehicles (EVs). There may be standard roadgoing EV vehicles entered into events (on two wheels and four), however it is anticipated that many of these vehicles will not be constructed by any main stream vehicle producer or ever be put forward for a country's vehicle National Type Approval system. These will be bespoke or prototype vehicles.

*The use of extreme High Voltages, up to and perhaps exceeding 1000V DC (but no greater than 1500V DC), is now to be expected.*

Venue operators and event organisers have already learnt to cope with vehicle team members handling a range of combustible liquid fuels as well as pressurised oxidants and gaseous fuels from storage containers or cylinders. Transfer from storage into or onto powered competition vehicles has become common place in specified areas of paddocks.

Going forward, the generation of electricity and its storage in vehicle mounted Rechargeable Energy Storage System (RESS), which once were made up from modest numbers of 12Volt (nominal) batteries, may now be high voltage multiple cell modules, *well in excess of 60V DC and up to 1000Volts DC*. These modules will require bespoke 'portable' off-vehicle charging units with high output capacity.

Speed sport on temporary sites (mostly airfields) will mean that there is unlikely to be any sustainable provision of electrical power. This will inevitably mean teams making the use of petrol or diesel-powered RESS chargers inevitable. The organisers may determine that a single recharging area should be designated for all EV teams (regardless of vehicle description).

For Hill Climbs, Sprints and Drag Racing an upper DC high voltage figure may be applied in the governing rules [NORA92, ACU or MSUK]. For top speed contenders and for land speed record contenders, vehicle weight limits (excluding the weight of rider or driver), are applied by Straightliners for bikes, three wheelers, karts and cars.

Organisers have to keep events as safe as possible for ALL. Other competitors; the course marshals, scrutineering personnel and paddock and course official. As well as members of the public who come to watch vehicles travelling fast.

### **Hazards:**

**Electricity at high voltages** is a potential severe hazard. Exposure of a human to high voltage electrical currents can be the cause of death or can result in life changing injuries.

**Lithium-ion RESS overheating** is an exothermic reaction which a fire extinguisher cannot stop. Repeated rapid cooling with copious amounts of water may halt the reaction. The only alternative on an airfield will be to leave the EV in an open-air exclusion zone, where the vehicle can be 'secured' from everyone and monitored until any risk has passed. Organisers personnel may be required to monitor this zone.

### **Safety Devices**

On-vehicle safety devices shall be those which have passed type-approval for production made vehicles or they must meet the requirements of the NORA92, MSUK or ACU for other electric powered forms of motor sport, where prototype or bespoke vehicles can compete. A visual indicator flashing lamp will need to show that a vehicle is in a powered state, however a major incident could have caused damage to this lamp. Safety buttons and switches on the vehicle need to be clearly visible and marked for access and use.

### **Rescue and recovery personnel.**

The rescue unit personnel have received training in dealing with some EV incidents, however they will need help from the rider or driver if they are able to give assistance. On incident sites the help from the teams *HV qualified person* or help from the team's *'first to the scene' crew member*, will be needed when approaching a particular EV.

### **Off vehicle safety equipment for personnel.**

An EV team is required to provide all personal protective equipment (PPE) and safety related equipment for their team personnel and sufficient equipment for use by others. The safety equipment has to be readily available for use in the paddock space of each EV or at the scene of any incident involving an electric vehicle of any type. Safety equipment will need to be positioned ready for immediate use. Safety equipment cannot be kept 'in the back of a van' or within an enclosed trailer.

### **High Voltage (HV) qualified team member and "First to the scene" crew member.**

#### **(This could be two people).**

Each team must have a high voltage (HV) qualified person present at the event. The 'first to the scene' (FTTS) person could be the team member who is "HV qualified" or they may be a particular team member who knows fully the construction of the complete vehicle being used and the positioning and operation of all of the fitted safety devices.

An FTTS crew member will be required to *sign-on* at race control at the commencement of the event which will allow them to position track side of the paddock gate when the team vehicle is on the course. The FTTS crew member, on foot, will need to be in proximity to a designated response vehicle. The incident response vehicle will take them to any location on the course. The FTTS crew

member will need to make themselves readily identifiable (although carrying an insulated rescue pole, wearing HV gloves and carrying an antiflash helmet or mask may be sufficient).

*Any incident with an EV will result in a delay to the event, as would any incident involving other types of competing vehicle. The planning of events will take into account the care and expertise needed to supervise the removal of a damaged EV.*