



## Proposed 2019 Specification and Rule Changes

Date: 13 November 2018

To help schools and teams prepare for the future Energy Breakthrough, Lead Scrutineers Tim White and Michael McTigue, have drafted a range of specification and rule changes that are under consideration for change for 2019.

Schools, Team Managers and Vehicle Manufacturers are all invited to review and discuss this proposal to ensure a safe and effective event into the future. A stakeholder consultation will be held in December 2018 after this year's event.

Please contact [enquiries@eb.org.au](mailto:enquiries@eb.org.au) to express an interest in being involved in this consultation.

### Human Powered Vehicle (HPV) Specifications

Current Rule:

#### 2.2 Exclusions

Choice of design and construction materials is free, except that:

- Our experience has shown Rear Wheel Steer (RWS) vehicles to be highly unstable. For this reason, RWS vehicles will not be accepted at the RACV event.

This rule is also included in "5.1: Steering Type".

Proposed Change:

We like to encourage innovation in design and believe that if designed and constructed correctly, Rear Wheel Steer can be stable and successful. We would request that designs are submitted for review and approval prior to construction.

Current Rule:

#### 2.1 Inherent Safety

The onsite repairing, securing or joining of steering, brake or any other safety related components with glue or epoxy resins during the event is strictly forbidden.

Proposed Change:

We propose that teams would be allowed the opportunity to repair a vehicle should it break during the trial. A new trial regulation would require use of all appropriate safety attire and perhaps have a Lead Scrutineer / Race Director present whilst the repairs are carried out.

Current Rule:

### **2.3.1 Clearances and Access for Enclosed Bodywork Vehicles**

- The location of closure devices for opening body sections must be marked outside with a triangle of contrasting colour to the body and side length of at least 10cm making it clear for anyone unfamiliar with the vehicle.
- The word "RELEASE" should be written near the triangle.

Proposed Change:

Standardised 'Triangles' and 'RELEASE' stickers may be provided to teams at registration, as the quality can vary significantly between teams.

Current Rule:

### **2.4 Vision and Ventilation**

Airflow for rider ventilation, provision to mitigate rain and window fogging must be demonstrated.

Proposed Change:

This rule to be turned into a design guideline, rather than a requirement.

Current Rule:

### **3.0 Vehicle Dimensions**

#### **Turning circle**

10 metre maximum diameter (left and right).

Note: Due to the hairpins in Try-athlon Time Trial and Obstacle courses, Try-athlon teams are strongly encouraged to set up their vehicle with a maximum turning circle of 8 metres.

Proposed Change:

### **3.0 Vehicle Dimensions**

#### **Turning circle**

HPV & EEV: 12 metre maximum recommended (left and right).

TRYathlon Vehicles: 8 metre maximum recommended (left and right).

In Scrutineering, a steering slalom test would replace the previous full 360 degree turning circle test. The Slalom would be four traffic cones spaced at 4.2m.

Current Rule:

### **3. Vehicle Dimensions**

600 mm minimum (width between centres of outermost tyre ground contact points)

Comment:

## **Track**

Consideration and discussion for adding a provision to allow a narrower track for four wheeled vehicles, which have one axle's track of 500mm minimum and the sum of both axle's tracks is to be 900mm minimum.

### **Current Rule:**

#### **4.1.1 Construction**

All protection bars, including bracing must be constructed from metal meeting the minimum outside diameter (O.D) specifications in the following table.

	HPV	EEV
Steel or Chromoly tubing	12.7mm O.D	16.0mm O.D
Aluminium tubing	16.0mm O.D	19.0mm O.D

### **Comment:**

Consideration given to whether these diameters are still suitable for today's vehicles and levels of competition.

### **Current Rule:**

#### **4.2.1: Rider protection clearances for fully enclosed hard-shell vehicles:**

- Measurement from top of helmet to inside of shell: 50mm.

### **Proposed Change:**

We propose bringing this rule in line with the 'Australian HPV Racing Design & Construction Specifications'. These specify: the use Ethylene Vinyl Acetate (EVA) foam of density 105kg/cubic metre. 20mm thickness is required with minimum area of 1200 cm<sup>2</sup>, or dimensions of 200mm X 600mm.

We also propose to recommend the use of foam around the shoulders and arms on hard shell vehicles.

### **Current Rule:**

#### **5.3 Lock Stops**

In addition, at full lock there must be shielding or a clearance of 100mm between the occupant and any rotating part (such as wheels and controls) and in all steering positions there must be at least 50mm clearance between the hand controls (including brake levers) and the frame or solid bodywork.

### **Proposed Change:**

This requirement would be removed as fully enclosed wheels negates this requirement.

Current Rule:

## **6. Brakes**

### **6.1 Independent Systems**

- All wheels in contact with the road must have a braking capability.

### **6.3 Directional Stability**

- Brakes on the same axle line (e.g. both front wheels) must operate via a single lever, so that independent operation of any braking system shall not have the potential to affect directional stability of the vehicle. That is, the braking power of each and every braking system shall be symmetrical about the vehicles longitudinal centre line.

Comment / Proposed Change:

If the front brakes are operated via an independent braking lever (ie/ Left hand lever for Left hand brake), then there is not a need to install a rear brake. If both front wheels operate off a single lever, then a rear brake is necessary. We believe rear brakes are can be quite dangerous and are not necessary with independent front braking.

We propose bringing this rule in line with the 'AustralianHPVRacing Design&Construction Specifications'. These specify:

#### **6.2 Braking Systems Configuration:**

6.2.1 Minimum of two independently operated systems must be evident and operational.

6.2.2 A separate lever for each front brake where there are two front wheels meets this requirement.

6.2.3 A rear wheel brake is not required when there are two front wheels with separately operated brakes.

Current Rule:

### **7.1.1: Headlight**

- Front lighting must be at least one white light, securely mounted between 250mm and 600mm above road level, at the front of the vehicle (forward of the rider's feet).

Proposed Change:

We propose leaving the height at a maximum of 600mm, but removing the minimum height. We believe having the light lower than 250mm in certain instances would make the light more effective.

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## Energy Efficient Vehicle (EEV) Specifications

### Current Rule:

#### 2. Fire Extinguisher

- All Energy Efficient Vehicles must be fitted with an Australian Standard, dry powder minimum 5BE fire extinguisher of minimum capacity 0.9 kg.

### Comment:

We would like to discuss the validity of a 0.9kg extinguisher. Racing cars and the like allow smaller extinguishers and have a greater risk of fire. A smaller extinguisher is also far less of a hazard if it becomes loose in the vehicle.

### Current Rule:

#### 3: Engine Immobilizer

- The cut-out switch must be clearly visible, marked by a blue triangle and mounted on the left hand side of the vehicle and within 300 mm of the rider's left shoulder.

### Comment:

Standardised 'Cut Out Switch' stickers may be provided to teams at registration, as the quality can vary significantly between teams.

### Current Rule:

#### 5.4: Total Combined Mass of Propulsion Batteries

The maximum total combined mass of propulsion batteries per vehicle is:

Battery type	Kg
Lead Acid	100
Ni Cd	65
Ni Zn	60
Li Ion	30
Ni MH	45

Note: Where Lithium Ion batteries are used a Battery Management System must be carried on board that is designed to provide adequate protection during charging and discharging.

### Comment:

More research is required into a fair battery mass vs available charging capacity. We will be seeking at this year's event to collect some data through a 'sign-in' / 'sign-out' process as to how much battery capacity teams are using during the course of the 24 Hour Trial.

## Current Rule:

### **5.6: Power Limitations**

- Electrical systems are restricted to a maximum of 48 Volts.
- The power output of Hybrid 1 and Hybrid 2 vehicles must not exceed 250 Watts at the driven wheel. This output is in accordance with Victoria's legal limit for licensed road use.
- The power output of Electric Only vehicles must not exceed 750 Watts at the driven wheel.

All vehicles must be fitted with a maximum 20 Amp circuit breaker which must be mounted:

1. Out of reach of the rider.
2. Within 200mm of the battery pack.
3. In a position where it is visible to trial marshals when the vehicle is in the pits.
4. With tags provided by scrutineers and tags can only be replaced by scrutineers or trial marshals.

## Comment:

These will be reviewed in line with observations at this year's event and also with discussions with teams. We believe it is far easier to limit battery weight rather than power. Teams do not have to spend more money to create a level playing field.

# HPV and EEV Trial Regulations

## Current Rule:

### **3.1.1: Helmet**

- For human powered vehicles and pedal/electric hybrid vehicles, minimum requirement is a bicycle helmet approved to AS 2063, AS 1698 or ECE 22.05.
- For petrol-powered or electric-only Energy Efficient Vehicles, requirement is a motor cycle helmet approved to either AS 1698 or ECE 22.05.

## Comment:

Review and discussion on the suitability of pedal/electric riders wearing bicycle helmets; and pedal/petrol riders wearing motorcycle helmets.

## Current Rule:

### **3.1.2 Eye Protection**

- Shatterproof glasses, goggles or a helmet visor must be worn at all times.

## Comment:

If the vehicle has a full fairing, we believe glasses should be optional. Open top, or if fully enclosed vehicles put any significant holes in their windscreens for heat or demisting, then glasses would need to be worn.

## Current Rule:

### **3.1.7: Clothing**

#### **Liquid fuelled Energy Efficient Vehicles**

- All competitors shall wear overalls or clothes that cover and are neat fitting from ankle to wrist to neck.
- Fire retardant material is advised, and light fabric/disposable overalls are not permitted.

## Comment:

Review validation of petrol EEV vehicles wearing overalls in light of the desire to protect the riders vs risk of overheating.

## Current Rule:

### **9.5: Battery Recharging Procedure**

- Any team found to be charging batteries not in the designated area will be penalised.

## Comment:

Highlight this as an important safety rule for safe recharging.