

2019 TRIAL REGULATIONS  
HPV, EEV & TRY-ATHLON

# ENERGY BREAKTHROUGH

20-24 NOVEMBER 2019 | MARYBOROUGH, VICTORIA

## POWERED BY IMAGINATION

THE PREMIER SCIENCE, TECHNOLOGY, ENGINEERING AND MATHS, ACTIVE LEARNING PROGRAM

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# HUMAN POWERED VEHICLE (HPV) AND ENERGY EFFICIENT VEHICLES (EEV) AND TRYATHLON ENDURANCE TRIAL REGULATIONS

[Version 2019.01](#)

## 1 SPIRIT OF COMPETITION

The Energy Breakthrough Trial presents a unique opportunity for students to extend their learning experience beyond the boundaries of formal education. The following competition regulations have been framed so that the efforts and experiences of all participants are maximised, to be bound only by the constraints of safety and the spirit of healthy, but friendly competition.

## 2 ELIGIBILITY

### 2.1 Make-up of Teams

Teams will consist of the following numbers of competitors:

Class	Year Level	Team Size	Gender Requirements	School Size
A1	Years 1 - 6	Min 6 - Max 10	At least 50% female.	Schools with an enrolment of 200 or less
A2	Years 1 - 6	Min 6 - Max 10	At least 50% female.	Schools with an enrolment of more than 200.
B1	Years 7 - 8	Min 6 - Max 8	At least 50% female.	N/a
B2	Years 7 - 10	Min 6 - Max 8	At least 50% female.	N/a
C	Years 7 - 12	Min 6 - Max 8	At least 50% female.	N/a
All Female	Years 7 - 12	Min 6 - Max 8	Female only	N/a
Open	Up to Year 12	Min 6 - Max 8	No gender requirements.	N/a

### 2.2 Team composition

- All entries are to be team entries and must consist of current school students (Young people enrolled in a school or young people enrolled in a secondary school certificate/program and under 20 years of age as at 31 December).

- Team members do not have to all come from the same school. They could be part of a scout, church, or other community group, however they must all be current school students and be covered by the group's insurance. [Where non-school teams have riders from other schools participating in Energy Breakthrough, they must have written approval from the Principal of the school.](#)
- [Classification for schools entering the A1 and A2 classes will include the TOTAL school enrolment, not the Primary component of a school. This classification will be made by the organisers using information published on each school's website and the MySchools website.](#)

## 2.3 Registered Riders

- Only registered team riders shall take part in the Trial, however rider changes can be made up to the start of the endurance trial.
- Emergency riders are encouraged to participate in the practice session to ensure they are familiar with the track and the vehicle.

## 2.4 Team Member Participation

- Team managers must ensure that every nominated team member participates as a rider during the Trial.
- Team Managers are required to keep a log of rider track time, which can be checked by marshals investigating incidents.

## 2.5 Age of Drivers

Drivers of Energy Efficient Vehicles shall be at least 14 years of age, unless special prior approval is provided by organisers.

## 2.6 Identification

All riders must have official identification, which must be shown on request during the trial.

## 2.7 Rider Substitution

- Sick or injured riders may be replaced prior to the start of the trial by a registered reserve rider of the same gender.
- Riders cannot be substituted after the start of the Trial.
- A rider substitution will require the identification wristband of the replaced rider to be handed to the Administration Centre and a new identification issued to the reserve rider.

# 3 RIDER ATTIRE

## 3.1 Fit and Adjustment

All vehicle occupants shall wear the following safety attire correctly fitted and adjusted at all times the vehicle is on the track during all on track activities..

### 3.1.1 Helmet

For human powered vehicles [and EEV 1 vehicles](#), minimum requirement is a bicycle helmet approved to AS 2063, AS 1698 or ECE 22.05.

For EEV 2 or electric-only Energy Efficient Vehicles, requirement is a motor cycle helmet approved to either AS 1698 or ECE 22.05.

### 3.1.2 Eye Protection

- [It is recommended that shatterproof glasses or cycling glasses be worn at all times.](#)
- [Vehicles that are fully enclosed are not required to wear eye protection.](#)
- Open bodywork (or 'head out') vehicles or vehicles have significant sections of windows removed will be required to wear eye protection.

### 3.1.3 Gloves

Gloves must be worn by riders when in the vehicle.

### 3.1.4 Shoes

Shoes must provide full foot coverage. Sandals or thongs are not permitted.

### 3.1.5 MP3 players

The use of MP3 players or similar music/entertainment devices by riders is NOT permitted during Trial or Practice sessions.

### 3.1.6 Video cameras

- Small video cameras (eg. GoPro) are allowed as long as they are not attached to the rider's helmet and do not pose any safety risk.
- Camera's must not be mounted to the outside of the vehicle silhouette when viewed from the front

### 3.1.7 Clothing

#### Human Powered Vehicles

- Minimum coverage of shoulders, upper body and mid-thigh (e.g.: shorts and T-shirt; or cycling knicks and jersey.)
- Sleeveless triathlon skin suits, sleeveless cycling jerseys, sleeveless t-shirts, tank tops or singlets are not permissible.

#### Electric powered Energy Efficient Vehicles

- Riders of pedal/electric hybrid vehicles may choose to comply with the Human powered Vehicle clothing rules.
- Riders of electric-only vehicles must comply with the requirements for liquid fuelled vehicles below.
- Teams that have battery power must provide a pair of full cover gloves and a pair of protective goggles for anyone handling batteries.

#### Liquid-fuelled Energy Efficient Vehicles

- All riders 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

- It is not permissible for riders of fuel powered vehicles to ‘dress down’ when their fuel is used up.

## 4 SCRUTINEERING

### 4.1 Compulsory

Scrutineering is compulsory for all vehicles and teams, to ensure compliance with vehicle specifications and safety requirements.

### 4.2 Before track

- Before entering onto the track for a Practice session, all vehicles must be scrutineered for safety.
- Scrutineers can refuse permission to enter the track for any safety reason.

### 4.3 Subsequent scrutineering

All vehicles may also be inspected at random during the trial for operation of safety items or when the vehicle is involved in a track incident. (See Section 7.11).

## 5 TRAFFIC LIGHTS, FLAGS AND SIGNALS

All competitors shall understand the meaning of the following traffic signals/flag signals:

### Green Light or Flag

The track is clear for competition.

### Yellow Light or Flag

- A sign of danger or track obstruction in the vicinity of the marshal point.
- Riders are required to stop racing, slow and pass the point of danger at a significantly reduced speed (at or below 20 kph) using extreme caution
- Riders must not resume competition until they are well clear of the danger and until they reach the vicinity of the next marshal point displaying a Green Light or Flag.

### Red Light or Flag

- An indication of extreme danger.
- All vehicles shall come to an immediate stop.
- Racing has ceased.
- Riders must follow the directions of the Clerk of Course and flag marshals.

### Blue Flag

- Is an indicator that a faster vehicle is positioned close to you.
- Competitors shown the blue flag must hold their line to allow overtaking.

## 6 TRANSPONDERS AND LAP TIMING

It is the Team Manager's responsibility to ensure that:

- a transponder is collected from the Administration Centre at Check-in;
- the transponder is correctly fitted to the vehicle according to the instructions;
- the transponder is working during all on track activities;
- [any queries relating to lap times are reported to Timing Officials as soon as practical for investigation; and](#)
- the transponder is returned to the Administration Centre at the end of the Trial, prior to leaving the event site.

## 7 START, FINISH AND BREAK

### 7.1 Pre-Race Briefing

All Team Managers must attend the pre-race briefing by the Clerk of Course and / or Race Director.

### 7.2 Grid Assembly

- The Race Director, in conjunction with the marshal team, will allocate and advertise starting grid positions following the practice session.
- Vehicles will be assembled according to the official grid positions.
- Vehicles will be called to the starting grid assembly area [60 minutes](#) prior to the official start.
- If a vehicle is not on the grid within 15 minutes of the scheduled start time, officials reserve the right to place the vehicle at the rear of the grid.

### 7.3 Trial Start

The trial will be started with the drop of the National flag.

### 7.4 Trial Finish

All trials will conclude with the display of the black and white chequered flag. This is will be:

- 24 hours after the start for the secondary HPV and Energy Efficient Vehicle teams.
- After 14 hours of competition for the HPV Class A teams.
- 8 hours after the start for TRYathlon teams in their Endurance Trial.
- After all 8 riders have completed the TRYathlon Obstacle and TRYathlon Time Trial events.

### 7.5 Primary break

- All HPV A vehicles will leave the track by re-entering the pits from the time specified in the event schedule on Friday evening.

- All HPV A teams will restart their trial at the specified time on Saturday morning.
- The restart of the HPV A trial will be under the direction of the Clerk of Course.

## 7.6 Extreme Weather (Heat / Rain)

- [In the event of severe heat exceeding 36 degrees or severe rain / thunderstorm or other severe weather events, the Clerk of Course and / or Race Director reserve the right to implement a range of staged strategies to reduce risk to riders, marshals, support crew and spectators on site.](#)
- [These strategies range from compulsory breaks for riders, suspension of the Trial for a period of time, to cancellation of the Trial.](#)

# 8 TRACK CONDUCT

## 8.1 Speed Limit

- Speedometers are mandatory and ALL competing vehicles shall observe a maximum speed of 60 km/h during all on track activities.
- The maximum speed in the pit lane is 10 km/h.
- Vehicles detected exceeding 60km/h will have the lap immediately voided.
- Voided laps will be displayed on the results display system, but not counted towards a team's final total.

## 8.2 Seat belts

All vehicle occupants shall wear a correctly adjusted seat belt during all on track activities.

(Refer 8.4 of the Vehicle Specifications for correct adjustment of seat belts.)

## 8.3 Right of Way

Competing vehicles have right of way over disabled vehicles that need to be recovered.

## 8.4 Direction of Travel

Under no circumstances is a vehicle to be ridden or pushed on the track in the opposite direction to competition.

## 8.5 Track Position and Overtaking

- A blue line has been painted on the track. Riders should keep to the left of this blue line on the inside of the track, unless overtaking another vehicle.
- Riders should overtake on the outside, to the right of the vehicle being overtaken.
- Riders should not change lanes without checking their mirrors to make sure it is safe to do so.

- It is the responsibility of the overtaking (faster) rider to ensure that the overtaking move is carried out without endangering other competitors.
- Cutting in, deliberate blocking or leaving insufficient clearance will be penalised.

## 8.6 Vehicle Lighting

- Front lights, as per by Vehicle Specifications, shall be illuminated during the hours of darkness as directed by the Clerk of Course.
- Rear lights, as per by Vehicle Specifications, are to be turned on steady mode during all on track activities.
- Riders must stop in the pits as soon as possible to rectify any inoperable or insecure lights.

## 8.7 Lighting Batteries

Batteries used solely for lighting may be charged and/or recharged and/or replaced as required.

## 8.8 Track Incidents

- All vehicles involved in significant crashes or rollovers are to be removed from the track by marshals only and the barriers quickly restored to trial condition as soon as practical.
- All vehicles involved in rollovers or significant crashes must have a “Return to Pits” sticker applied and may then be ridden back to the pits.
- Vehicles that have been involved in a track incident and received a “Return to Pits” sticker cannot restart until a Pit Marshal has checked the vehicle is safe to continue and have removed the sticker.
- [After returning to the pits the rider will NOT be allowed to ride again for at least 30 Minutes.](#) During this time, Team Managers must monitor the riders’ condition, and if in doubt take the rider to the Trackside Medical Centre for assessment.
- If a vehicle is unable to continue because it is damaged or the rider is unable to ride, then the vehicle may be recovered by the team for repair. Teams unable to recover their own vehicle can request assistance.
- Riders who are unable to ride their vehicle back to the pits should be taken to the Trackside Medical Centre to be assessed. They must be cleared by the medical team before being allowed to ride again.

## 8.9 Injured Riders

The Clerk of Course and track marshals monitor the all on track activity and where necessary will call for assistance from Medical and Emergency Services to attend to injured riders.

## 8.10 Vehicle Recovery

- If a vehicle breaks down, the track marshals will report the incident and the team will be informed.
- It is the responsibility of the team to recover their vehicle.



- If a team is unable to safely recover their vehicle they can request assistance from the Clerk of Course and event officials.

## 8.11 Emergency Vehicles

- When emergency vehicles are on the track it displays flashing yellow lights which indicates extreme danger in the same manner as corner yellow lights/flags.
- Riders must slow down, use extreme caution, must not overtake other competitors and pass when directed by the officials.

# 9 PIT AREAS

## 9.1 Pit Set-up

- All pit sites must be set-up as per the direction of Event Officials.
- Each team in the HPV, EEV and TRYathlon endurance trials will be allocated a site in the pit area, except where schools with three entries in a category will be allocated two pits sites.
- All pit sites are numbered and are a minimum of 2.8 metres wide by 2.0 metres deep.
- Where possible, pit numbers are the same as the team number.
- All teams must leave approx 1 metre clearance area in front of their pit site for rider changeovers and for other teams to have line of sight of the track and pit lane.
- There is no existing shelter in the Pit areas.
- Teams are encouraged to erect a small tent or arrange to share a tent with another team.
- Teams are encouraged to erect a team or school banner in their designated pit area(s) including team numbers. A banner about two by one metres would be ideal.
- HPV A teams are required to share their pit spaces - but not tools and resources - with Try-athlon teams for their Friday night Try-athlon Practice session.
- No vehicles or trailers will be allowed in the Try-athlon pit areas.

## 9.2 Speed in Pits

Maximum speed in the pit area is 10 km/h.

## 9.3 Direction of Travel in Pits

Under no circumstances shall a vehicle enter the pit area via the pit exit lane.

## 9.4 Pit Lane Conduct

- All rider changes shall occur in the designated area adjacent to each team's pit.
- Closed shoes must be worn in pit lane.
- Vehicles shall come to a halt in the pit lane under the effect of the vehicle's own braking system.
- Stopping with the assistance of others is not permitted.

- Rider shall bring their vehicle to a complete stop prior to unfastening seat belts.
- Rider refreshments and adjustments to clothing etc. shall only be effected when the vehicle is stationary in the pit area.
- A maximum of three students and one supervising adult, in addition to the incoming and outgoing riders, shall attend a vehicle in the pit lane at rider change-over.
- The four designated people from each team attending the vehicle in pit lane are encouraged to wear a reflective vest and must wear enclosed shoes.
- Pit entry and exit lanes shall be kept clear at all times.
- Stationary vehicles shall give way to vehicles proceeding along pit lane.

## 9.5 Pit Crew Communications

- The use of radio communication between rider and pit crew is permitted provided operating the unit does not interfere with the rider's control of the vehicle.
- The use of notice boards for communication between the rider and the pit crew are permitted.
- However, such notice boards and their use shall comply with the following:
  - they must be held and displayed by one person only at a time;
  - they must be held so they do not go beyond the line of pit lane barriers.

## 9.6 Major Repairs

- Major repairs including welding and grinding equipment must NOT be carried out in the pit lane. The pit lane includes a team's tent adjacent to the track.
- These repairs must be carried out in the vicinity of the repair container.

## 9.7 Removal of Components

- Redundant, superfluous and/or damaged components of substantial mass (i.e. greater than 0.5 kg) may not be removed from a vehicle except with the permission of the Clerk of Course.
- At the discretion of the Clerk of Course, the vehicle may be required to carry ballast.
- Teams may not substitute or replace power sources or strip the vehicle below its starting weight after the commencement of the event.

# 10 FUEL USE AND RECHARGING OF BATTERIES

## 10.1 Fuel Burning Energy Efficient Vehicles

In accordance with the EEV Vehicle specifications, fuel burning entries will receive a single allocation of fuel.

## 10.2 Amounts of Fuel Allocated

[EEV1 Petrol + Pedal: 2 litres](#)

EEV2 Petrol + Electric: 3 litres

### 10.3 Sealing of Fuel Tanks

Fuel tanks on vehicles will be sealed after the allocation of fuel prior to the start of the event.

### 10.4 Batteries

- At EEV teams using batteries are required to present all of their battery allocation for identification marking at scrutineering.
- All batteries must have manufacturers labels including details of battery type displayed.
- Batteries must be labelled with the school name.

### 10.5 Battery Recharging – Processes and Procedures

- The onus is on the teams to use safe and reliable battery chargers.
- Teams will start the Trial with fully charged batteries.
- All recharging is to be conducted in a designated area provided by the event organisers, and under constant supervision, to ensure charging is carried out in a safe manner.
- The designated recharging area will not open until one hour after the trial start.
- [Batteries must be signed in and out via the designated marshal on duty at the time.](#)
- Any team found to be charging batteries not in the designated area will be penalised.
- All battery chargers must be electrically tested and tagged. Only approved tagged chargers can be used.
- Chargers must also be presented during Scrutineering for an extra Energy Breakthrough tag to be applied.
- Battery chargers must be of a commercially available type.
- The physical dimensions of the charger must not exceed 300 mm x 300 mm x 300 mm
- Bare connections and alligator clips are strictly forbidden. All connections must be made using a properly insulated electrical connector. Anderson plugs are the preferred type of connector.
- Only one battery pack may be charged at a time. A battery pack is defined as the usual amount of batteries required to run the vehicle.
- [Teams will be provided with one power outlet in the charging area, which will be fitted with a digital readout.](#)
- [Outlets are restricted to 4 amps \(fused\) or 720W whichever is the lower and officials will disconnect chargers drawing higher amp readings and notify the team.](#)
- [Once kilowatt hour allocation has been used, the power outlet will shut off. Teams must remove their charging equipment from the container at this point.](#)

# 11 TRIAL POINT SCORING

- The vehicle completing the greatest number of laps in each class in the Trial period scores the maximum points.
- Other vehicles in each class score points for the number of laps completed in proportion to the number of laps.
- In HPV Secondary, HPV Primary and EEV classes, the Endurance trial is worth 50 points.
- In TRYathlon, the Endurance is worth 30 points.

For example, say team AA in a particular class travels the greatest distance, 200 laps, and team BB in the same class travels 160 laps.

## Points scored are as follows:

Team AA: 200 laps = 50 points

Team BB: 160 laps  $50 \times \frac{160}{200} = 40$  points

# 12 INFRINGEMENTS

## 12.1 Vehicle Design

- Vehicles which are considered safe but DO NOT comply with key elements of vehicle specifications may be given permission to start the trial with a penalty.
- This penalty can be up to 50 laps and will be applied by the event officials.

## 12.2 Reporting of Incidents and Timing Issues

- Teams may report track incidents or infringements of these competition rules to the Clerk of Course or Pit Marshals who will investigate and act accordingly.
- [Any queries relating to lap timing issues are to be reported to the Timing Officials as soon as practical for investigation.](#)
- [Where the Timing Officials believe there is a lap timing issue requiring correction, all such corrections shall be coordinated through the Clerk of Course or Race Director.](#)

## 12.3 Protests

- Teams who wish to proceed with a formal protest will be provided with the appropriate documentation via the Clerk of Course.

## 12.4 Penalties

- A team that breaches any trial regulation including the spirit of competition, will be notified that they are under investigation for an infringement of the competition rules.

- The Clerk of Course and event officials will review the incident and may apply a penalty which they consider is consistent with the severity and intent of the infringement.
- Incident reviews will be conducted as soon as practical, but in any case, will be resolved before the end of the endurance trial.

**Penalties may take the form of:**

- A warning.
- A “stop and go” penalty.
- A time penalty.
- 50 lap penalty.
- Disqualification of a rider.
- Exclusion from trial results.
- Withdrawal from competition.