

2017

Victorian HPV Series

HPV Vehicle Specifications

Proudly brought to you by

**Casey – Cardinia HPV & Cycling Club Inc.
Wonthaggi Human Powered Grand Prix,
Bendigo EEV / HPV Grand Prix and
Bridgebuilders Knox Grand Prix**

Please note: Throughout the 2017 racing season the Victorian HPV Series will be transitioning our Vehicle Specifications to a set of National Vehicle Specifications. This change will enable more stability throughout all events and greater flexibility for teams to attend, enter all events and simplify the scrutineering process. We understand and appreciate that many of you may not have sufficient time to modify or make changes to your vehicles before our first race in February 2017. Therefore, for the 2017 racing season the Victorian HPV Series will be scrutineering your vehicle under the National Vehicle Specifications first. If there is a non-compliant item we will then consult to our 2016 Victorian HPV Series Vehicle Specifications. If your vehicle complies with one or both rules you will be eligible to race your vehicle. We will continue to follow this process for the duration of the 2017 season and will implement the National Vehicle Specifications from the beginning of 2018.

HUMAN POWERED VEHICLE SPECIFICATIONS

Entrants will design, build and compete in an endurance event, using a vehicle powered solely by human effort. The objective is to build an efficient and stable machine powered entirely by human effort. These rules are similar to those for the RACV Energy Breakthrough and the Australian International Pedal Prix to allow vehicles from other events to enter without major structural changes.

Entrants must:

- Design and build a vehicle “from a clean sheet”.
- Develop or adapt a vehicle from an existing design.
- Liaise with local industry or community groups to design and build a machine.
- Commercially designed vehicles are acceptable, however the spirit of the event encourages school based design and construction.

For school entries the school Principal must sign a declaration indicating the level of involvement in the design and construction by the students

The entrant must maintain the vehicle in compliance with these regulations and event supplementary regulations throughout the entire event.

Vehicles that don't comply fully with these specifications, can be accepted at the Organising Committee / Scrutineers discretion, except where the breach is in regards to safety.

No vehicle will be allowed to start in the event until it has passed scrutineering.

The organising committees and / or scrutineers reserve the right to stop and inspect any vehicle during the race and assess its compliance to the race regulations. Vehicles that are deemed to not comply with the event regulations i.e. due to an accident or parts removal and / or replacement, cannot return to the track until repaired and inspected by a race scrutineer. Vehicles may be required to present for scrutineering at the conclusion of the event.

All entrants to the Series will be required to compete for the duration of each event to qualify for points to be awarded.

Where it is envisaged that vehicles will be entered in a range of events eg Victorian Series, RACV Energy Breakthrough or AIPP events, entrants are advised to check the relevant specifications when designing their vehicles.

Team managers are reminded that they have a responsibility and a duty of care to their riders. During the construction and use of the vehicle the Team Manager must monitor that-

- a/ the rider protection structures are strong enough to meet their purpose
- b/ rider safety is not compromised at any time
- c/ all team riders fit safely into the vehicle as required by these specifications

The Organising Body will make a decision in any case not covered by these specifications.

If changes are made to these specifications, the organising body will attempt to notify all teams who have entered an Event in the Series via their e-mail contact and such changes will be published on the website

1. SCOPE & CONFIGURATION

1.1 INTENT

The human powered vehicle category is intended as an experiment in personal mobility; the objective is to build an efficient and stable machine powered entirely by human effort.

1.2 SEATING CAPACITY, WHEELS

The vehicle shall carry a rider alone, and shall have three or more load bearing wheels arranged in a stable configuration. All wheels on the vehicle must be load bearing when stationary.

1.3 RIDING POSITION

Riding position shall not compromise machine controllability or safety, nor shall the riding position place the rider in a potentially hazardous position in the event of a collision. For these reasons a riding position (body angle) of less than 20degrees is not allowed.

Note: Any design that places the rider in other than a conventional reclined seating position shall be submitted, prior to the event, to the organisers to gauge compliance with this clause and its intent.

1.4 POWER SOURCE

Motive power shall be entirely supplied by the rider; however innovative systems such as regenerative braking are encouraged. Where regenerative systems are used, adequate shielding and guarding of the energy storage and drive systems shall be used to protect the rider, pit crew and officials from potential hazards.

Motorised fans for any purpose are not accepted in the vehicle.

2. DESIGN AND MATERIALS

2.1 INHERENT SAFETY

- The design shall provide protection for the rider in the event of a collision or rollover.
- The design shall be free of protrusions or other features capable of causing interference or injury to riders, fellow competitors or spectators.
- Where composite materials are used, constructors must ensure safe work requirements are met in regard to unbound fibres and sharp protrusions that may endanger riders or pit crew.
- Vehicle control and stability shall not be jeopardised by inappropriate design and construction methods. For example; tilt steered vehicles requiring rider lean have proven unstable in past events. Compliance with this clause may need to be demonstrated.
- The onsite repairing, securing or joining of steering, brake or other safety related components with glue or epoxy resins during the event is forbidden
- Any electrical connections for lights or warning devices must be of an automotive or industrial standard with fully insulated connectors

2.2 CONSTRUCTION

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

- Mounting methods used for composite material or metal safety bars that are demountable from the vehicle frame shall be by means of bolts, anchor plates, slip joints or other rigid methods. Each mount end of the bar shall be affixed to the main chassis or to substantial brackets.
For composite material bars, anchor plates must sandwich, and be glued to, the bar structure or be cast into the structure as part of the composite.
- Construction methods shall produce a sound, race-worthy vehicle that presents no dangers to the rider; other competitors, pit crew or spectators.
- The use of Go-kart, motorcycle or bicycle frames is not permitted, but bicycle centre brackets, head stems, forks and wheel dropouts etc are allowed.

2.3 BODYWORK

Full or partially enclosed bodywork is encouraged. Where full bodywork is fitted:

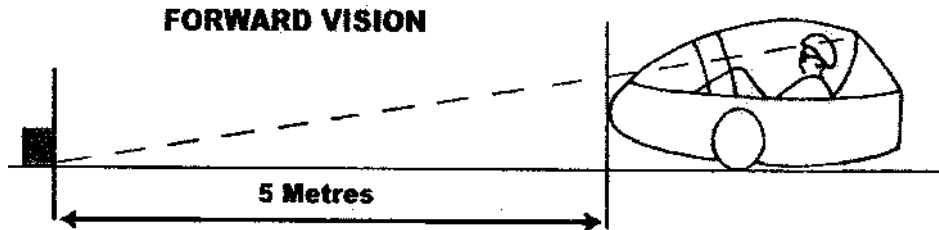
- There must be a forward distance of at least 300mm between the rider's face and any bodywork or screen. Open cockpit and screen edges must be taped or have rolled edges to prevent cuts.
- The rider shall be able to open and / or remove bodywork and exit the vehicle without external assistance in a reasonable time span. (*An assistant may be used during testing*).
- If teams prepare multiple body configurations for use, then all must meet the specifications and be presented for scrutineering
- Bodywork shall be capable of being opened and / or removed from outside the vehicle, independent of the rider, in an emergency.
- Rider and vehicle safety shall not be impaired by restricted ventilation or visibility.
- The positioning of operating devices for the opening of body sections must be marked on the outside with a triangle, in a color that contrasts with the vehicle color, having 50mm sides and a 10mm border making their location obvious to anyone not familiar with the vehicle.

2.4 RIDER VISION

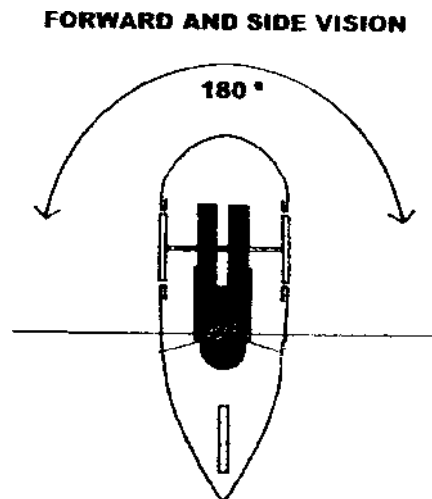
Both rider and vehicle safety shall not be impaired by restricted ventilation or visibility

Riders seated in the normal riding position must be able to meet the following vision requirements.

- Sight an object on the road at a distance of 5 metres in front of the vehicle.



- Sight 180 degrees ahead of the rider and any other vehicles behind the rider on each side by turning their head. Constructors must avoid excessive width of the front protection bar, where it will restrict the rider's view of the track.



- Provision should be provided to reduce the effects of rain and fogging.

3. DIMENSIONS

The vehicle shall comply with the following major dimensional requirements.

- 3.1 Length 2700 mm maximum
- 3.2 Width 1100 mm maximum
- 3.3 Height 1200 mm maximum
- 3.4 Wheelbase 1000 mm minimum between the most forward and most rearward axles
- 3.5 Track 600mm minimum lateral distance between the centre point of the outermost wheels measured at ground level
- 3.6 Turning circle be able to turn in a circle of 10 metre diameter maximum, between kerbs, in either direction

4. OCCUPANT PROTECTION

Each vehicle shall be fitted with a safety cockpit area that will protect the rider in the case of a rollover or impact accident. Although reference in these rules shall be made to “Bars” any structure or material that performs the same function and meets similar strength and rigidity requirements shall be allowed. All exposed corners of protection bars shall have a radius of no less than 50mm.

4.1 ROLL OVER PROTECTION

Roll over protection for the cockpit area shall consist of four principal parts. They shall be (a) Head Protection Bar, (b) Cockpit Side Intrusion Assembly, (c) Leg Protection Structure and (d) overhead protection

Construction

- All protection bars, including bracing must be made using one of the three following materials and construction methods:

4.1.1 Steel or Chromoly

- Steel or chromoly tubing no less than 12.7mm outside diameter (with joins either welded or by plate – refer 4.1.4)

4.1.2 Aluminium

- Aluminium tubing no less than 16.0 mm outside diameter (with joins either welded or by plate – refer 4.1.4)

4.1.3 Composites

- Fully enclosed bodies made from composites such as Carbon-Fibre, Fibreglass or Kevlar can use integral composite roll bars and side intrusion bars provided they comply with the following requirements:

Composite roll bars must be a shaped rib molded integrally with the body and of at least equal strength to a metal roll bar. (e.g.: The roll bar area should not be able to flex when pressed by hand)

All composite roll bar and side intrusion bar ribs must follow the same positioning as the steel protection bars.

All composite constructions must have finished edges. That is no protruding fibres or frayed edges.

Metal roll bars can be used with composite bodies.

Any joins must follow the plate mounting method as described in 4.1.4 Plate Joints. All teams constructing new vehicles with any protection bars made from composite materials (eg carbon fibre, fibreglass, kevlar) must send photos to the Event organisers for review before vehicles can race.

The onus is on teams to ensure that their vehicle is compliant with the required safety standards.

4.1.4 Plate Joints

- Where metal protection bars are to be joined without welding or attached to a composite body, plates should be used to distribute the loads into the body.

- These plates must be welded onto the metal protection bar and be no less than 30mm x 30mm round in size and at least 2mm thick.
- A matching plate should be used on either side of the composite body and spacers must be used to prevent crushing of the composite structure.
- The plates must be joined using at least two 6 mm bolts with locking nuts (eg. Nylock Nuts).
- Corners and edges should be rounded and smoothed off.

4.1.5 Role of Bodywork in Occupant Protection

- Fully enclosed bodywork alone does not fulfill the protection bar requirements, so all vehicles require protection bars made from either metal or integral composite (refer 4.1.3) meeting all construction specifications, regardless of bodywork.

4.1.6 Head Bar

A structure that encloses (outlines) the complete silhouette of the rider when seated in the vehicle and viewed from the rear. The head protection bar shall be within 150mm of the rider's helmet measured forward or rearward.

For this section vehicles shall be classed as -

a. Open vehicles.

Where the cockpit area is open to the elements or a flexible material is used to cover the overhead area, the minimum size of the head protection bar shall be at least 500mm wide at the height of the rider's shoulders, with the edges of the bar rising around the riders head till they join. On a horizontal line drawn 150mm vertically down from the bars highest point, their distance apart shall be a minimum of 400mm between the outer edges. All exposed corners shall be a minimum 50mm radius.

With the tallest rider seated in the vehicle in the normal riding position, the minimum clearance between the top of the rider's helmet and the bottom of the head bar shall be 150mm vertical distance

b. Enclosed hard shell canopies.

Where the cockpit area is closed off from the main airflow, using a rigid material (Coreflute or better) to cover the overhead area, the minimum size of the head protection bar shall be 500mm wide at the height of the riders shoulders, with the edges of the bar rising around the riders head till they join. On a horizontal line drawn 150mm vertically down from the bars highest point, their distance apart shall be a minimum of 300mm wide between the outer edges. With the tallest rider seated in the vehicle in the normal riding position, the minimum clearance between the top of the rider's helmet and the bottom of the head bar shall be 100mm vertical distance

Where the “Hard Shell” or part thereof, is a removable section for rider access during the race, the rider protection system must remain fastened as part of the chassis / frame / body assembly. A robust and reliable locking system must secure the hard shell section closed at all times the vehicle is on track.

If the enclosing hard shell or a lid or window, within 400mm forward distance of the head protection bar, is removed during a race, due to accident or for ventilation / vision reasons, then the vehicle shall be deemed to be have been changed to an open top vehicle and must meet those specifications, or shall not proceed.

- The main head bar and brace together with the side intrusion bars must be one continuous welded frame and must be solidly attached to the vehicle frame. (See Section 4.1.4: Plate Joints)

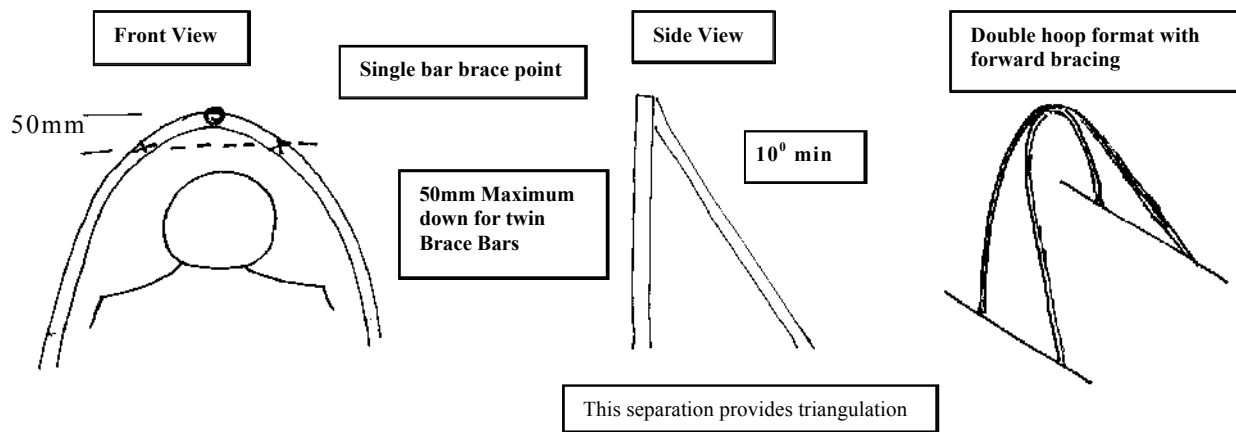
4.1.7 Head Protection Bar bracing

The head protection bar hoop, must be braced by at least one bar, preferably two, to a major structural member of the frame to form a tripod.

Bracing of the head protection structure shall be to the highest point where a single brace is used or, to within 50mm vertical height of the highest point where two braces are used. The minimum included angle for a brace to the protection bar shall be 10° .

Where the brace material has a bend in its line, the angle shall be taken from a straight line drawn between the head protection bar mount point and its anchor point on the frame.

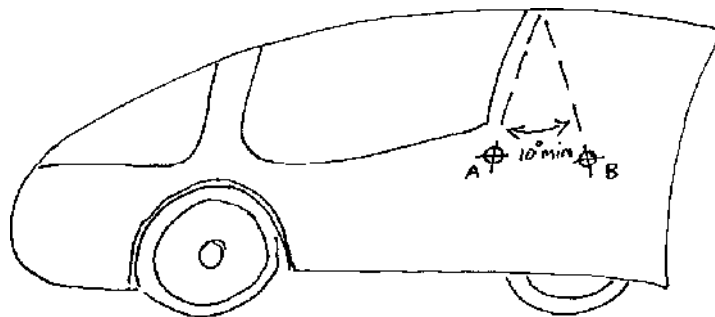
Note: teams can use mounting plates or other mounting approaches but it must be solid, and able to support the weight of the vehicle and rider in a roll over.



However the bend angle of a brace bar shall not exceed 30° unless a gusset is used across the bend.

The Cockpit Overhead Intrusion Device shall not be deemed as part of this bracing.

Where the Head Protection Bar is part of a body assembly, the bracing may be part of that bodies panelling or part of the bars structure, providing that an angle of not less than 10° can be shown by projecting lines between the head bar and the bodies mounting points.



Where this configuration is used the composite shell must be significantly mounted to each side of the vehicle, adjacent to the main head protection bar or at the head bar and another substantial mounting point where direct support for the body work and head bar is provided. All mounting points of compersite bodies that have roll over protection bars inbuilt must have a “tear out plate” (4.1.4) on the inner and outer of the mount.

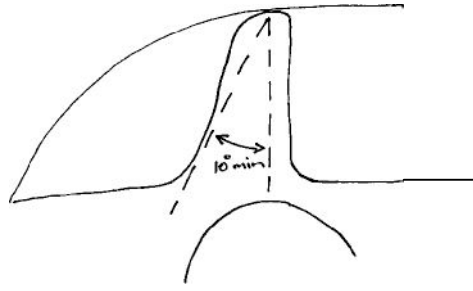
4.1.8 Cockpit Side Intrusion assembly

A rigid Cockpit Side Intrusion assembly shall be provided on each side of the vehicle, rigidly mounted to the main protection bar so that it protects the rider’s arms, shoulders and hips from any impact with track side obstacles or a “T bone” collision by another vehicle.

4.1.9 Leg Protection Structure

A Leg Protection Structure shall be provided that traverses the vehicle's centre line, across the knee area, to protect the knees and feet when the vehicle is inverted. The leg protection structure must be supported by a brace to its highest point to prevent the bar folding over in the event of a roll over or collision.

Where the leg protection structure is part of a body assembly, the bracing may be part of that bodies paneling or part of the bars structure, providing that an angle of not less than 10° can be shown by projecting lines between the leg bar and body mounting. Where the leg protection structure is part of a removable structure for rider or service entry, it must have a solid and reliable latching system.



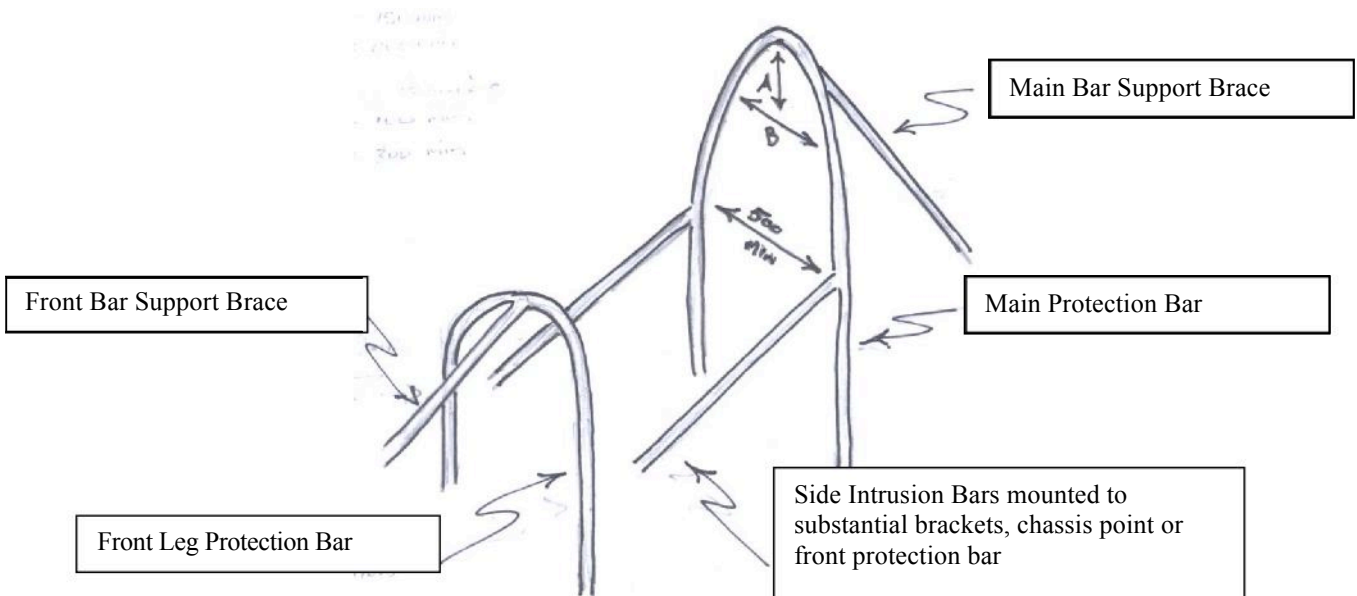
4.1.10 Overhead Intrusion Method

It is required that a **Cockpit Overhead Intrusion Device** is provided that protects the rider from impact or intrusion, if the vehicle is hit by or hits another vehicle or track side obstacle, while on its side. The minimum requirement shall be two bars, (Aluminum, Steel or Composite) evenly spaced about the centre line of the vehicle and covering between the main head protection bar and the leg protection bar. These bars must be a minimum of 200mm apart and a maximum of 300mm apart at their mid point. Closer spacing is allowed when more than two bars are used but the minimum overall width is 200mm. There is no maximum width for more than two bars but they should be evenly spaced. Where a composite lid / hatch is used over the rider, bracing of the composite material to achieve the protection requirements must be displayed.

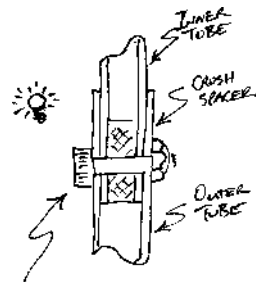
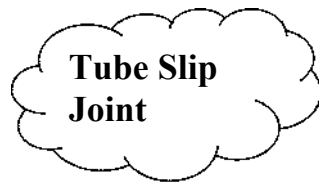
4.2 CONSTRUCTION

4.2.1 Rider Cockpit Protection Assembly

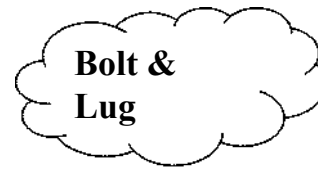
Dimensions for	Open Vehicles	Enclosed Vehicles
	A = 150mm	A = 150mm
	B = 400mm	B = 300mm



These sections shall be assembled to form a solid structure in conjunction with the body, frame or chassis. They will be mounted and braced to solid frame or chassis areas to resist bending in all directions from impacts that are foreseeable during a race incident.



Minimum bolt size M6
x Gr5 + Nyloc nut



Minimum bolt size M6
x Gr5 + Nyloc nut

Any parts of the structure may be joined using bolts and welded tabs, Slip joints with through bolts (a crush spacer must be used in the inner tube), welding or a similar high strength composite material design or appropriate combination. No joint shall have the potential to slip along the section/bar/tube etc to which it abuts. Eg. No ring clamps etc.

4.2.2 Materials for Rider Protection Structures

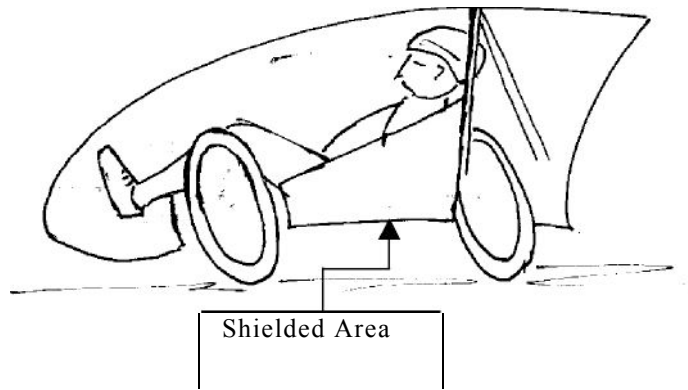
A safety structure, constructed of any material, should not deform from its shape to any appreciable degree, when solidly pushed by hand **in any direction**.

The minimum bolt size used in the mounting or joining of rider protection tubes or materials shall be M6 x Gr 5 strength, fitted with Nyloc nuts or similar. At least 3 threads should show through the nut.

Where part of the protection system joins onto a composite material chassis or a composite protection system mounts to a tubular frame, a 7cm² (min) anti "Tear Out" plate (e.g. 30mm diameter washer) shall be used each side of the composite material join, to spread the loads over the materials surface. A crush resistance system must be inside of any composite sections that have a soft core or may be crushed, when bolt forces are applied across the materials section when forming a ridged join.

4.2.3 Floor and Side Protection Panels

All vehicles shall be fitted with a floor pan. It must be of sufficient size and construction as to prevent the rider's feet, legs or hands from contacting the road surface when seated. The rider's body, along each side, shall be protected by rigid material panels (Core flute, Plastic or better) that restricts the rider from accidental contact with the road surface or another vehicle in a rollover, T bone or side slide situation.



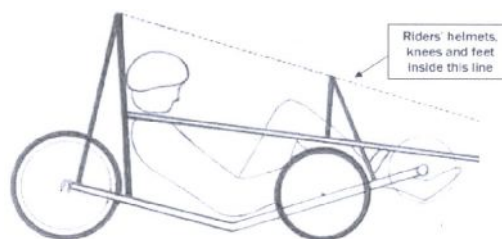
This area shall cover from shoulder to hip and down to the floor line under the rider and be rigidly retained in place with the floor pan. It is encouraged that the tray/floor be part of a body shell but, as a minimum, must be securely affixed to the side protection panels. Toe clips, elastic straps or pedal-to-shoe locking devices do not fulfill the requirements of this clause

4.2.4 Forward Protection & Nose Cone

All vehicles must incorporate substantial forward protection for the rider's feet, to cope with a frontal collision, and must be designed so as not to cause penetration damage to another vehicle in a collision eg curved nose cone. Chains, gear wheels and sprockets shall be suitably shielded to prevent their contact with other vehicles.

4.2.5 Rider to Road Clearances While Inverted

A projected line across the height of both main and leg protection bars shall provide a minimum clearance of 50mm between the rider's knee and toes in their highest position and this line. The line drawn between the head and knee protection bars is carried forward for the foot clearance.



4.3 SEAT

4.3.1 Position

Seat design shall not compromise machine controllability or safety, nor shall the seat place the rider in a potentially hazardous position in the event of a collision. For these reasons a prone riding position or extreme recumbent position is not allowed.

4.3.2 Locking

The seat must be positively fixed into the riding position. Adjustable seats must lock securely into position for each rider and must not be able to be moved while the rider is seated. A retaining system must hold the seat in position when the vehicle is inverted. Seat belts cannot be used as part of the seat lock position

4.3.3 Extra padding

Any temporary or removable seat padding used by the riders must be fixed into place using a positive attachment to a fixed part of the vehicle or seat frame. Straps, Ties, Cord loops, Velcro, Clips etc meet this requirement. The weight of the rider does not meet this requirement

4.3.4 Head Restraint

- The vehicle shall have a head rest behind the rider's head that reduces the chance of over extension of the riders head backwards

Note: when a rider is secured into the seat, provision should be made to prevent riders with long hair having it caught in moving parts

4.4 SEAT BELT

4.4.1 Type

The vehicle shall be fitted with an adult four point automotive static seat belt for all riders.

Automotive full harness types are acceptable.

The seat belt must be completely standard, including buckle, stitching and mounting plates and be free of visible damage.

Seat belts must have a certification attached

Seat belts are to be at least 48mm wide and adequately attached to the frame by the standard terminal plates of a commercially made seat belt.

Recommended suppliers

HEMCO INDUSTRIES Vic.

Phone (03) 5334 1213

Fax (03) 5334 1011

KLIPPAN SAFETY PRODUCTS

Phone 1800 804 588

4.4.2 Mounting

The seat belt shall be mounted to a major structural member of the vehicle **in such a way that the belt is positioned to satisfy ADR 4/01.**

Upper belts may be mounted to suitably braced points on the roll bar **but must not pull excessively downwards on the rider's shoulders while restraining the rider.**

4.4.3 Positioning

The positioning of buckles and belts on the rider's body shall conform strictly to the belt wearing requirements of Australian Design Rules (ADR's) for motor vehicles.

The relevant section of the ADR 4/01 is reproduced below.

“Seat belts are designed to bear upon the bony structure of the body, and should be worn across the chest, shoulders and low across the front of the pelvis; wearing the lap section of the belt across the abdominal area must be avoided.

Seat belts should be adjusted as firmly as possible, consistent with comfort, to provide the protection for which they have been designed. A slack belt will greatly reduce the protection afforded to the wearer.”

Riders may be directed to the pits during the race to have their seat belts readjusted.

4.5 SHIELDING

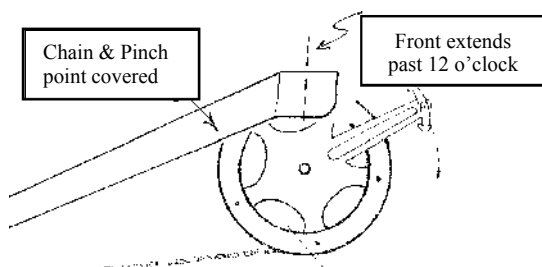
4.5.1 Rider Protection

All wheel spokes shall be shielded **on both sides** with rigid material to prevent injury resulting from accidental contact with rider's limbs or fingers. Exposed axle ends further than 300mm from the centre line of the vehicle shall be:

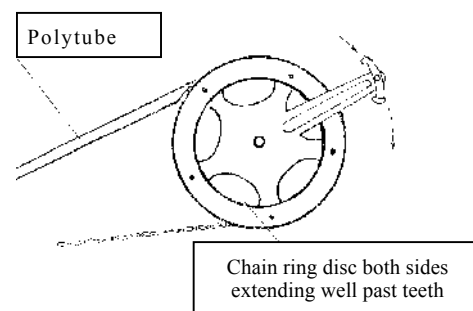
- In a recess or be flush with the hub.
- Covered by body work or by bar work.
- Dome nuts or hub caps.
- Shielded by an annulus capping.
- A nyloc nut with no thread showing.

Other moving components (chains, sprockets, gear wheels and controls) shall be guarded to prevent accidental hazardous contact with rider or clothing and have "pinch points" shielded.

Rigid Chain Guard



Chain Tube and Sprocket Ring



5. STEERING

5.1 TYPE

The type of steering mechanism is free, provided the driver is afforded continuous positive control without the need for regular adjustment. Simple rope systems are not permitted.

A minimum distance of 300 mm is required between the steering column and the riders face.

5.2 FREEDOM FROM BINDING AND FOULING

Steering linkages shall operate freely from full left to full right lock without binding or fouling.

5.3 LOCK STOPS

Positive stops shall be provided to limit the steering linkage movement at maximum lock to prevent damage, over centre travel, or tyre / wheel contact against occupants or frame components.

Stop bolts, plates, chains or cables are acceptable for this requirement.

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

6. BRAKES

6.1 Vehicles should have a minimum of two independently operable systems. Where two front brakes only are used they must operate off separate levers

6.2 No rear brake is required where the two front wheels are braked via separate levers

6.3 Constructors / team managers should consider the effects of an individual front brake system that operates out of balance from the centre line of the vehicle, when combined with fatigue of the rider

Brake systems must not apply friction contact to the tyres.

6.4 STEERING CONTROL

Full steering control shall be maintained while any two braking systems are being operated.

7. ANCILLARY DEVICES

7.1 LIGHTING

Each track in the Series will have different lighting methods e.g. street lights, portable tower lights or none at all.

Therefore a vehicles front lighting shall be of sufficient size and capability to effectively illuminate the path of the vehicle and sufficiently illuminate vehicles being approached from behind.

Helmet mounted lights cannot be used.

Lighting periods will be as directed by each event organizer and communicated at that event.

7.1.1 Headlight

Each vehicle shall have a minimum of one white headlight forward of the riders feet at the front of the vehicle. Flashing headlight settings are not to be used in any circumstances.

The headlight must be of sufficient size and light intensity to effectively illuminate the track and be fitted at least 250mm and not more than 600mm above road level.

Lighting must have the ability to project a solid beam of light (typically 1 metre wide) onto a wall at 10 metres. Additional lighting to improve the rider's vision is encouraged provided at least one light meets the designated requirement.

Note. Clear covering panels over all light types, especially covers at acute angles to the light, severely reduce the lights illumination of the road and may cause non compliance to this rule.

7.1.2 Tail Light

Each vehicle shall have a minimum of one red tail light.

Red LED-type bicycle tail lights are acceptable and set to steady mode at all times during each event. The tail light shall be positioned symmetrically about the vertical axis of the vehicle and set at least 350mm and not more than 600mm above the road surface. The light shall be mounted within 150 mm of the rear most point of the vehicle.

7.1.3 Outline Lighting

The use of reflective material or strip lighting to indicate machine width and height (especially from the rear) is encouraged. However, any lighting/outline marking system that may be mistaken by a rider as a red tail light or white head light shall not be used. Teams may use subsidiary lights of colors other than red or white, anywhere on their vehicle.

A light colored under floor or reflective strip on the underside of the vehicle to make it more visible in a rollover is encouraged.

7.1.4 Mounting and Aiming

All lights shall be securely mounted to maintain correct aim.

7.1.5 Batteries

All batteries used in the vehicle shall be suitably restrained with the method dependent on size and weight of the battery. Lighting or other power source batteries shall not be able to fall out of their restraint if the vehicle is inverted. Wet batteries (liquid lead/acid) shall not be used.

7.2 MIRRORS

7.2.1 Number and Type

The Vehicle shall be fitted with two flat plain or mildly convex mirrors, one on either side of the rider. The two mirror lenses shall have similar curvature (i.e. same image size). Reflecting surface area of each mirror shall be 20cm² minimum

7.2.2 Positioning

Each mirror shall be positioned no lower than rider chest height and such that:

- the rider is afforded a clear view to the rear in each mirror.
- the rider can reach each mirror from the normal riding position.

7.2.3 Mounting

Mirrors shall be securely mounted and be free from vibration.

7.3 WARNING DEVICE

An audible electrical warning device shall be fitted and be operable from the normal riding position, and shall not impair rider control in its mounting or use. The warning device shall be mounted forward of the front axle and the mouth of the device must directly contact the external air stream.

The rider may be required to demonstrate the operation of the horn at pit exit.

The operation of the horn must be solely by the use of a momentary switch.

The horn must emit sound in excess of **85** dbA measured directly in front of the vehicle at a distance of 1 metre from the front of the vehicle. This will be checked at scrutineering.

The warning device is intended to be used to warn other riders, not to intimidate them

7.4 OTHER DEVICES

Other equipment e.g. drink bottle, GPS, communication radio etc shall be securely mounted, and shall not impair rider control in their mounting or use.

The use of MP3's or similar music /entertainment devices by riders is NOT permitted.

Small video cameras (eg. GoPro) are allowed as long as they are not attached to the rider's helmet and are positioned so that they cannot pose any safety risk. They should be mounted inside the outline of the body eg not attached to the top of the trike frame / shell, and approved by the Chief Scrutineer

7.5 SPEEDOMETER

It is compulsory that the vehicle be equipped with a simple electronic speedometer to monitor speed whilst on the track and in the pit areas (speed limit of 10 kph)

7.6 TRANSPONDER:

Vehicle design should allow for a lap counting transponder to be mounted inside the vehicle, positioned within 200mm of the road surface, not above carbon fibre or metal; and not within 500mm of any RF source.

Transponder should not be located near any batteries. Transponders will be issued to Team Managers upon Check-in at the Administration Centre each event after vehicles have passed scrutineering.

8. MARKINGS

8.1 NUMBER AND COLOUR

Each vehicle shall have two identification panels, so that the vehicle number is clearly visible from either side. Identification panels shall be a rectangle of 250 x 300mm diameter and white in color. Panels shall be surrounded by a black border 18mm wide (insulation tape).

No marking or design is permitted within 50mm of the panel, or within 50mm of the border. Official numbers will be supplied by the organisers at the time of registration and must be properly affixed to the vehicle prior to scrutineering.

8.2 EVENT SPONSORSHIP

Vehicles shall have provision for placement of event sponsorship stickers that must be clearly visible at all times throughout the event.

Each vehicle shall have one space on each side of the vehicle measuring 600mm by 300mm for this purpose.

8.3 TEAM SPONSORSHIP

Teams are invited to display on their vehicles and uniforms, any signs/logos that promote healthy school/institution, industry and community links.

Signs/logos, stickers, vehicle name etc. representing drug, alcohol, illegal substances or practices are forbidden.

The event organisers, in the public's interest, reserve the right to request removal of any offensive signage or refuse participation in the event by a team member, team or vehicle.

9. ENERGY EFFICIENT VEHICLE CATEGORY

Where an event has categories relating to EEV vehicles, vehicle specifications similar to the previous years RACV Energy Breakthrough event for EEVs shall apply.

