World Solar Cycle Challenge 2001

Technical Regulations

(v.060201)

A VEHICLE SPECIFICATIONS

(i) CYCLE SIZE:

The maximum size of the solar cycle in motion is 3.5 metres long by 1.6 metres wide by 1.6 metres high. The minimum height is 1 metre. 3 wheel vehicles must have 2 wheels configured in the style of a transverse axle. The minimum track is 0.75 metre. The minimum wheelbase is 1 metre.

(ii)BRAKING:

There must be 2 brake systems independent of each other. The brake systems must be constructed in a way that no single-point failure compromises both systems. The braking power of each and every braking system shall be symmetrical about the vehicle's longitudinal centre line. The cycle must be able to stop within 22 m from a speed of 30 km/h on a dry bitumen surface. This will be tested at the time of the Speed, Brake and Stability test.

(iii) VISIBILITY:

The rider must have a clear view of the road without significantly changing his/her position. Minimum eye height is 700 mm. Riders must have adequate 180-degree vision of the road to the front of the vehicle. A mirror or rear electronic view system is required to give a clear view to the rear of the cycle.

(iv) RIDING POSITION:

The 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 prone riding position is not allowed. The Class C vehicles should take into account protection for the rider in the event of a collision.

(v) SAFETY BELTS:

Safety belts with a minimum four (4) point attachment must be worn in all 3 and 4 wheeled cycles. Attachment points must be designed in accordance with sound engineering practice. Entrants should note the requirements of the Australian Design rules concerning the wearing of belts.

(vi) EXTREMITY MARKINGS:

All cycles must have a fluorescent / iridescent strip or LED lights attached to the front and rear extremities of the cycle.

(vii) MINIMUM HEIGHT:

The minimum height for a solar cycle is 1 metre. A fin may be erected to achieve this height. If a fin is employed, it must be fluorescent or carry LED lights. Power for the LED lights may be supplied by batteries

isolated from the main battery system.

(viii) ELECTRICAL:

The driver must be protected from electrical shock hazards. High Voltage warning signs must be fitted if using in excess of 32 volts. The driver must have a means of electrically isolating the battery and the solar panel

(ix) FAIRING:

A front cowl is permitted on cycles entered under either Class A or B but this must be located between the front of the vehicle and the rear of the front tyre. No other structure with the sole purpose of streamlining is allowed in Classes A and B. This includes rear wheel spats.

(x) EGRESS:

The rider must be able to be extricate themselves from the vehicle within 15 seconds. If the extrication involves permanent damage to the vehicle then the Team Manager will need to satisfy and declare the method to the Scrutineer at the time of Scrutineering.

(xi) STEERING:

The steering effort must be forward of the centre of mass (i.e. no rear-wheel steering) The type of steering mechanism is free, provided the rider is afforded continuous positive control without the need for regular adjustment. Simple rope systems are not permitted. Steering linkages shall operate freely from full left to full right lock without binding or fouling.

(xii) EQUIPMENT:

Vehicles must carry all equipment as fitted at the time of scrutineering at all times during the course of the event.

(xiii) WARNING DEVICE:

Cycles must be fitted with a bell or horn.

B. Power

Only a combination of solar radiation and instant human power may be used for propulsion.

Solar collectors must not exceed 1.6 square metres in total. This area may be carried on board either the solar cycle or a combination of support vehicle and solar cycle.

(The array must be constructed in a way that allows easy measurement. If there are greater than two separate array areas, the largest cell will be measured and multiplied by the total number of cells to determine the total area)

The solar cycle must carry a minimum of 0.15 square metres measured horizontally.

Solar collectors carried on board the support vehicle may be used to recharge spare battery packs during the event.

No other source of charging is permitted during event time.

Mirrors, lenses or any optical device used to increase cell output are not permitted. Any cell cooling may only be achieved using coolant at ambient temperature.

NOTE: All competitors may start each day with fully charged batteries. This allows teams to recharge by mains or generator outside of Event time. Batteries will NOT be collected at the conclusion of each day. The organisers make no provision for, and give no guarantee that power will be available at any given point on the route.

B.1 BATTERIES:

All propulsion batteries must be rechargeable. The battery type options and maximum weight allowances are as follows:

BATTERY TYPE	CLASS A	CLASS B	CLASS C1	CLASS C2
Lead Acid (Pb/Acid)	24 kg	24 kg	24 kg	24 kg
Nickel Cadmium (Ni/Cd)	19.2 kg	19.2 kg	19.2 kg	
Nickel Zinc (Ni/Zn)	14.5 kg	14.5 kg	14.5 kg	
Lithium Ion	6.8 kg	6.8 kg	6.8 kg	
Nickel Metal Hydride (NiMH)	13.7 kg	13.7 kg	13.7 kg	

Any battery not listed will have its theoretical energy density determined by the CSIRO battery laboratory. Entrants desiring to use an electrochemistry not listed are encouraged to contact the organisers as soon as possible.

Batteries may be broken down into a maximum of three (3) battery packs. The total weight of the battery packs must not exceed the maximum weight allowance. ALL battery packs will be scrutineered.

Only one battery pack is to be carried on the solar cycle at any given time.

All entrants may commence each day with a full charge

Any unauthorised battery replacement will incur a time penalty or exclusion from the Event.

Small instruments may be powered by primary cells. A two-way radio with an integral rechargeable battery may also be used. Any other rechargeable battery will be considered part of the total battery mass allowed.

Teams must submit a chemical incident contingency plan relevant to the battery chemistry employed and include a statement of intent with regard to handling or disposal of cells, batteries or component materials. This should include all cells used in ancillary equipment used by the team as well as that in the competing vehicle.

Energy storage devices other than batteries may be used but at the beginning of each day's stage the total of stored energy must be less than a nominal 950watt hours (at a 20hour rate)

B.2 MOTORS

This event is for solar power assisted cycles. Power assisted cycles are defined by law in the Motor Vehicle Regulations as detailed below.

SOUTH AUSTRALIA

MOTOR VEHICLES REGULATIONS 1996

*These regulations are reprinted pursuant to the Subordinate Legislation Act 1978 and incorporate all amendments in force as at **22 April 1999**.*

Exemption from registration and insurance for power-assisted pedal cycles
9B. A power-assisted pedal cycle may be driven on roads without registration or insurance.

"power-assisted pedal cycle" means a pedal cycle that has one or more auxiliary propulsion motors with a combined power output not exceeding 200 watts;

B.2.1

Solar Cycles shall have one or more auxiliary propulsion motors with a combined power output not exceeding 200 watts;

B3. CLASSES:

NOTE: Only single seat cycles will be allowed to compete

Class A.	Non-aerodynamic, commercially available standard bicycles (maximum 2 wheels - not recumbent)
Class B.	Non-aerodynamic Recumbent or Experimental Cycle
Class C1.	Aerodynamic Experimental Vehicle - Open class (minimum 3 wheels)
Class C2.	Aerodynamic Experimental Vehicle with lead-acid batteries (minimum 3 wheels)
	Restricted to Lead Acid batteries and Production solar cells. Solar cells and batteries must be commercially available to all competitors and approved by the WSC.

Teams must demonstrate that the cells being used in the array were purchased from a standard production lot.

Additional class awards may apply provided that a minimum of three entries can be so grouped. The organisers reserve the right to determine the class of any entrant.

B4 DEFINITION OF CATEGORIES:

PRIVATE ENTRY / SCHOOL: Entered in the name of an individual or educational institution.

TERTIARY INSTITUTIONS: Entered in the name of a tertiary institution

COMMERCIAL ORGANISATIONS: This entry is in the name of a company or manufacturer.