

Model Solar Boat Challenge 2009

National rules and specifications

Divisions

The Solar Boat event will have two divisions:

Junior must be less than 13 years of age

Senior self selected.

Any team with student members 13 years of age or older on the 1st October must enter the senior division, and teams with all members less than 13 years of age at that time may elect to contest either division.

All students competing must be at school at the time of the event, or being home schooled.

Within the Junior Division, teams may elect to work to a very specific set of standards, with quite limited choice of parts. This more directed specification, (the 'Junior Restricted' group) is regarded as most suitable for less experienced teams or schools who wish to contain costs. These teams will be regarded as 'Junior' teams for the Challenge, but will be eligible for special awards for this group. They will thus be competing in the junior category as well as within the 'Junior restricted' group.

Awards

The emphasis in the event will be on participation and learning, and the chance to participate will be maximized.

Awards will be given for the following categories

- Teamwork
- Engineering and construction
- Innovation
- Use of recycled materials

- The two fastest teams in each division, as a result of points earned in a knock out competition and finals races.

Description of entries

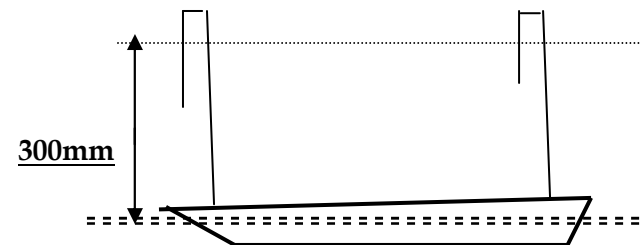
Team members may be questioned informally about their entry at the start of the competition. It is expected that team members are able to discuss their entry without adult assistance, at a level appropriate to their age. While posters of the team entry are not compulsory at the National level, teams are encouraged to bring one if they have made one.

Boat Size

The maximum size of all boats, including any front or rear projections, is 550mm long by 300mm wide. The boat may be as narrow as desired.

Guides

To ensure all boats steer in a straight line, they must be fitted with 2 guides (one at each end of the boat). Each must be looped over a nylon guide line. The guide line will be stretched as near as possible to 300mm above the water level. (See diagram.) The guideline must not be used to propel the boat.



Solar cells

The boat is to be powered by solar cells, up to a maximum of 350 sq.cm of the active photovoltaic cells in area. Teams may need to provide calculations used to confirm the area of solar cells. The outer edges of cells which do not produce electricity need not be included in calculations.

Solar cells must be of a silicon-based material, and must be available for general purchase by the public.

Rare and difficult to obtain types (such as used in research or satellites) will not be accepted, and substitute cells will be supplied for racing if deemed necessary by the scrutineers.

Teams are asked to supply evidence of the source of the panel if it is not purchased from the Technology Education Centre, Scorpio, Dick Smith, Tandy or Jaycar Electronics. This must be forwarded to the National organizer before the National event.

No storage devices, capacitors or batteries can be used.

Switch

A switch must be installed between the motor and the solar panels, to allow the engine to be turned off easily. The switch may consist of a plug or clip.

Motors

Junior division: For 2009, teams may use only one motor costing less than \$20. If the motor is not purchased from one of the listed suppliers, teams must provide evidence that the purchase was from an Australian supplier, and that the purchase price was below \$20.

The Junior Restricted category may only use a motor of value less than \$5.00, purchased from either: the Technology Education Centre, Scorpio, Dick Smith, Tandy or Jaycar Electronics. The motor may be part of a kit with propeller and shaft, in which case an approximation will be made by the scrutineers of its value.

All junior motors will be accounted for at the new price of the motor, not at a reduced second-hand price.

Senior division: either one rare earth motor (valued below \$180), or an unrestricted number of cheap motors (below \$20 each).

Propulsion

Junior division: restricted to one plastic propeller underwater of 35mm or less, or one propeller in the air. No restriction on paddle wheels, oars, etc. An exception will exist if students make their own propeller, in which case no restrictions on material or size apply.

Junior Restricted group: may use only one professional propeller, in kit form, with the shaft, bearing tube and propeller supplied in one set. Propellers are to be up to 40mm in diameter and may be multi-bladed. No other form of propulsion can be used.

Senior division: No restriction on propellers, paddles etc.

If propellers are used by either division in the air, like aircraft propellers, no restriction on their size applies, but the whole boat must not exceed the overall size of 300mm X 550mm.

Similarly, if paddle wheels, oars or similar propulsion is used, no size restrictions exist, provided they fit within the maximum size.

Maximum cost

Junior, Senior divisions: no restriction on the cost of the boat applies to these divisions, but a summary of the costs involved would be appreciated by scrutineers and judges.

As stated elsewhere, cost limits apply to motors; (Junior below \$20, or \$5 if 'Junior Restricted' group. **Senior motors**, below \$180, or \$20 each if multiple motors)

Attaching panels

Panels must be securely attached, so that they cannot fall off in the water.

Exchanging panels

Teams may share panels. In the event that two boats sharing a panel are required to race each other (eg. in finals), then an alternative panel must be available.

Students must do the work

Students are to design and construct the boats themselves, though some adult help to improve their construction skills is acceptable. High level technical work on Junior division boats, including routing, welding, moulding, or spray painting is discouraged, as students will not normally have access to these skills.

All adjustments to the boats, and the launching and retrieval of boats, are to be done by the students and not by adults. If special circumstances require adults to intervene, permission must be sought from the scrutineers or event co-coordinator.

Boat teams must be available for the boat event

In the event that a school has entries in other events, such as the solar model cars, the entry of a boat requires that a team or team member are available at all times to race the vessel. (within reason)

Hulls

No commercially built hulls may be used.

Entrants from the same school may not have identical hulls, eg. made in the same mould, except where other substantial differences in at least two of the following are incorporated: different cabins, motors, panel attachment or propellers.

Hulls must not have been submitted for State or National competitions in previous years, unless substantial modifications have been made and documented to the satisfaction of the race coordinator.

Composite, vacuum or blow moulded hulls may not be used by Junior division students, and may only be used by Senior division entrants if they have participated in making them.

Senior students using vacuum or blow moulded hulls, or other composite hulls, must have designed and made them themselves.

Modification to these rules

Teams are invited to email suggestions to the Solar Boat Coordinator, for consideration for inclusion in future events.

Suggestions of 'approved suppliers' of motors can be forwarded at any time.

Suggested starting equipment

Teams are advised that a paper tag, bearing the number of the boat, will be supplied at the time of scrutineering for attachment to the rear guide post. This will be the point gripped by students as the boats are released, and reduces the chance of any push to start the boat.

This tag should be fixed in such a position as to minimise the shadowing of the solar panel.
