

Regulations of the Panasonic World Solar Challenge 2007

Edition 1.1

Explanatory notes are displayed in shaded boxes, such as this one.

1. Scope & Application

- 1.1 These regulations apply to the 2007 Panasonic World Solar Challenge (The Event), which comprises participants' application, pre-event preparation, scrutineering, testing, on-road components and associated activities.
- 1.2 All persons and groups accepted to participate in the event are assumed to know these regulations and their participation in the event will constitute an acceptance of them.
- 1.3 The event will be conducted by these regulations, the Technical Regulations and appendices and any further regulations that may be issued.
- 1.4 The event is recognised by the International Solarcar Federation (ISF).

2. The Event

- 2.1 The **Purpose** of the event is to promote research into sustainable transport.
- 2.2 The **Challenge** is to cross the continent of Australia in a vehicle described in the technical regulations.
 - 2.2.1 The Challenge Class
solarcars utilising no more than 6 m² of solar collectors.
 - 2.2.2 The Adventure Class
Veteran solarcars as defined under regulation A.3.3.
- 2.3 The event will incorporate the *Greenfleet* Technology Class for vehicles demonstrating practical advancements in automotive technology.
- 2.4 Other award categories (e.g. for Technical Innovation) to be announced in further regulations.
- 2.5 The 'Correct Title' of the 2007 event is the "Panasonic World Solar Challenge".
 - 2.5.1 Entrants shall use the "Correct Title" in all references to The Event.

3. Entrants & Eligibility

- 3.1 The Entrant is the legal entity completing the Participation Agreement.
- 3.2 Eligible Vehicles will be those described in the Technical Regulations.
- 3.3 The Entrant must register all vehicles used by the team, with the organisers.
- 3.4 The Entrant must register all members of its team with the organisers.

4. Organiser

4.1 Events South Australia
Panasonic World Solar Challenge
GPO Box 1972
Adelaide 5001
AUSTRALIA
Telephone: +61-8-8463 4690
Facsimile: +61-8-8463 4718
E-Mail: wsc@saugov.sa.gov.au

4.2 Organising Committee

Chris Selwood, Brian Scholz, Dr. David Rand, Dr. Paul Gwan, Prof. John Storey, Dr. Peter Pudney (in addition for Technology Class - Henry O'Clery, David Viola).

4.3 Stewards of the Event

The Stewards of the Event shall be appointed by the International Solarcar Federation.

Australia: Mr John Ward, MSc; Europe: Dr Ivor Grayson-Smith Japan: Mr Takahiro Iwata.

4.4 Senior Officials

4.4.1 The Senior Officials shall be appointed by the International Solarcar Federation.

4.4.2 Event Director - Chris Selwood

4.4.3 Clerk of the Course - Brian Scholz

4.4.4 Assistant Clerks of the Course - Graham Jackson, David Kitching, Bo Dorniak

4.4.5 Chief Scrutineer – Dr Paul Gwan

4.4.6 Chief Battery Scrutineer – Dr David Rand

4.4.7 Chief Safety Officer – Peter Schloithe

4.4.8 Chief Medical Officer - Dr Bill Boyd

4.4.9 Chief Timekeeper – tba

4.5 Date and Venue of the Event

4.5.1 The event will commence with registration on 18 October 2007

4.5.2 The event is to commence in Darwin, and conclude in Adelaide.

4.5.3 Pre-event scrutineering commences 18 October 2007

4.5.4 Qualifying track event, stability and brake tests 20 October 2007

4.5.5 Pre-event briefing 20 October 2007

4.5.6 Start of on-road component 21 October 2007

4.5.7 Presentation of Awards 28 October 2007

4.6 Entries

4.6.1 Applications for participation may be made by Entrants with eligible vehicles.

4.6.2 Applications will be opened on 1 August 2006. Entries close 30 May 2007.

4.6.3 Applications must be made on the approved form and signed by the Entrant.

4.6.4 The Organisers reserve the right to accept or reject any entry at their discretion. No correspondence will be entered into.

4.6.5 Every Entrant must complete a participation agreement.

4.6.6 The (Solarcar) field will be limited to thirty (30) vehicles.

4.6.7 Entries received after the thirty (30) solarcar maximum may be put on a reserve list.

4.6.8 Entries may be invalidated if payments are overdue.

4.6.9 Vehicle and battery data sheets must be lodged by 1 July 2007

4.7 Change of Entry Details

4.7.1 An Entrant may change the specification of the vehicle or drivers up to the scheduled time of scrutineering, providing such changes are notified in writing. No guarantee is given that changes will appear in printed lists.

4.7.2 Once a vehicle and its drivers have passed scrutineering, no changes will be permitted.

4.8 Entry Fee

4.8.1 Entry fee for the 2007 event is AU\$3300 inclusive of Australian taxes

4.9 Financial

4.9.1 The South Australian Tourism Commission will issue invoices on behalf of the Panasonic World Solar Challenge.

4.9.2 All invoices are payable by the date shown thereon.

4.9.3 Any outstanding financial matters must be finalised before the start of the event.

4.10 Amendments to the Regulations

4.10.1 These Regulations may be amended by the issue of further regulations.

4.11 Interpretation of Regulations

4.11.1 The Stewards of the Event are the only authority empowered to make a decision on the interpretation of these Regulations.

4.12 Route

4.12.1 The Event shall be conducted on public roads between Darwin, Northern Territory and Adelaide, South Australia, a distance of approximately 3,010 km.

4.13 Authority to be on Public Roads

4.13.1 Authority to use public roads as a participant in the Panasonic World Solar Challenge may be granted by the road traffic authorities of the Northern Territory of Australia after a successful roadworthiness inspection. All entrant vehicles successful in scrutineering will be issued with a conditional certificate of registration and must comply with the provisions thereof.

4.13.2 Solarcars successful in scrutineering will be issued with a Northern Territory Government licence plate (Govt. fees apply), which must be displayed on the vehicle in such a manner as to be visible from the rear (material: aluminium; size: 215mm x 97mm).

4.13.3 All vehicles associated with the event shall comply with all road traffic laws

4.13.4 All vehicles associated with the event shall be driven in a careful and courteous manner at all times.

4.13.5 Each team must, during the course of the event, have the means of transporting the participating vehicle and all associated equipment.

4.14 Drivers/Passengers

4.14.1 The minimum number of solarcar drivers is two and the maximum number is four. Two seat cars may register up to four passengers in addition to the drivers.

4.14.2 The official mass of each solarcar driver/passenger, as weighed at scrutineering, shall be 80 kg, including driving clothes and helmet.

4.14.3 If the mass of the driver/passenger is less than 80 kg, ballast will be added to make up the difference.

4.14.4 No credit will be given if the driver/passenger weighs more than 80 kg.

4.14.5 Correct ballast must be carried in the vehicle when driving.

4.14.6 Observers will check that the correct ballast is in place at each driver change.

4.14.7 Ballast provided by the competitor will be subject to approval at scrutineering.

4.14.8 Additional ballast may be provided by the organisers.

4.15 Drivers and Entrants Qualifications

- 4.15.1** At scrutineering, all solarcar drivers must present a current and valid motor vehicle driver's licence recognised by Australian authorities.
- 4.15.2** All drivers shall have a minimum experience of 12 hours driving the solar car demonstrated by presentation of logbook.
- 4.15.3** Only the nominated drivers may drive during competition hours.
- 4.15.4** Any participant under the age of 18 shall be duly vouched for.

Note that supervision and responsibility for persons under the age of 18 is vested in the relevant team manager. As a biennial event with an international team it is not practical for the event to require 'Police Checks' on its volunteers. Written permission to participate in the event, acknowledging these facts must be given by the parent or legal guardian of any proposed participant under the age of 18.

4.16 Administrative Checking

- 4.16.1** Place: Royal Darwin Showground (Foskey Pavilion).
- 4.16.2** Date and Time: Thursday 18 October 2007 from 0800 hours.

4.17 Pre-Event testing

- 4.17.1** The Event will provide facilities for track testing immediately prior to the event.
- 4.17.2** Registered entrants must not drive their participating vehicle on the Stuart Highway in the Northern Territory between 1 September 2007 and the start of the event.

A condition of the Event permit issued by the Government of the Northern Territory is that Entrants will not test their solar cars on the Stuart Highway in the weeks preceding the event. Arrangements may be made for vehicle use permits for other sections of road in the NT, including the Tablelands Highway between Cape Crawford and Barkley Homestead. The Organisers will arrange facilities for track testing at Hidden Valley Raceway in the days prior to the speed trials.

4.18 Scrutineering

- 4.18.1** Scrutineering will take place at the Royal Darwin Showgrounds (Foskey Pavilion) and Hidden Valley Motor Sport Complex and such other place and time as the Clerk of the Course may direct.
- 4.18.2**

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|--------------------------|---|
| Thursday 18 October 2007 | 0800 to 1800 hours |
| Friday 19 October 2007 | 0800 to 1700 hours |
| Saturday 20 October 2007 | 0700 to 1500 hours (Hidden Valley only) |
- 4.18.3** Specific scrutineering times for each team will be posted on the Official Noticeboard at the Foskey Pavilion at 1500 hrs on Wednesday 17 October 2007.

- 4.18.4** All entrant vehicles are required to present at the designated set time, in a READY TO START condition. Scrutineers will examine the vehicles to ensure they conform to these regulations.
- 4.18.5** If a vehicle arrives late for scrutineering, the Team may incur a fine of AU\$200.00 may be demoted to reserve status.
- 4.18.6** Any vehicle failing scrutineering may be re-presented at the discretion of the Chief Scrutineer.
- 4.18.7** No vehicle will be allowed to start the event until it has passed scrutineering.
- 4.18.8** Speed, stability and brake testing forms part of the scrutineering process and will be conducted at Hidden Valley Raceway on Saturday 20 October 2007 between 0700 and 1500 hours.
- 4.18.9** Front and rear Escort Vehicles (detailed in reg. 6.4) shall be presented for inspection at the same time as the solarcar, or such other time as directed by the Clerk of the Course.
- 4.18.10** Unfair Practice: Exclusion will occur if the Organisers discover that an Entrant has deliberately violated these Regulations to gain unfair advantage over other entries, or departed from the spirit of the competition.

4.19 Grid Positions

- 4.19.1** Grid position will be determined by performance at the speed trials.

4.20 Compulsory Signs

- 4.20.1** The organisers shall supply signs that carry event and event sponsor logos.
- 4.20.2** Unbroken, rectangular spaces, 200mm in height x 500mm in width must be provided on the right and left sides of the competing vehicle.
- 4.20.3** These signs must be displayed on the solar car at all times and in such a way that they are clearly visible to a person standing 5m from the car.

4.21 Competition Numbers

- 4.21.1** Cars will be allocated numbers upon receipt of entry.
- 4.21.2** Special requests for the use of particular competition numbers may be submitted. Allocation is at the sole discretion of the Organisers.
- 4.21.3** Competition numbers must be in an area of at least 200mm x 200mm and be clearly displayed on each side of the solar car.
- 4.21.4** Competition numbers shall be in contrasting colours to their background and acceptable in every way to the Chief Scrutineer.
- 4.21.5** Competing vehicles must carry the national flag of the country of entry, fixed adjacent to the windscreen - minimum size 70mm x 40mm.

5. Insurance Cover

- 5.1 All Entrants will be covered by the Organiser's Public Liability policy.
- 5.2 Third Party Property insurance will be arranged by the Organiser on behalf of the Entrant.
- 5.3 Personal Accident insurance will be arranged by the Organiser on behalf of the Entrant.
- 5.4 Any insurance premiums in respect of 5.2 and 5.3 are payable by the entrant.
- 5.5 Comprehensive vehicle insurance is the responsibility of the entrant.

Note: Third Party Bodily Injury insurance is a component of Motor Vehicle Registration, a fee for which is payable to the Motor Vehicle Registration Authority (see regulation 4.13).

6. Conduct of the Event

- 6.1 The Start Line: The on-road component of the event will start in State Square, Darwin, at 0800, Sunday 21 October 2007
 - 6.1.1 All vehicles must be in place by 0630 in starting grid position for final scrutineering. Any vehicle not present will be required to start from the rear of the grid.
 - 6.1.2 The starting grid will be classed as '*parc ferme*' between the hours of 0645 and 0745 or such other time as the Clerk of the Course may nominate.
 - 6.1.3 Two (2) team members must stay with the car during this time to assist officials with inspections.
 - 6.1.4 The Organisers reserve the right to change the time and/or place of the start.
 - 6.1.5 Details of declared control points and stages to be announced in further regulations

- 6.2 **The Course**
 - 6.2.1 The main stages of the event will be between Darwin and Alice Springs (c.1500km) and Alice Springs and Adelaide (c.1500km). Details of stages will be provided in further regulations.
 - 6.2.2 Adventure Class vehicles may be subject to handicap at the discretion of the Clerk of the Course.

This is to ensure that Adventure Class vehicles with potentially in excess of 8 m² of solar collectors will not enjoy unfair advantage over the new generation Challenge Class (6 m²) car
 - 6.2.3 The selection (and cost) of overnight stops shall be the responsibility of the Entrant.
 - 6.2.4 At overnight stops, the solar car and all other vehicles must be parked in such a manner that they, and all and any team activities, are conducted a minimum of 10 metres from the edge of the road.
 - 6.2.5 If the Entrant's overnight camp is not immediately adjacent to the road, a marker cone must be placed on the roadside adjacent to the entry leading to the camp.
 - 6.2.6 All vehicles will run to the same daily time schedule and will be required to complete the full course.

- 6.2.7** Any detour signs erected by the civil authorities must be observed and the correct route rejoined at first opportunity. The organisers may change the course at any time.

6.3 Control Stops

- 6.3.1** Control Stops will be established at intervals along the route.
- 6.3.2** Control Stops may or may not be disclosed.
- 6.3.3** All vehicles will be required to stop at Control Stops and will be held by the control-point manager for 30 minutes. The Clerk of Course may direct any additional penalty time to be taken at a control point.
- 6.3.4** Observers may be changed and vehicles scrutinised at any time.
- 6.3.5** It is the responsibility of the team manager to check whether any updated information is available from the Control Stop Manager.
- 6.3.6** Teams must obey the directions of the Control Stop Manager.
- 6.3.7** During Control Stop time, teams may perform basic safety and maintenance tasks with the agreement of the Control Stop Manager.

Entrants may perform any maintenance or safety checks on their vehicle during Control Stops. This includes checking and adjusting tyre pressures, terminal voltage and any tasks of cleaning or removal of debris. It does not include undertaking any repairs that involve dismantling or replacing components (including wheels/tyres). The array may be placed on a charging stand, as long as that does not render the vehicle incapable of being immediately moved or repositioned on request of the control stop manager.

- 6.3.8** No repairs or maintenance tasks that involve dismantling or substitution of vehicle components are to be undertaken (this provision includes wheel changing).
- 6.3.9** With the exception of those associated with a hand held multimeter, no cables may be connected to the solar car for any reason whilst the solar car is held at a Control Stop.

It is recognised that in the event of telemetry failure, entrants may wish to download data during a Control Stop. This is permissible under the following condition: Permission of the Control Stop Manager must be sought in advance and connection may only be made under supervision of the incoming observer, and the details written up in the Observer notes.

- 6.3.10** Control Stops will be opened in time to accommodate the leading vehicle, and remain open during competition hours. Closing times will be calculated on the minimum speed required to remain in the event rounded to the next nearest full hour.
- 6.3.11** Any team that has missed a Control Stop must reach the next Control Stop whilst it is open. Any team missing (or for whom it is clear will miss) two consecutive control stops should contact the Clerk of the Course.
- 6.3.12** The Clerk of the Course may direct a team to trailer their solar car forward to an open Control Stop.

- 6.3.13 Any team that has trailered their solar car forward may only rejoin the route under the direction of the Clerk of the Course.
- 6.3.14 Any team that has trailered their solar car forward may not rejoin the route in front of any team who has not trailered.
- 6.3.15 Trailering may only occur during competition hours.
- 6.3.16 Teams who have not completed the full course will be listed in order of km covered under solar power.

6.4 Escort Vehicles

- 6.4.1 Each solar car must, at all times when in motion on the highway, be accompanied by two escort vehicles (1 in front and 1 to rear).
- 6.4.2 At any given time, the rear escort vehicle shall be designated the primary escort vehicle, and shall have communications in accordance with Regulation 6.14.
- 6.4.3 Escort vehicles shall display amber (yellow) flashing lights visible from all directions from a distance of at least 200 metres in daylight conditions, these lights must be operating at all times whilst the vehicles are escorting the solarcar.

Note that low power xenon beacons designed as warning devices for industrial equipment are unlikely to meet the visibility requirement.

- 6.4.4 Whilst travelling on the open road, the primary escort (q.v. 6.4.1) must be no more than 3 seconds behind the solarcar, and must at all times maintain a minimum safe stopping distance relevant to the speed and conditions prevailing. The lead vehicle must, whilst travelling on the open road, maintain a distance no greater than 500 m, and no less than 2 seconds in front of the solarcar. The solarcar must be allowed a minimum safe stopping distance relevant to the speed and conditions prevailing.
- 6.4.5 A warning sign not less than 900mm x 300mm with black lettering on a yellow background, clearly visible from a distance of 25m, must be displayed on the rear of the rear escort vehicle, stating "CAUTION, SOLAR VEHICLE AHEAD".
- 6.4.6 All team vehicles must carry a sign, visible from 30m to the rear, stating the name of the Team
- 6.4.7 All vehicles equipped with CB radio (qv 6.14.2) shall carry a sign, visible from 30m to the rear, advising the selected CB channel number.
- 6.4.8 A primary escort vehicle (qv 6.4.2) shall not be a bus, truck, large campervan or be towing a trailer.

The need for this regulation is based on the identification of the perceived hazard. If approaching traffic sees a large vehicle with a flashing light, the immediate perception is that that vehicle itself is the hazard, not the solarcar it is protecting. There have been a number of instances where members of the public have overtaken large rear escort vehicles and narrowly missed the (unseen) solarcar.

- 6.4.9 When stopped, all wheels of all vehicles must be off the highway. Wherever possible, the overnight rule which states that all team activity shall occur at least 10m from the edge of the road should be observed.
- 6.4.10 The Entrant shall provide the organiser with a list of all vehicles associated with the

team.

All team members and vehicles are required to be registered. Notwithstanding this regulation, the Organisers reserve the right to determine if any individual or vehicle is acting 'de facto' as a part of a team.

- 6.4.11** All vehicles associated with the Entrant, (with the exception of those identified in 6.4.1), shall keep a minimum of 500m from the competing solar car **and each other** whilst travelling on the open road, such that vehicles can be safely overtaken one at a time – NO CONVOYS.
- 6.4.12** All vehicles associated with the Entrant, (with the exception of those identified in 6.4.1), must not obstruct participating solarcars or escort vehicles.
- 6.4.13** The Entrant shall be responsible for the actions of all crew and vehicles associated with the team.
- 6.4.14** Escort and team vehicles may be subject to scrutineering at any time during the event to ensure compliance with these regulations.

6.5 Timing

- 6.5.1** Timing is under the control of the Official Timekeeper assisted by Observers.
- 6.5.2** The official start time each day is 0800.
- 6.5.3** Official finish time each day is 1700.
- 6.5.4** A penalty of 1 minute will be imposed for each minute taken past Official Finish Time of 1700, up to and including 1710. After 1710, each additional minute over will attract a two minute penalty.
- 6.5.5** Time penalties incurred in the manner described in 6.5.4 will determine an adjustment of the official start time the following day (eg: finish 1707 = start 0807: finish 1712 = start 0814 etc.)
- 6.5.6** A vehicle starting before its official start time will be subject to penalty (as detailed in 8.1.10).
- 6.5.7** No solar car is to travel between sunset and sunrise.

6.6 Convoys

- 6.6.1** Teams and escort vehicles may not drive in convoys (qv. 6.4.11) and must allow easy overtaking.
- 6.6.2** Any event vehicle being overtaken **MUST** give way. This includes escort vehicles.

6.7 Cattle Grids

- 6.7.1** Grids and stock control devices may not be covered.

6.8 Vehicle Movement

- 6.8.1** The participating vehicle may not, during competition hours, be pushed, towed or carried forward by another vehicle unless abnormal circumstances prevail or under the direction of the Clerk of the Course.

It is the responsibility of the Entrant to operate their car safely at all times. The Entrant may take whatever action they consider appropriate to any given situation. It is the duty of the Observer to record such matters.

- 6.8.2** Competing vehicles may be pushed on and off the highway for the overnight stop.
- 6.8.3** Push starting the car is not allowed.
- 6.8.4** Regenerative power systems must not be on when hand pushing or being towed under circumstances allowed in 6.8.2.
- 6.8.5** Slip streaming is not allowed (driving closer than 10m). Whilst travelling on the open road a solar car may be no closer than 10m to the vehicle in front unless overtaking.
- 6.8.6** Pressure-wave pushing is not allowed (driving closer than 10m). The rear escort vehicle is not allowed within 10m of the solar car whilst travelling on the open road.
- 6.8.7** Driving tests may be carried out by any qualified crew member from sunrise until 0800 and from 1700 until sunset.

6.9 Servicing

- 6.9.1** The batteries may never be removed from the Observer's control.
- 6.9.2** Any component, except batteries and the chassis, may be replaced at any time except during the mandatory time a vehicle is held at a Control Stop as detailed in 6.3.
- 6.9.3** With the exception of ambient temperature water sprayed from a hand held device, and only whilst the solar car is stationary, no artificial cooling of solar cells is permitted.

6.10 Late Time Limit

- 6.10.1** Any vehicle, which does not reach the final control in Adelaide within the time allowed, may be deemed a non finisher.

In practical terms, any vehicle finishing the course (in accordance with these regulations) to arrive before the close of the finish line prior to the Award ceremony will be classed as a finisher.

6.11 Intoxicating Substances

- 6.11.1** Australian civil law applies to drugs and to driving under the influence of alcohol. Drivers, team members and officials are to maintain a 0% blood alcohol level whilst engaged in any duties associated with the event.

6.12 Safety

- 6.12.1 The Entrant is responsible for the road-worthiness of its solar car. By submitting an entry, the Entrant declares the vehicle's integrity and suitability for the event.
- 6.12.2 The Entrant acknowledges that the scrutineering process will determine only whether the solar car complies with the Regulations.
- 6.12.3 No warranty or representation, whether expressed or implied, is made in relation to the mechanical and/or systems roadworthiness of the entrant vehicle in providing this compliance with the event Regulations as specified above.
- 6.12.4 All solar cars and escort vehicles are operated and driven at the Entrant's own risk.
- 6.12.5 All solar cars and escort vehicles must be maintained in a safe, roadworthy condition and be operated safely and within the law at all times.
- 6.12.6 A team may be excluded from the Event at any time if the team, in the opinion of the Clerk of the Course, is operating its solar car or escort vehicles in an unsafe manner.

6.13 Safety

- 6.13.1 Each team must provide a Safety Officer.
- 6.13.2 Each team must provide suitable and appropriate safety equipment, including (but not limited to): first aid kit, safety glasses and gloves for handling batteries, hazard warning cones, red warning flag, fire extinguishers, safety vests and a whistle. Such minimum safety equipment shall be located in the rear escort vehicle and be available for scrutineering as detailed in regulation 4.18.9
- 6.13.3 It is the Safety Officer's responsibility that safety equipment is correctly placed and appropriate warning is given to other traffic, as required.
- 6.13.4 Each team is required to have at least one member holding a recognised first aid certificate, current for the duration of the event.
- 6.13.5 Each team is required to submit a safety plan in accordance with regulation B.10.

Entrants should be aware that fatigue and dehydration are serious problems in this event. This is especially relevant to all drivers, particularly those of solar cars.

6.14 Communications

- 6.14.1 Every solar car shall have means of communicating with the primary escort vehicle, and demonstrate this capability at scrutineering
- 6.14.2 The primary escort vehicle of each team must have a 40 channel UHF CB radio compliant with Australian Standards.
- 6.14.3 The chosen channel number shall be displayed on the rear of the vehicle as detailed in 6.4.7.

UHF CB refers to equipment operating in the range from 476.025 Mhz (ch 1) – 477.400 Mhz (ch 40). 27Mhz AM devices and hand held devices with fewer than 40 channels are not compliant with this regulation. Facilities for teams to hire the correct equipment will be available and further details will be provided to registered entrants. Enquiries concerning allowable frequencies for other equipment should be directed the Australian Communications Authority. <http://www.aca.gov.au>

7. Observers

7.1 Appointment of Observers

- 7.1.1 An Observer shall be appointed by the organisers to travel with each competing team.
- 7.1.2 Observers will be considered as Judges of Fact.
- 7.1.3 Observers may be changed between Entrants throughout the Event.

7.2 Observers' Responsibilities to the Entrant

- 7.2.1 To record their name and the time period of their observation duty.
- 7.2.2 To record the start and stop time, distance covered each day, and all other incidents.
- 7.2.3 To secure removable battery boxes or solar vehicle at sunset.
- 7.2.4 To notify the Clerk of the Course at the earliest opportunity if a battery has been changed or a battery seal broken, or if any breach of regulation has occurred.
- 7.2.5 Observers may not interpret regulations or give advice to Entrants.

7.3 Entrants' Responsibilities to the Observer

- 7.3.1 To assist the Observer in his duties at all times.
- 7.3.2 To provide reasonable food and water for the Observer at least 3 times a day.
- 7.3.3 Never to leave the Observer alone with the car.
- 7.3.4 To send for assistance from the organiser, or call in results if requested by the Observer.
- 7.3.5 To provide a proper seat in the primary (rear) escort vehicle.

It is expected that the Entrant will allocate the front passenger seat of the primary escort vehicle to the Official Observer. This includes fair and reasonable space, with, for example, the footwell not being filled with computer equipment such that the passenger space is restricted.

- 7.3.6 To provide space for the Observer's luggage in the same vehicle as the Observer
- 7.3.7 The arrangements for hosting the Observer must be declared at Scrutineering.

8. Penalties and Protests

- 8.1 Entrants committing the following offences may be subject to a time penalty determined by the Clerk of the Course.

- 8.1.1 Obstructing an overtaking vehicle.
- 8.1.2 Slip streaming, hand pushing or pressure wave pushing.
- 8.1.3 Failure to follow the route instructions.
- 8.1.4 Failure to observe a request by Police or Officials.
- 8.1.5 Wilful damage or interference to property.
- 8.1.6 Failing to get off the highway when stopped.
- 8.1.7 Failure to report damage to stock.
- 8.1.8 Failure to stop at a control.
- 8.1.9 Exceeding any posted speed limit.
- 8.1.10 Starting prior to due time of departure (time prior to due time being added to penalty).
- 8.1.11 Failure to comply with any provision of these regulations.

8.2 In normal circumstances, time penalties shall be served on the day of issue and prior to crossing the finish line.

Penalties will be issued by the Clerk of Course, who may depute any other official to serve the notice to the Entrant. Time penalties will normally be served on the day of issue, by extending the time spent in a control stop. The Clerk of the Course may impose other arrangements appropriate to particular circumstances. Time penalties for cell or module replacement under regulation B.9.3 shall be served at the control point following the replacement.

8.3 Exclusion from the Event

Entrants committing the following offences may be liable to exclusion:

- 8.3.1 Replacement of battery without permission.
- 8.3.2 Removing battery chassis from Observer's control.
- 8.3.3 Charging of batteries from any source other than that scrutinised.
- 8.3.4 Failing the stability test.
- 8.3.5 Inability to maintain minimum speed.
- 8.3.6 Carrying or towing a competing vehicle.
- 8.3.7 Wilful disregard of the regulations and the spirit of the event.
- 8.3.8 Running without rear escort vehicle as described in regulation 6.4.2.
- 8.3.9 Misrepresentation.

Entrants who have been excluded for inability to maintain minimum speed may trailer their solarcar to the finish line, and take part in the display and closing ceremonies.

8.4 Protests and appeals

- 8.4.1 Any protest must be lodged with the Clerk of the Course or his delegate, in writing,

within 24 hrs of the incident giving rise thereto. A protest fee of AU\$100 will apply.

- 8.4.2** Any decision of the Clerk of the Course may be appealed to the Stewards by lodgement with the organisers of a written 'notice of appeal' outlining the grounds for the appeal, within one hour of the handing down of the CofC decision giving rise thereto. The decision of the Stewards is final. No correspondence will be entered into.

The Stewards will consider all protests at the earliest opportunity

9. Determination of Winners - Finishers

- 9.1** In each class, the winner will be the first solar car to have completed the course in accordance with these regulations, any further regulations, and the directions of the Clerk of the Course.
- 9.1.1** To be classed as a finisher, a vehicle must have completed the entire course within the time parameters allowed.
- 9.1.2** The Organisers will designate a fixed point as "Finish of Timing" in order that Entrants are not in a competitive situation in the Adelaide Urban area.
- 9.1.3** The solar car must proceed to the Finish Line under its own power to complete the course
- 9.1.4** The route between the timing point detailed in 9.1.2 and the Finish Line will be deemed a 'transport stage'.

In the event of two or more Entrants being in the transport stage at the same time, they must present themselves to the finish line in the order by which they crossed the 'finish of timing', unless an Entrant's solar car ceases to function. The finish line will close at 1730. In the event that an Entrant is caught between "Finish of Timing" and the "Finish Line" they should inform the Clerk of the Course and make overnight arrangements appropriate to the circumstances, (e.g. the Observer may mark the position as normal, and the team may load their car onto a trailer and return to complete the course from 0800 the following day.

9.2 Provisional Result

- 9.2.1** The progress of solar cars may be publicised during the event. These results may not include all penalties and will, therefore, not be accurate and final.

9.3 Final Result

- 9.3.1** Results will not become final until the Stewards have made a determination on any protest lodged in accordance with regulation 8.5.

10. Winners and Finishers

- 10.1 The winning team will make itself available for a press conference if so required.
- 10.2 Finishing vehicles shall be made available for public exhibition up to the time of the prize giving ceremony.

11. Prizes and Awards

- 11.1 Trophies will be awarded to each class winner.
- 11.2 If the outright winner of the Challenge class is in the Production class, a separate Production class winner will not be awarded.
- 11.3 Certificates will be provided to all finishers.
- 11.4 Special awards and prizes will be announced in further regulations.

12. Event Advertising and Publicity of Results

- 12.1 All advertising, sales promotion and publicity material produced by, or in connection with, the entrants or their sponsors, concerning or referring to the Event, shall refer prominently to the Event by the correct title as defined in Regulation 1, and all entrants shall, by entering the Event, specifically agree to abide by this Regulation.
- 12.2 By entering the Event, the Entrant agrees to the free use of any names, photographs (or graphic interpretation thereof) of their team, vehicles and equipment in any publicity material that may be issued by the Organisers or official Sponsors of the event (q.v 10.1 / 10.2).

Regulations of the Panasonic World Solar Challenge 2007

Part 2 - Technical Regulations (v 1.1)

Explanatory notes are displayed in shaded boxes, such as this one.

A Vehicle classes

A.1 There will be three classes of vehicle: Challenge class, Adventure class, and Technology class.

A.2 Challenge class

A.2.1 Challenge class vehicles must conform to the specifications defined in these vehicle regulations.

A.2.2 There will be two classes of vehicle within the Challenge class: Open class, and Production class.

A.2.3 Open class

A.2.3.1 For Open class vehicles, there are no limitations on the technologies that may be used.

A.2.4 Production class

A.2.4.1 Solar cells and batteries used in Production class vehicles must be commercially available to all competitors and approved by the organising committee.

A.2.4.2 Manufacturer's data sheets must be provided for Production class vehicles. Suppliers of solar cells and batteries for Production class vehicles will be required to provide a declaration that the materials used are from a standard production lot.

The intention here is that these materials are produced for standard terrestrial applications and readily available on the open market. For the purposes of the Panasonic World Solar Challenge, the term production means that the solar collectors and batteries of the participating vehicle were sourced from a commercial supplier. It is the responsibility of the entrant to prove the status of the materials through the provision of such items as catalogue entries, price lists and supplier profiles. The Chief Scrutineer's decision is final and no correspondence will be entered into.

A.2.4.4 The Organisers reserve the right to determine the class of any Challenge class vehicle.

A.3 Adventure class

A.3.1 The Adventure class is open to vehicles that comply with the regulations of any previous ISF event.

The previous ISF classes include:

Classic WSC:

Solar collectors may be constructed in any way provided that they lie, at all times, entirely within a single right rectangular parallelepiped of dimensions $A \times B \times C$, where $A \leq 4.44\text{m}$, $B \leq 2.00\text{m}$, $C \leq 1.60\text{m}$ and $A \times B \leq 8.00\text{ m}^2$.

Cut Out Class: Solar collectors may be constructed in any way provided that they lie, at all times, entirely within a single rectangular parallelepiped of dimensions $A \times B \times C$, where $A \leq 5.00\text{m}$, $B \leq 2.00\text{m}$, $C \leq 1.60\text{m}$. Furthermore, the product of the length and width, less any single rectangular region not occupied by solar array components, may not exceed 8 m^2 .

ISF 5000:

The solar car must have a maximum length of 5m and a maximum width of 1.8m.

There is no restriction on array area.

A.3.2 Adventure class vehicles must comply with all clauses of these vehicle regulations, except where stated otherwise.

A.3.3 Adventure class vehicles will compete in the Adventure class only. The progress of Adventure class vehicles may be subject to the control of the Clerk of the Course.

This is to ensure that Adventure Class vehicles with potentially in excess of 8 m^2 of solar collectors will not enjoy unfair advantage over the new generation Challenge Class (6 m^2) car q.v. regulation 6.2.2

A.4 Technology class

A.4.1 The Panasonic World Solar Challenge wishes to provide a forum to further demonstrate advanced technology in personal transport applications. Consideration will be given to vehicles demonstrating advanced automotive technology to prove their capabilities by being part of the event. Applicants are invited to submit details (in confidence) of their proposed vehicle for consideration.

A.4.2 The Technology class is not time competitive.

A.4.3 Technology class vehicle data (e.g. energy consumption, range, etc.) is to be made available to the organisers to assist in planning future events.

A.4.4 Technology class vehicles will be scrutineered according to these regulations and must meet all relevant criteria and comply with any conditions imposed by the Chief Scrutineer.

A.4.5 The progress of Technology class vehicles will be subject to the control of the Clerk of the Course.

A.4.6 Supplementary regulations for the Technology class are available from the Organisers.

B Vehicle specifications

B.1 Minimum speed

B.1.1 The vehicle must be able to maintain an average speed of 50 km/h. Allowance may be made for poor weather.

B.2 Size

B.2.1 When in motion, the vehicle may be no longer than 5 m, no wider than 1.8 m, and no taller than 1.6 m. This rule does not apply to Adventure class vehicles.

B.3 Seats

B.3.1 Each occupant must be provided with an appropriately constructed seat consisting of a base (squab) and backrest. Dispensation from this rule may be granted to Adventure class vehicles. For Challenge Class vehicles the angle of the seat must not be greater than 27°. (ISF Measurement methodology may be found in Appendix 3)

Operating a vehicle in an extremely inclined position induces fatigue, prevents the driver from securing sufficient visibility and may interfere with the effective functioning of the seatbelt in the event of collision.

B.3.2 The use of safety belts is mandatory for all occupants. The minimum standard is that belts shall be a commercially manufactured lap and harness type (3 point) safety belt, installed and attached to provide adequate occupant restraint in the event of a collision or vehicle roll over. Anchorages must be designed and installed in accordance with sound engineering practice.

B.3.3 All vehicles shall be constructed or adapted to protect, as far as is reasonably possible, the occupant(s) in the event of collision or vehicle roll-over. Steps should be taken to ensure that vehicle components, accessories or other components do not impinge on the occupant space.

B.3.4 Challenge Class vehicles must incorporate a structural roll bar in accordance with appendix 2.

It is strongly recommended that existing vehicles be modified to incorporate this standard.

B.3.5 Occupants of the solar car must wear a helmet whilst participating in the event. The helmet must meet or exceed the Snell95 or DOT motorcycle standards.

B.4 Doors and openings

B.4.1 Vehicles must be designed to allow occupants to enter and exit the vehicle without assistance. The doors must be able to be secured and released from both inside and outside the vehicle. Teams will be required to demonstrate that occupants can enter and exit the vehicle unassisted in no more than 15 seconds.

Dispensation from rule B.4.1 may be granted to Adventure class vehicles

B.4.2 Adventure class entrants will be required to demonstrate that occupants can exit the vehicle unassisted in no more than 15 seconds. If emergency egress involves permanent damage to the vehicle then the Team Manager will need to declare the method of extraction to the satisfaction of the Chief Scrutineer at time of scrutineering.

B.4.3 Emergency opening points must be clearly indicated on the exterior of the

vehicle.

B.4.4 Securing of any egress canopy or hatch with adhesive tape is not permitted.

B.5 Brakes

B.5.1 The vehicle must have a balanced, dual braking system so that if one system should fail, the vehicle can still be stopped.

B.5.2 The vehicle must be able to stop with an average deceleration of 3.8 ms⁻² from any speed that the vehicle is capable of travelling. The vehicle must demonstrate the ability to stop in 25 m from 50 km/h and in 12.5 m from 35 km/h.

B.5.3 Challenge Class vehicle must be equipped with a parking brake capable of holding the vehicle (including driver) on an incline of 18°

The braking systems for the solarcar should be designed and modelled in accordance with sound automotive engineering practice. Experience has shown that, in general, bicycle type brakes are inappropriate to the application and are unlikely to pass scrutineering. Note that regenerative braking does not contribute to the requirement of a dual braking system.

B.6 Tyres

B.6.1 Tyres must be able to safely withstand the loads and forces imposed by the vehicle mass, speed capability and braking. Tyres must be suitably designed and rated and used in accordance with the manufacturer's recommendations.

B.7. Windows and windscreens

B.7.1 All windows must be made of a material which is highly resistant to breaking or major damage. Windows which are necessary to ensure the driver's vision must be made of glass or similar transparent material that does not distort vision.

B.7.2 The window may not be tinted or coloured to the extent that condition of the driver cannot be easily observed from outside the car.

B.8 Vision

B.8.1 The driver must have vision in all directions to the satisfaction of the Chief Scrutineer. Rear vision may be electronic and/or mirror. Electronic rear vision systems must operate whenever the vehicle is in motion under its own power; minimum height for driver's eye is 700 mm.

"vision in all directions to the satisfaction of the Chief Scrutineer?" The ISF does not feel that the ability to read a card with lettering of a prescribed size from a certain distance fulfills the ability to determine the suitability of the vehicle to be driven on the public highway. Common sense must prevail. Would you drive it 3000km?

B.9 Steering

B.9.1 For Challenge Class vehicles, the steering system must be controlled by a steering wheel which has a continuous circumference/perimeter. (q.v. appendix 1).

B.9.2 Solar cars must be able to make a U-turn in either direction within a 16m lane.

B.10 Lights and indicators

B.10.1 Rear brake lamps, front and rear turn indicators and front and rear hazard lamps are required. These must be visible in sunlight by other road users at a distance of 30 m.

B.10.2 Challenge Class vehicles must be equipped with headlights.

B.10.3 An audible warning device (horn, hooter, klaxon etc.) must be permanently fitted to the vehicle and demonstrated to the satisfaction of the scrutineer.

B.11 Electrical

B.11.1 All electrical equipment must comply with the relevant IEEE standards. Where the system voltage exceeds 32 V, the occupants must be protected from electrical shock hazards by ensuring that it is impossible for any occupant of the vehicle to touch live wires or terminals.

B.11.2 High Voltage warning signs must be fitted throughout the vehicle adjacent to all terminals where a potential of more than 32 V might be present, and to all covers which, when removed, expose live wires or terminals.

B.11.3 The driver must be able to electrically isolate the solar panel from the rest of the car while seated in a driving position and without releasing the seat belt. Soft (e.g. MOSFET) switching is permissible.

B.11.4 The driver must be able to electrically isolate the battery from the rest of the car while seated in a driving position and without releasing the seat belt. Soft switches are not permitted—the switch must be a circuit breaker, contactor, or other mechanical type.

B.11.5 For emergency use, a means of electrically isolating both the solar panel and the battery from each other and the rest of the car must be provided on the exterior of the car. The device must be able to be operated instantly and without hesitation by someone unfamiliar with the car, and without removing any panels or tape. Soft (e.g. MOSFET) switching is permissible for the solar panel. Battery isolation must be effected through the use of a mechanical device.

B.11.6 The position of the emergency isolation activation device must be clearly marked by a blue equilateral triangle containing a red flash (minimum side length 150 mm), with the legend "Emergency Electrical Isolation". The blue triangle must be placed within a yellow disc (minimum 80 mm diameter). In addition, there must be a clear instruction on how to operate the device (e.g. PULL). For Challenge Class cars the isolation device must be located below the windscreen on the left side of the car. It is recommended that all vehicles adopt this position as a standard

B.11.7 The entrant must prepare an electrical drawing showing all the essential power circuits of the electrical equipment of the vehicle. The circuit drawing must include the battery, fuse, breaker, power switch, capacitor, motor controller or chopper, motor, charging unit and connecting cable. All the elements shown in the circuit drawing must indicate detailed electrical specifications.

B.11.8 The Entrant must prepare a second drawing, which is the plan view drawing

(as seen from above) that shows the layout of the above elements inside the vehicle. This must be presented as a hard copy in A4 format to form part of the event log book.

B.12 Occupant safety

B.12.1 All sharp edges, chains and sprockets must be covered when in use, and internal components or cargo must be secured.

B.12.2 Adequate ventilation must be provided to all occupants.

B.13 Emergency Recovery

B.13.1 All Challenge Class vehicles must be equipped with front and rear towing eyes which together with their mountings hold sufficient strength to enable the vehicle to be recovered or moved from an inoperable or dangerous situation. The minimum inner diameter shall be 50 mm. Towing eyes must be painted yellow, orange or red. It is recommended that all vehicles comply with this requirement.

B.14 Reversing mechanism

B.14.1 Challenge Class vehicles must be able to be driven backwards under their own power with the driver seated normally behind the steering wheel.

B.15 Identification

B.15.1 The vehicle must have a unique vehicle identification number (VIN), which must be permanently attached to a substantial part of the vehicle chassis or frame. *The International Solarcar Federation issues VIN numbers. A vehicle identification plate can be supplied for a nominal fee. For further details, contact the Organisers.*

C Energy sources

C.1 Natural solar irradiation received directly by the car is the only external energy source that may be used for propulsion.

C.2 Energy recovered from the motion of the car may be used.

C.3 For Adventure class vehicles, the solar array must comply with the regulations for a previous ISF event. The following rules in this section do not apply to Adventure class vehicles.

C.4 The area of the solar array must be no greater than 6 m².

The area of the array will be determined by summing the active areas of the cells, as specified by the manufacturer. Entrants must supply sufficient information (e.g CAD drawings and calculations) to enable the scrutineers to determine compliance with this regulation. The Chief Scrutineers decision is final and no correspondence will be entered into.

E Energy storage

E.1 Energy storage types

E.1.1 Any energy storage device may be used. The total stored energy of these devices together with that of any fitted battery packs must meet the approval of the

Chief Scrutineer.

E.1.1.1 Temporary storage devices (e.g supercapacitors) must be shown to be in a fully discharged state at the start line.

E.1.2 If the energy storage system is built from commercially-available secondary cells, the allowable mass for this event is:

| | |
|------------|--------|
| Pb/Acid | 125 kg |
| NiMH | 70 kg |
| Ag/Zn | 40 kg |
| Ni/Zn | 75 kg |
| Ni/Fe | 100 kg |
| Li-Ion | 30 kg |
| Li-Polymer | 30 kg |

E.1.3 If the energy storage system is not made from commercially-available secondary cells, the allowable configuration and mass will be determined by the CSIRO laboratories. Contact the Organiser for further details.

E.1.4 Commercially available instruments, computers and digital multimeters may use ancillary batteries provided that the battery is internal to the instrument. In this case, no external connection is allowed to the instrument battery.

E.1.5 Batteries powering vehicle systems and ancillary devices (including computers, telemetry equipment and non-commercial instrumentation) that do not derive their power from internal batteries or the main battery pack via DC/DC converters are considered part of the overall energy storage system.

E.2 Battery installation

E.2.1 For the purposes of the event, battery packs are defined as the outer container holding the battery of cells or modules and associated control equipment.

E.2.2 Battery packs must be removable from the vehicle in which they are installed.

E.2.3 Battery packs must be constructed such that tamper evident devices such as seals can be applied by the scrutineers.

E.2.4 Battery packs must be securely fixed to the car.

Fixing by the use of cable ties is unlikely to meet this requirement.

E.2.5 The traction battery must not exceed two packs.

E.2.6 Chemical spill-proof barrier(s) must exist between the occupants and all battery packs.

E.2.7 Battery packs shall be provided with adequate airflow vented to the exterior of the car.

E.2.8 Teams shall supply a lockable box into which the battery packs may be placed for impound (normally between sunset and sunrise).

E.3 Charging

E.3.1 After the start of the event, batteries may be charged only from the vehicle solar array. Energy may be recovered from the movement of the vehicle (e.g.

regenerative braking). Any such devices employed must be declared and passed by the Chief Scrutineer.

E.3.2 Charging of batteries from any other sources will lead to exclusion from The Event.

E.4 Battery replacement

E.4.1 The vehicle must travel along the entire course with the same make and number of rechargeable cells or modules that were passed by the scrutineer as constituting the total battery pack for the vehicle.

E.4.2 Cells, modules or battery packs may not be replaced for any reason other than in the case of accident or malfunction.

E.4.3 The Chief Battery Scrutineer must approve any replacement of a cell or battery module. Each time a set of cells or battery modules is replaced, the team will incur a penalty calculated thus: Time Penalty (in minutes) = $100 \times 1.225^m \times n/N \times E$ where m is the number of times the battery has been changed previously, n is the number of cells or battery modules to be replaced, N is the total number of cells or battery modules in the pack, and E is the total energy (in kWh, 20 hour rate) of the battery pack as determined by the CSIRO theoretical energy density value of the electro chemical composition of the battery, or the manufacturers specification, whichever is the greater.

E.5 Chemical incident contingency plan

E.5.1 Teams must submit a chemical incident contingency plan relevant to the battery chemistry employed and include a statement of intent with regard to handling and 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.

E.6 Impounding the battery

E.6.1 Between sunset to sunrise each day, the battery pack must be placed in a lockable box and placed under the control of the Observer.

E.6.2 In circumstances where the battery cannot be removed from the car, or the team chooses to leave the battery in the car, the whole car shall be placed under the Observer's control between sunset and sunrise, in which case no work of any kind may be performed on the vehicle during this period.

E.7 Data sheets

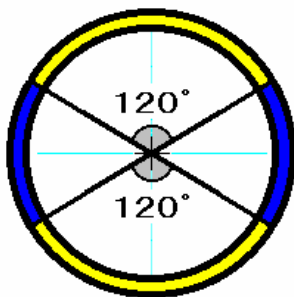
E.7.1 Photographs, drawings, vehicle specifications and background information for the program must be received by 30 June 2007.

Appendix 1
International Solarcar Federation Steering Wheel Specifications
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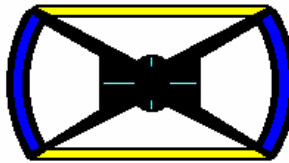
Steering

To reduce the possibilities of driver injury in the event of collision and to minimise impediments to emergency egress, the steering system must be controlled by a steering wheel which has a continuous perimeter.

A circular shape is preferred, however the upper part above 2/3 and/or the lower part below 2/3 of the circumference of the steering wheel may be flat as depicted in the diagram below).

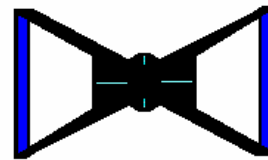


Permitted

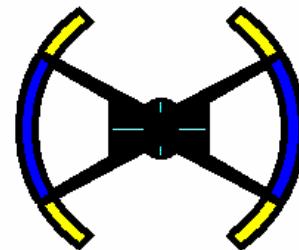
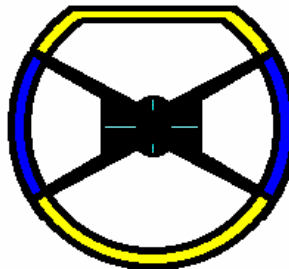


Permitted

Not Permitted



Not Permitted



Appendix 2

International Solarcar Federation Roll Bar Specifications

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All vehicles must be equipped with the first and second roll bars (as shown in the specifications below) to prevent direct damage to the driver and serious cockpit deformation in the event of a collision or of a car turning over.

The first and second roll bars form the basic element of the rollover structure. These structures must be made of steel tubes or other material of sufficient tensile strength to protect the occupant from a force of $4w$ (w =weight of vehicle). The structure must be bolted, welded or otherwise structurally incorporated to the vehicle according to sound engineering practice. For vehicles whose bodywork fulfills the function as the first and second roll bars, the installation of additional roll bars is not necessary.

Roll bars shall meet the following dimensional criteria:

- The line extended from the top of the first roll bar to the top of the second roll bar must be above the driver's helmet when he/she is seated normally in the vehicle.
- The top of the first roll bar must be higher than the top of the steering device.
- The first roll bar must cover the steering device with steered wheel(s) in the straight position ahead when the vehicle is viewed from the front.
- The second roll bar must cover the driver's shoulder when the vehicle is viewed from the front. In case that the bodywork of the vehicle covers the driver's shoulder, the second roll bar may cover only the driver's head.
- The second roll bar must have enough strength for lifting or towing with the driver on-board.

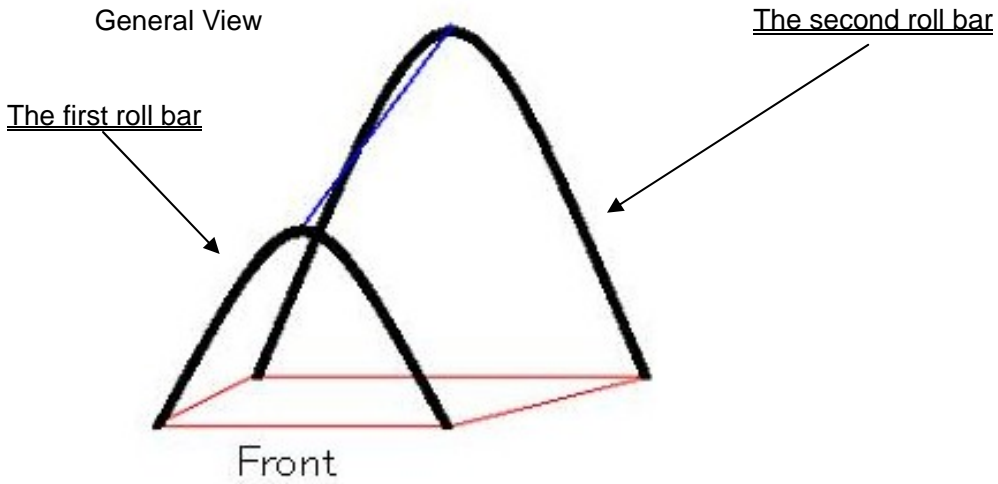
General descriptions

Roll bars must be designed and constructed so that, when correctly installed, they minimize the risk of injury to the occupant.

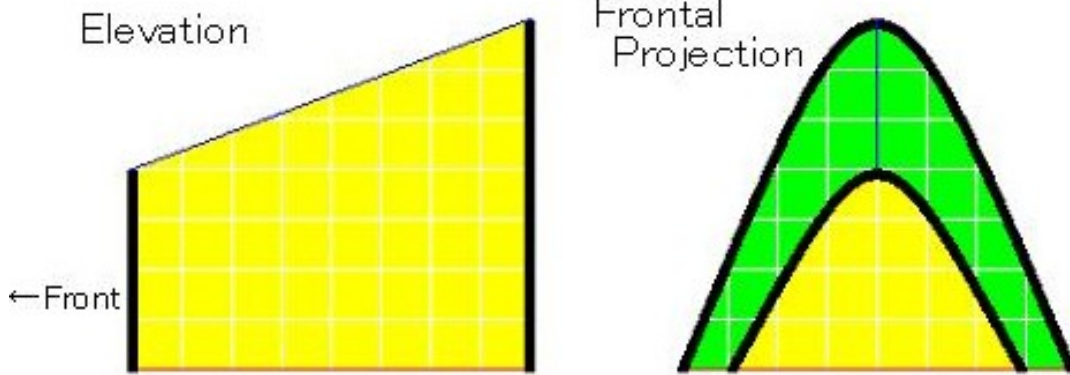
The responsibility to secure the necessary strength rests with competitors.

No part of roll bars must hamper the entry/exit of the occupant or take up the space designed for the occupant.

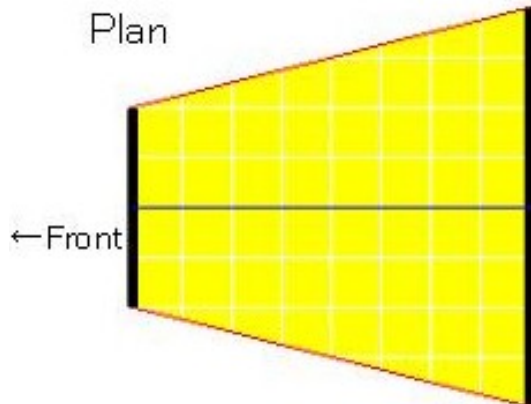
Basic roll bar configuration



The driver's helmet must, when seated normally, be contained within the defined area



All driving controls must be capable of being accessed and operated within the defined area



All parts of the driver's body (including any protective clothing and equipment, must, when seated normally, be contained within the defined area

Appendix 3

International Solarcar Federation Standard Measurement of Seating Angle

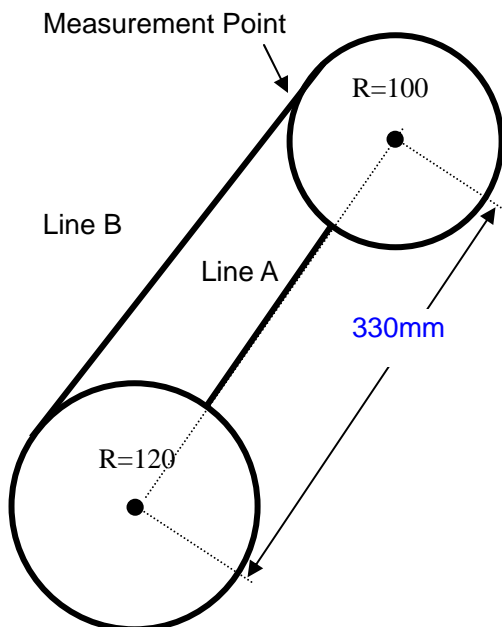
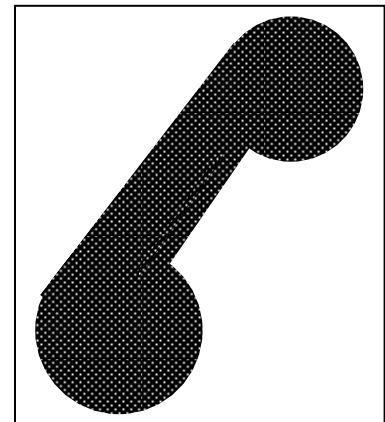
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The seating angle must not exceed 27 degrees

The concept of determining the seating angle is based on the measurement of torso angle in accordance with ISO/JIS Standards.

- JIS D4607 is the standard that shows the three-dimensional seated human model for measurement of automotive body interiors.
- JIS D0024 establishes the H points (hip point: rotational centre of body and thigh in the three-dimensional human model) and indicates measurement methods including the torso angle based on D4607.

For ISF scrutineering purposes, measurement is effected by using a template based on the hip and shoulders of a two-dimensional form derived from the JIS D0024 standard.



Making a Template

- Draw a circle with a radius of 120mm.
- At a point 330mm from the centre of the circle, draw another circle with a radius of 100mm
- Draw a line connecting the centre of the two circles (Line A).
- Draw a tangent to connect the circumferences of two circles (Line B)
- Cut the shape using suitable material
- Attach a plumb line to the measurement point
- The angle is measured between line A and the perpendicular.