ERA Cup rules V1 2021

All vehicles entered will comply with the following Technical and Sporting Regulations.

TECHNICAL

General

The cars build during the 2020-2021 season may only be build with a kit-car kit bought through ERA or build to the exact same specification. The bodywork is free within the boundaries of below regulations.

Regulations below relating to chassis build are implemented for future self designed chassis. If in doubt contact ERA through info@erachampionship.com

T1 - Motor

T1.1. The vehicle will only be powered by one DC electric motor supplied by ERA.

T1.2. The motor is sealed and must not be opened. No machining or drilling of the casing is allowed. The motor brushes supplied as standard cannot be changed or modified.

T1.3. Motor cooling is only permissible using passive or forced air, without any prior energy input or power from batteries other than the main vehicle batteries.

T1.4. The motor must be easily accessible for inspection. ERA reserve the right to remove motors for return to the manufacturers for inspection.

T2 - Batteries

T2.1. One approved and supplied unmodified battery, referred to as the 'main battery', will be used on each vehicle.

T2.2. Auxiliary batteries for powering devices on the car that does not add to the primary battery capacity of is linked to the motor in any way must not exceed one PP3 or six AA cells per car, if this system is larger

than this it needs to be submitted separately (with electrical plan) before the race and approved by ERA. Proprietary unmodified electronics with self-contained batteries, e.g. speedometers, watches, radios are permitted so long as they're not connected to any of the car control systems. All other devices including motor controllers must be powered off the main batteries. If in doubt consult ERA.

T2.3. Out of the car, the main battery must be kept separate.

Safety Note – Batteries should be handled with care. Batteries that are dropped may sustain internal damage, fail and possibly cause injury.

T2.5. The main battery must be firmly secured to the chassis of the vehicle using rigid fixings – i.e. no webbing or elastic straps, and must not be able to move in any direction in those fixings. Plastic threads on fixings are not permitted. Over centre clips must be security pinned.

T2.6. The main battery may be mounted upright or on any side but must not be inverted, i.e. terminals must not point towards the ground.

T2.7. The main battery must be separated from the driver by a bulkhead, sufficient to restrain the battery from the driving compartment. This bulkhead must not be able to short circuit the battery terminals. The battery must be located inside the vehicle's bodywork.

T2.8. Batteries must have quick release connections to enable rapid disconnection in the event of an emergency, and they must not be liable to disconnect or short against metal parts.

T2.9. The main batteries in vehicles at the start of practice sessions or races will not exceed 25°C or ambient temperature plus five Celsius when ambient is above 20°C as measured by ERA. Spot checks will be carried out and any vehicle found to have a battery in excess of this temperature will have its race start delayed.

T3 - Wheels & Track

T3.1. Only the ERA supplied Tyres and wheels are permitted. Drawings available upon request.

Tyre sizes:

10*4.5-5

11*7.1-5

T3.2. There must be four wheels located as a matching front and matching rear pair, symmetrically about the centerline of the vehicle.

T3.3. The track of the vehicle must not be less than 500 mm front or rear. The track is deemed as the measured width between centers of tyres where they contact the ground. The track may vary front to rear.

T4 - Centre Of Gravity

T4.1. The base of the main batteries must be at or below 100 mm from ground level if fitted differently from the standard kit car. A 6 mm diameter hole should be drilled through any solid floors adjacent to the batteries to allow height measurement.

T4.2. The driver's seat including any padding must be at or below 100 mm from ground level. A six mm hole should be drilled through the base of the seat to allow height measurement.

T5 - Dimensions

T5.1. The vehicle must not exceed 2800 mm in length, **1400 mm** in width, and 1200 mm in height.

T5.2. Ground clearance must not be less than 20 mm.

T5.3. No part of the vehicle may extend more than 800 mm behind

the centre point of the rear wheels.

T6 - Driver And Seating

T6.1. The vehicle will have one seat for the driver firmly fixed to the vehicle chassis.

T6.2. The driver must be seated in a feet forward, reclined position. Drivers may not

1. kneel, sit astride a seat, or lie down in any way such that their chests and head are forward of their waist.
2. T6.3. The driver must be able to demonstrate a clear exit from the vehicle unaided.
3. T6.4. There must be a solid floor under the whole of the driver, to prevent ingress of debris.
4. T6.5. There must be a padded head rest behind the driver's helmet to prevent whiplash.
5. T6.6. All parts of the vehicle's seat which are in contact with the driver must have some form of protective padding.

T7 - Bodywork

T7.1. There must be a rigid structure around the driver extending from the front bulkhead to the back of the driver. It will have a minimum height of 250 mm from the seat base and must cover the elbows. Next to the legs, i.e. forward of the lap strap, it may be less than 250mm high provided it reaches the top of the cockpit.

T7.2. It shall be of rigid material such as aluminium, rigid plastics, carbon fibre, glass reinforced plastic or other composites of at least 1.5 mm thickness. Plywood needs to be a minimum of 3 mm thick. Corrugated plastic type material or foam on its own is not permitted for this area.

T7.3. There must be a suitable bulkhead between driver and wheels to prevent any accidental contact with the driver.

T7.4. The cockpit opening, when viewed from directly above must be able to accommodate a rectangle 600 mm in length and 350 mm wide with no intrusions, e.g. helmet fairings, instrument covers, etc. must not overhang this area.

T7.5. The driver's helmet must be positioned at the rearmost point possible of the cockpit, creating a clear space in front of the drivers' helmet.

T7.6. Bodywork, including windscreens, to the front or sides of the driver's helmet may not be higher than the eye level of every driver. This does not include front wheels or their coverings.

T7.7. Closed cell foam of minimum 25 mm thickness must be attached down the inside of the cockpit sides to protect a substantial part of the driver's body, from the floor to the cockpit opening.

T7.8. Any sharp edges/protrusions in the cockpit must be padded/ protected.

T7.9. There must be a solid, rigidly mounted, bulkhead forward of the driver's feet, with 200 mm depth of foam with a compressive strength of 300 – 700 Kn/m2* affixed to the front side of this bulkhead, to protect the driver from frontal impact. Any material forward of the bulkhead must be easily deformable. This must be available for inspection at scrutineering.

*The foam must be an extruded polystyrene foam such as Styrofoam, Dow Floormate or Kingspan Styrozone.

T7.10. The rear tyres need to be protected from collision (wheel to wheel) from behind and in front by the bodywork.

T8 - Brakes

T8.1. Brakes will be subject to a force test of 300N applied horizontally forwards from the top of the roll bar with the car situated on a flat tarmac/concrete surface. There must be no movement of the car. All drivers must be capable of producing this braking force. This will be subject to spot checks outside of scrutineering.

T8.2. A minimum of two independent brake systems must be fitted, such that there is still some braking if one system were to fail. This is not necessary when using the kit car supplied system.

T8.3. Both wheels on either front or rear axles must have the same type of brake such that the car brakes in a straight line. This is in addition to any electrical braking system that might be incorporated.

T8.4. The driver must be able to operate the brakes without removing either hand from the steering mechanism.

T9 - Roll Bars

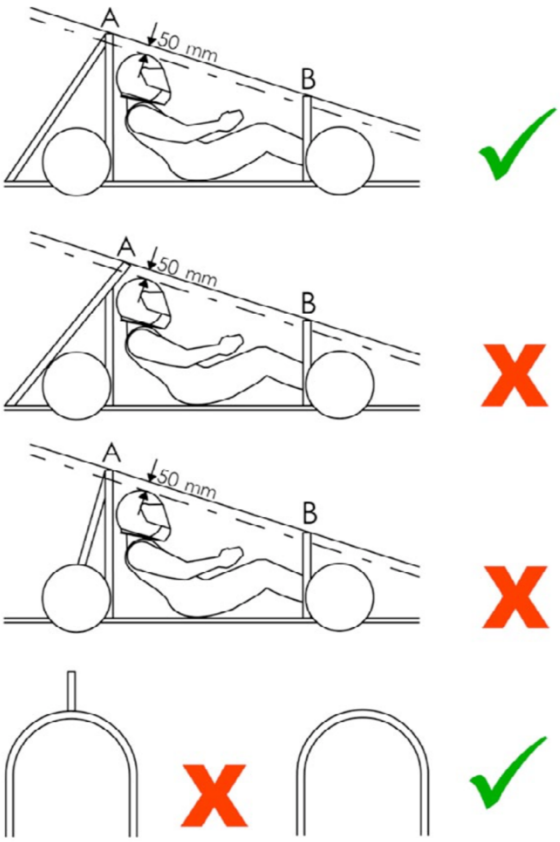
T9.1. The vehicle must have front and rear roll bars offering protection in accordance with the diagrams shown here – the helmeted head of all drivers must be at least 50 mm below the line A-B as shown.

T9.2. Roll bars must be firmly secured to the chassis of the vehicle using mechanical fixings or welding. Gluing/ bonding of roll bars to chassis with no mechanical fixings or welding is not permitted.

T9.3. One central triangulated brace or two side triangulated braces must be fitted to the rear roll bar. These braces should attach to the chassis of the vehicle at one end, to not more than 200 mm from the top of the roll bar at the other, and must be capable of taking loading in all directions.

T9.4. Aluminium or steel square or circular section roll bars are to be used and must be strong enough and of sufficient dimensions to perform satisfactorily. If in doubt check material suitability with Greenpower before construction. Composite roll bars are not permitted.

T9.5. Non-structural bodywork along with front and rear wheels must not be regarded as part of the roll protection. The top 150 mm of the roll bar must not have any fairing or other aerodynamic aid.



T10 – Safety Equipment

T10.1. Two mirrors are highly recommended but can be replaced by a video system.

T10.2. A 36 volt, minimum 100 amp, rated isolation switch must be fitted. It must be clearly visible and be easily accessible to the driver, and from outside the vehicle. Two switches may be fitted if needed. On/Off positions must be clearly marked. Indirect operation of the isolator is not permitted.

T10.3. The vehicle must be fitted with a minimum four fixing point, 50 mm width safety harness, with secure fixing points on the roll bar or chassis. Harness shoulder strap fixing points should be close to shoulder height and neck width **(approx. 150 mm).** Lap straps must be able to be fully tightened before shoulder straps and must fully tighten around the driver's lap without additional padding in front of the driver.

T10.4. Drivers in low reclined seating positions with a raking angle of less than 45 degrees if the seat has a flat base, or 30 degrees with a front angle of 15 degrees will require a five or six point safety harness.

Safety Note – Avoid drilling roll bars at shoulder height as it weakens the structure.

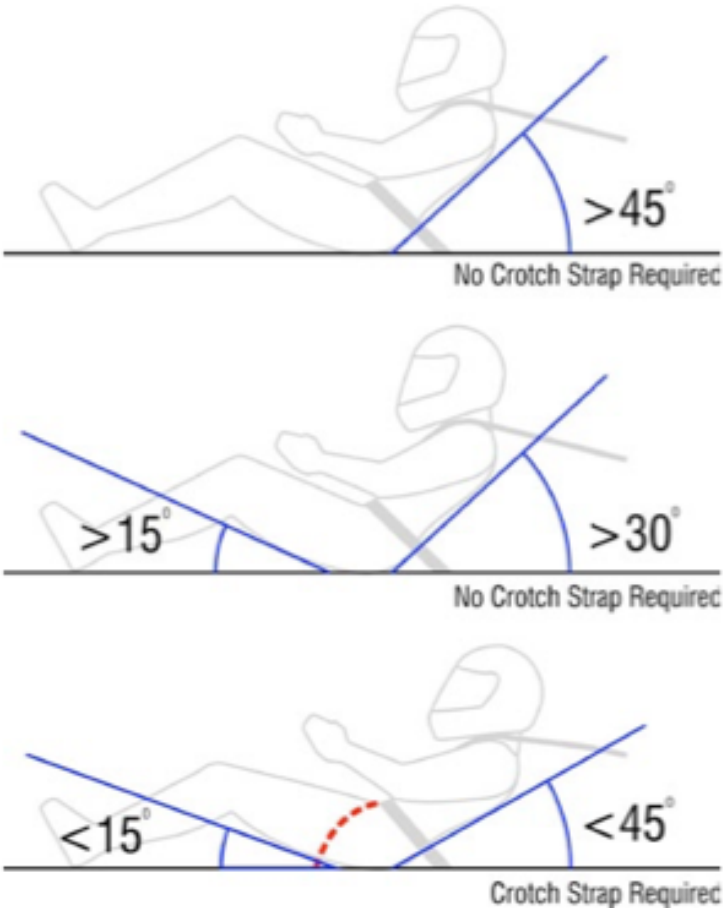
Safety Note – Harness ends should protrude at least 100 mm beyond the buckle for all drivers, and be folded and sewn at the ends to act as a stopper.

T10.5. A non-flashing, red brake light will be fitted so it is clearly visible from the rear of the vehicle.

T10.6. The drive train must be guarded to prevent fingers, hair and clothing becoming trapped at any time.

T10.7. The use of locking nuts on safety critical components is **mandatory**, including but not limited to: safety harnesses, roll bars, wheels, steering and braking systems.

T10.8. All roll bars must be produced from steel, with minimum outside diameter of 25mm and minimum wall thickness of 1.5mm.



T11 - Steering

T11.1. Steering systems must have minimal play.

T11.2. Steering must be able to operate smoothly from lock to lock, without wheels making contact with bodywork.

T11.3. Steering must be by mechanical linkages only.

T11.4. Steering must be by front wheels only.

T12 - Electrics

T12.1. The accelerator must be spring loaded to the Off position.

T12.2. Electronic motor controllers must not be capable of boosting battery voltage, i.e. at any time the voltage across the motor terminals may not exceed the voltage across the battery terminals.

T12.3. A fused link/cut-out must be in place in the main power circuit, rated at 70 amps or less. This is already provided by the supplied battery (keyed switch) this must be accessible at all times and may not be covered by the bodywork. If the design does not allow the supplied battery switch to be accessible a secondary switch that is accessible needs to be implemented and clearly marked.

T12.4. All wires and terminals on the vehicle must be neatly run, secured and unable to chafe, away from moving parts. All wiring must be correctly rated for its use.

T12.5. All wiring and electrical components must be correctly rated for their use.

T12.6. Low current ancillary circuits must have their own fuse (normally 5A or less).

SPORTING REGULATIONS

s1 - Team Clothing

S1.1. Drivers must wear a suitable motorcycle or motor racing specification full face crash helmet including chin protection and visor. Drivers must ensure the helmet is correctly fastened before they get into the vehicle.

S1.3. Full overalls must be used whilst driving. They must be of a suitable thickness to provide protection. Paper overalls are not acceptable.

S1.4. Full fingered gloves must be worn.

S1.5. All team members must wear stout closed toe footwear, ideally with toe protection.

S1.6. Team members in the pit lane must wear overalls or long trousers.

S2 - Team Regulations

S2.2. All drivers must be fully conversant with the Supplementary Regulations for each event, must be knowledgeable about their vehicle, and must attend the Team Briefing at events.

TERMS OF ENTRY

By entering for any ERA organised event in any category, the team are agreeing to the following Terms of Entry.

1) Published regulations may be subject to change. In the event of this happening, notification will be sent to all entered teams and posted on the ERA website.

2) All vehicles will be subject to pre-event and possible post-event scrutineering to ensure compliance.

3) The vehicle and required drivers must be presented at scrutineering in a race ready configuration.

4) Supplementary Regulations specific to each event will be published approximately three weeks beforehand and sent by email to all entrants for that event.

5) ERA's scrutineers and officials accept no responsibility for damage caused to cars whilst performing safety checks, recovery or rescue during an event.

6) Whilst these regulations, the scrutineers and other officials endeavour to ensure vehicles are safe to participate, ultimate responsibility lies with the entrant.

7) Whilst compliance with the Technical and Sporting Regulations should result in a compliant vehicle, race officials reserve the right to prevent a vehicle racing.

8) It is understood that all persons participating in events under these rules are doing so at their own risk and the entrant
will ensure that all competitors under the age of 18 will have disclaimers signed by their parents or guardians prior to competing.

9) ERA ensure that Public Liability and Personal Accident Insurance for participants is always in place for events under their control and accept

no liability for events organised by third parties or team practice sessions.

10) As part of communications activity, ERA regularly uses photography for publicity purposes. Entrants must ensure all participants are aware of this and the necessary permission
is obtained. If permission is not granted, Greenpower must be notified prior to every event in which the participant takes part.

Team leaders with less able students wishing to participate, who
may have special requirements with regard to the regulations, should contact ERA who will be pleased to assist in any way possible.