School .....Team Name .....

Scrutineered by	Date	Passed

Drivers name: _____

Age:_____ *(at 1 October this yr)*

Last competed at: _____

Design Guidelines / WOF

COMPETITION CLASS VEHICLES *(Evolocity 2021)*

A significant amount of the design and construction of each machine must be done by the team.
All vehicles will be scrutineered and compete at the scrutineer's discretion.
Technical queries should be posted in 'General Discussion' on http://evolocityschools.freeforums.net/ and will be answered by the Chief Scrutineer.

A higher standard of construction is required for this Competition Class. Welds will be inspected closely to ensure they are adequately laid down, and bracing well placed to withstand the forces that will typically be applied to it. All fixings must be locked with spring washers, castle nuts & pins or 'Nyloc' nuts.

All vehicles must be approved for entry by meeting the "Competition Class Regulations".
This DG / WOF sheet is an abridged checklist.

Comments:

Chassis & General

P F 1.1 Vehicle is no greater than 1800mm long x 1300mm wide *(bumper to bumper and the outside of wheeltrack).*

P F 1.2 Wheelbase is between 900 to 1300 mm.

P F 1.3 Wheeltrack is between 900 to 1300 mm.

P F 1.4 Vehicle has four wheels.

P F 1.5 There are no sharp edges or burrs on the chassis, bumpers, wheels or other components.

P F 1.6 There is space for the race number to be mounted in a forward facing position

Seat & Roll Bar

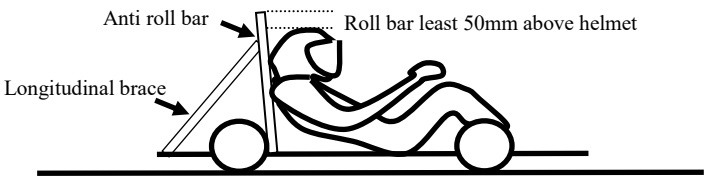
International Karting (FIA) regulations are not definitive around the need for seatbelts. EVolocity is adopting a responsible stance (as below) for 2021 but will continue to review these specifications.

P F 2.1 Seat provides back support including a head brace and is securely attached to the chassis.

P F 2.2 Seat will restrain the driver from falling out either side during normal manoeuvring.

P F 2.3 A seat belt is fitted and adequately secured to the chassis

P F 2.4 A strong anti roll bar is fitted behind the seat forming a hoop that is 50mm above the drivers helmet (as shown) and braced towards the rear or front of the vehicle.



Front & Rear Bumpers: *(see diagram)*

P F 3.1 Front & rear bumpers are adequately built from a minimum 19 x 1.2 mm steel tube.

P F 3.2 Bumpers form an extended loop no less than 100mm and no more than 200mm between top and bottom rail centres with the bottom loop centre 60mm to100mm above ground.

P F 3.3 The bumper horizontal rails are wider than the outer chassis, with rounded corners and flush to the outside of the wheels (but no more than 50mm inside of that line).

P F 3.4 Bumpers are supported in a minimum of two places from the chassis, built to withstand substantial impact and from the side the bumper is in the vertical plane.

P F 3.5 The bumper must not exceed the outside wheeltrack at any time

Side bumpers: *(see diagram)*

P F 4.1 Side protection bumper bars (or pods) are fitted and supported in a minimum of two places from the chassis and be of such a construction to withstand substantial impact.

P F 4.2 Side bars are fitted as an extended loop no less than 100mm and no more than 200mm between top & bottom rail centres, and constructed from a min 19 x 1.2 mm steel tube.

P F 4.3 The lower (side) bar is 60mm to 100mm from the ground, with the front of the bars closer than 200mm from the front wheel (with the wheels straight ahead), and closer than 100mm from the back wheel, and doesnt protrude outside wheels, or be more than 50mm inside them.
Note: Strong plastic front and rear bumpers, and/or side pods may be used but must meet all the above requirements.

Steering:

P F 5.1 Steering is mechanical, secured to the chassis proper, and well constructed using the standard Ackermann principle.

P F 5.2 Steering system is without substantial play in any of the steering components and the components themselves are adequate for the task.

P F 5.3 Steering wheel is solid without protrusions nor allow shaft intrusions on (possible) impact

P F 5.4 Steering wheel is firmly secured & strong enough to help anchor the driver in an accident.

P F 5.5 Steering wheel centre is adequately padded and recessed from the rim.

Axles:

P F 6.1 If a conventional rear axle is used, it is made from 24mm solid (min) or hollow steel adequately supported by suitable axle bearings securely affixed to the chassis.

P F 6.2 Stub axles are 15mm dia (min) at inside bearing, 12mm dia (min) at the outside bearing.

P F 6.3 Axle supports are reasonably placed to ensure minimum bending moment on the axle.

P F 6.4 All axle wheel nuts are split pin locked, or use nylocs that are in good condition.

P F 6.5 Axles do not protrude past the outside of tyres or rims.

P F 6.6 Wheels are securely attached to the axles.

Note: It is recognised that some people may wish to use wheels fitted with hub motors and that these may not absolutely conform to the above axle requirements. This may be permissible and participants are encouraged to discuss this with a scrutineer BEFORE beginning construction

Wheels and tyres

P F 7.1 Tyres do not exceed 300mm in outer diameter.

P F 7.2 Wheel are capable of handling the torque, lateral loads, and other demands that will be placed upon them the event. *It is not anticipated that spoked or lightweight pressed steel wheels will be adequate.*

P F 7.3 Tyres will be capable of handling the torque, lateral loads, &other demands in the event.

P F 7.4 Wheels and correctly inflated tyres are not damaged in a way that reduces their capacity.

P F 7.5 Wheel bearings are in good condition with minimal play and no notable roughness.

P F 7.6 Wheels are securely fixed to hubs and from there to the chassis.

Brakes

P F 8.1 Brakes work on both rear wheels only.

P F 8.2 Brake pedal or lever is adequate with minimal play before engagement and is accessible

P F 8.3 Brakes are even between wheels to pull the vehicle up evenly.

P F 8.4 Brakes are capable of locking the rear wheels with the driver in the vehicle.

P F 8.5 All brake components (levers, pedals, rods, cables, hydraulics, pads, discs, drums, shoes etc) are capable of sustaining repeated strong usage and remain intact & operational.

Floorpan

P F 9.1 The floorpan is of suitable material, secured within the chassis and parallel to it.

P F 9.2 The floorpan extends from the front of the seat to forward of the drivers feet.

Motors & Drivetrain

P F 10.1 Motor is electric

P F 10.2 Total motor power does not exceed 3kW & Anderson connectors for power limiter fitted.

P F 10.3 Power source and motor specifications supplied to EVolocity 1 month before race day

P F 10.2 Motor mounts will keep it in place in the case of a significant crash or inversion.

P F 10.3 Drivetrain parts are guarded to ensure driver cannot come into contact with them.

Driver:

Nominated driver #1: _____

DOB _____

Nominated driver #2: _____

DOB _____

P F 11.1 Drivers must have competed in EVolocity in previous years & must attend a safety briefing

P F 11.2 Drivers must be 14 years old and be capable of competently operating the vehicle.

P F 11.3 Driver has a full-face motorcycle helmet which fits correctly, and isnt significantly damaged, chipped or cracked.

P F 11.4 Driver has suitable protective footwear, eye protection, leather gloves, overalls *(full length & long sleeved)* or racing suits ready to wear when in the vehicle.

P F 11.5 Driver has minimal bare skin showing, hair contained within the helmet or overalls/race suit and no clothing worn on top of overalls.

Note: In future years a limit may be placed on the entries from each school with encouragement for peers from other schools to drive carts denied entry under such limitation.

Electrics and batteries:

P F 12.1 Batteries must be separated from the driver and secured to the chassis to ensure they will remain in the same position in the event of an accident or inversion.

P F 12.2 An appropriate ***circuit breaker or fuse*** is in the circuit from the power supply, rated for the systems current and the size of the power wiring. *See chart in Regulations for fuse sizes*

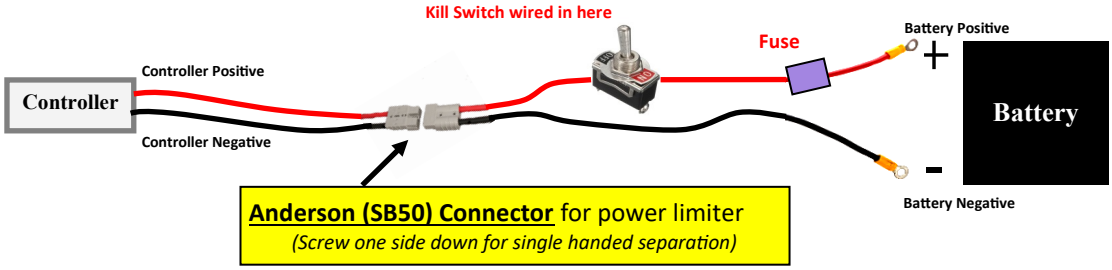
P F 12.3 An adequately rated ***'Kill Switch'*** is connected *(as in the diagram below),* well labelled and easily accessible on the outside of the vehicle.

Note: 1) The kill switch may be a d.c contactor with remote switch or be the requisite circuit breaker if manually triggerable and accessible.
2) It may also be an accessible lanyard that can separate the Anderson connector in a single pull.

P F 12.4 The motor controller must be adequate for the task and securely mounted.

P F 12.5 The batteries must not exceed **48V** (nominal) and be of recognised chemistry *(eg Pb, $LiPO_4$).*

P F 12.6 A power limiter will be provided on race day to ensure all vehicles have a total power no greater than 3kW. A pair of Anderson SB50 connectors are to be fitted ready for the borrowed power limiter to be inserted on race day. *EVolocity will supply theses on request.*



P F 12.7 To avoid doubt; the kill switch, circuit breaker, wiring, and any other associated components must be securely fixed to the chassis such that they would not ordinarily become adrift. *Tape and other temporary fixing will not be acceptable (except in special circumstances), and is likely to result in a scrutineering fail.*

P F 12.8 All components that require it must have adequate heat dissipation.

P F 12.9 The throttle must reliably return to zero when it is released.

P F 12.10 Wires and terminals must be neatly run, well joined and terminated, secured and unable to chafe, become loose, foul the driver or any other parts of the operating system.

P F 12.11 Wires must be adequately insulated and rated for the current requirements. *See chart in Appendix of Competition Class Regulations for wire sizes.* Wiring must not show signs of overheating and if passing through a metal hole must be well protected against chafing (*most likely via 'double insulating')*

Scrutineering

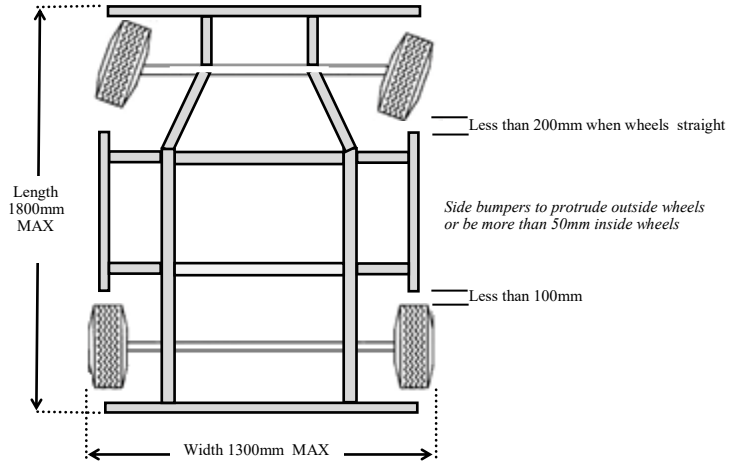
P F 13.1 All vehicles will be inspected on race day by Scrutineers with engineering knowledge against these Design Guidelines.

P F 13.2 Scrutineers will take into account any other aspects of each vehicle that could affect the safety of drivers or spectators and reserve the right to restrict a vehicle's entry.

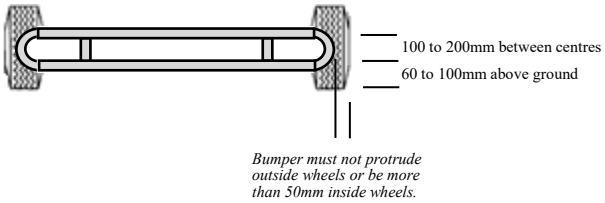
P F 13.3 Prior to race day queries of regulations should be directed to the online forum.

Vehicle Dimensions

Top View



Back View



Health & Safety: Evolocity will supply an safety plan 4 weeks prior to the event.
RAMS documents are the responsibility of the school team(s).

Build Tips when designing your vehicle:

- Discuss any doubts about aspects of your design with the Chief Scrutineer ***before*** you start building.
- Think about how you will store and transport the vehicle. Larger vehicles will be potentially more difficult to manage.
- Keep the Centre of Gravity low to improve stability. Eg. keep the driver as low as possible with respect to the chassis possibly by positioning the seat height below the wheel axles. Heavy batteries should also be kept low.