

Technical regulations for European Formula Ford to be entered in F1600 Championship Series

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ARTICLE 1: DEFINITIONS

1.1 Formula Ford car

Four wheel single-seater racing car fitted SCCA FF legal petrol engine, and designed solely for speed races on circuits or closed courses.

1.2 Bodywork:

All entirely sprung parts of the car in contact with the external air stream, except the rollover structures and the parts definitely associated with the mechanical functioning of the engine, transmission and running gear. Airboxes, radiators and engine exhausts are considered to be part of the bodywork.

1.3 Ground Clearance:

The clearance between the ground and the lowest part of the bodywork, and/or of the suspended part of the car, in normal trim with the driver aboard.

1.4 Minimum weight:

The minimum weight must be the weight of the car in the condition in which it crosses the finishing line and enters parc-ferme, or at any time during the competition and/or practice. The minimum car plus driver weight will include the driver dressed for the competition with all required personal safety items.

1.5 Date of car build:

Cars built before 1st January xxxx (or 1.1.xx) is interpreted to indicate cars built for the season indicated as shown by the year code. Consequently cars built to the new or revised specification, but finished before that date will still be defined as new season cars.

1.6 Sprung suspension:

The means whereby all complete wheels are suspended from the body/chassis unit by a spring medium.

1.7 Wheel:

Wheel: Flange and rim.

Complete wheel: Flange, rim and tyre.

1.8 Intake system:

All the elements between the cylinder head and the external side of the air filter.

1.9 Ceramic materials:

Ceramic Materials (e.g. AL₂O₃, SiC, B₄C, Ti₅Si₃, SiO₂, Si₃N₄) – These are inorganic, non-metallic solids.

1.10 Composite materials:

Material formed from several distinct components, the association of which provides the whole with properties which none of the components taken separately possesses. High strength composites include components made with Carbon and or aramid fibres.

1.11 High volume components:

Are those from series production vehicles which have been produced in numbers greater than 25,000 in 12 consecutive months.

ARTICLE 3: BODYWORK AND DIMENSIONS

3.1 Car Dimensions:

See table of single seater dimensions. (Appendix A).

3.2 Front nose:

The forward extremity of the nose of the car shall be less than 200mm from the ground.

3.3 Bodywork:

Any device designed to aerodynamically augment the down thrust on the vehicle is prohibited, as are aerofoils, fins or spoilers of any type. Body shapes that decrease drag without influencing down force are authorised.

The bodywork must totally enclose the engine inlet manifold and filter with an opening for the passage of air. The uppermost surface of the bodywork must not extend more than 25mm above the top surface of the rollover hoop. See additional note in dimensions table, appendix A.

Have positive fastenings for all hinged or detachable parts of the bodywork.

Not have skirts, bridging devices or any form of aerodynamic device between the chassis and the ground/track. Any specific part of the car influencing its aerodynamic performance must:

- i) comply with rules relating to bodywork.
- ii) be rigidly secured to the entirely sprung part of the vehicle.
- iii) remain immobile in relation to the vehicle.

3.4 Bodywork shape:

3.4.1) The shape of the bodywork must not include external concave surfaces, except where flat or convex surfaces are joined. When these surfaces are joined, no part of either surface, when viewed in a vertical section, must occupy the same Z coordinate, except at the joint. No flat surfaces are permitted within 15° of the horizontal.

3.4.2) The bodywork can be shaped to fit over the chassis. However, any such body shape that can be deemed, or even thought, to produce an aerodynamic effect that could result in down force will be prohibited.

3.4.3) Any bodywork in front of the front bulkhead shall have no external concave surfaces.

3.5 Bodywork mounting:

Bodywork may only be mounted directly to the chassis, undertray, or suspension mounting points. Suspension mounting points may be covered by bodywork, but only if this is an integral part of the bodywork, and not an addition to the main bodywork.

Only original factory specification parts supplied by the manufacturer can be used in front of the forward bulkhead. No additional material can be added.

3.6 Rear bodywork:

The bodywork must not extend rearwards past the rearmost point of the gearbox housing (no gearbox extensions permitted).

3.7 Lower rear bodywork:

Located below the rear wheel centre line: is only permitted alongside and beneath the engine and can only extend from behind the cockpit to a line drawn through the rear wheel axis. The incorporation of suspension or other fairings in this bodywork or separately is prohibited.

3.8 Drivers compartment:

Be fitted with bodywork with a driver's compartment isolated from the engine, gearbox, hydraulic reservoirs, transmission shafts, chains, belts and gears, brakes, road wheels, their

operating linkages and attachments, suspension components, petrol/fuel tanks, oil tanks, water header tanks and catch tanks.

3.9 Floor:

3.9.1) Have a complete Floor of adequate strength rigidly supported within the driver compartment.

3.9.2) Have any undertray provided with drainage holes to prevent accumulation of liquids.

3.9.3) Any extension of the floor rearward of the main rear bulkhead (under the engine) must conform to the same reference plane and tolerances as the flat floor.

ARTICLE 13: COCKPIT

13.1 Cockpit Opening:

The opening giving access to the cockpit must allow a designated horizontal template to be inserted vertically into the cockpit (not considering the steering wheel, the removable seat, or any side head support) down to 250mm lower than the lowest point of the cockpit opening. This template is defined by dimensions J, K, L in Appendix A.

13.2 Internal Cross Section:

The free internal cross section of the cockpit from the soles of the driver's feet to behind the seat shall at no point be less than 70000mm². The only thing that may encroach on this area is the steering column. A free vertical section of minimum 250mm width maintained to a minimum height of 250mm with corners of maximum 50mm radius must be maintained over the whole length of the cockpit with the steering wheel removed. The driver normally seated in their driving position with the seat belts fastened and the steering wheel removed must be able to raise both legs together such that their knees reach the plane of the steering wheel in the rearwards direction; this action must not be obstructed by any part of the car. The cockpit must be so conceived that the maximum time necessary for the driver to get out from their normal driving position does not exceed 5 seconds with all driving equipment being worn, the safety belts fastened, and the steering wheel in place in the most inconvenient position.

13.3 Feet Position:

The soles of the feet of the driver, seated in the normal driving position and with their feet on the pedals in the inoperative position, shall not be situated to the fore of the vertical plane passing through the centre line of the front wheels.

ARTICLE 15: SAFETY STRUCTURES

15.1) These regulations are based the 2011 Royal Automobile Club Motor Sports Association (MSA) current Yearbook (Blue Book) rules, and specific Ford requirements.

15.2 Roll Structures:

15.2.1) The basic purpose of safety structures is to protect the driver. This purpose is the primary design consideration. The use of the rollover hoop to achieve or supplement aerodynamic effects is prohibited.

It is not permitted to carry or pass any liquids in or through any tubes comprising part of the chassis structure, or safety ROPS.

15.2.2) All cars must have two roll structures. The principal structure must be positioned behind the driver. The second structure must be in front of the steering wheel but no more than 250mm forward of the top of the steering wheel rim in any position. The two roll structures must be of sufficient height to ensure the driver's helmet and his steering wheel are at least 70mm and 50mm respectively below a line drawn between their highest points at all times.

15.2.3) The Safety Roll-over structure must either comply fully with an MSA ROPS Certificate issued in 2005 or earlier or be constructed to the following requirements:

15.2.4) The roll-over hoop must be symmetrical about the lengthwise centre-line of the car and of minimum height 900mm measured vertically from the base of the cockpit or 920mm measured along the line of the driver's spine from the bottom of the car seat.

15.2.5) There must be at least one brace rearwards from the top of the roll-over hoop at an angle not exceeding 60° with the horizontal. This brace must be the same diameter as the roll-over hoop, if two braces are fitted to the tube the diameter may be reduced to 20-26mm the wall thickness being maintained. In addition, forward facing braces should be considered. The width inside the roll-over hoop main tubes must be 380mm minimum measured 600mm above the base of the seat. It must incorporate a cross brace to restrain the driver's head and give rearward support. The top hoop radius must not be less than 100mm measured at the centre line of the tube.

15.2.6) Minimum Material steel specification: Cold drawn seamless Carbon steel 350N/mm²

Minimum Dimensions: 42.4mm diameter x 2.6mm wall thickness

15.2.7) The front roll-over hoop (Hoop in front of the steering wheel) must be designed to withstand the forces given hereafter in any combination on top of this hoop:-

1.5w Lateral;

5.5w Fore and aft;

7.5w Vertical

w = 600Kg

15.2.8) Each manufacturer must be able to demonstrate to the ASN:

i) That the material used has a certificate of origin or traceability and is kept segregated from other batches of material.

ii) That welding procedures used produce consistent and sound welds and are regularly checked by laboratory tests.

iii) That they operate and maintain auditable in-house quality standards and procedures which are updated regularly.

15.3 Chassis Survival Cell:

15.3.1) The model year of the chassis must be clearly and indelibly stamped into a structural member of the main chassis, (or on a steel plate attached by welding on at least 3 sides to the chassis), in an area visible to scrutineers without bodywork or other component removal. All chassis's for a particular model year will be stamped in the same position.

15.4 The chassis:

The longitudinal centre line of the chassis must correspond with the longitudinal centre line of the wheel axis'.

The chassis must be of tubular steel construction with no load bearing panels except bulkhead and undertray, curvature of the undertray must not exceed 25.4mm. The undertray/floor (Art 3) extends from the bulkhead forward of the pedals to a vertical plane passing 120mm beyond the rear face of cylinder block. Monocoque chassis construction is prohibited. Load bearing panels are defined as, sheet material affixed to the frame by welding or bonding or by rivets or by bolts or screws that have centres closer than 152mm. The maximum length of weld attaching the panels to the chassis shall be 25.4mm.

The gap between the ends of the each weld shall be a minimum of 152 mm. Bodywork must not be used as stress bearing panels. The use of stabilised materials, composite materials using carbon and/or Kevlar reinforcement is prohibited (unless specifically permitted in these regulations). In the case of a vehicle with the fuel tank placed immediately behind the driver, a Bulkhead (a non-flammable, solid closing panel, attached to the main frame of the chassis with its

fixation points less than 152mm apart around the full extremity of the panel), must be placed between the engine and the fuel tank. In addition another closing panel must be fitted between the fuel tank and the driver to prevent any fuel spillage, however caused, from reaching the driver whilst seated in the car. Gaps must be sealed with GRP or Intumescent Putty. Magnesium is prohibited for bulkheads. The tolerance on the variation in flatness of the under surface of the car between the furthest forward bulkhead, and the rear bulkhead (at the position of the Roll Over protection hoop) will be 5mm. The Lateral Protection structure base (Side pod base) can be up to 25mm above the floor defined above, but must be parallel to it, and subject to the 5mm flatness tolerance. The floor of the side pod must reflect the plan of the upper surface.

15.5 Head Protection:

15.5.1) A rear head restraint must be fitted, capable of restraining a 17kg mass decelerating at 5g. Dimensions to be 100mm x 100mm and located such that the driver's helmet is restrained and cannot move past it under rearward forces, or be trapped between the rollover hoop and the head restraint. It is recommended that it be within 50mm of the driver's helmet when normally seated.

15.5.2) Side head restraints are mandatory for all cars the internal gap between the ears must be less than 400mm, and the side restraints must be fitted with an energy absorbing material of at least 20mm minimum thickness. Its construction must not impair the drivers ability to extricate themselves from the vehicle within the maximum time allowed. (See Art 13.2) The side head protection device may be detachable during this extradition, but its removal must form part of the extradition period. The energy absorbing material used must comply with a minimum F.I.A standard for this application.

15.5.3) Side Head protection shall be installed at such a height that it ensures that the driver's helmet will contact this protection in such a manner as to reduce to a minimum any possible injury in the case of contact with it.

15.6 Frontal Protection:

15.6.1) The chassis must include an impact-absorbing structure fitted ahead of the front bulkhead of the tubular steel frame. This structure must be independent of the main bodywork and must be solidly fixed to the extremities of the bulkhead (i.e. with bolts requiring tools for removal). It must constitute a box of 300mm minimum length, 150mm minimum height in any vertical section and 40000mm² minimum total cross section. It must be metallic using honeycomb sandwich construction with a panel thickness of 13.9mm minimum. The

main bodywork is defined as the external covering of the chassis frame from the foremost steel bulkhead to the centreline of the rear wheels.

15.6.2) The impact-absorbing structure shall be fixed to the chassis with a minimum of 4 fasteners, in high quality steel using a core diameter of 6mm minimum. Irrespective of the size of the impact absorbing structure (safety foot box), the maximum total area of access holes allowed in the walls of this structure shall be 15000mm². The basic structure is defined as a unit with 5 closed sides, and 1 open side. The access hole dimensions quoted apply to any modification to the 5 closed sides. (Minimum clearance holes for the passage of steering rack / rods are not included in the calculation of this area.

15.7 Lateral Protection Structure:

15.7.1) Continuous panels whose projection on a vertical plane parallel to the longitudinal axis of the car shall be at least 150mm high, shall extend on either side of the car, at a minimum distance of 550mm from the car's longitudinal

centre line between at least the transverse planes passing through the fuel tank rear face and the frontal extremity of the minimum cockpit opening, and at a minimum distance of 350mm from the car's longitudinal centre line between at least the transversal planes passing through the above extremity and the front rollover bar hoop. These panels shall be made from a composite material of 3000mm² minimum cross section with a honeycomb core in metal or Nomex giving adequate resistance to compression. The external skins shall be of aluminium alloy, plastic, or carbon fibre of a minimum thickness of 0.5mm or made up of another assembly of materials of equivalent efficiency. The panels must be securely attached to the flat bottom and their upper extremity to the main structure of the car in such a manner as to ensure absorption of a lateral impact. The radiators may play the role of protective panels or of transversal struts. The periphery of the bodywork covering the Lateral Protection Structure, when viewed from below, must be curved upwards with a minimum radius of 50mm, and a maximum radius of 70mm with the exception of air entry and exit openings into the Lateral Protection Structure.

15.8 Cockpit side protection:

Above the level of the Lateral Protection Structure, and up to the level of the upper chassis tube, stretching from the rear roll hoop to the front roll hoop there must be an anti-intrusion panel. This anti-intrusion panel shall be either built into the removable bodywork, or keyed into the main chassis but cannot be rigidly attached to the chassis. It can be made from glass reinforced plastic, Kevlar or aluminium skin added to the inner face of the removable body panel. Any material added must considerably improve the anti-penetration capability of the structure in the area of the driver

If the side protection is built into the bodywork alongside the driver the minimum requirement is: - a double layer, 141.75 g/m² (5oz), bi directional, laminated Kevlar (Aramide) material.

APPENDIX A

TABLE OF SINGLE SEATER DIMENSIONS

1. Safety roll over bar
2. Substantial support structure
3. Lateral Protection structure
4. Substantial structure
5. Front track
6. Rear track
7. Wheelbase

Notes: Maximum height is measured with the driver aboard.
Maximum height excludes safety roll-over bar on which there is no maximum height.

Single seater dimensions – refer to drawing

*(A) Maximum body height measured from ground	900
(B) Maximum front overhang from front wheel axis	1000
(C) Exhaust height measured from the ground	600 Max
(D) Minimum height of Lateral Protection Structure	150
(E) Minimum safety roll-over bar length in line with drivers spine	920
(F) Minimum allowed helmet clearance	50
(G) Maximum width	1850
(H) Maximum body width behind front wheels	950
(J) Minimum cockpit opening	450
(K) Minimum cockpit parallel opening length	300
(L) Minimum cockpit overall opening length	600
(M) Maximum rear wheel width	5.5 inch
(N) Maximum front wheel width	5.5 inch
(P) Maximum exhaust length from rear wheel axis	600
(R) Minimum ground clearance	OPEN
(S) Maximum width including lateral protection structure	1300
(T) The maximum height of any part wider than 1100mm ahead of the front wheels is not to exceed the front rim height	
(U) Maximum height of nose (see Art 4.13 for implementation date)	200
Minimum wheelbase	2000
Minimum track	1200
Wheel diameters	13 inch

ALL dimensions in mm unless specifically stated

(* Except for within 450mm rearward of the front face of the ROPS and for a maximum of 150mm either side of the centre line where bodywork may not be more than 25mm higher than the upper surface of the ROPS.)

Appendix C

TYRES

The only approved tyres for Formula Ford cars are Hoosier per F1600CS regulations.