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## **ARTICLE 1 : DEFINITIONS**

### **1.1 Formula 3000 cars :**

Automobiles designed solely for speed races on circuits or closed courses and built by the FIA designated manufacturer to a specification laid down by the FIA.

### **1.2 Automobile :**

Land vehicle running on at least four non-aligned complete wheels, of which at least two are for steering and at least two for propulsion.

### **1.3 Land vehicle :**

A locomotive device propelled by its own means, moving by constantly taking real support on the earth's surface, of which the propulsion and steering are under the control of a driver aboard the vehicle.

### **1.4 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 and radiators are considered to be part of the bodywork.

### **1.5 Wheel :**

Flange and rim.

### **1.6 Complete wheel :**

Wheel and inflated tyre.

### **1.7 Automobile Make :**

In the case of Formula racing cars, an automobile make is a complete car. When the car manufacturer fits an engine which it does not manufacture, the car shall be considered a hybrid and the name of the engine manufacturer shall be associated with that of the car manufacturer. The name of the car manufacturer must always precede that of the engine manufacturer. Should a hybrid car win a Championship Title, Cup or Trophy, this will be awarded to the manufacturer of the car.

### **1.8 Event :**

An event shall consist of official practice and the race.

### **1.9 Weight :**

Is the weight of the car with the driver, wearing his complete racing apparel, at all times during the event.

### **1.10 Racing weight :**

Is the weight of the car in running order with the driver aboard and all fuel tanks full.

### **1.11 Cubic capacity :**

The volume swept in the cylinders of the engine by the movement of the pistons. This volume shall be expressed in cubic centimetres. In calculating engine cubic capacity, the number Pi shall be 3.1416.

### **1.12 Supercharging :**

Increasing the weight of the charge of the fuel/air mixture in the combustion chamber (over the weight induced by normal atmospheric pressure, ram effect and dynamic effects in the intake and/or exhaust system) by any means whatsoever. The injection of fuel under pressure is not considered to be supercharging.

### **1.13 Sprung suspension :**

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

**1.14 Cockpit :**

The volume which accommodates the driver.

**1.15 Survival cell :**

A continuous closed structure containing the fuel tank and the cockpit.

**1.16 Active suspension :**

Any system which allows control of any part of the suspension or of the trim height when the car is moving.

**1.17 Composite structure :**

Non-homogenous materials which have a cross section comprising of either two skins bonded to each side of a core material or an assembly of plies which form one laminate.

**1.18 Telemetry :**

The transmission of data between a moving car and anyone connected with the entry of that car.

**1.19 Semi automatic gearbox :**

One which, when the driver calls for a gear change, takes over the control of one or more of the engine, clutch and gear selectors momentarily to enable the gear to be engaged.

**1.20 Cockpit padding :**

Non-structural parts placed within the cockpit for the sole purpose of improving driver comfort and safety. All such material must be quickly removable without the use of tools.

**1.21 Camera :**

Television camera the dimensions of which are available from the FIA.

**1.22 Camera housing :**

A device which is identical in shape and weight to a camera and which is supplied by the relevant Competitor for fitting to his car in lieu of a camera.

## **ARTICLE 2 : GENERAL PRINCIPLES**

### **2.1 Role of the FIA :**

The following technical regulations for F3000 cars are issued by the FIA.

### **2.2 Publication date for amendments :**

Each year, prior to October at the latest, the FIA will publish all changes to be made to these regulations which will normally take effect on the 1st January following their publication.

Changes which the FIA deem necessary for safety reasons and changes to the specification of the cars may be made without notice.

### **2.3 Compliance with the regulations :**

All F3000 cars must comply with these regulations in their entirety at all times during an Event and during official tests described under Article 51 in the Sporting Regulations.

### **2.4 Eligible cars :**

The only rolling chassis permitted are those supplied by the FIA designated F3000 car manufacturer. Once supplied, the rolling chassis may not be modified in any way whatsoever except where specifically permitted by these regulations or with the written permission of the FIA after consultation with the manufacturer. Any such modifications will only be permitted if they are deemed absolutely necessary after a problem has been clearly identified.

Furthermore, any components supplied as part of the rolling chassis which need to be replaced must be supplied by the FIA designated F3000 car manufacturer unless specifically authorised elsewhere in these regulations.

### **2.5 Measurements :**

All measurements must be made while the car is stationary on a flat horizontal surface.

### **2.6 Duty of competitor :**

It is the duty of each competitor to satisfy the FIA technical delegate and the Stewards of the Meeting that his F3000 car complies with these regulations in their entirety at all times during an Event.

### **2.7 Technical passport :**

All competitors must be in possession of a technical passport for their car which will be issued by the relevant ASN and must accompany the car at all times.

No car will be permitted to take part in an Event unless the passport is available for inspection at initial scrutineering.

## ARTICLE 3 : BODYWORK AND DIMENSIONS

### 3.1 Permitted changes to the original specification :

3.1.1 Front and rear wing angles may be changed using only the range of adjustment provided in the original specification.

3.1.2 **Other than the panels designed to control radiator exit air, no bodywork may be removed.**

3.1.3 Devices used to keep the space between the rear aerofoil sections constant may be used provided it is clear that this is their only purpose.

3.1.4 Tape may be applied to the bodywork but only to joints, fasteners or any vulnerable leading edge. In all cases it must be clear that the tape has no function other than securing or protecting the part or parts to which it is attached.

3.1.5 Bodywork may be painted.

### 3.2 Wheel centre line :

The centre line of any wheel shall be deemed to be half way between two straight edges, perpendicular to the surface on which the car is standing, placed against opposite sides of the complete wheel at the centre of the tyre tread.

### 3.3 Height measurements :

All height measurements will be taken normal to and from the reference plane.

### 3.4 Overall width :

The overall width of the car, including complete wheels, must not exceed **1800mm** with the steered wheels in the straight ahead position. **Overall width will be measured when the car is fitted with tyres inflated to 1.4 bar.**

### 3.5 Width ahead of the rear wheel centre line :

3.5.1 Bodywork width ahead of the rear wheel centre line must not exceed 1400mm.

3.5.2 **No lateral extremity of any bodywork forward of the front wheels may deflect more than 5mm vertically when a vertical 0.5kN load is applied to it. During such a test the load will be applied through a 50mm pad whose centre is positioned 700mm forward of the front wheel centre line and 620mm from the car centre line.**

3.5.3 In order to prevent tyre damage to other cars, the top and forward edges of the lateral extremities of any bodywork forward of the front wheels must be at least 10mm thick with a radius of at least 5mm.

### 3.6 Width behind the rear wheel centre line :

Bodywork width behind the rear wheel centre line must not exceed 1000mm.

### 3.7 Overall height :

No part of the bodywork may be more than 950mm above the reference plane.

### 3.8 Front bodywork height :

All bodywork situated forward of a point lying **330mm** behind the front wheel centre line, and more than 250mm from the centre line of the car, must be no less than 50mm and no more than 250mm above the reference plane.

### 3.9 Height in front of the rear wheels :

3.9.1 **Other than the rear view mirrors, each with a maximum area in plan view of 9000mm<sup>2</sup>, no bodywork situated more than 330mm behind the front wheel centre line and more than 330mm forward of the rear wheel centre line, which is more than 600mm above the reference plane, may be more than 300mm from the centre line of the car.**

**3.9.2 No bodywork between the rear wheel centre line and a line 800mm forward of the rear wheel centre line, which is more than 500mm from the centre line of the car, may be more than 500mm above the reference plane.**

**3.9.3 No bodywork between the rear wheel centre line and a line 400mm forward of the rear wheel centre line, which is more than 500mm from the centre line of the car, may be more than 300mm above the reference plane.**

**3.10 Bodywork between the rear wheels :**

**3.10.1** No bodywork situated between **the rear wheel centre line and a point** lying **330mm** forward of **it** may be more than 600mm above the reference plane.

**3.10.2** **No bodywork situated between the rear wheel centre line and a point lying 150mm behind it may be more than 450mm above the reference plane.**

**3.11 Height behind the rear wheel centre line :**

**3.11.1** Any part of the car more than 150mm behind the centre line of the rear wheels must not be more than 800mm above the reference plane.

**3.11.2** No bodywork behind the centre line of the rear wheels, and more than 150mm each side of the longitudinal centre line of the car, may be less than 300mm above the reference plane.

**3.11.3** Any bodywork **more than 150mm** behind the rear wheel centre line which is more than **300mm** above the reference plane, **and between 75mm and 480mm from the car centre line, must lie in one of two areas when viewed from the side of the car. These areas are situated from 300mm to 375mm and 600mm to 800mm above the reference plane. When these areas are viewed from the side of the car, no longitudinal cross section may have more than three closed sections in the upper area or more than one in the lower.**

**3.12 Bodywork around the front wheels :**

With the exception of brake cooling ducts, in plan view, there must be no bodywork in the area formed by two longitudinal lines parallel to and 400mm and **900mm** from the car centre line and two transversal lines, one 350mm forward of and one 800mm behind the front wheel centre line.

**3.13 Bodywork facing the ground :**

**3.13.1** All sprung parts of the car situated more than **330mm** behind the front wheel centre line and more than **330mm** forward of the rear wheel centre line, and which are visible from underneath, must form surfaces which lie on one of two parallel planes, the reference plane or the step plane. This does not apply to any parts of rear view mirrors which are visible, provided each of these areas does not exceed 9000mm<sup>2</sup> when projected to a horizontal plane above the car. The step plane must be 50mm above the reference plane.

**3.13.2** **Additionally**, the surface formed by all parts lying on the reference plane must :

- extend from a point lying **330mm** behind the front wheel centre line to the centre line of the rear wheels ;
- have minimum and maximum widths of 300mm and 500mm respectively ;
- be symmetrical about the centre line of the car ;
- **have a 50mm radius (+/-2mm) on each front corner when viewed from directly beneath the car, this being applied after the surface has been defined.**

**3.13.3** The surface lying on the reference plane must be joined **around its periphery** to the surfaces lying on the step plane by a vertical transition. If there is no surface visible on the step plane vertically above any point around the **periphery** of the reference plane, this transition is not necessary.

**3.13.4** The peripheries of the surfaces lying on the reference and step planes may be curved upwards with maximum radii of 25 and 50mm respectively. Where the vertical transition meets the surfaces on the step plane a radius, no greater than 25mm, is permitted.

A radius in this context will be considered as an arc applied perpendicular to the periphery and tangential to both surfaces.

The surface lying on the reference plane, the surfaces lying on the step plane and the vertical transitions between them, must first be fully defined before any radius can be applied or the skid block fitted. Any radius applied is still considered part of the relevant surface.

**3.13.5** All parts lying on the reference and step planes, in addition to the transition between the two planes, must produce uniform, solid, hard, continuous, rigid (no degree of freedom in relation to the body/chassis unit), impervious surfaces under all circumstances.

Fully enclosed holes are permitted in **the surfaces lying on the reference and step planes** provided no part of the car is visible through them when viewed from directly below.

**3.13.6** To help overcome any possible manufacturing problems, **and not to permit any design which may contravene any part of these regulations, dimensional tolerances are permitted on bodywork situated between a point lying 330mm behind the front wheel centre line and the rear wheel centre line. A vertical tolerance of +/- 5mm is permissible across the surfaces lying on the reference and step planes and a horizontal tolerance of 5mm is permitted when assessing whether a surface is visible from beneath the car.**

**3.13.7** All sprung parts of the car situated behind a point lying **330mm** forward of the rear wheel centre line, which are visible from underneath and are more than 250mm from the centre line of the car, must be at least 50mm above the reference plane.

#### **3.14 Skid block :**

**3.14.1** Beneath the surface formed by all parts lying on the reference plane, a rectangular skid block, **with a 50mm radius (+/-2mm) on each front corner**, must be fitted. This skid block may comprise more than one piece but must :

- a) extend longitudinally from a point lying **330mm** behind the front wheel centre line to the centre line of the rear wheels.
- b) be made from an homogeneous material with a specific gravity between 1.3 and 1.45.
- c) have a width of 300mm with a tolerance of +/- 2mm.
- d) have a thickness of 10mm with a tolerance of +/- 1mm.
- e) have a uniform thickness when new.
- f) have no holes or cut outs other than those necessary to **fit the fasteners permitted by 3.14.2 or those holes specifically mentioned in g) below.**
- g) have **seven** precisely placed holes **the positions of which are detailed in Drawing 1**. In order to establish the conformity of the skid block after use, its thickness will only be measured in **the four 50mm diameter holes and the two forward 80mm diameter** holes.
- h) be fixed symmetrically about the centre line of the car in such a way that no air may pass between it and the surface formed by the parts lying on the reference plane.

**3.14.2** **Fasteners used to attach the skid block to the car must :**

- a) **have a total area no greater than 40000mm<sup>2</sup> when viewed from directly beneath the car ;**
- b) **be no greater than 2000mm<sup>2</sup> in area individually when viewed from directly beneath the car ;**
- c) **be fitted in order that their entire lower surfaces are visible from directly beneath the car.**

**When the skid block is new, ten of the fasteners may be flush with its lower surface but the remainder may be no more than 8mm below the reference plane.**

**3.14.3** The lower edge of the periphery of this block may be chamfered at an angle of 30° to a depth of 8mm, the trailing edge however may be chamfered over a distance of 200mm to a depth of 8mm.

### 3.15 Overhangs :

No part of the car shall be more than 500mm behind the centre line of the rear wheels or more than 1200mm in front of the centre line of the front wheels.

No part of the bodywork more than 200mm from the centre line of the car may be more than 900mm in front of the front wheel centre line.

All overhang measurements will be taken parallel to the reference plane.

### 3.16 Aerodynamic influence :

Any specific part of the car influencing its aerodynamic performance:

- Must comply with the rules relating to bodywork.
- Must be rigidly secured to the entirely sprung part of the car (rigidly secured means not having any degree of freedom).
- Must remain immobile in relation to the sprung part of the car.

**In order to ensure that this requirement is respected, the FIA reserves the right to introduce load/deflection tests on any part of the bodywork which appears to be (or is suspected of) moving whilst the car is in motion.**

Any device or construction that is designed to bridge the gap between the sprung part of the car and the ground is prohibited under all circumstances.

No part having an aerodynamic influence and no part of the bodywork, with the exception of the skid block in 3.14 above, may under any circumstances be located below the reference plane.

### 3.17 Upper bodywork :

**3.17.1 With the exception of the opening described in Article 3.17.3, when viewed from the side, the car must have bodywork in the triangle formed by three lines, one vertical passing 1330mm forward of the rear wheel centre line, one horizontal 550mm above the reference plane and one diagonal which intersects the vertical at a point 940mm above the reference plane and the horizontal 330mm forward of the rear wheel centre line.**

**The bodywork over the whole of this area must be arranged symmetrically about the car centre line and must be at least 200mm wide when measured at any point along a second diagonal line parallel to and 200mm vertically below the first.**

**Furthermore, over the whole area between the two diagonal lines, the bodywork must be wider than a vertical isosceles triangle lying on a lateral plane which has a base 200mm wide lying on the second diagonal line.**

**3.17.2 When viewed from the side, the car must have no bodywork in the triangle formed by three lines, one vertical 330mm forward of the rear wheel centre line, one horizontal 950mm above the reference plane, and one diagonal which intersects the vertical at a point 600mm above the reference plane and the horizontal at a point 1030mm forward of the rear wheel centre line.**

**3.17.3 In order that a car may be lifted quickly in the event of it stopping on the circuit, the principal rollover structure must incorporate a clearly visible unobstructed opening designed to permit a strap, whose section measures 60mm x 30mm, to pass through it.**

## ARTICLE 4 : WEIGHT

### 4.1 Minimum weight :

The weight of the car must not be less than **660kg**.

### 4.2 Ballast :

Ballast can be used provided it is **designed in accordance with drawings supplied by the rolling chassis supplier, is** fitted in the places provided for this purpose and is secured in such a way that tools are required for its removal. It must **also** be possible to fix seals if deemed necessary by the FIA technical delegate.

### 4.3 Adding during the race :

With the exception of nitrogen or compressed air, no substance may be added to the car during the race. If it becomes necessary to replace any part of the car during the race, the new part must not weigh any more than the original part.

## **ARTICLE 5 : ENGINE**

### **5.1 Permitted changes to the original specification :**

**5.1.1** Rear exhaust mountings are free.

### **5.2 Type of engine permitted :**

The only engines permitted are those supplied by the FIA designated F3000 engine supplier. Once supplied, the engine and ancillaries supplied with it may not be modified in any way whatsoever except with the written permission of the FIA after consultation with the engine supplier.

### **5.3 Exhaust system :**

**5.3.1** Variable length exhaust systems are forbidden.

**5.3.2** Exhaust outlets must face rearwards.

### **5.4 Limitation of the engine rev speed :**

**5.4.1** Maximum crankshaft rotational speed is 9000rpm.

### **5.5 Temperature of the charge :**

**5.5.1** Any device, system, procedure, construction or design the purpose and/or effect of which is any decrease whatsoever of the temperature of the intake air and/or of the charge (air and/or fuel) of the engine is forbidden.

**5.5.2** Internal and/or external spraying of water or any substance whatsoever is forbidden (other than fuel for the normal purpose of combustion in the engine).

### **5.6 Starting the engine :**

A supplementary device temporarily connected to the car may only be used to start the engine in the pits or on the starting grid.

### **5.7 Telemetry :**

The use of telemetry is forbidden.

## ARTICLE 6 : FUEL SYSTEM

### 6.1 Permitted changes to the original specification :

- 6.1.1 Replacement fuel lines and fittings need not be supplied by the chassis manufacturer but must be to the same specification.
- 6.1.2 Heat shrink or fire sleeve protective coverings may be added to fuel lines.
- 6.1.3 Cork tank hatch gaskets may be replaced by those made from rubber.

### 6.2 Fuel tanks :

6.2.1 The fuel tank must be a single rubber bladder conforming to or exceeding the specifications of FIA/FT5-1999.

6.2.2 All the fuel stored on board the car must be situated between the front face of the engine and the driver's back when viewed in lateral projection.

Furthermore, no fuel can be stored more than 300mm forward of the highest point at which the driver's back makes contact with his seat.

However, a maximum of 2 litres of fuel may be kept outside the survival cell, but only that which is necessary for the normal running of the engine.

6.2.3 Fuel must not be stored more than 400mm from the longitudinal axis of the car.

6.2.4 All rubber bladders must be made by manufacturers recognised by the FIA. In order to obtain the agreement of the FIA, the manufacturer must prove the compliance of his product with the specifications approved by the FIA. These manufacturers must undertake to deliver to their customers exclusively tanks complying with the approved standards.

A list of approved manufacturers is available from the FIA.

6.2.5 All rubber bladders shall be printed with the name of the manufacturer, the specifications to which the tank has been manufactured and the date of manufacture.

6.2.6 No rubber bladders shall be used more than 5 years after the date of manufacture, unless inspected and re-certified by the manufacturer for a period of up to another 2 years.

### 6.3 Fittings and piping :

6.3.1 All apertures in the fuel tank must be closed by hatches or fittings which are secured to metallic or composite bolt rings bonded to the inside of the bladder.

Bolt hole edges must be no less than 5mm from the edge of the bolt ring, hatch or fitting.

All hatches and fittings must be sealed with the gaskets or 'O' rings supplied with the tank.

6.3.2 All fuel lines between the fuel tank and the engine must have a self sealing breakaway valve. This valve must separate at less than 50% of the load required to break the fuel line fitting or to pull it out of the fuel tank.

6.3.3 No lines containing fuel may pass through the cockpit.

6.3.4 All lines must be fitted in such a way that any leakage cannot result in accumulation of fuel in the cockpit.

6.3.6 When flexible, all lines must have threaded connectors and an outer braid which is resistant to abrasion and flame.

6.3.7 All fuel lines must have a minimum burst pressure of 41 bar at the maximum operating temperature of 135°C.

### 6.4 Crushable structure :

The fuel tank must be completely surrounded by a crushable structure, which is an integral part of the survival cell and must be able to withstand the loads required by the tests in Articles 18.2.1 and 18.3.

## **6.5 Tank fillers :**

**6.5.1** Fuel tank fillers must not protrude beyond the bodywork. Any breather pipe connecting the fuel tank to the atmosphere must be designed to avoid liquid leakage when the car is running and its outlet must not be less than 250mm from the cockpit opening.

All fuel tank fillers must be designed to ensure an efficient locking action which reduces the risk of accidental opening following a crash impact or incomplete locking after refuelling.

**6.5.2** All cars must be fitted with a self sealing connector which can be used by the scrutineers to obtain fuel from the tank.

This connector must be the type approved by the FIA.

## **6.6 Refuelling :**

**6.6.1** Refuelling during the race is forbidden.

**6.6.2** Refuelling the car on the grid may only be carried out by using an unpressurised container which is no more than 2 metres above the ground.

**6.6.3** Any storage of fuel on board the car at a temperature of more than ten degrees centigrade below the ambient temperature is forbidden.

**6.6.4** The use of any specific device, whether on board or not, to decrease the temperature of the fuel below the ambient temperature is forbidden.

## **ARTICLE 7 : OIL AND WATER SYSTEMS**

### **7.1 Permitted changes to the original specification :**

- 7.1.1** Replacement oil or hydraulic lines and fittings need not be supplied by the chassis manufacturer but must be to the same specification.
- 7.1.2** Heat shrink or fire sleeve protective coverings may be added to all oil, hydraulic or water lines.
- 7.1.3** Water pipes may be modified to accept a water heating system.
- 7.1.4** Blanking of oil or water radiator intakes for the purpose of optimising temperatures provided this is its sole purpose.
- 7.1.5** Stone guards may be fitted in front of oil and water radiators.

### **7.2 Location of oil tanks**

All oil storage tanks must be situated between the front wheel axis and the rearmost gearbox casing longitudinally, and must be no further than the lateral extremities of the survival cell are from the longitudinal axis of the car.

### **7.3 Longitudinal location of oil system**

No other part of the car containing oil may be situated behind the complete rear wheels.

### **7.4 Catch tank**

When a car's lubrication system includes an open type sump breather, this breather must vent into a catch tank of at least 3 litres capacity.

### **7.5 Transversal location of oil system**

No part of the car containing oil may be more than 700mm from the longitudinal centre line of the car.

### **7.6 Oil replenishment :**

No oil replenishment is allowed during a race.

### **7.7 Oil and water lines :**

- 7.7.1** No lines containing water or lubricating oil may pass through the cockpit.
- 7.7.2** All lines must be fitted in such a way that any leakage cannot result in the accumulation of fluid in the cockpit.
- 7.7.3** No hydraulic fluid lines may have removable connectors inside the cockpit.
- 7.7.4** All lubricating oil lines must have a minimum burst pressure of 41 bar at the maximum operating temperature of 135°C.
- 7.7.5** All hydraulic fluid lines which are not subjected to abrupt changes in pressure, with the exception of lines under gravity head, must have a minimum burst pressure of 408 bar at the maximum operating temperature of 204°C when used with steel connectors and 135°C when used with aluminium connectors.
- 7.7.6** All hydraulic fluid lines subjected to abrupt changes in pressure must have a minimum burst pressure of 816 bar at the maximum operating temperature of 204°C.

## ARTICLE 8 : ELECTRICAL SYSTEMS

### 8.1 Permitted changes to the original specification :

8.1.1 Any modifications required to fit the driver communication system described in Article 8.5 below.

8.1.2 The type and position of the auxiliary battery plug may be changed and joints in this cable and that of the starter cable may be added.

### 8.2 Starter :

All cars must be fitted with a starter which is capable of starting the engine at all times when operated by the driver aboard the car.

### 8.3 Dashboard :

The dashboard must be supplied by the FIA designated supplier.

### 8.4 Data acquisition systems :

The only data acquisition system which may be fitted is that specified by the FIA and supplied by the appointed manufacturer.

### 8.5 Driver radios :

All radio equipment is free, must be powered only from the source supplied for this purpose in the car wiring loom and may transmit only voice communication.

### 8.6 Accident data recorders :

**The recorder must be fitted and operated :**

- **by being rigidly attached to the survival cell using the four 7mm diameter holes provided** ;
- **in accordance with the instructions of the FIA** ;
- symmetrically about the car centre line and with its top facing upwards ;
- with each of its 12 edges parallel to an axis of the car ;
- less than 50mm above the reference plane ;
- in a position which is normally accessible at the start and finish of an Event ;
- in order that the entire unit lies between 40% and 60% of the wheelbase of the car ;
- with its main connector facing forwards ;
- in order that its status light is visible when the driver is in the cockpit ;
- in order that the download connector is easily accessible without the need to remove bodywork.

## **ARTICLE 9 : TRANSMISSION SYSTEM**

### **9.1 Permitted changes to the original specification :**

- 9.1.1** Internal differential plates and ramp angles may be changed but only by using the range of parts available from the rolling chassis supplier.
- 9.1.2** Differential pre-load may be changed but only by using the range of parts available from the rolling chassis supplier.
- 9.1.3** Gearbox ratios, but only from the range available from the rolling chassis supplier.
- 9.1.4** Final drive ratio, but only from the range available from the rolling chassis supplier.
- 9.1.5** Detent springs in the gear selector mechanism.
- 9.1.6** The type of clutch is free but must be fitted without any modification other than with parts available from the designated chassis supplier and must be acceptable to the engine supplier.
- 9.1.7** A magnet may be fitted inside the gearbox for particle collection.
- 9.1.8** A lay shaft end cover may be fitted.
- 9.1.9** Gauze may be fitted over any opening in the gearbox bell housing.

### **9.2 Four wheel drive :**

Four wheel drive cars are forbidden.

### **9.3 Type of gearbox :**

- 9.3.1** All cars must have no more than **six** forward gears.
- 9.3.2** Automatic gearboxes and differentials with electronic, pneumatic or hydraulic slip control are forbidden.

### **9.4 Reverse gear :**

All cars must have a reverse gear operable any time during the Event by the driver when the engine is running.

### **9.5 Traction control :**

The use of traction control is forbidden.

## ARTICLE 10 : SUSPENSION AND STEERING SYSTEMS

### 10.1 Permitted changes to the original specification :

- 10.1.1 The addition of a steering position sensor and wiring to connect it to the FIA approved data acquisition system.
- 10.1.2 Steering arms may be replaced to change steering ratio but only by using the range of parts available from the rolling chassis supplier.
- 10.1.3 Wishbone length and attachment, track rod length and pushrod length by means of adjustment provided.
- 10.1.4 Replacement suspension joints need not be supplied by the chassis manufacturer but must be **of an identical** specification.
- 10.1.5 The addition of a strain gauge to each pushrod **assembly** and wiring to connect them to the FIA approved data acquisition system.
- 10.1.6 Road springs and spring platform position may be changed and thrust washers or spacers between the springs and platforms may be added.
- 10.1.7 Anti-roll bars may be adjusted or changed but, **with the exception of shims or spacers**, only by using the range of parts available from the rolling chassis supplier.
- 10.1.8 Damper packers and bump rubbers.
- 10.1.9 Camber angles may be adjusted but only by using the range of parts available from the rolling chassis supplier.
- 10.1.10 Devices to measure suspension displacement may be fitted, provided this is their sole purpose, including any wiring needed to connect them to the FIA approved data acquisition system.
- 10.1.11 Damper valving may be changed but only by using the range of parts detailed in the manufacturers F3000 technical specification.
- 10.1.12 Spacers to move the position of the steering wheel may be added between the wheel and column.
- 10.1.13 Steering lock stops are free.
- 10.1.14 **Steering pinions may be changed but only by using the range of parts available from the rolling chassis supplier.**

### 10.2 Active suspension :

The use of active suspension is forbidden.

### 10.3 Chromium plating :

Chromium plating of any steel suspension is forbidden.

### 10.4 Sprung suspension :

Cars must be fitted with sprung suspension.

The springing medium must not consist solely of bolts located through flexible bushes or mountings.

There must be movement of the wheels to give suspension travel in excess of any flexibility in the attachments.

### 10.5 Suspension members :

10.5.1 All suspension members must be made from an homogeneous metallic material.

10.5.2 In order to prevent intrusion of suspension parts into the survival cell during a side impact, each member of every front suspension component with two inboard mountings must be joined by a link as close to the survival cell as practical. This link must be circular with a minimum diameter of 10mm, and any slip joint must be bolted or pinned and located in the centre of the span.

**10.5.3** **The cross-sections of** each member of every suspension component must **have** an aspect ratio no greater than 3.5:1 **and be symmetrical about its major axis**. All suspension components may however have sections with an aspect ratio greater than 3.5:1, **and be non-symmetrical**, provided these are adjacent to their inner and outer attachments and form no more than 25% of the total distance between the attachments of the relevant member.

All measurements will be made perpendicular to a line drawn between the inner and outer attachments of the relevant member.

**10.5.4** No major axis of a cross section of a suspension member may subtend an angle greater than 5° to the reference plane when measured parallel to the centre line of the car.

**10.5.5** Non-structural parts of suspension members are considered bodywork.

**10.5.6** In order to **help** prevent a wheel becoming separated in the event of all suspension members connecting it to the car failing, **two** cables, **each with separate attachments**, must be fitted **to** connect each wheel/upright assembly to the main structure of the car. **The cables** and **their** attachments must be **designed in order to help prevent a** wheel **making** contact with the driver's head **during an accident**.

The length of each cable should be no longer than that required to allow normal suspension movement.

Each complete cable restraint system, including **their** attachments, must have a minimum tensile strength of 50kN and **each cable** must be flexible with a minimum diameter of 8mm.

## **10.6 Steering :**

**10.6.1** The steering must consist of a mechanical link between the driver and the wheels.

**10.6.2** Four wheel steering is forbidden.

**10.6.3** The steering wheel, steering column and steering rack assembly must pass an impact test, details of the test procedure may be found in Article **16.5**.

## ARTICLE 11 : BRAKE SYSTEM

### 11.1 Permitted changes to the original specification :

11.1.1 Replacement brake pads need not be supplied by the rolling chassis supplier but must be the same make and to the same specification as the range available from the rolling chassis supplier.

11.1.2 The removal of or blanking of brake duct intakes for the purpose of optimising temperatures provided this is its sole purpose.

11.1.3 Devices to measure brake pressures may be fitted, provided this is their sole purpose, including any wiring needed to connect them to the FIA approved data acquisition system.

11.1.4 Brake and clutch master cylinder sizes may be changed provided no other modification is required to fit them.

### 11.2 Separate circuits :

All cars must be equipped with one brake system which has two separate hydraulic circuits operated by one pedal, one circuit operating on the two front wheels and the other on the two rear wheels. This system must be designed so that if a failure occurs in one circuit the pedal will still operate the brakes in the other.

### 11.3 Brake discs :

11.3.1 Brake discs must be made from ferrous material.

11.3.2 All **brake** discs must have minimum thicknesses, when new, of 28.0mm for the front and 25.0mm for the rear.

### 11.4 Brake calipers :

11.4.1 All brake calipers must be made from an homogeneous metallic material **and be fitted to the trailing side of the upright.**

11.4.2 There must be no more than 4 brake caliper pistons on each wheel.

### 11.5 Cooling of the brakes :

Air ducts for the purpose of cooling the front brakes shall not protrude beyond :

- A plane parallel to the ground situated at a distance of 140mm above the horizontal centre line of the wheel.
- A plane parallel to the ground situated at a distance of 140mm below the horizontal centre line of the wheel.
- A vertical plane parallel to the inner face of the front rim and displaced from it by 120mm toward the centre line of the car.
- The periphery of the tyre forwards or the wheel rim backwards, when viewed from the side of the car.

### 11.6 Liquid cooling :

Liquid cooling of the brakes is forbidden.

### 11.7 Brake pressure modulation :

Anti lock brakes and power braking are forbidden.

## ARTICLE 12 : WHEELS AND TYRES

### 12.1 Permitted changes to the original specification :

12.1.1 Wheels may be painted.

12.1.2 Wheels may be sand blasted to prevent tyres turning on the rims.

### 12.2 Location :

Complete wheels must be external to the bodywork in plan view, with the rear aerodynamic device removed.

### 12.3 Dimensions :

12.3.1 Complete wheel width **must not exceed 380mm**.

12.3.2 Complete wheel diameter **must not exceed 660mm**.

12.3.3 Wheel bead diameter **must lie between 328 and 332mm**.

12.3.4 These measurements will be taken horizontally at axle height.

### 12.4 Wheel material :

All wheels must be made from homogeneous metallic materials.

### 12.5 Maximum number of wheels :

The number of wheels is fixed at four.

### 12.6 Number of tyres :

12.6.1 The tyre manufacturer shall be obliged to supply three sets of tyres per car per event, six front and six rear tyres, all of which have the same technical characteristics and specifications.

12.6.2 Each tyre must bear on its wall and in block letters the reference "Formula 3000", the date of manufacture and the name or logo of the manufacturer which must not exceed 160mm in length.

## ARTICLE 13 : COCKPIT

### 13.1 Permitted changes to the original specification :

13.1.1 The pedals may be modified and their position changed for driver comfort.

13.1.2 The type and position of the driver's heel rest is free.

13.1.3 The position and size of the steering wheel may be changed for driver comfort but only by using the range of parts available from the rolling chassis supplier.

13.1.4 The addition of a seat and any padding for driver comfort, provided this is its sole purpose.

13.1.5 A clutch footrest may be added.

13.1.6 Equipment for supplying the driver with drink may be fitted in the cockpit.

13.1.7 A screen may be added.

13.1.8 The position of gear lever mounting and the size of the gear lever knob may be changed.

### 13.2 Cockpit opening :

**13.2.1 In order to ensure that the opening giving access to the cockpit is of adequate size, the template shown in Drawing 2 will be inserted into the survival cell and bodywork.**

**During this test the steering wheel, steering column, seat and all padding required by Articles 14.7.1-6 (including fixings), may be removed and :**

- **the template must be held horizontal and lowered vertically from above the car until its lower edge is 525mm above the reference plane ;**
- **referring to Drawing 2, the edge of the template which lies on the line d-e must be no less than 1800mm behind the line A-A shown in Drawing 5.**

**Any measurements made from the cockpit entry template (when referred to in Articles 13.2.3, 15.3.1, 15.5.4, 15.6.4, 16.3 and 18.4), must also be made whilst the template is held in this position.**

**13.2.2**The forward extremity of the cockpit opening, even if structural and part of the survival cell, must be at least 50mm in front of the steering wheel.

**13.2.3**The driver must be able to enter and get out of the cockpit without it being necessary to open a door or remove any part of the car other than the steering wheel. **When seated normally, the driver must be facing forwards and the rearmost part of his crash helmet may be no more than 125mm forward of the rear edge of the cockpit entry template.**

**13.2.4**From his normal seating position, with all seat belts fastened and whilst wearing his usual driving equipment, the driver must be able to remove the steering wheel and get out of the car within 5 seconds and then replace the steering wheel in a total of 10 seconds.

**For this test, the position of the steered wheels will be determined by the FIA technical delegate and after the steering wheel has been replaced steering control must be maintained.**

### 13.3 Steering wheel :

The steering wheel must be fitted with a quick release mechanism operated by pulling a concentric flange installed on the steering column behind the wheel.

### 13.4 Internal cross section :

**13.4.1**A free vertical cross section, which allows the outer template shown in Drawing 3 to be passed vertically through the cockpit to a point 100mm behind the face of the rearmost pedal when in the inoperative position, must be maintained over its entire length.

**The only things which may encroach on this area are the steering wheel and any padding that is required by Article 14.7.7.**

**13.4.2**A free vertical cross section, which allows the inner template shown in Drawing 3 to be passed vertically through the cockpit to a point 100mm behind the face of rearmost pedal when in the inoperative position, must be maintained over its entire length.

The only thing **which may** encroach on **this area is** the steering wheel.

**13.4.3**The driver, seated normally with his seat belts fastened and with the steering wheel removed must be able to raise both legs together so that his knees are past the plane of the steering wheel in the rearward direction. This action must not be **prevented** by any part of the car.

**13.5** **Position of the driver's feet :**

**13.5.1**The survival cell must extend from behind the fuel tank in a rearward direction to a point at least 300mm in front of the driver's feet, with his feet resting on the pedals and the pedals in the inoperative position.

**13.5.2**When he is seated normally, the soles of the driver's feet, resting on the pedals in the inoperative position, must not be situated forward of the front wheel centre line.

## **ARTICLE 14 : SAFETY EQUIPMENT**

### **14.1 Permitted changes to the original specification :**

**14.1.1** A shroud may be fitted over the fire extinguisher.

**14.1.2** The position of the rear view mirrors may be changed but the original mounting positions must be retained.

**14.1.3** Extra padding may be added to the headrests but must be made of the same material.

**14.1.4** Alternative designs of seat belts may be fitted but must comply with the relevant FIA standard.

### **14.2 Fire extinguishers :**

**14.2.1** All cars must be fitted with a fire extinguishing system which must discharge into the cockpit and into the engine compartment.

**14.2.2** Any AFFF which has been specifically approved by the FIA is permitted.

**14.2.3** The quantity of extinguishant may vary according to the type of AFFF used, a list is available from the FIA.

**14.2.4** When operated, the fire extinguishing system must discharge 95% of its contents at a constant pressure in no less than 10 seconds and no more than 30 seconds.

If more than one container with extinguishant is fitted, they must be released simultaneously.

**14.2.5** Each pressure vessel must be equipped with a means of checking its pressure which may vary according to the type of AFFF used. A list is available from the FIA.

**14.2.6** The following information must be visible on each container with extinguishant :

- a) Type of extinguishant ;
- b) Weight or volume of the extinguishant ;
- c) Date the container must be checked which must be no more than two years after the date of filling.

**14.2.7** All parts of the extinguishing system must be situated within the survival cell and all extinguishing equipment must withstand fire.

**14.2.8** Any triggering system having its own source of energy is permitted, provided it is possible to operate all extinguishers should the main electrical circuits of the car fail.

The driver must be able to trigger the extinguishing system manually when seated normally with his safety belts fastened and the steering wheel in place.

Furthermore, a means of triggering from the outside must be combined with the circuit breaker switch. It must be marked with a letter "E" in red inside a white circle of at least 100mm diameter with a red edge.

**14.2.9** The system must work in any position, even when the car is inverted.

**14.2.10** Extinguisher nozzles must be suitable for the extinguishant and be installed in such a way that they are not directly pointed at the driver.

### **14.3 Master switch :**

**14.3.1** The driver, when seated normally with safety belt fastened and steering wheel in place, must be able to cut off all electrical circuits to the ignition, all fuel pumps and the rear light by means of a spark proof circuit breaker switch.

This switch must be located on the dashboard and must be clearly marked by a symbol showing a red spark in a white edged blue triangle.

14.3.2 There must also be an exterior switch, with a horizontal handle, which is capable of being operated from a distance by a hook. This switch must be situated at the base of the main rollover structure on the right hand side.

#### 14.4 Rear view mirrors :

14.4.1 All cars must have at least two mirrors mounted so that the driver has visibility to the rear and both sides of the car.

14.4.2 The reflective surface of each mirror must be at least **150mm** wide, this being maintained over a height of at least 50mm. Additionally, each corner may have a radius no greater than 10mm.

14.4.3 **No part of the reflective surface may be less than 250mm from the car centre line or more than 750mm from the rear of the cockpit entry template.**

14.4.4 **The FIA technical delegate must be satisfied by a practical demonstration that the driver, when seated normally, can clearly define following vehicles.**

**For this purpose, the driver shall be required to identify any letter or number, 150mm high and 100mm wide, placed anywhere on boards behind the car, the positions of which are detailed below :**

**Height** : **From 400mm to 1000mm from the ground.**

**Width** : **2000mm either side of the centre line of the car.**

**Position** : **10m behind the rear axle line of the car.**

#### 14.5 Safety belts :

It is mandatory to wear two shoulder straps, one abdominal strap and two straps between the legs. These straps must be securely fixed to the car and must comply with FIA standard 8853/98.

#### 14.6 Rear light :

All cars must have a red light in working order throughout the event which :

- is the model specified by the FIA ;
- faces rearwards at 90 degrees to the car centre line ;
- is clearly visible from the rear ;
- is not mounted more than 100mm from the car centre line ;
- is **mounted between 300mm and 375mm** above the reference plane ;
- is no less than **450mm** behind the rear wheel centre line measured parallel to the reference plane ;
- can be switched on by the driver when seated normally in the car.

The three measurements **above** will be taken to the centre of **the rear face of the light unit.**

#### 14.7 Headrests and head protection :

14.7.1 **All cars must be equipped with three areas of padding for the driver's head which :**

- **are so arranged that they can be removed from the car as one part ;**
- **are located by two horizontal pegs behind the driver' head and two fixings, which are clearly indicated and easily removable without tools, at the front corners ;**
- **are made from a material specified by the FIA ;**
- **are fitted with a cover manufactured from 60-240gsm materials which use suitable thermo-setting resin systems ;**
- **are positioned so as to be the first point of contact for the driver's helmet in the event of an impact projecting his head towards them during an accident.**

**14.7.2 The first area of padding for the driver's head must be positioned behind him and be between 75mm and 90mm thick over an area of at least 40000mm<sup>2</sup>.**

**14.7.3 The two further areas of padding for the driver's head must be positioned directly alongside each side of his helmet. The upper surfaces of these areas of padding must be at least as high as the survival cell over their entire length.**

**Each area of padding must be between 75mm and 90mm thick over an area of at least 25000mm<sup>2</sup> and may have a radius of 10mm along its upper inboard edge. When calculating their area, any part which is greater than 75mm thick and which lies between the front face of the rear area of padding and the forward-most part of the driver's helmet whilst he is seated normally, will be taken into account (area 'B' in Drawing 4). The thickness will be measured perpendicular to the car centre line.**

**14.7.4 Forward of the side areas of padding further cockpit padding must be provided on each side of the cockpit rim. The purpose of the additional padding is to afford protection to the driver's head in the event of an oblique frontal impact and must therefore be made from the same material as the other three areas of padding.**

**These extensions must :**

- **be symmetrically positioned about the car centre line and a continuation of the side areas of padding ;**
- **be positioned with their upper surfaces at least as high as the survival cell over their entire length;**
- **have a radius on their upper inboard edge no greater than 10mm ;**
- **be positioned in order that the distance between the two is no less than 360mm ;**
- **be as high as practicable within the constraints of driver comfort.**

**14.7.5 All of the padding described above must be so installed that if movement of the driver's head, in any expected trajectory during an accident, were to compress the foam fully at any point, his helmet would not make contact with any structural part of the car.**

**Furthermore, for the benefit of rescue crews all of the padding described above must be installed using the FIA approved system. The method of removal must also be clearly indicated.**

**14.7.6 No part of the padding described above may obscure sight of any part of the driver's helmet when he is seated normally and viewed from directly above the car.**

**14.7.7 In order to minimise the risk of leg injury during an accident, additional areas of padding must be fitted each side of, and above, the driver's legs.**

**These areas of padding must :**

- **be made from a material specified by the FIA ;**
- **be no less than 25mm thick over their entire area ;**
- **cover the area situated between points lying 50mm behind the centre of the point at which the second roll structure test is carried out and 100mm behind the face of the rearmost pedal when in the inoperative position, as shown in Drawing 4 ;**
- **cover the area above the line A-A shown in Drawing 3.**

#### **14.8 Wheel retention :**

All cars, whilst under their own power, must be fitted with devices which will retain any wheel in the event of it coming loose.

After the wheel nut is fastened, these devices must be manually fitted in a separate action to that of securing the wheel nut.

**14.9 Seat fixing and removal :**

**14.9.1 In order that an injured driver may be removed from the car in his seat following an accident, all cars must be fitted with a seat which, if it is secured, must be done so with no more than two bolts. If bolts are used they must :**

- **be clearly indicated and easily accessible to rescue crews ;**
- **be fitted vertically ;**
- **be removable with the same tool for all Teams and which is issued to all rescue crews.**

**14.9.2 The seat must be equipped with receptacles which permit the fitting of belts to secure the driver and one which will permit the fitting of a neck support.**

**14.9.3 The seat must be removable without the need to cut or remove any of the seat belts.**

**14.9.4 Details of the tool referred to above, the belt receptacles and the neck support are available from the FIA Technical Department.**

## **ARTICLE 15 : CAR CONSTRUCTION**

### **15.1 Permitted changes to the original specification :**

**15.1.1** Replacement nuts, bolts and washers need not be supplied by the rolling chassis supplier but must be to a similar specification.

**15.1.2** The rear impact absorbing structure may be painted.

### **15.2 Materials :**

**15.2.1** The use of magnesium sheet less than 3mm thick is forbidden.

**15.2.2** Within composite structures, the strain-to-failure of any fibrous reinforcing material must not be less than 1.5%.

**15.2.3** The use of carbon or aramid fibre reinforcing materials in composite structures is forbidden except in the survival cell, frontal impact absorbing structure, roll over structures, non-structural components of the engine, bodywork ahead of the front edge of the complete front wheels and bodywork more than **150mm** behind the rear wheel centre line.

**15.2.4** Any repairs to the survival cell or nosebox must be carried out in accordance with the manufacturers specifications and be carried out in a repair facility approved by the manufacturer.

**15.2.5** The car may not be used in another event until the technical passport has been completed satisfactorily.

### **15.3 Roll structures :**

**15.3.1** All cars must have two roll structures **which are designed to help prevent injury to the driver in the event of the car becoming inverted.**

The principal structure must be at least 940mm above the reference plane **at a point 30mm behind the cockpit entry template.** 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.

**15.3.2** The principal structure must pass a static load test details of which may be found in Article 17.2. **Furthermore, the car manufacturer must supply detailed calculations which clearly show that it is capable of withstanding the same load when the longitudinal component is applied in a forward direction.**

**15.3.3** The second structure **must pass a static load test details of which may be found in Article 17.3.**

**15.3.4** Both roll structures must have minimum structural cross sections of 10000mm<sup>2</sup>, in vertical projection, across a horizontal plane 50mm below the their highest points.

### **15.4 Structure behind the driver :**

**The parts of the survival cell immediately behind the driver which separate the cockpit from the car's fuel tank, and which lie less than 150mm from the centre line of the car, may be situated no further forward than the line a-b-c-d-e shown in Drawing 2.**

### **15.5 Survival cell specifications :**

**15.5.1** The survival cell must have an opening for the driver, the minimum dimensions of which are given in Article 13.2. Any other openings in the survival cell must be of minimum size to allow access to mechanical components.

**15.5.2** An impact absorbing structure must be fitted in front of the survival cell. This structure need not be an integral part of the survival cell but must be solidly attached to it.

Furthermore, it must have a minimum external cross section, in horizontal projection, of 9000mm<sup>2</sup> at a point 50mm behind its forward-most point.

### **15.5.3** Referring to **Drawing 5** :

The external width of the survival cell between the lines **B-B** and **C-C** must be no less than 450mm and must be at least 60mm per side wider than the cockpit opening when measured normal to the inside of the cockpit aperture. These minimum dimensions must be maintained over a height of at least 350mm.

The width of the survival cell may taper forward of the line **B-B** but, if this is the case, it must do so at a linear rate to a minimum of **300mm** at the line **A-A**.

Between the lines **A-A** and **B-B** the width of the survival cell must be greater than the width defined by the two lines **a-b**. This minimum width must be arranged symmetrically about the car centre line, must be maintained over a height of at least **400mm** at the line **B-B** and may taper at a linear rate to **275mm** at the line **A-A**. **When assessing the minimum external cross-sections of the survival cell, radii of 50mm at the line B-B, and reducing at a linear rate to 25mm at the line A-A, will be permitted.**

The minimum height of the survival cell between the lines **A-A** and **B-B** need not be arranged symmetrically about the horizontal centre line of the relevant section but must be maintained over its entire width.

The minimum height of the survival cell between the lines **B-B** and **C-C** is 550mm.

### **15.5.4** **When the test referred to in Article 13.2.1 is carried out and the template is in position with its lower edge 525mm above the reference plane, the shape of the survival cell must be such that no part of it is visible when viewed from either side of the car.**

The parts of the survival cell which are situated each side of the driver's helmet must be no more than 550mm apart **and, in** order to maintain good lateral visibility the driver, when seated normally with his seat belts fastened and looking straight ahead, must have his eyes above the sides of the survival cell.

### **15.5.5** In order to give additional protection to the driver in the event of a side impact **a flat test panel of uniform construction, which is designed and constructed in order to represent a section of the survival cell sides, must pass a strength test. Details of the test procedure may be found in Article 18.6.**

Referring to **Drawing 5, with the exception of local re-enforcement and/or inserts, all parts of the survival cell which are as wide or wider than the minimum widths stipulated in Article 15.4.4, including any radii applied, must be manufactured to the same specification as the panel tested under Article 18.6. Furthermore, parts to this tested specification must cover an area which :**

- **begins at least 250mm high at line A-A ;**
- **tapers at a linear rate to at least 400mm high at line B-B and which remains at this height to the rear of the survival cell ;**
- **is no less than 100mm above the reference plane between the line B-B and the rear of the survival cell.**

## **15.6 Survival cell safety requirements :**

**15.6.1** The survival cell and frontal absorbing structure must pass an impact test against a solid vertical barrier placed at right angles to the centre line of the car, details of the test procedure may be found in Article 16.2.

**15.6.2** **Between the front and rear roll structures, on each side of the survival cell, impact absorbing structures must be fitted and must be solidly attached to it. The purpose of these structures is to protect the driver in the event of a lateral impact and, in order to ensure this is the case, a lateral strength test in the vicinity of the driver's seating position must be carried out successfully. Details of the test procedure may be found in Article 18.2.2.**

**The survival cell and one of these impact absorbing structures must be designed in order to pass an impact test, details of this test procedure may be found in Article 16.3. If these structures are not designed and fitted symmetrically about the car centre line they must both be designed in order to pass the impact test.**

**15.6.3** An impact absorbing structure must be fitted behind the gearbox symmetrically about the car centre line with its rearmost point no less than 480mm behind the rear wheel centre line. It must also have a minimum external cross section, in horizontal projection, of 9000mm<sup>2</sup> at a point 50mm forward of its rearmost point. When calculating this area only those parts situated less than 100mm from the car centre line may be considered and the cross section may not diminish forward of this point.

**This structure must be designed in order to pass an impact test and must be constructed from materials which will not be substantially affected by the temperatures it is likely to be subjected to during use. Details of this test procedure may be found in Article 16.4.**

**15.6.4** The survival cell must also be subjected to **five** separate static load tests :

- 1) on a vertical plane passing through the centre of the fuel tank ;
- 2) on a vertical plane passing **through the rearmost point at which the outer end of the forward-most front wheel tether would make contact with the survival cell when swung about its inner attachment ;**
- 3) **on a vertical plane 375mm forward of the rear edge of the cockpit entry template ;**
- 4) from beneath the fuel tank ;
- 5) **on each side of the cockpit opening.**

Details of the test procedures may be found in Articles 18.2-4.

**15.6.5** To test the attachments of the frontal impact absorbing structure to the survival cell, a static side load test must be carried out . Details of the test procedure may be found in Article 18.5.

## ARTICLE 16 : IMPACT TESTING

### 16.1 Conditions applicable to all impact tests :

16.1.1 All tests must be carried out in accordance with FIA Test Procedure 01/00, in the presence of an FIA technical delegate and by using measuring equipment which has been calibrated to the satisfaction of the FIA technical delegate.

16.1.2 Any significant modification introduced into any of the structures tested shall require that part to pass a further test.

### 16.2 Frontal test :

All parts which could materially affect the outcome of the test must be fitted to the test structure which must be solidly fixed to the trolley through its engine mounting points but not in such a way as to increase its impact resistance.

The fuel tank must be fitted and must be full of water.

A dummy weighing at least 75kg must be fitted with safety belts described in Article 14.5 fastened. However, with the safety belts unfastened, the dummy must be able to move forwards freely in the cockpit.

The extinguishers, as described in Article 14.2 must also be fitted.

For the purposes of this test, the total weight of the trolley and test structure shall be 780kg and the velocity of impact 12.0 metres/sec.

The resistance of the test structure must be such that during the impact :

- **the average deceleration over the first 150mm of deformation does not exceed 5g ;**
- the average deceleration of the trolley does not exceed 25g ;
- the peak deceleration in the chest of the dummy does not exceed 60g for more than 3ms.

Furthermore, there must be no damage to the survival cell or to the mountings of the safety belts or fire extinguishers.

This test must be carried out on the survival cell subjected to the tests described in Articles 18.2-4, and on a frontal impact absorbing structure identical to the one which was subjected to the test described in Article 18.5.

### 16.3 Side test :

**All parts which could materially affect the outcome of the test must be fitted to the test structure which must be solidly fixed to the ground and a solid object, having a mass of 780kg and travelling at a velocity of 10m/s, will be projected into it.**

**The object used for this test must :**

- **incorporate an impactor assembly specified by the FIA which is fitted in accordance with their instructions ;**
- **be positioned in order that its centre of area strikes the structure 300mm above the reference plane and at a point 500mm forward of the rear edge of the cockpit opening template.**

**During the test the striking object may not pivot in any axis and the survival cell may be supported in any way provided this does not increase the impact resistance of the parts being tested. The impact axis must be perpendicular to the car centre line and parallel to the ground.**

**The resistance of the test structure must be such that during the impact :**

- **the average deceleration of the object, measured in the direction of impact, does not exceed 20g ;**

- the force applied to any one of the four impactor segments does not exceed 80kN for more than a cumulative 3ms ;

- the energy absorbed by each of the four impactor segments must be between 15% and 35% of the total energy absorption.

Furthermore, all structural damage must be contained within the impact absorbing structure.

This test must be carried out on the survival cell subjected to the tests described in Articles 18.2-4.

#### **16.4 Rear test :**

All parts which will be fitted behind the rear face of the engine and which could materially affect the outcome of the test must be fitted to the test structure. If suspension members are to be mounted on the structure they must be fitted for the test. The structure and the gearbox must be solidly fixed to the ground and a solid object, having a mass of 780kg and travelling at a velocity of 12m/s, will be projected into it.

The object used for this test must be flat, measure 450mm wide by 550mm high and may have a 10mm radius on all edges. Its lower edge must be at the same level as the car reference plane and must be so arranged to strike the structure vertically and at 90° to the car centre line.

During the test, the striking object may not pivot in any axis and the crash structure may be supported in any way provided this does not increase the impact resistance of the parts being tested.

The resistance of the test structure must be such that during the impact :

- the average deceleration of the object does not exceed 35g ;
- the maximum deceleration does not exceed 60g for more than a cumulative 3ms, this being measured only in the direction of impact.

Furthermore, all structural damage must be contained within the area behind the rear wheel centre line.

#### **16.5 Steering column test :**

The parts referred to in Article 10.6.3 must be fitted to a representative test structure, any other parts which could materially affect the outcome of the test must also be fitted. The test structure must be solidly fixed to the ground and a solid object, having a mass of 8 kg and travelling at a velocity of 7 m/s, will be projected into it.

The object used for this test must be hemispherical with a diameter of 165 mm.

For the test, the centre of the hemisphere must strike the structure at the centre of the steering wheel along the same axis as the main part of the steering column.

During the test the striking object may not pivot in any axis and the test structure may be supported in any way provided this does not increase the impact resistance of the parts being tested.

The resistance of the test structure must be such that during the impact the peak deceleration of the object does not exceed 80g for more than a cumulative 3 ms, this being measured only in the direction of impact.

After the test, all substantial deformation must be within the steering column and the steering wheel quick release mechanism must still function normally.

## ARTICLE 17 : ROLL STRUCTURE TESTING

### 17.1 Conditions applicable to both roll structure tests :

17.1.1 Rubber 3mm thick may be used between the load pad and the roll structure.

17.1.2 Under the load, deformation must be less than 50mm, measured along the loading axis and any structural failure limited to 100mm below the top of the rollover structure when measured vertically.

17.1.3 Any significant modification introduced into any of the structures tested shall require that part to pass a further test.

### 17.2 Principal roll structure :

A load equivalent to **24kN** laterally, 45kN longitudinally **in a rearward direction** and 60kN vertically, must be applied to the top of the structure through a rigid flat pad which is 200mm in diameter and perpendicular to the loading axis.

During the test, the roll structure must be attached to the survival cell which is supported on its underside on a flat plate, fixed to it through its engine mounting points and wedged laterally by **any of** the static load test pads described in Article 18.2.

### 17.3 Second roll structure :

**A vertical load of 75kN must be applied to the top of the structure through a rigid flat pad which is 100mm in diameter and perpendicular to the loading axis.**

**During the test, the rollover structure must be attached to the survival cell which is fixed to a flat horizontal plate.**

## ARTICLE 18 : STATIC LOAD TESTING

### 18.1 Conditions applicable to all static tests :

**18.1.1** All the following tests must be carried out on the survival cell subjected to the impact test described in Article 16.2.

**18.1.2** The FIA reserve the right to carry out the static load tests in Articles 18.2, **18.3** and **18.4** at random on any other chassis produced by the manufacturer.

These tests will be carried out with 80% of the load referred to in these Articles and during these tests the deflection of the reference chassis may not be exceeded by more than 20%.

**18.1.3** Deflections and deformations will be measured at the centre of area of circular load pads and at the top of rectangular pads.

**18.1.4** All peak loads must be applied in less than three minutes, through a ball jointed junction at the centre of area of the pad, and maintained for 30 seconds.

**18.1.5** In the tests described in **Articles** 18.2, **18.3** and **18.4**, permanent deformation must be less than 1.0mm (0.5mm **in 18.3**) after the load has been released for 1 minute.

**18.1.6** All tests must be carried out by using measuring equipment which has been calibrated to the satisfaction of the FIA technical delegate.

**18.1.7** A radius of 3mm is permissible on the edges of all load pads and rubber 3mm thick may be placed between them and the test structure.

**18.1.8** Any significant modification introduced into any of the structures tested shall require that part to pass a further test.

### 18.2 Survival cell side tests :

**18.2.1** For test 1), referred to in Article **15.6.4**, pads 100mm long and 300mm high, which conform to the shape of the survival cell, must be placed against the outermost sides of the survival cell with the lower edge of the pad at the lowest part of the survival cell at that section.

A constant transverse horizontal load of 25.0kN will be applied and, under the load, there must be no structural failure of the inner or outer surfaces of the survival.

**18.2.2** For test 2), referred to in Article **15.6.4**, pads 200mm in diameter which conform to the **shape of the survival cell, must be placed against the outermost sides of the survival cell.**

**The centre of area of the pads must pass through the plane mentioned above and the mid point of the height of the structure at that section.**

**A constant transverse horizontal load of 30.0kN will be applied to the pads and, under the load, there must be no structural failure of the inner or outer surfaces of the survival cell and the total deflection must not exceed 15mm.**

**18.2.3** For test 3), referred to in Article **15.6.4**, pads 200mm in diameter which conform to the shape of the survival cell, must be placed against the outermost sides of the survival cell.

The centre of area of the pads must pass through the plane mentioned above and the mid point of the height of the structure at that section.

A constant transverse horizontal load of 30.0kN will be applied to the pads and, under the load, there must be no structural failure of the inner or outer surfaces of the survival cell and the total deflection must not exceed **15mm**.

### 18.3 Fuel tank floor test :

A pad of 200mm diameter must be placed in the centre of area of the fuel tank floor and a vertical upwards load of 12.5kN applied.

Under the load, there must be no structural failure of the inner or outer surfaces of the survival cell.

#### **18.4 Cockpit rim test :**

**Two pads, each of which is 100mm in diameter, must be placed on both sides of the cockpit rim with their upper edges at the same height as the top of the cockpit side with their centres at a point 200mm forward of the rear edge of the cockpit opening template longitudinally.**

**A constant transverse horizontal load of 10.0kN will then be applied at 90° to the car centre line and, under the load, there must be no structural failure of the inner or outer surfaces of the survival cell and the total deflection must not exceed 20mm.**

#### **18.5 Nose push off test :**

During the test the survival cell must be resting on a flat plate and secured to it solidly but not in a way that could increase the strength of the attachments being tested.

A constant transversal horizontal load of **40.0kN** must then be applied to one side of the impact absorbing structure, using a pad identical to the ones used in the lateral tests in Article 18.2.1, at a point 550mm from the front wheel axis.

The centre of area of the pad must pass through the plane mentioned above and the mid point of the height of the structure at the relevant section. After 30 seconds of application, there must be no failure of the structure or of any attachment between the structure and the survival cell.

#### **18.6 Side intrusion test**

**18.6.1 The test must be carried out in accordance with FIA Test Procedure 02/00, in the presence of an FIA technical delegate and by using measuring equipment which has been calibrated to the satisfaction of the FIA technical delegate.**

**18.6.2 The test panel must be 500mm x 500mm and will be tested by forcing a rigid truncated cone through the centre of the panel at a rate of 2mm (+/-1mm) per second until the displacement exceeds 150mm.**

**During the first 100mm of displacement the load must exceed 150kN and the energy absorption must exceed 6000J. There must be no damage to the fixture or border before these requirements have been met.**

## ARTICLE 19 : FUEL

### 19.1 Fuel :

**19.1.1** The FIA will designate a supplier of fuel who will be required to supply a single type of fuel at each Event. Competitors may only use this fuel in an Event.

**19.1.2** Once supplied nothing may be added to the fuel.

**19.1.3** The fuel will have the following physical properties :

PROPERTY	UNITS	MIN	MAX	TEST METHOD
RON		92.0	102.0	ASTM D 2699-86
MON		85.0		ASTM D 2700-86
Oxygen	%m/m		3.7	Elem Analysis
Nitrogen	%m/m		0.2	ASTM D 3228
Benzene	%v/v		5.0	ASTM D 3606
RVP	hPa	350	700	ASTM D 323
Lead	g/l		0.005	ASTM D 3237
Density at 15°C	kg/m <sup>3</sup>	725.0	780.0	ASTM D 4052
Oxidation stability	minutes	360		ASTM D 525
Existent gum	mg/100ml		5.0	EN 5
Sulphur	%m/m		0.1	ISO 8754
Copper corrosion	rating		C1	ISO 2160
Electrical conductivity	pS/m	200		ASTM D 2624

Distillation :

PROPERTY	UNITS	MIN	MAX	TEST METHOD
At 70°C	%v/v	15.0	50.0	ISO 3405
At 100°C	%v/v	40.0	70.0	ISO 3405
At 140°C	%v/v		90.0	ISO 3405
At 180°C	%v/v	85.0		ISO 3405
Final Boiling Point	°C		215	ISO 3405
Residue	%v/v		2.0	ISO 3405

The fuel will be accepted or rejected according to ASTM D 3244 with a confidence limit of 95%.

In addition, the fuel will contain no substance which is capable of exothermic reaction in the absence of external oxygen.

### 19.2 Air :

Only air may be mixed with the fuel as an oxidant.

## **ARTICLE 20 : TELEVISION CAMERAS**

### **20.1 Presence of cameras and camera housings :**

All cars must be fitted with a camera or a camera housing at all times throughout the Event.

### **20.2 Location of camera housings :**

Camera housings, when used, must be fitted in the same location as cameras.

### **20.3 Location of camera equipment :**

All cars must be equipped with three positions in which cameras or camera housings can be fitted and, referring to **Drawing 6**, all cars must carry a camera or camera housing in position number 3.

Once positions are determined in the above manner, any decision as to whether a camera or camera housing is fitted in those positions will rest solely with the relevant Competitor.

### **20.4 Transponders :**

All cars must be fitted with a timing transponder supplied by the officially appointed timekeepers. This transponder must be fitted in strict accordance with the instructions of the FIA.

## **ARTICLE 21 : FINAL TEXT**

The final text for these regulations shall be the English version which will be used should any dispute arise over their interpretation.

Headings and typeface in this document are for ease of reference only and do not form part of these Technical Regulations.