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# Article 275

## Formula 3 Technical Regulations

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Last update 1st January 1998

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## **ARTICLE 1: DEFINITIONS**

### **1.1) Formula 3 car**

Automobile designed solely for speed races on circuits or closed courses.

### **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. Complete wheel: Flange, rim and tyre.

### **1.6) 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.

### **1.7) Event**

An event shall consist of official practice and the race.

### **1.8) Weight**

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

### **1.9) Racing weight**

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

### **1.10) 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 shall be 3.1416.

### **1.11) 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.

### **1.12) Intake system**

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

### **1.13) Main structure**

The fully sprung structure of the vehicle to which the suspension and/or spring loads are transmitted, extending longitudinally from the foremost front suspension on the chassis to the rearmost one at the rear.

### **1.14) Sprung suspension**

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

### **1.15) Active suspension**

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

### **1.16) Cockpit**

The volume which accommodates the driver.

### **1.17) Survival cell**

A continuous closed structure containing all fuel tanks and the cockpit.

### **1.18) Composite structure**

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

### **1.19) Telemetry**

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

## **1.20) 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.

## **ARTICLE 2: REGULATIONS**

### **2.1) Role of the FIA**

The following technical regulations for Formula 3 cars are issued by the FIA.

### **2.2) Publication date for amendments**

Each year in October at the latest, the FIA will publish all changes made to these regulations. All such changes will take effect on the third 1st January following their publication.

Changes made for safety reasons may come into force without notice.

### **2.3) Notice for change in the air restrictor**

The FIA reserves its right to modify the dimensions of the air restrictor with one year's notice.

### **2.4) Permanent compliance with regulations**

Automobiles must comply with these regulations in their entirety at all times during an event.

### **2.5) Measurements**

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

### **2.6) 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) 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.

### **3.2) Height measurements**

All height measurements will be taken with the car in normal racing trim with the driver aboard seated normally.

### **3.3) Overall width**

The overall width of the car including complete wheels shall not exceed 185 cm, with the steered wheels in the straight ahead position.

### **3.4) Width ahead of the rear edge of the front wheels**

The bodywork ahead of the rear edge of the complete front wheels is limited to a maximum width of 130 cm.

### **3.5) Width between the rear edge of the front wheels and rear wheel centre line**

The maximum width of the bodywork behind the rear edge of the complete front wheels and in front of the centre line of the rear wheels is 130 cm.

### **3.6) Width behind the rear wheel centre line**

Bodywork behind the centre line of the rear wheels must not exceed 90 cm in width.

### **3.7) Overall height**

Except for the rollover structures, no part of the car can be higher than 90 cm from the ground. However, any part of the rollover structures more than 90 cm from the ground must not be shaped to have a significant aerodynamic influence on the performance of the car.

### **3.8) Front bodywork height**

No part of the bodywork in front of the rear edge of the complete front wheels and more than 25 cm from the longitudinal centre line of the car may be closer than 40 mm to the reference plane referred to in Article 3.13. or above the height of the front wheel rims.

### **3.9) Height in front of the rear wheels**

With the exception of engine airboxes, no part of the bodywork forward of the front edge of the complete rear wheels and extending above the height of the complete rear wheels may project beyond 45 cm each side of the longitudinal axis of the car.

### **3.10) Height between the rear wheels**

Any bodywork between the front edge of the complete rear wheels and 25 cm behind the rear wheel centre line must be no higher than the complete rear wheels.

### **3.11) Bodywork behind the front edge of the complete rear wheels**

Behind the front edge of the complete rear wheels, a maximum of three aerofoil sections may be used. All aerofoil sections used in this area must conform to one of the three sets of dimensions given in Appendix 1 of these Technical Regulations.

No trim tabs may be added to any of these aerofoil sections. However, devices used to keep the space between sections constant may be used provided it is clear that this is their only purpose.

A tolerance of +/- 1.0 mm will be permitted on any stated dimension.

### **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 40 cm and 90 cm from the car centre line and two transversal lines, one 5 cm forward of the front edge and one 20 cm behind the rear edge of the complete front wheel.

### **3.13) Bodywork facing the ground**

Between the rear edge of the complete front wheels and the front edge of the complete rear wheels, all sprung parts of the car visible from underneath must lie on one of two parallel planes, the reference plane or the step plane. The step plane must be 50 mm above the reference plane. This distance may be reduced by up to 5 mm if wear occurs to the surface lying on the reference plane after contact with the ground.

The surface formed by all parts lying on the reference plane must extend from the rear edge of the complete front wheels to the front edge of the complete rear wheels, have a minimum width of 30 cm (+/- 3 mm), a maximum width of 50 cm and must be symmetrical about the longitudinal centre line of the car.

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.

The peripheries of the surfaces formed by the parts lying on the reference and step planes may be curved upwards with maximum radii of 25 and 50 mm respectively. The surface formed by the parts lying on the reference plane must be connected at its extremities vertically to the parts lying on the step plane and any radius which forms the transition between the two planes may have a maximum radius of 25 mm.

To help overcome any possible manufacturing problems, a tolerance of 5 mm is permissible across these surfaces.

All sprung parts of the car behind the front edge of the complete rear wheels visible from underneath and more than 15 cm (+/- 1.5 mm) from the longitudinal centre line must be at least 50 mm above the reference plane.

### **3.14) Overhangs**

No part of the car shall be more than 50 cm behind the centre line of the rear wheels or more than 100 cm in front of the centre line of the front wheels.

No part of the bodywork more than 20 cm from the longitudinal centre line of the car may be more than 90 cm in front of the front wheel centre line.

### **3.15) 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.

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 may under any circumstances be located below the reference plane described in Article 3.13.

### **3.16) Wheelbase and track**

Minimum wheelbase: 200 cm.

Minimum track: 120 cm.

## **ARTICLE 4: WEIGHT**

### **4.1) Minimum weight**

The weight of the car must not be less than 530 kg.

### **4.2) Ballast**

Ballast can be used provided it is secured in such a way that tools are required for its removal. It must be possible to fix seals if deemed necessary by the scrutineers.

### **4.3) Adding during the race**

The adding to the car during the race of any liquid or other material whatsoever or the replacement during the race of any part with another materially heavier is forbidden.

## **ARTICLE 5: ENGINE**

### **5.1) Types of engine permitted**

5.1.1 - Engines with reciprocating pistons:

The maximum number of cylinders is 4.

Two stroke engines are forbidden.

5.1.2- Engines with rotary pistons:

Cars with rotary piston engines covered by NSU-Wankel patents will be admitted on the basis of a piston displacement equivalence. This equivalence is 1.5 the volume determined by the difference between the maximum and minimum capacity of the working chamber.

5.1.3 - The use of magnesium is forbidden in any engines homologated after 01.01.94.

### **5.2) Maximum capacity**

Engine capacity must not exceed 2000 cm<sup>3</sup>.

### **5.3) Supercharging**

Supercharging is forbidden.

### **5.4) Engine modifications**

5.4.1 - The engine block and engine head castings, machining completed, must be those of a car engine equipping a car model of which the FIA has ascertained the series production of at least 2500 units in 12 consecutive months.

Each engine must be homologated by the FIA, and described on an homologation form for Formula 3 engines.

5.4.2 - The original engine block and cylinder head may be modified by the removal of material, but addition of material is not permitted. However, it is permitted to sleeve an engine block, by welding if necessary, that originally is not fitted with sleeves, to modify or close the lubrication holes in the cylinder head, close standard injector holes or to use helicoils.

Unused apertures in the cylinder head or block may be closed provided the only purpose is that of closing.

Any parts added to the intake system must be permanently attached only to the intake manifold, not to the cylinder head.

5.4.3 - The type of crankshaft bearings may not be modified.

5.4.4 - Mechanical components from the original engine do not have to be used.

5.4.5 - The intake system is free but must be fitted with an air restrictor 3 mm long and having a maximum diameter of 26 mm.

All the air feeding the engine must pass through this air restrictor, which must be made of metal or metal alloy.

5.4.6 - The material of the air box is free, provided that it is not porous.

The entire intake system including manifolds, injectors, airbox and restrictor must fit into a box 100 cm long x 50 cm wide x 50 cm high.

It must be possible to remove the entire intake system from the engine as one unit with the cylinder head.

5.4.7 - Provided Article 5.2 is respected, the bore and stroke are free.

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

5.4.9 - Inlet and exhaust valves must be the conventional poppet type and controlled by coil springs.

5.4.10 - The use of ceramic materials is forbidden.

5.4.11 - Connecting rods must be made from a conventional steel alloy.

5.4.12 - Inlet and exhaust valves must be made from a conventional steel alloy.

5.4.13 - No more than one fuel injector per cylinder is permitted.

5.4.14 - Variable valve timing is forbidden.

### **5.5) Vacuum tightness control of the intake system**

The control apparatus described hereafter represents the ultimate method of verification of the vacuum tightness of intake systems, without the possibility of appeal.

All event organisers will have to put such an apparatus at the disposal of the scrutineers for verification purposes, both before and after the race.

The apparatus aims to create artificially a vacuum in the intake system and includes

- A membrane suction pump, with a nominal output of 25 to 28 litres/minute, and capable of obtaining a vacuum of 55 to 65 cm Hg for zero air flow.
- A rubber tubular stop perfectly adjusted to the flange.
- A vacuum gauge connected to the piping between the rubber stop and the suction-pump.

The procedure to be respected for the checking is the following:

- a) Rotate the engine into such a position that, in each cylinder, at least one of the valves is closed.
- b) Open the injection slide or the carburettor butterflies.
- c) Check on the vacuum gauge that the suction pump creates in the induction system a depression superior or equal to 15 cm Hg.
- d) If condition a) cannot be met, disconnect the rocker arms or remove the camshaft, in order to shut all inlet valves.

If one or several valves have been damaged during the event, the entrant may repair them under the steward's control before undergoing the testing procedure.

In these last cases, the minimum vacuum to be obtained shall be 20 cm Hg instead of 15 cm Hg.

### **5.6) Exhaust system**

5.6.1 - Variable length exhaust systems are forbidden.

5.6.2 - The outlet orifices of the exhaust pipes, when directed to the rear, must be less than 60 cm from the ground.

5.6.3 - The exhaust system must incorporate at least one approved and functioning catalytic converter through which all exhaust gases must pass. The matrix of each converter must have at least 100 cpsi, be 105 mm in diameter and 120 mm long.

Each type of converter must be specifically approved by the FIA before use in an event.

*N.B.:* The application of this Article is left to the discretion of each ASN.

5.6.4 - The noise generated by the car must not exceed 98 dbA at 3800 rpm measured at 0.5 m and 45° to the exhaust outlet.

All measures which are taken to ensure that the maximum noise limits are not exceeded must be permanent in nature, and must not be removed by the exhaust gas pressure.

*N.B.:* the application of this article is left to the discretion of each ASN.

### **5.7) Telemetry**

The use of telemetry is forbidden.

### **5.8) Clutch**

The diameter of the clutch assembly must not be less than 165 mm.

### **5.9) Oil and water pumps:**

Electrically driven engine oil and water pumps are forbidden.

### **5.10) Inlet trumpets**

Variable length engine inlet trumpets are forbidden.

## **ARTICLE 6: PIPING AND FUEL TANKS**

### **6.1) Fuel tanks**

6.1.1 - All fuel tanks must be rubber bladders conforming to or exceeding the specifications of FIA/FT3.

6.1.2- Fuel must not be stored more than 55 cm from the longitudinal axis of the car.

6.1.3 - 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.

6.1.4- All rubber bladders shall have a printed code indicating the name of the manufacturer, the specifications to which the tank has been manufactured and the date of manufacture.

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

### **6.2) Fittings and piping**

6.2.1 - No lines containing fuel, cooling water or lubricating oil may pass through the cockpit.

6.2.2 - All lines must be fitted in such a way that any leakage cannot result in the accumulation of fluid in the cockpit.

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

6.2.4 - All fuel and lubricating oil lines must have a minimum burst pressure of 41 bar at the maximum operating temperature of 135 degrees centigrade.

6.2.5 - 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 degrees centigrade when used with steel connectors and 135 degrees centigrade when used with aluminium connectors.

6.2.6 - 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 degrees centigrade.

6.2.7 - No hydraulic fluid lines may have removable connectors inside the cockpit.

### **6.3) Crushable structure**

The chassis must include a crushable structure surrounding the fuel tank with the exception of the access hatches, this structure being an integral part of the car main structure and of the survival cell, and conforming to the following specifications:

6.3.1 - The crushable structure must be a honeycomb sandwich construction based on a fire resistant core of a minimum crushing strength of 18N/cm<sup>2</sup> (25lb/in<sup>2</sup>). It shall be permitted to pass water pipes through this core, but not fuel, lubricating oil or electrical lines.

The sandwich construction must include two skins of 1.5 mm thickness having a tensile strength of minimum 225N/mm<sup>2</sup> (14 tons/in<sup>2</sup>).

6.3.2 - The minimum thickness of the sandwich construction must be 1 cm.

### **6.4) Tank fillers**

6.4.1 - 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 25 cm from the cockpit opening.

All 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.

6.4.2 - 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.

## **6.5) Refuelling**

6.5.1 - Refuelling during the race is forbidden.

6.5.2 - Refuelling the car on the grid by any other means than by gravity from a maximum head of 2 metres above the ground is forbidden.

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

6.5.4 - 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 SYSTEM**

### **7.1) Location of oil tanks**

All oil storage tanks must be situated between the front wheel axis and the rearmost gearbox casing longitudinally, and if situated outside the main structure of the car they must be surrounded by a 10 mm thick crushable structure.

### **7.2) Longitudinal location of oil system**

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

### **7.3) 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 2 litres capacity.

### **7.4) Transversal location of oil system**

No part of the car containing oil may be more than 55 cm from the longitudinal centre line of the car.

### **7.5) Oil replenishment**

No oil replenishment is allowed during a race.

## **ARTICLE 8: STARTING**

### **8.1) Starter**

A starter must be fitted with electrical or other source of energy carried aboard the car, and able to be controlled by the driver when seated normally.

The starter must be capable of starting the engine at all times.

### **8.2) Starting the engine**

A supplementary device temporarily connected to the car may be used to start the engine both on the grid and in the

pits.

## **ARTICLE 9: TRANSMISSION TO THE WHEELS**

### **9.1) Four wheel drive**

Four wheel drive cars are forbidden.

### **9.2) Type of gearbox**

All cars must have no more than five forward gears.

Transversal gearboxes, sequential gearboxes or gearboxes forward of the rear wheel axis are forbidden.

Semi automatic and automatic gearboxes and differentials with electronic, pneumatic or hydraulic slip control are forbidden.

Viscous differentials are not considered to have hydraulic slip control, provided outside control is not possible when the car is in motion.

### **9.3) Reverse gear**

All cars must have a reverse gear which, at any time during the event, can be selected while the engine is running and used by the driver when seated normally.

### **9.4) Traction control**

The use of traction control is forbidden.

## **ARTICLE 10: SUSPENSION AND STEERING**

### **10.1) Active suspension**

Active suspension is forbidden.

### **10.2) Chromium plating**

Chromium plating of any steel suspension components is forbidden.

### **10.3) Suspension members**

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

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

### **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) Steering**

10.5.1 - The steering must consist of a mechanical link between the driver and the wheels.

10.5.2 - Four wheel steering is forbidden.

## **ARTICLE 11: BRAKES**

### **11.1) Separate circuits**

All cars must have a brake system which has at least two separate circuits operated by the same pedal. This system must be designed so that if leakage or failure occurs in one circuit, the pedal shall still operate the brakes on at least two wheels.

### **11.2) Brake discs**

11.2.1 - Brake discs must be made from ferrous material.

11.2.2 - Brake discs must not be drilled, and must have a maximum of 4 grooves per side. Additionally, all solid discs must have a minimum thickness of 9.5 mm and ventilated discs 15.0 mm when new.

### **11.3) Brake calipers**

11.3.1 - All brake calipers must be made from an homogeneous metallic material.

11.3.2 - There must be no more than four brake caliper pistons on each wheel.

### **11.4) Air ducts**

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 140 mm above the horizontal centre line of the wheel.
- A plane parallel to the ground situated at a distance of 140 mm 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 120 mm 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.

### **11.5) Liquid cooling**

Liquid cooling of any part of the braking system is forbidden.

## **11.6) Brake pressure modulation**

Anti-lock brakes and power braking are forbidden.

## **ARTICLE 12: WHEELS AND TYRES**

### **12.1) Location**

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

### **12.2) Wheel material**

All wheels must be made from homogeneous metallic materials.

### **12.3) Dimensions**

12.3.1 - Maximum complete wheel width: 11.5 inches.

Compulsory wheel diameter: 13.0 inches.

12.3.2 - These measurements will be taken horizontally at axle height.

### **12.4) Maximum number of wheels**

The number of wheels is fixed at four.

### **12.5) Wheel attachment**

A safety spring must be in place on the wheel nut throughout the event and must be replaced after each wheel change. These springs must be painted dayglo red or orange.

Alternatively, another method of retaining the wheels may be used, provided it has been approved by the FIA.

### **12.6) Pressure control valves**

Pressure control valves on the wheels are forbidden.

## **ARTICLE 13: COCKPIT**

### **13.1) Cockpit opening**

The opening giving access to the cockpit must allow the horizontal template, shown in Appendix J Drawing 274-5, to be inserted vertically, from above the car into the survival cell and bodywork, with the steering wheel removed.

It must be possible to lower the template 25 mm below the lowest point of the cockpit opening.

The driver must be able to enter and get out of his seat without it being necessary to open a door or move any part of the car. Sitting at his steering wheel, the driver must be facing forward.

The cockpit must be so conceived that the maximum time necessary for the driver to get out from his 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.

### **13.2) Steering wheel**

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

### **13.3) Internal cross section**

The internal cross section of the cockpit from the soles of the driver's feet to behind his seat shall at no point be less than 700 cm<sup>2</sup>. The only things which can encroach on this area are the steering column and padding for driver comfort.

A free vertical cross section, having a minimum width of 25 cm, maintained over a minimum height of 25 cm and with corner radii of a maximum of 5 cm, must be maintained along the whole length of the cockpit with the steering wheel removed.

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 obstructed by any part of the car.

## **ARTICLE 14: SAFETY EQUIPMENT**

### **14.1) Fire extinguishers**

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

14.1.2 - Permitted extinguishants:

BCF (C F2 C1Br)

NAF S3

NAF P

Any AFFF which has been specifically approved by the FIA (see "Technical List n° 6")

Dry powder is also permitted but only on cars being used in or coming from countries where national regulations preclude the use of the above products.

14.1.3 - Minimum extinguisher capacity:

- For BCF, NAF S3, NAF P:

Cockpit: 1.65 litres.

Engine: 3.30 litres.

- For AFFF: The capacity may vary according to the type used (see "Technical List n° 6")

#### 14.1.4 - Minimum quantity of extinguishant:

BCF: Cockpit 2.5 kg

Engine: 5.0 kg

NAF S3: Cockpit 2.0 kg

Engine: 4.0 kg

NAF P: Cockpit 2.0 kg

Engine: 4.0 kg

Powder: Cockpit 1.2 kg

Engine: 2.4 kg

AFFF: The quantity may vary  
according to the type used  
(see "Technical List n° 6")

#### 14.1.5 - Discharge time:

Engine: 30 secs minimum / 80 secs maximum.

Cockpit: 10 secs minimum / 40 secs maximum.

Both extinguishers must be released simultaneously.

#### 14.1.6 - All extinguishers must be pressurised according to the contents:

BCF: 7.0 bar

NAF S3: 7.0 bar

NAF P: 7.0 bar

Powder: 13.5 bar

AFFF: The pressure may vary according to the type used (see "Technical List n° 6")

Furthermore, each extinguisher when filled with an AFFF must be equipped with a means of checking the pressure of the contents.

#### 14.1.7 - The following information must be visible on each extinguisher:

a) Capacity

b) Type of extinguishant

c) Weight or volume of the extinguishant

d) Date the extinguisher must be checked, which must be no more than two years after the date of filling or the date of the last check.

14.1.8 - All extinguishers must be adequately protected and must be situated within the survival cell. In all cases their mountings must be able to withstand a deceleration of 25g.

All extinguishing equipment must withstand fire.

14.1.9 - 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 all extinguishers 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 10 cm diameter with a red edge.

14.1.10 - The system must work in any position, even when the car is inverted.

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

## **14.2) Master switch**

14.2.1 - 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.

14.2.2 - 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.

## **14.3) Rear view mirrors**

All cars must have at least two mirrors, each with a minimum surface area of 55 cm<sup>2</sup>, mounted so that the driver has visibility to the rear and both sides of the car.

## **14.4) Safety belts**

The wearing of two shoulder straps, one abdominal strap and two straps between the legs is mandatory. These straps must be securely fixed to the car and must comply with FIA standard 8853-1985 or 8853/98.

## **14.5) Rear light**

All cars must have a red light of at least 21 watts, in working order throughout the event which:

- Faces rearwards at 90° to the car centre line.
- Is clearly visible from the rear.
- Is not mounted more than 10 cm from the car centre line.
- Is at least 40 cm from the ground.

The two measurements being taken to the centre of area of the lens.

- Has a minimum surface area of 50 cm<sup>2</sup>.
- Can be switched on by the driver when seated normally in the car.

In addition the lens and reflector must conform to the EEC standards and must carry the corresponding approval marking.

#### **14.6) Headrest**

All cars must be equipped with a headrest which cannot deflect more than 5 cm when a rearward force of 85daN is applied.

The headrest surface must not be less than 400 cm<sup>2</sup> and must be continuous and without protruding parts.

It must be positioned so that it is the first point of contact for the driver's helmet in the event of an impact projecting his head backwards, when he is seated normally.

### **ARTICLE 15: SAFETY STRUCTURES**

#### **15.1) Materials used for car construction**

15.1.1 - The use of magnesium sheet less than 3 mm thick is forbidden.

15.1.2 - The use of titanium is forbidden.

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

15.1.4 - 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 on the engine, bodywork ahead of the front edge of the complete front wheels and bodywork more than 20 cm behind the rear wheel centre line.

15.1.5 - The surface formed by all the parts lying on the reference plane referred to in Article 3.13 must be made of wood.

15.1.6 - Any repairs to the survival cell or nosebox must be carried out in accordance with the manufacturer's

specifications, in a repair facility approved by the manufacturer.

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

## **15.2) Rollover structures**

15.2.1 - The basic purpose of safety structures is to protect the driver. This purpose is the primary design consideration.

15.2.2 - All cars must have at least two rollover structures.

The first structure must be in front of the steering wheel, not more than 25 cm forward of, and at least as high as the top of the steering wheel rim.

The second structure must not be less than 50 cm behind the first and high enough for a line extended from the top of the first structure to the top of the second to pass 5 cm over the driver's helmet when he is seated normally in the car with his helmet on and seat belts fastened.

15.2.3 - Both rollover structures required by Article 15.2.2 must, when attached to the car, be capable of withstanding three loads applied simultaneously to the top of the structure which are 1.5 w laterally, 5.5 w longitudinally, and 7.5 w vertically, w being 560 kg.

15.2.4 - The second rollover structure shall be subjected to a static load test by applying the combined loads described in 2.3. On top of the structure through a rigid flat pad perpendicular to the loading axis.

During the test, the rollover 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, but not in a way as to increase the resistance of the structure being tested.

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

This test must be carried out in the presence of an FIA technical delegate and using measuring equipment verified by the FIA.

15.2.5 - The design concept of the rollover structures required by Article 15.2.2 shall be free. However, the second rollover structure must have a minimum structural cross section, in vertical projection, of 100 cm<sup>2</sup>, across a horizontal plane passing 5 cm lower than the highest point of the second rollover structure.

## **15.3) Survival cell and frontal protection**

15.3.1 - The chassis structure must include a survival cell formed from two continuous box members, one on each side of the driver.

These box members must be connected by at least one closed bulkhead at the main rollbar level, one hoop at the front rollbar level and a closed bulkhead in front of the pedal box. Openings in the closed bulkheads must be of a minimum size to allow the passage of controls.

15.3.2 - Each box member shall extend from behind the driver to a plane at least 30 cm in front of the soles of his

feet with the driver seated normally and with his feet on the pedals in the inoperative position.

When he is seated normally, the soles of the driver's feet, resting 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.

Should the car not be fitted with pedals, the driver's feet at their maximum forward extension shall not be situated to the fore of the above mentioned vertical plane.

15.3.3 - Throughout its length from behind the driver to the soles of his feet, each box must have a minimum cross sectional area of 150 cm<sup>2</sup> and a minimum structural material cross section of 10 cm<sup>2</sup>.

Forward of this, the boxes may taper to a minimum cross section of 100 cm<sup>2</sup> and a minimum structural material cross section of 5 cm<sup>2</sup>.

All these areas must be calculated by considering only that part of the box members more than 12.5 cm from the centre line of the car.

15.3.4 - The forward 20 cm of the box members need not to be an integral part of the survival cell but must be solidly attached to it.

15.3.5 - Throughout the length of each box member or panel, the structural material shall have a minimum tensile strength of 310N/mm<sup>2</sup> for composite materials or 225N/mm<sup>2</sup> for metallic materials and the total of the skin thicknesses across the section of each box member or panel must be minimum 3 mm. The skins must be stabilised.

15.3.6 - All holes and cut outs in the boxes shall be strongly reinforced and all material sections through these holes shall still comply with the minimum material area requirements.

15.3.7 - The minimum height of the box member between the front and rear rollover bar structures shall at no point be less than 40 cm, and 30 cm between the front rollover bar and the soles of the driver's feet.

15.3.8 - Furthermore, at least that part of the box members forward of a transversal section 20 cm to the rear of the front wheel axis, shall be subjected to an impact test against a solid vertical barrier placed at right angles to the centre line of the car.

If such a part is tested separately from the rest of the chassis structure it must be attached to the trolley in such a way that it does not increase the impact resistance of the structure being tested.

For the purposes of this test, the total weight of the trolley and test structure shall be 560 kg and the velocity of impact 10 metres/sec.

The resistance of the test structure must be such that during the impact the average deceleration of the trolley does not exceed 25 g.

Furthermore, all structural damage must be contained in the zone ahead of the front wheel axis.

This test must be carried out in the presence of an FIA technical delegate in an approved testing centre.

Any significant modification introduced into any part of the structure tested shall require the structure to undergo a further test.

## **15.4) Lateral protection structures**

15.4.1 - Continuous panels whose projections on a vertical plane parallel to the longitudinal axis of the car shall be at least 15 cm high, shall extend on either side of the car, at a minimum distance of 55 cm from the car's longitudinal centre line between at least the transversal planes passing through the fuel tank rear face and the frontal extremity of the minimum cockpit opening (Art. 13.1), and at a minimum distance of 35 cm from the car's longitudinal centre line between at least the transversal planes passing through the above extremity and the front rollover bar hoop.

15.4.2 - These panels shall be made from a composite material of 30 cm<sup>2</sup> 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 0.5 mm or made up of another assembly of materials of equivalent efficiency.

The panels must be securely attached to the flat bottom and at 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.

## **ARTICLE 16: FUEL**

### **16.1) Fuel**

The fuel must be commercial petrol which is available from service stations and must contain no additive other than that of a lubricant on current sale.

The fuel must have the following characteristics:

- 102 RON/90 MON maximum; 95 RON/85 MON minimum for unleaded fuels and 100 RON/92 MON maximum; 97 RON/86 MON minimum for leaded fuels, the measurements being made according to the standards ASTM D 2699-86 and D 2700-86, the fuel being accepted or rejected according to ASTM D 3244 with a confidence limit of 95 %.
- Specific gravity between 720 and 785 kg/m<sup>3</sup> at 15 degrees C (measured according to ASTM D 4052).
- A maximum of 2.8 % oxygen for leaded fuel or 3.7 % if the lead content is less than 0.013 g/l, and 0.5 % nitrogen by weight, the remainder of the fuel consisting exclusively of hydrocarbons and not containing any power boosting additives.

The measurement of the nitrogen content will be carried out according to the standard ASTM D 3228, and that of the oxygen by elemental analysis with a tolerance of 0.2%.

- Maximum content of peroxides and nitrooxide compounds: 100ppm (ASTM D 3703).
- Maximum lead content: 0.40g/l or the standard of the country of the event, if this is lower (ASTM D 3341 or D 3237).
- Maximum benzene content: 5 % in vol. (ASTM D 3606)

- Maximum Reid vapour pressure: 900 hPa (ASTM D 323)
- Distillation at 70°C: 10 % - 47 % (ASTM D 86)
- Distillation at 100°C: 30 % - 70 % (ASTM D 86)
- Distillation at 180°C: 85 % min (ASTM D 86)
- Maximum final boiling point: 225°C ASTM D 86)
- Maximum residue: 2 % volume (ASTM D 86)

## **16.2) Air**

Only air may be mixed with the fuel as an oxidant

## **ARTICLE 17: 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.

## **ARTICLE 18 : CHANGES FOR 1999**

### **18.1) Create Article 1.21**

1.21 - 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.

### **18.2) Changes to Article 3.4**

Article 3.4 Width ahead of the rear edge of the front wheels:

3.4.1. The bodywork ahead of the rear edge of the complete front wheels is limited to a maximum width of 130 cm.

3.4.2. Furthermore, 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 10 mm thick within a radius of at least 5 mm.

### **18.3) Changes to Article 3.10**

No part of the bodywork between the front edge of the complete rear wheels and 25 cm behind the rear wheel centre line and higher than the complete rear wheels may be more than 15 cm from the centre line of the car.

### **18.4) Changes to Article 3.11**

Behind the front edge of the complete rear wheels, a maximum of three aerofoil sections may be used. All aerofoil sections used in this area must conform to one of the three sets of dimensions given in Appendix 1 of these Technical Regulations. Each of the dimensions given must remain nominally at the same height above the reference plane over the entire width of the relevant aerofoil section.

No trim tabs may be added to any of these aerofoil sections. However, devices to keep the space between sections constant may be used provided it is clear that this is their only purpose.

A tolerance of 1.0 mm will be permitted on any stated dimension.

## **18.5) Changes to Article 5.5**

### **5.5 - Control of the intake system :**

With at least one valve in each cylinder shut and the engine throttles open, the complete intake system must be capable of sustaining a vacuum of 0.2 bar.

Alternatively, if all the valves are shut, either by removing the camshaft(s) or following a repair carried out under the supervision of the scrutineers, a vacuum of 0.267 bar must be sustained.

Any device used for checking the vacuum must have a maximum nominal output of 35 litres per minute and be capable of obtaining a vacuum of 0.734 bar to 0.867 bar for zero airflow.

## **18.6) Changes to Article 6.1**

### **6.1 - Fuel tanks:**

6.1.1 - The fuel tank must be a single rubber bladder conforming to or exceeding the specifications of FIA/FT3.

6.1.2- 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 30cm 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 the quantity which is necessary for the normal running of the engine.

6.1.3 - Fuel must not be stored more than 40cm from the longitudinal axis of the car.

6.1.4 - The fuel bladder must be fitted with the fuel resistant polyurethane foam baffling with which it is supplied.

6.1.5 - 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.

6.1.6 - 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.

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

## **18.7) Changes to Article 6.2**

### **6.2 Fittings and piping**

6.2.1 - 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.

The bolt holes 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.

6.2.2 - 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.

6.2.3 - No lines containing fuel, cooling water or lubricating oil may pass through the cockpit.

6.2.4 - All lines must be fitted in such a way that any leakage cannot result in the accumulation of fluid in the cockpit.

6.2.5 - No hydraulic fluid lines may have removable connectors inside the cockpit.

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

6.2.7 - All fuel and lubricating oil lines must have a minimum burst pressure of 41 bar at the maximum operating temperature of 135 degrees centigrade.

6.2.8 - 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 degrees centigrade when used with steel connectors and 135 degrees centigrade when used with aluminium connectors.

6.2.9 - 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 degrees centigrade.

## **18.8) Changes to Article 10.3**

### **Article 10.3 Suspension members**

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

10.3.2 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 10 mm, and any slip joint must be bolted or pinned and located in the centre of the span."

### **18.9) Changes to Article 13.1**

The opening giving access to the cockpit must allow the horizontal template, shown in Appendix J Drawing 274-5, to be inserted vertically, from above the car into the survival cell and bodywork, with the steering wheel, steering column, seat and all padding removed.

The front tip of the template must be no less than 625mm from the front wheel centre line and it must be possible to lower the template 25mm below the lowest point of the cockpit opening.

Furthermore, the forward extremity of the cockpit opening, even if structural and part of the survival cell, must be at least 5cm in front of the steering wheel.

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 or cockpit padding. Sitting at his steering wheel, the driver must be facing forward.

The cockpit must be so conceived that the maximum time necessary for the driver to get out from his normal driving position does not exceed 5 seconds with all driving equipment being worn and starting with the safety belts fastened.

### **18.10) Changes to Article 13.3**

The internal cross section of the cockpit from the soles of the driver's feet to behind his seat shall at no point be less than 700cm<sup>2</sup>.

A free vertical cross section which allows the template shown in Appendix J Drawing 274-6 to be passed vertically through the cockpit, must be maintained over its entire length.

The only things that can encroach on these two areas are the steering wheel and padding.

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 obstructed by any part of the car.

### **18.11) Changes to Article 14.5**

#### **14.5 - Rear light**

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

- Is a model approved by the FIA.
- Faces rearwards at 90° to the car centre line.
- Is clearly visible from the rear.
- Is not mounted more than 10cm from the car centre line.
- Is at least 35 cm above the reference plane.

- Is no less than 45 cm behind the rear wheel centre line, measured to the face of the lens and parallel to the reference plane.

- Can be switched on by the driver when seated normally in the car.

The three measurements being taken to the centre of area of the lens.

### **18.12) Changes to Article 14.6**

All cars must be equipped with headrests made from a material specified by the FIA.

The headrests must consist of one at least 75mm thick over an area of 400cm<sup>2</sup> behind the driver's helmet and one at least 75mm thick over an area of 400cm<sup>2</sup> along each side of the driver's helmet.

The headrests must be so installed that if movement of the driver's head was to fully compress the foam at any point over their area, his helmet would not make contact with any structural part of the car.

They must be so positioned as to be the first point of contact for the driver's helmet in the event of an impact projecting his head backwards or sideways when he is seated normally.

### **18.13) Changes to Article 15.3**

15.3.1 - The survival cell must extend from behind the fuel tank in a rearward direction to a point at least 15cm in front of the driver's feet, with his feet resting on the pedals and the pedals in the inoperative position.

The survival cell must have an opening for the driver, the minimum dimensions of which are given in Article 13.1. Any other openings in the survival cell must be of minimum size to allow access to mechanical components.

The safety structures described in Article 15.2 must be a part of the survival cell or solidly attached to it.

15.3.2 - When he is seated normally, the soles of the driver's feet, resting 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.

Should the car not be fitted with pedals, the driver's feet at their maximum forward extension shall not be situated to the fore of the above mentioned vertical plane.

15.3.3 - In front of the survival cell, an impact absorbing structure must be fitted. This structure need not to be an integral part of the survival cell but must be solidly attached to it.

15.3.4 - The minimum external width of the survival cell is 34cm. This width must be maintained for a minimum height of 25cm along the whole length of the survival cell. The minimum height of the survival cell between the two rollover structures is 55cm.

Furthermore, the parts of the survival cell which are situated each side of the driver's helmet must be no more than 550mm apart and at least as high as a line parallel to and 220mm below the line between the tops of the two roll structures.

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 top of the sides of the survival cell.

15.3.5 - Furthermore, at least that part of the survival cell forward of a transversal section 20cm to the rear of the front wheel axis, shall be subjected to an impact test against a solid vertical barrier placed at right angles to the centre line of the car.

If such a part is tested separately from the rest of the survival cell it must be attached to the trolley in such a way that it does not increase the impact resistance of the structure being tested.

For the purposes of this test, the total weight of the trolley and test structure shall be 560kg and the velocity of impact 10 metres/sec.

The resistance of the test structure must be such that during the impact the average deceleration of the trolley does not exceed 25g.

Furthermore, all structural damage must be contained in the zone ahead of the front wheel axis.

This test must be carried out in the presence of an FIA technical delegate in an approved testing centre.

15.3.6 - In addition, the survival cell must be subjected to three separate static lateral load tests :

- 1) In the cockpit area on a vertical plane passing through the centre of the seat belt lap strap fixing.
- 2) In the fuel tank area on a vertical plane passing through the centre of area of the fuel tank in side elevation.
- 3) On a vertical plane passing halfway between the front wheel axis and the top of the first rollover structure.

For the tests described above, a pad 10cm long and 30cm high, with a maximum radius on all edges of 3 mm and conforming to the shape of the survival cell, shall 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. Rubber 3 mm thick may be used between the pads and the survival cell.

A constant transverse horizontal load of 2000daN shall be applied, in less than 3 minutes, to the pads at their centre of area through a ball jointed junction, and maintained for a minimum of 30 seconds.

Under these load conditions, there shall be no structural failure of the inner or outer surfaces of the survival cell and permanent deformation must be less than 1mm after the load has been released for 1 minute. The deformation will be measured at the top of the pads across the inner surfaces. In test 1, deflection across the inner surfaces of the survival cell must not exceed 2cm.

15.3.7 - To test the attachments of the frontal impact absorbing structure to the survival cell, a static side load test shall be performed on a vertical plane passing 40cm in front of the front wheel axis.

A constant transversal horizontal load of 2000daN must be applied to one side of the impact absorbing structure using a pad identical to the one used in the lateral tests in Article 15.3.6. 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 that 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.

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.

15.3.8 - A further static load test must be carried out on the survival cell from beneath the fuel tank. A pad of 20 cm diameter must be placed in the centre of area of the fuel tank and a vertical upwards load of 1000daN applied in less than 3 minutes through a ball jointed junction. The load must be maintained for a minimum of 30 seconds.

Under these loads conditions, there must be no structural failure of the inner or outer surfaces of the survival cell and permanent deformation must be less than 0.5mm after the load has been released for 1 minute the measurement being taken at the centre of area of the pad.

15.3.9 - Two further static load tests must be carried out on the survival cell on each side of the cockpit opening. A pad of 10cm diameter must be placed with its upper edge at the same height as the top of the cockpit side with its centre at a point 200mm forward of the rear edge of the cockpit opening template longitudinally. A constant transverse horizontal load of 1000daN will then be applied at 90° to the car centre line, in less than 3 minutes, through a ball jointed junction. The load must be maintained for a minimum of 30 seconds.

Under these load conditions, there must be no structural failure of the inner or outer surfaces of the survival cell, there must be no more than 10mm total deformation and permanent deformation must be less than 1.0mm after the load has been released for 1 minute, the measurements being taken at the centre of area of the pad.

15.3.10 - The static load tests in Article 15.2.4; 15.3.6; 15.3.7,15.3.8 and 15.3.9 must be carried out in the presence of an FIA technical delegate and using measuring equipment verified by the FIA.

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

15.3.11 - In order to ensure all survival cells are manufactured in the same way, each constructor must submit the weight of every survival cell produced. These weights will be compared with that of the survival cell which was subjected to the tests in 15.3.6; 15.3.7, 15.3.8 and 15.3.9. If any survival cell weighs less than 95% of the one previously tested, it will then have to be subjected to the tests above.

**APPENDIX 1**  
**(ALL DIMENSIONS ARE IN MILLIMETERS)**

(see drawings 274-1, 274-2 and 274-3)

**Points for aerofoil section number 1:**

<b>1</b>	94.44	-01.37
<b>2</b>	93.90	-00.00
<b>3</b>	91.57	-00.89
<b>4</b>	89.20	-01.78
<b>5</b>	86.84	-02.64

<b>6</b>	84.48	-03.51
<b>7</b>	83.67	-03.73
<b>8</b>	82.86	-03.91
<b>9</b>	82.02	-03.99
<b>10</b>	81.18	-03.99
<b>11</b>	03.84	-00.03
<b>12</b>	02.90	-00.10
<b>13</b>	02.01	-00.43
<b>14</b>	01.22	-00.97
<b>15</b>	00.61	-01.68
<b>16</b>	00.20	-02.54
<b>17</b>	00.00	-03.48
<b>18</b>	00.08	-04.42
<b>19</b>	00.41	-05.28
<b>20</b>	00.84	-06.10
<b>21</b>	01.27	-06.81
<b>22</b>	01.91	-07.62
<b>23</b>	02.97	-08.81
<b>24</b>	04.22	-10.08
<b>25</b>	05.49	-11.23
<b>26</b>	06.78	-12.27
<b>27</b>	08.18	-13.18
<b>28</b>	09.80	-14.02
<b>29</b>	11.81	-14.86
<b>30</b>	14.38	-15.70
<b>31</b>	17.65	-16.53
<b>32</b>	21.51	-17.22
<b>33</b>	25.76	-17.65

<b>34</b>	30.18	-17.78
<b>35</b>	34.62	-17.60
<b>36</b>	39.04	-17.17
<b>37</b>	43.43	-16.56
<b>38</b>	47.83	-15.80
<b>39</b>	52.17	-14.91
<b>40</b>	56.49	-13.87
<b>41</b>	60.76	-12.68
<b>42</b>	65.02	-11.43
<b>43</b>	69.27	-10.11
<b>44</b>	73.48	-08.76
<b>45</b>	77.70	-07.37
<b>46</b>	81.92	-05.94
<b>47</b>	86.11	-04.45
<b>48</b>	90.27	-02.92
<b>49</b>	94.44	-01.37

**Points for aerofoil section number 2:**

<b>1</b>	14.78	-02.90
<b>2</b>	16.66	-02.67
<b>3</b>	18.80	-02.41
<b>4</b>	23.34	-01.93
<b>5</b>	28.12	-01.45
<b>6</b>	32.87	-01.04
<b>7</b>	37.34	-00.71
<b>8</b>	40.62	-00.53
<b>9</b>	43.89	-00.36

<b>10</b>	47.17	-00.23
<b>11</b>	50.44	-00.10
<b>12</b>	53.67	-00.05
<b>13</b>	56.79	00.00
<b>14</b>	59.79	00.00
<b>15</b>	62.66	00.00
<b>16</b>	65.84	00.00
<b>17</b>	69.72	-00.05
<b>18</b>	74.32	-00.10
<b>19</b>	79.60	-00.20
<b>20</b>	85.24	-00.36
<b>21</b>	90.88	-00.53
<b>22</b>	96.52	-00.76
<b>23</b>	102.13	-01.02
<b>24</b>	107.77	-01.32
<b>25</b>	113.41	-01.65
<b>26</b>	119.02	-02.01
<b>27</b>	124.66	-02.41
<b>28</b>	130.28	-02.85
<b>29</b>	135.89	-03.33
<b>30</b>	138.58	-03.56
<b>31</b>	140.97	-03.79
<b>32</b>	143.53	-04.01
<b>33</b>	145.80	-04.19
<b>34</b>	151.41	-04.47
<b>35</b>	154.10	-04.50
<b>36</b>	155.07	-04.27
<b>37</b>	155.91	-03.78

<b>38</b>	160.99	00.00
<b>39</b>	161.75	-00.94
<b>40</b>	139.24	-15.60
<b>41</b>	114.15	-25.63
<b>42</b>	98.96	-29.16
<b>43</b>	83.67	-30.91
<b>44</b>	72.57	-31.32
<b>45</b>	61.44	-31.27
<b>46</b>	50.34	-30.71
<b>47</b>	39.27	-29.67
<b>48</b>	27.15	-27.18
<b>49</b>	15.49	-22.56
<b>50</b>	10.01	-19.41
<b>51</b>	05.41	-15.77
<b>52</b>	02.67	-12.90
<b>53</b>	00.53	-09.91
<b>54</b>	00.13	-08.94
<b>55</b>	00.03	-07.93
<b>56</b>	00.18	-06.96
<b>57</b>	00.56	-06.20
<b>58</b>	01.25	-05.54
<b>59</b>	02.29	-04.95
<b>60</b>	04.01	-04.45
<b>61</b>	06.78	-03.94
<b>62</b>	10.44	-03.43
<b>63</b>	14.78	-02.90

**Points for aerofoil section number 3:**

<b>1</b>	163.07	00.00
<b>2</b>	164.08	-01.19
<b>3</b>	160.86	-03.91
<b>4</b>	157.66	-06.63
<b>5</b>	154.56	-09.14
<b>6</b>	151.54	-11.46
<b>7</b>	147.47	-14.30
<b>8</b>	143.26	-16.99
<b>9</b>	138.86	-19.56
<b>10</b>	134.26	-22.02
<b>11</b>	128.27	-24.94
<b>12</b>	122.10	-27.69
<b>13</b>	116.76	-29.79
<b>14</b>	111.38	-31.70
<b>15</b>	103.48	-34.11
<b>16</b>	95.48	-36.22
<b>17</b>	87.17	-37.92
<b>18</b>	78.77	-39.12
<b>19</b>	71.75	-39.78
<b>20</b>	64.72	-40.13
<b>21</b>	59.33	-40.21
<b>22</b>	53.95	-40.11
<b>23</b>	48.67	-39.85
<b>24</b>	43.43	-39.45
<b>25</b>	38.20	-38.81
<b>26</b>	33.00	-37.95

<b>27</b>	27.53	-36.78
<b>28</b>	22.17	-35.38
<b>29</b>	17.32	-33.86
<b>30</b>	12.55	-32.16
<b>31</b>	09.50	-30.96
<b>32</b>	06.55	-29.69
<b>33</b>	05.08	-29.03
<b>34</b>	03.71	-28.40
<b>35</b>	02.34	-27.51
<b>36</b>	01.22	-26.29
<b>37</b>	00.43	-24.82
<b>38</b>	00.05	-23.22
<b>39</b>	00.13	-21.29
<b>40</b>	00.76	-19.48
<b>41</b>	01.91	-17.91
<b>42</b>	03.45	-16.76
<b>43</b>	06.86	-15.04
<b>44</b>	10.31	-13.39
<b>45</b>	15.32	-11.20
<b>46</b>	20.42	-09.22
<b>47</b>	24.00	-07.95
<b>48</b>	27.58	-06.81
<b>49</b>	33.35	-05.18
<b>50</b>	39.14	-03.73
<b>51</b>	46.86	-02.21
<b>52</b>	54.64	-01.12
<b>53</b>	60.71	-00.53
<b>54</b>	66.80	-00.20

<b>55</b>	73.18	-00.03
<b>56</b>	79.55	00.00
<b>57</b>	86.31	-00.10
<b>58</b>	93.09	-00.33
<b>59</b>	100.10	-00.66
<b>60</b>	107.16	-01.14
<b>61</b>	113.59	-01.70
<b>62</b>	120.07	-02.33
<b>63</b>	126.34	-03.02
<b>64</b>	132.59	-03.78
<b>65</b>	137.90	-04.47
<b>66</b>	143.20	-05.18
<b>67</b>	147.47	-05.77
<b>68</b>	151.77	-06.38
<b>69</b>	151.94	-06.40
<b>70</b>	152.12	-06.42
<b>71</b>	153.01	-06.50
<b>72</b>	153.90	-06.43
<b>73</b>	154.76	-06.25
<b>74</b>	155.60	-05.94
<b>75</b>	156.39	-05.51
<b>76</b>	157.12	-05.00
<b>77</b>	163.07	00.00