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# Annexe "J"

## au Code Sportif International, 1992 (classification, définitions et spécifications des voitures)

En cas de divergence d'interprétation entre les termes des diverses traductions des règlements officiels de la FISA, le texte français fera seul foi.

**LES TEXTES DES DIFFERENTES REGLEMENTATIONS ETABLIES PAR LA FISA** (Code Sportif International et ses Annexes et Règlements des Championnats Internationaux de la FIA) **FIGURANT DANS CET ANNUAIRE SONT CEUX ETABLIS AU 15 OCTOBRE 1991.**

**TOUTE MODIFICATION PARAITRA A PARTIR DE CETTE DATE DANS LE BULLETIN OFFICIEL MENSUEL DE LA FISA.**

# Appendix "J"

## to the International Sporting Code, 1992 (classification, definitions and specifications of cars)

In the case of differences of interpretation as regards the terms used in the various translations of official FISA regulations, only the French text will be considered authentic.

**TEXTS OF THE VARIOUS REGULATIONS DRAFTED BY THE FISA** (International Sporting Code and its Appendices and regulations of the FIA International Championships) **APPEARING IN THIS YEAR BOOK ARE THOSE DRAWN UP ON 15 OCTOBER 1991.**

**ANY AMENDMENTS WILL BE PUBLISHED AFTER THIS DATE IN THE OFFICIAL FISA MONTHLY BULLETIN.**

# Appendix "J" to the International Sporting Code

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# *Art. 251* - **Classification and definitions**

## 1) CLASSIFICATION

### 1.1) CATEGORIES AND GROUPS

The cars used in competition shall be divided up into the following categories and groups:

Category I : — Group N: Production Cars
— Group A: Touring Cars
— Group B: Grand Touring Cars
— Group T1: Series Cross-Country Cars
— Group T2: Improved Cross-Country Cars
Category II: — Group T3: Sport Cross-Country Cars
— Group C: Sports Cars
— Group D: International Formula Racing Cars
— Group E: Free Formula Racing Cars
Category III: — Group F: Racing Trucks
— Group T4: Cross-Country Trucks

### 1.2) CUBIC CAPACITY CLASSES

The cars will be divided up into the following 18 classes according to their cubic capacity.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1. | Cyl.-capacity | lower than or equal to | | 500 cc | | | | |
| 2. | Cyl.-capacity | exceed. | | 500 cc | and inf/equal | to | | 600 cc |
| 3. | " | " | " | 600 cc | " | " | " | 700 cc |
| 4. | " | " | " | 700 cc | " | " | " | 850 cc |
| 5. | " | " | " | 850 cc | " | " | " | 1,000 cc |
| 6. | " | " | " | 1,000 cc | " | " | " | 1,150 cc |
| 7. | " | " | " | 1,150 cc | " | " | " | 1,300 cc |
| 8. | " | " | " | 1,300 cc | " | " | " | 1,600 cc |
| 9. | " | " | " | 1,600 cc | " | " | " | 2,000 cc |
| 10. | " | " | " | 2,000 cc | " | " | " | 2,500 cc |
| 11. | " | " | " | 2,500 cc | " | " | " | 3,000 cc |
| 12. | " | " | " | 3,000 cc | " | " | " | 3,500 cc |
| 13. | " | " | " | 3,500 cc | " | " | " | 4,000 cc |
| 14. | " | " | " | 4,000 cc | " | " | " | 4,500 cc |
| 15. | " | " | " | 4,500 cc | " | " | " | 5,000 cc |
| 16. | " | " | " | 5,000 cc | " | " | " | 5,500 cc |
| 17. | " | " | " | 5,500 cc | " | " | " | 6,000 cc |
| 18. | " | " | over | 6,000 cc | | | | |

Unless otherwise specified in special provisions imposed by the FISA for a certain category of events, the organisers are not bound to include all the above-mentioned classes in the Supplementary Regulations and, furthermore, they are free to group two or more consecutive classes, according to the particular circumstances of their events.

No class can be subdivided.

## 2) DEFINITIONS

### 2.1) GENERAL CONDITIONS

2.1.1.) **Series Production cars (Category I) :**

Cars of which the production of a certain number of identical examples (see definition of this word hereinafter) within a certain period of time has been verified at the request of the manufacturer, and which are destined for normal sale to the public (see this expression).

Cars must be sold in accordance with the homologation form.

2.1.2.) **Competition cars (Category II) :**

Cars built as single examples and destined solely for competition.

2.1.3.) **Trucks (Category III)**

2.1.4.) **Identical cars :**

Cars belonging to the same production series and which have the same bodywork (outside and inside), same mechanical components and same chassis (even though this chassis may be an integral part of the bodywork in case of a monocoque construction).

2.1.5.) **Model of car :**
Car belonging to a production-series distinguishable by a specific conception and external general lines of the bodywork and by an identical mechanical construction of the engine and the transmission to the wheels.

2.1.6) **Normal sale :**
Means the distribution of cars to individual purchasers through the normal commercial channels of the manufacturer.

2.1.7) **Homologation :**
Is the official certification made by the FISA that a minimum number of cars of a specific model has been made on series-production terms to justify classification in Production Cars (Group N), Touring Cars (Group A), Grand Touring Cars (Group B), Series Cross-Country Cars (Group T1) of these regulations. Application for homologation shall be submitted to the FISA by the ASN of the country in which the vehicle is manufactured and shall entail the drawing up of a homologation form (see below). It must be established in accordance with the special regulations called "Regulations for homologation", laid down by the FISA. Homologation of a series-produced car will become null and void 5 years after the date on which the series-production of the said model has been stopped (series-production under 10 % of the minimum production of the group considered).
The homologation of a model can only be valid in one group, Production Cars (Group N)/Touring Cars (Group A)/Series Cross-Country Cars (Group T1) or Grand Touring Cars (Group B). If a model already homologated in Grand Touring Cars (Group B) passes into Production Cars (Group N)/Touring Cars (Group A)/Series Cross-Country Cars (Group T1), the first homologation is cancelled.

2.1.8) **Homologation forms :**
All cars recognised by the FISA will be the subject of a descriptive form called homologation form on which shall be entered all data enabling identification of the said model.
This homologation form defines the series as indicated by the manufacturer. According to the group in which the competitors race, the modification limits allowed in international competition for the series are stated in Appendix J. (For the Cross-Country Cars, the regulations can be obtained from the ASNs).
The presentation of the forms at scrutineering and/or at the start may be required by the organisers who will be entitled to refuse the participation of the entrant in the event in case of non-presentation.
Should the date for the coming into force of a homologation form fall during an event, this form will be valid for that event throughout the duration of the said event.
With regard to Production Cars (Group N), apart from the specific form for this group, the Touring Cars (Group A) form must also be submitted.
In case of any doubt remaining after the checking of a model of car against its homologation form, the scrutineers should refer either to the maintenance booklet published for the use of the make's distributors or to the general catalogue in which are listed all spare parts.
In case of lack of sufficient accurate documentation, scrutineers may carry out direct scrutineering by comparison with an identical part available from a concessionnaire. It will be up to the competitor to obtain the homologation concerning his car from his ASN.

**Description :** A form breaks down in the following way :
1) A basic form giving a description of the basic model.
2) At a later stage, a certain number of additional sheets describing "homologation extensions", which can be "variants", or "errata" or "evolutions".

a) **Variants (VF, VO)**
These are either supply variants (VF) (two suppliers providing the same part for the manufacturer and the client does not have the possibility of choice), or options (VO) (supplied on request and available at the concessionnaires).

b) **Erratum (ER)**
Replaces and cancels an incorrect piece of information previously supplied by the constructor on a form.

c) **Evolution (ET-ES)**

Characterises modifications made on a permanent basis to the basic model (complete cessation of the production of the car in its original form in the case of the evolution of the type (ET), or sporting evolution (ES) intended to render a model more competitive.

**Use :**

1) **Variants (VF, VO)**

The competitor may use any variant or any part of a variant as he wishes, only on condition that all the technical data of the vehicle, so designed, conforms to that described on the homologation form applicable to the car, or expressly allowed by Appendix J.

For example, the fitting of a brake calliper as defined on a variant form is only possible if the dimensions of the brake linings, etc. obtained in this way, are indicated on a form applicable to the car in question. (For Production Cars (Group N), see also Art. 254.2).

2) **Evolution of the type (ET)**

(For Production Cars (Group N), see also Art. 254.2)

The car must comply with a given stage of evolution (independent of the date when it left the factory), and thus an evolution must be wholly applied or not at all.

Besides, from the moment a competitor has chosen a particular evolution, all the previous evolutions should be applied, except where they are incompatible : for example, if two brake evolutions happen one after another, only that corresponding to the date of the stage of evolution of the car will be used.

3) **Sporting evolution (ES)**

Since the ES form refers to a previous extension, or to the basic form, the car must correspond to the stage of evolution corresponding to this reference ; moreover, the

Sporting Evolution must be applied in full.

2.1.9) **Mechanical components**

All those necessary for the propulsion, suspension, steering and braking as well as all accessories whether moving or not which are necessary for their normal working.

2.2) **DIMENSIONS**

**Perimeter of the car seen from above :**

The car as presented on the starting grid for the event in question.

2.3) **ENGINE**

2.3.1.) **Cylinder capacity :**

Volume V generated in cylinder (or cylinders) by the upward or downward movement of the piston(s).

$V = 0.7854 \times b^2 \times s \times n$

where b = bore

s = stroke

n = number of cylinders.

2.3.2) **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 systems) by any means whatsoever.

The injection of fuel under pressure is not considered to be supercharging (See Article 3.1 of the General Prescriptions for Groups N, A, B).

2.3.3) **Cylinder block :**

The crankcase and the cylinders.

2.3.4) **Intake manifold :**

— Part collecting the air-fuel mixture from the carburettor(s) and extending to the entrance ports of the cylinder head, in the case of the carburettor induction system.

— Part situated between the valve of the device regulating the air intake and extending to the ports on the cylinder head, in the case of an injection intake system.

— Part collecting the air at the air filter outlet and extending to the cylinder head entrance ports in the case of a diesel engine.

2.3.5) **Exhaust manifold :**

Part collecting together the gases from the cylinder head and extending to the first gasket separating it from the rest of the exhaust system.

2.3.6) For cars with a turbocharger, the exhaust begins after the turbocharger.

2.3.7) **Sump :** The elements bolted below and to the cylinder block which contain and control the lubrifying oil of the engine. These elements must not have any mounting part of the crankshaft.

2.3.8) **Engine compartment :**Volume defined by the first structural envelope surrounding the engine.

2.4) **RUNNING GEAR**

The running gear includes all parts totally or partially unsuspended.

2.4.1) **Wheel**

Flange and rim ; by complete wheel is meant flange, rim and tyre.

2.4.2) **Friction surface of the brakes :**

Surface swept by the linings on the drum, or the pads on both sides of the disc when the wheel achieves a complete revolution.

2.4.3) **Mac Pherson suspension :**

Any suspension system in which a telescopic strut, not necessarily providing the springing and/or damping action, but incorporating the stub axle, is anchored on the body or chassis through single attachment point at its top end, and pivots at its bottom end either on a transversal wishbone locating it transversally and longitudinally, or on a single transversal link located longitudinally by an anti-roll bar, or by a tie rod.

2.5) **CHASSIS - BODYWORK**

2.5.1.) **Chassis :**

The overall structure of the car around which are assembled the mechanical components and the bodywork including any structural part of the said structure.

2.5.2) **Bodywork :**

— **externally :** all the entirely suspended parts of the car licked by the airstream.

— **internally :** cockpit and boot.

Bodywork is differentiated as follows :

1) completely closed bodywork
2) completely open bodywork
3) convertible bodywork with the hood in either supple (drop-head) or rigid (hard-top) material.

2.5.3.) **Seat :**

The two surfaces making up the seat cushion and seatback or backrest.

**Seatback or backrest :**

Surface measured from the bottom of a normally seated person's spine.

**Seat cushion :**

Surface measured from the bottom of the same person's spine towards the front.

2.5.4) **Luggage compartment :**

Any volume distinct from the cockpit and the engine compartment inside the vehicle.

These volumes are limited in length by the fixed structures provided for by the manufacturer and/or by the rear of the seats and/or, if this is possible, reclined at a maximum angle of 15° to the rear. These volumes are limited in height by the fixed structures and/or by the detachable partitions provided for by the manufacturer, or in the absence of these, by the horizontal plane passing through the lowest point of the windscreen.

2.5.5) **Cockpit :**

Structural inner volume which accomodates the driver and the passengers.

2.5.6) **Bonnet :**

Outer part of the bodywork which opens to give access to the engine.

2.5.7) **Mudguard :**

A mudguard will be considered to be the area defined according to drawing 251-1.

**Front mudguard :** the area defined by the inner face of the complete wheel of the standard car (C1/C1) and the lower edge of the side window(s) (A/A) and the front edge of the front door (B1/B1).

**Rear mudguard :** the area defined by the inner face of the complete wheel of the standard car (C2/C2) and the lower edge of the side window(s) (A/A) and the rear edge of the rear door (B2/B2).

In the case of two-door cars (B1/B1) and (B2/B2) will be defined by the front and rear of the same door.

2.5.8) **Engine compartment :**

Volume defined by the first structural envelope surrounding the engine.

2.6) **ELECTRICAL SYSTEM**

**Headlight :**any signal the focus of which creates an in-depth luminous beam directed towards the front.

2.7) **FUEL**

**Fuel tank :**any container holding fuel likely to flow by any means whatsoever towards the main tank or the engine.

# *Art. 252* - General prescriptions for Production Cars (Group N), Touring Cars (Group A), Grand Touring Cars (Group B)

1) **GENERAL REMARKS**

1.1) All modifications are forbidden unless expressly authorised by the regulations specific to the group in which the car is entered or by the general prescriptions below or imposed under the chapter "Safety Equipment".

The components of the car must retain their original function.

1.2) **APPLICATION OF THE GENERAL PRESCRIPTIONS**

The general prescriptions must be observed in the event that the specifications of Production Cars (Group N), Touring Cars

(Group A), Grand Touring Cars (Group B) do not lay down a more strict prescription.

1.3) **MAGNESIUM**

The use of magnesium alloy sheet metal with a thickness less than 3 mm is prohibited.

1.4) It is the duty of each competitor to satisfy the Scrutineers and the Stewards of the Meeting that his automobile complies with these regulations in their entirety at all times during the event.

1.5) Damaged threads can be repaired by screwing on a new thread with the same interior diameter ("helicoil" type).

2) **DIMENSIONS AND WEIGHT**

2.1) **GROUND CLEARANCE**

No part of the car must touch the ground when all the tyres on one side are deflated. This test shall be carried out on a flat surface under race conditions (driver(s) on board).

2.2) **BALLAST**

It is permitted to complete the weight of the car by one or several ballasts provided that they are strong and unitary blocks, fixed by means of tools with the possibility to fix seals, placed on the floor of the cockpit, visible and sealed by the scrutineers.

**Application :** Touring Cars (Group A), Grand Touring Cars (Group B) ; no kind of ballast is authorised in Production Cars (Group N). In rallies, however, the carrying of tools and spare parts for the car will be allowed under the conditions laid down in

Article 253.

3) **ENGINE**

3.1) **SUPERCHARGING**

In case of supercharging, the nominal cylinder-capacity will be multiplied by 1.7 and the car will pass into the class corresponding to the fictive volume thus obtained. The car will be treated in all respects as if its cylinder-capacity thus increased were its real capacity.

This shall particularly be the case for assigning the car to its cylinder-capacity class, its interior dimensions, its minimum number of places, its minimum weight, etc.

3.2) **EQUIVALENCE FORMULA, BETWEEN RECIPROCATING PISTON AND ROTARY ENGINES**

(of the type covered by the NSU Wankel patents)

The cubic capacity equivalent is 1.8 times the volume determined by the difference between the maximum and minimum capacities of the combustion chamber.

3.3) **EQUIVALENCE FORMULA BETWEEN RECIPROCATING PISTON AND TURBINE ENGINES**

This formula is the following:

$$C = \frac{S\,(3.10 \times R) - 7.63}{0.09625}$$

S = High pressure nozzle area — expressed in square centimetres by which is meant the area of the air-flow at the exit from the stator blades (or at the

exit from the first stage if the stator has several stages). Measurement is done by taking the minimum area between the fixed blades of the high pressure turbine first stage. In cases where the first stage turbine stator blades are adjustable, they must be opened to their greatest extent to present the greatest area for the determination of area S.

The area of the high pressure nozzle is thus the product of the height (expressed in cm) by the width (expressed in cm) and by the number of blades.

R = The pressure ratio is the ratio of the compressor of the turbine engine. It is obtained by multiplying together the value for each stage of the compressor, as indicated hereafter :

Subsonic axial compressor : 1.15 per stage

Trans-sonic axial compressor : 1.5 per stage

Radial compressor : 4.25 per stage.

Thus a compressor with one radial and six axial subsonic stages will be designated to have a pressure of :

$$4.25 \times 1.15 \times 1.15 \times 1.15 \times 1.15 \times 1.15 \times 1.15$$

C = Equivalent cubic capacity for reciprocating piston engines in $cm^3$.

3.4) All engines into which fuel is injected or in which fuel is burned after an exhaust port are prohibited for the time being.

3.5) **EQUIVALENCES BETWEEN RECIPROCATING PISTON ENGINES AND NEW TYPES OF ENGINES**

The FISA reserves the right to make modifications on the basis of comparisons established between classic engines and new types of engines, by giving a two year notice from the 1 st January following the decision taken.

3.6) **EXHAUST SYSTEM AND SILENCER**

Even when the specific provisions for a group allow the replacement of the original silencer, the cars competing in an open-road event shall always be equipped with an exhaust silencer complying with the traffic regulations of the country(ies) through which the event is run.

The orifices of the exhaust pipes shall be placed at a maximum of 45 cm and a minimum of 10 cm from the ground. The exit of the exhaust pipe must be situated within the perimeter of the car and less than 10 cm from this perimeter, and aft of the vertical plane passing through the centre of the wheelbase. Moreover, adequate protection must be provided in order to prevent heated pipes from causing burns.

The exhaust system must not be provisional. Exhaust gas may only exit at the end of the system. Parts of the chassis must not be used to evacuate exhaust gasses.

**Catalytic exhausts :** Should two possible versions of one car model be homologated (catalytic and other exhaust), the cars must comply with one or other version, any combination of the two versions being prohibited.

3.7) **STARTING ON BOARD THE VEHICLE**

Starter with electric or other source of energy on board operable by the driver when seated in the seat.

3.8) **CYLINDERS**

For non-sleeved engines, it will be possible to reparate the cylinders by adding material, but not parts.

4) **TRANSMISSION**

All cars must be fitted with a gearbox including a reverse gear which must be in working order when the car starts the event, and be able to be operated by the driver when he is normally seated.

5) **WHEELS**

**Measuring wheel width :** the width is to be measured with the wheel mounted on the car, on the ground, the vehicle in race condition, driver aboard, at any point along the circumference of the tyre, except in the area in contact with the ground.

When multiple tyres are fitted as part of a complete wheel, the latter must comply with the maximum dimensions for the

Group in which these tyres are used (See Article 255.5.4 and Article 256.5).

**Application :** Touring Cars (Group A), Grand Touring Cars (Group B).

6) **COACHWORK**

6.1) Convertible vehicles must comply in all respects with the specifications applying to open cars.

6.2) **MINIMUM INSIDE DIMENSIONS**
If a modification authorised by Appendix J affects a dimension stated on the homologation form this dimension may not be retained as an eligibility criterion for the car.

6.3) **COCKPIT**
Only the following accessories may be installed in the cockpit : spare wheels, tools, spare parts, safety equipment, communication equipment, ballast (if permitted), windscreen washer water container (Touring Cars (Group A) and Grand Touring Cars (Group B) only). The passenger area and seat of an open car must in no way be covered.
Containers for helmets and tools situated in the cockpit must be made of non-inflammable material and they must not, in case of fire, give off toxic vapours.

6.4) All body panels of the vehicle must be at all times of the same material as those of the original homologated car and must be of the same material thickness as that of the original homologated car (tolerance ± 10 %).

6.5) **HOLES FOR MOUNTING HEADLAMPS** The boring of holes in the front bodywork for light brackets is authorised, limited solely to mountings.

6.6) Any object of a dangerous nature (battery, inflammable products, etc.) must be carried outside the cockpit.

7) **ELECTRICAL SYSTEM**

7.1) **LIGHTING**
A fog light may be changed for another light, and vice versa, provided that the original mounting remains the same.

7.2) The mounting of the alternator is free.

8) **FUEL - COMBUSTIVE**

8.1) The **fuel** must be **petrol** without any additive other than that of a lubricant on current sale which cannot increase the octane number.
The fuel must have the following characteristics :
— 100 RON maximum, the measurement being made according to the standard ASTM D 2699-**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/m³ at 15°C (measured according to ASTM D4052).
— a maximum of **2.8 %** oxygen (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 measuring of the nitrogen content will be carried out according to the standard ASTM D3228 and that of the oxygen content by elemental analysis with a tolerance of 0.2 %.
— maximum content of peroxides and nitrooxide compounds : 100 ppm (ASTM D3703).
— maximum lead **content** : 0.40 g/l or the standard of the event, if it is lower **(ASTM D3341 or D3237)**.
— maximum benzene **content** : 5 % in volume **(ASTM D3606)**.
If the fuel available locally for the event is not of a sufficient quality for use by competitors, the ASN of the organising country must ask the FISA for a waiver in order to enable the use of fuel not corresponding to the characteristics defined above.

8.2) Only air may be mixed with the fuel as an oxydant.

8.3) **REFUELLING PROCEDURE**

**Standardised coupling**
— In case of a centralised system provided by the circuit or a system provided by the competitors, the refuelling hose shall be provided with a leak-proof coupling to fit the standardised filler mounted on the car. The dimensions of this fitting are given in the drawing 252-5.

— All cars must be provided with a fuel filler complying with this diagram. This leak-proof fitting must comply with the dead man principle and must not therefore incorporate any retaining device when in an open position (spring-loaded, bayonet, etc.).

— The air vent(s) must be equipped with non return and closing valves having the same closing system as that of the standard filler and having the same diameter. During refuelling the outlets of the air-vents must be connected with the appropriate coupling either to the main supply-tank or to a transparent portable container with a minimum capacity of 20 litres provided with a closing system rendering it completely leak-proof. The venting catch tanks must be empty at the beginning of the refuelling operation. In the cases where the circuits are unable to provide the entrants with a centralised system, they will have to refuel according to the above procedure. The level of the reserve tank may in no case be more than 3 metres above the level of the track where the refuelling is effected. This applies to the whole duration of the event.

The overflow bottles must conform to one of the drawings 252-1 or 252-2.

The reserve tank and all metal parts of the refuelling system from the coupling over the flow meter up to the tank and its rack must be connected electrically to the earth.

The application of the following is recommended :

1. Each pit should be equipped with two aircraft type grounding connections.
2. The refuelling system (including tower, tank, hose, nozzle, valves and vent bottle) should be connected to one of the above grounding connections for the entire duration of the race.
3. The car should be connected, at least momentarily, to the other grounding connection as soon as it stops in the pit.
4. No fuel hose connection (fill or vent) unless and until conditions 2 and 3 have been fulfilled.
5. All fuel-handling pit crew members should wear non-static protective clothing.

The refuelling tank may be one of the following :

— models made of rubber, of the type FT3, built by an approved manufacturer, or

— tanks conforming to one of the diagrams 252-3 or 252-4.

**Applications :** For Touring Cars (Group A), Grand Touring Cars (Group B), refer to the general prescriptions of the FIA Championships.

8.4) **TANK VENTILATION**

It is authorized to equip a tank with ventilation exiting through the car roof.

8.5) **INSTALLATION OF THE FT3 TANK**

The FT3 tank may be placed either in the original location of the tank or in the luggage compartment.

There must be an orifice to evacuate any fuel which may have spread into the tank compartment.

The position and the dimension of the filler hole as well as that of the cap may be changed as long as the new installation does not protrude beyond the bodywork and guarantees that no fuel shall leak into one of the interior compartments of the car.

If the filler hole is situated inside the car, it must be separated from the cockpit by a liquid-tight protection.

9) **BRAKES**

Carbon brake discs are forbidden.

# *Art. 253* - **Safety equipment (Gr. N, A, B)**

1) A car, the construction of which is deemed to be dangerous, may be excluded by the Stewards of the meeting.

2) If a device is optional, it must be fitted in a way that complies with regulations.

3) **LINES**

3.1) **PROTECTION**

Fuel, oil and brake lines must be protected externally against any risk of deterioration (stones, corrosion, mechanical breakages, etc.) and internally against all risks of fire. If the series production fitting is retained, no additional protection is necessary.

**Application :** obligatory for Touring Cars (Group A), Grand Touring Cars (Group B), optional for Production Cars (Group N).

3.2) **SPECIFICATIONS AND INSTALLATION**

Series production fittings may be retained. If they are modified, they must comply with the specifications concerning them below :

— Fuel and lubricating oil lines must have a minimum burst pressure of 70 bar (1000 psi) and a minimum operating temperature of 135°C (250°F).

When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

— Lines containing hydraulic fluid, with the exception of lines under gravity head only, must have a minimum burst pressure of 70 bar (1000 psi) or higher according to operating pressure, and a minimum operating temperature of 232°C (450°F).

When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

— Lines containing cooling water or lubricating oil must be outside the cockpit. Lines containing fuel or hydraulic fluid may pass through the cockpit, but without any connectors inside except on the front and rear bulkheads according to drawings 283-1 and 283-2, and on the braking circuit.

4) **BRAKING SAFETY SYSTEM**

Double circuit operated by the same pedal : the pedal shall normally control all the wheels ; in case of a leakage at any point of the brake system pipes or of any kind of failure in the brake transmission system, the pedal shall still control at least two wheels.

**Application :** compulsory fitting on all cars. If this system is fitted in series production, no modifications are necessary.

5) **ADDITIONAL FASTENERS**

At least two additional safety fasteners must be fitted for each of the bonnet and boot lids. The original locking mechanisms will be rendered inoperative or removed.

Large objects carried on board the vehicle (such as the spare wheel, toolkit, etc.) must be firmly fixed.

**Application :** obligatory for Touring Cars (Group A) and Grand Touring Cars (Group B). Optional for Production Cars (Group N).

6) **SAFETY BELTS**

Wearing of a diagonal strap and one abdominal strap : fixation on the shell : 3.

**Application :** compulsory for all Production Cars (Group N) together with Touring Cars (Group A), Grand Touring Cars (Group B) participating in rallies.

Wearing of two shoulder straps and one abdominal strap : fixation points on the shell : two for the abdominal strap — two or possibly one symetrical in relation to the seat for the shoulder straps.

**Application :** compulsory for all Touring Cars (Group A), Grand Touring Cars (Group B) (except in rallies).

A hole may be made in a series production seat to allow the passage of a safety belt.

## 7) EXTINGUISHERS - EXTINGUISHING SYSTEMS

### 7.1) IN RALLIES

**— Group N :**

The systems mounted in accordance with Art. 7.3 are recommended.

**— Groups A and B :**

These systems are compulsory.

Furthermore, hand-operated extinguishers are compulsory for all Groups (see Art. 7.4).

### 7.2) IN CIRCUIT EVENTS, SLALOMS, HILLCLIMBS

Hand-operated extinguishers are compulsory.

An automatic extinguisher (see Art. 7.3) may replace the manual extinguisher.

### 7.3) SYSTEMS MOUNTED

#### 7.3.1) Fixation

Each extinguisher bottle must be installed in such a way that it is capable of withstanding accelerations of up to 25 g no matter how these are applied.

#### 7.3.2) Operation - Triggering

The two systems must be triggered simultaneously.

Any triggering system is allowed. However a source of energy not coming from the main source must be provided in the case of a triggering system which is not exclusively mechanical.

The driver seated normally at his steering wheel with his safety harness attached must be able to trigger the system manually, as must any person outside the car.

The means of triggering from the exterior must positioned close to the circuit breaker or combined with it, and must be marked by the letter "E" in red inside a white circle of at least 10 cm diameter with a red edge.

Automatic triggering by heat sensors is recommended.

The system must work in any position, even when the car is upside down.

#### 7.3.3) Checking

The type of extinguishant, its quantity, and the total weight of the bottle must be specified on each bottle.

#### 7.3.4) Specifications

Minimum capacities of extinguisher systems :

Closed cars : cockpit : 2.5 kg
engine : 5 kg

Open cars : cockpit : 5 kg
engine : 2.5 kg.

Alternatively a single bottle of 7.5 kg may be used if the extinguishant is distributed according to the above specifications.

In circuit events a single 4 kg bottle will be accepted, the extinguishing agent being shared between the cockpit and the engine. The extinguishant must be Halon 1211 or 1301 (BCF-BTM) only.

Extinguishing equipment must withstand fire and be protected against impacts.

The extinguisher system nozzles must be installed in such a way that they are not directly pointed at the driver (danger of burns caused by cold).

#### 7.3.5) Discharge time

Cockpit : 30 secs for Halon 1211
60 secs for Halon 1301.

Engine compartment : 10 secs.

### 7.4) MANUAL EXTINGUISHERS

#### 7.4.1) Installation

Each extinguisher bottle must be installed in such a way that it is capable of withstanding accelerations of up to 25 g no matter how these are applied. Only rapid release metal mountings with metal straps will be accepted.

#### 7.4.2) Operation - Triggering

The extinguishers must be easily accessible to the driver and co-driver.

#### 7.4.3) Checking

The type of extinguishant, its quantity, and the total weight of the bottle must be specified on each bottle.

7.4.4) The cars must be equipped with one or two bottles containing a minimum of 4 kg of Halon 1211 or 1301 (BCF-BTM), powder or a product having an efficiency and non-toxicity at least equal to that of Halon 1211.

## 8) ROLLBAR

### 8.1) DEFINITIONS

**8.1.1) Rollcage**

A structural framework made up of tubes, connections and fixation points. It is designed to prevent serious deformation in the case of a collision or a car turning over.

**8.1.2) Rollbar**

Structural framework made up of a main rollbar, connections and fixation points.

**8.1.3) Safety cage**

Structural framework made up of a main rollbar and a front rollbar, or of two lateral rollbars, connections and fixation points.

**8.1.4) Main rollbar**

A structure made out of a vertical frame situated in a transversal plane in relation to the car's axis, near the back of the front seats.

**8.1.5) Front rollbar**

Identical to the main rollbar but its shape follows the windscreen mountings and the front part of the roof.

**8.1.6) Lateral rollbar**

A rollcage made up of a vertical framework situated in a longitudinal plane in relation to the car's axis placed on the right or the left. The rear pillar must be placed against or behind the back of the driver's seat or that of his co-driver. In case where the main rollbar is used as the rear pillar, the connection must be near the roof. The front bar must be near the windscreen and dashboard. The driver and his co-driver must be able to get in and out of the vehicle without any inconvenient difficulty.

**8.1.7) Longitudinal strut**

Longitudinal tube which belong neither to the main rollbar nor to the front rollbar.

**8.1.8) Diagonal strut**

Tube crossing the car from one of the corners of the main rollbar to any fixation point of the other side of the rollbar or of the near longitudinal strut.

**8.1.9) Framework reinforcement**

Tube fixed to the rollcage improving its efficiency.

**8.1.10) Reinforcement plate**

Metal plate, fixed to the chassis structure of the car on which the rollbar rests.

**8.1.11) Fixing plate**

Plate which is attached to the tubes and allow their fixation to the chassis.

**8.1.12) Removable connection**

Optional connection of lateral or diagonal struts to the main rollbar or the front rollbar. It must be possible to dismantle these pieces of equipment.

### 8.2) SPECIFICATIONS

**8.2.1) General comments**

8.2.1.1) Safety cages should be designed and constructed in such a fashion that after they have been properly built in, they prevent the bodywork from deforming and thus reduce the risks of injury to people on board the vehicle.

The essential characteristics of safety cages come from a finely detailed construction, suitable adaptation and fixation to the car plus snug fitting against the bodywork. The rollbars must never be used as pipes for liquids.

The safety cage must be constructed in such a way that it does not obstruct access to the front seats and does not encroach on the space provided for the driver and co-driver.

However parts of the rollcage may encroach upon the front passenger space by passing through the dashboard and the lateral upholstery as well at the rear by passing through the upholstery or the rear seats. The rear seat may be folded down.

Any modification to the homologated rollbars (see Art. 8.6) is forbidden, even with regard to the fixations and welds.

8.2.1.2) **Basic rollcage** (drawings 253-3 and 253-4). (For Rallies only).
**Rollbar :** Production Cars (Group N) and Touring Cars (Group A), Grand Touring Cars (Group B) up to 2,000 $cm^3$.
**Rollcage :** Touring Cars (Group A), Grand Touring Cars (Group B) more than 2,000 $cm^3$ (optional for Production Cars (Group N) and Touring Cars (Group A), Grand Touring Cars (Group B) up to 2,000 $cm^3$ (drawings 253-5 and 253-6)).

8.2.1.3) **Different possibilities of installing the obligatory strut (with the exception of rallies) :**
This strut can be fixed to any basic rollcage (drawings 253-3 to 253-7).
The combination of several struts (drawings 253-8 to 253-11) is permitted.

8.2.1.4) **Different possibilities of installing the optional reinforcements of the rollcage :**
Each type of reinforcement (drawings 253-12 to 253-21) may be used separately or combined with one or several others.
These reinforcements can be installed in each of the basic rollcages (drawings 253-3 to 253-7).

8.2.2) **Technical specifications**

8.2.2.1) **Main, front and lateral rollbars**
The rollbars must be in a single piece. Their construction must be impeccable without unevenness or cracks. The fitting must be done in such a way that it marries the interior shape of the car, or straight if it cannot be directed upwards. If it is necessary for the lower parts of the rollbar to be rounded, these parts must be strengthened and follow the interior shape exactly.
Minimum bending r = 3 × tube diameter
In order to get an efficient installation of the rollcage, it is allowed to locally modify the original upholstery, directly on the legs of the rollcage, for example by cutting or embedding (deformation).
Only those parts of the interior lining which hinder the passage of the rollbar can be withdrawn.
However, this modification can in no case allow the removal of entire parts of the upholstery.

8.2.2.2) **Fixation of the rollbars to the body**
Minimum fixations for the safety rollcage :
1 for each pillar of the main or lateral rollbar.
1 for each pillar of the front rollbar.
1 for each pillar of the rear longitudinal strut.
1 for each pillar of the main rollbar, and each rear pillar of the lateral rollbar at the fixation point for the front seat belt, or in the approximate area of this position.
The fixation of the rollbar pillars must be done with at least three bolts.
The attachment points of the front and main rollbars on the body must be reinforced with a steel plate of at least 3 mm thick and with a surface area of 120 $cm^2$, welded to the body.
The various possibilities are given in drawings 253-22 to 253-36.
Hexagonal bolts or similar, of a minimum diameter of 8 mm (minimum quality 8-8 as per the ISO specifications) shall be used.
The nuts shall be self-locking or fitted with washers.
These fixations represent a minimum. It is possible to increase the number of bolts, to weld the steel rollbar to the bodyshell.
The additional fixations may be bolted and/or welded to the body.

8.2.2.3) **Longitudinal struts**
They must be fixed to the left and to the right above and outside the main rollbar, then going directly backwards and as near as possible to the interior side contour.
A rounded construction (with a large bend) is allowed if it is placed as near the roof as possible.
The diameter, the thickness and the material of the longitudinal struts should correspond to the norms fixed for the rollcages.
The forces must be efficiently divided and absorbed.

The attachment points must be strengthened by plates if their location does not allow them to absorb forces.

8.2.2.4) **Diagonal struts**

With the exception of rallies, the installation of at least one diagonal strut is obligatory.

Their construction must be carried out in accordance with drawings 253-8 to 253-11 without bends.

The attachment points of the diagonal struts must be so located that they cannot cause injuries.

They must preferably have the same diameter as the tubes of the main structure.

8.2.2.5) **Optional reinforcements of the rollcage**

The diameter, the thickness and the material of the reinforcements must correspond to the norms fixed for the rollcages.

They shall be either welded into position or installed by means of a detachable connection (obligatory for the front transversal reinforcements).

The reinforcement tubes should never be attached to the actual bodywork of the car.

8.2.2.5.1) **Transversal struts**

The fitting of transversal struts as shown in drawing 253-12 is permitted. The transversal strut fixed to the front bar must not, however, encroach upon the space reserved for the occupants. It must be placed as high as possible under the dashboard and must be detachable.

8.2.2.5.2) **Longitudinal struts (lateral protection)**

The fixing of a longitudinal strut at the side(s) of the vehicle at door level is permitted. The tube making up this reinforcement must be built into the safety rollcage and its angle with the horizontal tube must not exceed 15° angled downwards towards the front). No point of the longitudinal strut should be higher than one third of the total height of the door measured from its base.

8.2.2.5.3) **Roof reinforcement**

The reinforcement of the upper part of the rollcage by the strut(s) as shown in drawing 253-13 is permitted.

8.2.2.5.4) **Angle reinforcement**

The reinforcement of the upper angles between the main rollbar and the longitudinal connections with the front rollbar is permitted, as is the reinforcement of the upper rear angles of the lateral rollbars, as shown in drawing 253-14 and 253-20.

The upper fixation of these reinforcements shall, under no circumstances, be situated to the fore of the middle of the longitudinal linking tube, and their lower fixation shall, under no circumstances, be situated lower than in the middle of the vertical pillar of the rollbar.

8.2.2.6) **Padding for protection**

The padding of the dangerous points on the rollbars is recommended in order to prevent injury.

The rollbar may be covered with a detachable protective casing.

8.2.2.7) **Removable connections**

Should removable connections be used in the construction of the rollbar they must comply with or be similar to a type approved by the FISA (see drawings 253-37 to 253-41).

The screws and bolts must be of a sufficient minimum diameter, and of the best possible quality (8.8).

8.2.2.8) **Welding instructions**

All welding should be of the highest quality possible with full penetration (preferably arc welding and in particular heliarc).

Although good outside appearance of a weld does not necessarily guarantee its quality, poor looking welds are never a sign of good workmanship.

When using heat treated steel the special instructions of the manufacturers must be followed (special electrodes, welding under protecting gas).

It must be pointed out above all else that the manufacture of heat treated steel, and high carbon steels may cause certain problems and that bad construction may result in a decrease in strength (crinking) and an absence of flexibility.

8.3) **MATERIAL PRESCRIPTIONS**

Specifications of the tubes used :

| Minimum : material : | Minimum tensile strength : | Minimum dimensions : |
|---|---|---|
| Cold drawn seamless carbon steel | 350 N/mm² | 38 x 2.5 or 40 x 2 (in mm) |

These dimensions represent the minima allowed.

In choosing the quality of the steel, attention must be paid to the elongation properties and the weldability.

8.4) **REGULATIONS FOR CARS**

8.4.1) **Production Cars (Group N)**

The fitting of a rollbar or rollcage is compulsory for all events.

It is authorised to move the fuse box to enable a rollcage to be fitted.

8.4.2) **Touring Cars (Group A) and Grand Touring Cars (Group B)**

The fitting of a safety cage is obligatory for all events.

The diagonal strut although not obligatory for rallies, is desirable.

Rules of application are as follows :

— Up to 2,000 cm³ : rollbar obligatory, rollcage optional.

— More than 2,000 cm³ : rollcage obligatory.

8.5) **EXCEPTIONS**

However manufacturers of safety rollcages may propose a rollbar of free conception to an ASN for approval as regards the dimensions of the tubes and the implantation of the braces provided that the construction is certified to withstand stress minima given hereafter (and applied simultaneously) :

— 1.5 w lateral*

— 5.5 w fore and aft

— 7.5 w vertical

* w = weight of the car + 75 kg.

It must be possible to submit a certificate, on a form approved by the ASN, signed by a qualified technician to the event's scrutineers.*

It must be accompanied by a drawing or photo of the rollbar in question declaring that this rollbar can resist the forces mentioned above.

Rollbars must not be modified.

8.6) **HOMOLOGATION**

The FISA being aware of the problem of habitability being raised by the use of safety rollcages proposes that each car manufacturer recommends a type of safety rollcage complying with FISA standards.

This rollbar, made from steel, must be described on a homologation extension form presented to the FISA for approval, and must not be modified (see Article 8.2.1.1).

9) **REAR VIEW**

This shall be provided by an inside mirror commanding a rear window with at least a 10 cm vertical opening, maintaining along a width of at least 50 cm. However, if the straight line connecting the upper and lower edges of the rear window opening makes an angle inferior to 20° with the horizontal, the rear view must be efficiently obtained by other means (two outside mirrors or any other system of equivalent efficiency). Furthermore, all these cars should be equipped with two outside mirrors for circuit events.

**Application :** obligatory for all Groups.

10) **TOWING-EYE**

All cars will be equipped with a rear and front towing-eye for all events. This towing-eye will only be used if the car can move freely . It will be clearly visible and painted in yellow, red or orange.

**Application :** All groups.

11) **WINDOWS**

The windows must be certified for road use, their marking standing as proof. The windshield must be made of laminated glass.

**Application :** All groups.

12) **SAFETY FIXING DEVICES FOR WINDSHIELD**

Such devices may be used freely.

**Application :** optional.

13) **GENERAL CIRCUIT BREAKER**

The general circuit breaker must cut all electrical circuits, battery, alternator or dynamo, lights, hooters, ignition, electrical controls, etc) and must also stop the engine. It must be a spark-proof model, and will be accessible from inside and outside the car. As for the outside, the triggering system of the circuit breaker will compulsorily be situated at the lower part of the windscreen mounting of the driver's side for closed cars. It will be marked by a red spark in a white-edged blue triangle with a base of at least 12 cm. This outside triggering system only concerns closed cars.

**Application :** compulsory fitting for all cars taking part in speed events on circuits or hill-climbs. The fitting is recommended for other events.

14) **FISA APPROVED SAFETY FUEL TANKS**

Whenever a competitor uses a safety fuel tank, it must come from a manufacturer approved by the FISA.

In order to obtain the FISA's agreement, a manufacturer must have proved the constant quality of its product and its compliance with the specifications approved by the FISA.

Safety tank manufacturers recognised by the FISA must undertake to deliver to their customers exclusively tanks complying with the norms approved. To this end, on each tank delivered the name of the manufacturer, the model, the exact specifications according to which this tank has been manufactured, the date of the manufacturing, and the series number, shall be printed.

14.1) **TECHNICAL SPECIFICATIONS**

The FISA reserves the right to approve any other set of technical specifications after study of the dossier submitted by the manufacturers concerned.

14.2) **SPECIFICATIONS FIA/Spec/FT3**

The Technical specifications for these tanks are available, on request, from the FISA Secretariat.

14.3) **AGEING OF TANKS**

The ageing of safety tanks entails a considerable reduction in the strength characteristics after approximately five years.

Therefore, all fuel cells must be replaced by new ones at the latest five years after the fabrication date indicated on the cell.

14.4) **APPLICATION OF THESE SPECIFICATIONS**

Production Cars (Group N), Touring Cars (Group A) and Grand Touring Cars (Group B) may be equipped with a safety fuel tank if the modifications necessary do not exceed those allowed by the regulations.

As far as Production Cars are concerned, the maximum capacity of the FT3 tanks must be that of the homologated tank, and the original tank must be removed.

15) **PROTECTION AGAINST FIRE**

An efficient protective screen must be placed between the engine and the occupant's seat, in order to prevent the direct passage of flames in case of fire.

Should this screen be formed by the rear seats, it is advisable to cover them with a flameproof coating.

16) **SEAT ATTACHMENT/ SUPPORT**

If the original seat attachments and supports are changed, they must respect the following :

— 4 attachments per seat, using 8 mm minimum diameter bolts.

— the minimum thickness of the material for the reinforcement plates, brackets, etc. is 3 mm for steel and 5 mm for light alloy.

— the minimum surface area for each mounting point (brackets and counterplates) is 40 $cm^2$.

17) **PRESSURE CONTROL VALVES**

Pressure control valves on the wheels are forbidden.

# *Art. 254* - **Specific regulations for Production Cars (Group N)**

1) **DEFINITION**
Large scale series production touring cars.

2) **HOMOLOGATION**
At least 5000 identical units must have been produced in 12 consecutive months and homologated by the FISA in Touring Cars (Group A).
The Supply Variants (VF) homologated in Touring Cars (Group A) are also valid in Production Cars (Group N).
The Optional Variants (VO) of the Touring Cars (Group A) form shall not be valid in Production Cars (Group N), unless they refer to :
— fly-wheel for automatic gearboxes ;
— fuel tank ;
— automatic gearboxes ;
— sun roof ;
— safety roll cage ;
— 2/4 doors versions.
The use of tanks homologated in VO on the Touring Car (Group A) form must be carried out under the conditions laid down in Article 5.9.2 of the Touring Car (Group A) regulations, and Article 254.6.8.
Likewise evolutions of the type (ET) or sporting evolutions (ES) homologated in Touring Cars (Group A) are not valid in production Cars (Group N).

3) **NUMBER OF SEATS**
Cars must have at least 4 places, in accordance with the dimensions defined for Touring Cars (Group A).

4) **MODIFICATIONS AND ADJUNCTIONS ALLOWED OR OBLIGATORY**
All the modifications which are not allowed by the present regulations are expressly forbidden.
The only work which may be carried out on the car is that necessary for its normal servicing, or for the replacements of parts worn through use or accident. The limits of the modifications and fittings allowed are specified hereinafter. Apart from these, any part worn through use or accident can only be replaced by an original part identical to the damaged one.
The cars must be strictly series production models identifiable by the homologation form data.

5) **MINIMUM WEIGHT**
Cars must have at least the weight appearing on the homologation form plus the weight of the safety devices.
As far as rollcages or rollbars which cannot be removed from the car and which were manufactured in accordance with Articles 253.8.2, 8.3 and 8.4 of Appendix J are concerned, the following weights will be taken as a basis for the safety cage :
— Rollbar according to drawings 253-3/4 : 15 kg
— Rollcage according to drawings 253-5/6/7/8/9/10/14/15/18/20 : 25 kg
— Rollcage according to drawings 253-11/12/13/16/17/19/21 : 30 kg
This is the real minimum weight of the empty car (without persons or luggage aboard) without tools, jack. All the liquid tanks (lubrication, cooling, braking, heating where applicable) must be at the normal level foreseen by the manufacturer, with the exception of the windscreen wiper or headlight wiper, brake, cooling system, fuel and water injection tanks, which shall be empty. Additional headlights which do not appear on the homologation form must be removed before weighing.

6)
6.1) **ENGINE**
The accelerator cable may be replaced or doubled by another one.
— **Ignition :** Make and type of plugs are free as are rev-limiters and high tension cables.
— **Cooling system :** The thermostat is free as is the control system and the temperature at which the fan cuts in.
Locking system for the radiator cap is free.

— **Fuel feed :** Carburettor(s) parts or fuel injection system parts regulating the quantity of fuel reaching the engine may be modified, provided that they have no influence on air admission.

The original injection system must be maintained.

The injectors may be changed for injectors which are identical except with regard to the size of the pintle nozzle hole at the end.

Competitors using cars with any hydraulic valve lift system whatsoever must be able to supply the scrutineers with a mechanical valve lifter to enable them to control the valve lift.

— The material of the elastic part of the engine mountings is free, but not the number of engine mountings.

— The electrical resistances situated in the electronic box may be modified.

— **Exhaust :**

It will be possible :

• either to remove the inside of the original silencer ;

• or to modify the exhaust from the first silencer to the exit, the maximum dimensions of the duct being those of the pipe situated upstream of the first silencer (see drawing 254-3). Should two inlets exist in the first silencer, the section of the modified duct must be less than or equal to the total of the two original sections.

Only one pipe may be present at the exit.

The exit should be situated in the same position as that of the series production exhaust system.

These liberties must not entail any bodywork modifications and must respect the laws of the country in which the event is run with regard to noise levels.

Additional parts for the mounting of the exhaust are authorized.

If an exhaust silencer is added, it must be of the original type and must contain noise-absorbing material.

The catalytic converter is considered as a silencer.

— **Cylinder head gasket :** The material is free, but not the thickness.

— **Cruising speed controller :** This controller may be disconnected.

— **In rallies only :** the cubic capacity is limited as follows for normally aspirated engines :

• 3 l maximum for two valves per cylinder.

• 2.5 l maximum for more than two valves per cylinder.

**In the event of supercharged engines being used :**

The supercharged system must comply with that of the homologated engine.

The maximum diameter of the air intake into the compressor must be 36 mm, maintained for a minimum distance of 3 mm measured downstream of a plane perpendicular to the rotational axis situated at a maximum of 50 mm upstream of a plane passing through the most upstream extremities of the wheel blades (see drawing n° 254-4).

This diameter must be complied with, regardless of the temperature conditions.

The compressors respecting the above dimensions must be retained. The others must be fitted with a restrictor fixed to the compressor housing and coupling with the dimensions defined above. This restrictor must not be an integral part of the compressor housing ; it must be an added part.

In case of an engine with two parallel compressors, each compressor must be limited to a maximum intake diameter of 25.5 mm.

All the air necessary for feeding the engine must pass through the restrictor. For the installation of this restrictor, it is permitted to remove material from the compressor housing, and to add it, for the sole purpose of attaching the restrictor onto the compressor housing. It must be possible to affix seals between the restrictor (or the restrictor/compressor housing attachment), the compressor housing (or the housing/flange attachment) and the turbine housing (or the housing/flame attachment) (see drawing 254-4). It must be easy to inspect it, or possible to dismantle it for inspection. The shape of the restrictor is free, subject to restrictions mentioned above.

This restrictor, which is compulsory is Rallies, is not prohibited in other events, should a competitor decide to use it.

6.2) **TRANSMISSION**

— Clutch : the disc is free, including the weight, with the exception of the number and diameter.

6.3) **SUSPENSION**

— **Springs :**

**Coil springs :**

The length is free, as is the number of coils, the wire diameter, the type of spring (progressive or not), the external diameter and the form of the spring seats.

**Leaf springs :**

The length, width, thickness and vertical curvature are free.

**Torsion bars :**

The diameter is free.

These freedoms on the suspension springs do not authorise one to disregard article 205 of the homologation form (minimum height of the centre of the hubcab, wheel passage opening).

— **Shock absorbers :**

Free, provided that their number, their type (telescopic, arm, etc), their working principle (hydraulic, friction, mixed, etc.), and their attachment points remain unchanged.

Gas filled dampers, regarding their working principle, will be considered as hydraulic dampers.

If, in order to change the damping element of a Mac Pherson suspension, or a suspension operating in an identical manner, it is necessary to replace the entire Mac Pherson strut, the replacement parts must be mechanically equivalent to the original ones and have the same mounting points.

For Mac Pherson suspensions, the shape of the spring seats is free and these seats are adjustable. Their material is free. The reinforcing of the suspension and its anchorage points by the addition of material is allowed.

In the case of oil-pneumatic suspension, the spheres may be changed as regards their dimension, shape and material, but not their number. **A tap, adjustable from outside of the car, may be fitted on the spheres.**

6.4) **WHEELS AND TYRES**

The wheels are free, respecting the homologated diameter (Article 801.a), and the homologated width (Article 801.b) which is considered as a maximum.

They must be covered by the wings (same checking system as in Group A, Article 255.5.4), and the maximum track given on the homologation form must be respected.

Tyres are free provided that they can be mounted on those wheels.

The spare wheel may be brought inside the driving compartment, on condition that it is firmly secured there and that it is not installed in the space reserved for the driver and the front seat passenger.

Wheels fixations by bolts may be changed to fixations by pins and nuts provided that the number of attachment points and the diameter of the threaded parts as indicated on drawing n° 254-1 are respected.

Air extractors added on the wheels are forbidden.

6.5) **BRAKING SYSTEM**

Brake linings are free, as well as their mountings (riveted, bonded, etc.) provided that the contact surface of the brakes is not increased.

Protection plates may be removed or bent.

In the case of a car fitted with servo-assisted brakes, this device may be disconnected.

The same applies for anti-lock braking systems.

Brake lines may be changed for aviation type lines.

6.6) **BODYWORK**

6.6.1) **Exterior :**

Hubcaps must be removed.

Protective headlight covers may be fitted provided that their only function is to cover the glass, and that they have no influence on the car's aerodynamics.

The fitting of underbody protections is authorized in rallies only, provided that these really are protections which respect the ground clearance, which are removable and which are designed exclusively and specifically in order to protect the following parts : engine, radiator, suspension, gearbox, tank, transmission, exhaust, extinguisher bottle.

Any locking system may be used for the cap of the petrol tank.

The fitting of external rear view mirrors is authorised, as is the changing of the windscreen wiper blades both front and rear.

6.6.2) **Passenger space**

All accessories which have no effect on the vehicle's behaviour are allowed without restrictions, such as those concerning the aesthetics or interior comfort (lighting, heating, radio, etc.), on the express condition that they do not influence, even in a secondary manner, the efficiency of the engine, steering, strength, transmission, braking, or road-holding.

Inversion of the driving side is possible, on condition that the original car and the modified car are mechanically equivalent and that the parts used are foreseen by the manufacturer for such a conversion for the model in question.

All the passenger seats, if occupied, must be fitted with a headrest. The carpeting must remain in place.

All the controls must be those provided by the manufacturer and they must retain their original function but they can be worked on to make them more accessible or more easily usable ; for example, the addition of an extension to the handbrake lever, of an additional flange to the brake pedal, etc.

The following is allowed in particular :

1) Additional measuring instruments, counters, etc. may be freely installed, provided that their fitting is not likely to create any danger.

2) The horn may be changed or an additional one, possibly for the passenger's use, added.

3) The mechanism of the handbrake lever may be adapted in order to obtain instant unlocking (fly-off handbrake).

4) Seat supports may be modified, and all kinds of seat-covers may be added including those creating bucket seats.

5) The front seats may be changed for bucket seats.

6) Additional compartments may be added to the glove compartment as well as additional pockets to the doors.

7) Steering wheel is free.

8) It is authorised to replace the electric window winders with manually-operated winders, using corresponding parts which are available for the model concerned. Likewise, the inner door panel may be replaced.

6.6.3) **Reinforcements**

Reinforcement bars may be fitted on the suspension mounting points to the bodyshell or chassis of the same axle, on each side of the car's longitudinal axis, on condition that they are removable and are attached by means of bolts. The distance between a suspension attachment point and an anchorage point of the bar cannot be more than 100 mm, unless the bar is a transversal strut homologated with the rollbar, and unless there is an upper bar attached to a MacPherson suspension or similar. In the latter case, the maximum distance between an anchorage point of the bar and the upper articulation point will be 150 mm (drawings 255-4 and 255-2).

Apart from these points, this bar must not be mounted on the bodyshell or the mechanical parts.

Strengthening of the suspended part is allowed provided that the material used follows the original shape and is in contact with it.

6.6.4) When the spare wheel is originally set in a closed accomodation, and when this wheel is changed for a thicker one (see Article 6.4), situated in this space, it is possible to remove from the cover of the location of the wheel the surface induced by the diameter of the new wheel (drawing n° 254-2).

6.7) **ELECTRICAL SYSTEM**

— **Battery :** the make, capacity, and battery cables are free.

The tension and the site of the battery must be retained.

— **Generator :** may be replaced by a more powerful one. A dynamo may not be replaced by an alternator and vice-versa.

— **Lighting system :** Additional headlights including the corresponding relays are allowed, provided that the total does not exceed eight (tail and parking lights not included) and that this is accepted by the laws of the country. They may not be housed within the bodywork.

Headlights and other exterior lights must always exist in pairs. The original headlights can be made inoperative and covered with adhesive tape. They can be replaced by other headlights, in compliance with this article. A reversing light may be fitted provided it can only be used when the gear lever is in the "reverse" position, and provided that the police regulations on this subject are observed.

Fuses may be added to the electrical system.

6.8) **FUEL CIRCUIT**

Providing the original tank is equipped with an electric pump and an interior filter, it is possible when using an FT3 tank to place a filter and a pump with identical characteristics to the homologated one outside. These parts must be protected in adequate fashion.

The filler holes may not be located in the window panels.

Fuel lines must be changed for aviation type lines if an FT3 tank is used, the route of these lines being free. Should a series production tank be used, this changement is optional.

The total capacity of the tanks must not exceed that indicated in Article 401.d of the Group A homologation form.

6.9) **JACK**

The jack is free on condition that its lifting points on the car are not modified.

# *Art. 255* - **Specific Regulations for Touring Cars (Group A)**

1) **DEFINITIONS**
Large scale series production Touring Cars.

2) **HOMOLOGATION**
At least 5,000 identical examples of these cars must have been manufactured in 12 consecutive months.

3) **NUMBER OF SEATS**
Touring cars must have 4 seats minimum.

4) **WEIGHT**
Cars are subject to the following scale of minimum weights in relation to their cubic capacity.

| | | |
|---|---|---|
| Up to: | 1 000 cm³ : | 620 kg |
| " | 1 300 cm³ : | 700 kg |
| " | 1 600 cm³ : | 780 kg |
| " | 2 000 cm³ : | 860 kg |
| " | 2 500 cm³ : | 940 kg |
| " | 3 000 cm³ : | 1,020 kg |
| " | 3 500 cm³ : | 1,100 kg |
| " | 4 000 cm³ : | 1,180 kg |
| " | 4 500 cm³ : | 1,260 kg |
| " | 5 000 cm³ : | 1,340 kg |
| " | 5 500 cm³ : | 1,420 kg |
| Over: | 5 500 cm³ : | 1,500 kg |

This is the real minimum weight of the car, without driver nor co-driver nor their equipment. At no time during the event may a car weigh less than the minimum weight stated in this article. In case of doubt, the Scrutineers may drain the tanks to check the weight.

The use of ballast is permitted in the conditions provided for under Article 2.2 of the "General Prescriptions for Production Cars (Group N), Touring Cars (Group A), Grand Touring Cars (Group B)".

5) **MODIFICATIONS AND ADJUNCTIONS ALLOWED GENERAL CONDITIONS**

Irrespective of the parts for which the present article lays down freedom of modification, the original mechanical parts necessary for the propulsion, suspension as well as all accessories necessary for their normal functioning, excepting any steering or braking part, having undergone the normal machining operations laid down by the manufacturer for series production may be subjected to all tuning operations through finishing, scraping but not replacement.

In other words provided that the origin of the series production part may always be established, its shape may be ground, balanced, adjusted, reduced or modified through machining. Chemical and heat treatment are allowed, in addition to the above. However, the modifications defined by the above paragraph are allowed on condition that the weights and dimensions mentioned on the homologation form are respected.

**Nuts and bolts :** Throughout the car, any nut, bolt, screw may be replaced by any other nut, any other bolt, any other screw and have any kind of locking device (washer, lock nut, etc.).

**Addition of material and parts :** Any addition of material or parts is forbidden unless it is specifically allowed by an article in these regulations. Any material removed is not to be reused.

Restoration of body shape and chassis geometry, following accidental damage, is permissible by the addition of the materials necessary to effect the repairs (body filler, weld metal, etc.) ; other parts which are worn or damaged are not to be repaired by the addition or attaching of material unless an article in these regulations allows appropriate freedom.

5.1) **ENGINE**

5.1.1) **Cylinder-block - Cylinder-head**

It is permitted to close the unused apertures in the cylinder block and cylinder head, if the only purpose of this operation is that of closing.

A rebore of 0.6 mm maximum is allowed in relation to the original bore without this leading to the capacity class limit being exceeded.

The resleeving of the engine is allowed within the same conditions as for reboring, and the sleeve material may be modified.

Planing of the cylinder-block is allowed.

In the case of rotary engines, on condition that the original dimensions of the intake inlet ports and of the exit of the exhaust are respected, the dimensions of the inlet and exhaust ducts into the engine block are free.

**Cylinder head :** planing authorised.

5.1.2) **Compression ratio :** free.

5.1.3) **Cylinder head gasket :** free.

5.1.4) **Pistons :** free as well as the piston-rings, gudgeon pins and their securing mechanism.

5.1.5) **Connecting rods, crankshaft :**

Besides the modifications laid down in the paragraph "General Conditions" above, the original crankshaft and connecting rods may receive chemical, heat or mechanical treatment different from that laid down for series production parts.

5.1.6) **Bearings :** make and material are free ; they must however retain their original type and dimensions.

5.1.7) **Flywheel :** it may be modified in accordance with the above paragraph "General Conditions" provided that the original flywheel may still be identified.

5.1.8) **Fuel feed**

The accelerator cable and its cable sleeve stop are free.

The air filter, including the filter box and the plenum chamber, is free.

The air filter along with its box may be removed, moved in the engine compartment or replaced by another (see drawing 255.1).

The pipe between the air filter and the carburettor(s) or the air measuring device (injection) is free.

Likewise, the pipe between the air measuring device and the intake manifold or the supercharging device is free.

The air intake may be fitted with a grill.

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**For African rallies only :** it is possible to make a hole, with a maximum diameter of 10 cm, in the engine bonnet in order to provide air for the engine, and to place a pipe, with a maximum internal diameter of 10 cm, in this hole (see drawing 255-13).

Anti-pollution parts may be removed provided that this does not lead to an increase in the quantity of air admitted.

Fuel pumps are free. They may not be fitted in the cockpit unless this is an original fitting, in which case they must be well protected.

Petrol filters, with a maximum unit capacity of 0.5 l may be added to the fuel feed circuit.

The accelerator linkage is free.

The original heat exchangers and intercoolers, or any other device fulfilling the same function, must be retained, and remain in their original location, which means that their supports and position must remain original.

The pipes between the supercharging device, the intercooler and the manifold are free, but their only function must be to channel air.

In the case of air-water intercoolers, the pipes connecting the intercooler and its radiator are free, but their only function must be that of channelling water.

Any water injection fitted must be homologated and must not be modified.

The use of any other substance or device to reduce the temperature of the mixture is forbidden.

The drawings on page 14 of the homologation form must be respected.

The inner dimensions of the ports are free in the rotary chambers for rotary engines and for 2-stroke engines.

5.1.8.1) **Carburettor**

The element of the carburettor(s) regulating the metering of the quantity of petrol admitted to the engine may be modified, but not the diameter of the venturi, and the carburettor must stay in its original position.

5.1.8.2) **Injection**

The original system and its type, as specified on the homologation form of the vehicle (such as K-Jetronic) must be retained, as must its location.

The elements of the injection device regulating the metering of the quantity of fuel admitted to the engine may be modified, but not the diameter of the opening of the butterfly.

The air measuring device is free.

The injectors are free, except for their number, their position, their assembly axis and their operating principle.
The petrol lines feeding them are free.
The electronic box is free, insofar as it does not incorporate more data.
The fuel pressure regulator is free.

5.1.8.3) **Limitation in rallies**
The cubic capacity is limited as follows for normally aspirated engines :
— 3 l maximum for two valves per cylinder.
— 2.5 l maximum for more than two valves per cylinder.

**In the event of supercharged engines being used :**
The supercharged system must comply with that of the homologated engine.
The maximum diameter of the air intake into the compressor must be 38 mm, maintained for a minimum distance of 3 mm measured downstream of a plane perpendicular to the rotational axis situated at a maximum of 50 mm upstream of a plane passing through the most upstream extremities of the wheel blades (see drawing n° 254-4).
This diameter must be complied with, regardless of the temperature conditions.
The compressors respecting the above dimensions must be retained. The others must be fitted with a restrictor fixed to the compressor housing and coupling with the dimensions defined above. This restrictor must not be an integral part of the compressor housing ; it must be an added part.
In case of an engine with two parallel compressors, each compressor must be limited to a maximum intake diameter of 26.9 mm.
All the air necessary for feeding the engine must pass through the restrictor. For the installation of this restrictor, it is permitted to remove material from the compressor housing, and to add it, for the sole purpose of attaching the restrictor onto the compressor housing. It must be possible to affix seals between the restrictor (or the restrictor/compressor housing attachment), the compressor housing (or the housing/flange attachment) and the turbine housing (or the housing/flange attachment) (see drawing n° 254-4). It must be easy to inspect it, or possible to dismantle it for inspection.
The shape of the restrictor is free, subject to restrictions mentioned above.
This restrictor, which is compulsory in rallies, is not prohibited in other events, should a competitor decide to use it.

5.1.9) **Camshaft(s)**
Free, except the number and number of bearings. Timing is free. The material, type and dimensions of the pulleys, chains and belts for driving the camshafts are free. The material of the gearing and sprockets associated with the camshaft is free. The route and the number of belts and chains are free. The guides and tensioners associated with these chains or belts are also free, **as are protective covers.**

5.1.10) **Valves**
The material and the shape of the valves are free, but their characteristic dimensions (mentioned on the homologation form) must be retained, including the respective angles of the valves axis. Valve lift is free.
With regard to the cylinder head orifices (inner side of the engine), in the case of rotary engines, only those dimensions which have been entered on the Homologation Form have to be respected.
The cups, cotters and guides (even if they do not exist as original parts) are not subject to any restriction. Shims may be added under the springs.
The material of the seats is free.

5.1.11) **Rocker arms and tappets**
Rocker arms may only be modified in accordance with Article 5 "General Conditions" above. Tappets are free, provided they are interchangeable with the original ones. It is possible to use bracking plates to adjust them.

5.1.12) **Ignition**
The ignition coil(s), condenser, distributor, interrupter and plugs are free subject to the ignition system (battery/coil or magneto), remaining the same as provided by the manufacturer for the model concerned.
The fitting of an electronic ignition system, even without a mechanical interrupter, is allowed provided no mechanical part other than those mentioned hereabove is modified or changed, with the exception of the crankshaft, the flywheel

or the crankshaft pulley, for which modifications limited to the necessary additions will be possible. In the same conditions, it shall be possible to change an electronic ignition for a mechanical ignition. The number of plugs may not be modified ; that of the coils is free.

5.1.13) **Cooling**

Provided the original fitting on the car is retained, the radiator and its fixation are free, as are the lines linking it to the engine. A radiator screen may be fitted.

The fan and its drive system can be changed freely, or be withdrawn. It is allowed to add a fan per function.

Thermostat is free. Dimensions and material of the fan/turbine are free, as are their number.

The fitting of a water catch tank is allowed. The radiator cap may be locked.

The water injection devices may be disconnected, but not removed.

The expansion chamber may be modified ; if one does not exist originally, one may be added.

5.1.14) **Lubrication**

Radiator, oil/water exchanger, lines, thermostat, sump and filter are free, without modifying the bbodywork.

However, the fitting of an oil radiator outside the bodywork is only allowed below the horizontal plane passing through the hub in such a way that it does not protrude beyond the general perimeter of the car seen from above as it stands on the starting line, without modifying the bodywork.

Fitting an oil radiator in this manner does not allow the addition of an enveloping aerodynamic structure.

All air openings must have the sole effect of inducing the necessary air for the cooling of the radiator, and must not have any aerodynamic effect.

Oil pressure may be increased by changing the discharge valve spring.

If the lubrication system includes an open type sump breather, it must be equipped in such a way that the oil flows into a catch tank.

This must have a capacity of 2 litres for cars with a cubic capacity equal to or below 2,000 cc, and 3 litres for cars with a cubic capacity of over 2,000 cc. This container shall be made either out of plastic or shall include a transparent window.

An air/oil separator can be mounted outside the engine (maximum capacity 1 litre), in accordance with the following drawing 255-3.

The oil must only flow from the oil catch tank towards the engine by the force of gravity.

A fan may be fitted for cooling the engine oil, but must have no aerodynamic effect.

5.1.15) **Engine - Mountings - Angle and position**

Mountings are free (but not their number) provided that the angle and position of the engine within its compartment are not modified, and that Articles 5.7.1 and 5 - General Conditions are respected.

Supports may be welded to the engine and to the bodywork and their position is free.

In Rallies only, it is possible to cut out a part of the bulkhead situated in the engine compartment for the fitting of one or more air filters or for the intake of air ; however, such cut-outs must be strictly limited to those parts necessary for this installation (see drawing 255-6).

Furthermore, if the air intake ventilating the driving compartment is in the same zone as the air intake for the engine, this zone must be isolated from the air filter unit, in case of fire.

5.1.16) **Exhaust**

**Downstream** the exhaust manifold exit the exhaust is free provided that the sound levels in the country(ies) crossed are not exceeded if it is an event on open roads. The exhaust exit must be inside the car's perimeter. (See General Prescriptions, Article 3.6).

For cars with turbocharged engines the exhaust can only be modified after the turbocharger.

In the case of rotary engines, and on condition that the original dimensions of the inlet ports of the exhaust manifold are respected, the dimensions of the ducts in the manifold are free.

Thermal screens may be fitted on the exhaust manifold, the turbocharger and on the exhaust device, with, however, the sole function of thermal protection.

5.1.17) **Driving pulleys**, belts and chains for ancillaries situated outside the engine :
The material, type and dimensions of the pulleys, chains and belts for driving the ancillaries are free. The route and the number of belts and chains are free.

5.1.18) **Gaskets :** Free.

5.1.19) **Engine springs**
Springs are not subject to any restrictions but they must keep their original functioning principle.

5.1.20) **Starter**
It must be retained, but its make and type are free.

5.1.21) **Supercharging pressure**
This pressure may be modified by Article 5.1.19 and Article 5 - General Conditions.
With this in view, the connection between the housing and the waste-gate may be made adjustable if it is not originally so. The original system of operation of the waste-gate may be modified and be rendered adjustable but this system has to be maintained. A mechanical system has to stay mechanical, an electrical system has to stay electric, etc.

5.2) **TRANSMISSION**

5.2.1) **Clutch**
Clutch is free, but the homologated bell-housing must be retained, together with the operation type.

5.2.2) **Gearbox**
An additional lubrication and oil cooling device is allowed (circulation pump, radiator, and air intakes situated under the car) in the same conditions as for Article 5.1.14, but the original lubrication principle must be retained.
However, a gearbox homologated as an additional one with an oil pump can be used without this pump.
A fan may be fitted for cooling the gearbox oil, but must have no aerodynamic effect.
The gears of the additional gearbox on the homologation form may be changed, provided that they respect the informations given on this form.
Gearbox supports are free, but not their number.
May be used :
— The series housing with series ratios or one of the two sets of additional ratios ;
— One of the additional housings only with one of the additional sets of ratios.

5.2.3) **Final drive and differential**
A limited-slip differential is allowed provided that it can be fitted into the original housing without any modification other than those laid down in the above paragraph "General Conditions". The original differential may also be locked.
The original lubricating principle for the rear axle must be retained. However an additional lubricating and oil cooling device is allowed (circulation pump, radiator, and air intakes situated under the car) under the same conditions as for Article 5.1.14. The differential supports are free.

5.3) **SUSPENSION**
The position of the rotational axles of the mounting points of the suspension to the wheel uprights and to the shell (or chassis) must remain unchanged.
In the case of an oil-pneumatic suspension, lines and valves connected to the spheres (pneumatic parts) are free.

5.3.1) Reinforcement bars may be fitted on the suspension mounting points to the bodyshell or chassis of the same axle, on each side of the car's longitudinal axis. The distance between a suspension attachment point and an anchorage point of the bar cannot be more than 100 mm, unless the bar is a transversal strut homologated with the rollbar, and unless there is an upper bar atta-

ched to a MacPherson suspension or similar. In the latter case, the maximum distance between an anchorage point of the bar and the upper articulation point will be 150 mm (drawings 255-4 and 255-2).

Apart from these points, this bar must not be mounted on the bodyshell or the mechanical parts.

5.3.2) Strengthening of the mounting points and of the running gear, by adjunction of material, is allowed.

5.3.3) **Anti-roll bar**

The anti-roll bars homologated by the manufacturer may be replaced or removed, provided that their mounting points on the chassis remain unchanged.

These anchorage points can be used for the mounting of reinforcement bars.

5.3.4) The joints may be of a different material from the original ones.

The suspension mounting points to the bodyshell or chassis may be modified :

— by using a "Uniball" joint.

The original arm can be cut and a new seat for the "Uniball" welded.

Braces will be used next to the "Uniball" itself.

— by using a screw with a greater diameter.

— by reinforcing the anchorage point through the addition of material.

The position of the centre of the articulation cannot be changed (See drawing 255-5).

5.3.5) The material and main spring dimensions are free (but not the type). The spring seats may be made adjustable even if this includes the adjunction of material.

A coil spring may be replaced with two or more springs of the same type, concentric or in series, provided that they are fully interchangeable with the original and can be fitted without any modifications other than those specified in this article.

5.3.6) **Shock Absorbers**

Make is free, but not the number, the type (arm, etc.), the system of operation (hydraulic, friction, mixed, etc.) nor the supports. With regard to their principle of operation, gas-filled shock-absorbers will be considered as hydraulic shock-absorbers. If in order to change the damping element of a Mac Pherson suspension, or suspension working on an identical principle, it is necessary to replace the entire Mac Pherson strut, the replacement part must be mechanically equivalent to the original one, except for the damping element, and the spring cup.

5.4) **WHEELS AND TYRES**

Complete wheels (complete wheel = flange + rim + tyre) are free provided that they may be housed within the original bodywork ; this means the upper part of the wheel (rim flange and tyre flange), located vertically over the wheel hub centre, must be covered by the bodywork, when measured vertically.

Wheel fixations by bolts may be freely changed to fixations by pins and nuts.

The use of tyres intended for motor cycles is forbidden.

In no case should the width of the rim-tyre assembly in relation to the cubic capacity of the car, exceed the following :

Up to: 1 000 cm³ : 6.5"
1 300 cm³ : 7"
1 600 cm³ : 7.5"
2 000 cm³ : 8.5"
3 000 cm³ : 9"
3 500 cm³ : 10"
4 000 cm³ : 10"
4 500 cm³ : 11"
5 000 cm³ : 11"
5 500 cm³ : 12"
Over: 5 500 cm³ : 12"

The rim diameter may be increased or reduced by up to 2 inches in relation to the original dimensions.

The wheels do not necessarily have to be of the same diameter.

Should the wheel be fixed using a central nut, a safety spring must be in place on the nut throughout the duration of the event and must be replaced after each wheel change.

The springs must be painted "Dayglo" red. Spare springs must be available at all times.

The aerodynamic devices situated on the wheels are limited as follows (see drawing 255-9) :

— maximum diameter less than the inner diameter of the rim ;
— maximum offset 40 mm ;
— attachment by nuts/bolts or screws, not just by pressure.

5.5) **BRAKING SYSTEM**

5.5.1) **Brake linings**

Material and mounting method (riveted or bonded) are free provided that the dimensions of the linings are retained.

5.5.2) **Servo brakes, braking force adjusters, anti-locking devices**

They may be disconnected but not removed. The adjusting device is free. The braking force adjusters may not be moved from the compartment in which they are originally situated (cockpit, engine compartment, exterior, etc.).

5.5.3) **Cooling of brakes**

Protection shields may be modified or removed, but material may not be added.

Only one flexible pipe to bring the air to the brakes of each wheel is allowed, but its inside section must be able to fit into a circle with a 10 cm diameter.

The air pipes must not go beyond the perimeter of the car, seen from above.

5.5.4) **Brake discs**

The only operation allowed is rectification.

5.5.5) The handbrake device may be disconnected but only for closed course races (circuit, hillclimbs, slaloms).

5.5.6) **Hydraulic pipes**

Hydraulic pipes may be replaced by lines of aircraft quality.

5.6) **STEERING**

Power steering may be disconnected but not removed.

5.7) **BODYWORK - CHASSIS**

5.7.1) **Lightening and reinforcements**

Strengthening of the sprung parts of the chassis and bodywork is allowed provided that the material used follows the original shape and is in contact with it. Reinforcements by composite materials are allowed in accordance with this article, whatever their thickness, according to the drawing 255-8.

Insulating material may be removed from under the car floor, from the engine compartment, the luggage boot, and the wheel arches.

Unused supports (eg spare wheel) situated on the chassis/bodywork can be removed, unless they are supports for mechanical parts which cannot be moved or removed.

It is possible to close the holes in the cockpit, the engine and luggage compartments, and in the wings. The holes may be closed using sheet metal or plastic materials, and may be welded, stuck or riveted. The other holes in the bodywork may be closed, by adhesive tape only.

5.7.2) **Exterior**

5.7.2.1) **Bumpers :** Overriders may be removed.

5.7.2.2) **Hub-caps and wheel embellishers**

Hub-caps may be removed. Wheels embellishers must be removed.

5.7.2.3) **Windscreen wipers**

Motor, position, blades and mechanism are free but there should be at least one windscreen wiper provided for the windscreen. The windscreen washer device may be dismounted. The capacity of the washer tank may be increased and the tank may be moved inside the cockpit in accordance with Article 252.6.3.

5.7.2.4) External decorative strips may be removed. Any parts following external contour of the bodywork and less than 25 mm high will be considered as decorative strips.

5.7.2.5) Jacking points may be strengthened, moved, and increased in number.

5.7.2.6) Headlight covers may be fitted provided their sole aim is to protect the headlight glass and they have no effect on the car's aerodynamics.

5.7.2.7) Taking into account the different police regulations in each country registration plate locations and type are free.

5.7.2.8) The registration plate mountings may be dismounted but not their lighting system.

5.7.2.9) Additional safety fastenings for the windscreen and the side windows may be fitted provided they do not improve the aerodynamic qualities of the car.

5.7.2.10) The fitting of underbody protections is authorised in rallies only, provided that these really are protections which respect the ground clearance, which are removable and which are designed exclusively and specifically in order to protect the following parts : engine, radiator, suspension, gearbox, tank, transmission, exhaust, extinguisher bottles.

5.7.2.11) It is permitted to fold back the steel edges or reduce the plastic edges of the wings if they protrude inside the wheel housing.
The plastic sound-proofing parts may be removed from the interior of the wheel passages. These plastic elements may be changed for aluminium elements of the same shape. It is possible to fit plastic protection parts in the wings, on the same ground as aluminium parts.

5.7.2.12) Removable pneumatic jacks are permitted, but without the compressed air bottle on board (circuits only).

5.7.2.13) "Skirts" are banned. All non-homologated devices or constructions designed so as to fully or partially fill the space between the sprung part of the car and the ground is forbidden in all circumstances. No protection authorised by Article 255.5.7.2.10 can play a role in the aerodynamics of the car.

5.7.2.14) It is authorised to remove or replace existing supports between the bodywork and the chassis, but it is not possible to change or add locations.

5.7.2.15) The external rear-view mirror are free, if they are only rear-view mirrors. However, the external rear-view mirror on the driver's side, if it is modified or changed, must have a reflecting surface of at least 90 $cm^2$.

5.7.2.16) **Mudflaps** (Rally only)
If the supplementary regulations of an event authorise them, transversal mudflaps will be accepted under the following conditions :
— at least one third of the car width must be free, behind the front and the rear wheels (see drawing 255-12).
— there must be a gap of at least 20 cm between the right and the left mudflap in front of the rear wheels.
— the bottom of these mudflaps must be no more than 10 cm from the ground when the car is stopped, with nobody on board.

5.7.3) **Cockpit**

5.7.3.1) **Seats**
Occupants seats and their mountings are free provided that they comply with Article 253.16, but they must include a headrest. The front seats may be moved backwards but not beyond the vertical plane defined by the front edge of the original rear seat.
The passenger's seat may be removed as well as the rear seats.

5.7.3.2) Should the fuel tank be installed in the boot and the rear seats removed, a fireproof and liquid-proof bulkhead must separate the cockpit from the fuel tank.
In the case of twin-volume cars it will be possible to use a non-structural partition wall in transparent, non-flammable plastic between the cockpit and the tank arrangement.

5.7.3.3) **Dashboard**
The trimmings situated below the dashboard and which are not a part of it may be removed.

It is permitted to remove the part of the centre console which contains neither the heating nor the instruments (according to the drawing 255-7).

5.7.3.4) **Doors**
The following is allowed :
— the removal of soundproofing material provided that this does not modify the shape of the doors.
— the replacement of electric winders by manual ones.

5.7.3.5) **Roof**
All padding, insulating material and roof lining may be removed from the underside of the roof.

5.7.3.6) **Floor**
Insulating and padding materials may be removed. Carpets are free and may thus be removed.

5.7.3.7) Other padding materials may be removed.

5.7.3.8) **Heating system**
The original heating equipment may be replaced by another also provided by the manufacturer, and mentioned in his catalogue as supplied on demand.
It is permitted to blank off the water supply of the internal heating device, in order to prevent water spillage during an accident, providing an electric demist system or similar is available.

5.7.3.9) **Air-conditioning**
May be added or removed but heating must be assured.

5.7.3.10) **Steering wheel**
Free, the anti-theft device may be removed.
The steering can be on either the right or left provided that it is a question of a simple inversion of the steering wheels control, laid down and supplied by the manufacturer without any other mechanical modifications except those made necessary by the inversion.

5.7.3.11) A rollcage may be fitted. (See Article 253.8).

5.7.3.12) The rear removable window shelf in two-volume cars may be removed.

5.7.3.13) **Air pipes**
Air pipes may only pass through the cockpit if these are intended for the ventilation of the cockpit.

5.7.3.14) **Inside rear view mirrors**
If there are two efficient outside rear view mirrors (one on each side), the inside rear view mirror is optional.

5.7.4) **Additional accessories**
All those which have no influence on the car's behaviour are allowed, for example equipment which improves the aesthetics or comfort of the car interior (lighting, heating, radio, etc.).In no case can these accessories increase the engine power or influence the steering, transmission, brakes, or roadholding even in an indirect fashion. All controls must retain the role laid down for them by the manufacturer. They may be adapted to facilitate their use and accessibility, for example a longer handbrake lever, an additional flange on the brake pedal, etc.
The following is allowed :
1) The original windscreen may be replaced by a laminated windscreen with defrosting equipment incorporated.
2) Measuring instruments such as speedometers etc. may be installed or replaced, and possibly have different functions. Such installations must not involve any risk.
However, the speedometer may not be removed, if the supplementary regulations of the event prevent this.
3) The horn may be changed or an additional one added, within reach of the passenger. The horn is not compulsory on closed roads.
4) Circuit breakers may be freely changed vis-a-vis their use, position, or number in the case of additional accessories.
5) A "fly-off" hand brake may be installed.
6) Spare wheel(s) is not compulsory. However if there are any, they must be securely fixed, and not installed in the space reserved for the driver and

front passager (if he is on board). No exterior modification of the bodywork must result from this installation.

7) Additional compartments may be added to the glove compartment and additional pockets in the doors provided they use the original panels.

8) Insulating material may be added to the existing bulkhead to protect the passengers from fire.

9) It is permitted to change the joints of gear-box change systems.

### 5.8) ELECTRICAL SYSTEM

5.8.1) The nominal voltage of the electrical system including that of the supply circuit of the ignition must be retained.

5.8.2) The addition of relays and fuses to the electrical circuit is allowed as is the lengthening or addition of electric cables.
Electric cables and their sleeves are free.

5.8.3) **Battery**
The make and capacity of the battery(ies) are free. Each battery must be securely fixed and covered to avoid any short circuiting or leaks.
The number of batteries laid down by the manufacturer must be retained.
Should the battery be moved from its original position, it must be attached to the body using a metal seat and two metal clamps with an insulating covering, fixed to the floor by bolts and nuts. For attaching these clamps, bolts with a diameter of at least 10 mm must be used, and under each bolt, a counterplate at least 3 mm thick and with a surface of at least 20 $cm^2$ beneath the metal of the bodywork.
The battery must be covered by a leakproof plastic box, attached independently of the battery. Its location is free, however if in the cockpit it will only be possible behind the front seats. In this case, the protection box must include an air intake with its exit outside the cockpit (see drawings 255-10 and 255-11).

5.8.4) **Generator and voltage regulator**
Free, but neither the position nor the driving system of the generator may be modified. The position of the voltage regulator may be changed but may not be placed in the cockpit unless it was placed there originally.

5.8.5) **Lighting - Indicating**
All lighting and signalling devices must comply with the legal requirements of the country of the event or with the Convention on international road traffic.
Taking this comment into account the location of the indicators and parking lights may be modified, but the original orifices must be sealed. The make of the lighting devices is free.
Lighting devices which are part of the standard equipment must be those foreseen by the manufacturer and must comply where their functioning is concerned with what the manufacturer has foreseen for the model in question.
Original headlamps can be replaced by others having the same lighting functions as long as there is no cutout in the bodywork and the original holes are completely closed.
The operating system of the retractable headlights, as well as its energy source, may be modified.
Freedom is granted with regard to the frontal glass, the reflector and the bulbs. The mounting of additional headlights is authorised provided that the total number of headlights equipping the car does not exceed 8 (parking lights and side lights not included) and provided that the total is an even one.
They may, if necessary, be fitted into the front part of the coachwork or into the radiator grille, but such openings as needed in this case must be completely filled by the headlights. Original headlights may be rendered inoperative and may be covered with adhesive tape.
The replacement of a rectangular headlight by two circular ones, or vice-versa, fitted on a support corresponding to the dimensions of the aperture and sealing it completely is allowed. The fitting of a reverse-light is authorised, if necessary by embedding it into the coachwork, but provided it will only switch on when the reverse-gear is engaged and provided the police regulations are respected.

If a new registration plate support is provided for with lighting, the original system (support + lighting) may be removed. On circuits, plate lighting is not compulsory.

The Supplementary Regulations of an event may give waivers to the above mentioned prescriptions.

5.9) **FUEL TANKS**

5.9.1) The total capacity of the fuel tanks must not exceed the following limits:

| | |
|---|---|
| Cars up to 700 cc | : 60 l |
| Cars from 700 cc to 1,000 cc | : 70 l |
| Cars from 1,000 cc to 1,300 cc | : 80 l |
| Cars from 1,300 cc to 1,600 cc | : 90 l |
| Cars from 1,600 cc to 2,000 cc | : 100 l |
| Cars from 2,000 cc to 2,500 cc | : 110 l |
| Cars over 2,500 cc | : 120 l |

5.9.2) The fuel tank may be replaced by a safety fuel tank homologated by the FISA (specification FT3) or by another tank homologated by the car manufacturer. In this case, the number of tanks is free and the tank must be placed inside the luggage compartment or in the original location. The construction of collector tanks with a capacity of less than 1 litre is free.

The various homologated tanks and the FT3 tanks may also be combined (including the standard tank), insofar as the total of their capacities does not exceed the limits determined by Article 5.9.1. The position of the original tank may only be modified in cars of which the tank has been placed by the manufacturer inside the cockpit or close to the occupants.

In this case it shall be permissible either to install a protective device between the tank and the occupants of the car, or to place the tank in the luggage compartment, and, if need be, to modify its supplementary accessories (refuelling orifice, petrol pump, overflow pipe).

In any case, these changes of the position of the tanks should not give rise to any lightenings or reinforcements other than those provided for under Article 5.7.1 but the opening remaining after the removal of the original tank may be closed by the installation of a panel.

The filler holes may be located in the window panels.

It is possible to fit a radiator in the fuel circuit (maximum capacity one litre).

5.9.3) The use of an increased-capacity fuel tank may be authorised by an ASN with the agreement of the FISA for events organised under special geographic conditions (crossing desert or tropical country for example).

# *Art. 256* - **Specific regulations for Grand Touring Cars (Group B)**

1) **DEFINITION**
Grand Touring Cars.

2) **HOMOLOGATION**
At least 200 identical units (minimum 2 seats) of these cars must have been built in 12 consecutive months.

3) **FITTINGS AND MODIFICATIONS ALLOWED**
All those allowed for Touring Cars (Group A) with the following modifications. However, Article 255.5.1.8.3 (Restrictor) has not to be applied.

4) **WEIGHT**
Cars are subjected to the following minimum weight scale in relation to their cubic capacity.

| | | |
|---|---|---|
| Up to | 1,000 cm³ : | 620 kg |
| " | 1,300 cm³ : | 700 kg |
| " | 1,600 cm³ : | 780 kg |
| " | 2,000 cm³ : | 860 kg |
| " | 2,500 cm³ : | 940 kg |
| " | 3,000 cm³ : | 1 020 kg |
| " | 3,500 cm³ : | 1 100 kg |
| " | 4,000 cm³ : | 1 180 kg |
| " | 4,500 cm³ : | 1 260 kg |
| " | 5,000 cm³ : | 1 340 kg |
| " | 5,500 cm³ : | 1 420 kg |
| Over | 5,500 cm³ : | 1,500 kg |

5) **WHEELS AND TYRES**
Same text as for Touring Cars (Group A - Art. 5.4) except for the rim diameter and the maximum widths (in rallies only).
The total of the widths of two rim-tyre assemblies on one and the same side of the car must be less than or equal to:

| | | |
|---|---|---|
| Up to | 1,000 cm³ : | 13" |
| " | 1,300 cm³ : | 14" |
| " | 1,600 cm³ : | 15" |
| " | 2,000 cm³ : | 17" |
| " | 2,500 cm³ : | 18" |
| " | 3,000 cm³ : | 18" |
| " | 3,500 cm³ : | 20" |
| " | 4,000 cm³ : | 20" |
| " | 4,500 cm³ : | 22" |
| " | 5,000 cm³ : | 22" |
| " | 5,500 cm³ : | 24" |
| Over | 5,500 cm³ : | 24" |

**In rallies:** The rim diameter cannot exceed 16" (or 415 mm for metric dimensions).

# *Article 257* - **Sport Car technical regulations (Group C)**

SUMMARY

## ARTICLE 1 : DEFINITIONS

1) **Group C Car :** A two seater closed automobile designed solely for speed races on circuits or closed courses.

2) **Automobile :** A land vehicle running on at least four non-aligned complete wheels, of which at least two are used for steering and at least two for propulsion.

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.

4) **Coachwork :** All entirely sprung parts of the car licked by the external air stream, except the parts definitely associated with the mechanical functioning of the engine, transmission and running gear. Any air intake shall be considered to be part of the coachwork.

5) **Automobile Make :** An automobile make is a complete car. When a 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 the name of the car manufacturer. The name of the car manufacturer shall always precede that of the engine manufacturer. Should a hybrid car win a Championship Title, Cup or Trophy, this will be granted to the manufacturer of the car.

6) **Event :** An event shall consist of official practice and the race.

7) **Weight :** Is the weight of the car without the driver at all times during the event.

8) **Racing weight :** Is the weight of the car in running order with the driver aboard and the fuel tank full.

9) **Wheel :** Flange and rim.
**Complete wheel :** Flange, rim and tyre.

10) **Door :** That part of the coachwork that opens to give access to the driver and passenger compartments.

11) **Cockpit :** Inner structural volume which accomodates the driver and the passenger.

12) **Survival cell :** Continuous closed structure containing the cockpit and the fuel tank.

13) **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 capacity the number Pi shall be 3.1416.

14) **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.

15) **Sprung suspension :** All road wheels/axles must be suspended from the body/chassis unit by a springing medium (i.e. axles or wheels must not be connected directly to the chassis/body unit). The springing medium must not consist of bolts located through flexible bushes or flexible mountings. There must be independent movement of the axles/wheels uprights/stub axles giving suspension travel from "bump" to "droop" in excess of the flexibility of the mounting location attachments.

16) **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 mounting on the chassis to the rearmost one at the rear.

17) **Mechanical Components :** All those necessary for the propulsion, suspension, steering and braking, as well as all accessories, whether moving or not, which are necessary for their normal working.

## ARTICLE 2 : REGULATIONS

1) The following regulations governing the construction of Group C cars listed below are issued by the FISA.

2) Each year in October, the FISA will publish all changes made to these regulations. All such changes will take effect on the second 1 st January follo-

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

3) If an automobile is deemed to be dangerous, it may be excluded by the Stewards of the Meeting.

4) It is the duty of each competitor to satisfy the Scrutineers and the Stewards of the Meeting that his automobile complies with these regulations in their entirety at all times during an event.

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

## ARTICLE 3 : COACHWORK AND EXTERIOR DIMENSIONS

1) **Length :** The overall length of the car must not exceed 4800 mm.

2) **Width :** The overall width of the car including the complete wheels shall not exceed 2000 mm, with the steered wheels in the straight ahead position.

3) **Height :** The height measured vertically from the lowest point of the flat surface as defined under Article 3.7.3 to the highest point of the glazed part of the windscreen must be at least 920 mm. The height measured vertically from this same point of the flat surface to the highest point of the car must not exceed 1030 mm.

4) **Overhangs :** Front plus rear overhangs must not exceed 80 % of the wheelbase. The difference between the front and rear overhangs must not exceed 15 % of the wheelbase.

5) **Doors**

5.1) Two doors are compulsory.

5.2) The dimensions of the lower door panel (the part which is normally opaque) must be such as to allow a rectangle or a parallelogram of at least 500 mm wide and 300 mm high measured vertically, to be inserted in it. The corners of the rectangle or parallelogram may be rounded to a maximum radius of 150 mm.

5.3) The doors must have a window of transparent material into which a parallelogram must be able to be inscribed, the horizontal sides of which shall measure at least 400 mm. The height measured on the surface of the window perpendicularly to the horizontal sides, shall be at least 250 mm.

The corners of the parallelogram may be rounded to a maximum radius of 50 mm. The measurements shall be taken across the chord of the arc.

5.4) Each door must have only one outside handle which must be of a lever type operated by pulling upwards, and which must be clearly indicated by an arrow of a red or contrasting color.

5.5) The doors when opened must afford free access to the driver and passenger compartments.

5.6) The doors must be designed in such a way as to never restrict the lateral visibility of the driver.

5.7) Sliding doors are forbidden.

5.8) **The door hinges must be in the form of pins which can be removed without tools from the outside of the car.**

6) **Windscreen**

6.1) A windscreen made of one piece of laminated glass, or equivalent material approved by FISA, is compulsory. Windscreen safety fixing devices bolted or screwed to the car structure are compulsory (minimum number : 5).

6.2) The shape of the windscreen must be such that at a distance of 50 mm measured vertically downwards from the highest point of the transparent part, the width of the glazed surface is at least 250 mm measured across the chord of the arc on either side of the longitudinal axis of the car.

6.3) The shape of the screen must be such that its upper edge forms a regular, continuous convex line.

6.4) It must be possible to fit on the windscreen a vertical band 100 mm high by 950 mm (measured horizontally) across the chord of the arc between the inner faces of the windscreen, the centre of which shall be 300 mm vertically downwards from the highest point of the roof, excluding the air intakes.

7) **Bodywork :**

7.1) The bodywork must cover all mechanical components in vertical projection seen from above.

7.2) Any air intake higher than the highest point of the windscreen must not be forward of that point.

7.3) On the bottom of any car, rearward of the vertical plane tangent to the rear of the complete front wheels, and forward of the vertical plane tangent to the fore of the complete rear wheels, a solid, hard, impervious, flat, rigid and continuous surface must be provided over the whole width of the car and over a length of at least 900 mm measured along the longitudinal axis of the car.

This entire surface must be an integral part of the chassis/body unit and must not have any degree of freedom or any provision for adjustment in relation to this unit.

No space may exist between the "flat bottom" defined above and the chassis/body unit.

To help overcome any possible manufacturing difficulties a tolerance of ± 5 mm will be permitted on the "flat bottom" referred to above. This tolerance is not to permit designs against the spirit of the "flat bottom".

7.4) No part having an aerodynamic influence and no part of the coachwork may under any circumstances be located below the geometrical plane generated by the plane surface provided for by Article 3.7.3.

7.5) Any part having an aerodynamic influence and any part of the coachwork must be rigidly secured to the entirely sprung part of the car (chassis/body unit), must not have any degree of freedom, must be securely fixed and remain immobile in relation to this part while the car is in motion.

7.6) 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.

7.7) The maximum height of any point of the rear air extraction tunnel or venturi measured from the geometrical plane referred to in Article 3.7.3 must not exceed 280 mm.

A tunnel or venturi includes any underside surface of the bodywork facing the ground, excluding the wheel arches, the rearmost wing and the bodywork behind the complete rear wheels in frontal projection.

All these surfaces must be solid, hard, rigid, fixed, impervious and geometrically continuous.

No flexible material may be used to close the only holes allowed in the tunnels or venturis for suspension components, driveshafts and jacks.

**Exhausts may exit in the tunnels.**

7.8) Behind the rear wheels, the bodywork should terminate below the axis of the rear wheels.

Any cooling holes in the bodywork directed to the rear must be fitted with louvres or any other similar device to always prevent the tyres being visible from the rear.

The bodywork shall project over the complete wheels so as to cover at least half of their circumference and their whole width.

7.9) All elements of the bodywork shall be completely and neatly finished, with no temporary or makeshift elements.

7.10) In the case of open cars, the opening above the seats must be symmetrical on either side of the longitudinal axis of the car.

An open car is defined by the following prescriptions :

— The shape of the bodywork seen from one side must be identical to the shape seen from the other side.

— Seen from above, a central part separating the driver from the passenger, even if this part is not connected to the bodywork at the seat-back, can be accepted, as long as the opening is of the same size for the driver and for the passenger.

— The bodywork can be made with transparent material, but the rules concerning the windscreen must be respected.

7.11) The fasteners of the front and rear covers must be clearly indicated by arrows of a red or constrasting color and must be manœuvrable without tools.

**ARTICLE 4 : WEIGHT**

1) The weight of the car must not be less than 750 kg.

2) 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.

3) The adding to the car during the race of any solid material whatsoever

or the replacement during the race of any part of the car with another materially heavier is forbidden.

4) The weight may be checked at any time during the event with the quantity of liquids remaining in the tanks except after the race where the car will be emptied of all the fuel before weighing.

**ARTICLE 5 : ENGINE**

1) Type of engines allowed :

4-stroke, normally aspirated reciprocating piston engines.

Maximum cylinder capacity : 3500 $cm^3$.

Maximum number of cylinders : 12.

The total maximum quantity of fuel allowed for the whole race is free.

2) The normal section of each cylinder must be circular.

3) Diesel, 2-stroke, **rotary piston** and turbine engines are forbidden.

6) Temperature of the charge :

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.

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

5) **Exhausts outlets must be located either to the rear of the rear wheel axle or in the tunnels/venturis.** If the outlet pipes are pointing rearwards, their orifices shall be placed at a height neither greater than 45 cm nor less than 10 cm in relation to the ground.

**ARTICLE 6 : FUEL SYSTEM**

1) **Fuel specification :**

1.1) Fuel must be **petrol** with no other additive other than that of a lubricant on current sale which cannot increase the octane rating.

The fuel must have the following characteristics :

— A maximum of 100 RON, the measurement being made according to the standard ASTM D2699-**86**, the fuel being accepted or rejected according to ASTM D3244 with a confidence limit of 95 %.

— Specific gravity between 720 and 785 $kg/m^3$ at 15°C (measured according to ASTM **D4052**).

— A maximum of **2.8** % oxygen (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 measuring of the nitrogen content will be carried out according to the standard ASTM D3228 and that of the oxygen content by elemental analysis with a tolerance of 0.2 %.

— Maximum content of peroxides and nitrooxide compounds : 100 ppm (ASTM D3703).

— Maximum lead content : 0.40 g/l or the standard of the country of the event if this is lower **(ASTM D3341 or D3237)**.

— Maximum benzene content : 5 % in volume **(ASTM D3606)**.

If the fuel available locally for the event is not of a sufficient quality for use by competitors, the ASN of the organising country must ask the FISA for a waiver in order to enable the use of fuel not corresponding to the characteristics defined above.

1.2) The storing of fuel on board the car at a temperature of more than 10°C below the ambient temperature is forbidden.

The use of any device, whether on board the car or not, to reduce the temperature of the fuel below the ambient temperature is forbidden.

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

2) **Fuel lines, pumps and filters :**

2.1) **All fuel lines must have a minimum burst pressure of 41 bar (600 psi) and a minimum operating pressure of 135°C (250°F). When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).**

2.2) No lines containing fuel may pass through the cockpit.

2.3) No fuel pumps or fuel filters may be fitted inside the cockpit.

2.4) All fuel lines, filters and pumps must be positioned in such a way, that in the event of leakage, it cannot result in fuel entering the cockpit.

3) **Fuel tank :**

3.1) All cars must be equipped with a single fuel tank.

3.2) 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. However, a maximum of 2 litres of fuel may be kept outside the fuel tank but only that which is necessary for the normal running of the engine.
The fuel tank must be situated at not more than 65 cm from the longitudinal axis of the car.

3.3) The fuel tank must be a rubber bladder conforming to or exceeding the specifications of FIA/FT3.

3.4) All rubber bladders must be made by manufacturers recognised by the FISA. In order to obtain the agreement of the FISA a manufacturer must prove the compliance of its product with the specifications approved by the FISA. 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 FISA (See technical list N° 1).

3.5) 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.

3.6) No bladders may be used more than five years after the date of manufacturer.

3.7) All fuel fittings in the tank (including air vents, inlets, outlets, tank fillers, inner tank connectors and access openings) must be metal fittings bonded into the fuel tank.

3.8) All connections between the fuel tank and the chassis (including tank fillers, air vents, access openings, inlets and outlets) must be frangible. By frangible is meant that should the fuel tank move in relation to the chassis in the event of an accident, the connection between the fuel tank and the chassis will fail at a load which is less than 50 % of the load required to pull the bonded metal fitting out of the tank.

3.9) 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 fail the fuel line fitting out of the fuel tank.

3.10) The tank must be isolated by means of bulkheads so that in case of spillage, leakage or accident happening to the tank, the fuel will not pass into the driver or engine compartment or come into contact with any part of the exhaust system.

4) **Tank fillers and caps :**

4.1) All cars must be fitted with fuel tank fillers and vents which must be single or combined units installed on both sides of the car.
Both fillers and air vents must be equipped with leakproof dry break couplings complying with the dead man principle and therefore not incorporating any retaining device when in an open position (spring loaded balls, bayonet, etc.). Couplings dimensions are given in the diagrams of Article 252.8.3 of Appendix J. All filler and vent caps must be designed to ensure an efficient locking action which reduces the risks of an accidental opening following a crash impact or incomplete locking after refuelling.

4.2) The tank fillers, vents and caps must not protrude beyond the bodywork.

4.3) The tank fillers, vents and breathers must be placed where they would not be vulnerable in the event of an accident.

4.4) Any breather pipe connecting the tank to atmosphere must exit on the outside of the bodywork, must be fitted with a non-return valve and must be designed in such a way as to avoid any liquid leakage when the car is running or upside down.

5) **Refuelling :**

Refuelling the car by any other means than by gravity with a maximum height of 2 metres above the track where the refuelling takes place is forbidden throughout the duration of the event.

During the race, only one autonomous supply tank complying with the diagram N° 257-2 must be used per car. This tank must have a simple cylindrical internal shape and must not have any additional internal parts.

The refuelling pipe (maximum 1'' 1/2 inner diameter) must be provided with a leak-proof coupling to fit the filler mounted on the car.

During refuelling the outlet of the air-vent must be connected with the appropriate coupling to the main supply-tank by an identical 1'' 1/2 I/D hose.

All metal parts of the refuelling system from the coupling to the supply tank and its rack must be connected electrically to the earth.

A 90° cut off valve of maximum diameter 1''1/2 situated on the outlet of the main supply tank and controlling the fuel flow must be manned at all times during refuelling.

All hoses used must have a maximum inner diameter of 1''1/2 inches.

For refuelling on the starting grid, only an unpressurised container not exceeding 12 litres capacity which is vented to air and has a leak proof coupling connecting it to the tank filler on the car can be used, as well as an overflow bottle of the type defined in Article 252.8.3 of Appendix J.

During practice, the standard supply tank or the 12 litre container as defined above must be used.

6) **Fuel capacity :**

The maximum amount of fuel which may be carried on board is 100 l. Any device, system, procedure, construction or design, the purpose and/or effect of which is any increase whatsoever, even temporarily, of the total fuel storage capacity beyond the maximum of 100 litres is forbidden.

**ARTICLE 7 : OIL SYSTEM**

1) **Oil tanks**

1.1) The quantity of oil carried on board must not exceed 20 litres.

1.2) No oil storage tank may be located further from the longitudinal axis of the car than the lateral extremities of the survival cell and at a maximum of 65 cm from the axis. No part of the car containing oil may be situated aft of the gearbox or final drive casing on a rear wheel drive car. In the case of front wheel drive, no part of the car containing oil may be situated behind the complete rear wheels.

1.3) All oil storage tanks situated outside the main structure of the car must be surrounded by a 10 mm thick crushable structure, as defined in Article 14.3.3.

2) **Oil catch tank :** If a car has a lubrication system which includes an open type sump breather, it must vent into a catch tank of at least 3 litres capacity. The catch tank should either be made of transparent material or include a transparent panel.

3) **Oil lines**

3.1) **All lubricating oil lines must have a minimum burst pressure of 41 bar (600 psi) and a minimum operating temperature of 135°C (250°F). When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).**

3.2) No lines containing **lubricating** oil may pass through the cockpit.

## ARTICLE 8 : ELECTRICAL EQUIPMENT

**1) Battery :** The battery or batteries must not be located in the cockpit, must be securely fixed and be completely protected by a box made of insulating material.

2) **Windscreen Wiper :** The car must be fitted with at least one windscreen wiper which must be in working order throughout the event.

3) **Starting :** A starter is compulsory with electrical or other source of energy carried aboard the car, and able to be controlled by the driver when normally in his seat.

4) **Lighting equipment :**

4.1) All lighting equipment must be in working order throughout the event, even if the event is held entirely in daylight.

4.2) All cars must be fitted with two red stop lights and two red rear lights. They must be located symmetrically on either side of the longitudinal axis of the car and be mounted in a visible position.

4.3) All cars must be fitted with at least two headlights.

4.4) All cars must be fitted with direction indicators mounted at the front and rear of the vehicle (with side indicators mounted to the rear of the front wheel axis).

4.5) All cars must have at least one red rain light of at least 21 watts in working order throughout the event which :

- Faces rearward and is clearly visible from the rear ;
- Is not mounted less than 40 cm from the ground.
- Is not mounted more than 10 cm from the car centre line or, in case of two lights, are mounted symmetrically on either side of the longitudinal axis of the car and on the bodywork behind the rear wheels in frontal projection ;
- Has a minimum surface of 50 sq.cm ;
- Can be switched on by the driver when seated normally in the car ;

In addition the lens and reflector must conform to the standards EEC 77/538 or ECE 38 for rear fog lamps of motor vehicles and must carry the corresponding approval marking.

5) **Cables :**

All electrical circuits must be enclosed in a fire-resistant material.

## ARTICLE 9 : TRANSMISSION

1) Four wheel drive cars are forbidden.

2) All cars must have a reverse gear which must be in working order throughout the event. It must be possible for the driver to select the reverse gear while seated normally and with the engine running.

## ARTICLE 10 : BRAKES

1) 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 operate the brakes on at least two wheels.

## ARTICLE 11 : WHEELS AND TYRES

1) The maximum width of the complete wheel is 16".

This measurement will be taken horizontally at axle height, with the tyre at normal running pressure and the car in running order with the driver aboard.

2) The number of wheels is fixed at four.

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

Alternatively, any wheel retaining device which has been approved by FISA must be used throughout the event.

4) **Pressure control valves on the wheels are forbidden.**

## ARTICLE 12 : COCKPIT

1) **Cockpit definition :**

1.1) The structural volume of the cockpit must be symmetrical on either side of the longitudinal centre line of the car.

1.2) Up to a height of 30 cm from the floor, the driver in his normal driving position must be located on one side of the longitudinal centre line of the car.

2) **Elbow width :**
The minimum elbow width in the cockpit must be 110 cm, maintained over a height of 10 cm and 25 cm in length. This measurement will be taken horizontally and perpendicularly to the longitudinal centre line of the car.

3) **Footwells :**
3.1) The car must have two footwells, defined as two free volumes on either side of the longitudinal centre line of the car, each one having a minimum vertical cross section of 750 sq.cm.
This cross section must be maintained from the pedal faces back to the vertical projection of the centre of the steering wheel.

3.2) The minimum width of each footwell is 25 cm and this width must be maintained over a height of at least 25 cm.

4) **Equipment permitted in the cockpit :**
4.1) The only components which can be fitted in the cockpit are :
- Safety equipment and structures
- Tool kit
- Seat and controls necessary for the driving
- Electronic equipment
- Driver cooling system.

4.2) Any of these components must still respect the 750 sq.cm free footwell sections, each side of the centre line of the car.

4.3) When any of the above equipment is installed in the cockpit, it must still be possible to exit the cockpit in the time specified in Article 12.5.1.

4.4) These components must be covered by a rigid protection if they have sharp edges that could cause injury. Their fixations must withstand a 25 g deceleration.

5) **Cockpit exit time :**
5.1) The cockpit must be designed so as to allow the driver to get out from his normal driving position in 7 seconds through the driver's door and in 9 seconds through the passenger's door.
5.2) For the purposes of the above tests, the driver must be wearing all normal driving equipment, the seat belts must be fastened, the steering wheel must be in place in the most inconvenient position, and the doors must be closed.

6) **Ventilation :**
A fresh air inlet to the cockpit and a used air outlet must be fitted to all cars.

7) **Pedals :**
The soles of the feet of the driver, seated in the normal driving position and with his feet on the pedals and 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 the maximum forward extension shall not be situated to the fore of the vertical plane referred to above.

8) **Dashboard hoop :**
The driver, normally seated in his driving position with his seat belts fastened and with the steering wheel in place must be able to raise both legs together so that his knees reach the plane of the steering wheel in the rearward direction. This action must not be obstructed by any part of the car.

9) **Lines in the cockpit :**
No lines containing fuel, cooling water, lubricating oil or hydraulic fluid may pass through the cockpit. Only brake lines may pass through the cockpit but without any connector installed inside.
All lines containing hydraulic fluid, with the exception of lines under gravity head only, must have a minimum burst pressure of 70 bar (1000 psi) or higher according to the operating pressure, and a minimum operating temperature of 232°C (450°F). When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

10) **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.

**ARTICLE 13 : SAFETY EQUIPMENT**
1) **Fire extinguishers :**
1.1) Extinguishing products allowed are :
BCF ($CF_2ClBr$) ; BTM ($CBrF_3$) ; TDE ($C_2Br_2F_4$).
1.2) The minimum capacities are :
- Cockpit : 2.5 kg (closed cars)
  5 kg (open cars).
- Engine compartment : 5 kg (closed cars)
  2.5 kg (open cars).

1.3) The extinguisher bottles must be adequately protected, must be mounted in the **survival cell** and must not be mounted forward of the centre line of the front wheels. In all cases the mountings of the extinguishers must be capable of withstanding a deceleration of 25 g. The extinguishing equipment must withstand fire.
1.4) In the event of discharge both bottles must be released simultaneously.
Discharge time must be as follows :
- Engine compartment : 10 seconds minimum.
- Cockpit : 30 seconds ± 5 for BCF and TDE
  60 seconds ± 5 for BTM.

1.5) Any triggering system having its own source of energy is permitted provided it is possible to operate all extinguishers in case of failure of the car's main electric circuit.
The driver must be able to trigger all extinguishers manually when seated normally in the car 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 handle (see Article 13.5). It must be marked with a letter "E" in red inside a white circle of at least 10 cm diameter with a red edge.
1.6) The following weights shall be clearly marked on each bottle :
- Weight of the empty bottle.
- Weight of the extinguishing agent.
- Total charged weight.

1.7) The system must work in any position even when the car is upside down.
1.8) The extinguisher nozzles must be installed in such a way that they are not directly pointed at the driver.

2) **Safety belts :**
2.1) The wearing of two shoulder straps, one abdominal strap and two straps between the legs is compulsory. These straps must comply with FIA standard N° 8853-85.
2.2) A static test of the anchorages must be performed with loads and procedures as defined in FIA standard N° 8853-85.
A dossier including all details of the test must be submitted to FISA.

3) **Rear view mirrors :**
The car must be fitted with two rear view mirrors, one fitted on each side of the car in order to give an efficient view to the rear. Each mirror must have a minimum area of 100 sq.cm.

4) **Headrest :**
4.1) A headrest of a minimum area of 400 sq.cm must be fitted to all cars. Its surface must be continuous and without protruding parts.
4.2) The headrest must deflect less than 5 cm under an 85 kgf rearward force.
4.3) The headrest shall be located in a position such that the headrest is the first point of contact with the driver's helmet in the event of an impact projecting the driver's head rearwards, when he is seated in the normal driving position. The distance between the driver's helmet and the headrest should be kept to a minimum so that the distance moved by the helmet under the above mentioned force is less than 5 cm.

5) **Circuit breaker :**
The driver when seated normally with the safety belt fastened and the stee-

ring wheel in place, must be able to cut off all electrical circuits and stop the engine by means of a spark proof circuit breaker.
The internal switch must be marked by a symbol showing a red spark in a white edged blue triangle.
There must also be a clearly indicated external handle which rescue personel can operate from a distance by a hook. This handle must be located at the lower part of the windscreen pillar on the driver's side.

6) **Towing eye :**

6.1) A towing eye with a minimum inner diameter of 80 mm must be securely fitted to the front and rear structures of all cars.

6.2) It must be positioned in such a way that it can be used should the car be stopped in a gravel bed.

6.3) The towing eye must be clearly visible and painted in yellow, red or orange and must be located inside the contour of the bodywork when viewed from above.

**ARTICLE 14 : SAFETY STRUCTURES**

1) **General :**

1.1) The basic purpose of safety structures is to protect the driver. This purpose is the primary design conside- ration.

1.2) Chromium plating of suspension parts is forbidden. The use of magnesium alloy sheet less than 3 mm thick is forbidden.

2) **Rollover structures :**

2.1) The car must be fitted with two rollbars, one to the front and one to the rear of the chest of the driver and of the passenger. Both rollbars must correspond in shape to the inner profile of the upper part of the cockpit, and must be linked at the top by at least one tubular member (preferably two with their junctions as apart as possible) or a box member. In addition, the rear rollbar shall comprise at least one diagonal reinforcing member and two backstays directed rearwards (see drawing N° 257-1).
The various authorized diagonal members are the following : MQ, MS, NP, NR.

2.2) When no static load test is performed, the structure shall be built with steel tubes exclusively having at least the following characteristics :

| | |
|---|---|
| Cold drawn seamless<br>Carbon steel - E 30 daN | Diam. 48.3<br>x 2.6 mm |
| Alloy steel type 25CD4,<br>SAE 4125 etc.<br>E 50 daN | Diam. 42.4<br>x 2.6 mm |

Design must be made according to the following considerations :

2.2.1) Whenever bolts and nuts are used, the bolts must be of a sufficient minimum diameter according to the number used. They must be of the highest possible quality (preferably aircraft) and at least of ISO standard 8.8. Square head bolts and nuts must not be used.

2.2.2) One continuous length of tubing must be used for the rollbars with smooth continuous bends and no evidence of crimping or wall failure.
Centreline bend radius of the tube must not be smaller than 3 times the tube diameter.

2.2.3) All welding must be of the highest quality possible with full penetration (preferably arc welding and in particular gas protected welding). Although the good outside appearance of a weld does not necessarily guarantee its quality, poor looking welds are never a sign of good workmanship.
When using heat treated steel, the special instructions of the manufacturers must be followed (special electrodes, gas protected welding, etc.).

2.2.4) Reinforcing members and backstays must be of the same tubing size as that used for the rollbars.
Diagonal member and backstays must be straight, not curved.

2.2.5) The upper mounting points of the backstays must be as close as pos-

sible to the top of the rollbar and in any case at least 3/4 of the way up the total height of the rollbar.

The upper and lower ends of the diagonal member must join the main rollbar or backstay or monocoque the nearest as possible to the top junction rollbar to backstay or to the rollbar lower mounting foot.

2.2.6) **Mounting of the rollcage to the monocoque/chassis :**

The rollbars must make use of two plates :

— a steel plate, welded or riveted or bolted onto the monocoque, at least 3 mm thick with an extension along a vertical component of the monocoque (see drawings 253-22 to 253-36 of Appendix J).

This plate must have a total surface of at least 120 $cm^2$, a third of which at least constitutes the link with the vertical body component.

— a plate attached to the tube, having at least the same thickness as the metal of the tube to which it is fixed. These two plates shall be joined together by at least three hexagonal headed bolts and nuts of at least 8 mm diameter or by at least three high-resistance Allen screws and bolts of a minimum 8 mm diameter. More bolts may be used or the rollbar legs may in addition be welded to the reinforcement plates. In no case may the rollbar be welded directly on to the monocoque without a reinforcement plate.

Where the rollbar rests on a box member, the latter must be locally reinforced with for example additional plates, skins of increased thickness, etc.

Identical reinforcing plates must be used for diagonal members or backstays fixed to the monocoque. Each backstay must be fixed to the main structure of the car by bolts having a cumulative section area at least two thirds of that specified for the rollbar mounting foot.

2.2.7) **Removable members :**

Should removable members be used in the structure, the demountable joints must comply with a type approved by FISA. The following joints are approved : a tapered connection, a twin lug connection with axis working under double shearing conditions and a muff-connection complying with drawings 253-37 to 253-41 of Appendix J.

These demountable joints cannot be used for the front and rear rollbars.

2.3) Recognised car or rollbar manufacturers may also present a rollcage of free design with regard to the material, the dimensions of the tubes and the mounting provided that the entire rollover structure is subjected to a static load test by applying three loads simultaneously, which are 1.5 w laterally, 5.5 w longitudinally in the rearward direction and 7.5 w vertically, "w" being 900 kgf.

These loads will be applied to the top of the structure through a rigid pad resting on the front and rear rollbars and inclined laterally of the same angle as the loading axis.

During the test, the rollover structure must be attached to the complete monocoque and main structure, supported on its underside by a flat plate and prevented from moving laterally and longitudinally in such a way as not to increase the resistance of the rollover structures.

Under the load, the deformation of the top of the inside structure must be less than 50 mm and there must be no structural failure of the monocoque/chassis, of the rollover structures and of their junctions.

3) **Crushable structures :**

3.1) The bottom and the sides in lateral projection of the fuel tank must be protected by a crushable structure at least 1 cm thick.
Radiators can be used as crushable structures.

3.2) If the fuel tank is situated less than 20 cm from the lateral flanks of the car, the entire surface must be protected by a crushable structure at least 10 cm thick.

3.3) The crushable structure must be a sandwich construction based on a fire resistant core with a minimum crushing strength of 18 N/sq.cm., and two sheets of at least 1.5 mm thickness and having a tensile strength of 225 N/sq.mm.

3.4) Only water pipes may pass through the crushable structure, but not fuel, oil or electrical lines.

4) **Firewall and floor :**

4.1) Cars must be equipped with a firewall between the driver and engine to prevent the passage of flames from the engine compartment to the cockpit. Any holes in the firewall must be of the minimum size for the passage of controls and wires and must be completely sealed.

4.2) A crushable structure of 1 cm thick similar to that detailed in Article 14.3.3, must be the basis of the cockpit floor.

5) **Survival cell and frontal protection :**

5.1) **General prescriptions :**

5.1.1) The chassis structure must include a survival cell extending from behind the fuel tank to a plane at least 20 cm in front of the soles of the driver's feet, with his feet resting on the pedals and the pedals in the inoperative position. The survival cell must have openings corresponding to the doors, the minimum dimensions of which are given in Article 3.5.

Any other openings in the survival cell must be of the minimum size to allow access to mechanical components.

The safety structures described in Article 14.2 must be a part of the survival cell or solidly attached to it.

5.1.2) 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 (i.e. with bolts which require tools for removal).

5.1.3) The minimum height of the survival cell, in any vertical section but not considering the structure higher than the bottom of the windscreen, must be 30 cm.

5.2) **Basic specifications :**

5.2.1) The survival cell and frontal absorbing structure must include two continuous box members, one on the driver's external side and one on the passenger's external side.

5.2.2) The side box members of the survival cell must be connected by at least two closed bulkheads, one at the frontal extremity and one at the main rollover bar level and by a further hoop at the front rollover bar level.

5.2.3) The frontal absorbing structure must connect the forward box members all along their length and must be a continuation of the panels of the survival cell. This structure must be metallic using honeycomb sandwich construction but radiators may be incorporated in this structure between the box members.

The frontal absorbing structure must have a minimum length of 40 cm and a minimum height of 15 cm in any vertical section.

5.2.4) The minimum total cross section of the frontal absorbing structure and survival cell must be 800 $cm^2$.

5.2.5) The minimum cross section of each box member must be 250 $cm^2$ between the main rollover bar and the foremost point of the front rollover bar mountings ; it may then taper to 150 $cm^2$ up to the survival cell frontal extremity (considering only areas located at more than 25 cm from the car' centre line) and then 100 $cm^2$ up to the frontal absorbing structure extremity.

5.2.6) The minimum structural material cross sections in the box members across the sections mentioned above are 12, 10 and 5 $cm^2$ respectively.

5.2.7) The structural material of the box members must have a minimum tensile strength of 310 $N/mm^2$ for composite materials or 225 $N/mm^2$ for metallic materials. The total of all the skin thickness across the section of each box member must be at least 3 mm.

5.2.8) All holes and cutouts in the boxes must be strongly reinforced and all material minimum cross sections complied with.

5.3) **Crash testing of the frontal absorbing structure :**

5.3.1) The frontal absorbing structure can be designed freely when at least that part of the survival cell forward of a transversal section 20 cm to the rear of the soles of the driver's feet in static position and the frontal absorbing struc-

ture are subjected to an impact test against a solid, vertical barrier placed at right angle to the longitudinal axis of the car.

The test structure must be solidly attached to the trolley in such a way as not to increase its impact resistance. For the purpose of the test, the total weight of the trolley and test structure or complete car shall be 900 kg and the velocity of impact 13,9 metres/second.

During the test, the maximum average deceleration must not exceed 25 g and the final deformation must be contained within the zone ahead of the soles of the driver's feet.

This test must be carried out under the supervision of a FISA technical delegate in recognised testing centres approved by FISA, which list is available from FISA.

5.3.2) In addition to the above frontal impact test, and to test the attachments of the frontal absorbing structure onto the survival cell, a static side load test shall be performed on a vertical plane passing 50 cm forward of the front wheel axis using a pad of 10 cm length and 30 cm height conforming to the shape of the structure with the centre of area of the pad at the mid point of the height of the structure. A constant transverse horizontal load of 2000 daN shall be applied to the pad at its centre of area through a ball jointed junction. After 1/2 minute of application there shall be no structural failure of the absorbing structure or survival cell or of any attachment between the two. During that test, the same part of the box members as defined in the frontal impact test above or the complete survival cell will be solidly secured to a flat plate but not in such a way as to increase the strength of the attachments being tested.

5.4) **Crash testing of the complete car :**

The survival cell and frontal absorbing structure can be designed freely without considering the basic specifications of paragraph 5.2 above subject to the following conditions :

5.4.1) The general prescriptions of paragraph 5.1 above must be followed.

5.4.2) The crash testing defined in paragraph 5.3 above must be performed identically but with the complete monocoque including the frontal absorbing structure, the survival cell and the crushable structure around the fuel tank.

**The entire crash structure 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 with its fuel bladder full of water. A dummy as defined in FIA Standard n° 8853-1985 must be installed in the survival cell with the safety belts defined in Article 13.2 fastened. The extinguishers must also be installed as in Article 13.1.**

5.4.3) In addition to the impact test described above, the survival cell **wedged only longitudinally on its rear face** shall be subjected to **three** separate static lateral load tests :

a) in the cockpit area on a vertical plane passing through the centre of the seat belt lap strap fixing.

b) in the fuel tank area on a vertical plane passing through the centre of area of the fuel tank in side elevation.

c) on a vertical plane passing **halfway between** the front wheel axis **and the centre of the dashboard hoop**.

For the tests described above, a pad 10 cm long and 30 cm 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. It is permissable to place rubber 3 mm thick between the pads and the survival cell.

A constant transverse horizontal load of 2000 daN shall be applied 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 surfaces of the survival cell and no permanent deformation **of these surfaces** after the load is removed, **with a tolerance of 1 mm between surfaces. The**

**deformation shall be measured at the top of the pads on the inner surfaces.**

5.5) The static load tests in Articles 14.2.3, 14.5.3.2 and 14.5.4.3 must be carried out under the supervision of a FISA technical delegate and using measuring equipment verified by FISA.

A dossier defining the structure, test methods and results of all tests shall be submitted to FISA before the use of the relevant model of car in a group C event.

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

**ARTICLE 15 : FINAL TEXT**

The final text of these regulations is the French text which shall be used should any controversy arise over their interpretation.

**ARTICLE 16 : FIA CUP REGULATIONS**

**Cars entered in the FIA Cup must be in conformity with the present regulations apart from the following points :**

**1) Weight :**

**The weight of the car must not be less than 700 kg.**

**2) Limitation of the engine rev speed :**

**Maximum crankshaft r.p.m. authorized : to be determined.**

**An electronic limiter approved by the FISA must be fitted to each car and used throughout the entire duration of the event. The Scrutineers may inspect the electronic limiter at any time during the event.**

**3) Brakes :**

**Carbon discs are forbidden.**

# *Art. 260* - **Sports-Prototype Junior Technical Regulations (Group C3)**

1) **DEFINITION**

Two seater competition automobiles built specially for races on closed circuits.

2) **SPECIFICATIONS**

2.1) **Engine**

The whole made up by the block, cylinders and cylinderheads. All modifications are allowed, but the engine must compulsorily be a reciprocating engine, without supercharging, with a maximum cubic capacity of 2.5 litres, or Wankel type (coefficient 1.8). Oval pistons and water injection are forbidden.

2.2) **Weight**

The cars must have the following minimum weight :

Engine capacity less than or equal to 1000 cc: 500 kg
" " from 1000 cc to 1300 cc: 535 kg
" " from 1300 cc to 1600 cc: 560 kg
" " from 1600 cc to 2000 cc: 600 kg
" " from 2000 cc to 2500 cc: 640 kg

This is the real weight of the empty car, with no persons or bagage on board, the car being fully equipped. All the safety parts normally prescribed are included in this weight.

The weight may be checked at any time during an event with the quantity of liquid remaining in the tanks and after emptying the car of all the fuel (on the understanding that it is forbidden to add oil, water or any other liquid before the weighing).

The weight of the car may be completed by means of one or several ballasts incorporated in the material of the car provided that these are solid and unitary blocks, fixed by means of tools and offering the possibility for seals to be affixed if the Scrutineers deem it necessary.

2.3) **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 mounting on the chassis to the rearmost one at the rear.

3) **OTHER PRESCRIPTIONS**

3.1) **Exterior dimensions**

Maximum width : 200 cm.
Maximum length : 480 cm.

The height measured vertically from the lowest point of the flat surface as defined under Article 3.8 to the highest point of the car must not exceed 1030 mm, except with regard to the rollbar which must not give rise to an aerodynamic structure.

— Front plus rear overhangs must not exceed 80 % of the wheelbase.
— The difference between the front and rear overhangs must not exceed 15 % of the wheelbase.

3.2) **Doors**

— Closed cars :

Two doors are obligatory. The word door should be taken as meaning that part of the bodywork which opens to give access to the seats. The doors, when open, must afford free access to the seats. No mechanical part should obstruct access to the seats.

The outside door handle on closed cars must be clearly indicated.

The dimensions of the lower door panel (the part which is normally opaque) must be such as to allow a parallelogram of at least 50 cm wide and 30 cm height, measured vertically, to be inserted in it. The corners of the parallelogram may be rounded to a maximum radius of 15 cm.

Cars with sliding doors will not be allowed unless they include a safety system enabling a quick and easy evacuation of the car's occupants in case of accident.

The doors should have a window of transparent material into which a parallelogram should be able to be inscribed, the horizontal sides of which shall measure at least 40 cm. The height measured on the surface of the window perpendicularly to the horizontal sides, shall be at least 25 cm. The angles may

be rounded with a maximum radius of 5 cm. The measurements shall be taken across the chord of the arc.

The doors should be designed in such a way as to never restrict the lateral vision of the driver.

— Open cars :

Doors are optional. If they exist, they must respect the dimensions laid down in the previous paragraph (closed cars), as far as the opaque part is concerned. If they do not exist, the bodywork at the sides of the cockpit must respect these dimensions.

3.3) **Windscreen**

— Closed cars :

A windscreen of a single piece, made of laminated glass, is compulsory.

The shape of the windscreen must be such that at a distance of 5 cm measured vertically downwards from the highest point of the transparent part, the width of the glazed surface is at least 25 cm measured across the chord of the arc on either side of the longitudinal axis of the car.

The shape of the screen must be such that its upper edge forms a regular, continuous convex line.

It must be possible to fit on the windscreen a band 10 cm high (measured vertically) by 95 cm (measured horizontally) across the chord of the arc between the inner faces of the windscreen, the centre of which will be 30 cm vertically from the highest point of the roof.

— Open cars :

A windscreen is optional and its dimensions are free.

3.4) **Cockpit**

3.4.1) Cockpit : Inner volume in which the driver and the passenger sit.

3.4.2) The structural volume of the cockpit must be symmetrical on either side of the longitudinal centre line of the car.

3.4.3) Up to a height of 30 cm from the floor, the driver in his normal driving position must be located on one side of the longitudinal centre line of the car.

3.4.4) The minimum elbow width above the seat is 130 cm, measured horizontally and perpendicularly to the longitudinal centre line of the car between the inner faces of the doors.

3.4.5) The car must have two footwells defined as two free volumes, symmetrical on either side of the longitudinal centre line of the car. The only components allowed to intrude into the footwells are the steering column and its joints.

These footwells will be defined by the following :

— its vertical section perpendicular to the longitudinal centre line of the car, which has a minimum cross section of 750 $cm^2$ and its minimum width of 25 cm maintained up to a height of minimum 25 cm.

— its length from the pedals to the vertical projection of the centre of the steering wheel.

3.4.6) Only the following components can be fitted in the cockpit : a communication system, fire extinguishers, driver cooling system, rollbar, tool kit, seat, ignition box and other electronic equipment.

These components must not reduce the access defined by the doors and must respect the free sections of the footwells defined above.

They must be covered by a rigid protection if they have sharp edges that could cause injury.

Their fixations must withstand a 25 g deceleration.

3.4.7) An efficient ventilation system with a fresh air inlet and a used air outlet must be provided for.

3.4.8) For open cars, it must be possible to insert vertically the horizontal template shown on drawing 259-2, into the bodywork and chassis openings corresponding to the volume for the driver and the passenger. This verification will be done with the steering wheel removed, down to the seat back rests.

3.5) **Wheels and tyres**

The number of wheels is fixed at four. The use of wheels with a device to hold on the tyres is recommended. Should "knockoff" nuts be used, these should never protrude beyond the rims.

The maximum width of the complete wheel is limited to 16".

The width shall be measured with the tyre at normal running pressure, and the wheel mounted on the car resting on the ground in running order with the driver aboard. This measurement of the width will only be taken at the widest point of the tyre, above the hub-level. In no case can the width measured where the beads join the rim exceed the width of the tyre.

The fitting of multiple tyres on one and the same rim is authorised.

A safety spring must be in place on the nut throughout the duration of the event and must be replaced after each wheel change. These springs must be painted dayglo red or orange. Spare springs must be available at all times.

**Pressure control valves on the wheels are forbidden.**

3.6) **Transmission**

The maximum number of gearbox ratios is set at 5, not including the reverse gear.

This reverse gear is obligatory, and the driver must be able to operate it from his seat.

3.7) **Suspension parts**

It is forbidden to chromium-plate steel suspension parts.

3.8) **Bodywork**

All elements of the bodywork shall be completely and neatly designed and finished, with no temporary or makeshift elements.

The body shall cover all mechanical components ; the only parts which may protrude are the exhaust and intake pipes and the top of the engine.

Air intakes must not be higher than the highest points of the roof or windscreen. In the case of open cars, the opening above the seats must be symmetrical in relation to the longitudinal axis of the car.

An open car must respect the following prescriptions :

— The shape of the bodywork seen from one side must be identical to the shape seen from the other side.

— Seen from above, a central part separating the driver from the passenger, even if this part is not connected to the bodywork at the seat-back level, can be accepted, considering that the opening is of the same size for the driver and for the passenger.

— The bodywork can be made from transparent material, but the rules concerning the windscreen must be respected.

The bodywork shall project over the wheels so as to provide efficient covering of at least a third of their circumference, and at least the whole width of the tyre. Behind the rear wheels, the bodywork must terminate below the axis of the rear wheels.

Cooling holes directed to the rear must be fitted with louvres or any other device to prevent the tyre being visible from the rear.

Any parts having an aerodynamic influence and all parts of the bodywork must be rigidly secured to the entirely sprung part of the car (chassis-body unit), must not have any degree of freedom, must be securely fixed and remain immobile in relation to this part while the car is in motion.

On the bottom of any car, rearward of the vertical plane tangent to the rear of the complete front wheels, and forward of the vertical plane tangent to the fore of the complete rear wheels, a solid, flat (tolerance ± 5 mm), hard, rigid and continuous surface must be provided in which a rectangle of 100 cm (measured along the transverse axis of the car) by 80 cm (measured along the longitudinal axis of the car) can be inscribed. The entire surface of this plate, which must be an integral part of the chassis-body unit, must not have any degree of freedom or any provision for adjustment in relation to this unit. No space may exist between the flat bottom defined above and the chassis-body unit.

No part having an aerodynamic influence and no part of the bodywork may, under any circumstances, be located below the geometrical plane produced by the surface as defined above.

Any transverse, longitudinal or other flexible, retractable, pivoting or sliding device bridging the gap between the body and the road surface is forbidden.

3.9) **Lighting equipment**

At the rear, the cars will be equipped with at least two "stop" lights, as well as two rear red lights. They will be situated symmetrically on either side of the

car's longitudinal axis in a visible position. All cars will be equipped with a rear red rain light, of which the optical seen from the rear will have a flat vertical surface of at least 50 $cm^2$ (minimum 21 Watts) and will be clearly visible from the rear.

The bulb and reflector must conform to EEC 77/538 or ECE 38 standards for the rear fog lamps or motor vehicles and must carry the corresponding approval marking.

In addition, for night racing, the cars must be equipped with at least two headlights as powerful as those with which touring cars are usually fitted plus direction indicators (with side indicators mounted to the rear of the axis of the hub of the front wheels) mounted at the front and rear.

The lighting equipment must be in working order throughout the whole duration of the race.

3.10) **Battery**

It must be fitted outside the cockpit and be firmly fixed and completely protected by a box in insulating material.

3.11) **Windscreen wiper**

If the car is equipped with a windscreen, at least one windscreen wiper, in working order, is obligatory.

3.12) **Oil tanks**

The quantity of oil carried on board may not exceed 20 litres. All oil tanks must be efficiently protected.

All oil storage tanks situated outside the main structure of the car must be surrounded by 10 mm thick crushable structure.

No part of the car containing oil may be situated aft of the gearbox or final drive casing on any rear wheel driven car. In the case of front wheel drive, no part containing oil may be situated behind the complete rear wheels.

All oil lines external to the cockpit, with the exception of lines permanently mounted on the engine, must be capable of withstanding a pressure of 70 $kg/cm^2$ (1000 psi) and a temperature of 230°C (446° F).

3.13) **Starting**

Only the on-board source of energy and starter may be used to start the engine, operated by the driver from his seat.

3.14) **Fuel**

— For petrol engines :

The fuel must be **petrol** without any additive other than that of a lubricant on current sale which cannot increase the octane number.

The fuel must have the following characteristics :

— 100 RON maximum, the measurement being made according to the standard ASTM D2699-**86**, the fuel being accepted or rejected according to ASTM D3244 with a confidence limit of 95 %.

— Specific gravity between 720 and 758 $kg/m^3$ at 15°C measured according to ASTM **D4052**.

— A maximum of **2.8** % oxygen (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 measuring of the nitrogen content will be carried out according to the standard ASTM D3228 and that of the oxygen content by elemental analysis with a tolerance of 0.2 %.**

**— Maximum content of peroxides and nitrooxide compounds : 100 ppm (ASTM D3703).**

— Maximum lead content : 0.40 g/l or the standard of the country of the event if this is lower **(ASTM D3341 or D3237)**.

— Maximum benzene content : 5 % in volume **(ASTM D3606)**.

If the fuel available locally for the event is not of a sufficient quality for use by competitors, the ASN of the organising country must ask the FISA for a waiver in order to enable the use of fuel not corresponding to the characteristics defined above.

The storing of fuel on board the car at a temperature more than 10 degrees centigrade below the ambient temperature is forbidden.

The use of a specific device (either on board or otherwise) to reduce the

fuel temperature below the ambient temperature is forbidden.

— For diesel engines :
The fuel must correspond to the following specifications :

| | |
|---|---|
| — Hydro-carbon content, % in weight | 99.0 min |
| — Density | 0.860 max |
| — Cetane n° (ASTM D613) or calculated Cetane index (ASTM D976/80) | 60 max |

3.15) Only air may be mixed with the fuel as an oxydant.

## 4) SAFETY EQUIPMENT

### 4.1) Cables, lines and electrical equipment

Unless the cables, lines and electrical equipment such as batteries, fuel pumps, etc. are in compliance with the requirements of the aircraft industry as regards their location, material and connections, they must be placed or fitted in such a way that any leakage cannot result in :
— Accumulation of liquid,
— Entry of liquid into the cockpit,
— Contact between liquid and any electrical line or equipment.
Should the cables, lines or electrical equipment pass through or be fitted in the cockpit, they must be fully enclosed in a cover of liquid-tight and fireproof material.
All fuel lines external to the cockpit, with the exception of lines permanently mounted on the engine, should be of a reinforced construction, attached by screw-on connectors.
They must withstand a 70 kg/cm² pressure (1,000 psi) and a 230°C (446°F) temperature.
All electrical circuits should be enclosed in fire-proof material.

### 4.2) Additional protection of the pipes

An additional protection of fuel pipes and brake lines outside the coachwork against any risk of damage (stones, corrosion, breaking of mechanical parts, etc.) and inside the cockpit against any risk of fire (fuel pipes only) is compulsory.

### 4.3) Safety harnesses

The wearing of two shoulder straps, one abdominal strap and two straps between the legs is obligatory ; fixation points on the bodyshell : two for the abdominal strap, two, or else one symmetrical in relation to the seat for the shoulder straps, two for the straps between the legs. This harness must comply with FIA Standard n° 8853-1985.

### 4.4) Extinguishing systems

**Installation :** Each extinguisher bottle must be installed in such a way that it is capable of withstanding accelerations of up to 25 g no matter how these are applied.
Extinguisher bottles must not be located forward of the front wheel axis.

**Operation - Triggering :**
The two systems must be triggered simultaneously.
Any triggering system is allowed. However a source of energy not coming from the main source must be provided in the case of a triggering system which is not exclusively mechanical.
The driver seated normally at his steering wheel with his safety harness attached must be able to trigger the system manually ; the same applies to any person outside the car. The means of triggering from the exterior must be positioned close to the circuit breaker or combined with it, and must be marked by the letter "E" in red inside a white circle of at least 10 cm diameter with a red edge.
Automatic triggering by heat sensors is recommended.
The system must work in any position, even when the car is upside down.

**Checking :** The type of extinguishant, its quantity, and the total weight of the bottle must be specified on each bottle.

**Minimum capacities of extinguisher system :**

— Closed cars : cockpit : 2.5 kg
engine : 5 kg
— Open cars : cockpit : 5 kg
engine : 2.5 kg.

The extinguishant must be Halon 1211 or 1301 (BCF-BTM) only.

Extinguishing equipment must withstand fire and be protected against impacts.

The extinguisher system nozzles must be installed in such a way that they are not directly pointed at the driver (danger of burns caused by cold).

**Discharge time :**

Cockpit : 30 secs for Halon 1211,
60 secs for Halon 1301,
Engine compartment : 10 secs.

4.5) **Safety Rollbars**

4.5.1) **Closed cars**

Two rollbars, to the front and to the rear of the chest of the driver and the passenger must be provided. They shall correspond in shape to the inner profile of the upper part of the cockpit, shall be connected at their base by the chassis of the car and linked at the top by at least one tubular strut or boxmember. In addition, the rear rollbar shall comprise a diagonal reinforcement bar and two braces directed rearwards (see drawing n° 257-1).

The various authorised diagonal struts are the following : MQ, MS, NP, NR.

The safety rollbars must be covered with non-combustive shock absorber foam.

This structure shall be built with tubes with at least the following characteristics :

| | |
|---|---|
| — Cold-drawn seamless Carbon steel E-30 daN | Diam. 45 x 2.5 mm |
| — Alloy steel Type 25 CD4 SAE 4125 etc. E-50 daN | Diam. 40 x 2.5 mm |

Steels tubes of Diam. 1.75 inch x 0.090 are also accepted.

4.5.2) **Open cars**

The main rollbar behind the front seats must be symmetrical in relation to the longitudinal axis of the car, and must respect the following dimensions :

— Height : the top of the rollbar must protrude at least 5 cm beyond the height of the driver's helmet when he is normally seated behind the steering wheel.

— Width : measured within the limits of the vertical pillars of the rollbar, the width should be at least 20 cm, measured at a point 60 cm above the driver's and forward passenger's seats (on the straight line perpendical to the vertebral column) from the longitudinal axis of the seat towards the outside.

— Longitudinal position : the longitudinal distance between the top of the rollbar and the driver's helmet when he is normally seated at the wheel must not exceed 25 cm. Will also be considered as open cars, cars which do not have a supportive structure between the top of the windscreen side posts and those of the rear window (if there is one).

The structure of the rollbar must conform to the drawing n° 259-1, or to the drawing n° 257-1, and to the foregoing table, to the specifications concerning removable connections, and to the General Considerations.

The fitting of frontal struts, facing forward, intended for the protection of the driver is authorised for open cars, on condition that these struts are removable.

| | |
|---|---|
| — Cold-drawn seamless Carbon steel E-30 daN | Diam. 45 x 2.5 mm |
| — Alloy steel Type 25 CD4 SAE 4125 etc. E-50 daN | Diam. 40 x 2.5 mm |

The various authorized diagonal struts are the following : MQ, MS, NP, NR.

4.6) **General circuit breaker**

The general circuit breaker must cut all electrical circuits (battery, alternator

or dynamo, lights, hooters, ignition, electrical controls, etc.). It must be of a spark-proof model, and will be accessible from inside and outside the car. As for the outside, the triggering system must be situated at the lower part of the windscreen pillar on the driver's side for closed cars, or at the lower part of the main hoop of the rollbar, either on the right or on the left, for open cars. It will be marked by a red spark in a white-edged blue triangle with a base of at least 12 cm.

4.7) **Oil catch tank**

Any car with a lubrication system which includes an open type sump breather, must be equipped in such a way as to prevent oil spillage. The oil catching device shall have a minimum capacity of 3 litres. The container shall either be made out of translucent plastic or include a transparent panel.

4.8) **Towing-eye**

A towing-eye (minimum inner diameter : 80 mm) must be securely fitted to the front and the rear of the cars.

This towing-eye will only be used if the car can move freely.

It shall be clearly visible and painted in yellow, red or orange. It must be located inside the contour of the bodywork.

4.9) **Tank fillers and air-vents**

The tank fillers and their caps must not protrude beyond the coachwork.

The caps must be designed in such a way as to ensure an efficient locking action which reduces the risks of accidental opening following a crash impact or incomplete locking after closing.

The fillers must be placed away from points which are vulnerable in case of accident. The air-vents must be located at places which present no danger.

4.10) **Standardised coupling**

— The refuelling hose must be provided with a leak-proof coupling to fit the standardised filler mounted on the car. The dimensions of this filler are given in the drawing 252-5.

— All cars must be provided with a fuel filler complying with this diagram. This leak-proof filler must comply with the dead-man principle and must not therefore incorporate any retaining device when in an open position (spring loaded, bayonet, etc.).

— The air-vent(s) must be equipped with non return and closing valves having the same closing system as that of the standard filler, and the same diameter.

During refuelling the outlets of the air-vents must be connected with the appropriate coupling, either to the main supply-tank or to a transparent portable container with a minimum capacity of 20 litres provided with a closing system rendering it completely leak-proof.

— Should the circuits be unable to provide the entrants with a centralised system, these will have to refuel according to the above procedure. In no case may the level of the reserve tank exceed two metres above the track where the refuelling takes place, for the entire duration of the event.

The overflow bottles and the independent storage tanks must comply with the drawings 252-1 or 252-2 and 252-3 or 252-4.

— All metal parts of the refuelling system from the coupling over the flowmeter to the tank and its rack must be connected electrically to the earth.

A 90° cut off valve situated close to the main supply tank, controlling the fuel flow, must be manned at all times during refuelling.

All hoses, valves, fittings and couplings used must have a maximum inner diameter of 50 mm (2 inches).

4.11) **Petrol tanks**

All the cars must be equipped with safety fuel tanks conforming to the specifications FIA/FT3 and supplied by an approved manufacturer.

The maximum outer diameter of the lines going from the engine to the tanks is 20 mm and their path must be as direct as possible.

The tank(s) may not be placed more than 65 cm from the longitudinal axis of the car and must be located within the limits defined by the front and rear axles of the wheels.

It shall be isolated by means of bulkheads so that in case of spillage, leakage or accident happening to the tank, the fuel will not pass into the cockpit or engine

compartment or come into contact with any part of the exhaust system. The fuel tanks must be efficiently protected (see Article 4.14).

Competitors must provide an illustration of the entire fuel circuit of the vehicle.

Low points must be provided for in the circuit enabling all the fuel to be speedily drained when the vehicle is positioned on a horizontal surface.

For hill-climbs and slaloms if the total capacity of the fuel tanks is not greater than 20 l, the safety tank will not be compulsory on condition that the position of the tank does not protrude beyond 30 cm in any direction from the longitudinal axis of the car, and that it is surrounded by a crushable structure 1 cm thick.

The safety tank is also optional for circuit races of less than 100 km under the same conditions of installation.

The maximum amount of fuel which may be carried on board is 100 l.

4.12) **Headrest**

Headrest of a minimum area of 20 x 20 cm must be fitted, covered with non-combustive shock absorber foam.

It must be designed in such a way that the driver's head may not become trapped between the safety structure and the headrest.

4.13) **Firewall and floor**

Cars shall have an adequate firewall to prevent the passage of fire from the engine compartment or under the car to the cockpit. Openings in the firewall for the passage of engine controls, wires and lines shall be of the minimum size necessary. The cockpit floor shall be constructed to protect the driver by preventing the entry of gravel, oil, water and debris from the road or from the engine. Bottom panels or belly panels shall be adequately vented to prevent the accumulation of liquid.

4.14) **Crushable structures**

The bottom of the tanks licked by the airflow shall be protected by a crushable structure, the entire surface of which shall be 1 cm thick.

All the petrol tanks shall be at least 20 cm from the lateral flanks and must be protected by a crushable structure, the entire surface of which shall be 10 cm thick.

The crushable structure should be a sandwich construction based on a fire-resistant core of a minimum crushing strength of 18 N/cm². Water pipes may be passed through this core, but not fuel, oil or electrical lines.

The sandwich construction must include two sheets of 1.5 mm thickness, one of which shall be aluminium alloy sheet having a tensile strength of 225 N/mm² and minimum elongation of 5 per cent, or, alternatively, two sheets of 1.5 mm thickness having a tensile strength of 225 N/mm².

4.15) **Survival cell and frontal protection**

The chassis must include an impact-absorbing structure fitted ahead of the feet of the driver and passenger. This structure must be independent of the bodywork and, if it is detachable, it must be solidly fixed to the extremities of the side box members of the main chassis (i.e. using bolts requiring the use of tools for removal).

It must have a minimum length of 30 cm, a minimum height of 15 cm in any vertical section, and a total minimum cross section of 800 cm². This structure must be made from a metallic material with a minimum tensile strengh of 225 N/mm² and be of a honeycomb sandwich construction with a minimum skin thickness of 1.5 mm. It must constitue a box, the panels of which will have a minimum thickness of 15 mm, or if the radiator(s) is(are) incorporated into the structure, two continuous box members of a minimum cross section of 100 cm² on either side of the radiator(s).

4.16) **Rear-view**

Rear-view mirrors giving an efficient view towards the rear must be fitted on both sides. (minimum surface 100 cm² for each one).

4.17) **Brakes**

The braking system must be designed in such a way that the brake pedal controls all wheels normally. In the event of any kind of failure in the brake transmission, the pedal shall still control at least two wheels.

4.18) **Exhaust system**

It shall be directed either rearwards or sideways. If the outlet pipes are pointing rearwards, their orifices shall be placed between 45 cm and 10 cm above the ground. If the exhaust pipes are directed sideways, their orifices must be located aft of a vertical passing through the wheelbase centre plane and may not project in any way beyond the bodywork.

4.19) **Position of the pedals**

The axis of the pedals must never be situated to the fore of the axis of the front wheels.

**N.B. :** The prescriptions under Art. 4.15, 4.19, 3.1, 4.5.1 and 4.5.2 are compulsory for any new car built as from 1 st January 1987. The cars which were built before this date are admitted, provided that proof of the date of construction is supplied.

In the case of the latter :

— Art. 3.1 : The prescriptions concerning the sum and the difference of the overhangs are not to be respected, nor is the maximum width of 200 cm, which is then fixed at 210 cm.

— Art. 3.3.4 : The minimum width can be reduced to 110 cm, and to 100 cm for cars of less than 1000 $cm^3$.

— Art. 4.5.1 and 4.5.2 : The dimensions of the tubes for the rollbars should then be respectively :

- 42.4 x 2.6 for carbon steel
- 35 x 2 for alloy steel.

# Art. 274 - Technical Regulations Formula 3000

SUMMARY

## ARTICLE 1 : DEFINITIONS

1) **Formula 3000 car :**
Automobile designed solely for speed races on circuits or closed courses.

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.

3) **Land vehicle :**
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.

4) **Coachwork :**
All entirely sprung parts of the car licked by the external air stream, except the safety rollover structures and the parts definitely associated with the mechanical functioning of the engine, transmission and running gear. The air-box(es) and all radiators shall be considered to be part of the coachwork.

5) **Wheel :**
Flange and rim. Complete wheel : Flange, rim and tyre.

6) **Automobile Make :**
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 Champion Title or Cup, this will be granted to the manufacturer of the car.

7) **Event :**
An event shall consist of official practices and the race.

8) **Weight :**
Is the weight of the car without the driver at all times during the event.

9) **Racing weight :**
Is the weight of the car in running order with the driver aboard and all fuel tanks full.

10) **Cubic capacity :**
Means the volume swept in the cylinder(s) of the engine by the movement of the piston(s). In calculating engine cubic capacity, the number Pi shall be 3.1416.

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.

12) **Suspension :**
All road wheels in contact with the ground, and their axles must be suspended from the chassis/body unit by springing mediums (i.e. axles or wheels must not be connected directly to the chassis/body unit). The springing medium must not consist of bolts located through flexible bushes or flexible mountings.
There must be independant movement of the axles/wheels and uprights/stub axles giving suspension travel from "bump" to "drop" in excess of the flexibility of the mounting location attachments.

13) **Cockpit :**
The structural inner volume in which the driver is located.

14) **Survival cell :**
A continuous closed structure containing the fuel tank and the cockpit.

## ARTICLE 2 : REGULATIONS

1) **Role of the FISA :**
The following regulations governing the construction of F3000 listed below are issued by the FISA.

2) **Publication date for modifications :**
Each year, in October, the FISA will publish all changes made to these regulations. All changes affecting the manufacturing of engines will become effective as from the fourth 1 st January following the announcement. All other changes will become effective as from the third 1 st January following the announcement. Changes made for safety reasons may come into force without notice.

3) **Dangerous construction :**
If an automobile is deemed to be dangerous, it may be excluded by the Stewards of the Meeting.

4) **Permanent compliance with regulations :**
Automobiles must comply with these regulations in their entirety at all times during the event.

5) **Measurements :**
All measurements must be made while the car is stationary on a flat horizontal metalled surface.

6) **Duty of competitor :**
Is it the duty of each competitor to satisfy the Scrutineers and the Stewards of the Meeting that his automobile complies with these regulations in their entirety at all times during the event.

## ARTICLE 3 : COACHWORK AND DIMENSIONS

**1) Overall width :**
Overall width of the car, including complete wheels shall not exceed 200 cm, with the steered wheels in the straight ahead position.

2) **Width ahead of front wheels :**
The coachwork ahead of the front wheels is limited to an overall width of 150 cm. Nevertheless, any part of the coachwork ahead of the front wheels exceeding an overall width of 110 cm shall not extend above the height of the front wheel rims with the driver aboard seated normally, and irrespective of the fuel load.

3) **Width and shape between the front wheels and the rear wheels :**
The overall maximum width of the coachwork behind the rearmost edge of the complete front wheels and in front of the centre-line of the rear wheels shall not exceed 130 cm.
The crushable structure is included in this width. 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 directly beneath the car must lie on one plane within a tolerance of $\pm$ 5 mm.
All these parts must produce a uniform, solid, hard, rigid (no degree of freedom in relation to the body/chassis unit), impervious surface, under all circumstances.
The periphery of the surface formed by these parts may be curved upwards with a maximum radius of 5 cm.
No parts of the bodywork in front of the centre-line of the rear wheels and extending above the height of the rear complete wheels may project beyond 45 cm each side of the longitudinal axis of the car.

3.1) The tolerance of plus or minus 5 mm has been introduced into the rules to cover any possible manufacturing problem and not to permit designs against the spirit of the "flat bottom".

3.2) Any skids, skirts, or other devices protruding from the "flat bottom" (also if into the plus or minus 5 mm) must be removed from the flat bottom area because it could be seen as infriging article 3.7.
3.3) To protect the bottom of the car skids can be placed outside the flat bottom area but in respect of Art. 3.7.

4) **Width behind the centre-line of the rear wheels :**
Coachwork behind the centre-line of the rear wheels shall not exceed 90 cm in width.

5) **Overhang :**
No part of the car shall be more than 60 cm behind the centre-line of the rear wheels.
No part of the car shall be more than 120 cm in front of the centre-line of the front wheels.

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 (see drawing n° 274-1).

6) **Height :**
Except for the safety rollover structures, no part of the car shall be higher than 90 cm from the ground with the car in normal racing trim with the driver aboard seated normally.
Any part of any safety rollover structure higher than 90 cm from the ground must not be shaped to have a significant aerodynamic influence on the performance of the car.

7) **Aerodynamic influence :**
Any specific part of the car influencing its aerodynamic perfor-mance :
- must comply with the rules relating to coachwork ;
— 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.
— must have no contact with a part of the car not entirely sprung.
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 coachwork may under any circumstance be located below the geometrical plane generated by the plane surface provided for by Article 3.3.
No part of the coachwork in front of the front wheel axis and more than 20 cm from the longitudinal centre line of the car may be closer than 25 mm to the geometrical plane referred to above.

8) **Lift of the car :**
The roll-over structure must be designed to provide a clearly visible unobstructed opening in order that a strap whose section measures 6 by 3 cm can pass through it to lift the car.

## ARTICLE 4 : WEIGHT

1) **Minimum weight :**
The weight of the car must not be less than 540 kg.

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.

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

1) **Type of engine eligible :**
4-stroke engines with reciprocating pistons.
Engine cubic-capacity without supercharging : lower than or equal to 3000 cc.
Number of cylinders : maximum 12.
The angle between the cylinder banks must be 90°.
The Wankel, Diesel, 2-stroke engines and turbines are forbidden.
Engines with more than 4 valves per cylinder are forbidden, as well as oval pistons and supercharging.
The normal section of each cylinder must be circular.

2) **Limitation of the engine rev speed :**
Maximum crankshaft rotational speed authorized : 9000 r.p.m.
In order to ensure that all the competitors respect the maximum of 9000 revs per minute, an electronic limiter, approved by the FISA, must be fitted to each car and used throughout the entire duration of the race and also during timed practice.
The scrutineers may inspect the electronic limiter at any time during the event.
Any element discovered, enabling its functioning to be tampered with, shall

be used to cancel all the times obtained in practice or to exclude the car from the classification of the race. These penalties are not exhaustive.

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

## ARTICLE 6 : FUEL SYSTEM AND PIPING

1) **Fuel tanks :**
1.1) The fuel tank must be a single rubber bladder conforming to or exceeding the specifications of FIA/FT3.

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 30 cm forward of the highest point at which the driver's back makes contact with his seat (see drawing 274-4). 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.

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

1.4) All rubber bladders must be made by manufacturers recognised by the FISA. In order to obtain the agreement of the FISA, the manufacturer must prove the compliance of his product with the specifications approved by the FISA. These manufacturers must undertake to deliver to their customers exclusively tanks complying with the approved norms.
A list of approved manufacturers is available from the FISA (See technical list N° 1).

1.5) 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.

1.6) No rubber bladder shall be used more than 5 years after the date of manufacture.

2) **Fittings and piping :**

2.1) All fuel fittings (including air vents, inlets, outlets, tank fillers, connections between tanks and access openings) must be metal fittings bonded into the fuel tank.

2.2) All connections between the fuel tank and the survival cell (including tank fillers, air vents, access openings, inlets and outlets) must be frangible. By "frangible" is meant that should the tank move in relation to the survival cell during an accident, the connection between the fuel tank and the survival cell will fail at a load which is less than 50 % of the load required to pull the bonded metal fitting out of the tank.

2.3) All fuel lines between the fuel tanks 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.

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

2.5) All lines must be fitted in such a way that any leakage cannot result in accumulation of liquid in the cockpit.

2.6) All fuel and lubricating oil lines must have a minimum burst pressure of 41 bar (600 psi) and a minimum operating temperature of 135 degrees C (250 degrees F).
When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

2.7) All lines containing hydraulic fluid, with the exception of lines under gravity head only, must have a minimum burst pressure of 70 bar (1000 psi) or higher according to operating pressure, and a minimum operating temperature of 232 degrees C (450 degrees F).
When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

Hydraulic fluid lines must have no connections inside the cockpit which are capable of being removed.

3) **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 15.4.5 and 4.7.

4) **Tank fillers and caps :**
The tank fillers and their caps shall not protrude beyond the coachwork. Any breather pipe connecting the fuel tank to the atmosphere shall 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 filler caps 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.

5) **Refuelling :**
5.1) Refuelling during the race is forbidden.

5.2) Fuelling the car on the grid other than by gravity from a maximum height of 2 metres is forbidden.

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.

5.4) The use of any specific device (whether on board or otherwise) to decrease the temperature of the fuel below the ambient temperature is forbidden.

## ARTICLE 7 : OIL SYSTEM

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

2) **Longitudinal location of oil system :**
No part of the car containing oil may be situated aft of the gearbox or final drive casing.

3) **Transverse location of oil system :**
No part of the car containing oil may be more than 65 cm from the longitudinal centre-line of the car.

4) **Oil 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.
The container shall include a lateral transparent panel to check the possible oil level.

5) **Oil replenishment :**
No oil replenishment is allowed during a race.

## ARTICLE 8 : STARTING

1) **Compulsory starter :**
Compulsory starter with electrical or other source of energy carried aboard the car, and able to be controlled by the driver when normally in his seat.
The starter must be capable of starting the engine at all times.

2) **Start of the engine :**
A supplementary external source of energy temporarily connected to the car may be used to start the engine both on the starting grid and in the pits.

## ARTICLE 9 : TRANSMISSION TO THE WHEELS

1) **Ban on 4-wheel drive cars :**
Four-wheel drive cars are forbidden.

2) **Type of gearbox :**
Five gearbox ratios, not including the reverse gear, as maximum.
Semi-automatic and automatic gearboxes and differentials with electronic, pneumatic or hydraulic slip control are forbidden.

3) **Reverse gear :**
All automobiles must have a reverse gear which, at any time during the event, can be selected while the engine is running and used normally by the driver when seated normally in the car.

## ARTICLE 10 : SUSPENSION

1) **Active suspension :**
Active suspension is forbidden, as is any system which allows control of the flexibility of the suspension springs, shock absorption and trim height when the car is moving.

2) **Chromium plating :**
Chromium plating of steel suspension members of over 725 N/mm² (45 tons/inch2) tensile strength is forbidden.

## ARTICLE 11 : BRAKES

1) **Double circuit :**
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.

2) **Prohibition of carbon discs :**
Carbon discs are forbidden.

3) **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 at a distance of 120 mm of this face toward the centre line of the car.
Furthermore, such ducts, when viewed from the side must not protrude beyond the periphery of the tyre in a forward sense or the rim in a rearward sense.

## ARTICLE 12 : WHEELS AND TYRES

1) **Location :**
Complete wheels shall be external to the coachwork with the car viewed in plan with the rear aerodynamic device removed.

2) **Dimensions :**
2.1) The maximum width of **the complete wheel** must not exceed 16 inches.
Compulsory diameter of the wheels : 13 inches.
Maximum compulsory diameter of the complete wheels : 24,5 inches.
2.2) The width shall be measured with the tyre at normal running pressure, and the complete wheel mounted on the car resting on the ground, in running order, with the driver aboard.
These measurements will be taken horizontally at axle height.

3) **Maximum number of wheels :**
The number of wheels is fixed at four.

4) **Number of tyres :**
The tyre manufacturer shall be obliged to supply three sets of tyres per car and per event, that is six front and six rear tyres, all of which with the same technical characteristics and the same specifications.
Each tyre must bear on its wall and in block letters the reference "Formula 3000", the date of manufacturing of the tyre, and the name or logo of the manufacturer.
The manufacturer's logo must not exceed a length of 16 cm.
A section of the wall of the tyre, measuring 12 x 6 cm, must be foreseen for the positioning of a code.
This code will serve the purpose of individualizing the tyres according to the events in which they are used, in order that the tyres distributed for one event may, under no circumstances, be used again for another event.

5) **Wheel fixation :**
A safety spring must be in place on the fixation nut throughout the duration of the event and must be replaced after each wheel change. These springs must be painted dayglo red or orange.
Alternatively, any other system approved by FISA must be used.

6) **Steering :**
Four wheel steering is forbidden.

7) Pressure control valves on the wheels are forbidden.

## ARTICLE 13 : COCKPIT

1) **Cockpit opening :**
The opening giving access to the cockpit must allow the horizontal template shown below to be inserted vertically 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 (see drawing 274-5).
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.

2) **Rear-view mirrors :**
All cars must have at least two mirrors mounted so that the driver has visibility to the rear and both sides of the car. The reflective surface of each mirror must be at least 10 cm wide and at least 5 cm high, with a maximum corner radius of 1 cm.
The height from the ground to the centre of area of each mirror must be at least 62 cm.

3) **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.

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. This harness must comply with FIA standard n° 8853-1985.

5) **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 $cm^2$.
The only things which may encroach on this area are the steering column and the padding for driver comfort.
A free vertical cross section with a minimum width of 25 cm, maintained to a minimum height of 25 cm and with corner radii of a maximum of 5 cm, must be maintained over the whole length of the cockpit with the steering wheel removed. The driver, normally seated in his driving position 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

1) **Fire extinguishers :** 1.1 — Extinguishing product :
BCF ($CF_2ClBr$) - BTM ($CBrF_3$) - TDE ($C_2Br_2F_4$).

1.2) Minimum capacity
Driver's compartment : 5 kg ;
Engine compartment : 2.5 kg.

1.3) Location - mounting method :
The extinguisher bottle must be adequately protected and the bottle for the driver's compartment must be situated within the **survival cell.** In all cases, the bottle mountings must be able to withstand a 25 g acceleration.

1.4) Discharge time :
— engine compartment : 10 seconds minimum.
— driver's compartment : 30 ± 5 seconds for BCF and TDE.
60 ± 5 seconds for BTM.
Both bottles should be released simultaneously.

1.5) Drive system :
Any triggering system having its own source of energy is permitted, provided it is possible to operate all extinguishers should the main electric circuits of the car fail.
The driver must be able to operate all extinguishers manually when seated normally in the car with his safety belts fastened and steering wheel in place, as must a person outside the car.
To avoid accidental triggering, a warning symbol marked by a red letter "E" must be fitted close to the inside triggering mechanism, which will be of a push-button type situated on the left side of the cockpit.
The outside triggering mechanism must be combined with the circuit breaker and must be indicated by the same warning symbol in a white circle with a red edge, of at least 10 cm diameter.

1.6) **Checking of bottles :**
**The following weights shall be indicated on each bottle : weight of the empty bottle, weight of the extinguishing agent, total charged weight.**

**1.7) Operation :**
**The system must work in any position even when the car is inverted.**

**2) Master-switch :**
The driver, when seated normally with safety belt fastened and steering wheel in place, must be able to cut off all electrical circuits and stop the engine by means of a spark proof circuit breaker which will be also accessible from outside the car.
The inside triggering device must be of a switch type located on the right side of the cockpit and marked by a symbol showing a red spark in a blue triangle with a white border. The outside triggering mechanism must be of a horizontal handle type, located at the base of the main rollover structure, on the right hand side, capable of being operated from a distance by the rescue personnel with the aid of a hook.

3) **Rear light :**
All cars must have a red signalling light of at least 21 watts, in working order **throughout the event.**
This light must :
— Face rearward and be clearly visible from the rear ;
— Not be mounted more than 10 cm from the car centre line **and less than 40 cm from the ground** ;
— Have a minimum surface of 50 $cm^2$ ;
— Be able to 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.

**ARTICLE 15 : SAFETY STRUCTURES**
**1) Magnesium sheet :**
The use of magnesium sheet less than 3 mm thick is forbidden.

2) **Titanium :**
The use of titanium is forbidden, except for the engine.

3) **Rollover structures :**

3.1) The basic purpose of these structures is to protect the driver. This purpose is the primary design consideration.

3.2) All cars must have at least two rollover structures :

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

3.2.2) The second rollover 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. If the second structure is not located behind the driver, there must be a structure behind him which is high enough so that a line extended from its top to the top of either structure in front of him will pass over **5 cm** the top of his helmet when he is seated normally with his helmet on and seat belts fastened.

3.3) All safety structures required by paragraph 3.2 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 740 kg**.

The second rollover structure shall be subjected to a static load test by applying the combined loads described above on top of the structure through a rigid flat pad perpendicular to the loading axis. During that 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 by the static load test pads described in Article 15.4.5.

Under the load, the deformation at the top of the structure must be less than 50 mm and there must be no structural failure of the junctions between the rollover structure and the survival cell.

3.4) The design concept of the rollover structures required by paragraph 3.2 shall be free. However, the second rollover structure must have a minimum structural cross section, in vertical projection, of 100 cm², across a horizontal plane passing 5 cm lower than the highest point of the second rollover structure.

3.5) All cars must have a structure immediately behind the driver's seat which is wider than and extends above his shoulders when he is seated normally in the car with his seat belts fastened. This structure must be capable of withstanding a sustained lateral load of 1.5 w applied to its top, **w being 740 kg**.

4) **Survival cell and frontal protection :**

4.1) The survival cell must extend from behind the fuel tank in a rearward direction to a point at least 15 cm 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 Articles 15.3.2 and 15.3.5 must be a part of the survival cell or solidly attached to it.

The soles of the feet of the driver, seated in the normal driving position and with his feet on the pedals and 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.

4.2) 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.

4.3) The minimum external width of the survival cell is 30 cm. This width must be maintained to a minimum height of 25 cm over the whole length of the survival cell.

The minimum height of the survival cell between the two rollover structures is 40 cm.

4.4) The survival cell and frontal absorbing structure shall be subjected to an impact test against a solid vertical barrier placed at right angles to the longitudinal axis of the car. The entire crash structure 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 with its bladder full of water. A dummy as defined in FIA Standard N° 8853-1985 must be installed in the survival cell with the safety belts defined in Article 13.4 fastened. The extinguishers must also be installed as in Article 14.1.

For the purpose of this test, the total weight of the trolley and test structure shall be 740 kg and the velocity of impact **11 metres/sec.** The resistance of the test structure must be such that during the impact an average deceleration of not more than 25 g is recorded and the final deformation is contained within the zone ahead of the driver's feet.

This test must be carried out under the supervision of a FISA technical delegate in testing centers approved by FISA, whose list is available from FISA.

4.5) In addition to the impact test described above, the survival cell, only wedged longitudinally on its rear face, shall 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 through the front wheel axis and the center of the dashboard hoop.

For the tests described above, a pad 10 cm long and 30 cm 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. It is permissible to place rubber 3 mm thick between the pads and the survival cell.

A constant transverse horizontal load of 2000 daN shall be applied 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 surfaces of the survival cell and no permanent deformation of these surfaces after the load is removed, with a tolerance of 1 mm between the surfaces. The deformation shall be measured at the top of the pads on the inner surfaces. In the case of the test in the cockpit/lap strap area, at no time during the test can there be a deformation of more than 2 cm across the inner surfaces of the survival cell.

4.6) 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 40 cm in front of the front wheel axis.

A constant transversal horizontal load of 2000 daN shall be applied to one side of the impact absorbing structure using a pad identical to the one used in the lateral tests in paragraph 4.5.

The centre of area of the pad must pass through the plane mentioned above and the mid point of the height of the structure. 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 such a way as to increase the strength of the attachments being tested.

4.7) A 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 1000 daN applied through a ball-jointed junction. The load must be applied for 30 seconds.

Under these loads conditions, there shall be no structural failure of the inner surfaces of the survival cell and no permanent deformation of these surfaces after the load is removed, measured at the centre of the pad with a tolerance of 0.5 mm.

The static load tests in Article 15.3.3 and Articles 15.4.5, 6 and 7 must be carried out under the supervision of a FISA technical delegate and using measuring equipment verified by FISA. A dossier defining the structure, test methods and results of all these tests shall be submitted to the FISA before the use of the relevant model of car in an F3000 event.

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

5) **Headrest :**

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

The headrest surface shall not be less than 80 $cm^2$. and must be continuous and without protruding parts. The headrest shall be located in a position such that it is the first point of contact with the driver's helmet in the event of an impact projecting the driver's head rearwards, when he is seated in the normal driving position.

6) **Lateral protection structures :**

Continuous panels, whose projections on a vertical plane parallel to the longitudinal axis of the car, shall be at least 20 cm high, shall extend between the transverse planes passing through the front rollover structure and the fuel tank

rear face on either side and at least 55 cm from the car's longitudinal centre line. These panels shall be made from a composite material of 10 mm minimum thickness with a honeycomb core in metal or nomex giving adequate resistance to compression. The external covering shall be of aluminium alloy, plastic, or carbon fibre of 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 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**

1) **Fuel :**

The fuel must be **petrol** without any additive other than that of a lubricant on current sale which cannot increase the octane number.

The fuel must have the following characteristics :

— 100 RON maximum, the measurement being made according to the standard ASTM D2699-**86**, the fuel being accepted or rejected according to ASTM D3244 with a confidence limit of 95 %.

- Specific gravity between 720 and 785 kg/m³ at 15°C (the measurement being made according to the standard ASTM **D4052**).

- A maximum of **2.8** % oxygen (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 will be carried out according to the standard ASTM D3228, that of the oxygen by elemental analysis with a tolerance of 0.2 %.

— Maximum content of peroxides and nitrooxide compounds : 100 ppm (ASTM D3703).

— Maximum lead content : 0.40 g/l or the standard of the country of the event if this is lower (**ASTM D3341 or D3237**).

— maximum benzene content : 5 % in volume (**ASTM D3606**).

If the fuel available locally for the event is not of a sufficient quality for use by competitors, the ASN of the organising country must ask the FISA for a waiver in order to enable the use of fuel not corresponding to the characteristics defined above.

The storing of fuel on board the car at a temperature of more than 10 degrees centigrade below the ambient temperature is forbidden.

The use of a specific device (on board the car or otherwise) to reduce the temperature of the fuel below the ambient temperature is forbidden.

2) **Oxydant :**

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

**ARTICLE 17 : FINAL TEXT**

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

**ARTICLE 18 : CHANGE FOR 1993**

**Article 5.1 - Engine :**

Change : "Number of cylinders : maximum 12"
to :"Number of cylinders : maximum 8".

# Art. 275 - Technical Regulations Formula N° 3

SUMMARY

## ARTICLE 1 : DEFINITIONS

1) **Formula 3 car :**
Four-wheel automobile designed solely for speed races on circuits or closed courses.

2) **Automobile :**
Land vehicle running on at least four non-aligned wheels, of which at least two are used for steering, and at least two for propulsion.

3) **Land vehicle :**
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.

4) **Coachwork :**
All entirely sprung parts of the car licked by the external air stream, except the safety rollover structures and the parts definitely associated with the mechanical functioning of the engine, transmission and running gear. The radiators shall be considered to be part of the coachwork.

5) **Wheel :**
Flange and rim. Complete wheel : Flange, rim and tyre.

6) **Automobile make :**
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 Champion Title or Cup, this will be granted to the manufacturer of the car.

7) **Event :**
An event shall consist of official practices and the race.

8) **Weight :**
Is the weight of the car at any time during the event, with neither fuel nor driver on board.

9) **Racing weight :**
Is the weight of the car in running order with the driver aboard and all fuel tanks full.

10) **Cylinder capacity :**
Means the volume swept in the cylinder(s) of the engine by the movement of the piston(s). In calculating engine cylinder capacity, the number Pi shall be 3.1416.

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 systems) by any means whatsoever. The injection of fuel under pressure is not considered to be supercharging.

12) **Intake system :**
All the elements between the head and the external side of air restrictor.

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.

14) **Suspension :**
All road wheels in contact with the ground, and their axles must be suspended from the chassis/body unit by springing mediums (i.e. axles or wheels must not be connected directly to the chassis/body unit). The springing medium must not be comprised of bolts located through flexible bushes or flexible mountings.
There must be independant movement of the axles/wheels and uprights/stub-

axles giving suspension travel from "bump" to "drop" in excess of the flexibility of the mounting locations attachments.

15) **Cockpit :**
The structural inner volume in which the driver is located.

16) **Survival cell :**
A continuous closed structure containing the fuel tank and the cockpit.

## ARTICLE 2 : REGULATIONS

1) **Role of the FISA :**
The following regulations governing the construction of F3 cars listed below are issued by the FISA.

2) **Publication date for modifications :**
Each year, the FISA will publish all changes made to these regulations. All such changes will take effect on the third
1 st January following their publication.
Changes made in consideration of safety matters may come under validity immediately.

3) **Previous notice for change in the air restrictor :**
The FISA reserves its right to modify the dimensions of the air restrictor with a one year notice.

4) **Dangerous construction :**
If an automobile is deemed to be dangerous, it may be excluded by the Stewards of the Meeting.

5) **Permanent compliance with regulations :**
Automobiles must comply with these regulations in their entirety at all times during an event.

6) **Measurements :**
All measurements must be made while the car is stationary on a flat horizontal metalled surface.

## ARTICLE 3 : COACHWORK AND DIMENSIONS

1) **Overall width :**
Overall width of the car, including complete wheels with the steered wheels in the straight ahead position, shall not exceed **185** cm.

2) **Width ahead of front wheels :**
The coachwork ahead of the front wheels may be extended to an overall maximum width of **130** cm.
Nevertheless, any part of the coachwork ahead of the front wheels exceeding an overall width of 95 cm, shall not extend above the height of the front wheel rims, with the driver aboard seated normally, and irrespective of the fuel load.

3) **Width between the front wheels and the rear wheels :**
The overall maximum width of the coachwork behind the forward edge of the front wheels and in front of the centre-line of the rear wheels shall not exceed 130 cm.
The crushable structure is included in this width.
No part of the bodywork in front of the centre-line of the rear wheels and extending above the height of the rear complete wheels may project beyond **45** cm each side of the longitudinal axis of the car.

4) **Width of rear wing :**
The width of the coachwork behind the centre-line of the rear wheels may not exceed **90** cm.

5) **Overhang :**
No part of the car shall be more than 60 cm behind the centre line of the rear wheels.
No part of the car shall be more than 100 cm in front of the front wheels axle.
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.

6) **Height :**
Except for the safety rollover bars, no part of the car shall be higher than 90 cm from the ground with the car in normal racing trim with the driver aboard

seated normally. Any part of any safety rollover bar higher than 90 cm from the ground must not be shaped to have a significant aerodynamic influence on the performance of the car.

7) **Wheelbase and track :**
Minimum wheelbase : 200 cm
Minimum track : 120 cm.

8) **Flat bottom and aerodynamic influence :**
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 directly beneath the car must lie on one plane within a tolerance of ± 5 mm. All these parts must produce a uniform, solid, hard, rigid (no degree of freedom in relation to the body/chassis unit), impervious surface, under all circumstances. The periphery of the surface formed by these parts may be curved upwards with a maximum radius of 5 cm.

8.1) The tolerance of plus or minus 5 mm has been introduced into the rules to cover any possible manufacturing problem and not to permit designs against the spirit of the "flat bottom".

8.2) Any skids, skirts, or other devices protruding from the "flat bottom" (also if into the plus or minus 5 mm) must be removed from the flat bottom area because it could be seen as infriging Article 3.8.4.

8.3) To protect the bottom of the car skids can be placed outside the flat bottom area but in respect of Article 3.8.4. 8.4) Any specific part of the car influencing its aerodynamic performance :

— must comply with the rules relating to coachwork ;
— 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.
— must not be in contact with any not entirely suspended 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 coachwork may under any circumstances be located below the geometrical plane generated by the plane surface provided for by this article.

No part of the coachwork in front of the front wheel axis and more than 20 cm from the longitudinal centre-line of the car may be closer than 25 mm to the geometrical plane referred to above.

## ARTICLE 4 : WEIGHT

1) **Minimum weight :**
The weight of the car must not be less than 455 kg.

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.

The weight may be checked at any time during an event without the driver on board and with the quantity of liquid remaining in the tanks (on the understanding that it is forbidden to add oil, any other liquid or extinguishants before the weighing) and after the tanks have been emptied of all fuel.

## ARTICLE 5 : ENGINE

1) **Engines with reciprocating pistons :**
a) Engine cylinder capacity : inferior or equal to 2,000 $cm^3$.
b) Maximum number of cylinders : 4.
c) Supercharging forbidden.

2) **Rotary piston engines :**
Cars with rotary piston engines covered by NSU-Wankel patents will be admitted on the basis of a piston displacement equivalence. This equivalence is 1.8 the volume determined by the difference between the maximum and minimum capacity of the working chamber.

3) **Engine modifications :**

The engine block and engine head castings, machining completed, must be those of an engine equipping a car model of which the FISA has ascertained the series-production of at least 5,000 units in 12 consecutive months. The original engine block and cylinder head may be modified freely by removal of material to the exclusion of any addition of material. However, it is permitted to sleeve an engine block that originally is not fitted with sleeves and to use "helicoïls" and to modify or close the lubrication holes in the cylinderhead. As the position of the injectors is free, the standard holes can be closed by adding material.

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

The type of crankshaft bearings may not be modified (the replacement of a plain bearing by a roller bearing is therefore forbidden). The engine fixation is free.

It is pointed out that whatever the type of the engine used, it is not compulsory that the different mechanical components of the engine should proceed from the original engine.

The intake system is free but it must be fitted with a air restrictor of 3 mm in length having a circular section, perpendicular with an aperture of 24 mm diameter maximum.

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

The material of the air box is free, provided that it is not porous. It is prescribed that the entire intake system including manifolds, injectors, air-box and restrictor must fit into a box of 1 m long, 50 cm wide and 50 cm high. It is also prescribed that the intake system may be removed from the engine as one unit with the cylinder head(s).

The maximum cylinder-capacity may be obtained by increasing or reducing either the bore or stroke or both dimensions.

The other original parts of the engine may be replaced or modified without restriction. It is permitted to weld the sleeves to the block for the conventional engine.

It is permitted to close the unused apertures in the cylinder block and cylinder head, if the only purpose of this operation is that of closing.

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

4) **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 section-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) **Exhaust pipes :**
The outlet orifices of the exhaust pipes, when directed to the rear, must be placed at a height of less than 60 cm above the ground.

**ARTICLE 6 : FUEL SYSTEM**

1) **Line location :**
No line containing fuel may pass through the cockpit.

2) **Line specifications :**
All fuel lines must have a minimum burst pressure of 70 bar (1000 psi) and a minimum operating temperature of 135° C (250° F).
When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

3) **Fuel tanks :**
All fuel tanks, except for a collector tank not exceeding
5 litres capacity, must be rubber bladders conforming to or exceeding the specifications of FT3.

3.1) Safety fuel tanks approved by the FISA :
The FISA reserves its right to approve any other set of technical specifications after study of the dossier submitted by the manufacturers concerned.

3.2) Safety tank manufacturers recognised by the FISA :
Competitors must use safety fuel tanks made by a manufacturer recognised by the FISA. In order to obtain the FISA's agreement, a manufacturer must prove the compliance of its product with the specifications approved by the FISA.
These manufacturers must undertake to deliver to their customers exclusively tanks complying with the norms approved. To this end, on each tank delivered there shall be printed a code indicating the name of the manufacturer, the exact specification according to which the tank has been manufactured and the date of the manufacturing.

3.3) Ageing of safety fuel tanks :
The ageing of safety fuel tanks entails a considerable reduction in the strength characteristics after approximately five years. Therefore, all fuel cells must be replaced at the latest five years after the date of manufacture indicated on the cell.

3.4) List of recognised manufacturers :
A list of approved manufacturers is available from FISA.
(See technical list n° 1).

4) **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 specifications hereafter :

a) The crushable structure must be a honeycomb sandwich construction based on a fire-resistant core of a minimum crushing strength of 18 N/cm² (25 lb/sq.i). 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 225 N/mm² (14 tons/sq.i).

b) The minimum thickness of the sandwich construction must be 1 cm.

5) **Tank fillers and caps :**
The tank fillers and their caps shall not protrude beyond the coachwork.
The filler shall have a sufficient diameter to allow for the air exhausted at the time of quick refuelling. Any breather pipe connecting the tank with the atmosphere shall be designed to avoid liquid leakage when the car is running, and its outlet must not be less than 25 cm to the rear of the cockpit.
All filler caps must be designed to ensure an efficient locking action which reduces the risk of an accidental opening following a crash impact or incomplete locking.

6) **Refuelling during the race :**
In the event that any fuel is added after the race starts, the container from which fuel is being added must have a leakproof coupling which connects it to the tank filler on the car. The air vent of the container must be fitted with a non-return valve.

7) **Fuel system :**
No part of the car containing fuel may be at a distance of more than 55 cm from the longitudinal axis of the car.

## ARTICLE 7 : OIL SYSTEM

1) **Location - crushable structure :**
Any oil storage tank situated outside the main structure of the car must be surrounded by a 10 mm thick crushable structure.
No part of the car containing oil may be situated aft of the gearbox, or final drive casing.

2) **Oil lines :**
No line containing lubricating oil may pass through the cockpit.
All lubricating oil lines must have a minimum burst pressure of 70 bar (1000 psi) and a minimum operating temperature of 135°C (250°F).
When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

3) **Oil catch tank :**
When a car lubrication system includes an open type sump breather, this breather must vent into a catch tank of at least 2 litre capacity.
The container shall either be made out of translucent plastic, or include a transparent panel.

4) **Oil replenishment :**
No oil replenishment is allowed during a race.

5) **Oil system :**
No part of the car containing oil may be situated at a distance of more than 55 cm from the longitudinal axis of the car.

## ARTICLE 8 : STARTING

1) **Starter :**
Compulsory starter with electrical or other source of energy carried aboard the car, and able to be controlled by the driver when normally in his seat.

2) **External energy source :**
A supplementary external source of energy temporarily connected to the car may be used to start the engine both on the starting grid and in the pits.

## ARTICLE 9 : TRANSMISSION

1) **Number of driven wheels :**
The car must be driven by two wheels only.

2) **Type of gearbox :**
Five gearbox ratios, not including the reverse gear, as maximum.
Transversal gearboxes and/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.

3) **Reverse gear :**
All automobiles must have a reverse gear which, at any time during the event, can be selected while the engine is running and used normally by the driver when seated normally in the car.

## ARTICLE 10 : SUSPENSION

1) **Active suspension :**
Active suspensions are forbidden, as is any system which allows control of the flexibility of the suspension springs, shock absorption and trim height when the car is moving.

2) **Chromium plating of suspension :**
Chromium plating of steel suspension members of over 725 N/mm² (45 tons square inch) tensile strength is forbidden.

**ARTICLE 11 : BRAKES**

1) **Braking system :**
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.
Carbon discs are banned.

2) **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.
Furthermore, such ducts, when viewed from the side must not protrude beyond the periphery of the tyre in a forward sense or the rim in a rearward sense.

**ARTICLE 12 : WHEELS AND TYRES**

1) **Number of wheels :**
Number of wheels : 4.

2) **Location :**
Complete wheels shall be external to the coachwork with the car viewed in plan, with the rear aerodynamic device removed.

3) **Dimensions :**
3.1) The width of the complete wheels is limited to 11.5 inches. Compulsory diameter of the rear wheels : 13 inches.

3.2) The width shall be measured with the tyre at normal running pressure, and the complete wheel mounted on the car resting on the ground, in running order, with the driver aboard.
This measurement of the width will only be taken at the widest point of the tyre, above the hub-level. In no case can the interior width measured where the beads join the rim exceed the width of the tyre.

4) **Multiple tyres :**
The fitting of multiple tyres on one and the same rim is authorised.

5) **Wheel fixation :**
A safety spring must be in place on the fixation nut throughout the duration of the event and must be replaced after each wheel change. These springs must be painted dayglo red/orange.
Alternatively, any other system approved by FISA must be used.

6) **Steering :**
Four-wheel steering is forbidden.

7) Pressure control valves on the wheels are forbidden.

**ARTICLE 13 : COCKPIT**

1) **Cockpit opening :**
The opening giving access to the cockpit must allow the horizontal template shown below to be inserted vertically into the survival cell and bodywork (not considering the steering wheel) down to 25 mm lower than the lowest point of the cockpit opening.
The driver must be able to enter and get out of this 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 designed 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.

2) **Rear view mirrors :**
All cars must have at least two mirrors mounted so that the driver has visibility to the rear on both sides of the car (minimum surface of each one : 55 $cm^2$).

3) **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 be in conformity with the norma FIA n° 8853 – 1985 (obtainable from FISA).

4) **Internal section :**
The free 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 $cm^2$. The only things which may encroach on this area are the steering column and the padding for the driver comfort.
A free vertical section of minimum 25 cm width maintained to a minimum height of 25 cm with corners of maximum 5 cm radius must be maintained over the whole length of the cockpit, with the steering wheel removed.
The driver normally seated in his driving position with the safety belts fastened and the steering wheel in place must be able to raise both legs together so that his knees reach the plane of the steering wheel in the rearwards direction ; this action must not be obstructed by any part of the car.

5) **Lines in the cockpit :**
No lines containing fuel, cooling water or lubricating oil may pass through the cockpit. Lines containing hydraulic fluid may pass through the cockpit but without any connection located inside which are capable of being removed.
All lines containing hydraulic fluid, with the exception of lines under gravity head only, must have a minimum burst pressure of 70 bar (1000 psi) or higher according to operating pressure, and a minimum operating temperature of 232 degrees C (450 degrees F).
When flexible, these lines must have threaded connectors and an outer braid resistant to abrasion and flame (will not sustain combustion).

**ARTICLE 14 : SAFETY EQUIPMENT**
**1) Fire Extinguishers**
1.1) Extinguishant :
Halon 1211 or 1301 (BCF - BTM).

1.2) Minimum capacity :
Cockpit : 5 kg
Engine compartment : 2.5 kg.

1.3) Location - Mounting method :
The extinguisher bottle must be adequately protected, and the bottle for the driver's compartment must be mounted within the **survival cell**. In all cases, the bottle mountings must be able to withstand 25 g accelerations, no matter how these are applied.

1.4) Discharge Time :
Engine compartment : 10 seconds
Driver's compartment : 30 ± 5 seconds for Halon 1211
60 ± 5 seconds for Halon 1301.

1.5) Drive System :
Any triggering system having its own source of energy is permitted, provided it is possible to operate all extinguishers in case the main electric circuits of the car fail.
Automatic triggering by heat sensors is recommended.
The driver must be able to trigger all extinguishers manually when seated normally in the car with his belts fastened and steering wheel in place. The same applies to any person outside the car. To avoid accidental triggering, a warning symbol marked by a red letter "E" must be fitted close to the inside triggering mechanism, which will be of a push-button type situated on the left side of the cockpit. The outside triggering mechanism must be combined with the circuit breaker and must be indicated by the same warning symbol in a white circle with a red edge, of at least 10 cm diameter.

1.6) Checking of bottles :
The type of extinguishant, the total weight of the bottle and the quantity of extinguishant must be specified on each bottle.

1.7) Working :
Both bottles must be released simultaneously. The system must work whatever position the car is in, even when the car is inverted.

2) **Master-switch :**
The driver seated normally with his safety belt fastened and the steering wheel in place must be able to cut off all electrical circuits and stop the engine by means of a spark proof circuit breaker. The inside triggering device must of a switch type located on the right side of the cockpit and marked by a red spark in a blue triangle with a white border. The outside triggering mechanism must be of a horizontal handle type, located at the base of the main rollover structure, on the right hand side, capable of being operated from a distance by the rescue personnel with the aid of a hook.

3) **Rear light :**
All cars must have a red warning light of at least 21 watts in working order **throughout the event** which faces rearward, is clearly visible from the rear, is mounted not more than 10 cm from the car centre-line **and not less than 40 cm from the ground**, has a minimum surface of 50 $cm^2$, and can be switched on by the driver.
The optical (lens and reflector) must conform to the EEC standards for rear fog lamps of motor vehicles and must carry the corresponding approval marking.

## ARTICLE 15 : SAFETY STRUCTURES

1) **Survival cell and frontal protection :**

1.1) The chassis structure must include a survival cell formed from two continuous box members, one on each side of the driver. These box members can be coupled at the car's centre line but they 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.

1.2) Each box member shall extend from behind the driver to a plane at least 10 cm in front of the soles of his feet with the driver seated normally and with his feet on the pedals and the pedals in the inoperative position. The soles of the feet of the driver, seated in the normal driving position and with his feet on the pedals and 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 maximum forward extension shall not be situated to the fore of the vertical plane referred to above.

1.3) Throughout its length from behind the driver to the soles of his feet, each box must have a minimum cross sectional area of 150 $cm^2$ and a minimum structural material cross section of 10 $cm^2$ (the thickness measured in a non vertical direction of the box member areas located at more than 12.5 cm from the car's centre line must be 20 mm minimum). Forward of this, the boxes may taper to a minimum cross section of 100 $cm^2$ and a minimum structural material cross section of 5 $cm^2$.

1.4) The chassis must include an impact-absorbing structure fitted ahead of the survival cell. This structure must be independant of the bodywork and if detachable must be solidly fixed to the extremities of the survival cell box members (i.e. with bolts requiring tools for removal).
It must constitute a box of 30 cm minimum length, 15 cm minimum height in any vertical section and 400 $cm^2$ minimum total cross section. It must be metallic using honeycomb sandwich construction with a panel thickness of 15 mm minimum.

1.5) Throughout the length of each box member or panel, the structural material shall have a minimum tensile strength of 310 $N/mm^2$ for composite materials or 225 $N/mm^2$ 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 stabilized.

1.6) All holes and cutouts in the boxes shall be strongly reinforced and all material sections through these holes shall still comply with the minimum material area requirements.

1.7) 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.

2) **Lateral protection structures :**

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.

These panels shall be made from a composite material of 30 $cm^2$ 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.

3) **Rollover bars :**

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

3.2) All cars must have at least two rollover structures, but the use of titanium is forbidden.

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

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

This second structure behind the seat must be symmetrical about the lengthwise centre-line of the car and comply with the following figures :

— The minimum height must be at least **95** cm measured vertically from the base of the monocoque.

— The top of the rollbar must also be at least 5 cm above the driver's helmet when the driver is sitting in a normal driving position.

The vertical projection of the second rollover structure made on a horizontal plane passing 5 cm lower than the top of the second rollover structure must have a minimum area of 100 $cm^2$.

3.3) Strength :

The rollbar, of entirely free conception, must be capable of withstanding the stress minima indicated as follows, applied simultaneously to the top of the structure, which are 1.5 w laterally, 5.5 w longitudinally in both directions and 7.5 w vertically, w being the racing weight of the car, the induced loads being carried over into the primary structure of the chassis. A certificate signed by a qualified technician must be submitted to the scrutineers of an event. It must be accompanied by a drawing or a photograph of the said rollover structure, and state that this rollbar can withstand the above mentioned loads.

3.4) **General considerations :**

3.4.1) Whenever bolts and nuts are used, the bolts should be of a sufficient minimum diameter, according to the number used. They must be of the highest possible quality (preferably aircraft). Square head bolts and nuts should not be used.

3.4.2) One continuous length of tubing should be used for the main structure with smooth continuous bends and no evidence of crimping or wall failure.

3.4.3) All welding should be of the highest quality possible with full penetration (preferably arc welding and in particular heliarc).

3.4.4) For monocoque constructions, consideration should be given to using a rollbar hoop of 360 degrees, the lower part of which fits exactly to the inner profile of the bodyshell, and attached with suitable mounting plates. This type of roll-bar then becomes a substitute for the frame.

4) **Headrest :**

All cars must have a headrest which does not deflect more than 5 cm rearwards, when a rearward force of 5 kg is applied. It must be designed so that the driver's head cannot be trapped between the rollover structure and the headrest.

5) **Magnesium use :**

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

6) **Titanium use :**

The use of titanium in suspension and steering parts, or in the rollover structure is forbidden.

## ARTICLE 16 : FUEL

1) **Fuel :**

The fuel must be **petrol** without any additive other than that of a lubricant on current sale which cannot increase the octane number.

The fuel must have the following characteristics :

— 100 RON maximum, the measurement being made according to the standard ASTM D2699-**86**, the fuel being accepted or rejected according to ASTM D3244 with a confidence limit of 95 %.

— Specific gravity between 720 and 785 kg/m³ at 15°C (measured according to ASTM **D4052**).

— A maximum of **2.8 %** oxygen (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 D3228, and that of the oxygen by elemental analysis with a tolerance of 0.2 %.

— Maximum content of peroxides and nitrooxide compounds : 100 ppm (ASTM D3703).

— Maximum lead content : 0.40 g/l or the standard of the country of the event, if this is lower (**ASTM D3341 or D3237).**

— Maximum benzene content : 5 % in volume (**ASTM D3606**).

If the fuel available locally for the event is not of a sufficient quality for use by competitors, the ASN of the organising country must ask the FISA for a waiver in order to enable the use of fuel not corresponding to the characteristics defined above.

The storing of fuel on board the car at a temperature of more than 10 degrees centigrades below the ambient temperature is forbidden.

The use of a specific device (on board the car or otherwise) to reduce the temperature of the fuel below the ambient temperature is forbidden.

2) **Oxydant :**

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

## ARTICLE 17 : FINAL TEXT

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

## ARTICLE 18 : CHANGES FOR 1993

Article 5.3 - Engine modifications :

The first sentence is modified as follows :

"The engine block and engine head castings, machining completed, must be those of car engine of which the FISA has ascertained the series production of at least **2500** units in 12 consecutive months. This engine must be homologated by the FISA, and described on a homologation form for Formula 3 engine." (See FIA Bulletin N° 255).

# *Art. 277* - **Technical Regulations Free Formula (Group E)**

1) It is permitted to organise sporting competitions open to other racing cars than those defined in one of the previous Groups of Appendix J.

All specifications concerning the vehicles and particularly the limitations of the cylinder-capacity are in this case at the discretion of promoters and it rests with them to list clearly these specifications in the Supplementary Regulations of the event, which anyway have to be approved by the National Sporting Authority answerable to the FISA.

However, racing cars, which do not comply with any of the International Racing formulae, must for security reasons be in conformity with the General Prescriptions listed under Art. 257.6.2, 257.8.5, 257.13.2, 253.13, 253.14, 253.4, 253.9, 257.7.2, 257.6.4, 275.14.3, and Art. 275.3.5.

1) The dimensions of the roll-bars must be as follows : the minimum height must be at least 36 inches (92 cm) measured along the straight line following the driver's spine, from the seat's metal shell to the top of the roll-bar. The top of the roll-bar must also be at least at 5 cm above the driver's helmet when the driver is sitting in normal driving position. The width must be at least 38 cm measured inside the roll-bar between the two vertical pillars of the sides.

It must be measured at 60 cm above the seat's metal shell on the perpendicular to the straight line following the driver's spine.

**Strength :**

In order to obtain a sufficient strength for the roll-bar, two possibilities are left to the manufacturers :

a) The roll-bar, of entirely free structural conception, must be capable to withstand the stress minima indicated in Art. 257.14.2.

b) The tubes and brace(s) must have a diameter of at least 1 3/8 inch (3.5 cm) and at least 0.090 inch (2 mm) wall thickness. The material should be molybdenum chromium SAE 4130 or SAE 4125 (or equivalent in DIN, NF, etc.).

There must be at least one brace from the top of the bar rearwards at an angle not exceeding 60° to the horizontal.

The diameter and material of the brace must be the same as those of the roll-bar itself.

In the case of two braces, the diameter of each of them may be reduced to 20/26 mm. Removable connection between the main hoop and the brace must comply with drawings Art. 253.37 to 253.41. Forward fitted stays are allowed.

2) The extinguisher system is left up to the ASNs. However the directives laid down in Art. 257.13.1 are strongly recommended.

# *Art. 278* - **Technical Regulations National Formulae**

## REGISTRATION OF NATIONAL FORMULAE

The FISA will accept to study the registration of "National" formulae, in order to have their technical prescriptions known at an international level and to ensure a certain stability and a standardisation of the regulations which rule them.

1) In persuance of Art. 251, any ASN has the right to define regulations applying to given types of "Formula libre" racing cars denominated hereafter : "National Formulae".

2) Are eligible for registration only the applications presented by at least two National Sporting Authorities and concerning a National Formula used in at least two countries.

3) The FISA will accept, in compliance with the preceding Art. 2 to register on a voluntary basis any set of prescriptions defining such National Formulae.

The regulations thus registered by the FISA will be applicable in countries the ASNs of which have declared to abide by them.

The declaration made by the National Sporting Authority to adopt the regulations of a determined National Formula is exclusively valid for the regulations such as they were originally deposited at the FISA, and this National Sporting Authority is entitled to withdraw this declaration if the regulations are altered afterwards.

The withdrawal of a declaration for another reason than the one hereabove mentioned, must compulsorily be communicated to the FISA before December 31 st in order to be valid as from the following year.

4) From the time when such National Formula is registered, its appellation can be used in those countries where the ASNs have adopted the registered regulations, only for cars entirely complying with the regulations deposited at the FISA.

5) Any application for the registration of regulations for a National Formula should be addressed to the FISA at the latest on October 1 st, to be valid as from January 1 st of the following year. The National Formulae can (but it is not compulsory) form the subject of restrictions as regards the engine or other manufacturing elements, in order to allow exclusively the use of parts of a given make. Such a one-make Formula may have a distinct commercial name related to the imposed design restrictions.

6) The National Sporting Authorities which have adopted a determined National Formula may file an application at theí FISA in view of the organisation of an award including several countries.

Any application of that kind will be submitted to the appreciation of the FISA whose decision will depend on the number of countries interested by the organisation of an event included in that award and on the advisability or the necessity, for the general interest of Automobile Sport, to introduce such a form of competition.

7) The organisation of any type of international award without the FISA's agreement will entail the application of penalties.

# Liste des laboratoires d'analyses de carburant reconnus par la FISA/ List of fuel analysis laboratories recognised by the FISA

## LISTE TECHNIQUE N° 2/TECHNICAL LIST N° 2

**Autriche/Austria (A)**
1. Institut für Vebrennungskraftmaschinen und Kraftfahrzeugbau der Technischen Universitdt Wien Vorstand Prof. Lenz, Getreidemarkt 9, 1060 WIEN (Pour détermination du taux d'octane/For determination of octane rate)
2. Institut für Chemische Technologie für Erdölprodukte der Universität Wien, Vorstand Prof. Schindlbauer, Getreidemarkt 9, 1060 WIEN

**Australie/Australia (AUS)**
Mr. Mike Tuminello - Chief Chemist BHP Petroleum Laboratory 245 Wellington Road, Mulgrave 3170, VICTORIA

**Belgique/Belgium (B)**
S.A. Labofina n.v. Centre de Recherches du Groupe Petrofina Chaussée de Vilvorde, 100 - 1120 BRUXELLES Tel. : (02)2339850 - Tlx : 23949

**Suisse/Switzerland (CH)**
EMPA - Service/Abteilung N° 133 Ueberlandstrasse 139 - 8600 DÜBENDORF Tel. : 1/823.41.33 - Tlx. : 825.345 Fax : 1/821.62.44

**Tchécoslovaquie/Czechoslovakia (CS)**
Chemopetrol, Korytna 47, PRAHA 10 - Strasnice

**Allemagne/Germany (D)**
1. GC-GERMAIN CONTROL Internationale Kontrollgesellschaft mbH E7, 16 und 21, 6800 MANNHEIM 1 Tel. : 0621/151049 - Fax : 0621/151026
2. SGS Control - COMBH Petrochemisches Labor Am Neuen Rheinafen 12 A 6720 SPEYER - Tel. : 06232/130140

**Espagne/Spain (E)**
Escuela Technica Superior de Ingenieros Industriales de Madrid Laboratorio de Quimica - 1 c/Jose Gutierrez Abascal, 2 28006 MADRID

**France/France (F)**
1. ATEPE Parc d'Activité de la Tuilerie Saint Benoît AUFFARGIS 78610 LE PERRAY EN YVELINES
2. Institut Français du Pétrole CEDI, BP3, 69390 VERNAISON Tel. : 78022020 - Tlx. : 340257
3. PLAS ZI La Vigne aux Loups 23, rue Bossuet 91160 LONGJUMEAU

**Royaume-Uni/United Kingdom (GB)**
1. Caleb Brett International Limited Laboratory and Technical Services Unit 'A' London Road, West Thurrock, Essex RM16 IHN. Tel. : (0708) 869960 - Fax : (0708) 861496
2. SGS Redwood Ltd. Old Station Approach London Road, PURTLEET, Essex, RM16 1QS Tel. : 0708 866 855 - Tlx. : 897 361 Fax : 0708 864 137

**Grece/Greece (GR)**
Générale Chimie de l'Etat Rue A. Tsoha 16 Ampelokipi - ATHENES

**Italie/Italy (I)**
1. Stazione Sperimentale Combustibili Via Galileo Galilei 1
20097 SAN DONATO MILANESE - MI Tel. : 02/510031
2. Ecocontrol Via della Scafa 121 00054 FIUMINCINO (ROMA) Tel. : 06/6453840
3. S.E.L.M. Litoranea Priolese - Statale 114 96010 PRIOLO (SIRACUSA) Tel. : 0931/731111

# Liste des fabricants et modèles de compteurs homologués par la FISA/ List of manufacturers of flow-meters and models homologated by the FISA

**LISTE TECHNIQUE N° 3/TECHNICAL LIST N° 3**

**Australie/Australia (AUS)**
MACNAUGHT INDUSTRIES 5 Howleys Road, NOTTING HILL 3168. Tel. : (3) 543 3466 - Fax : (3) 543 1426.
*M9*

**France/France (F)**
— EQUIP' FLUIDES Zone industrielle, 2, rue Lavoisier, 77400 LAGNY-SUR-MARNE. Tel. : (1) 64.30.89.50 - Tlx. : 691774.
*M5/M7 (M Series)*

**Royaume-Uni/United Kingdom (GB)**
1. BROOKS INSTRUMENT of EMERSON ELECTRIC UK LTD
Stuart Road, Bredbury, STOCKPORT SK6 2SR. Tel. : 061 – 4307100 - Tlx. : 667393.
*LS 53 78/LS 55 78/LS 56 78*

2. KDG INSTRUMENTS Ltd (FISHER CONTROLS)
Victoria Road, BURGESS HILL, W. Sussex RH1 59LJ. Tel. : 044462631 - Tlx. : 87551.
*Series 11 VR5*

3. ALPECO Ltd Unit 59, Edison Road, Bearbrook Industrial Estate, Rabans Lane, AYLESBURY, Bucks HP19 3TE. Tel. : (0296) 32737/8 - Tlx. : 837192.
*M5/M7 (M Series)*

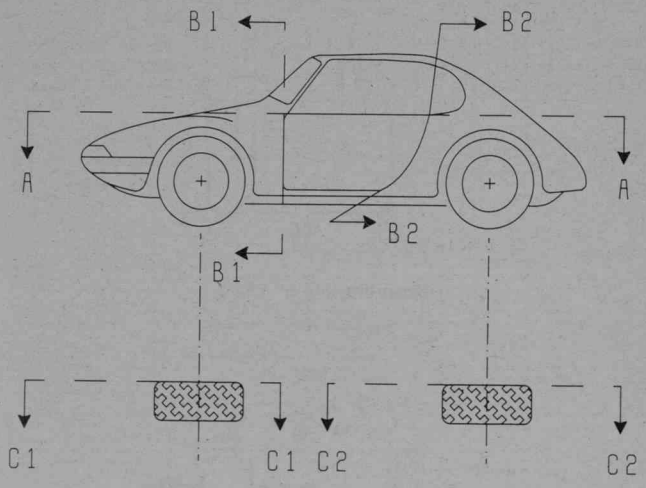
**Italie/Italy (I)**
GRUPPO ISOIL S.p.A. Via F.lli Gracchi, 27, 20092 CINISELLO BALSAMO (MI). Tel. : (02) 6121751 - Tlx. : 330426 - Fax : (02) 6123202.
ou/or
Via Madonna delle Rose 74, 24061 ALBANO S ALESSANDRO (BG). Tel. : (035) 581149 - Tlx. : 301222 - Fax : (035) 582078.
*SBM 75/AL/2"*

**Japon/Japan (J)**
OVAL ENGINEERING Co Ltd 10 – 8 Kamiochiai, 3 Chome, Shinjuku-ku, TOKYO. Tel. : (03) 360 – 5121 - Tlx. : 2322086.
*OVAL LS 5679 - 4200*
*LS 5678 B*

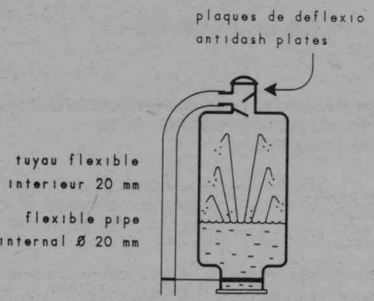
*Revision 2/Issue 2*

# Dessins

# Drawings




**Dessin/drawing n° 251-1**

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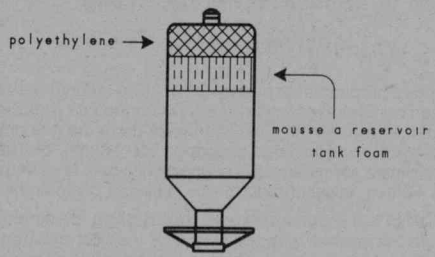


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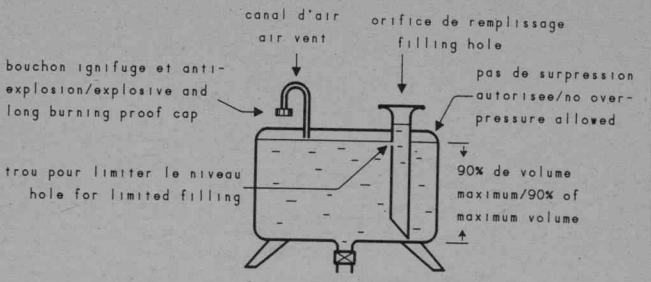


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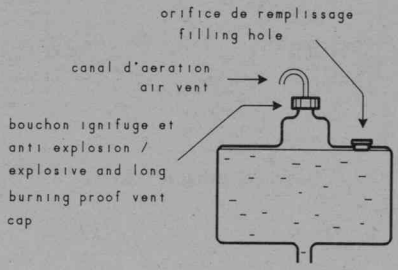
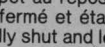



**Dessin/drawing n° 252-4**

**Orifice de remplissage standardisé pour voitures/Standardised car fuel filter**
Alliage recommandé/Recommanded material : AU4G
(aluminium, cuivre/copper, magnesium)

Usinage/Machining 


μ = Micron, Ra = Rugosité admise
average roughness of a surface.
Toutes cotes en mm/All dimensions
in mm.

A : Position du clapet au repos/position of the released valve.
Clapet normalement fermé et étanche à la pression de 100 m. bar (1.5 psi)/Valve normally shut and leak proof under 100 m. bar of pressure (1.5 psi).

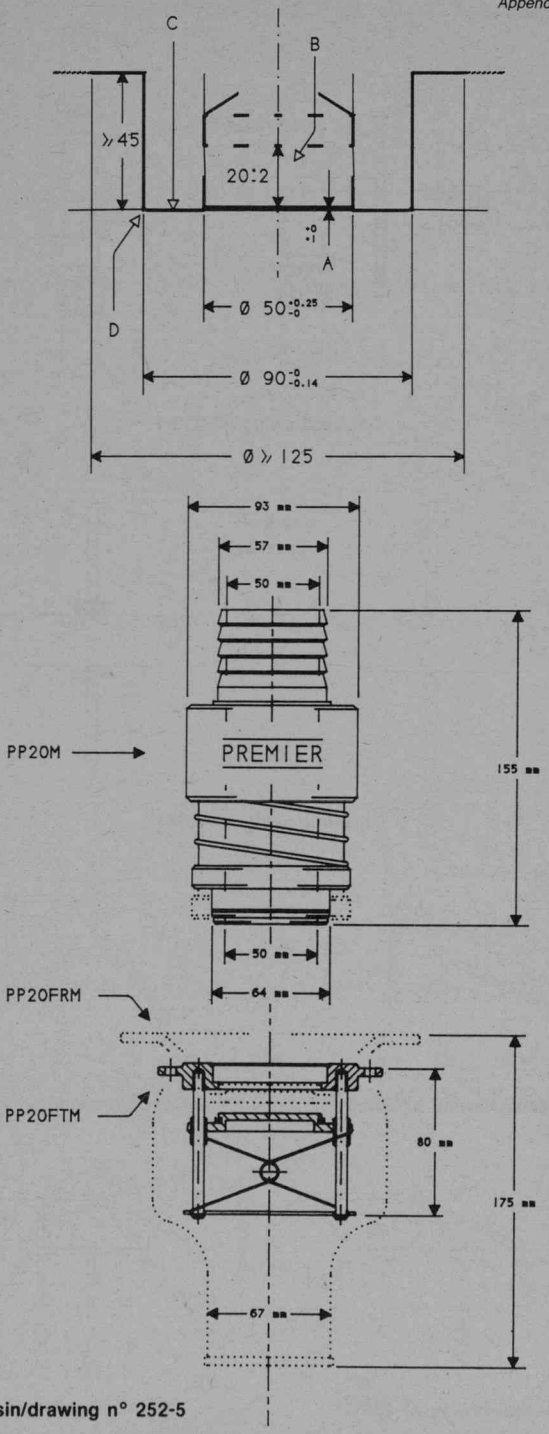
B : Ouverture du clapet/valve lift ($20 \pm 2$ mm).

C : Plan de joint ; tolérance de surfaçage : 0,05 mm/Gasket facing plane, unswerving tolerance : 0.05 mm.

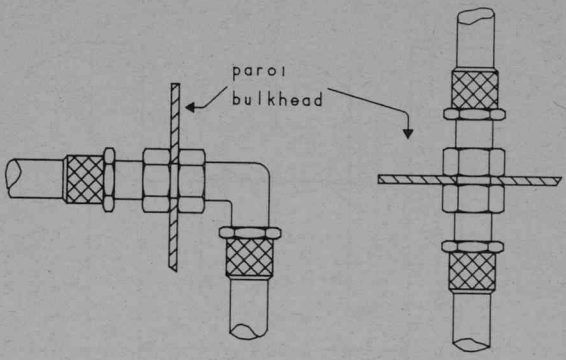
D : Chanfrein $1^{+1}_{+0}$ à 45° ou arrondi (rayon 1 mm)/
Bevel cut $1^{+1}_{+0}$ at 45°, or rounded at 1 mm radius.

L'attention des fabricants de l'accoupleur (côté-stands) est attiré sur le fait que la partie en contact avec la surface C de l'orifice de remplissage doit être munie d'un joint Vitton. Aussi, il est recommandé de ne pas dépasser un guidage initial, avant l'ouverture des soupapes, de 18 mm, de telles sorte qu'à l'ouverture maximale autorisée de la soupape (22 mm) la pénétration totale ne dépasse pas 40 mm, laissant ainsi 5 mm minimum de tolérance.

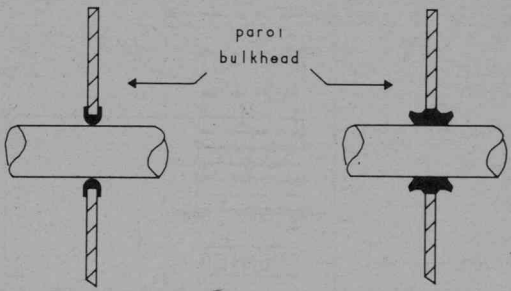
The attention of the manufacturers of the coupling (pit-side) is drawn to the fact that the part in contact with the area C of the filler must be provided with a Vitton joint. It is advised not to exceed an initial locating penetration of 18 mm, before the opening of the valve, so that, with the valve open to the authorised maximum (22 mm), the total penetration does not exceed 40 mm leaving thus a minimum of 5 mm tolerance.




**Dessin/drawing n° 252-5**




Dessin/drawing n° 253-1

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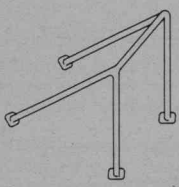

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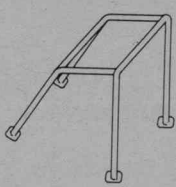

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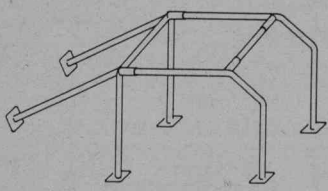

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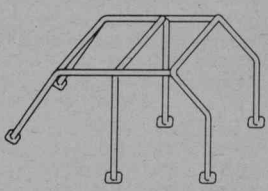

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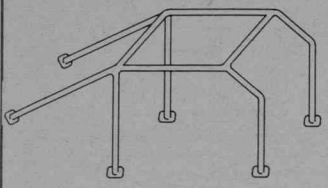

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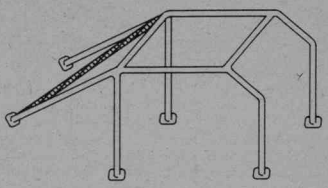

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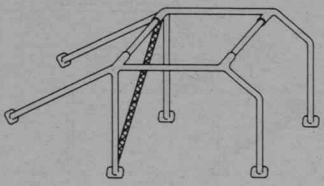

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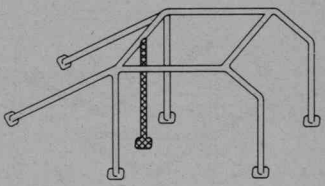

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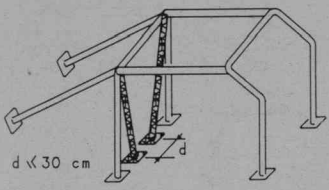


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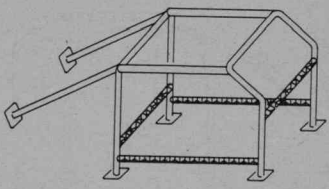

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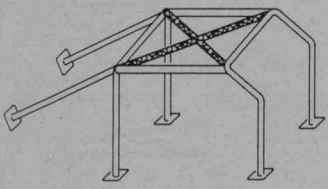

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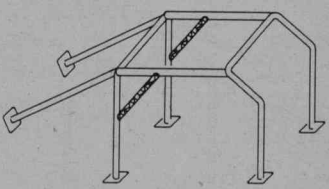

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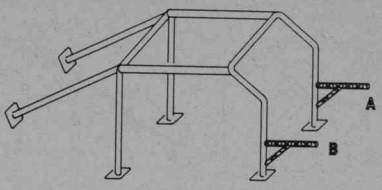
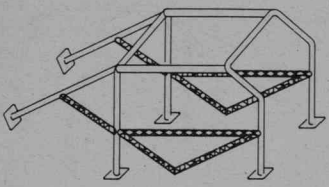
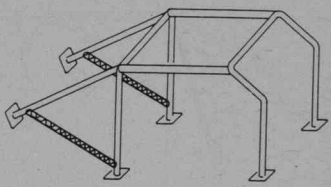



A et B sont les ancrages de suspension
A and B are the suspension anchorage points

**Dessin/drawing n° 253-15**



**Dessin/drawing n° 253-16**



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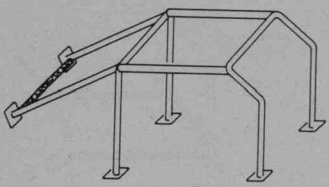

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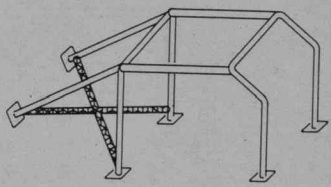

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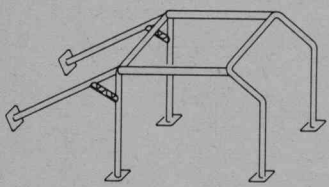

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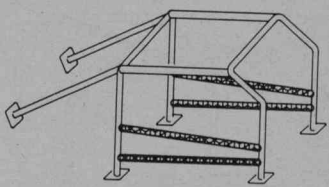
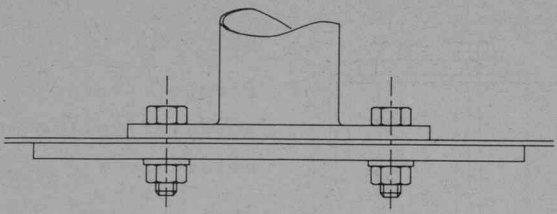


**Dessin/drawing n° 253-21**



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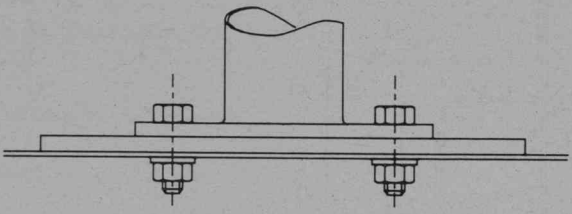

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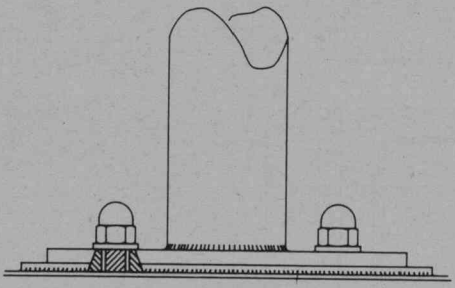

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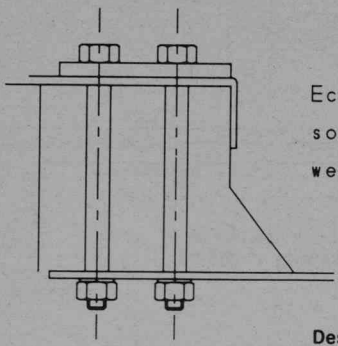
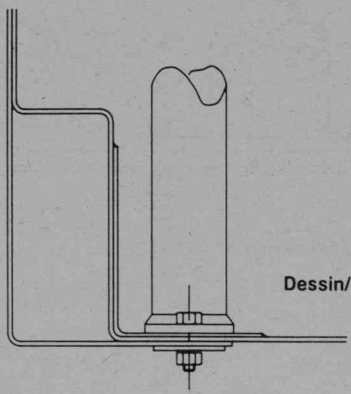


Ecrous rivetes ou soudes/Rivetted or welded nuts

**Dessin/drawing n° 253-25**



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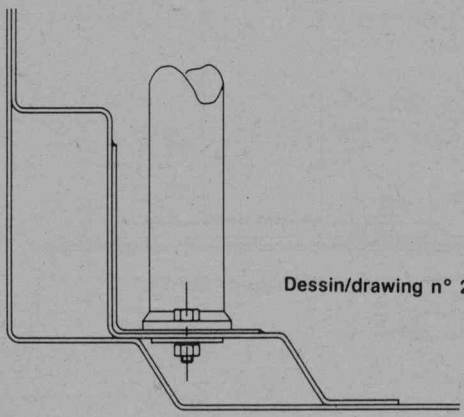

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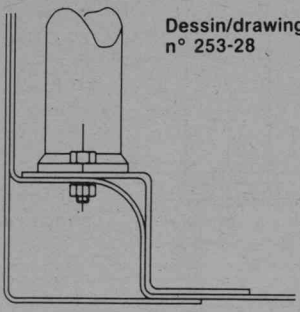
Dessin/drawing
n° 253-28



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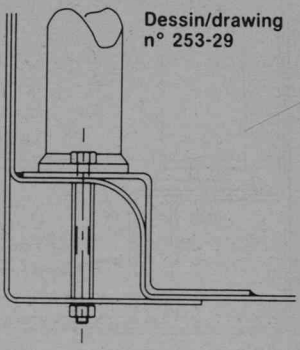
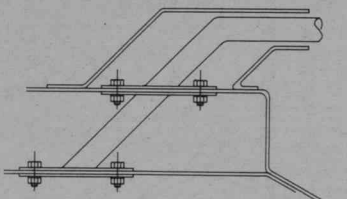
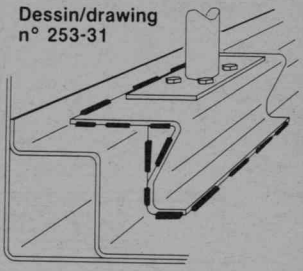




Dessin/drawing n° 253-30

Dessin/drawing
n° 253-31



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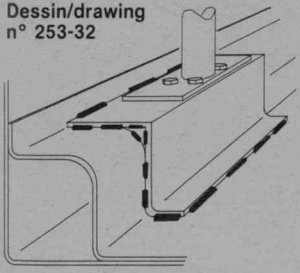

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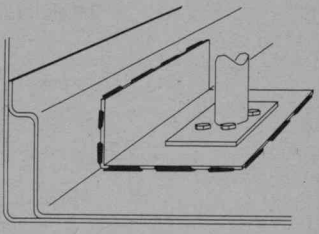

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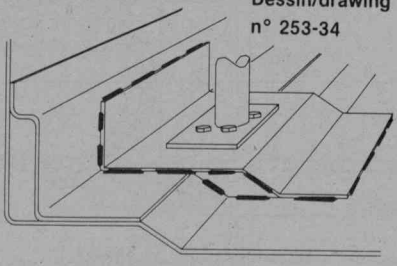

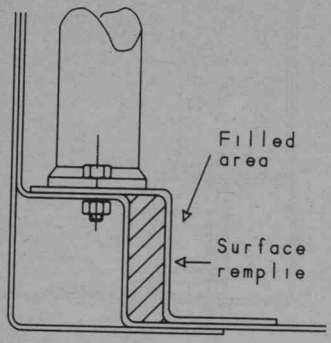


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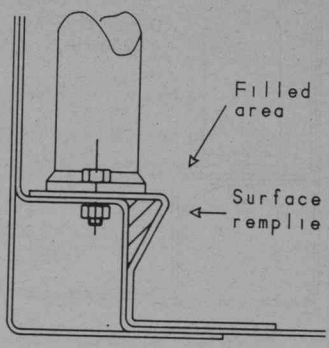


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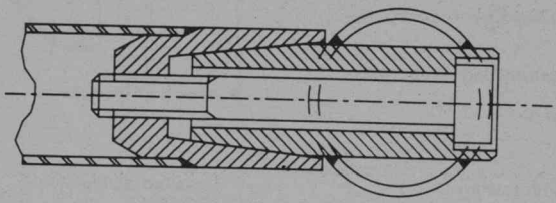

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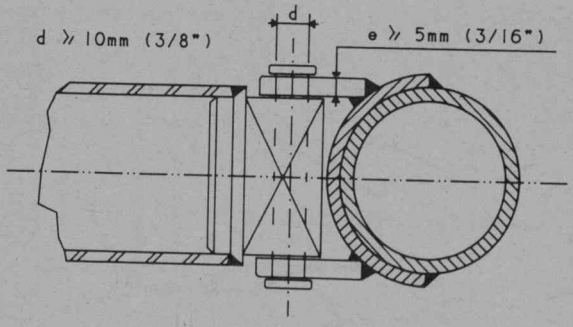
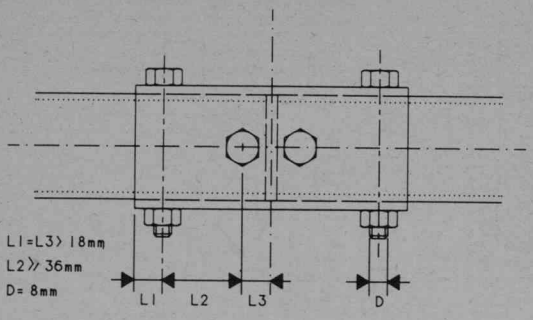
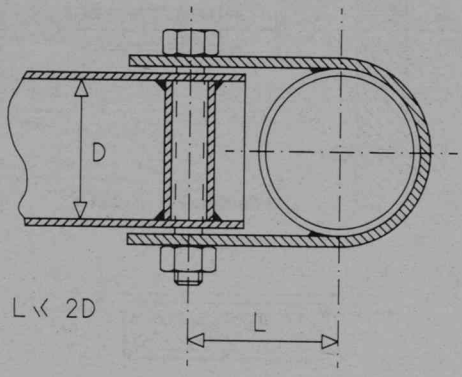


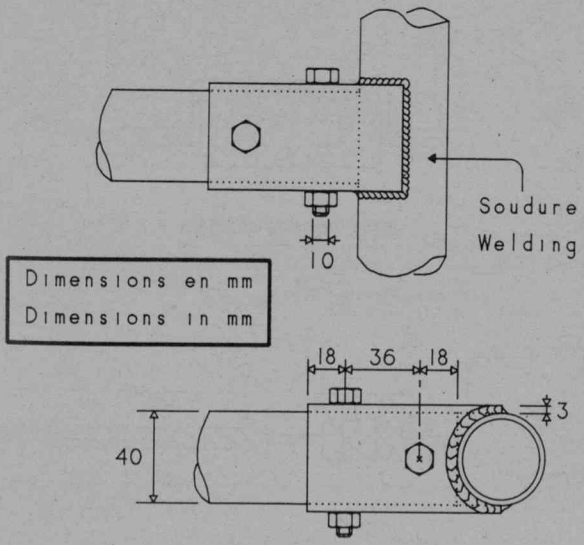

Dessin/drawing n° 253-38



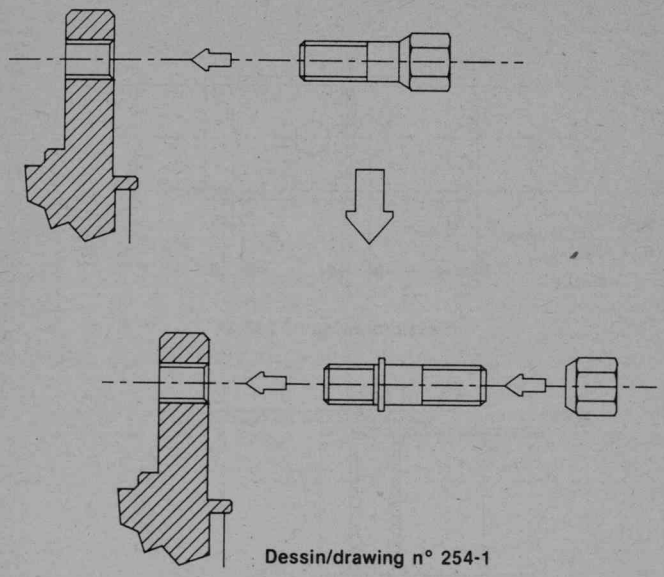

**Dessin/drawing n° 253-39**



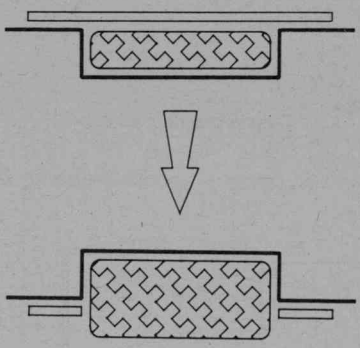

**Dessin/drawing n° 253-40**



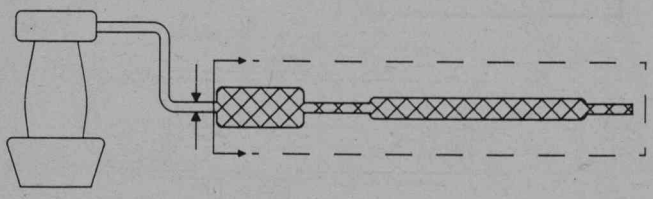

**Dessin/drawing n° 253-41**



Dessin/drawing n° 254-1

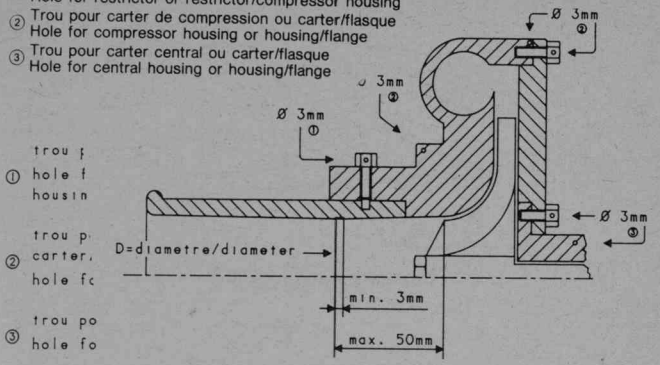


Dessin/drawing n° 254-2



Dessin/drawing n° 254-3

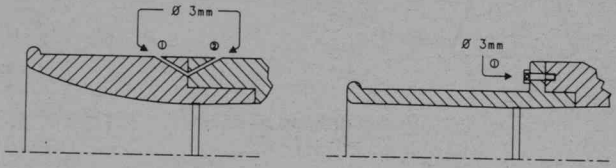
① Trou pour bride ou bride/carter de compression
Hole for restrictor or restrictor/compressor housing
② Trou pour carter de compression ou carter/flasque
Hole for compressor housing or housing/flange
③ Trou pour carter central ou carter/flasque
Hole for central housing or housing/flange



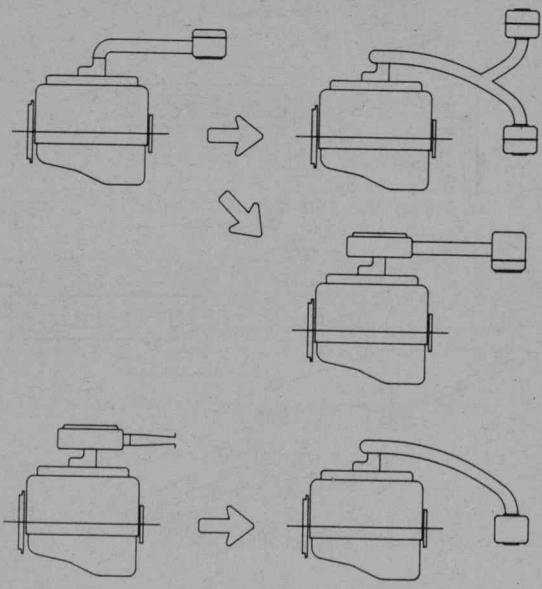

D = 38 mm max. pour Groupe A
D = 36 mm max. pour Groupe N

D = 38 mm max. for Group A
D = 36 mm max. for Group N

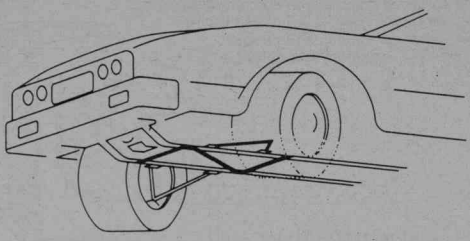
## AUTRES POSSIBILITES/OTHER POSSIBILITES :



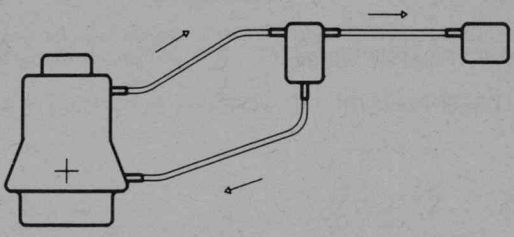

**Dessin/drawing n° 254-4**



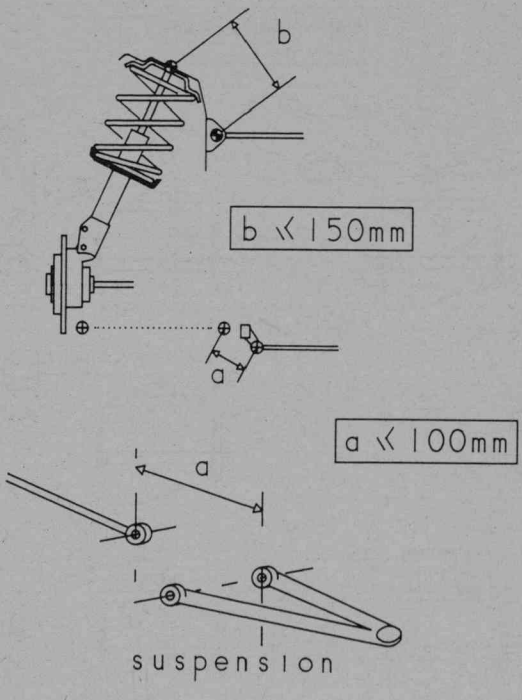
**Dessin/drawing n° 255-1**



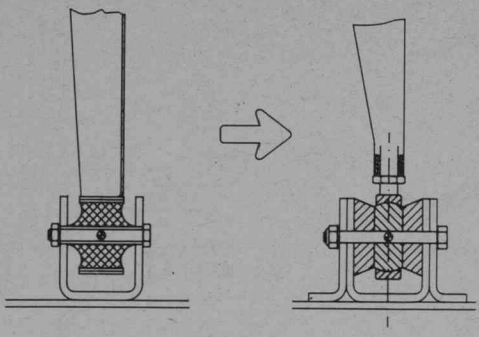
**Dessin/drawing n° 255-2**



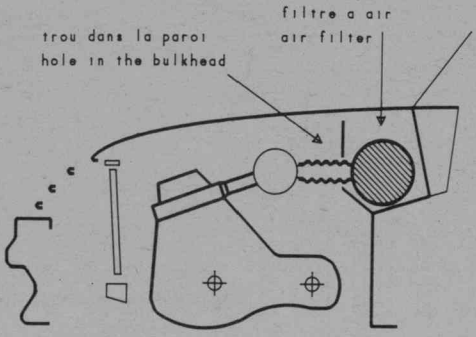
**Dessin/drawing n° 255-3**



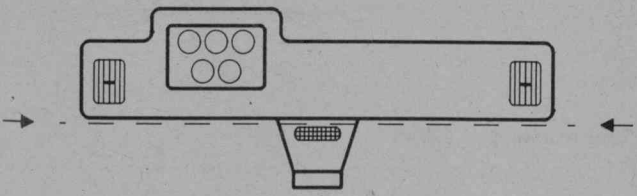

**Dessin/drawing n° 255-4**



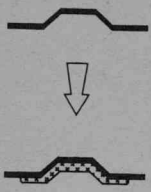
Dessin/drawing n° 255-5



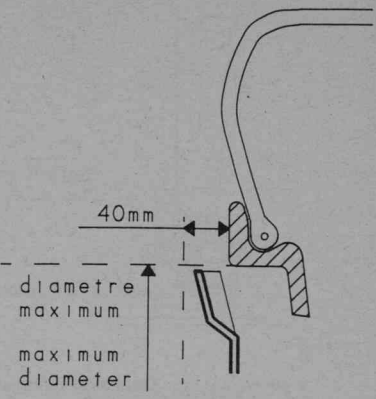

Dessin/drawing n° 255-6



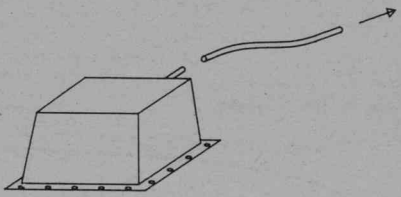
Dessin/drawing n° 255-7

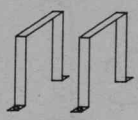


**Dessin/drawing n° 255-8**

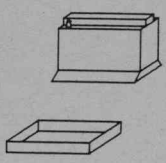


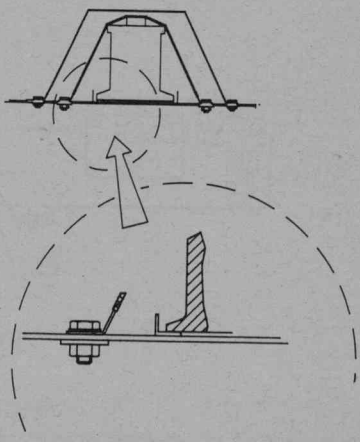

**Dessin/drawing n° 255-9**



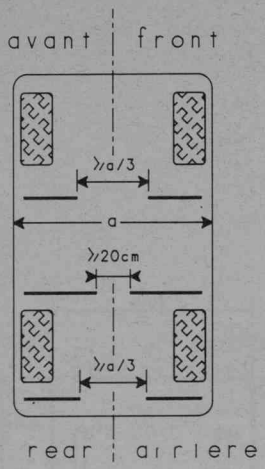


**Dessin/drawing n° 255-10**

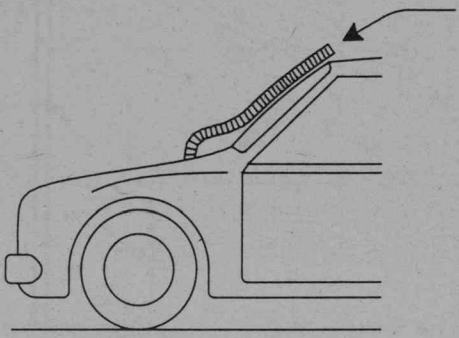




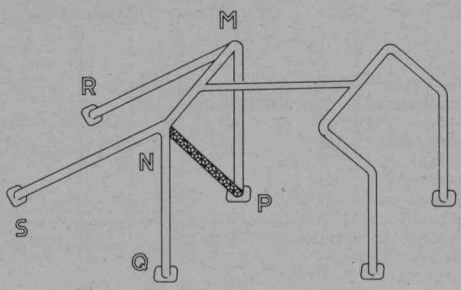
**Dessin/drawing n° 255-11**



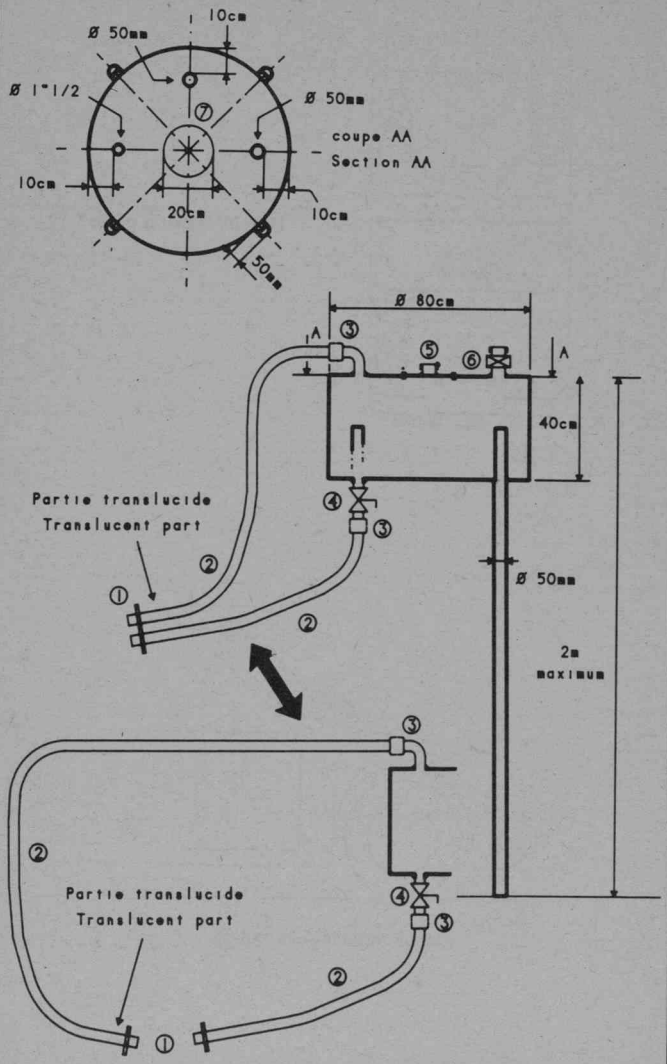

Dessin/drawing n° 255-12



Dessin/drawing n° 255-13

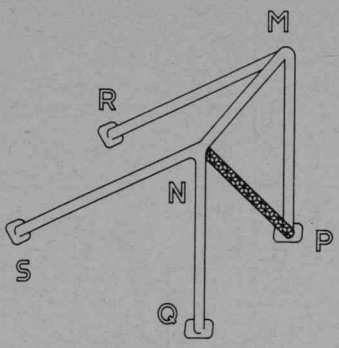



Dessin/drawing n° 257-1

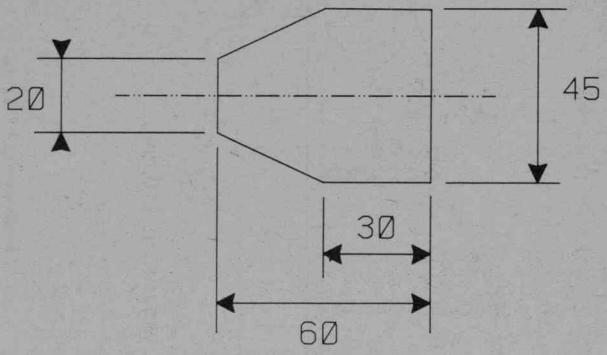



**Dessin/drawing n° 257-2**

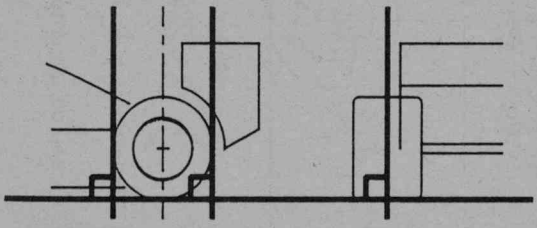
① Accoupleurs étanches combinés ou séparés ∅ 50 mm
Leakproof combined or separated couplings ∅ 2"
② Flexible ∅ int. 1"1/2
Hose internal diam. 1"1/2
③ Raccord rapide ∅ 1" 1/2
Quick coupling ∅ 1" 1/2
④ Vanne quart-de-tour ∅ 1" 1/2
Quarter turn valve ∅ 1" 1/2
⑤ Bouchon rapide de remplissage ∅ 50 mm
Quick filling cap ∅ 2"
⑥ Arrête-flamme/event ∅ 50 mm
Flame arrestor/vent ∅ 2"
⑦ Trappe de visite ∅ 200 mm
Inspection hole ∅ 8"



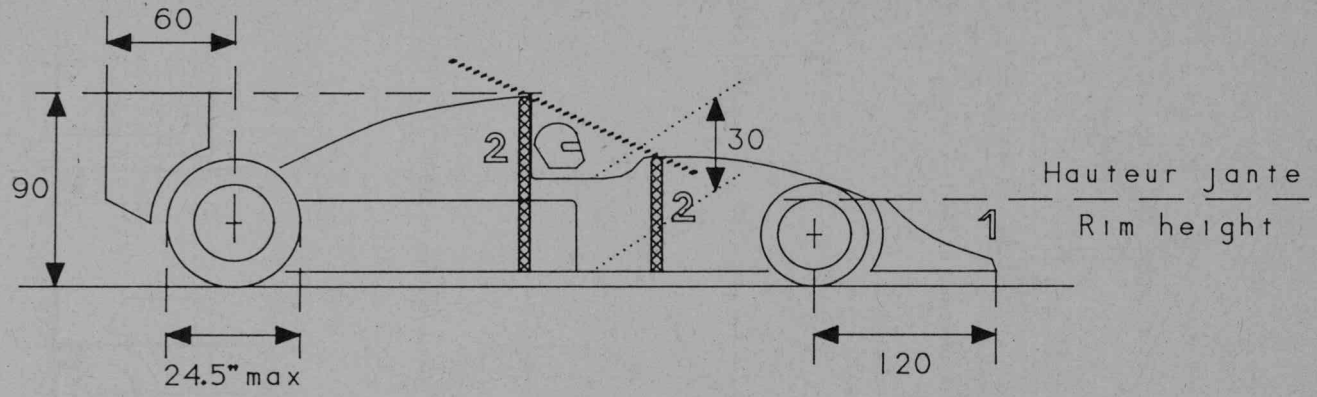

**Dessin/drawing n° 259-1**




**Dessin/drawing n° 259-2**



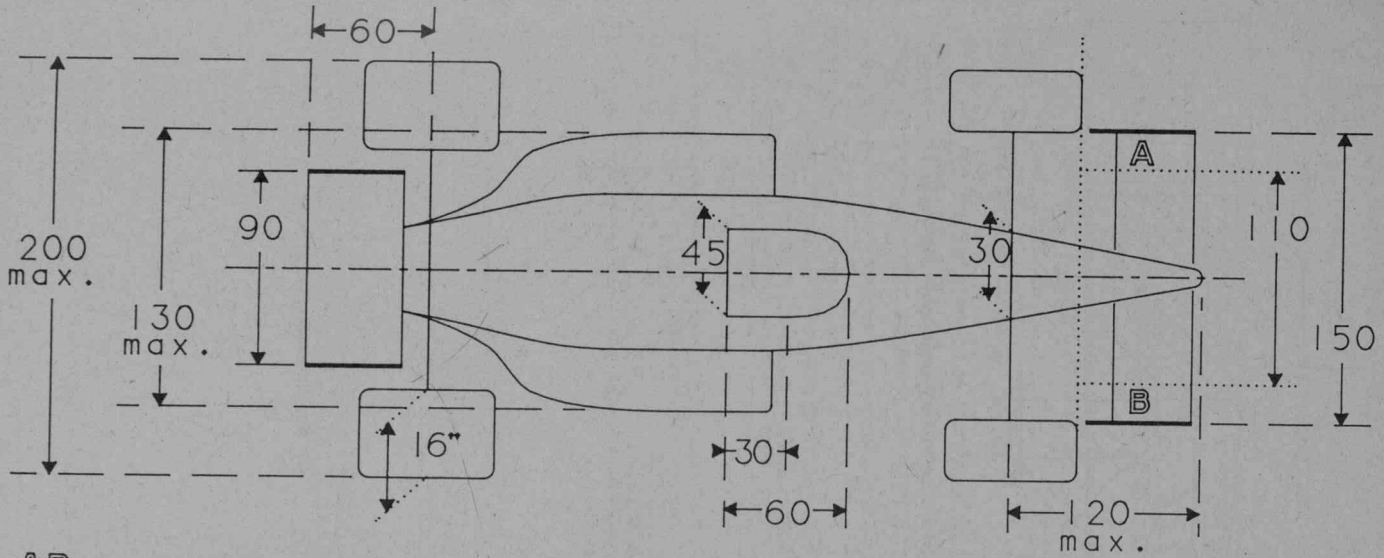
**Dessin/drawing n° 274-1**




1 Partie de plus de 110 cm de large/part wider than 110 cm.

2 Arceau de sécurité/safety rollbar

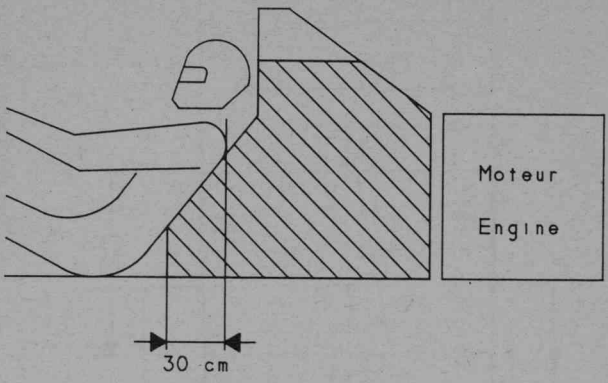
**Dessin/drawing n° 274-2**



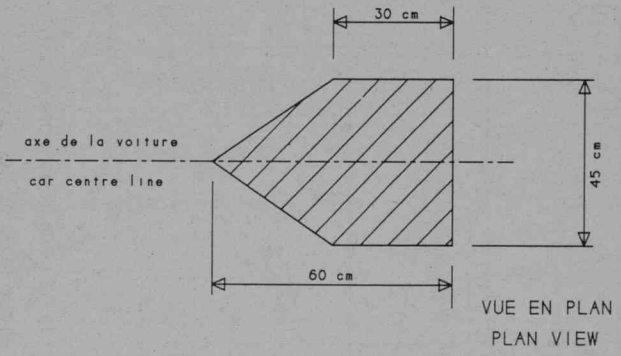

**AB:** Partie ne devant pas dépasser la hauteur de la jante avant.

**AB:** Parts that must not protrude above level of front rims.

**Dessin/drawing n° 274-3**




**Dessin/drawing n° 274-4**




**Dessin/drawing n° 274-5**