



## Appendix 4

### LHMC Spaceframe Technical Regulations

#### 5.2.1 INTRODUCTION.

The following Technical Regulations are set out in accordance with the MSA specified format and it should be clearly understood that if the following texts do not clearly specify that you can make a modification you should work on the principle that you cannot.

##### 5.2.1.a

- i) Two-wheel drive cars are eligible to run with LHMC super national
- ii) Four-wheel drive cars are eligible to run with LHMC supercar

#### 5.2.2 GENERAL TECHNICAL REQUIREMENTS AND EXCEPTIONS.

**5.2.2.a** Cars must comply with the Technical Regulations published by the Organisers for **The Championship** throughout official practice, qualifying heats and finals. (See SR.4.)

**5.2.2.b** All cars must comply fully with the current MSA Yearbook regulations J Common regulations for competitors: Vehicles and Rallycross and Technical N6.1 to 6.14.3. and these supplementary regulations.

**5.2.2.c** No approved modification may give rise to an unapproved one.

**5.2.2.d** The use of magnesium alloy sheet is not permitted. Titanium sheet may only be used for heat shields.

**5.2.2.e** All Spaceframe cars must have an identification number stamped into a plate measuring 80mm x 20mm which must be welded to the centre of the underside of the main 'B' hoop.

#### 5.2.3 SAFETY REQUIREMENTS.

**5.2.3.a** Minimum, Comply with current MSA Yearbook regulation 6.11 to 6.12.6. inclusive. In addition:

**5.2.3.b** Roll over structure crossed door-bars to K Appendix 2 Drawing 12 (h) are mandatory

**5.2.3.c** A currently FIA homologated competition seat and mountings are mandatory

**5.2.3.d** Currently FIA Homologated Seat Belts are mandatory.

**5.2.3.e** From a 'race ready' position with seat belts fastened, the driver must be able to vacate the car in 5 seconds.

**5.2.3.f** All cars must be fitted with a currently FIA homologated extinguisher system plumbed to the engine bay and the cockpit.

**5.2.3.g** Window nets must be fitted on the drivers side of the vehicle.

**5.2.3.h** In addition to the minimum apparel standards set out in MSA General Regulations N9 the following are mandatory:

- i) Flame resistant gloves and shoes

and the following are highly recommended:

- i) HANS devices
- ii) fireproof underwear

- iii) fireproof balaclava

#### 5.2.4. CHASSIS and BODYWORK.

**5.2.4.a** Dimensions as per manufacturer's specification/FIA homologation apart from: The wheelbase may be increased or decreased by up to 2.5%.

The track width is free.

Wheel diameter is free.

**5.2.4.b** The minimum elements of the spaceframe are shown in Drawing No. 1.

**5.2.4.c** Where the "door-bars" elements of the roll cage/spaceframe cross a rectangular box must be welded [in addition to the original welding] to add strength to the structure. The box must be at least 350mm long when measured horizontally from front to rear of the vehicle, 250 mm from top to bottom, and the box must be deep enough to cover doorbars. (See Drawing No 5) The material must be ferrous with a minimum thickness of 2mm.

**5.2.4.d** Energy absorbing material must be placed between the tubes forming side protection on the driver's side of the car. The material must be installed mechanically, ensuring that the rollcage/spaceframe remains intact, without piercing, bonding or welding. The material must not be inflammable (See drawing No 6)

Panels of energy absorbing material must be placed between the rollcage/spaceframe and the front and rear doors on the driver's side, and between the rollcage/spaceframe and the seat on the driver's side. This material must not be inflammable. It is prohibited to place parts between these panels and the driver's seat.

**5.2.4.e** No element of the roll cage may pass through the space normally used for the front passenger; this is to allow driver extraction from either side of the car.

**5.2.4.f** The floor frame is an integral part of the structure and the 'A' and 'B' main hoops must attach to it.

The floorframe must be constructed from either 50mm square box section or 50mm-diameter tube. The material must have a minimum tensile strength of 350N/mm<sup>2</sup>.

The floor must be made of steel of at least 16 SWG thickness and be welded to the underside of the floor frame to protect the driver. (Drawing No. 1-1) At the front the forward most part of the spaceframe must be at least 100mm behind the forward most part of the front bumper. (Drawing No. 2)

At the rear the rear most part of the spaceframe must be at least 100mm forward the rear most part of the rear bumper (Drawing No. 2)

**5.2.4.g** The "roof" of the spaceframe must be made of steel at least 16swg thickness welded on top of the upper surface to protect the driver. (Drawing No. 1-2)

**5.2.4.h** The bulkheads must extend across the full width of the spaceframe.

Bulkheads must be steel of at least 16swg thickness and welded to the spaceframe. No part of the front bulkhead, when viewed from above may be further back than the top of the windscreen.

No part of the rear bulkhead must be further forward than the rearmost part of the driver's seat.

**5.2.4.i** Cars with a front engine location must be constructed so that the rearmost part of the engine is not less than 25mm in front of the front bulkhead. No part of the engine may protrude through either the front or rear bulkheads.

**5.2.4.j** In rear-engine cars the steel bulkhead must extend vertically to at least the same height as the highest part of the engine. From this point a polycarbonate window, minimum thickness 5mm may complete it, extending to the full height of the interior space as well as a horizontal steel cover extending to the rearmost part of the interior space.

**5.2.4.k** In either case the full bulkhead must completely isolate the driver from the engine compartment. (Drawing No.4)

**5.2.4.l** Front and rear bulkheads must be sealed to be liquid proof and flameproof so that in the case of spillage, or leakage or failure of a tank - fuel, oil or cooling - no liquid will pass into the cockpit.

**5.2.4.m** A similar bulkhead must isolate the engine and exhaust system from the fuel tank and driver's cockpit.

#### **5.2.4.n** Spaceframe Supercar - Power

##### Transmission System /Flywheel Protection

All cars having transmission systems (propeller shafts etc) passing under and/or through the cockpit must be fitted with 10SWG steel transmission tunnel to prevent driver injury in the event of a component failure, such as propeller shaft, clutch or flywheel.

The transmission tunnel frame will be fabricated from 25mm x 25mm x 2mm SHS and have 10SWG steel plate welded to the exterior side of the tunnel frame. (Drawing No. 3)

#### **5.2.4.o** Aerodynamic Devices

i) In no case these exceed the overall limits of the original bodywork dimensions than 200mm at the front and 400mm at the rear of the car.

ii) They must not be wider than the widest part of the car's bodywork or higher than the highest part of the roof. Within these restrictions their design is free.

#### **5.2.4.p** - Body panels

i) The bonnet, boot (or hatch) driver and passenger doors must be interchangeable with the Manufacturer's original equipment.

ii) Door hinges must be of adequate strength; it must be possible to remove the doors completely without the use of tools.

iii) Body material is free subject to 5.2.2.d

**5.2.4.q** Under no circumstances can any part of the bodywork or the suspended parts of the car be below a horizontal plane passing 40mm above the ground, the car being in normal race trim with the driver strapped into his/her seat.

### **5.2.5 ENGINE.**

**5.2.5.a** The engine type and capacity are free but the engine block must be from a Homologated/Mass produced car.

**5.2.5.b** N6.3 applies, with the exception of N6.3.2.

The engine may be located at either the front or rear of the vehicle.

**5.2.5.c** Twin-engine configurations are not permitted unless homologated in that form.

**5.2.5.d** Variable valve timing is not permitted.

**5.2.5.e** Variable length inlet trumpets are forbidden.

**5.2.5.f** Titanium is not permitted except in connecting rods, valves, valve retainers and heat shields.

**5.2.5.g** The use of magnesium is not permitted in moving parts.

**5.2.5.h** The use of any ceramic component is forbidden.

**5.2.5.i** 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).

**5.2.5.j** The use of carbon or composite materials is restricted to clutches and non-stressed covers or ducts.

**5.2.5.k** Only a direct mechanical linkage between the throttle pedal and the engine load control device is permitted.

**5.2.5.l** All supercharged cars must be fitted with a restrictor fixed to the compressor housing.

All the air necessary for feeding the engine must pass through this restrictor, which must respect the following:

The maximum internal diameter of the restrictor is 45 mm. This must be 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 current FIA Appendix J FIA drawing 254-4).

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

The external diameter of the restrictor at its narrowest point must be less than 51mm and must be maintained over a distance of 5 mm to each side. The mounting of the restrictor onto the turbocharger must be carried out in such a way that two screws have to be entirely removed from the body of the compressor, or from the restrictor, in order to detach the restrictor from the compressor.

Attachment by means of a needle screw is not authorised.

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.

The heads of the screws must be pierced so that they can be sealed.

The restrictor must be made from a single material and may be pierced solely for the purpose of mounting and sealing, which must be carried out between the mounting screws, 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 FIA drawing 254-4).

**5.2.5.m** In case of an engine with two parallel compressors, each compressor must be limited to a maximum internal intake diameter of 32mm (internal diameter), 38 mm for the external diameter.

**5.2.5.n** The exhaust gases from the waste-gate must exit into the vehicle's exhaust system and must not be recycled in anyway. Furthermore, there must be no connection between the intake and exhaust systems

**5.2.5.o** Water injection is prohibited, even if it originally exists on the homologated block. Spraying of the intercooler is prohibited.

**5.2.5.p** Supercharged cars must not be equipped with any device which allows the boost pressure, or the electronic management system controlling the boost pressure, to be adjusted by the driver while the car is in motion (except the throttle pedal).

**5.2.5.q** Ceramic components, variable diameter inlets and adjustable internal vanes on turbochargers are forbidden

**5.2.5.r** Cars with forced induction will be subject to a coefficient of 1.7:1 as per current MSA Yearbook Regulation J 5.4.1.

#### **5.2.6. TRANSMISSION.**

**5.2.6.a** All cars must be fitted with a gearbox including a reverse gear, which must be in working order during the event, and be able to be operated by the driver when normally seated with seat belts fastened.

**5.2.6.b** Sequential gearshifts are permitted.

**5.2.6.c** Differentials with electronic, pneumatic or hydraulic slip control, which is adjustable, by the driver while the car is in motion are not permitted.

**5.2.6.d** Any sensor, contact switch or electric wire on the four wheels, gearbox or front, middle or rear differentials are forbidden. Only one sensor for displaying the ratio engaged is authorised on the gearbox, on condition that the sensor/electric wire/display assembly is completely independent of the engine control system.

**5.2.6.e** Front and rear limited slip differentials must be mechanical.

**5.2.6.f** Mechanical limited slip differential means any system, which works purely mechanically, i.e. without the help of a hydraulic or electric system. A viscous clutch is not considered to be a mechanical system.

**5.2.6.g** In the case of a 4-wheel drive vehicle, the addition of a hydraulic system or a viscous clutch to the central differential is allowed; in order to limit the slip, but this system must not be adjustable when the vehicle is in motion.

**5.2.6.h** Semi-automatic or automatic gearboxes with electronic, pneumatic or hydraulic slip control are forbidden.

**5.2.6.i** Continuously variable transmissions (CVT) are not permitted.

**5.2.6.j** Traction control is not permitted.

**5.2.6.k** Exposed chain drives are not permitted.

**5.2.6.l** A maximum of two wires are permitted to the centre differential to power an electric oil pressure pump, provided that the wires serve no other purpose, and the differential is standard equipment

for the make and model of vehicle. The system must not be adjustable when the car is in motion.

#### **5.2.7 SUSPENSION and STEERING.**

**5.2.7.a** Cars must be fitted with a sprung suspension.

**5.2.7.b** The operating method and the design of the suspension system are free.

**5.2.7.c** Suspension parts may not be attached to the spaceframe at those elements making up the major components of the roll cage i.e. main/front hoop and main braces.

**5.2.7.d** The springing medium must not consist solely of bolts located through flexible bushes or mountings but may be of fluid type.

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

**5.2.7.f** The use of active suspension is forbidden.

**5.2.7.g** Chromium plating of steel suspension members is forbidden.

**5.2.7.h** All suspension members must be made of homogeneous metallic material.

**5.2.7.i** Hydro-pneumatic suspension systems are permitted, on condition that they do not have active control.

#### **5.2.8 BRAKES.**

**5.2.8.a** The operating method and the design of the system are free except as below.

**5.2.8.b** There must be a double circuit operated by the same pedal and comply with the following:

- i) The pedal must normally control all the brakes.
- ii) In the case of a leak at any point of the braking system pipes or any kind of failure in the braking system, the pedal shall still control at least two wheels.

**5.2.8.c** Anti-lock brakes are not permitted.

**5.2.8.d** The brake discs must be made from ferrous material.

**5.2.8.e** A handbrake is mandatory; it must be efficient and simultaneously control the two front wheels or the two rear wheels.

**5.2.8.f** The handbrake may be mechanical or hydraulic.

**5.2.8.g** Any hydraulic handbrake must use a completely separate system from the normal braking system i.e. brake calliper, pads, master cylinder so that in the event of failure of the main braking system the handbrake will still be operable.

#### **5.2.9 WHEELS.**

**5.2.9.a** The complete wheel (flange + rim + inflated tyre) must always fit inside a U-shaped gauge of which the extremities are 250 mm apart, the measurement to be made on an unloaded part of the tyre.

**5.2.9.b** The diameter of the rim is free but may not exceed 18".

#### **5.2.10 TYRES**

**5.2.10.a** Tyres are free provided they comply with 5.2.9, subject to Championship regulations.

**5.1.10.b** Hand-cutting is permitted but only for the purpose of introducing additional grooves no deeper

than those moulded into a new tyre. Hand cutting in order to increase the depth of existing moulded grooves is prohibited.

#### **5.2.11 ELECTRICS.**

**5.2.11.a** The nominal voltage of the electrical system including that of the supply to the ignition of the "original" car must be retained.

**5.2.11.b** Relays, circuit breakers, fuses and cables are free.

**5.2.11.c** A red rear warning light complying with current MSA Yearbook regulation K5 Must be fitted

**5.2.11.d** The make, number and capacity of the batteries are free

**5.2.11.e** Have any wet batteries in the drive/passenger compartment enclosed in a securely located leak-proof container capable of retaining any leaked acid and protecting the terminals from short circuiting and producing sparks.

**5.2.11.e** All lights may be removed but all cars must be equipped with two rear lights of the anti-crash type as used in fog with the minimum of 15 watts each and illuminating an area of 60 sq. cm.

These must work with or replace the car brake light system at all times and must be between 115cm and 150 cm above the ground and must be clearly visible from behind.

**5.2.11.f** Generators are optional but the self-starter system must be operable at all times

**5.2.11.g** Starting the car: Cars must be equipped with an electrical energy source to enable the driver to start the engine when normally seated with seat belts fastened.

#### **5.2.12 WEIGHT.**

**5.2.12.a** At all times the minimum weight of the car with driver (wearing full racing apparel) will be:-

Up to 1000cc 770 kg

1001cc - 1400cc 860 kg

1401cc - 1600cc 950 kg

1601cc - 2000cc 1000 kg

2001cc - 2500cc 1130 kg

2501cc - 3000cc 1210 kg

3001cc - 3500cc 1300 kg

3501cc - 4000cc 1380 kg

4001cc - 4500cc 1470 kg

4501cc - 5000cc 1570 kg

5001cc - 5500cc 1670 kg

5501cc and over 1750 kg

**5.2.12.b** Two-wheel drive cars:

Minimum weight for any car will be 800kg.

**5.2.12.c** It is permitted to add ballast to the car to meet minimum weight limits.

The total amount of ballast must not constitute more than 5% of the real weight of the car.

The ballast may be of one or more pieces provided that they are strong solid blocks, coloured yellow, and fixed by means of m10 strength bolts to extra members fitted to the floor frame of the spaceframe either behind the rear bulkhead or in front of the front bulkhead.

**5.2.12.d** It must be possible for the ballast to be sealed by eligibility or event scrutineers.

#### **5.2.13 FUEL TANK/FUEL**

**5.2.13.a** Fuel tanks must be currently FIA homologated FT3 fuel cells.

Location: Fuel cells must be mounted within the main spaceframe structure at the opposite end of the vehicle to the engine location.

**5.2.13.b** No part of the fuel cell to be located less than 300mm from the bodyshell in both lateral and longitudinal directions, and must be outside the driver's compartment, and be separated from the driver's compartment by a metal firewall or container, both of which must be flameproof and liquid-proof.

**5.2.13.c** Identification: On each fuel cell delivered by the manufacturer, the model, the exact specifications according to which the tank has been manufactured, the date of manufacture, and the serial number are printed.

For scrutineering purposes this information on the fuel cell must be readily accessible.

**5.2.13.d** The fuel cell filler cap must be leak proof and shall not protrude beyond the bodywork.

**5.2.13.d** Any fuel filler inside the vehicle must be fitted with a collector/spill tray to drain spilled fuel outside the vehicle.

**5.2.13.f** Fuel fillers passing through the cockpit must be isolated and fitted with non-return valves at the fuel tank.

**5.2.13.g** Either Pump fuel as defined in 2012 MSA Blue Book "The Terminology" or FIA 2012 Appendix J Article 252, Article 9 maybe used.

**5.1.13j** The requirements of J5.13.7 must be complied with.

5.1.13k Have sufficient fuel for a fuel test present at any time during the meeting to comply with the fuel sampling requirements as laid down in the MSA year book D34.1 Procedure for fuel testing.

#### **5.2.14 EXHAUST and SILENCING**

**5.2.14.a** All exhausts systems must comply with the current MSA Yearbook regulations J5.15 and J5.17

**5.2.14.b** The orifices of the exhaust pipes must be between 100mm and 450mm above the ground.

**5.2.14.c** The exhaust pipe(s) may only exit from the rear of the car and must be within the perimeter of the vehicle's bodywork and not less than 100mm from this perimeter.

**5.2.14.d** The exhaust system must not be temporary.

**5.2.14.e** Exhaust gas may only exit at the end of the exhaust system.

**5.2.14.f** All exhaust gasses including wastegate outlet must pass through the main exhaust system.

**5.2.14.g** No part of the chassis may be used to evacuate exhaust gases.

#### **5.2.15 Telemetry / Voice communications**

**5.2.15a** Any form of wireless data transmission between the vehicle and any person and/or equipment (other than that required by the time keepers) is prohibited while the car is on the track. Data transmission through a temporary physical connection is allowed in the paddock only. **5.2.15b** Radio is authorised

## Appendix 1 Drawings

