

# TC Racer International Series Technical Regulations 2015

<b>ART. 1</b>	<b>GENERAL REMARKS</b>
	<p>Unless otherwise defined in the present regulations, TC R International Series 2015 respects following FIA rules:</p> <ul style="list-style-type: none"> <li>- FIA App. J, Art. 251, 253, 277</li> <li>- FIA General Prescriptions applicable to International Series</li> </ul> <p>The present regulations points also to the FIA App. J, Art. 255 and 263.</p> <p>The Technical Form has to be completed by the Manufacturer or Tuner with all requested information and will be common for all race cars of the model.</p> <p>WSC reserves the right to forbid the use of any part that is deemed outside of the TC R concept and to accept waivers to these regulations on request of Manufacturers or Tuners.</p> <p>Any action related to the employed parts not explicitly allowed by these regulations is forbidden. Everything not expressly permitted, is prohibited.</p>
<b>ART. 2</b>	<b>DEFINITION</b>
<b>2.1</b>	<p><b>Bodywork</b></p> <p>See App. J; Art. 251.2.5.2 Any air intake is considered to be part of the bodywork.</p>
<b>2.2</b>	<p><b>Chassis (Bodyshell)</b></p> <p>The main body of the car into which is fitted the engine, transmission, running gear, electrical systems, seats, controls, bodywork, etc.</p>
<b>2.3</b>	<p><b>Production (part)</b></p> <p>As fitted to the basic mass production car; the proof rests with the competitors.</p>
<b>2.4</b>	<p><b>Original</b></p> <p>As fitted to the WSC-certified car and in compliance with the TC R Technical Form.</p>
<b>2.5</b>	<p><b>Minimum Weight</b></p> <p>Is the weight of the car without driver, with empty tanks of consumable fluids (fuel, wind screen wash &amp; drinking water, etc.) and with all other tanks filled at the working level. (Certification)</p>
<b>2.6</b>	<p><b>Minimum Racing Weight</b></p> <p>Is the minimum weight of the car with the driver imposed to be respected at any time during the competition. The minimum racing weight can vary following WSC decisions for Balance of Performance and the Success Ballast allocation.</p>
<b>2.7</b>	<p><b>Cockpit</b></p> <p>The interior volume of the main structure which is reserved for the occupants. Its limits are defined by the roof, the floor, the doors, the lateral parts, the glazed parts and the front and rear bulkheads (or the back plane of the rear seats).</p>
<b>2.8</b>	<p><b>Turbo Charging</b></p> <p>Increasing the mass 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) using a turbo charger.</p>
<b>2.9</b>	<p><b>Location</b></p> <p>A site defined relative to the production: centre line of the car, axles centre (middle of the wheelbase on the centre line), cockpit, luggage compartment and engine compartment.</p>
<b>2.10</b>	<p><b>Position</b></p> <p>The site defined by dimensions from the production car data, e.g. axles centre and centre line of the car. For position evaluation will be used a tolerance of <math>\pm 5\text{mm}</math>.</p>
<b>2.11</b>	<p><b>Telemetry</b></p> <p>The transmission of data between a moving car and anyone connected with the entry of that car.</p>
<b>2.12</b>	<p><b>Mass Production</b></p> <p>Production requested for eligibility</p>
<b>2.13</b>	<p><b>Model of car</b></p> <p>All the identical cars belonging to a family (see below) and to a production series distinguishable by an identical conception and an identical external general lines of the bodywork, and by an identical mechanical conception of the engine and the transmission to the wheels.</p>
<b>2.14</b>	<p><b>Family of car</b></p> <p>Different series models belonging to one and the same production series of the same manufacturer.</p>

<b>2.15</b>	<p><b>Certification</b></p> <p>The TC R Technical Form is the official documentation of TC R Cars certified by WSC.</p>
<b>2.16</b>	<p><b>OEM (Original Equipment Manufacturer)</b></p> <p>OEM is a manufacturer of the mass produced cars and the supplier of the original spare parts.</p>
<b>2.17</b>	<p><b>Reference Part, Component or Unit</b></p> <p>Certificated part, electronic control unit or aggregate listed by WSC, which are deposited with the technical delegate and can be installed in the race cars on his decision at any time of the competition.</p>
<b>2.18</b>	<p><b>OEM Part</b></p> <p>Component coming from any OEM mass produced car and in normal sale.</p>
<b>2.19</b>	<p><b>WSC</b></p> <p>World Sporting Consulting Ltd is the organiser of the TC R International Series.</p>
<b>ART. 3</b>	<b>REGULATIONS</b>
<b>3.1</b>	<p><b>Role of the WSC</b></p> <p>The present technical regulations for TC R International Series are issued by WSC.</p> <p>The basic principle of the TC R International Series is the respect of a Weight / Power Ratio and of Balance of Performance.</p> <p>WSC will:</p> <ul style="list-style-type: none"> <li>- Certificate TC R cars</li> <li>- Ensure the Balance of Performance at the start of the International Series and take all necessary decision to keep it through the season.</li> </ul> <p>All WSC decisions regarding the regulations will be communicated by means of Notifications and Technical Bulletins.</p>
<b>3.2</b>	<p><b>Eligible cars</b></p> <p>Eligibility criteria for TC R Touring Car:</p> <ul style="list-style-type: none"> <li>- The model of car is on the list of TC R eligible cars for 2015 published by the WSC.</li> <li>- The cars correspond to FIA Homologation Criteria for Touring Cars (FIA Group A).</li> <li>- The model of car is produced by an OEM and belongs to a mass produced family.</li> <li>- 4/5 doors; 2/5 doors only if 4-doors are in the family.</li> <li>- Minimum length 4.2m</li> <li>- Turbo charged Diesel or Petrol mass production Engines, max 2.0 liter cylinder capacity</li> <li>- Hybrid propulsion is not allowed.</li> </ul> <p>WSC reserves the right to accept other cars, when the general characteristics match with the TC R concept. WSC reserves also the right to approve or to refuse applications which might not be in compliance with the above criteria.</p> <p>Without a WSC authorization only one Technical Form per model car will be accepted. The Technical Form Number and the certificating manufacturer, importer or tuner will be documented on the WSC List.</p>
<b>3.3</b>	<p><b>Compliance with the regulations</b></p> <p>All vehicles must be conformed to these regulations, TC R Technical Form, TC R Technical Passport and to all WSC Notification and Technical Bulletins.</p> <p>All parts <u>not mentioned</u> in these regulations have to remains those from the basic production car or another production model of the same manufacturer and correspond to the Manufacturer's Parts Catalogue for the produced model and may not be modified in any way.</p> <p>In case of doubt about the conformity of any part the Technical Delegate may ask the replacement with a reference part without any further explanation. All cost of such operations will be covered by the Competitor.</p> <p>It is the duty of each competitor to satisfy the Scrutineers and the Stewards of the competition that his car complies with these regulations in their entirety at all times during a competition.</p> <p>A car, the construction of which is deemed to be dangerous, may be excluded by the Stewards.</p>
<b>3.4</b>	<p><b>Measurements</b></p> <p>All cars' measurements must be taken while the car is stationary on a flat horizontal surface in the location stated in the Sporting or in the Supplementary Regulations.</p>
<b>3.5</b>	<p><b>Material</b></p> <p>Titanium or magnesium alloys, ceramic or exotic materials and sophisticated coatings are not permitted unless used for the production part or explicitly authorised by these regulations.</p> <p>All flexible supports (engine, transmission, subframes, etc.) may be replaced by stiffer brackets with same functional dimensions. If not otherwise defined by the present regulations the aggregate's position may not be modified. (Certification)</p> <p>External bodywork parts may be repaired by adding material respecting the certified properties (minimum weight, functional shape, etc.). Such operation needs the approval of the technical delegate.</p>

**3.6****Data logging**

The car must be fitted with the scrutineering data logging system designated by WSC providing following data:

- Speed of the 4 wheels (failing that, of one front wheel and one rear wheel)
- Engine revs
- Longitudinal acceleration
- Lateral acceleration
- Throttle pedal position
- Engine load (position of the throttle valve or of any other control element)
- Engine Water Temperature
- Boost pressure
- Front Brake Calliper pressure
- Lap trigger
- Ram pressure
- GPS (WSC Option)

The collected data must remain at the disposal of the WSC.

The use of Team Data Logger is allowed.

**3.7****Telemetry**

The use of telemetry is forbidden.

**3.8****Driving aids**

Driving aids are not permitted.

If the race car using mass production engine management cannot be operated without the Driving Aids, the mass production systems including mechanical parts and Electronic Control Units may be used on condition that the original hardware and software are maintained (only changes to the wiring are permitted). It is not allowed to the driver sitting in the car to change settings. The systems may be also switched off or removed (Certification).

**3.9****Balance of Performance (BoP)**

All Manufacturers or Tuners must communicate the requested specific numbers for the definition of the numeric model for the BoP evaluation.

Parameters which may be modified for Balance of Performance

- Minimum Weight; max. penalty 70kg
- Air restrictors (restrictor diameter nominal, 95%, 90%)
- Ride Height; -10/+20mm to the present regulations

WSC reserves the right to take further measures in order to guarantee proper BOP.

**3.10****Period of Certification**

WSC will release 1 (one) Technical Form per model and year. The race cars will be defined by the "year built".

Technical Form's modification will be allowed during the season only for following reasons:

- Safety
- Reliability
- Obvious lack of performance

**ART. 4****BODYWORK****4.1****Chassis (Certification)**

The chassis cannot be modified unless permitted by the present regulations.

Following condition must be respected:

- All chassis modifications have to be approved by WSC.
- If not otherwise defined by the present regulations any non-movable element must be attached with the use of tools.
- Wheel arch modifications allowed, for the sole purpose to accommodate race tyres.
- Front bulkhead may not be modified except for a modified passage of the gearshift control.
- No modification of McPherson turrets except of local reinforcement following the original shape and through metal ribs or fins as connection between turrets and front bulkhead for strengthening of strut mounting area. Production reinforcements and openings may be locally reworked without weakening the structure to allow access to the strut.
- Seam welding replacing or reinforcing production part spot welding is authorized.
- Local modifications of the chassis or subframes are permitted to provide clearance to the exhaust system.
- Temporarily removal of the roof outer skin is permitted only to allow the safety cage's correct installation.
- All modification will be certified in the Technical Form.

Subframes may not be modified for the fixation on the bodyshell or for the attachment of suspension elements. All subframe modifications have to be approved by WSC. Reinforcements, modifications for air jack installation and the removal of unused supports are permitted. (Certification)

For the following elements the FIA App. J, Art. 263.903 applies:

- Strengthening
- Removal of unused supports for accessories or trims
- Passage of the gearshift control
- Mountings and bearings of antiroll bars
- Mounting of pedal box and master cylinders

- Central tunnel and/or floor on the driver's side to allow correct driver's position
- Panel on top of fuel tank area
- Installation of air jacks

#### 4.1.1 **Bonnet and boot lids**

It must be possible to open them without use of tools.

The retaining springs (not the hinges) may be removed, but the car must have supports to hold the bonnet and the boot lid in open position. (Certification)

Openings may be made in the bonnet up to a maximum total surface of 1050 cm<sup>2</sup>, including any original opening. Inner surface shape of the openings is free provided that it does not protrude from the outer surface more than 50 mm inwards. The production internal reinforcements may be removed in the opening zone. (Certification)

#### 4.1.2 **Doors**

The production door locks, door-hinges, anti-intrusion bars, external door handles, and the driver side window lifters stay as original and in operation.

It must be possible to open all doors from outside (original handles) and the front doors also from the inside. Controls for opening the rear doors from the inside may be removed.

The other side window lifters may be removed, but the side windows must be locked in place and secured from all movement.

The removal of door soundproofing material and decorative strips is allowed.

Original inner trim panels must be replaced and be made from plastics (including composite materials) at least 1 mm thick. The panels must totally cover the door, its handles, locks and window winding mechanisms.

#### 4.1.3 **Engine & Luggage Compartments**

The FIA App. J, Art. 263.901-2 applies.

#### 4.2 **Windscreen and windows**

Plastic rear window min. 3.85mm is allowed.

The internal face of side and rear glass windows as well as that of glass rear-view mirrors must be covered with a transparent and colourless plastic safety film with a maximum thickness of 0.1mm in order to avoid the shattering and spraying of glass in the event of an accident. It must be fitted in a manner that facilitates checking.

#### 4.3 **Exterior**

If not differently defined by these regulations FIA App. J, Art. 263.902 applies.

The only body parts that can be replaced and changed in shape are:

- Front bumper; Shape resemble the original must be approved by WSC prior to production; no dive planes allowed.
- Front fenders; Shape must be approved by WSC prior to production (no louvres allowed)
- Side sills (these may be added if not present in the production car)
- Rear wheel arch extensions
- Rear door bulge compatible with the rear arch extensions
- Rear bumper; Shape resemble the original must be approved by WSC prior to production
- Wheel arch liners

No flat floor behind the vertical plane tangent to the back side of the front wheels and the foremost point of the rear bumper.

It is not allowed to tape the joints between bodywork panels. The hood's and boot lid's original position may not be changed.

#### 4.4 **Aerodynamic devices**

Rear wing

- Profile, Chord & Position on the car are as per App. J, Art. 263.902
- Aluminium extruded profile (WSC delivery)
- Maximum width is no greater than defined in App. J, Art. 263.902
- Brackets as per App. J, Art. 263.902 except freedom for the mounting surface on the car and on wing profile
- TC R side plates (WSC delivery); All edges will be rounded with at least R3 mm (Safety)

The front splitter will be WSC delivered and will be adapted to each car. Brackets are free. (Certification)

Rear diffuser included in the rear bumper:

- One single plane between a vertical plan minimum 380mm behind the rear axle centre line and the bumper's vertical projection
- Hollow area for the exhaust allowed
- Maximal width: 1650mm
- Max inclination to the doors' lower edge: 10°

Mass production flexible skirts reducing the ground clearance may be removed. (Certification) The ground clearance check will consider these parts as bodywork

#### 4.5 **Interior**

If not differently defined by these regulations FIA App. J, Art. 263.901-1 applies.

Dashboard trims; Centre console

Trims situated below the dashboard and which are not part of it may be removed. It is permitted to remove the part of the centre console. (Certification)

Dash board (Certification)

- General shape, appearance, mounting points and position must remain similar to production part.
- Thermoplastic material free
- Minimum weight: 2 kg including ducting and fixation elements.

Instruments (Certification)

Display and indicators can be freely fixed on the dash board or to the steering column. The installation shall not interfere with the driver's vision or safety.

Switches (Certification)

Standard switches may be replaced by switches of different design and may be fitted at different locations on the dashboard or on the centre console. Any opening resulting from this must be covered.

Production Pedal Box: metallic pedals may replace the production plastic parts. New master cylinders and new arrangement in the engine bay may be used. (Certification)

Of shelf pedal box (hanging or floor mounted) and master cylinders in the cockpit: Modifications are authorised provided they have no other function than to allow the fixing of the master cylinders and/or the pedal box (Certification).

## ART. 5 WEIGHT

### 5.1 Minimum Racing Weight

The target minimum racing weight (with driver) is 1,260 kg.

### 5.2 Ballast, Success Ballast

Ballast, including success ballast, must be made from metallic plates or blocks and must be fixed in the cockpit or in the boot according to the App. J Art. 263.201.

The ballast and success ballast will be declared as such at the scrutineering.

The ballast fixing system must allow to the Technical Delegate to seal the bolts. The ballast must be designed such, that tools are required for its removal.

### 5.3 Liquids

The weight may be checked at any time during the competition with the quantity of liquids in the tanks, except after the race when the car may be emptied of all the consumable liquids before weighing.

## ART. 6 ENGINE

### 6.1 Engine generals

Turbo charged mass production engines without modifications.

- The make and type of the spark plugs are free.
- It is allowed to change the injectors with OEM parts similar dimensions. (Certification)
- Cylinder head gasket may be changed with another one with identical dimensions. (Certification)
- Crankshaft bearings may be changed with another one with identical dimensions. (Certification)

Engine position: Production; The crankshaft's axis within a cylinder with R=20mm)

The use of a different standard engine coming from another mass production car of the same group is allowed. In this case the engine's position, defined by the crankshaft's axis within a cylinder with R=20mm, the inclination, defined by the cylinder sleeve axes and the y-position, defined by the gearbox fitting surface may not be modified.

Engine shall be sealed by the Manufacturer or Tuner, to ensure it is in compliance with certification.

Air feed for engine and engine cooling: FIA App. J, Art. 263 apply. It is not allowed to put ice or any other cooling system in the intake pipes or in front of the intercooler.

Production intercooler from another OEM may be used (Certification).

Orientative Engine Performance (ECE-R 85-5 Norm):

- Maximum Torque around 410Nm
- Maximum Power around 330HP

### 6.2 Engine Cooling

Water Cooling

Radiator: mass production part free provided that the radiator is fitted in the production location without any modification to the bodywork, water hoses and water pipes are free (Certification)

Thermostat: free (Certification)

Electric & mechanic fans for radiator cooling: free (Certification)

Air Ducts: free between air inlet and cooler core (Certification)

Engine oil cooling

The type of the used oil cooler (air/oil radiators or water/oil heat exchanger) and their connections are free. No modifications to the bodywork are allowed. The parts have to be situated within the perimeter of the bodywork in safe position. (Certification)

It is allowed to put tape in the grilles of the front bumper to regulate the engine cooler temperature (car colour).

Only ambient air may be used for heat dissipation.

### 6.3 Lubrication

Following is allowed:

- Pressure accumulator (Certification)
- Baffles and deflectors in production oil wet sump; The distance between the planes of the oil sump gasket on the engine block and on the oil sump may not be increased by more than 6 mm. (Certification)

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. (App. J, Art. 255. 5.1.14)

### 6.4 Engine control unit

Electronic control unit (ECU), engine control software, sensors and engine loom are free. (Certification)

The software and the map are frozen and cannot be overwritten. ECU box will be sealed by the Manufacturer or Tuner and the access to modify software and parameters will be closed.

The WSC Technical Delegate may at any time oblige the competitor to use the reference unit registered with the WSC by the Manufacturer or Tuner.

Any manipulation, modification or disconnection of any certified sensor is forbidden. The Competitor is responsible for the quality of the sensor signals.

### 6.5 Intake system

The air filter housing and the air filter element may be replaced with a catalogue part (Certification). The pipe from the filter housing to the turbo is free. (Certification)

1 (one) different mass production Turbo Charger may be used. (Certification)

It is allowed to change the impeller in case the Turbo Charger is integrated in the exhaust manifold. (Certification)

Air restrictor's installation will correspond to App. J, Art. 254.6.1.b) and to Drawing 254-4.

The turbo charger and the restrictor must have the possibility to be sealed.

Antipollution air circulation may be removed and the connections may be closed.

### 6.6 Exhaust

The exhaust system is free downwards the turbo charger and its regulating system, will fit a FIA homologated catalytic converter (FIA List no. 08) and will have the exit at the car's rear end below the rear bumper. (Certification)

If a different turbo charger is certified an adapter between this and exhaust manifold may be used, (Certification).

Sound level and measuring method similar to FIA App. J, Art. 263.328

### 6.7 Fly-wheel assembly (Certification)

Flywheel: production part or modified respecting following conditions:

- Fly wheel can be re-manufactured solely to allow for a replacement clutch.
- Minimum weight 6kg (without fasteners)
- Machined from a single block of steel (no weight reduction bores, pockets or cut-outs)
- same dimensions of the starter gear

## ART. 7 FUEL SYSTEM

### 7.1 Fuel tanks

a) Production fuel tank or corresponding to App. J, FIA Art. 253.14 (Certification).

Manufacturer may apply to certificate 2 (two) Fuel Cells: 1 (one) using the Production fuel tank and 1 (one) using a FIA Safety Fuel Cell.

b) If FIA Safety Fuel Cell is in use this will satisfy the following conditions:

- be conform to or exceeding the specifications of FIA/FT3 1999
- comply with the prescriptions of App. J, Art. 253.14
- have same position and similar capacity ( $\pm 5\%$ ) as the production tank
- Have a Fuel Cell Housing corresponding to Art. 263.401
- have similar shape of the inferior surface of the fuel cell Housing as the production fuel cell

c) Additionally to the FIA Safety Fuel Cell defined under 7.1.b) it is possible to use a rectangular shaped FIA Safety Fuel Cell with similar capacity ( $\pm 5\%$ ) as the production Fuel Cell (certification).

The Fuel Cell must be fitted as follows:

- located within the safety cage
  - o forward of the centre line of the rear wheels
  - o behind the vertical plane tangent to the most rear point of the driver's seat back
  - o no more than 65 cm from the vertical plane through the longitudinal axis of the car
- Installed in a fabricated mild steel vane welded to the bodyshell; a cut-out of the floor pan permitted.
  - o 1.6mm minimum thickness

- Lower surface of the tank vane at least 100mm above ride hide relevant area(s).
- mild steel 1.6mm minimum thickness fuel cell cover (fire wall)

The fuel cell, fuel cell container, fuel cell cover and the filling and ventilation systems must be separated from the cockpit by fire wall(s) and must be certified.

## 7.2 Fuel circuit

### Fuel lines:

Mass Production Fuel Lines may be used outside the cockpit. The protection will correspond to Appendix J, Art. 253.3.1.

Other fuel lines must correspond to the prescriptions of Article 253-3 of Appendix J.

The installation is free provided that the prescriptions of Article 253-3 of Appendix J are respected.

### Fuel sampling connector

The car must be fitted inside the engine compartment with a FIA approved self-sealing connector for fuel sampling (Technical list n°5) on the fuel feed line directly before the fuel high pressure pump.

The competitors will provide to the Technical Delegate on his request a connection hose to this connector.

## 7.3 Electric Fuel Pumps (Certification)

All Electric Fuel Pumps must stop by stalling engine.

# ART. 8 ELECTRICAL EQUIPMENT

## 8.1 Windscreen wiper

Any production wiper motor system may be used with at least 1 (one) original working wiper blade to clear the screen directly in front of the driver. (Certification)

The windscreen washer tank may be modified (free position) or removed.

Complete rear window wiper and washer system may be removed.

## 8.2 Engine Starter

The production starter must be fitted and must be in working order at all times of the competition.

The driver must be able to operate the starter when seated normally.

## 8.3 Lighting equipment

### 8.3.1

The exterior lighting equipment must at least ensure the following functions: headlights, front and rear direction indicators, stop lights, rain light (see 8.3.2) and rear tail lights and must be in working order at all times of the competition.

The exterior surface and appearance of the other lights cannot be modified but the interior elements may be removed. (Certification). Exception for the fender indicators which are free.

### 8.3.2

Rain lights:

One unit is compulsory and must be FIA approved (Technical List n°19).

Location: Tail gate, boot lid or replacing the 3<sup>rd</sup> brake light.

Position: Car's centre line.

## 8.4 Starter Battery

Type: dry

Number: 1

Location: In the production location, boot or in the cockpit. If in the cockpit, it must be situated behind a vertical and transversal tangent plane to the rearmost point of driver's seat.

Fixation: Should the battery be moved from its production position App. J, Art.255.5.8.3 applies.

Insulating cover: The terminals must be electrically protected with an insulating cover.

It must be possible at all times to start the engine with the energy of the battery transported on board the vehicle.

## 8.5 Electric loom (engine, car & data logger)

Production or racing loom (Certification).

# ART. 9 TRANSMISSION

## 9.1 Transmission system

For cars fitted with a paddle shift and/or a power-driven clutch with electronic or pneumatic control, the Technical Delegate may at any time oblige the competitor to use in competition the reference unit(s) registered with the WSC by the Manufacturer or Tuner.

## 9.2 Clutch

The clutch has to be the mass production one or certified under following conditions:

- Racing Catalogue pressed-type multi-discs sinter-cermetalllic
- Minimum Discs Dia. 183mm (7¼")
- Clutch Control System hydraulic or mechanic actuated by the driver
- Clutch release bearing is free (catalogue parts).

## 9.3 Gearbox

Mass production gearbox coming from the production model or from another car of the same group may be used (Certification). In the latter case a gear box adapter to the engine and gearbox brackets may be used. (Certification)

The use of paddle shift on mass production gearbox using catalogue (after-market) parts may be certified. The gear box control unit will be sealed and may be at any time be replaced by the technical delegate with the reference part. It is not allowed to alter the certified operating data.

- One sequential gearbox with one set of ratios may be certified under following conditions:
- A maximum of 6 (six) forward gears
  - 1 (one) reverse gear, selectable at any moment by the driver while the engine is running and the car is stopped
  - Every gear must be able to be engaged and in working order.
  - Gear changes must be made mechanically or using Paddle Shift (catalogue part).
  - Interference to Engine Control for shifting allowed (Ignition cut or power reduction)
  - Each individual gear change must be separately and solely initiated and commanded by the driver.
  - Any system that permits more than one gear pair to be engaged to the drive train at any time is prohibited.
  - Instantaneous gearshifts are forbidden.
  - Gearshifts have to be distinct sequential actions where the extraction of the current dog gear is subsequently followed by the insertion of the target dog gear.
  - The dog gear is considered extracted when its position is not able to transmit any torque.

The mass production gearbox may be also be certified and used under following conditions:

- Production ratios
- 1 (one) reverse gear, selectable at any moment by the driver while the engine is running and the car is stopped
- Every gear must be able to be engaged and in working order.
- Gear changes must be made mechanically or using Paddle Shift (after-market or catalogue part).
- Interference to Engine Control for shifting allowed (Ignition cut or power reduction)
- Each individual gear change must be separately and solely initiated and commanded by the driver.

The mass production gearbox and the sequential gearbox may be certified on the same Technical Form.

A new gearbox cooling using catalogue parts (pump, filter, cooler, lines, thermostat, etc.) may be certified. Mass Production Gearbox Cooling may be used without modification. Modified mass production gearbox cooling must be also certified.

#### 9.4 Final Drive

The final drive may be production or certified.

For each certified gear box one new final drive ratio or one new final drive ratio pair (for transmission using two final gear pairs for gearboxes with 2 lay shafts) in the certified housing may be certified.

Final drive cooling using catalogue parts (pump, filter, cooler, lines, thermostat, etc.) may be certified.

#### 9.5 Limited Slip Differential

Any mass production limited slip differential may be used with production parameters but the settings cannot be modified during driving.

The production differential may be replaced by a catalogue mechanical limited slip differential inside the drive unit housing (Certification).

It is permitted to remove material from the inside of the production housing. It must at all times be possible to clearly recognize the housing as the certified standard housing. (Certification)

#### 9.6 Transmission Shafts

Production transmission shafts including their joints may be replaced with steel catalogue parts. (Certification)

### ART. 10 AXLES, SUSPENSION AND STEERING

#### 10.1 Generals

No modifications of the chassis for new suspension pick up points

- The position of the new pick-up points is free; max  $\pm 20$ mm adjustment in all directions (Certification)
- Bolted brackets for suspension elements are free (Certification)

Position of the front and rear axles, wheel base and overhangs correspond to the Art. 263, Appendix J.

#### 10.2 Wheel Hubs and Bearing

The wheel hubs may be re-machined using similar wheel fixation (number of fixation points, same bolt PCD and thread), to allow the use of a stronger mass production wheel bearing. (Certification)

#### 10.3 Bearings, Silentblocks, Rubber bearing

Production bearing on suspension arms may be replaced by uniballs or bush bearings (Certification). No rolling contact bearings accepted.

#### 10.4 Front wishbones/upright/struts

The working principle and the number of pivot points on the wishbones/upright/struts have to be maintained. The parts are free (Certification)

#### 10.5 Rear suspension

Production suspension parts may be reinforced or modified. Simple links (strut with two joints) may be replaced by new parts (Certification)

Twist beam may be changed into double trailing arm, keeping the same external pivot points and adding two additional points on chassis. (Certification)

#### 10.6 Anti-roll bars

Anti-roll bars made from ferrous material, their bearings and their actuation are free. Adjustable lever arms (no turning blades) may be used without adjustment from the cockpit. (Certification)



	<p>If the production axle is not fitting anti-roll bar, it may be added. (Certification)</p> <p>The anti-roll bars may be disconnected but must remain in the car.</p>
<b>10.7</b>	<p><b>Springs</b></p> <p>Cylindrical, linear steel springs are free; the combination of one helper with one suspension spring is allowed.</p> <p>The spring seats are free. (Certification)</p> <p>Bump stops and packers are free.</p>
<b>10.8</b>	<p><b>Ride height</b></p> <p>For the checking of the ride height, the pressure of the tyres must not be less than 1.5 bars.</p> <p>Reference Ride Height: 80mm (-10/+20mm for BoP).</p>
<b>10.9</b>	<p><b>Shock absorbers</b></p> <p>Only 2 way shock absorbers allowed. (Certification)</p> <p>Inertial shock absorbers and rolling contact bearings are forbidden.</p>
<b>10.10</b>	<p><b>Steering</b></p> <p>The steering lock must be dismantled and the column adjusting system must be locked with tools. Steering column brackets may be replaced. The new brackets may be connected to the chassis or to the safety cage (Certification)</p> <p>A catalogue closed steering wheel can be used. The fitting of displays, switches and control lights on the steering wheel is allowed if offered by the steering wheel supplier. (Certification)</p> <p>The steering wheel must be fitted with a quick release system. (Certification)</p>
<b>10.11</b>	<p><b>Power steering</b></p> <p>For cars fitted with an automatically variable power steering the Technical Delegate may at any time oblige the competitor to use the reference unit WSC registered by the Manufacturer or Tuner.</p>
<b>ART.11</b>	<b>BRAKES</b>
<b>11.1</b>	<p><b>Generals</b></p> <p>Master cylinder(s) are free; The type and make will be certified.  Max brake diameter 380mm (width free); certified diameter and bells  Steel brake discs (no ceramic coating allowed)  Max 6 pistons front caliper (Certification)  Max 2 pistons rear caliper (Certification)  The brake calipers must be made from aluminium materials with a modulus of elasticity no greater than 80Gpa.  Simple brake effort repartition system(s) (hydraulic or/and mechanic) is (are) allowed. (Certification)</p>
<b>11.2</b>	<p><b>Brake fluid tanks</b></p> <p>The brake and clutch fluid tanks will be fixed in the engine bay. The brake fluid hoses may pass through the cockpit. (Certification)</p>
<b>11.3</b>	<p><b>Brake Cooling</b></p> <p>Ducts may be metallic (steel or aluminium sheet), flexible hoses or be made in composite material. (Certification)  Certified apertures in the bodywork may be used to bring the cooling air to the brakes.  The connection of the air ducts to the certified apertures in the bodywork is free. (Certification)</p> <p><u>Brake disc cooling :</u>  Ducts must channel air towards the inner face of the brake disc only and must not be bigger than the disc diameter.</p> <p><u>Brake calliper cooling :</u>  Ducts may wrap the calliper up to a maximum of 20 mm around it.</p> <p>Tape on the external air inlets to regulate the brake temperature is allowed (car colour).</p>
<b>11.4</b>	<p><b>Parking brake</b></p> <p>The parking brake is mandatory.</p> <p>The production parking brake may be removed or replaced by a hydraulic valve or master cylinder operated manually by the driver without any intermediate system. (Certification)</p>
<b>ART. 12</b>	<b>WHEELS AND TYRES</b>
<b>12.1</b>	<p><b>Generals</b></p> <p>The tyre types will be decided by WSC.  Any system allowing the car to be driven without pressure in the tyres is forbidden.  Pressure and temperature sensors are forbidden.</p>
<b>12.2</b>	<p><b>Dimensions</b></p> <p>Wheels: similar to FIA App. J, Art. 263.801 (Certification)  - Dimensions of the 4 wheels: identical</p>

- Maximum dimensions : 10" x 18" (width x diameter)
- Complete wheel: Maximum width at 2 bars : 280 mm
- The diameters at inner and outer rim edges must be identical with a tolerance of +/- 1.5 mm.
- Minimum weight: 11kg
- Material: Cast aluminium alloy
- Construction: Single unit
- Metal inserts are allowed for the passage of the drive to the wheel.
- Air extractors are forbidden.

### 12.3 Wheel visibility

The complete wheel above the hub centre line must not be visible in plain view and when viewed from the front, with the wheels aligned for the car to proceed straight ahead. Measurements are taken horizontally at axle centre line height.

### 12.4 Wheel attachment

Wheel fixations by bolts may be changed to studs fixations respectively knurled-head screws and nuts, provided that the number of fixation points, as mentioned above, remains unchanged. (Certification)

Certified wheel spacers are allowed.

### 12.5 Pressure control valves

Pressure control valves on the wheels are forbidden.

## ART. 13 COCKPIT

### 13.1 Equipment permitted in the cockpit

The only components which can be added in the cockpit are:

- Safety equipment and structures
- Seat, instruments and any other controls necessary for driving including the brake balance adjuster
- Electronic and electrical equipment; it is permitted to channel air towards the electronic equipment on condition that the ventilation devices comply with the present regulations.
- team communication radio
- Driver cooling and ventilation equipment
- Ballast
- Braking and clutch system hydraulic lines with properly secured connectors
- Pneumatic jacks and their pipes
- Battery
- Fuel, hydraulic lines with properly secured connectors (App. J. Art. 253.3.2)

None of the above items may hinder cockpit exit or the driver's visibility.

The above components must be covered where necessary by a rigid protective material to minimise injury, and their mountings must be able to withstand 25g deceleration.

### 13.2 Cockpit exit time

The driver, seated in his normal driving position, must be able to get out from the cockpit in 7 seconds through the driver's door and in 9 seconds through the passenger's door.

For the purposes of these tests, the driver must be wearing all normal driving equipment, the seat belts must be fastened, the steering wheel must be in place, and the doors must be closed.

### 13.3 Test for helmet removal

With the driver seated in his normal driving position in the car with which he is entered, wearing a frontal head restraint systems according to FIA Standard 8858-2010 (FIA List No. 29) appropriate to his size and with the seat harness tightened, it must be possible, that the helmet which the driver will wear in the race can be gently removed from his head without bending his neck or spinal column.

## ART. 14 SAFETY EQUIPMENT

### 14.1 Fire extinguishers

All cars must be equipped with an extinguishing system homologated by the FIA in accordance with Article 253.7.2. (FIA Technical List 16)

### 14.2 Safety belts

The safety belts must comply with FIA Standards N°8853/98 or N°8854/98. (FIA Technical List 24)

### 14.3 Rear view mirrors

The car must be fitted with 2 (two) production external rear view mirrors.

### 14.4 Driver Seat

The driver's seat must be FIA homologated Standard 8855-1999 (FIA Technical List 12) or 8862-2009 (FIA Technical List 40) and not modified. (Certification)

Manufacturer may apply to certificate 2 (two) seats: 1 (one) corresponding to Standard 8855-1999 and 1 (one) corresponding to Standard 8862-2009.

Maximum total thickness of cushions used between the driver and the homologated seat is 50mm.

	<p>If the production seat attachments or supports are changed, they must comply with the provisions of App. J, Art. 253-16.</p> <p>The seat must be mounted by means of at least four (4) M8 bolts of at least 10.9 quality.</p> <p>Seat position</p> <ul style="list-style-type: none"> <li>- Transversally: Seat centreline must not be less than 270 mm from the car's centreline.</li> <li>- Longitudinally limit based on FIA App. J, Art. 263.1002; the most rear seat position will be documented in the Technical Form related to the chassis.</li> </ul>
<b>14.5</b>	<p><b>Master switch</b></p> <p>The driver, when seated normally at the steering wheel with the safety belts fastened, must be able to cut off all the electrical circuits and switch off the engine by means of a spark-proof breaker switch.</p> <p>The switch must be:</p> <ul style="list-style-type: none"> <li>- positioned on the dashboard or in any other place easily accessible and must be able to be handled from inside the car by the driver seated and secured by his safety belts;</li> <li>- An exterior master switch must be located at the lower part of the windscreen pillar on the driver's side clearly identified by a symbol showing a red spark in a white-edged blue triangle.</li> </ul>
<b>14.6</b>	<p><b>Window Net</b></p> <p>A protective net is compulsory.</p> <p>It must meet the following specifications:</p> <ul style="list-style-type: none"> <li>- the net must be made up of woven strips at least 19 mm (3/4") wide;</li> <li>- the meshes must be a minimum of 25 x 25 mm and a maximum of 60 x 60 mm. The woven strips must be non-flammable and sewn together at each point of crossing. The net must not be of a temporary nature.</li> <li>- viewed from the side, it must reach from the centre of the steering wheel to the B-pillar.</li> </ul> <p>Fixation:</p> <p>The net must be attached either to the safety cage or to the chassis, above the driver's window, by means of a rapid release system that will function even if the car turns over.</p> <p>It must be possible to detach the net with one hand. To this end, the handle or lever must have coloured markings ("dayglo" orange).</p> <p>A push-button release system is authorised provided that it respects the prescriptions of this article.</p> <p>The push-buttons must be visible from the outside, be of a contrasting colour and be marked "press".</p>
<b>14.7</b>	<p><b>Towing devices</b></p> <p>All cars will be equipped with certified rear and front towing devices. It will be clearly visible and coloured in yellow, red or orange.</p> <p>The towing devices must be within the perimeter of the bodywork as viewed from above.</p> <p>It must allow the passage of a cylinder with a diameter of 60 mm.</p> <p>It must allow moving the car with blocked wheels using the cars braking system on a dry surface (concrete or asphalt) by applying traction on a plane parallel to the ground, with an angle of <math>\pm 15^\circ</math> to the longitudinal centreline of the car.</p> <p>The car must be fitted with the series dry weather tyres.</p> <p>Flexible towing devices must be always in good condition without abrasions or kinks.</p>
<b>14.8</b>	<p><b>Fuel system</b></p> <p>Fuel lines :</p> <p>Flexibles lines must be of aviation quality (App. J, Art. 253.3.2).</p> <p>The installation is free provided that the prescriptions of App. J, Art. 253.3 are respected.</p>
<b>14.9</b>	<p><b>Hydraulic pressure lines</b></p> <p>App. J, Art. 253.3.2 applies.</p>
<b>14.10</b>	<p><b>Side Protection Panel</b></p> <p>A side protection panel made of composite material complying with Art. 263.902 may be optionally used. (Certification)</p>
<b>ART. 15</b>	<p><b>SAFETY STRUCTURES</b></p> <p><b>Safety cage</b></p> <p>The safety cage must be homologated or certified by an ASN (App. J, Art. 253.8.1.b), or homologated by the FIA (App. J, Art. 253.8.1.c).</p> <p>The tubes closer the 50cm to the driver's head must be padded with non-flammable foam approved by the FIA. (FIA Technical List 23)</p>
<b>ART. 16</b>	<p><b>FUEL</b></p>
<b>16.1</b>	<p><b>Fuel specification</b></p> <p>The fuel must comply with the official samples at any time of the competition. Additives of any kind are forbidden.</p> <p>The fuel temperature may not be more than 20°C lower than the ambient temperature.</p>
<b>16.2</b>	<p><b>Air</b></p> <p>Only air may be mixed with the fuel as an oxidant.</p>
<b>ART. 17</b>	<p><b>FINAL TEXT</b></p> <p>The binding text of these regulations is the English version.</p>

