

2^{ème} partie / 2nd part

**Technical Appendices for
World Record Attempts**

**Annexes Techniques pour
Records du Monde**

2014

TABLE OF CONTENTS

02	TECHNICAL APPENDICES FOR WORLD RECORD ATTEMPTS
2.1.1	INTRODUCTION
2.1.3	FREEDOM OF CONSTRUCTION
2.1.5	CATEGORIES AND GROUPS
2.2	CLASSES
2.2.1	MEASUREMENT OF CAPACITY
2.2.2	SUPERCHARGING
2.2.3	TELEMETRY
2.2.4	MOTORCYCLE WEIGHTS
2.2.5	DESIGNATION OF MAKE
2.2.6	DEFINITION OF A PROTOTYPE
2.3	GENERAL SPECIFICATIONS
2.3.3	DEFINITION OF A FRAME OF A SOLO MOTORCYCLE
2.3.4	STARTING DEVICES
2.3.5	OPEN TRANSMISSION GUARDS
2.3.6	EXHAUST PIPES
2.3.7	HANDLEBARS
2.3.8	CONTROL LEVERS
2.3.9	THROTTLE CONTROLS
2.3.10	FUEL PUMPS
2.3.11	FOOTRESTS
2.3.12	BRAKES
2.3.13	MUDGUARDS AND WHEEL PROTECTION
2.3.14	STREAMLINING
2.3.15	INCLINATION AND SUSPENSION OF MOTORCYCLES
2.3.16	WHEEL RIMS, TYRES
2.3.17	TYRES FOR SOLOS
2.3.18	TYRES FOR SIDECARS
2.3.19	ADDITIONAL SPECIFICATIONS FOR SIDECARS
2.3.20	NUMBER PLATES
2.3.21	FUEL AND OIL TANKS
2.10	FUELS, OILS AND COOLANTS.....
2.11	EQUIPMENT, PROTECTIVE CLOTHING AND HELMETS.....
2.12	CONTROL
2.13	TECHNICAL CONTROL GUIDELINES AND DECLARATION FORM.....
2.14	NOISE CONTROL
2.15	GUIDELINES FOR USE OF SOUND LEVEL METERS
2.81	ADDITIONAL SPECIFICATIONS FOR SPECIAL VEHICLES USED FOR WORLD RECORDS (SHORT DISTANCE RECORDS)
2.82	ADDITIONAL SPECIFICATIONS FOR SOLAR OR ELECTRIC POWERED VEHICLES
2.83	ADDITIONAL SPECIFICATIONS FOR DRAG BIKES
2.84	ADDITIONAL SPECIFICATIONS FOR SPRINTERS

2.85 ADDITIONAL SPECIFICATIONS FOR SCOOTERS AND 50 CC
AUTOMATICS

DIAGRAMS AND TABLE

02 TECHNICAL APPENDICES

2.1.1 INTRODUCTION

The term motorcycle covers all vehicles having, in principle, less than four wheels, propelled by an engine and designed essentially for the carriage of one or more persons of which one is the rider of the vehicle. The wheels must normally be in contact with the ground except momentarily or in certain exceptional circumstances.

2.1.3 FREEDOM OF CONSTRUCTION

A motorcycle conforms to the requirements of the FIM Appendices, to the Supplementary Regulations, as well as to a number of specific conditions that the FIM may require for certain competitions. No further restriction is placed on the make, construction or type of motorcycle used.

All solo motorcycles (Group A) must be constructed in such a way that they are entirely controlled by a rider. Motorcycles with Sidecars (Group B) must be constructed to carry a passenger.

2.1.5 CATEGORIES AND GROUPS

Motorcycles are divided into categories which must be observed for all meetings for world record attempts (see APPENDICES FOR WORLD RECORD ATTEMPTS).

In principle, it is forbidden for different categories, groups and classes to compete in the same race, unless the **Supplementary Regulations of the event** state otherwise.

Category I

Motorcycles propelled by the action of one (1) wheel in contact with the ground.

Category II

Special vehicles propelled by the action of **two** (2) wheels in contact with the ground but which are not covered by the conditions for Category I.

Category III

Electric vehicles.

These categories are divided into groups:

Category IV

Special vehicles not propelled by wheels in contact with the ground.

Category I

Group A1 - Solo Motorcycles

2-wheeler vehicles making only one (1) track on the ground.

Group A2 - Scooters

Motorcycles with special characteristics.

A scooter is a motorised vehicle with 2 wheels, providing a seat for the rider and having a free space in front of the seat for the rider's legs.

The characteristics of a scooter are as follows:

The scooter must be fitted with a leg shield, of minimum 400 mm in width. The leg shield must start below the handlebar and extend down and to the rear, to either side of the seat, forming a platform with a minimum length of 250 mm and sufficient to fit the rider's feet.

The space between seat and handlebar shall be free of any obstructions. It must allow a rider to put his knees together, when seated normally with both feet on the platform.

The diameter of the wheel rims must not exceed 400 mm irrespective of engine capacities.

The scooter must be fitted with a starting device. The electrical equipment and lighting must conform to the International Convention for Road Vehicles.

Group A3 - Automatic 50 cc

Motorcycles driven by an engine capacity up to 50 cc and having automatic transmission.

Scooter specification: a scooter must have its crankcase/swing-arm constructed as one single, rigid unit. Its transmission must be by a continuous variator transmission (CVT).

Group B1 – Motorcycles with a Sidecar

Vehicles with three wheels making two tracks on the ground, consisting of a motorcycle making one track and a Sidecar for a passenger making the other.

Group B2 - Motorcycles with permanent Sidecar

Vehicles with three wheels making two or three tracks on the ground in the direction of forward travel, with a permanently attached Sidecar forming a complete integral unit.

If three tracks are made, the centre-line of the two tracks made by the motorcycle wheels must not be more than 75 mm apart. A track is determined by the longitudinal centre-line of each of the vehicle's wheels in the direction of forward travel.

Group B3 - Cycle-cars (FW or RW)

3-wheeler vehicles making three tracks on the ground forming a complete integral unit and having accommodation for a rider and passenger.

A cycle-car is a motorcycle with 3 wheels differing from a Sidecar in that 2 of the wheels are mounted on the same geometric horizontal axis. These may be on the front **(FW)** or rear **(RW)** of the vehicle and shall ensure stability of the vehicle.

The passenger can be by the side of the rider but not necessarily in the same frontal alignment. He can also be placed behind the rider.

Steering must be by handlebars with a minimum length of 500 mm or by a wheel with a minimum diameter of 300 mm.

If bodywork does not enclose the wheels, they must be protected by mudguards.

The dimensions for Sidecar tyres and wheel diameters also apply to cycle-cars.

Category II

Motorcycles propelled by the action of **two (2)** wheels in contact with the ground.

- Group B1 - Motorcycles with a sidecar**
- Group B2 - Motorcycles with permanent sidecar**
- Group B3 - Cycle-cars**

Category III

Special vehicles propelled by the action of **multiple** wheels or track devices in contact with the ground but which are not covered by the conditions for Category I or II.

- Group C - Special 2 wheeler motorcycles
- Group D - Special 3 wheeler motorcycles
- Group E - Snowmobiles
- Group F - Special Vehicles
- Group G - Quad Racers – 2 wheel driven
- Group H - Quad Racers – 4 wheel driven
- Group J - Electric Vehicles (see Art. 01.82)

Category IV

Special vehicles not propelled by wheels in contact with the ground.

- Group Y SPECIAL TWO WHEELED MOTORCYCLES (Streamliners)**

A maximum of two wheels (or in the form of stabilisers or skids) may be fitted to said vehicle, only to aid stability at low speeds. These aids must be retracted during the record attempt.

2.2 DIVISIONS, TYPES AND CLASSES

Groups are again separated into **divisions, types and classes (refer to the World Records Booklet).**

2.2.1 MEASUREMENT OF CAPACITY

2.2.1.1 Reciprocating movement engine, "Otto" Cycle

The capacity of each engine cylinder is calculated by the geometric formula which gives the volume of a cylinder, the diameter is represented by the bore, and the height by the space swept by the piston from its highest to lowest point:

$$\text{Capacity} = \frac{D^2 \times 3.1416 \times C}{4}$$

where D = bore
and C = stroke

When a cylinder bore is not circular the cross sectional area must be determined by a suitable geometrical method or calculation, then multiplied by the stroke to determine capacity.

When measuring, a tolerance of 1/10 mm is permitted in the bore. If with this tolerance the capacity limit is exceeded for the class in question, a further measurement must be taken with the engine cold (at ambient temperature), to 1/100 mm limits.

2.2.1.2 Rotary engines

The capacity of an engine which determines the class in which the motorcycle shall compete in a meeting shall be calculated by:

$$\text{Capacity} = \frac{2 \times V}{N}$$

where V = total capacity of all the chambers comprising the engine
and N = number of turns of the motor necessary to complete one cycle in a chamber.

This engine is classified as a 4-stroke.

2.2.1.3 Wankel system

For Wankel system engines with a triangular piston, the capacity is given by the formula:

$$\text{Capacity} = 2 \times V \times D$$

where V = capacity of a single chamber

and D = number of rotors.

Classified as a 4-stroke.

2.2.2 SUPERCHARGING

The direct injection of fuel is not considered to be supercharging.

An engine whether 2-stroke or 4-stroke coming within any one of the recognised classes as determined by the capacity of the working cylinder shall not be considered as supercharged when in respect of one engine cycle, the total capacity measured geometrically, of the fuel charging device or devices, including the capacity of the working cylinder, (if used for inspiring the fuel) does not exceed the maximum capacity of the class in question.

2.2.3 TELEMETRY

Information must not be transmitted in any way to or from a moving motorcycle.

An official signalling device may be required on the machine.

Automatic lap timing devices are not considered as "telemetry".

Automatic lap timing devices must not disrupt any official time keeping methods and equipment.

2.2.4 MOTORCYCLE WEIGHTS

Weighing scales must have been certified by a National Institute within two years prior to use and the certificate must be available to the Technical Steward.

A 1 % tolerance in the weight of the machine at the post-race control is accepted, except when otherwise stated in the 'Additional Specifications' of the category/class concerned.

A 2 kg discount, without fuel tank, irrespective of engine capacity, will be allowed.

2.2.4.1 Weights of motorcycles without fuel

Where required by the rules, vehicles are weight without fuel. **For electric powered motorcycles, these vehicles are weighed WITH all the batteries. In between the runs for an attempt, no batteries can be added or taken out of the vehicle. Batteries must be securely fitted.**

2.2.4.2 Ballast

The use of ballast is allowed to stay over the minimum weight limit. The use of ballast must be declared to the Chief Technical Steward at the preliminary checks.

Ballast must be made from solid metallic piece/s, firmly, securely connected, either through an adapter or directly to the main frame or engine, with minimum 2 steel bolts (min. 8 mm diameter, 8.8 grade or over). Fuel in the fuel tank can be used as ballast.

On three wheeled vehicles and cycle-cars, where the participation of a passenger is not compulsory, a ballast of 60 kg must be fixed to the machine on an area provided for this purpose. The ballast must be shown during verification and properly sealed to the motorcycles.

2.2.4.3 For Groups B1 and B2: a passenger may not be carried.

2.2.4.4 For record attempts in Groups B1 and B2 the body of the motorcycles must be constructed in such a way as to allow accommodation of a passenger. **If there is no** passenger, a ballast of 60 kg must be securely fixed to the Sidecar.

2.2.5 DESIGNATION OF MAKE

When two manufacturers are involved in the construction of a motorcycle the name of both must appear on the machine as follows:

- The name of the chassis manufacturer
- The name of the engine manufacturer

2.2.6 DEFINITION OF A PROTOTYPE

A prototype is a vehicle which must conform to the safety requirements as required by the FIM Code applicable to the type of competition for which it is to be used.

2.3 GENERAL SPECIFICATIONS

The following specifications apply to all vehicles of the groups indicated and to all types of competitions except where otherwise stated in the corresponding section of the FIM Code.

They should also be applied to all national competitions unless the FMNR (National Motorcycling Federation) has otherwise directed.

Further specifications for some competitions may also be required and these will be detailed in either the appropriate section of the FIM Sporting Code or in the Supplementary Regulations for the competition in question.

2.3.1 Materials

The use of titanium in the construction of the frame, the front forks, the handlebars, the swing arms, the swing arm spindles and the wheel spindles is forbidden. For wheel spindles, the use of light alloys is also forbidden. The use of titanium alloy nuts and bolts is allowed.

2.3.1.1 Titanium test to be performed on the track: Magnetic test (titanium is not magnetic).

2.3.1.2 3 % nitric acid test (titanium does not react. If metal is steel, the drop will leave a black spot).

2.3.1.3 Specific mass of titanium alloys 4,5-5, of steel 7,5-8,7 can be ascertained by weighing the part and measuring its volume in a calibrated glass filled by water (intake valve, rocker, connecting rod, etc.)

2.3.1.4 In case of doubt, the test should take place at a Materials Testing Laboratory.

2.3.1.5 Aluminium alloys can be ascertained visually.

2.3.2 General specifications for motorcycles are as follows.

2.3.2.1 The number of cylinders in an engine is determined by the number of combustion chambers.

2.3.2.2 If separate combustion spaces are used they must be connected by an unrestricted passage of minimum cross sectional area at least 50 % of the total inlet port area.

2.3.3 DEFINITION OF A MAIN FRAME OF A SOLO MOTORCYCLE

The structure or structures used to join any steering mechanism at the front of the machine to the engine/gear box unit and to all components of the rear suspension.

2.3.4 STARTING DEVICES

Starting devices are permitted.

2.3.5 OPEN TRANSMISSION GUARDS

2.3.5.1 For all motorcycles **and other vehicles**, if the primary transmission is exposed, it must be fitted with a guard as a safety measure.

The guard must be conceived in such manner~~e~~ that under no circumstances the rider can come into accidental contact with the transmission parts. **The guard** must be designed to protect the rider from injuring his **hands or feet**.

2.3.5.2 For Sidecars, a **chain** guard is required if the secondary transmission is not shielded by the bodywork.

2.3.5.3 A guard must be fitted to the countershaft sprocket.

2.3.5.4 A (chain) guard (**like a shark fin**) must be fitted in such a way as to prevent trapping between the lower chain run and the final driven sprocket at the rear wheel.

2.3.6 EXHAUST PIPES

2.3.6.1 The end of the exhaust pipe, over a minimum distance of 30 mm must be horizontal and parallel to the central axis of the solo machine (with a tolerance of $\pm 10^\circ$).

2.3.6.2 Exhaust fumes must be discharged towards the rear but not in a manner as to raise dust, foul the tyres or brakes, or inconvenience a passenger, if there is one, or any other riders.

2.3.6.3 The extremity of the exhaust pipes on solo motorcycles must not pass the vertical tangent of the rear tyre, if they keep the exhaust pipes system as originally homologated (see diagrams A,B,C).

2.3.6.4 On a Sidecar machine the exhaust must discharge horizontally and towards the rear, at a maximum angle of 30° to the axis of the machine, and at the end be of constant diameter over a distance of 30 mm.

2.3.7 HANDLEBARS

2.3.7.1 The width of handlebars is: Up to 80 cc, not less than 400 mm.

2.3.7.2 For all other **vehicles** (incl. Sidecars) not less than 450 mm.

2.3.7.4 The grips must be attached in such a way that at least the minimum width for handlebars is reached when measured between the outside ends of the grips.

2.3.7.5 Exposed handlebar ends must be plugged with a solid material or rubber covered.

2.3.7.6 The minimum angle of rotation of the handlebar on each side of the centre line or mid position must be of 15° for solo motorcycles and 20° Sidecars.

2.3.7.7 Whatever the position of the handlebars the front wheel must never touch the streamlining, if any.

2.3.7.8 Solid stops, (other than steering dampers) must be fitted to ensure a minimum clearance of 30 mm between the handlebar with levers and the tank when on full lock to prevent trapping the rider's fingers (see diagrams A, B, C).

2.3.7.9 Handlebar clamps must be very carefully radiused and engineered so as to avoid fracture points in the bar.

2.3.7.10 The repair by welding of light alloy handlebars is prohibited.

2.3.8 CONTROL LEVERS

2.3.8.1 All handlebar levers (clutch, brake, etc.) must be in principle ball ended (diameter of this ball to be at least 19 mm). This ball can also be flattened, but in any case the edges must be rounded (minimum thickness of this flattened part 14 mm). The ends must be permanently fixed and form an integral part of the lever.

2.3.8.2 Each control lever (hand and foot levers) must be mounted on a independent pivot.

2.3.8.3 The brake lever if pivoted on the footrest axis must work under all circumstances, such as the footrest being bent or deformed.

2.3.9 THROTTLE CONTROLS AND IGNITION CUT-OUT SWITCH

2.3.9.1 Throttle controls must be self-closing when not held by the hand.

2.3.9.2 For Sidecars and special 3-wheeler motorcycles, an ignition cut-out must be fitted to operate when the rider leaves the machine.

This ignition cut-out system must interrupt the primary circuit and must be wired for both the supply and return of the current.

The ignition cut-out switch must be placed as near to the centre of the handlebar as possible and must be operated by a non-elastic string of adequate length and thickness and strapped to the rider's right-hand wrist.

A spiral cable (similar to that of a telephone wire) of maximum 1 m extended length is permitted.

2.3.10 FUEL PUMPS

Electric fuel pumps must be wired through a circuit cut-out which will operate automatically in the event of an accident.

A test facility must be incorporated in the design of electrically operated fuel pumps for use at the technical control.

2.3.11 FOOTRESTS

2.3.11.1 Footrests, **when folding** must be fitted with a device (**spring**) which automatically returns them to the normal position. An integral protection is to be provided at the end of the footrest which must have at least 8 mm solid spherical radius (see diagrams A & C).

2.3.11.2 Non folding 'metallic' footrests must have an end (plug) which is permanently fixed, made of plastic, Teflon® or an equivalent type material (min. Ø 16mm).

2.3.12 BRAKES

2.3.12.1 Vehicles in Group A must have at least 1 efficient brake operated independently and concentrically with the wheel.

The split of the front brake lines for both front brake callipers must be made above the lower fork bridge (lower triple clamp).

2.3.12.2 Vehicles in Group B, **and other vehicles**, must be fitted with at least 2 efficient brakes operating on at least 2 of the wheels and operated independently and concentrically with the wheel.

2.3.12.3 For Sidecars, a Sidecar wheel brake must be fitted.

2.3.12.4 All road racing vehicles in Group B2 must have the following braking system: One main system with at least two circuits operating separately. One of the circuits must work upon at least two of the three wheels.

2.3.12.5 If one system fails the other system must work efficiently.

2.3.13 MUDGUARDS AND WHEEL PROTECTION

Mudguards must comply with the following requirements:

2.3.13.1 They must project laterally beyond the tyre on each side.

2.3.13.2 A front mudguard is **strongly recommended**.

2.3.14 STREAMLINING

The streamlining of Solo machines must correspond to the following specifications:

2.3.14.1 The front wheel with the exception of the tyre and the part hidden behind the mudguard must be clearly visible from each side.

2.3.14.2 Bodywork must not extend beyond a line drawn vertically at the leading edge of the front tyre and a line drawn vertically at the rearward edge of the rear tyre. The suspension should be fully extended when the measurement is taken. Mudguards are not considered as streamlining.

2.3.14.3 No part of the streamlining must be to the rear of a vertical line drawn through the rear wheel axle and the rim of the rear wheel must be clearly visible over the 180° of its circumference to the rear of this line. No part of the motorcycle shall project to the rear of a vertical line drawn through the exterior edge of the rear wheel.

2.3.14.4 Air foils or spoilers may only be fitted on solo machines when they are an integral part of the fairing or seat. They must not exceed the width of the fairing nor the height of the handlebar. Sharp edges must be rounded off with a minimum radius of 8 mm.

2.3.14.5 The windscreen edge and the edges of all other exposed parts of the streamlining must be rounded.

2.3.14.6 In the normal driving position, the rider must be completely visible with the exception of his forearms (and his legs if it is a Sidecar) from either side from the rear and from above. The minimum space between the face of the rider, or his helmet and the streamlining (including the windscreen) must be 100 mm. It is forbidden to use transparent materials to evade these rules.

2.3.14.7 The maximum height of the back of the rider's seat is 150 mm. This will be measured from the lowest point of the rigid base of the seat to the uppermost part of the fairing behind the rider.

2.3.14.8 Whatever the position of the handlebars, there must be a space of at least 20 mm between the streamlining and the ends of the handlebars or other steering systems, including any attachments thereto.

2.3.14.9 The front inclination where the number plate is fixed must not exceed an angle of 30° to the rear of the vertical (see diagram A).

2.3.14.10 The width of the seat or anything to its rear shall not be more than 450 mm, exhaust systems excepted.

2.3.14.11 The fuel cap must be fitted in such a way that it does not protrude in relation to the tank profile and cannot be torn off in a crash.

2.3.14.12 For all four stroke motorcycles only, equipped with a fairing, the lower fairing has to be constructed to hold in case of an engine breakdown, at least half of the total oil and engine coolant capacity used in the engine. The lower edge of

openings in the fairing must be positioned at least 50 mm above the bottom of the fairing.

The lower fairing should incorporate a maximum of two holes of 25mm. These holes must remain closed in dry conditions and must be only opened in « wet » race conditions as declared by the Clerk of the Course.

Minimum modifications with relation to the profile of the lower fairing are allowed, only to fulfil this rule.

2.3.15 INCLINATION AND SUSPENSION OF MOTORCYCLES

Solo motorcycles in road racing and production machine racing, when unloaded, must be capable of being inclined to an angle of 50° from the vertical without any part other than the tyre being in contact with the ground (see diagrams A and C).

2.3.16 WHEEL RIMS, TYRES (See Table 1)

2.3.16.1 All tyres will be measured mounted on the rim at a pressure of 1 kg/cm² (14 lb./sq.in.); measurements taken at a tyre section located at 90° from the ground.

2.3.16.2 Any modification to the rim or spokes of an integral wheel (cast, moulded, riveted) as supplied by the manufacturer or of a traditional detachable rim other than for spokes, valve or security bolts is prohibited except for tyre retention screws sometimes used to prevent tyre movement relative to the rim. If rim is modified for these purposes bolts, screws etc, must be fitted.

The maximum rear wheel rim widths are:

125cc	3.5"
250cc	5.5"
500cc	6.25"

For information, the distance is measured inside flange walls of the wheel rim in accordance with ETRTO.

2.3.17 TYRES FOR SOLOS

2.3.17.1 The width of tyres used in the individual classes must not be less than the values shown in Table 1

2.3.17.2 The minimum rim diameter is 400 mm.

2.3.17.3 Interior - fixture - width of tyre

The tyre must be mounted on a corresponding rim. The interior (fixture) width values for respective dimensions of tyres are shown in Table 1. The rim interior (fixture) must not be deformed or damaged.

2.3.17.4 Permitted maximum speed

The speed categories for use in individual classes are shown in Table 1. This does not apply to slick tyres.

2.3.17.5 Tyre surface tread pattern

2.3.17.6 The surface of the tyre can be smooth (i.e. without tread grooves) or treaded.

2.3.17.7 The tread pattern is unrestricted.

2.3.17.11 The choice of a certain type of tread pattern is left entirely up to the individual rider.

2.3.17.13 As a safe minimum, the depth of the tyre tread over the whole pattern at pre-race control must be at least 2.5 mm. In the 85cc class only, this minimum depth is 1.5 mm.

2.3.17.14 Tyres which at the preliminary examination have a tread depth of less than 1.5 mm are considered as non-treaded tyres.

2.3.17.16 The minimum distance between the surface of the tyre must be **sufficient to provide clearance with any parts of the motorcycle at any speed.**

2.3.17.17 To 'break in' the tyre surface

2.3.18 TYRES FOR SIDECARS

The appendices mentioned above for solo motorcycle tyres also apply to Sidecars.

2.3.18.3 When the springs are compressed to their maximum, there must still remain a minimum wheel clearance of 15 mm to every fixed part.

2.3.18.4 The minimum diameter of an inflated tyre must be 400 mm.

2.3.19 ADDITIONAL SPECIFICATIONS VALID FOR SIDECARS

2.3.19.1 Front and/or side Number Plates

The front inclination where the number plate is fixed must not exceed an angle of 30° to the rear of the vertical (see diagram A). **Numbers on the side must be applied on a flat (or near flat) surface. Numbers shall not be covered when the rider is in riding position.**

2.3.19.2 Dimensions

Maximum dimensions are (see diagram B):

Overall width:	1700 mm (including the exhaust system)
Maximum overall height:	800 mm (with the exception of the airbox – max height: 950 mm).
Overall length:	3300 mm
Wheel base:	2300 mm

2.3.19.3 Distance between Tracks

The distance between the tracks left by the centre lines of the rear motorcycle wheel and the Sidecar wheel must be at least 800 mm and not more than 1150 mm.

2.3.19.4 Riders Position

The rider's position regardless of whether or not a driving seat is fitted, must be such that the rider's feet are positioned behind the knees when looking in the driving direction.

2.3.19.5 Rider or Passenger's Position

Neither the rider, nor the passenger must be covered from above nor may they be attached to the vehicle in anyway.

The passenger must be able to lean out on either side.

2.3.19.6 Protection

Vehicles must have a solid and effective protection between the rider and the engine. This protection must prevent direct contact between the rider's body or his clothes and escaping flames or leaking fuel and oil.

2.3.19.7 Streamlining

The forward extremity of the streamlining shall be not more than 400 mm in front of the foremost part of the tyre (see diagram B).

The extreme rear edge of the streamlining must be not more than 400 mm beyond the extreme edge of the rear wheel (see diagram B).

The sidecar wheel must be enclosed by the fairing down to the height of its axle centreline.

2.3.19.8 Aerodynamic Devices

Spoilers and other aerodynamic devices are authorized on condition that they do not extend beyond the overall dimensions of the bodywork and are an integral part of the fairing and/or body.

2.3.19.9 Windscreen

The windscreen edge and the edges of all other exposed parts of the streamlining must be rounded.

2.3.19.10 Ground Clearance

The ground clearance measured over the entire length and width of the frame and other mechanical parts (engine, oil bay, exhaust and platforms) excluding the fairing, race ready, fully loaded with rider (and passenger if applicable) in a static racing position, must not be less than 65 mm with the handlebars in straight position.

No devices are permitted to reduce the ground clearance during the course of the race. After the race, a tolerance of - 5 mm is authorised.

2.3.19.11 Fixing of the Sidecar

The Sidecar must be fixed to the motorcycle in at least three points, if it is not an integral part of the chassis.

The fixing points must not allow movement at the joints. If the angle of the inclination is changeable, it must be locked in such a way that it is completely secured and not only clamped on.

2.3.19.12 Banking Sidecars

Banking Sidecars are strictly forbidden.

2.3.19.13 Steering

The motorcycle must be steered by a handlebar.

The handlebar extremities must not be lower than the front wheel spindle nor more than 500 mm behind the front wheel spindle in the straight ahead position.

The steering axis must not be offset more than 75 mm from the front wheel centre line.

To reduce the torque in the steering it is allowed to displace the front wheel and the rear wheel. (See also Art. 01.05, Group B2).

2.3.19.14 Handlebars

Whatever the position of the handlebars, there must be a space of at least 20 mm between the streamlining and the ends of the handlebars or other steering systems, including any attachments thereto.

2.3.19.15 Suspension

Suspension of the front wheel must be designed so that under suspension action and in a straight ahead position, the wheel shall only move vertically and in a single plane relative to the motorcycle - the plane must be in the driving direction.

This must occur without changes to the camber or the side-tracking. The vertical travel of the front and rear wheel spindles under suspension action must be at least 20 mm.

The fixing nuts and bolts of the front and rear suspensions must be secured by a safety wire.

2.3.19.16 Drive

The drive shall be transmitted to the ground only through the rear wheel of the motorcycle.

2.3.19.17 Wheels

The rear wheel and Sidecar wheel must be enclosed down to the level of the Sidecar platform on the inside.

2.3.19.18 Brakes

Minimum two 'disc' or 'drum' operated brakes in working order

2.3.19.19 Fuel Tank

The fuel tank must be independently protected from the ground.

2.3.19.20 Fuel Cap

The fuel cap must be fitted in such a way that it does not protrude in relation to the fairing or the tank profile and cannot be torn off in a crash.

2.3.19.21 Battery

The battery must be covered in such a way that neither the rider nor the passenger can come directly into contact with the battery or its contents.

2.3.19.22 Engine

The engine must be positioned in such a way that the centre-line of the engine (by definition a position midway between centre lines of outermost cylinders for transversal engines, or the crankshaft for in-line engines) shall not exceed 160 mm

beyond the centre-line of the rear wheel of the motorcycle. The engine must be positioned in front of the rear wheel.

2.3.19.23 Oil and Coolant Containment

In the area directly below the engine, the oil containment tray must be constructed to hold, in case of an engine breakdown at least half of the total oil and engine coolant capacity used in the engine (min 5 litres).

The surrounding edges of the tray must be at least 30 mm above the bottom of the tray.

This tray should incorporate a maximum of two holes of 25 mm in diameter and be closed with rubber plugs. These holes must remain closed in dry conditions and only opened when wet race conditions have been declared by the clerk of the course.

The frontal edge from the oil bay reservoir wall must be extended upwards to arrive just below (within 20 mm) the exhaust ports of the engine.

Holes for engine mounts (hangers) must be sealed.

From a vertical view, the engine must be located completely inside the oil bay platform.

The rear wheel must be protected from any possible oil spray. To make this protection, the engine and the rear wheel compartment must be separated. This separation must be created by installing a solid divider (wall) running from the top of the inside of the bodywork to the bottom of the oil tray. This divider (wall) must overlap the rear edge of the oil tray down to the bottom.

All sidecars with 4 –stroke engines must use this tray.

Oil lines containing positive pressure, if replaced, must be of metal reinforced construction with swaged or treaded connectors. Manufactured solid construction oil lines, where practical, must be replaced also.

Oil cooler must not be mounted on or above the body of the sidecar.

The location of the oil tank and oil cooler should be placed in a location where it is least likely to be damaged in an accident.

2.3.19.24 Exhaust Pipes and Silencers

The exhaust pipe(s) must not extend beyond the width of the Sidecar and the furthest extremity of the exhaust pipe must not exceed the vertical line drawn at a tangent to the rear edge of the Sidecar body.

Exhaust pipes fitted to the side of the Sidecar must be covered so that it is impossible for the passenger to be burnt. The ends of the exhaust pipes fitted to the

Sidecar must be so positioned or protected that it is impossible for them to become entangled with another machine.

2.3.20 NUMBER PLATES

They must be fitted as follows:

2.3.20.1 They must be rectangular shape and made from a rigid and solid material with minimum measurements 285 mm x 235 mm (see diagram 0).

2.3.20.2 The plates curved not more than 50 mm out of a true plane must not be covered or bent.

2.3.20.3 The allocated number (& plate) for the rider must be affixed in such a manner as to be clearly visible on the machine as follows:

Number(s) (& plate) must appear once, on each side of the motorcycle.

2.3.20.4 In place of separate plates, a space of equivalent size in (matt) colours can be painted or fixed on the bodywork or streamlining,

2.3.20.5 The figures must be clearly legible and like the background must be painted in matt colours to avoid reflection from sunlight.

The **minimum** dimensions of the letters being:

Height of figure:	140 mm
Width of figure:	80 mm
Width of stroke:	25 mm
Space between 2 figures:	15 mm

2.3.20.6 Figures must conform to one of the forms as printed in diagram 0.

2.3.20.7 All other number plates or markings on a motorcycle liable to cause confusion with the number must be removed before the start of a competition.

2.3.20.8 A space of at least 5 cm must be left free around all number plates in which no advertising may appear.

Riders of those motorcycles with number plates that do not comply with this rule will not be passed by the Chief Technical Steward for the race.

2.3.20.9 Number plate colours: must be in complete contrast with the numbers (i.e.: a white background with black numbers).

2.3.20.10 In case of a dispute concerning the legibility of numbers, the decision of the Technical Steward will be final.

2.3.21 FUEL AND OIL TANKS

2.3.21.2 Fuel must be contained in a single tank securely fixed to the machine. Seat tanks and auxiliary tanks are forbidden. The use of a quickly detachable replacement tank as a means of refuelling is strictly forbidden in all types of competition.

2.3.21.4 **It is strongly recommended for** any fuel tank to be completely filled with fuel cell foam (preferably with "Explosafe®").

2.3.21.5 Oil catch tanks and breather systems

Where an oil breather pipe is fitted, the outlet must discharge into a catch tank located in an easily accessible position and which must be emptied before the start of a race.

The minimum size of a catch tank shall be 250cc for the gearbox and 500cc for the engine.

All 4-stroke motorcycles must have a closed breather system. The oil breather line must be connected and discharge in the airbox (See Diagram C).

All possible measures must be taken to prevent the possible loss of waste oil so that it does not hinder a following rider.

2.3.21.6 Oil drain plugs and supply pipes

All oil drain plugs must be tight and must be drilled and wired in position. Oil supply lines must be correctly and securely wired in position. External oil filters and screws or bolts that enter an oil cavity must be safety wired.

2.3.21.7 Fuel tank breather pipes

Fuel tank breather pipes must be fitted with no-return valves. Fuel tank breather pipes must discharge into a catch tank, made of a suitable material, with a minimum volume of 250 cc

2.3.21.8 Fuel and oil filler caps

Fuel and oil filler caps, when closed, must be leak proof. Additionally, they must be securely locked to prevent accidental opening at any time.

2.10 FUEL, OIL AND COOLANTS

Fuel must remain fluid at all times.

2.10.3 Air

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

2.10.4 Primary Tests

2.10.4.1 The FIM may require tests of fuels to be administered before, or at the time of delivery to, an event at which such fuels are to be used.

2.10.4.2 The FIM may request any person or organisation, being a potential Official Supplier of fuel, to submit a sample for testing for conformity with the fuel specifications.

2.10.6 Fuel Storage

Fuel may only be stored in metal containers.

A maximum of 60 litres of fuel stored in a sealable can, is allowed in the competitor's pit.

Fire fighting equipment, protective devices and staff must conform to the requirements imposed by the local authorities and by-laws.

The organiser must have fire extinguishers of a size and type approved by the local by-laws. **It is strongly recommended for each competitor to have a fire extinguisher in his/her pit area (compulsory as from 2015).**

2.10.7 Coolants

The only liquid engine coolants permitted other than lubricating oil shall be water or water mixed with ethyl alcohol.

2.11 PROTECTIVE CLOTHING AND HELMETS

2.11.1 Riders and passengers must wear a complete leather suit with additional leather padding or other protection on the principal contact points, knees, elbows, shoulders, hips etc.

2.11.2 Linings or undergarments must not be made of a synthetic material which might melt and cause damage to the riders' skin.

2.11.3 **With the leather suit (or material equivalent to leather),** riders must also wear leather gloves and boots, **to provide** complete coverage from the neck down.

2.11.4 Leather substitute materials may be used, providing they have been checked by the Chief Technical Steward.

2.11.5 Use of a back protector is highly recommended.

2.11.6 Riders must wear a helmet which is in good condition, provides a good fit and is properly fastened.

2.11.7 Helmets must be of the full face type and conform to one of the recognised international standards:

- Europe ECE 22-05 'P'
- Japan JIS T 8133 : 2007
- USA SNELL M 2010
- USA **SNELL SA 2005 & SA 2010 (for Streamliners)**

2.11.8 Visors must be made of a shatterproof material.

2.11.9 Disposable "tear-offs" are permitted.

2.11.10 Any question concerning the suitability or condition of the riders clothing and/or helmet shall be decided by the Chief Technical Steward, who may, if he so wishes, consult with the manufacturers of the product before making a final decision.

2.12 PROCEDURES FOR TECHNICAL CONTROL

The rider is at all times responsible for his machine.

2.12.1 The Chief Technical Steward must be in attendance for an event at least 1 hour before the technical verifications are due to begin. He must inform the Clerk of the Course and/or the Jury President of his arrival.

2.12.2 He must ensure that all Technical Stewards, appointed for the event, carry out their duties in a proper manner.

2.12.3 He shall appoint the Technical Stewards to individual posts for the race, practices and final control.

2.12.4 Technical inspections will only be carried out when the technical specification form of the motorcycle has been distributed by the Organiser (during the preliminary controls).

2.12.5 One rider, or his mechanic, must be present with the machine for Technical control within the time limits stated in the Supplementary Regulations. The maximum number of persons present at the technical verification will be the rider, plus two others. In addition, the Team Manager will also be allowed.

2.12.6 The Chief Technical Steward must inform the International Jury of the results of the Technical control. The Chief Technical Steward will then draw up a list of accepted machines and submit this list to the Clerk of the Course.

2.12.7 The Chief Technical Steward has the right to inspect any part of the motorcycle at any time of the event.

2.12.8 Any rider failing to report as required below may be disqualified from the meeting. The International Jury may forbid any team who does not comply with the rules, or any rider who can be a danger to other participants or to spectators, to take part in the practice sessions or in the races.

2.12.9 The Technical control must be carried out in accordance with the procedure and times fixed in the Supplementary Regulations of the event.

2.12.11 The rider or mechanic must present a clean motorcycle and in conformity to the FIM rules. He must also present a duly filled in and confirmed technical card.

2.12.12 An overall inspection of the motorcycle must be carried out in conformity with the FIM rules. Accepted motorcycles will be marked with paint or a sticker.

Chief Technical Steward has the final authority in case of a dispute on the conformity of the parts in question and for acceptance thereof.

2.12.14 Before each **record attempt** the Technical Steward must confirm that the motorcycle has passed the Technical control by checking the Technical control sticker before the motorcycles go on the track.

2.12.15 Only accepted motorcycles may be used in a **record attempt**.

2.12.16 All machines must be controlled before they are placed in the closed park area.

2.12.17 If a motorcycle is involved in an accident, the Chief Technical Steward must check the machine (together with the helmet and clothing of the rider involved), to ensure that no defect of a serious nature has occurred.

If the helmet is clearly defective, the Chief Technical Steward must retain this helmet.

The organiser must send this helmet, together with the accident and medical report (and pictures and video, if available) to the Federation of the rider. If there are head injuries stated in the medical report, the helmet then must be sent to a neutral institute for examination.

2.12.18 The rider must present his equipment. The helmet must be marked.

2.12.19 The rider may present several motorcycles for Technical inspection.

2.12.20 Noise **may** be checked by random choice during practice as well as after the **event, if required by order of the authorities**. On request of rider, team

or mechanic, noise of their own motorcycles can be checked at any time during the event.

2.12.22 Weight should be checked where it is applicable by the rules. The random weight check during practices will be held with minimum disturbance to the riders.

On request of rider, team or mechanic, weight of their own motorcycles can be checked at any time during the event.

2.13 VERIFICATION GUIDELINES FOR TECHNICAL STEWARDS

- Make sure all necessary measures and administrative equipment are in place at least 1 hour before the Technical control (see separate list) is due to open (time in Supplementary Regulations).
- Decide who is doing what and note decisions. "Efficiency" must be the watchword. Always keep cheerful and remember the reasons for Technical controls: SAFETY AND FAIRNESS.
- Be well informed. Make sure your FMN has supplied you with all technical "updates" that may have been issued subsequent to the printing of the Technical Rule Books.
Copies of all homologation documents must be in your possession.
- Inspection must take place under cover with a large enough area (min. surface 100 sq. metres) to handle the technical verifications in two lines.
- Weighing apparatus must be accurate and practical. Certified master weights and their certificate must be available for verifying.

Rules regarding noise level and measurement must be respected.

2.13.1 Preparations, procedures

~~At each circuit~~, an area must be designated as the Technical control Area. In this area, under the control of the Chief Technical Steward, suitable equipment will be available to conduct proper inspections.

The Technical control will be carried out in accordance with the schedule set out in the Supplementary Regulations.

Technical Stewards must be available throughout the entire event to check motorcycles and equipment as required by the Chief Technical Steward.

Presentation of a machine will be deemed as an implicit statement of conformity with the technical regulations.

The Technical Stewards must inspect the motorcycles for obvious safety omissions.

The Technical Stewards must inspect that the motorcycle conforms to all technical rules laid out in the Regulations.

1) All classes

When required, all machines will be required for weight and/or noise check at the pre-race technical inspection.

The scales and noise meter will be available to the teams or riders for pre-race checking in the technical Technical control area.

Noise test should take place in a clear area adjacent to the Technical control at least 5 metres from any possible noise reflecting obstruction.

The riders and teams must be aware that the weight and noise may be controlled at random during practice in the pit-lane and at the end of the race.

Claiming that the noise and weight were not officially controlled before the race will not be grounds for appeal. Conformity of the rules is the responsibility of the rider and the team (or the participants).

The Chief Technical Steward reserves the right to spot check the weight and noise of any machines on pit row during free practice and official practice. This can occur at any time during the free practice and in the first forty minutes of any official (timed) practice. This will be carried out with the least possible inconvenience to the rider or the team.

Machines arriving later than the first free practice must be controlled in the technical Technical control area.

At the conclusion of the inspections, a small sticker or coloured mark will be placed on the frame indicating that the machine had passed inspection

The Technical Stewards must re-inspect any machine that has been involved in an accident.

The Technical Stewards must be available, based on instructions from the Chief Technical Steward, to re-inspect any motorcycle for technical compliance during the meeting.

During the technical inspection in the closed park the mechanics must assist with the inspections. A maximum of two (2) team members per rider is allowed in the closed park during the post-race technical inspection. Downloading of data is allowed in the closed park.

Representatives of the tyre manufacturers are allowed in the closed park.

2) Practice

Every machine used may be checked.

The minimum checks are regarding **safety aspects of the vehicle**. The Chief Technical Steward may request other checks.

The Chief Technical Steward may perform **checks at all times**.

3) Final inspection at the end of the record attempts

In accordance with the instructions of the Jury President and/or the Chief Technical Steward.

4) Appointment and attendance

The Technical Stewards must be present and available during the opening hours of the Technical control area. The Chief Technical Steward will instruct the Technical Stewards to verify motorcycles for compliance with technical and safety rules.

5) Administration day / Initial Technical control:

For all riders/teams min. 4 people

Tasks: Inspection of machine safety, clothing and helmets
(NO NOISE OR WEIGHT CONTROL (except where otherwise stated, i.e. for electric powered vehicles))

Administration tasks: 1 person

6) Technical control during record attempt days

Before the attempts: safety checks on start grid: as required

Between the attempts: as required

After the record attempt: 4 people

Displacement checks 2 people

Administration 1 person

NOTE: This is the required minimum of Technical Stewards. The number may of course be higher.

All final verification points to be decided in co-operation with the International Jury President and the Chief Technical Steward. Post-race checks are under extreme pressure. It is important to be very well organised.

Chief Technical Steward must present a report to the Jury after the technical verifications.

7) Minimum Equipment list

- Revolution meter
- Sound meter and calibrator
- Slide caliper
- Depth gauge
- Steel measuring tape
- Seals
- Weighing apparatus (scales) with calibration weights
- Tools for measuring engine capacity
- Tools for measuring valve lift
- Weighing apparatus for investigation of valve weights
- Colour for marking parts
- Magnet for materials testing
- Computer to read homologation CD-Rom

Documents list

- Regulations of the CURRENT YEAR
- Supplementary Regulations
- Homologation documents
- CD-Rom with homologations
- Technical control forms
- Writing materials

OFFICIAL FIM SPECIFICATION DECLARATION FOR ROAD RACING

All sections must be completed by the Technical Steward in the presence of the rider or rider's representative (See also Art. 01.77)

Particulars of the Meeting :

Title of the meeting :	IMN N° :
Place :	Date of the meeting :

Particulars of the Rider :

Rider's Name :	Rider's first name :
Nationality :	Date of birth :
Rider's Licence N° :	Medical examination :

Section I	1st Machine	2nd Machine
(1 FMN Senior Technical Steward + 1 Assistant)		
Administration		
Equipment and protective clothing		
Helmet (Standard + No.)		
Machine (Make + Type)		
Bore and Stroke		
Frame No.		
Section II		
(1 FMN Senior Technical Steward + 1 Assistant)		
Noise dB/A		
Ignition cut-out alternator		
Section III		
(1 FMN Senior Technical Steward + 1 Assistant)		
Fire retardant material (56.01.4)		
Weight		
Fuel tank with fix points		
Oil catch tank		
Breather system (4-stroke)		
Section IV		
(1 FMN Senior Technical Steward + 1 Assistant)		
Brakes/Tyres		
Bearing (Wheels, steering unit)		
Number + Plates		
Fairing		
Fuel tank		
Throttle control		
Oil drain/Filler plugs, etc. wired		
Ground clearance (Sidecar)		

OFFICIAL FIM SPECIFICATION DECLARATION

Comments : _____

Name of Technical Steward: _____

International Official's Licence N: _____

Acceptance of a machine for competition does not preclude the possibility of further post-race control to ensure compliance with the competition Technical rules.

Acceptance stamp of
Technical Steward

I hereby declare that the
information given above is
accurate in every respect

Signature : _____ Rider's signature : _____

2.14 SOUND CONTROL (when applicable)

Noise limits will be enforced when required by the Supplementary Rules (and depending on location of the attempts) as follows:

Noise will be controlled to: Max. 105 dB/A measured at a mean piston speed of 11 m/sec. The fixed RPM specified in Art. 2.12.6 may be used.

2.14.1 With the microphone placed at 50 cm from the exhaust pipe at an angle of 45° measured from the centre-line of the exhaust end and at the height of the exhaust pipe, but at least 20 cm above the ground. If this is not possible, the measurement can be taken at 45° upwards.

2.14.2 During a noise test, machines not equipped with a gear box neutral must be placed on a stand.

2.14.3 The silencers will be marked when they are checked and it is not allowed to change them after the verification, except for any spare silencer which has also been checked and marked.

2.14.4 The rider shall keep his engine running out of gear and shall increase the engine speed until it reaches the specified Revolutions Per Minute (RPM). Measurements must be taken when the specified RPM is reached.

2.14.5 The RPM depends upon the mean piston speed corresponding to the stroke of the engine.

The RPM will be given by the relationship:

$$N = \frac{30,000 \times cm}{l}$$

in which N = prescribed RPM of engine
 cm = fixed mean piston speed in m/s
 l = stroke in mm

2.14.6 Noise control

Due to the similarity of the piston stroke in different engine configurations within the capacity classes, the noise test will be conducted at a fixed RPM. For reference only, the mean piston speed at which the noise test is conducted, is calculated at 13 m/sec (2-stroke engines) and 11 m/sec (4-stroke-engines).

	1 cylinder	2 cylinders	3 cylinders	4 cylinders
125 cc (2-stroke)	7,000 RPM			
250 cc (2-stroke)		7,000 RPM		
500 cc (2-stroke)		5,500 RPM	7,000 RPM	7,000 RPM

2.14.6.2 For Wankel engines, the noise level will be measured at 6 000 RPM.

2.14.7 The noise level for engines with more than one cylinder will be measured on each exhaust end.

2.14.8 A machine which does not comply with the noise limits may be presented several times at pre-race control.

2.14.9 The surrounding noise should not exceed 90 dB/A within a 5 metres radius from the power source during tests.

2.14.10 Apparatus for noise control must be to international standard IEC 651, Type 1 or Type 2.

The sound level meter must be equipped with a calibrator for control and adjustment of the meter during periods of use.

2.14.11 Noise control during a competition

In a competition which requires noise control tests during the event, machines must comply with the noise limits without the tolerance in Art. 2.14.

2.14.12 Noise control after the competition

In a competition which requires a final examination of machines before the results are announced, this examination must include a noise control measurement of at least the first three machines listed in the final classification of each class and/or category. At this final test, there will be a 3 dB/A tolerance permitted.

2.15 GUIDELINES FOR USE OF SOUND LEVEL METERS

2.15.1 The Noise Control Officer (NCO) must arrive in sufficient time for discussions with the Technical Delegate and other Technical Stewards in order that a suitable test site and testing policy can be agreed.

2.15.2 Sound level measuring equipment must include a compatible calibrator, which must be used immediately before testing begins and always just prior to a re-test if a disciplinary sanction may be imposed.

Two sets of equipment must be available in case of failure of tachometer, sound level meter or calibrator during technical control.

2.15.3 Before testing, the NCO should if possible liaise with a maximum of two holders of FIM Sponsor's or Manufacturer's licences, or team managers, who have noise test equipment including calibrators, in order to agree the accuracy of the official sound level meter.

2.15.4 Tests should not take place in rain or excessively damp conditions. Machines considered excessively noisy must be individually tested if conditions allow.

2.15.5 In other than moderate wind, machines should face forward in the wind direction. (Mechanical noise will blow forward, away from microphone).

2.15.6 'Slow' meter response must be used.

2.15.7 'A' weighted setting on sound level meter.

2.15.8 Always round down meter reading, that is: 104.9 dB/A = 105 dB/A.

2.15.9 Correction

Type 1 meter : deduct 1 dB/A
Type 2 meter : deduct 2 dB/A

2.15.10 Ambient temperature

Below 10° Celsius: No deductions
Below 0° Celsius : No deductions

Action and decisions will be taken after discussions with Chief Technical Steward.

02.81 ADDITIONAL SPECIFICATIONS FOR SPECIAL VEHICLES USED FOR WORLD RECORDS (SHORT DISTANCE)

81.01 General

No part of a motorcycle (with the exception of extreme aerodynamic vehicles, also known as 'Streamliners') may extend beyond the wheels. No airfoils, spoilers or movable external control surfaces are allowed.

The seat shall not be placed directly above the rear wheel.

Only rear wheel drive is permitted.

**81.02 Number plates
(For 'non-streamlined' and 'partially streamlined' motorcycles)**

Each vehicle shall have two, fully visible white number plates which shall not be obscured by the rider in position. Each number plate shall be placed on either side of the machine.

The minimum sizes for number plates are: 150 mm (7") in height x 200 mm (8") in width.

Number plates may be painted on the streamlining. For light coloured bodywork, there shall be a black line of 6 mm (1/4") minimum width all around the perimeter of the white background.

Number plates which are not part of the streamlining shall be made of flexible materials only (i.e. ABS plastics, etc.). All other materials are prohibited.

All corners and edges shall be rounded (with a radius) and without any sharp edges.

81.03 Fuel

Fuel shall be liquid at ambient pressure and temperature and shall be used as such.

81.04 Fuel supply and shut-off valve

The vehicles shall have an efficient fuel shut-off which the rider can activate when he/she is in position.

All pressurised fuel lines, including non-valved fuel lines shall be reinforced by braided steel.

Nitrous oxide applications shall have a protected shut-off valve system in case of accident.

81.05 Air induction

Air induction created solely by depression and/or with the aid of pressure created by passive external systems (i.e. 'ram' air) is considered as naturally aspirated.

Air induction enhanced by active devices such as supercharging or turbo-charging is considered as forced induction.

81.06 Supercharging

Superchargers and turbochargers shall be separated from the rider, either by a cover of steel plate at least 3 mm thick or a ballistic blanket that meets SEMA specifications 14-1, or by a vehicle or engine structure that provides equivalent protection.

81.07 Engine cut-off

Two shut-off switches are required to stop the engine/motor power (including any nitrous oxide systems).

The rider shall be able to operate one cut-off switch with his hands placed on the handlebars.

The other cut-off switch shall be located on the outside of the cockpit.

81.08 Hand and Foot controls

Throttles shall be self-closing.

Foot operated throttles shall have a toe clip.

Hand controls (clutch and brake levers) shall have a ball end with a minimum diameter of 12.5 mm (1/2"). Flattened ball lever ends are acceptable if all edges are rounded. All control ends shall be an integral part of the lever.

Foot operated controls shall pivot independently.

When riders are in their riding position, a minimum distance of 250 mm (10") between thumbs shall be respected.

All handlebars shall extend outside each fork tube by minimum of 150 mm (6"). (This rule is not applicable to 'Streamliners'.)

Steering stops shall limit the rider's hands from touching the fairing or tank at full right and left travel.

Riders may be asked to demonstrate their ability to operate the vehicle with their controls set up.

81.09 Steering Dampers

A hydraulic steering damper is required in classes that have a record speed of 200 km/h (125 mph) or more. The hydraulic damper may not act as a fork stop.

81.10 Foot rests

Only one pair of functional footrests is allowed. All footrests shall be able to fold.

Footrests shall be positioned in front of the rear axle.

81.11 Brakes

At least one (1) efficient brake is required and shall be operated by hand or foot.

81.12 Transmission / chain covers

All transmission drives shall be protected with a guard which covers, at least, the outer perimeter from the top half of the first sprocket to the rearmost portion of the final sprocket.

81.13 Lights (front and rear)

Headlamps, if not removed, shall be at least taped in a crisscross pattern to hold potential broken glass.

81.14 Mirrors

'Stand alone' type rear view mirrors shall be removed.

Mirrors, when not removed and incorporated into a fairing (bodywork), shall be taped.

81.15 Safety and locking devices

Engine and transmission oil lines, when containing positive pressure shall have swaged connectors. All fluid drain plugs shall be 'safety' wired.

Axle fasteners shall have a secondary functional anti-rotation or locking device. Washers may not be used for this purpose.

81.16 Tyres

The minimum tread depth for tyres with ratings of under 320 km/h (200 mph) is 2.5 mm.

Tyres that exhibit cords shall be prohibited.

All vehicle tyres (tubeless included) are required to have metal valve caps and metal valve stems.

Angled valve stems may be safety wired to resist centrifugal force deflection.

Participants using under-rated tyres may be excluded from competition.

The rider has the sole responsibility of inspecting the condition of the tyres before and after each run.

81.17 'NON STREAMLINED' Vehicles (Open Class)

Any type of aerodynamic aid or streamlining device is prohibited in this class.

A front fender is compulsory and shall be restricted to the following size:

- The front fender may only cover the contour of the tyre until the rim, over a maximum section of 135° of the wheel, when looked upon from the side.
- The forward tip of the front fender shall not exceed forwards of an imaginary line drawn through the centre of the front wheel axle at an angle of 45°.
- The front fender and its section going to the fixing point(s), shall cover the forklegs partially (max 50%), and in a parallel line.

Any aerodynamic aid at the rear of the motorcycle (including the riders' seat section), shall not exceed past the most rearward edge of the rear tyre, shall not be higher than 100mm above the lowest section of the seatbase, nor extend below the seat base by more than 25mm.

Objects are considered 'streamlined' if they control the airflow around the motorcycle and/or rider or are placed to reduce aerodynamic drag.

81.18 'PARTIALLY STREAMLINED' Vehicles

Aerodynamic aids or streamlining devices are allowed with the following restrictions:

A front fender is compulsory but shall be restricted with the following requirements: viewed from either side, at least 180° of the lower part of the front tyre and wheel shall remain visible.

A continuous section (min 135°) of the lower half of the rear wheel shall always remain visible.

Any aerodynamic aid on any section behind the rider and his seat shall only exceed the rear edge of the tyre up to a distance equal to half of the rear wheel rim diameter.

The rider, when in racing position, shall be completely visible from either side of the motorcycle and from above, without having to look through any material. Hands may be hidden when viewed from above.

Front and rear streamlining shall each have a minimum of three (3) mounting points.

81.19 STREAMLINED (Special Construction Vehicles, or 'Streamliners')

In order for a vehicle to be defined as a 'Streamliner':

The rider shall be inside an enclosed compartment. A firewall shall separate the rider from the engine compartment. A substantial roll bar or equivalent structure shall be securely fitted to a part of the frame.

Full streamlining, including those which extend beyond the wheels, is allowed. With the following exceptions:

No movable external control surfaces are allowed. No airfoils or spoilers are allowed if not integrated in the basic streamlined form. Only one (1) single rear fixed vertical fin is allowed

The vehicle, unloaded, must be capable of being leaned at an angle of 20° degrees (minimum) from the vertical position without touching the ground, other than the tyres.

81.19.01 Numbers and background

Each vehicle shall have numbers and letters. Numbers and letters shall be of one solid colour and in contrast with the background area colour.

Minimum size of the background area: 250 mm x 300 mm (10" x 12")

Minimum size for the numbers: 200 mm x 30 mm (8" x 1-1/4")

81.19.02 Frame construction

The constructor of a frame made of other than high grade steel shall submit frame structure information that documents the durability of the structure.

Constructors may be asked to provide test certificates on components and on stress examination as required.

81.19.03 Canopy / Windshield

The canopy windshield shall be constructed of shatterproof plastic and provide a minimum of 120° of forward horizontal vision when the rider is in place.

The canopy assembly shall be removable from the inside or the outside without the use of any tools.

The outside of the Streamliner shall have clear markings with specific instructions for canopy removal.

The rider shall be able to exit the cockpit of the Streamliner, be it up-right or on its side, without any outside assistance.

81.19.04 External operation and emergency controls

All exterior access, operation points and all controls required for 'Main Ignition Shut-off' and for 'Canopy Release', shall be marked and clearly visible on the exterior of the Streamliner body.

81.19.05 Batteries

Two emergency battery cut-out switches are mandatory; one inside within reach of the rider and one outside the Streamliner.

All batteries shall be securely mounted. Batteries mounted in the rider's compartment shall be on the inside of an acid spill-proof and sealed box.

'Tie'-down straps or elastic cords shall not be used to hold batteries in place.

81.19.06 Roll bars

A Streamliner shall have a minimum of one (1) roll bar. **Streamliners entered and raced as from 2011**, will have a minimum of two (2) roll bars: one in front of the rider's head and one behind the rider's head.

Roll bars should have a minimum outside diameter of 31.5 mm (1 1/4"), a wall thickness of at least 2.2 mm (.090") and a steel cap of at least of 2.2 mm (.090") thick.

The roll bar shall surround a minimum of 140° of the upper part of the rider's head. The roll bar shall be braced on each side of the main frame.

Whilst wearing a helmet, there shall not be more than 5 cm (2") head movement within the roll bar. Fireproof padding may be added.

Any other roll cage design shall be tested for strength and have had a finite element study to prove this.

81.19.07 Rider's compartment / Cockpit

The roll cage and all interior panels shall prevent the rider's arms and/or legs from extending outside the rider's compartment. All mounting tabs, brackets and protrusions shall be free of sharp edges.

The rider's compartment shall have an outside air source.

All riders (with complete attire) shall demonstrate the ability to exit the compartment within **30 seconds** without assistance.

81.19.08 Fuel shut-off

Streamliners shall have a positive fuel shut-off safety valve which can be activated from the rider's compartment.

81.19.09 Engine compartments

Engine and fuel compartments shall be sealed off from the rider with at least one firewall.

Engine and fuel compartments shall have at least one 25 mm (1") opening for drainage.

Wiring, steering linkage and controls shall be sealed through firewalls to avoid leakage into the rider's compartment.

81.19.10 Fuel containment

Fuel and oil tanks are not permitted inside the rider's compartment.

Fuel lines shall not run through the rider's compartment.

Fuel compartments shall have at least one 25 mm (1") opening for drainage.

81.19.11 Steering Mechanism

All parts of the steering mechanism, including links, rods and cables shall be able to move freely throughout the Streamliner body, including the firewall, without excessive play.

The steering assembly shall be directly and securely mounted to the frame.

All steering components shall use bolts of grade '5' quality minimum.

Welding on steering components shall be scrutinized and may be subject to x-ray certification.

The handlebar/steering assembly in the cockpit shall be mounted in such a way as to allow the rider to evacuate rapidly in an emergency situation.

Quick disconnects for handlebars are permitted.

81.19.12 Wheel protection

A bulkhead shall separate the rider from the front wheel.

The front wheel shall be shielded to protect the rider in case of a tyre failure.

Each tyre compartment shall be sealed to prevent any dust, salt, etc., from entering the driver's compartment.

81.19.13 Skids and other supports

Motorcycle Streamliners which use skids shall have a positive 'up' and 'down'-locking feature. These positions shall be made visible to the rider when seated in the cockpit.

Skids shall have a turned up front edge to prevent digging into the track surface and shall be raised to the up position as soon the Streamliner is rolling and has found stability.

81.19.14 Fire extinguishers

Fire extinguisher(s) shall be able to extinguish a fire in both rider and engine compartments.

The minimum capacity for fire extinguishers required onboard Streamliners shall be:

- for speeds up to 250 km/h (150 mph): 2 kg / 5lbs.
- for speeds exceeding 250 km/h (150 mph): 5 kg / 10lbs.

A manual fire extinguisher control system is mandatory and shall be within reach of the rider. Once engaged, it shall stay activated and be capable of extinguishing a fire.

The fire extinguishing control system shall also be able to be activated from the exterior of the Streamliner.

Automatic systems with a heat-sensing switch shall also have a manual control to override the fire extinguishing system.

Extinguishing agents shall be approved and certified for use in confined spaces.

All nozzles, lines, and valves shall be securely mounted. Hose clamps may not be used to fix these parts.

The installation of extinguishers shall be made according to the manufacturer's specifications. All fire extinguishing equipment certifications/inspection tags shall not be older than twelve months.

81.19.15 Parachutes

All Streamliners are required to have one functional parachute.

Where speeds over 400 km/h (250 mph) are to be reached, two (2) parachutes are required: one low speed parachute and one high speed parachute.

All parachutes shall be mounted on a part of the frame structure.

Automatic parachute deployment actuators are required for:

- Streamliners with an 'open' tail section: the parachute shall automatically deploy at 45° from upright.
- Streamliners with a closed tail section: the parachute shall automatically deploy at 40° from upright.

The rider shall be able to activate the parachute without his hands leaving the steering mechanism.

Parachute system operations shall be inspected for rider-activated deployment and automatic deployment at left and right angles.

Any failure in parachute operation or handling problems associated with parachute operation will require a re-inspection by the Technical Stewards.

81.19.16 Helmets and clothing

Helmets shall meet current FIM Helmet Standards for Road Racing.

Other helmet test standard is highly recommended for Streamliners: Minimum: SNELL SA 2005 (or later) + SFI 31.1.A (with fire retardant lining, for use in closed driver compartments).

A neck brace is required.

Helmet liners, neck-brace and helmet balaclavas shall be made with fire-retardant materials (i.e. NOMEX®).

The minimum standard for the riders' suits, gloves, and boots is SFI 3-2A/15.

81.19.17 Seat belts and other harness systems

A ~~five~~ **seven** point' seat belt/harness system is required to hold the rider's body. **The seven points consist of two shoulder harness (right and left), two lap belts (right and left), two crotch straps (right and left, sometimes referred to as anti-submarine straps since they keep the torso from sliding under the lap belts), and the center strap (sometimes referred to as a supplemental crotch strap).**

Shoulder and seat belts shall be installed according to the manufacturers' specifications. A label shall show the date of manufacture and the date of inspection (not older than 5 years).

Shoulder and seat belts shall be attached to a part of the main frame structure. The harness mounting points on the frame shall be directly in line with the direction of pull. Bolts cannot be mounted by pushing through the webbing of the harness. ~~Belt and harness mounting hardware shall not be exposed.~~

Belt and harness mounting hardware will be mounted or protected to prevent rider in contact with any sharp edges or protruding components. Any belt attachment components on the outer plane of the chassis structure will be protected from sliding contact with track surfaces. Belts shall not be exposed on the engine side of the sealed firewall separating the cockpit area.

Shoulder harnesses shall not be able to slip off the rider's shoulders when seated in position with all belts fastened and adjusted.

Belt/harness systems with latch release shall have a cover over the latch release which prevents arm restraints from activating the latch assembly inadvertently. **Aluminum hardware as a component of any belt system is not permitted**

Arm restraints are mandatory with anchor points on the harness assembly and secured to the frame.

Leg restraints are compulsory for any Streamliner ~~where it is possible for the rider's legs to be outside the rider's compartment from any position while the Streamliner is rolling.~~ **Net type leg restraints are acceptable as long as the net allows the rider to exit the Streamliner without assistance.**

81.19.18 Test runs

All new Streamliners shall have made a minimum of three successful trial runs to demonstrate stability and control prior to a record attempt.

The mandatory runs shall be at speeds which represent a percentage of the respective class record or of the Streamliners' design speed to be attained:

Run #1 shall not be more than 50% of the intended class-speed record.

Run #2 shall not be more than 70% of the intended class-speed record.

Run #3 shall not be more than 85% of the intended class-speed record.

Any rider exceeding the speed increment may be subjected to disciplinary action.

Each test run will included parachute deployment and a demonstration of the total control by the rider of the Streamliner in operation.

Trial runs shall be closely observed by FMN and/or FIM representatives prior to advancing to the next speed increment.

81.19.19 Rules on assisted starting for Streamliners

In addition to any on-board starting devices, a 'push' type or 'tow'-start method is allowed, if deemed safe by the FIM Steward.

The maximum distance for an assisted start is 400 metres, counting from the starting point. No assisted starts shall take place within 800 meter (1/2 mile) from the first timing mark.

Once the '400' metre marker has been passed by the streamliner, no assistance vehicle is permitted to be on the track during the record attempt.

A flag (min 30 cm x 30 cm / 12"x 12") attached to the middle of the towline, shall be visible to the rider.

81.19.20 Support crew

The Streamliner support crew shall present their pre-run checklist and must present it to the Technical Stewards at the initial vehicle inspection.

2.82 TECHNICAL RULES FOR SOLAR OR ELECTRICAL POWERED VEHICLES

Introduction

The technical concept is for motorcycles with two wheels, having traction on one or both wheels, to be powered without the use of carbon based fuels and having zero toxic/noxious emissions.

Amendments to the technical regulations may be made at any time in order to ensure fairer competitions.

82.01 Groups and classes

82.01.1 Solar electrically powered vehicles

Vehicles propelled by the direct or indirect conversion of solar energy.

82.01.2 Electrically powered vehicles

2-Wheeled motorcycles, electric powered and propelled solely by stored electricity (battery/accumulator).

The number of electric motors and propelled wheels is free.

82.01.3 Charging the accumulator

Energy supply will be provided in the paddock at the times and locations determined by the organiser.

During practices and race riders are allowed to charge accumulator in the pit lane. It is compulsory to declare the process and technology to the FIM Technical Director.

The charging system must be separate from the machine and comply with all electrical safety requirements including thermal overload trip, fusing and be equipped with an earth leakage protection breaker.

82.02. Conformity

It is the duty of each competitor to show the Technical Stewards of the meeting that his/her vehicle fully complies with these rules and the rules governing the meeting, in their entirety at all times.

82.3 COMPONENTS

82.3.1 Number Plates

The background colours and figures (numbers) are green background with white numbers.

The sizes for all the front numbers are:

Minimum height:	160 mm
Minimum width:	80 mm
Minimum stroke:	25 mm

The size for all the side numbers is:

Minimum height:	160 mm
Minimum width:	80 mm
Minimum stroke:	25 mm

The allocated number for the rider must appear at least three times on the machine. The number on the front must be affixed only once in the centre of the fairing. The two side numbers must be located on the left and right side of the seat or the fairing. The numbers must be visible to spectators and officials from both sides of the track.

In case of a dispute concerning the legibility of numbers, the decision of the Technical Director will be final.

82.3.2 Handlebars

Exposed handlebar ends must be plugged with a solid material or rubber covered.

The minimum angle of rotation of the handlebar on each side of the centre line or mid position must be 15° for all solo motorcycles.

Whatever the position of the handlebars, the front wheel, tyre and the mudguard, a minimum clearance of 10 mm must remain with the motorcycle (parts).

Solid stops, (other than steering dampers) must be fitted to ensure a minimum clearance of 30 mm between the handlebar with levers and the body when on full lock to prevent the rider's fingers from becoming trapped.

Handlebar clamps must be very carefully radiused and engineered so as to avoid fracture points in the bar.

The repair by welding of light alloy handlebars is prohibited.

82.3.3 Control levers

All handlebar levers (clutch, brake, etc.) must be ball ended (diameter of this ball to be at least 16 mm). This ball can also be flattened, but in any case the edges must be rounded (minimum thickness of this flattened part 14 mm). These ends must be permanently fixed and form an integral part of the lever.

Each control lever (hand and foot levers) must be mounted on an independent pivot.

The brake lever, if pivoted on the footrest axis, must work under all circumstances, such as when the footrest is bent or deformed.

82.3.4 Power control

A 'self-closing' throttle (power control) must be applied

82.3.5 Foot Rest/Foot Controls

With the exception of vehicles of Group A2 (scooters) foot rests may be rigidly mounted or a folding type which must incorporate a device to return them to the normal position.

The end of the foot rest must have at least an 8mm solid spherical radius.

Non folding footrests must have an end (plug) which is permanently fixed, made of aluminium, plastic, Teflon® or equivalent type of material (min. radius of 8mm). The plug surface must be designed to reach the widest possible area of the footrest. The Technical Director has the right to refuse any plug that does not satisfy this safety aim.

82.3.6 Wheel and rims

- 1) Carbon wheels are forbidden.
- 2) If an OEM or aftermarket wheel is modified by the participant, he must supply the FIM technical director with documentation proving the correct dimensioning of the parts.

82.3.7 Tyres

Tyres are free.

The use of tyre warmers is allowed.

82.3.8 Streamlining

The use of carbon fibre or carbon composite materials is allowed.

Air foils or spoilers may only be fitted on solo machines when they are an integral part of the fairing or seat. They must not exceed the width of the fairing nor be positioned above the height of the handlebar. Sharp edges must be rounded off. No movable aerodynamic devices are permitted.

The maximum width of the bodywork must not exceed 800 mm. The width of the seat or anything to its rear shall not be more than 500 mm.

Any part of the streamlining which faces rearwards must be finished with rounded edges.

The rider must be completely visible from either side except for the rider's hands and forearms which may be obscured by bodywork, the inclination of the number plate must not render the front number plate invisible when viewed from the front.

Bodywork must not extend beyond a line drawn vertically at a distance of 200 mm to the leading edge of the front tyre and a line drawn vertically at a distance of 400 mm to the rearward edge of the rear tyre. The suspension should be fully extended when the measurement is taken.

With both wheels (tyres) on the ground, it must be possible to lean an unloaded motorcycle at an angle of 45° from the vertical position without any other part touching the ground.

2.3.9 Machine Weight

Motorcycle weight is between 100 kg (min.) and up to 300 kg (max.) See also APPENDICES FOR WORLD RECORD - CATEGORIES AND GROUPS.

The machine will be weighed 'ready-to-race'. No weight tolerance will be applied at the technical verification checks after practice and race.

82.3.10 Overall Dimensions

Maximum length of the vehicle: 2700 mm (motorcycles)
Maximum width: 800 mm (2 wheeled vehicles)

82.3.11 Materials

The use of titanium in the construction of the frame, the front forks, the handlebars, the swing arms, the swing arm spindles and the wheel spindles is forbidden. For wheel spindles, the use of light alloys is also forbidden. The use of titanium alloy nuts and bolts is allowed.

1. Titanium test to be performed on the track: Magnetic test (titanium is not magnetic).
2. The 3 % nitric acid test (titanium does not react. If the metal is steel, the drop will leave a black spot).
3. Specific mass of titanium alloys 4,5-5, of steel 7,5-8,7 can be ascertained by weighing the part and measuring its volume in a calibrated glass filled by water (intake valve, rocker, connecting rod, etc.)
4. In case of doubt, the test must take place at a Materials Testing Laboratory.

82.3.12 Chassis Number

A unique number must be embossed visibly on an easily accessible part of the chassis. In addition, a label made from durable material must be affixed in an easily accessible and visible location. The label must permanently display the name of the manufacturer, the model of the vehicle and its chassis number.

82.4 ELECTRIC EQUIPEMENT

82.4.1 IEC Publications

If no specific rule exists in these Technical Rules, the relevant IEC Standard (International Electro-technical Commission Standard) or Report has to be observed:

(Note: IEC Publications may be replaced by ISO publications, in the future.)

- IEC 60529: Degrees of protection provided by enclosures (IP Code).
- IEC 60783: Wiring and connectors for the road vehicles.
This report is applicable to cabling and connectors used in battery electric road vehicles.
- IEC 60784: Instruments for electric road vehicles.

This report is applicable to the instrumentation of electric road vehicles, excluding those items which are used as instrumentation in vehicles with internal combustion engines.

- IEC 60785: Rotating machines for electric road vehicles.
This report is applicable to rotating electrical machines [traction motors and auxiliary motors] of electric road vehicles including hybrids, which are fed from the main traction batteries).
- IEC 60786: Controllers for electric road vehicles.
This report is applicable to the equipment on electric vehicles that control the rate of energy transfer between the traction battery or batteries and the motor or motors).

82.4.2 Accumulator (storage battery)

The accumulator is defined as any equipment used for the intermediate storage of electrical energy supplied by the charging unit. Any on-board accumulator is considered as an integral part of the vehicle's accumulator.

The type, dimensions and weight of accumulator/s cannot be changed between official practices and race.

All on-board electrical equipment, unless consisting of items originally powered by dry batteries, small accumulators or their own solar cells, must receive its energy supply from the vehicle's official accumulators.

IMPORTANT: As a condition of entry, a Material Data Safety Sheet must be supplied with the race entry for the machine, including all relevant details as to the accumulator chemistry, human and environmental hazards, handling and specific fire risks and precautions.

82.4.3 Energy recovery

Recovering energy generated by the kinetic energy of the vehicle is permitted.

82.4.4 Use of outside energy sources

The use of any carbon based source of energy in any form whatsoever with the aim of improving the performance of the vehicle is strictly prohibited. This includes the energy used to drive the vehicle's cooling system.

82.4.5 Propulsion system failure

The vehicle must be able to freewheel in the event that the propulsion system has stopped (i.e. Fuel/Charge exhausted or system failure).

82.4.6 Electrical safety

In no part of the vehicle's electrical equipment may there be voltages of more than 500 volt referred to chassis and system ground respectively (system ground is the

ground of the electrical equipment). Between system ground and chassis or body of the vehicle no more than 50 volts are allowed.

The voltage is limited to 500 volt between any two points. In cases where the voltage of the power circuit exceeds 42 volt, this power circuit must be separated from the onboard circuit by an appropriate insulator.

Symbols warning of 'High Voltage' must be displayed on or near the electrical equipment protective covers; all symbols must comprise a black flash of lighting inside a yellow triangle with a black border. The sides of the triangle must measure at least 12 cm, but may be larger if practical.

The power circuit consists of all those parts of the electrical equipment which are used to propel the motorcycle. The on-board circuit consists of all those parts of the electrical equipment which are used for signalling, lighting or communication.

All parts of the electrical equipment must be protected to at least the equivalent of IP 44 type protection (dust proof and splash proof).

82.4.7 General circuit breaker – 'Emergency Stop'

Two emergency stop switches (circuit breakers) are required as a stop has to be easily accessible both to the rider and to marshals.

When seated in a normal riding position, the rider must be capable of interrupting all electrical transmission between the accumulators and the energy consumers by means of a spark-proof general circuit breaker situated in front of him. This breaker must be located in such a way that it can be also operated from outside the vehicle. This breaker must be clearly identified as such. The use of a lanyard attached to the rider to operate this breaker as an alternative to a button is permitted.

The general circuit must also include a second general circuit breaker which shall be located behind the rider, positioned and easily recognised taking into account that the vehicle may be on one side following an incident. This circuit breaker must be operated by a red button and identified with a yellow disc (minimum 8 cm in diameter) reading 'Emergency' in red or black letters.

The options suggested below are acceptable, as are other solutions that meet the stated requirements. Teams will be required to demonstrate the operation of the Emergency Stops during technical inspection.

1. A low voltage switch (e.g. push button) as a control for a contactor relay in which the contactor can be mounted down near the motor and keep the power voltages and currents away from the rider and top side of the vehicle.
2. A relay with an integrated "breaker" switch, which requires running the full battery voltage to wherever this breaker is mounted.

Operation of the general circuit breaker must also isolate any pre-charge resistors, if installed.

In order to prevent contact melting of the general circuit breaker its ampere square seconds characteristics, representing heat energy dissipated on the breaker contacts during switching, must be sufficient to guarantee proper operation of the circuit breaker, even under surge current conditions, in particular those occurring during the connection of the accumulator to the power plug.

Low power accumulators provided for low voltage circuits, e.g. auxiliary circuits, do not have to be isolated by the general circuit breaker – Emergency Stop provided that they are completely isolated from the main power accumulators.

82.4.8 Power Indicator

When the vehicle is in a powered on state, there must be two clearly visible indicators, one light on the instrument panel and one light on the rear of the vehicle.

The rear light must be red and visible from at least 10m away, from the side or rear, and must flash between 1 – 2 times / second on a 50% duty cycle.

82.4.9 Fuses (over-current trip switches)

An over-current trip is a device which automatically interrupts the electrical current in which it is installed if the level of this current exceeds a defined limit value for a specific period of time.

Fuses and circuit breakers (but never the motor circuit breaker) count as over current trips. Extra fast electronic circuit fuses and fast fuses are appropriate. The fuses must be in an easily accessible location and as close as possible to the accumulator at both polarities.

All electrical cables inside the motorcycle must be protected by means of over currents trips rated according to the diameter of the individual conductors. Over-current trips must under no circumstances replace the general circuit breaker (Emergency Stop Button).

82.4.10 General electric safety

It must be ensured that the components used cannot cause injury under any circumstances, either during normal operation or in foreseeable cases of malfunction. It must be ensured that the components used for protecting persons or objects can reliably fulfil their function for an appropriate length of time.

82.4.11 Insulation resistance

Every part of the electrical equipment must have a minimum insulation resistance between all live components and earth.

For equipment with up to 300 volt to earth, the insulation resistance must reach the following value: 250 k Ohms.

For equipment with more than 300 volt to earth, the insulation resistance must reach the following value: 500 k Ohms.

The measurement of the insulation resistance must be carried out using a dc Voltage of at least 100 volts.

82.4.12 Dielectric strength

All electrical equipment of the vehicle conducting electric must fulfil the following conditions:

With regard to the dielectric strength, a distinction must be made between materials with light, normal or reinforced insulation.

Normal insulation is insulation which can withstand a test voltage of at least 2000 volt at 50 hertz for a period of one minute. It must only be used for electrical circuits with a nominal voltage not exceeding 500 volt.

Light insulation must not be used (except for the on-board circuit).

All electric live parts must be protected against accidental contact. Insulating material not having sufficient mechanical resistance, i.e. paint coating, enamel, oxides, fibre coatings (soaked or not) or insulating tapes are not accepted.

All electric conducting non live parts must be connected with the motorcycle ground.

82.4.13 Capacitors

Voltage across capacitors belonging to the power circuit should fall below 65 volts within 5 seconds after the general circuit breaker is opened or the over current trips of the accumulator are blown.

82.4.14 Accumulator fastening

The accumulator must be installed securely inside the vehicle and be protected against short-circuits and leakage. The accumulator must be attached to the frame or chassis using metal clamps with an insulating covering.

The fixing method must be designed in such a way that neither the accumulator nor the fastening device itself nor its anchorage points can come loose, even when subjected to a crash. A solid partitioning bulkhead must separate the location of accumulator from the rider. Each accumulator box must include an air intake with its exit.

The accumulator installation must ensure that in the event of accumulator cell leakage or explosion, the contents are kept away from the rider and do not interfere in any way with the rider's vision or the safe handling of the machine.

2.85 TECHNICAL RULES FOR SCOOTERS AND AUTOMATIC 50 CC

85.01 General specifications

All vehicles must belong to Category I, Group A2 and Group A3, as specified in this Appendix and must comply with the following requirements.

~~A minimum quantity of 1000 units per year must be produced by the manufacturers and homologated for road use and conform to the Vienna Convention of 1968.~~

In case of conflict, the following specifications have priority.

85.02 Classes

- 50 cc Scooter
- Moped (50 cc)

~~85.03 Weight~~

- ~~• 50 cc Scooter: 65 kg~~
- ~~• Moped: 55 kg~~

~~85.04 Materials~~

~~It is forbidden to use the following materials: composite fibres, magnesium and titanium.~~

~~85.05 Engine~~

~~The original crankcase/swing arm unit may be modified, but from parts normally available from commercial or retail sources. (They shall appear on a manufacturer's range catalogue or an equipment retailer's catalogue, specialised in parts for competition).~~

~~Devices aimed at automatically modifying distribution diagrams of the engine are forbidden (fixed port and/or valve, inlet and exhaust timing only, if not installed on the originally homologated model, with the exception of the CDI).~~

~~85.06 Carburettor~~

~~The section of the carburettor (venturi) must be:~~

- ~~• 50 cc Scooter: Maximum \varnothing 19 mm~~
- ~~• Moped: Maximum \varnothing 19 mm~~

~~85.07 Cooling system~~

- ~~• 50 cc Scooter: Same system as original~~
- ~~• Moped: Free~~

~~85.08 Exhaust Pipe~~

~~See Arts. 2.3.6. Devices aimed at automatically modifying exhaust pipe volumes are forbidden.~~

85.09 Transmission

85.09.1 Transmissions must, in principle, be automatic. However, it is permitted to incorporate a manually operated transmission ratio locking device, except for scooters.

85.09.2 Manual clutch forbidden.

85.09.3 Exposed rotating parts of engine or transmission must be fitted with guards in such a manner that under no circumstances can the rider come into accidental contact. The original clutch basket must be reinforced with a steel ring.

85.10 Main frame

~~For Moped: Main frame and frame parts normally available from commercial or retail sources. They shall appear on the Moped manufacturer's range catalogue or adaptable spare parts lists available to the general public.~~

For Scooters: The original frame may be modified. ~~reinforced~~, The engine/swing-arm mounting can be reinforced, and the rubber absorption blocks may be substituted by bearings.

85.11 Handlebar

The width of the handlebar shall be: **minimum** 400 mm and 650 mm maximum.

85.12 Mudguards

Front mudguards are **recommended** ~~if mounted on the originally homologated model.~~

~~85.12.1 Scooter supplementary~~

~~No other fairings or aerodynamic devices may be used, apart from the original streamlining or fairing.~~

85.13 Fairing/Body work

For scooters only, **fairings may be added, but must turn with the handlebars.**

85.14 Footrests

For safety reasons, pedals must be removed for competition racing.

Footrests (except for Scooters) must be of the folding type or made from easily breakable material (plastic, etc.)

For scooters, the rider will drive with his feet on the platform for footrests (Art. 2.2 RRTR: category I - group A3).

85.15 Tyres

Only tyres normally available from commercial or retail sources as equipment for road use are permitted. ~~They shall appear on the tyre manufacturer's range catalogue or tyre specification lists available to the general public.~~

For mopeds, the total width of the tyre, mounted, shall not be more than 3.00" or 80 mm.

For scooters, tyres must be as original and the maximum rim diameter must not exceed 400 mm. Tyre dimensions are free, but compatible with the ETRTO.

85.16 Ignition cut-out

An ignition cut-out must be fitted to operate when the rider leaves the machine. This ignition cut-out system must interrupt the primary circuit and must be wired for both the supply and return of the current. It must be placed as near to the centre of the handlebar as possible and must be operated by a non-elastic string of adequate length and thickness and strapped to the rider's right-hand wrist. A spiral cable (similar to that of a telephone wire) of maximum 1 m extended length is permitted. The handlebars and the forks cannot be used as part of the electrical circuit: compulsory for mopeds, recommended for scooters.

85.17 Noise

If required to be checked, the maximum noise level is 95 dB/A, measured at 5,000 RPM. During the noise control, the moped must be placed on a stand. The rider shall keep his engine running and shall increase the engine speed until it reaches the RPM level indicated above.

85.18 Fuel and Oil Tank

Must be safely **secured and all drainplugs wired.**
