



FÉDÉRATION INTERNATIONALE
DE MOTOCYCLISME

TECHNICAL RULES
TRIAL

2016

*RÈGLEMENTS TECHNIQUES
TRIAL*

Technical Rules Trial
(Including rules for Sidecars)

2016

Règlements Techniques Trial
(Règlements pour Sidecars inclus)

TECHNICAL RULES FOR TRIAL (CTR)

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01.01 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. Furthermore, in order to traverse certain surfaces one or all of the wheels can be replaced with skis, rollers or chains.

01.03 FREEDOM OF CONSTRUCTION

A motorcycle must conform to the requirements of the FIM regulations, to the Supplementary Regulations, as well as to a number of specific conditions that the FIM may require for certain competitions. No 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.

01.05 CATEGORIES AND GROUPS OF MOTORCYCLES

Motorcycles are divided into categories and groups which must be observed for all meetings.

In principle, it is forbidden for different categories, groups and classes to compete together, unless the Supplementary Regulations state otherwise.

Category I

Motorcycles propelled by the action of only one driving wheel in contact with the ground in only one direction.

Group A1 - Solo Motorcycles

Two-wheel vehicles making only one track on the ground.

Group B1

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-lines 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.

Category II

- Group C - Special 2 wheel driven motorcycles
- Group D - Special 3 wheel, 2 wheel driven motorcycles

Category III

- Group J - Electric Vehicles (see Article 01.50)

01.07 CLASSES

Groups are again separated into classes according to cylinder capacities as detailed below. Generally, these classes must be observed for all meetings.

Category I

Group A1 Motorcycles

Class	over (cc)	up to (cc)
50	-	50
125	50	125
OPEN	125	300 cc (2 stroke) 350 cc (4 stroke)

Groups B1, B2 Sidecars

Same as groups A 1 and A 2 over 125 cc.

Category II

- Group D - Special 3 wheel motorcycles
- Group E - Snowmobiles
- Group G - Quad Racers
Four wheel balloon-tired off-road vehicles having a wheel at each diagonal extremity, consisting of a complete integral unit having accommodation for a rider only sitting astride, and steered by a handlebar.
Same classes as Category I, Group A1.

Category III

- Group J - Electric Vehicles (see Art. 01.82 in the Road Racing Technical Rules).

01.11 MEASUREMENT OF CAPACITY

11.11 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 should be taken with the engine cold, to 1/100 mm limits.

11.13 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.

Classified as a 4-stroke.

11.15 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.

This engine is classified as a 4-stroke.

01.17 SUPERCHARGING

Supercharging by means of a device of any kind is forbidden in all meetings.

An engine whether 2-stroke or 4-stroke coming within any one of the recognised classes (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 injecting the fuel), does not exceed the maximum capacity of the class in question.

01.18 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 shall not disrupt any official time keeping methods and equipment.

01.19 MOTORCYCLE WEIGHTS

19.01

The minimum weights of the Trial motorcycles, for **X-Trial** and Outdoor events are:

- For 125cc cylinder machines: **67 kg**
- For higher than 125cc cylinder machines: **70 kg**

The **minimum** weight of the verified motorcycle **must** not be less than the minimum weight required. **The minimum weight may be checked at any time during the event. A rider may be asked to submit his/her machine for a weight control during the event (in between the zones), or upon leaving the last zone.**

These weight checks will be performed in the shortest amount of time possible.

A 1 % tolerance in the weight of the machine is accepted when checked **during or after the event.**

19.03

Seals (preference goes to plastic seals) must be fixed to the front of the main frame (and with preference on the same side of the frame on all the motorcycles).

19.04

Weighing scales must be certified annually by a National Institute, **or within the last year of the date of the event.**

19.05

For Groups B1 and B2 at all competitions a passenger must be carried.

01.21 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

01.23 DEFINITION OF A PROTOTYPE

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

01.25 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 Sporting 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 FIM Appendix or in the Supplementary Regulations for the competition in question.

25.01 Use of titanium

The use of titanium in the construction of the frame, the front forks, the handlebars, and the swinging arms, is forbidden.

The use of titanium alloy nuts and bolts and wheel spindles is allowed.

Riders must ensure that when non-ferrous fasteners or spindles are used as replacements, their dimensions are increased as required.

Titanium tests to be performed at trackside:

25.01.1 Magnetic test (titanium is not magnetic).

25.01.2 3 % nitric acid test (Titanium does not react. If metal is steel, the drop will leave a black spot).

25.01.3 The specific mass of titanium alloys (4.5 - 5) and of steel (7.5 - 8.7) can be ascertained by weighing the part and measuring its volume in a calibrated glass vessel filled with water (intake valve, rocker, connecting rod, etc.)

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

25.02 Aluminium

Aluminium alloys can be ascertained visually.

25.03 Carbon fiber

The use of carbon fiber in Trial machines is authorised (with the exception of **handlebars and wheel rims** made from carbon-carbon, carbon-kevlar and/or other composite materials).

25.04 Ceramic materials

The use of ceramic parts is forbidden. The use of ceramic coated parts is authorized.

25.05 Other equipment

The use of data recording devices and automatic electronic ignition is authorised. No signal of any kind may pass between a moving motorcycle and anyone connected with the motorcycle's entrant or rider, except for the signal from the time keeping transponder or from the approved on-board cameras (**with prior written approval from the Championship Promoter/Organiser**).

25.06 Number of cylinders

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

25.07

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.

01.26 DEFINITION OF A 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.

01.27 STARTING DEVICES

Starting devices are compulsory.

01.28 FUEL TANKS

The fuel tank must be marked throughout the event. Unmarked fuel tanks will be reported to the Jury President.

Fuel tanks shall only be filled in the paddock area.

01.29 OPEN TRANSMISSION GUARDS

A guard must be fitted to the countershaft sprocket.

29.04

A chain guard must be fitted in such a way to prevent trapping between the lower chain run and the final driven sprocket at the rear wheel.

The external side of the rear sprocket must be completely covered by a hard, solid plastic sheet. No holes on the sprocket may remain visible.

01.31 EXHAUST PIPES

Exhaust pipes and silencers must fulfill all the requirements concerning sound control (see also Art. 01.79).

31.01

The end of the silencer must be horizontal and parallel (over a minimum distance of 30 mm) to the central axis of the solo motorcycle (with a tolerance of $\pm 10^\circ$) and must not exceed the end of the silencer body by more than 5 mm. All sharp edges must be rounded with a minimum radius of 2 mm (See diagram E).

31.02

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.

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

31.03

The extremity of the exhaust pipes on solo motorcycles must not pass the vertical tangent of the rear tyre.

31.04

The exhaust must discharge horizontally and towards the rear, at a maximum angle of 30° away from the axis of the machine.

01.33 HANDLEBARS

33.01

The width of handlebars (solo and Sidecars) must be not less than 600 mm and not more than 850 mm.

33.02

The handlebars must be equipped with a protection pad on the cross bar. The handlebars without cross member must be equipped with a protection pad located in the middle of the handlebars, covering widely the handlebars clamps.

33.03

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

33.04

Handlebar clamps must be very carefully radiuses and engineered so as to avoid any fracture points in the handlebar.

33.05

When light alloy handlebars are used, the distance between the two extremities of the clamping area (or of the 2 clamps) must not be less than 120 mm.

33.06

When hand protectors are used, these must be made of a shatter-resistant material and have a permanent opening for the hand.

33.07

The repair by welding of light alloy handlebars is prohibited.

33.08

Handlebars made from carbon-carbon, carbon-Kevlar and/or other composite materials are not authorized.

33.09

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

33.10

For Sidecars in trial, the minimum angle of rotation of the handlebar on each side of the centre line or mid position must be at least 40°. The steering must be effected only through the motorcycle front wheel and its steering fork. A steerable sidecar wheel is forbidden.

01.35 CONTROL LEVERS

35.01

All handlebar levers (clutch, brake, etc.) must be in principle 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.

35.03

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

35.04

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

01.37 THROTTLE CONTROLS

37.01

Throttle controls must be self-closing when not held by the hand. **The throttle operation (opening and closing) shall only be activated by mechanical cable from the twist grip directly attached to the throttle valve. All air intakes into the cylinder must pass through the throttle body. No other means allowing ambient air into the inlet track of the cylinder head are allowed.**

37.02 Ignition cut-out switches

37.03

It is compulsory that all motorcycles be equipped with an operational cut-off switch, connected through a lanyard to the rider (max. length - 1metre). Once the rider steps off the motorcycle, the lanyard must **disconnect from the cut-off switch and stop the engine from running within 1 second.**

01.39 FOOTRESTS

39.01

Footrests may be of a folding type but in this case must be fitted with a device which automatically returns them to the normal position, and an integral protection is to be provided at the end of the footrest which must have at least 8 mm radius (see diagram D).

01.41 BRAKES

41.01

All motorcycles must have at least 2 efficient brakes (one on each wheel) operated independently and operating concentrically with the wheel.

41.02

Vehicles in Group B must be fitted with at least 2 efficient brakes operating on at least 2 of the wheels and operated independently and operating concentrically with the wheels.

41.03

Brake discs with sharp edges (saw tooth design) are forbidden. The maximum dimensions allowed for openings (slots) will be: diameter of the holes: 6mm; slots: width 6mm, length 10 mm. See drawing.

41.04

An external protection made from a plastic material should cover the front and rear brake discs (fully in the front, partially on the rear). Holes for aeration and evacuation of materials shall not be more than 10 mm. in diameter or equivalent area

01.43 MUDGUARDS AND WHEEL PROTECTION

Motorcycles must be fitted with mudguards.

43.01

The front mudguard must cover at least 100° of the circumference of the wheel. The angle formed by one line drawn from the front edge of the mudguard to the centre of the wheel and one drawn horizontally through the centre of the wheel must be between 45° and 60°.

43.02

The rear mudguard (except for Trial Sidecars and machines used entirely "off-road" in events such as "Indoor" or "Arena" Trial) must cover at least 80° of the circumference of the wheel. The angle formed by two lines, one drawn from the rear edge of the mudguard to the centre of the wheel and one drawn horizontally through the centre of the wheel shall not exceed 60°.

43.03

For events held entirely "off-road" ("Indoor" or "Arena" Trial), the rear mudguard must extend rearwards beyond the segment of a circle which is covered by a vertical line drawn through the rear wheel spindle and a line drawn at an angle of 25° rearwards to the vertical line.

01.47 WHEELS, RIMS, AND TYRES

47.01

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

47.02

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.

The only exception is for tyre retention screws sometimes used to prevent tyre movement relative to the rim.

If the rim is modified for these purposes, bolts, screws etc., must be fitted.

01.49 TRIAL TYRES

49.01

The overall width of the tyre when fitted must not exceed 115 mm.

49.02

The tread depth (A) must not exceed 13 mm measured at right angles to the face of the tread. All blocks in the same circumference must be of the same depth (see diagram D bis).

49.03

The space between the blocks must not exceed 9.5 mm across the tyre (B) or 13 mm in a circumferential direction (C).

49.04

The space between shoulder blocks (D bis) must not exceed 22 mm.

49.05

The space across the tread (E) cannot extend completely across the tyre measured at right angles to the wall of the tyre, unless broken by a block.

49.06

All tread blocks (with the exception of the shoulder blocks) must be nominally rectangular with sides parallel with or at right angles to the tyre axis (tyre must have same appearance when reversed and conform, in principle, with Diagram D bis).

49.07

The tyre surface must not be fitted with any subsequently mounted elements such as anti-skid spikes, special chains, etc.

49.08

Only tyres normally available from commercial or retail sources for use on the public highway are authorised.

49.08.1 They shall appear on the tyre manufacturers range catalogue or tyre specification lists available to the general public

49.08.2 They must be manufactured to comply with European Tyre and Rim Technical Organisation (ETRTO) requirements in respect of load and speed codes and have a minimum service description of 45M.

01.50 ADDITIONAL SPECIFICATIONS FOR ELECTRIC POWERED VEHICLES

50.01 INTRODUCTION

The technical concept is reserved for motorcycles propelled by non-thermal energies with zero toxic/noxious emissions and by the action of one wheel in contact with the ground.

Amendments to these technical regulations may be made at any time in order to ensure fair competitions.

50.02 GENERAL EPV CLASS REQUIREMENTS

Two and/or three wheeled electric propelled machines, powered solely by stored electricity (battery /accumulator).

The number of electric motors is limited to one.

50.02.1 Race Procedures

(Race procedures to be defined by the Sporting Commission concerned).

50.02.2 Race Format (Guidelines – actual race format depends on the discipline concerned.)

Minimum race length: 20 minutes

Maximum race length: 30 minutes

50.02.3 Charging the accumulator

The vehicle's accumulators must be charged at the times and locations determined by the organiser of the meeting.

Charging may only be done with the energy supply provided by the race organiser.

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.

50.02.4 Pit Stop

Riders will be allowed to define their own method of energy renewal subject to safety and practical considerations subject to the approval of the race organiser.

Riders who wish to have a pit stop must declare the process and technology to the Technical Director/Chief Technical Steward for a safety evaluation. All information will be treated with strict confidentiality.

50.02.5 Transponder timing

Machines must be equipped with an official transponder only if required).

50.02.6 Technical Control

As a condition of entry, a Technical Construction File of the motorcycle entered may be required with a race entry. This document, which must be drawn up using the template provided (ref: FIM Technical Construction file), must provide the basic information listed, as well as the design steps taken to ensure safety for the rider(s), teams, spectators, officials and marshals.

The Technical Steward shall check both the machine and the rider for compliance with the technical specifications, as well as the employment of good engineering construction practice, and the presence of adequate electrical insulation and weatherproofing.

Damaged machines must be returned to the technical control area for examination after race or practice. In such circumstances it is the responsibility of the competitor

to ensure both his machine and clothing have been rechecked and approved before further use in the event.

It is the responsibility of the rider to ensure that a machine used in competition is electric, mechanically and structurally in a safe condition.

50.02.7 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.

50.03 SPECIFICATIONS

50.03.1 Requirements

All motorcycles must comply in every respect with all the requirements for racing as specified in these rules, unless otherwise specified.

50.03.3 Handlebars

See art. 01.33.

50.03.4 Control levers

See art. 01.35.

50.03.5 Foot Rest/Foot Controls

See art. 01.39.

50.03.6 Wheel and rims

See art. 01.47.

50.03.7 Tyres

See art. 01.49.

Machine Weight

Minimum weight: 75 kg. The maximum weight limit shall not exceed 120 kg.

The machine will be checked for weight in the 'ready-to-race' condition. The verified weight may never fall below the required minimum weight.

50.03.10 Overall Dimensions

For specific refer to this article of within these rules.

50.04 ELECTRICAL EQUIPMENT

50.04.1 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).

50.04.2 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.

50.04.3 Energy recovery

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

50.04.4 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.

50.04.5 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).

50.04.6 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 volts between any two points. In cases where the voltage of the power circuit exceeds 42 volts, 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 lightning 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 signaling, 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).

50.04.7 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.

50.04.8 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.

50.04.9 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-current 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).

50.04.10 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 fulfill their function for an appropriate length of time.

50.04.11 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 volts to earth, the insulation resistance must reach the following value: 250 k Ohms.

For equipment with more than 300 volts 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.

50.04.12 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 volts at 50 hertz for a period of one minute. It must only be used for electrical circuits with a nominal voltage not exceeding 500 volts.

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

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

50.04.13 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.

50.04.14 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 the 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.

50.04.15 Power control

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

01.53 ADDITIONAL SPECIFICATIONS FOR SIDECARS

53.01

Articulated Sidecars are strictly forbidden.

53.02

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

53.06

Handlebars must be firmly secured to the forks. They must be at a height above the mid-point in the seat.

The motorcycle must have a steering head which must be fitted like the handlebar, must not be attached to the unsuspended part of the front wheel suspension.

53.07

To reduce the torque in the steering it is allowed to displace the front wheel and the rear wheel leaving a maximum width of 75 mm between them.

53.08

The fuel tank and oil tank must be securely mounted and positioned behind the steering head.

53.09

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 the fixing method is completely secured and not only clamped on.

53.10

The position of the engine is optional, except that it must be positioned in front of the rear wheel.

The centre line of the engine is determined by half its overall width measured across the motorcycle and shall not extend more than 160 mm beyond the centre line of the rear wheel of the motorcycle.

If the engine and gearbox are mounted on plates, the minimum thickness of the steel plates must be 4 mm, and 5 mm for light alloy plates.

53.11

The minimum dimensions of a Sidecar available for passenger accommodation are:

Length: 1 350 mm - Width: 300 mm (See diagram N).

53.12

The minimum ground clearance of a laden Sidecar when measured must not be less than 175 mm.

53.13

The steering of the front wheel must be accomplished without any intermediate articulated steering joints directly by a classic telescopic fork or a swinging arm fork with the wheel supported equally each side (long or short leading link type). All other types of front wheel steering and suspension are forbidden.

53.14

The seat must have a minimum dimension 300 mm x 150 mm and must be fixed at a minimum height of 300 mm above the Sidecar floor (see diagram N).

53.15

For Sidecars, the rear wheel and the Sidecar wheel must be covered or protected with a solid material.

53.16

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.

53.17

On a Sidecar Trial 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 it must be of constant diameter over a distance of 30 mm.

On the opposite side of a Trial Sidecar, the exhaust pipe must not extend more than 330 mm from the centre of the machine. On the other side, the exhaust pipe must not extend beyond the width of the Sidecar (see diagram N).

The furthest extremity of the exhaust pipe must not exceed the vertical line drawn at a tangent to the rear edge of the rear motorcycle tyre or the rear edges of the Sidecar platform whichever is shorter.

01.56 LEGAL CONFORMITY OF THE MOTORCYCLES AND THEIR REGISTRATION PLATES

Motorcycles and their equipment must comply with the national legal requirements for road traffic of the country in which the vehicle is registered and with other rules specified in the Supplementary Regulations.

The electrical generator must operate continuously and normally with respect to current and voltage during the competition and at post competition control. The electrical connections must be retained.

01.63 FUEL, OIL AND COOLANTS

All motorcycles must be fuelled with unleaded petrol, as this term is generally understood.

All riders/teams must declare to the FIM Technical Steward the make and type of fuel to be used during practices and race(s), upon presentation of the riders' motorcycle(s) at the initial technical control.

See also: Art.63.04.2 Race fuels

63.01 Physical properties for unleaded fuel

63.01.1 Unleaded petrol must comply with the FIM specification.

63.01.2 Unleaded petrol (incl. E10) will comply with the FIM specification if:

(a) It has the following characteristics:

Property	Units	Min.	Max.	Test Method
RON		95.0	102.0	EN ISO 5164
MON		85.0	90.0	EN ISO 5163
Oxygen	% (m/m)		2.7	ISO 22854 or EN 13132
Oxygen (E10 Fuels)	% (m/m)		3.7	ISO 22854 or EN 13132
Nitrogen	% (m/m)		0.2	ASTM D 4629
Benzene	% (V/V)		1.0	ISO 22854 or EN 238
Vapour pressure (DVPE)	kPa		95.0	EN 13016-1
Lead	mg/L		5.0	ICP-OES or AAS
Manganese	mg/L		2.0	ICP-OES or AAS
Density at 15°C	kg/m ³	720.0	775.0	EN ISO 12185
Oxidation stability	minutes	360		EN ISO 7536
Existent gum	mg/100 mL		5.0	EN ISO 6246
Sulphur	mg/kg		10.0	EN ISO 20846 or 20884
Copper corrosion	rating		class 1	EN ISO 2160
Distillation:				EN ISO 3405
E at 70°C	% (V/V)	20.0	50.0	
E at 100°C	% (V/V)	46.0	71.0	
E at 150°C	% (V/V)	75.0		
Final Boiling Point	°C		210	
Residue	% (V/V)		2.0	
Appearance	Clear and bright			Visual inspection
Olefins	% (V/V)		18.0	EN ISO 22854
Aromatics	% (V/V)		35.0	EN ISO 22854
Total diolefins	% (m/m)		1.0	GC-MS or HPLC
Oxygenates:				EN ISO 22854* or EN 13132
Methanol	% (V/V)		3.0	
Ethanol (1)	% (V/V)		5.0	
Ethanol (E10) (1)	% (V/V)	5.0	10.0	
Isopropanol	% (V/V)		12.0	
Isobutanol	% (V/V)		15.0	
<i>tert</i> -Butanol	% (V/V)		15.0	
Ethers (C5 or higher)	% (V/V)		22.0	
Others (2)	% (V/V)		15.0	
*Preferred method				
(1) Ethanol must be blended according to EN 15376				
(2) Only the two following compounds are allowed:				

Notes:* Preferred method.

(1) Ethanol must be blended according to EN 15376.

(2) GC-MS methods may also be applied to fully deconvolute GC trace.

(b) The total of individual hydrocarbon components present at concentrations of less than 5% m/m must constitute at least 30% m/m of the fuel. The test method will be gas chromatography and/or GC/MS.

(c) The total concentration of naphthenes, olefins and aromatics classified by carbon number must not exceed the values given in the following table:

% (m/m)	C4	C5	C6	C7	C8	C9+
Naphthenes	0	5	10	10	10	10
Olefins	5	20	20	15	10	10
Aromatics	-	-	1.2	35	35	30

The total concentration of bicyclic naphthenes and bicyclic olefins may not be higher than 1% (m/m). The test method used will be gas chromatography.

(d) Only the following oxygenates are permitted:

Methanol, Ethanol, n-Propyl alcohol, Isopropyl alcohol, n-Butyl alcohol, sec-Butyl alcohol, Isobutyl alcohol, tert-Butyl alcohol; Methyl tertiary butyl ether, Ethyl tertiary butyl ether, Tertiary amyl methyl ether, Diisopropyl ether.

(e) Manganese is not permitted in concentrations above 2.0 m/L. For the present this is solely to cover possible minor contamination by other fuels.

Lead replacement petrols, although basically free of lead, are not an alternative to the use of unleaded petrol. Such petrols may contain unacceptable additives not consistent with the FIM Fuel Regulations.

63.01.3 Ethanol E85 will comply with the FIM specification if:

(a) It has the following characteristics:

Property	Units	Min.	Max.	Test Method
RON		95.0	110	EN ISO 5164
MON		85.0	100	EN ISO 5163
Vapour pressure (DVPE)	kPa	35.0	95.0	EN 13016-1
Lead	g/L		0.001	ICP-OES
Manganese	g/L		0.001	ICP-OES
Oxidation stability	Minutes	360		EN ISO 7536

Existent gum	mg/100 mL		5.0	EN ISO 6246
Sulphur	mg/kg		10.0	EN ISO 20846 or 20884
Copper corrosion	Rating		Class 1	EN ISO 2160
Distillation:				
Final Boiling Point	°C		210	EN ISO 3405
Residue	% (V/V)		2	EN ISO 3405
Appearance	Clear and bright			Visual inspection
Ethanol + higher alcohols	% (V/V)	75		EN 13132 or 14517
Higher alcohols (C3-C8)	% (V/V)		2.0	EN 13132 or 14517
Methanol	% (V/V)		1.0	EN 13132 or 14517
Ethers (5 or more C atoms)	% (V/V)		5.2	EN 13132 or 14517
Unleaded petrol as specified in 2.10.1.2	% (V/V)	14	25	
Water	% (V/V)		0.3	EN 12937
Inorganic chloride	mg/L		1	EN 15484
Acidity (as acetic acid)	% (m/m) (mg/L)		0.005 (40)	EN 15491

63.02 Oil

For oil used in two stroke mixtures, the following tolerances on the fuel specifications will be allowed:

• Density at 15°C	Plus/minus 30 kg/m ³
• Distillation residue	Not controlled

Any infringement of the fuel specifications will automatically result in the exclusion of the competitor from the entire meeting (see also Sporting Code Art. 140.1). The result of the competitors' fuel sample analysis (A or B Sample) more favourable to the competitor will be taken into account (See also Art. 63.05.3).

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

63.03 Air

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

63.04 Primary Tests

63.04.1 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.

63.04.2 Fuel companies which supply 'race' fuels (fuels other than those obtained at public fuel stations) to participating teams/riders must

submit ten litres (2 x 5 L) to the laboratory appointed by the FIM/DWO for analysis in accordance with the specification.

Providing the fuel is within the specification, a certificate containing a test report and batch number will be issued to the fuel company. The fuel company must provide a copy of the test report number to their client rider/teams before they take part in a race.

Contact for fuel analysis: fimfuels@intertek.com.

63.05 Fuel Sampling and Testing

- 1) The FIM-appointed Official has the sole responsibility for the management and supervision during the taking of fuel samples.
- 2) The preferred fuel test method is Gas chromatography or GC Fingerprint method.

Gas chromatography (GC) is an analytical technique for separating compounds based primarily on their volatility and polarity. Gas chromatography provides both qualitative and quantitative information for individual compounds present in a sample. ~~The~~ Gas chromatography is widely used for the analysis of fuels.

The GC Fingerprint is a comparison between the given reference and the fuel drawn from the competitor's motorcycle. With the fingerprint method any changes in the composition and concentration of the fuel against the reference is detected. The separation is done with a non polar column suitable for fuel analysis. The detection of the components is done with a flame ionisation detector.

3) If other test methods are required, fuel samples are transported to the appointed laboratory by an official courier, using the appropriate containers.

4) Riders selected for fuel controls are directed with their motorcycles to the inspection area.

5) Only new sample bottles are used for the fuel samples.

6) The fuel to be tested is transferred directly from the selected fuel tank into three vials (3 small sample containers), marked A, B and C and identified by reference to the motorcycle from which the sample was taken. The bottles are closed, sealed and labeled by the FIM appointed Official.

7) The Fuel Sample Declaration form is filled out immediately, containing all information as shown on the sample sheet, including the riders' name and race number, date and place of fuel sampling. A responsible team member signs this declaration, after verifying that all the information is correct.

8) Samples A and B are given to the appointed laboratory staff, present at the event for analysis or be sent to the respective laboratory by the organiser if no trackside laboratory is available. Sample B will be kept by the laboratory staff as a reserve sample, to be used for a second analysis if required. All samples are accompanied

by a copy of the Fuel Sample Declaration form. Costs for the analyses of sample A and B are paid by FIM.

9) Sample C is handed over to the FIM, accompanied by a copy of the Fuel Sample Declaration form, for safeguarding in case of protests and/or a request for a counter-expertise by the FIM appointed laboratory. Costs for the analyses of sample C are paid by the team concerned.

10) As soon as possible after completing the testing, the Fuel Analyst/FIM appointed laboratory will report the results of the fuel sample analyses directly to the FIM appointed Official, with a copy to the rider, the relevant Commission Director and CTI Secretariat (via ctr@fim.ch and cti@fim.ch).

11) In the case of non-conformity of the fuel, the FIM appointed Official must notify the results to the FIM, the Race Direction (or the International Jury) and the rider/team representative concerned. Failure of the sample to conform to the FIM fuel specifications results in the disqualification of the competitor. The result of the competitor's fuel sample analysis ("A" or "B" sample) more favourable to the competitor is taken into account.

12) Within 48 hours of the receipt of the notification of the results from the analysis of sample A and/or B, the team must notify the FIM and the FIM-appointed Official if a counter-expertise of sample C is requested.

13) The Race Direction (or the International Jury) takes a decision, immediately following the notification of the results of the final expertise. Any appeal against the decision of the Race Direction (or the International Jury) is heard by the FIM. Stewards appointed for the event at which the decision is taken. This takes place after the C sample has been analysed. For events without a Panel of Stewards, the appeal is lodged before the CDI.



FIM WORLD CHAMPIONSHIPS AND PRIZE EVENTS

Fuel Sample Declaration Form

FUEL SAMPLES TAKEN ON /..... / FOR LABORATORY ANALYSIS

Tech inspection, practice or Race N°:	<i>Sample "A"</i>	
	Can Label N°	Can Seal N°
Rider:	<i>Sample "B"</i>	
	Can Label N°	Can Label N°
Rider N°:	<i>Sample "C"</i>	
	Can Label N°	Can Label N°

MOTORCYCLE
MAKE: _____

TEAM: _____

The above listed details refer to fuel samples taken from the fuel tank of the motorcycle specified after the race whilst in the Check Area for a period of 30 minutes.

Sample "A" and "B" will go to the laboratory appointed by the FIM for analysis. Sample "C" will be safeguarded by the FIM in case a counter-expertise is required.

As a responsible member of the team named on this sheet,

(print name): _____

I have controlled the serial numbers of can seals and serial numbers of can labels and hereby certify the accuracy of the listed information.

Time: _____

(Signature)

Position in team: _____ (OWNER/MANAGER/MECHANIC)

01.65 EQUIPMENT AND PROTECTIVE CLOTHING

Clothing and footwear

65.01 During the practice and competition, the riders, passengers and assistants must wear boots and protective clothing, either trousers and long-sleeve shirt of cloth or a one-piece suit – **and it is recommended to wear protective items for chest and back.**

It is compulsory that the chest protectors are made according to CEN 1621-3 (at least Level 1 and Type A) and back protectors according to CEN 1621-2 (at least a "central back protector" with impact Level 1).

Back and chest protectors must be clearly marked according with CEN 1621 - 2/3.

Arms must be covered. Wearing gloves is compulsory.

65.07 Material equivalent to leather

The following characteristics of the material must be at least equivalent to 1.5 mm of cowhide (not split leather):

- 65.07.1** Fire retardant quality
- 65.07.2** Resistance to abrasion
- 65.07.3** Coefficient of friction against all types of asphalt
- 65.07.4** Perspiration absorbing qualities
- 65.07.5** Medical test - non toxic and non-allergenic
- 65.07.6** Fabric of a quality that does not melt.

65.07.7 Clothing in material other than leather must bear a sticker or label which says "in conformity with the FIM rules". This label must be sewn or attached to the clothing in a permanent way.

65.08 Approval

The clothing manufacturer is responsible for ensuring that the products and materials that carry his name conform to these rules. The FIM cannot be held liable for any injuries that a rider or passenger may sustain from their use.

01.67 WEARING OF HELMETS

- It is compulsory for all participants taking part in practice and races to wear a protective helmet. The helmet must be properly fastened, be of a good fit, and be in good condition. The helmet must have a chin strap type 'retention system'.
- **Helmets equipped with chin protection are strongly recommended for Junior riders (younger than 16 years). Chin protection for Junior riders will become compulsory by 2018. (See also art. 69.03).**

- Helmets constructed with an outer shell of more than one piece are permitted, provided that, in case of emergency; they can be quickly and easily removed from the rider's head by releasing or cutting the chin strap only.
- All helmets must be marked with one of the official international standard marks mentioned in Art. 01.70 or the Approval Mark (stamp) of the FMN of the rider. Helmets marked by an FMN must comply with one of the International Standards listed in Art. 01.70 before approval by an FMN.
- **A helmet is made to provide protection. It is not a platform to attach foreign objects. Cameras or other accessories are NOT permitted nor shall be attached to the rider's helmet.**

Failure to observe the above rules will entail exclusion.

01.69 HELMET OPERATIVE INSTRUCTIONS

69.01

Scrutineers, under the supervision of the Chief Technical Steward, may check prior to practice and the races that all helmets meet the technical requirements.

69.02

If a helmet does not meet the technical requirements and is found to be defective, the Technical Steward must remove all approval marks and retain the helmet until the end of the event. The rider must submit another helmet for approval by the Technical Steward. After an accident involving impact, the helmet must be presented to the Technical Steward for examination (see also Art. 77.02.14).

69.03

All helmets must be intact and no alteration must have been made to their construction. After an accident involving impact the helmet must be presented to the Technical Steward for examination.

A chin guard is strongly recommended for Junior riders. Chin guards, if used, can only be those designed by the manufacturer of the helmet in question.

69.04

The Chief Technical Steward/Technical Steward may ask a rider for the following checks before the rider is permitted to take part in practice of the race:

69.04.1 That the helmet fits well on the rider's head,

69.04.2 That it is not possible to slip the retention system over the chin, when fully fastened,

69.04.3 That it is not possible to pull the helmet over the rider's head by pulling it from the back of the helmet.

01.70 RECOGNISED INTERNATIONAL HELMET APPROVAL MARKS

- EUROPE ECE 22-05 (P, NP or J)
- JAPAN JIS T 8133:2007 (**valid until 31.12.2019**)
JIS T 8133:2015
- USA SNELL M 2010 (**valid until 32.12.2019**)
SNELL M 2015

(see International Helmet Standards in diagram section)

01.71 EYE PROTECTION

The use of glasses, protective goggles as well as helmet visors and 'tear off's' is permitted. The material used for eye protectors and glasses must be made of shatter-proof material. Helmet visors must not be an integral part of the helmet.

Eye protectors which cause visual disturbance (scratched etc.) must not be used.

01.73 NATIONAL COLOURS FOR HELMETS

In competitions between national teams, it is recommended that helmets be of the same colour for each team member and that their national flag colours, presented in stripes, bands or other design be included in the overall helmet colour scheme.

In addition to this, for the holders of World or National championships, a central band 50 mm wide from front to back across the top carrying the national colours or a rainbow is admitted.

The following National colours are approved:

Andorra	FMA	White with vertical blue, yellow and red bands
Argentina	CAMOD	White with blue horizontal band
Australia	MA	Green and yellow sides, red, white & blue representation of the Australian flag across the top
Austria	OeAMTC	Bright red with a 60 mm wide black band and the label of the OeAMTC in a white field on the front side
Belgium	FMB	Yellow
Brazil	CBM	Yellow and green
Bulgaria	BMF	Green and red

Canada	CMA	White and 3 Red Maple leaves, one on front and one on each side
Chile	FMC	Red with blue band and yellow stars
China	CMSA	Red and yellow
Czech Republic	ACCR	Blue with red, white and blue border
Denmark	DMU	Red and white
Finland	SML	White with blue cross
France	FFM	Blue
Germany	DMSB	White with black border
Great Britain	ACU	Green
Greece	ELPA	White with blue border
Hungary	MAMS	Red and green
Ireland	MCUI	Green and orange
Italy	FMI	Red with one green and one white horizontal band
Japan	MFJ	White with red circle on top
Kenya	KMSF	Black, Red, Green, with white bands and the country name KENYA on both sides.
Luxembourg	MUL	Purple
Mexico	FMM	White with green and red border
Monaco	MCM	Blue and white
Netherlands	KNMV	Orange
New Zealand	MNZ	White with black kiwi on front
Norway	NMF	Red and blue
Peru	FPEM	Red with 75 mm wide white strips and blue and yellow chequered border
Poland	PZM	White with red band
Portugal	FNM	White
Rumania	FRM	Black with vertical blue, yellow and red bands with national emblem.
Russia	MFR	White with a red border and a vertical red band with star
San Marino	FSM	White with the San Marino National emblem
Slovakia	SMF	Blue, red and white
South Africa	MSA	Black, green, blue and red with yellow and white bands
Spain	RFME	Yellow and red
Sweden	SVEMO	Blue and yellow
Switzerland	FMS	Red with white cross
Uruguay	FUM	Light blue
USA	AMA	Blue with 2 white bands

01.75 BADGE OF THE FIM

Under certain circumstances the FIM may permit the use of the FIM badge on certain equipment in order to show that the latter conforms with the standards laid down by the FIM. When this authorisation is granted and provided the equipment on which it

appears is in good condition, the badge is then the guarantee of the conformity with the standard set by the FIM.

01.76 NUMBER SASHES (BIBS)

Starting numbers must be in conformity with the following:

76.01

Trial World Championship:	Red numbers on a white background
Trial World Championship for Women	Black numbers on a pink background
FIM Junior Trial World Cup:	Blue numbers on a white background
FIM Youth Trial Cup 125cc:	Green numbers on a white background

76.02

The numbers shall be printed on a white area of 25 cm X 25 cm.

76.03

Height of numbers: 15 cm

76.04

Width of number: 6 cm

76.05

Width of stroke: 2 cm

76.06

Only the space outside the 25 x 25 cm area may be used for publicity.

76.07

Bibs manufactured from PLASTIC material are not allowed.

01.77 CONTROL

77.01 Verification

General

A rider **remains** at all times responsible **that his/her machine is in conformity with the Technical Rules for Trial motorcycles.'**

77.01.1 The Chief Technical Steward must be in attendance at an event 1 hour before technical verifications are due to begin. He must inform the Clerk of the Course, Jury President and CTI Delegate, if present, of his arrival.

77.01.2 He must ensure that all technical stewards appointed for the event carry out their duties in a proper manner.

77.01.3 He shall appoint the technical stewards to individual posts for the race, practices and final control.

77.01.4 Technical inspections will only be carried out when the technical control form of the motorcycle has been presented by the Organiser.

77.01.5 The rider, or his mechanic, must be present with the machine for technical control within the time limits stated in the Supplementary Regulations. On request of the Technical Steward, the riders must present themselves to the technical verification.

77.01.6 The Chief Technical Steward must inform the Clerk of the Course/ Jury President 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.

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

77.02

Any rider failing to report as required by the provisions below may be excluded from the meeting. The Clerk of the Course may prohibit any person who does not comply with the rules mentioned below, or any rider who could be a danger to other participants or to spectators, from taking part in the competitions.

77.02.1 The technical control must be carried out in conformity with the procedure and times fixed in the CTR Rules and the Supplementary Regulations of the event. The maximum number of persons present at the technical verification will be the rider, plus two others. In addition, for Team events, the Team Manager will also be allowed to be present.

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

77.02.3 The rider must present his equipment e.g. helmet and bib with prescribed starting number.

77.02.4 A rider may present one motorcycle for the Individual Trial World Championship and two for the Indoor Trial World Championship.

77.02.5 The Sound control must be carried out first. The exhaust silencer must be marked with paint. The Sound level will be recorded in the technical card.

77.02.7 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.

77.05 Dangerous machines

If, during practice or the race, a Technical Steward finds that a machine is defective and might constitute a danger to other riders, he must immediately notify the Clerk of the Course or his deputy. It is their duty to exclude such a machine either from the practice or from the race itself.

01.78 SCRUTINEERING GUIDELINES FOR TECHNICAL STEWARDS

- Make sure all necessary measures and administrative equipment are in place at least 1/2 hour before the start of the technical control (see separate list) is due to open (time in Supplementary Regulations).
 - Decide prior to the technical control who is doing what and note decisions. "Efficiency" must be the watchword. Always keep cheerful and remember the reasons for scrutineering: 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 50 sq. metres).
 - Inspection area must be supplied with the necessary equipment, including tables, chairs, electric light and power outlet.
 - Weighing apparatus must be accurate and practical. Certified master weights and their certificate must be available for verifying.
 - Prepare before the START of the competition, a closed and guarded area (closed parc/parc-fermé).
 - Rules regarding sound level and -measurement must be respected.
 - **Procedures**
- | | <u>Minimum number of Scrutineers required</u> |
|---|--|
| • Checking of documentation (entry forms, licence, helmet, clothing, etc.). | 1 person |
| • Sound level test, silencer marking. | 2 person |
| • The machine weight (with empty tank): | 1 persons |

- Machine inspection (with strict check of carburettor). Compliance with rules and safety. Items must be marked. 2 persons
- Scrutineers can have different tasks, but the team of scrutineers must have a minimum of 3 persons. At least one (1) person must be a holder of an FIM **SENIOR** Technical Stewards Licence.

Technical control on day before or on the same day of the start of OFFICIAL PRACTICE:

- Minimum time: 1/2 hour
- Minimum safety checks, marked items and weight. 2 persons
- Free use of the weighing equipment by all teams.

Technical control on day before or on the same day of the start of the RACE:

- Minimum time: 1 hour
- Free use of the weighing equipment by all teams.
- General machine inspection, helmet and clothing.

Technical control after the race:

- After the race, ensure that **the selected machines used in during the race** go directly to the Closed Parc (**Parc Fermé**) and are retained 30 minutes.
- Post race inspection (machines weighted, as they finished the last zone).

Control:

- According to protest or by decision on the International Jury.

List of Tools and Documents

Tools :

- Revolution meter
- Sound meter and calibrator
- Durometer for tyre control ('Shore' hardness gauge)
- Slide calliper (for verifying engine capacity, carburettor diameter, etc.)
- Depth gauge
- Steel measuring tape
- Arrangement for measuring ground clearance

- Seals
- Weighing apparatus (to be furnished by the Organiser); set of weights to adjust the scales (100 kg), vertical balance (0 –10 kg)
- Tools for measuring the engine capacity
- Lampoil tester for measuring the cylinder capacity
- Colour for marking parts
- Label, temperature stable, if taken for marking silencer
- Magnet for testing titanium
- Adequate fuel sample bottles
- PC with CD Drive + '**Windows 10**' (recommended)
- Printer, etc. are recommended
- Calculator

Documents :

- Supplementary Regulations
- FIM Technical Rules - current year
- FIM Rules of the discipline concerned, e.g. CCP, CTI
- FIM Sporting Code
- Homologation papers (if applicable)
- Writing material
- Technical Control Forms

01.79 SOUND LEVEL CONTROL

The sound level will be controlled to limits as set out in Art. 79.11 .

01.79 SOUND CONTROL

IMPORTANT

- The surrounding sound should not exceed 90 dB/A within a 5 metres radius from the power source during tests.
- For the initial sound control and technical inspection, a rider (or his mechanic) shall present only one (1) spare silencer per machine.
- Other spare silencers may be presented after all participants have presented their motorcycles, or on the following days of the event.
- During the sound test method, machines not equipped with a gear box neutral must be placed on a stand.
- The sound level for engines with more than one cylinder will be measured on each exhaust end.

- During the sound test, only the rider may sit on the machine in the normal riding position. No other team personnel may influence the sound test.
- A machine that does not comply with the sound limits can be presented several times at pre-race control.
- The silencers will be marked when they are checked and they may not be changed after verification, except for a spare silencer that has also been checked and marked.
- All silencers will be checked and marked, once they have successfully passed the sound check. The end opening of the silencer shall remain unmodified once it has been checked and marked.
- Silencers fitted with adapters aimed to reduce the sound level shall be permanently fitted.

79.01 The '2 metre max' method – Maximum sound levels

In order to pursue the measures taken to reduce the sound level in favour of environment and in the framework of the 'RIDE QUIET' campaign, a new method for measuring the sound level called '2 metre max' is applied as from 2013 in all 'all-terrain' disciplines.

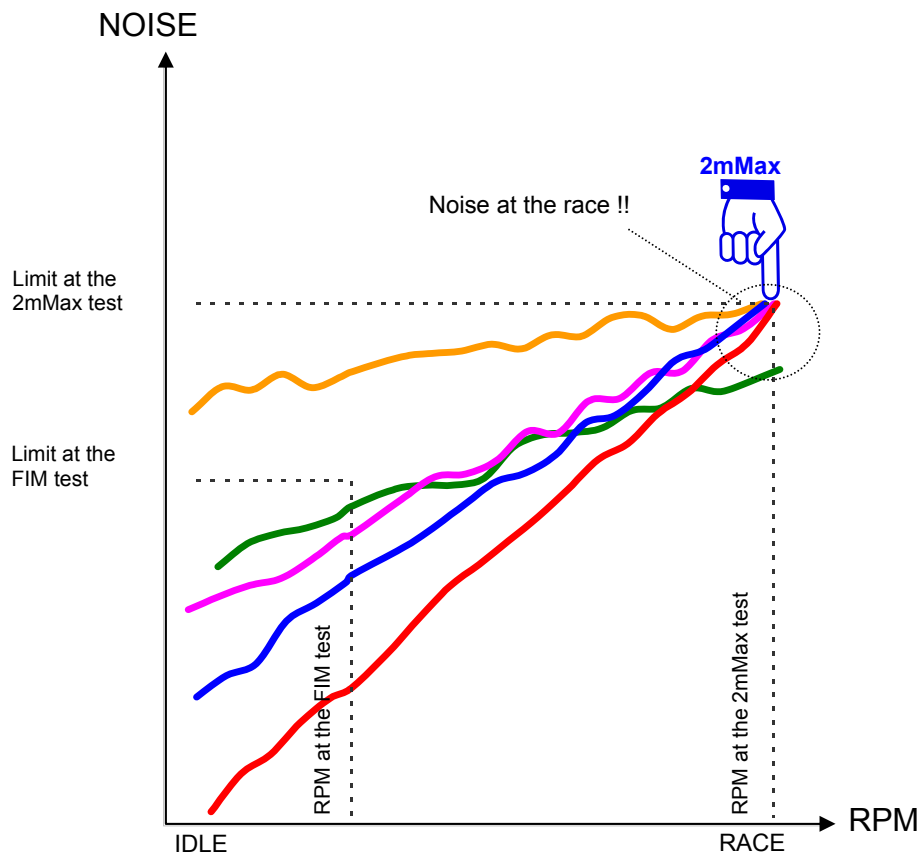
WHAT DOES IT CONSIST OF?

The 2 metre max method shows a very good correlation between the sound power level (LwA) issued by motorcycles in full acceleration, and the maximum sound pressure levels measured at proximity of the same motorcycles, with engines at idle and quickly taken to their maximum rotational speeds.

The technical specifications and the resources to initiate the application of this new method, for the use of the technical stewards and officials are mentioned in Art. 79.01 of these Technical Regulations. This article will detail the "2metre max" method, the sound levels, the indispensable tools.

Only the sound levels measured with the '2 meter max' method will be considered by the technical stewards and by the Race Direction/Jury of the event to decide whether the motorcycle is in conformity with the maximum sound levels authorized.

THE 2 METER MAX METHOD - IN FOCUS



THE OPERATING PROCEDURE

The '2 metre max' method will consist in quantifying not only the sound level produced by the silencer of the exhaust, but the maximum global sound level achieved by the motorcycle when the engine rpm's are raised to the maximum engine speed, limited by

- natural regulation for 2T, or
- rev limiter for 4T.

For (4 stroke) engines without a rev. limiter, it would be advisable to limit the full open throttle between 1 and 2 seconds maximum.

THE PREPARATION OF THE SOUND METER

For all FIM Championship-and Prize events, a sound meter Class 1 (type 1) is required to measure the sound levels. For all other Championships, a sound meter of Class 1 or 2 (type 1 or 2) is required

- Activate the 'A' weighing
- **FAST** time weighting must be activated
- Select range High **80~130 dB**

- Calibrate the sound meter at 93,5 dB or 113.5 dB to take into account the incidence of the wind foam ball
- Position the wind foam ball on the microphone
- Activate the function MAX MIN – set on **MAX**

THE SET UP OF THE SOUND METER AND THE MOTORCYCLE

- The sound levels will be measured with the sound meter/microphone fixed on a tripod, in the horizontal position, at the rear of the motorcycle.
- For the place and position of the motorcycle, ensure that there are no solid obstacles within 10 meters around the microphone.
- The sound meter will be positioned at a distance of 2 metres behind the motorcycle, at an angle of 45° from the centreline, on the exhaust side and at a height of 1.35 metre above the ground. The sound meter must be level and horizontal.
- The 2 metres distance is measured from the point where the centre of rear tyre touches the ground.
- It is preferred to make the tests on soft ground, not reverberating, i.e. grass or fine gravel.
- In other than moderate wind, machines should face forward against the the wind direction.
- The ambient sound level must remain lower than 100 dB/A.

THE POSITIONING OF THE MOTORCYCLE (see illustrations following)

The reference points:

- For a motorcycle: the contact point of the rear wheel on the ground.
- For motorcycles fitted with 2 exhaust outputs, the measurement will be made on the side of the air intake. If a central positioned air intake is used, both sides will be tested.
- For Side-cars: the contact point of the side wheel on the ground.

To make repetitive measurements, all motorcycles can be positioned into a small frame fixed on the ground.

THE NEW 2 METRE MAX METHOD – THE OPERATION – PROTECT YOUR HEARING – USE EAR PROTECTION

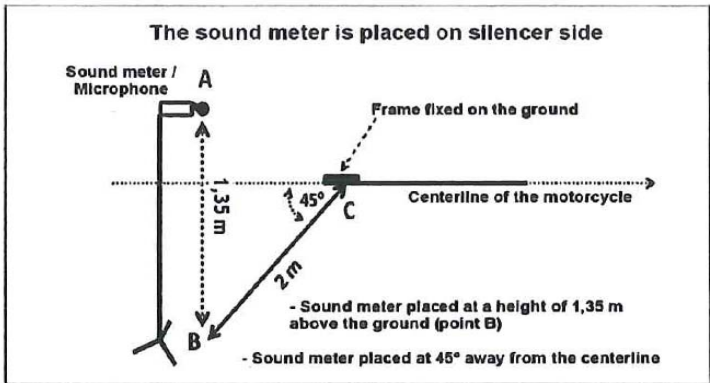
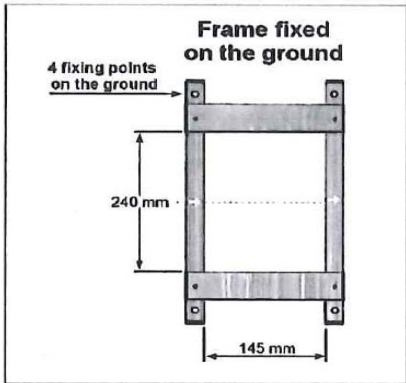
- The measurement is made with motorcycle on its wheels, with a hot engine.
- The technical steward takes place besides the motorcycles, opposite to the microphone, not to screen or stand between the bike and the microphone. **A mechanic, placed on the left side of the motorcycle, shall disengage the clutch.**
- If a second steward is permanently attending the sound level checks, it is strongly advised for him to use earplugs, a headset or ear protectors.
- The Inspector shall open throttle as fast as possible until full open throttle (instantly, within 0.3 seconds). He will keep the engine at max engine 'rpm' for at least 1 second. To conclude, the inspector will release the throttle quickly.

What is maximum engine rpm? This is the rpm value which the engine must be able to reach & perform, at minimum, to reach max KW/PS value obtained at the RPM. Any vehicle checked unable to reach this minimum value of maximum RPM will be refused.

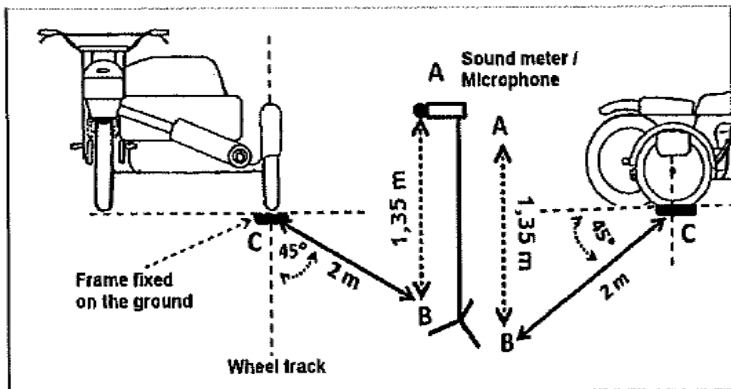
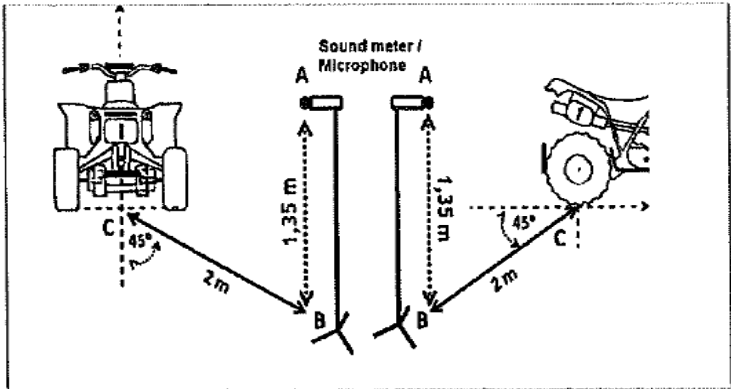
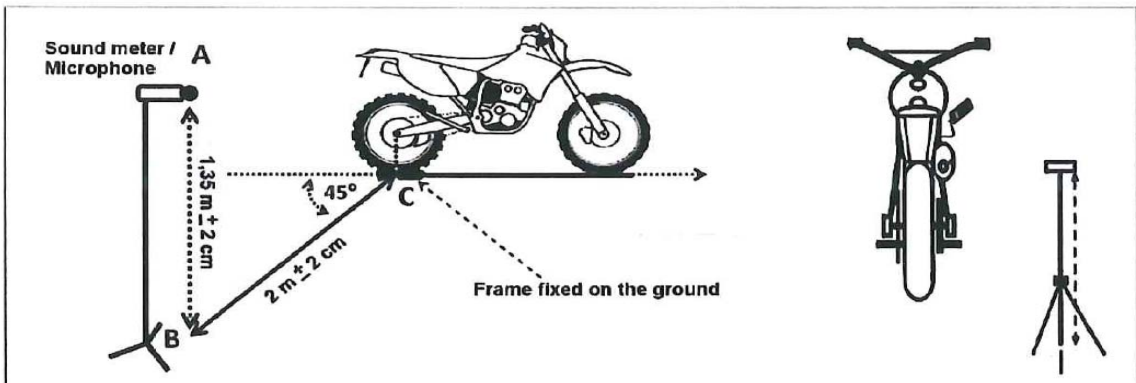
- If the result exceeds the limit, including 'after fire', the Inspector shall test the motorcycle a maximum of two (2) more chances.
- For motorcycles equipped with an engine rpm limiter, the throttle will be opened - instantly, within 0.3 seconds - and kept open until at least 1 second has passed and/or until there is an audible sign that the engine is over-revving.
- For motorcycles without an engine 'rpm' limiter, the throttle will have to be opened for less than 2 seconds and/or until there is an audible sign of over-revving the engine.
- If the engine starts to misfire close the throttle slightly and re-open the throttle.
- If detonations appear, the measurement must be started again.

The numbers obtained from the test shall not be rounded down.

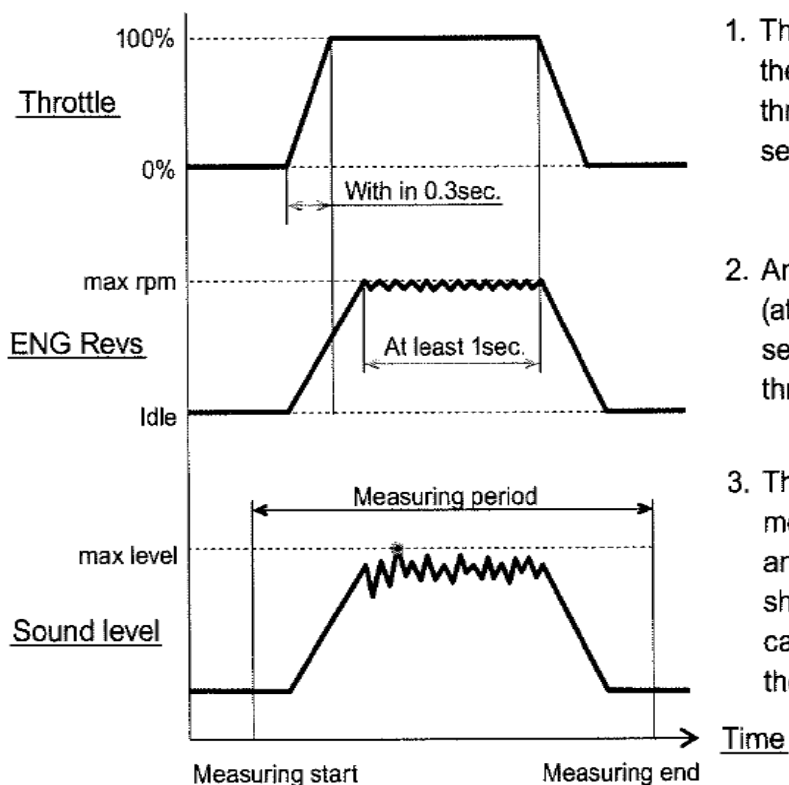
For the sound level measurement, only the Inspector shall handle the throttle. He shall open the throttle himself in order to minimize any influence by another operator (it is helpful to have the microphone equipped with an extension cable to the sound meter).



POSITION OF THE SOUND METER IN RELATION TO THE MOTORCYCLE



THE IMAGE OF THE SOUND MEASURING PROCEDURE



1. The Inspector shall open the throttle until full open throttle within 0.3 seconds.
2. And keep at the max rpm (at rpm limiter) at least 1 second. Then, release the throttle quickly.
3. The sound level is measured in the all period and the maximum level shall be recorded in any case. (automatically by the sound meter).

THE MEASUREMENT – RECORDING OF THE SOUND LEVEL

- When the measurement is considered acceptable, write down the result, then reset the meter (push on the sideline) the 'MAX MIN' setting until the previously displayed value disappears.
- Push again on the MAX MIN sideline to arm the sound level meter.
- The sound level meter is then ready for the following measurement.

Any attempt by a participant to prevent his/her engine from reaching the maximum published rpm figure will be considered a breach of the rules.

Even after a motorcycle has passed the sound control, if there is any doubt, it may be checked again.

A noticeably lower engine speed is detected easily by hearing. In case of doubt, check **the maximum rpm value** with a tachometer before it reaches the rpm limiter.

Sound levels will be checked against the limits stated in Art. 79.11.

For the initial sound control and technical inspection, a rider (or his mechanic) shall present only one spare silencer per machine.

Other spare silencers may be presented after all participants have presented their motorcycles, or during the following days of the event.

Note: Taking into account the local inhabitants and the environment, the admissible sound levels considered are:

- For all events: 78 dB/A measured at 100 m from the closest
- The sound will be measured with a calibrated and homologated sound meter at a distance of 100m, perpendicular to the axis of the race track.
- A tolerance of +5 dB/A will be added to these values.

79.02. Sound control during and after the competition

In a competition that requires a final examination of machines before the results are announced, this examination must include a sound control measurement of at least three (3) machines chosen at the discretion of the Clerk of the Course in co-operation with the Chief Technical Steward

79.07

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

79.08

A machine which does not comply with the sound limits can be presented several times.

79.11 Sound limits in force

With relation to the precision of the method and the added value (prior known as 'tolerance'), the sound meter values obtained during all the sound tests are final (no further corrections will be applied).

79.11.1 For checks before the race:

- For all 2 stroke engine types: 104 dB/A (+2 dB/A, for consideration of the precision of the method).

- For 4 stroke engine types: 106 dB/A (+2 dB/A, for consideration of the precision of the method)

NOTE: As from 2017, the maximum sound level will be reduced by 3 dB/A

- For all 2 stroke engine types: **101** dB/A (+2 dB/A, for consideration of the precision of the method).

- For 4 stroke engine types: **103** dB/A (+2 dB/A, for consideration of the precision of the method)

79.11.2 For all checks during and after the event:

- For all engine types: + 1 dB/A (for consideration of the degradation of the silencer)

79.12

A machine that does not comply with the Sound limits can be presented several times.

01.80 GUIDELINES FOR USE OF SOUND LEVEL METERS

80.01

The Sound Control Officer (SCO) must arrive in sufficient time for discussions with the Clerk of the Course and other Technical Officials in order that a suitable test site and testing procedure can be agreed.

80.02

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.

80.03 Corrections

Corrections are presented as the 'precision of the method' (see Art.79.11).

80.04 Ambient temperature

No deductions.

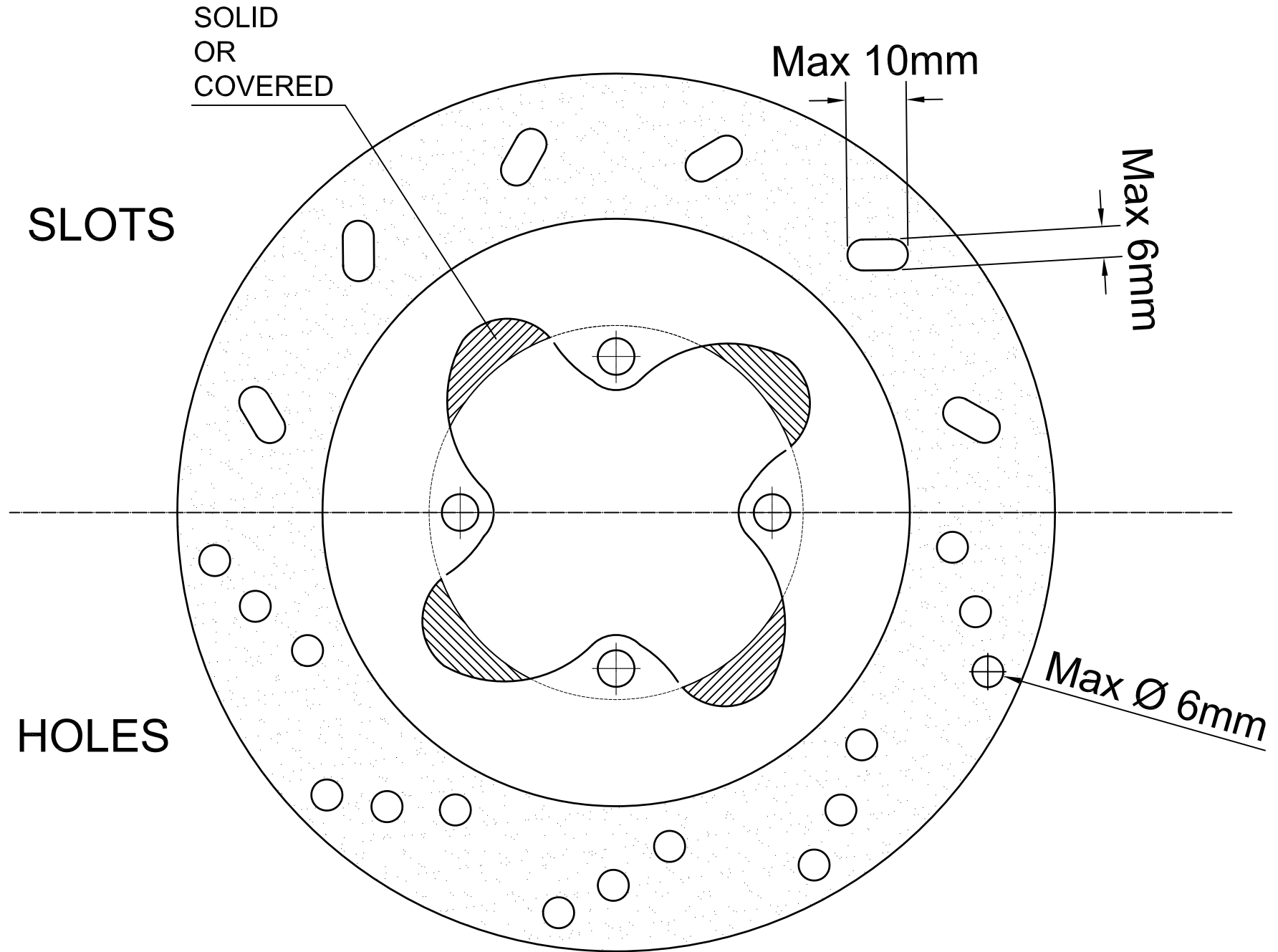
80.05 Action and decisions will depend on the Sporting Discipline concerned, and decisions taken during prior discussions with the FIM Technical Director and/or the Chief Technical Steward.

01.81 TIMEKEEPING

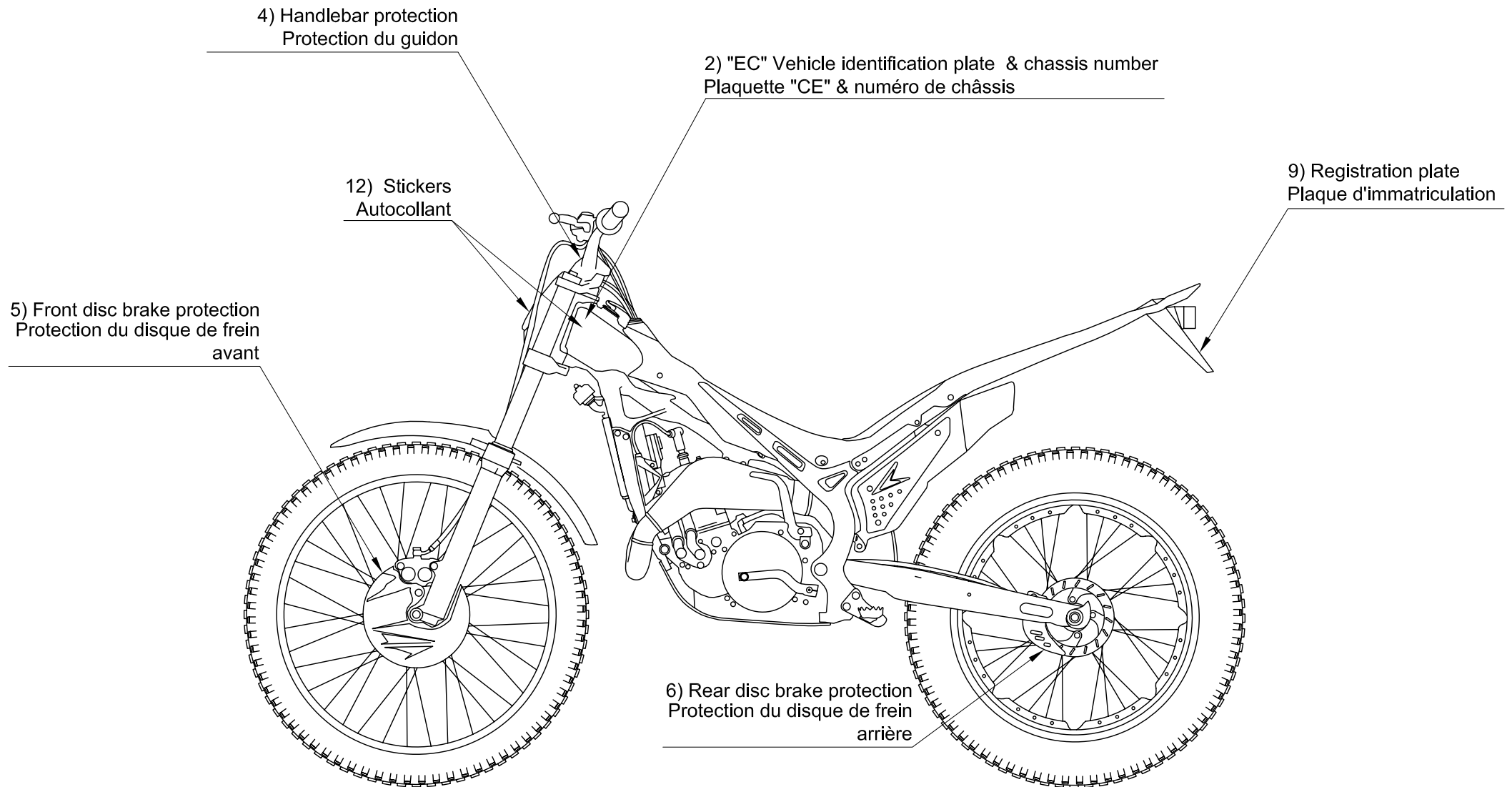
Since 01.01.1993, the Sporting Commission is responsible for Timekeeping.

Diagrams (tba)

REAR BRAKE DISC

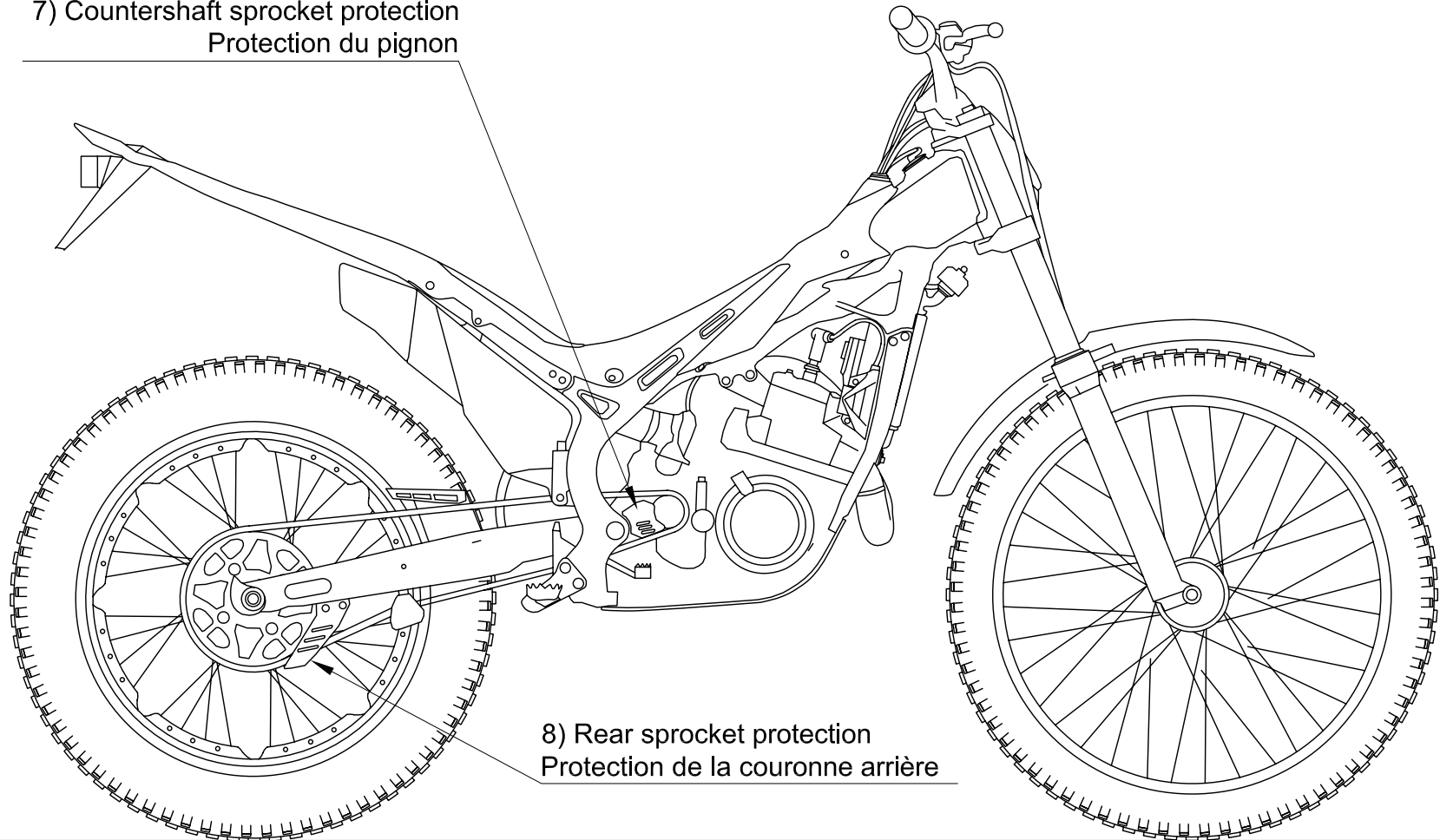


CHECKLIST



CHECKLIST

7) Countershaft sprocket protection
Protection du pignon



8) Rear sprocket protection
Protection de la couronne arrière