



# ALPE ADRIA MOTO 3

## TECHNICAL REGULATIONS

2020



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## **AACR 6.0 ALPE ADRIA MOTO3 TECHNICAL REGULATIONS**

### **AACR 6.1 ENGINES**

#### **AACR 6.1.1 General**

- a) Only 250cc single cylinder normally aspirated 4-stroke engines are permitted.
- b) The maximum cylinder bore diameter is 81 mm.
- c) The number of engines is free.
- d) The maximum engine RPM is currently free. An RPM limit can be determined during the season for balancing reasons.

#### **AACR 6.1.2 Engine Valve Operation**

- a) Valve timing system drive must be by one chain. An intermediate drive gear which rotates on only one axle or rotation centre is allowed in the system.
- b) Only reciprocating inlet and exhaust valves are permitted, with a maximum of 2 valves each for inlet and exhaust.
- c) Pneumatic engine valve closing systems are not allowed.
- d) Variable valve timing and variable valve lift systems, driven by hydraulic and/or electric/electronic systems are not allowed.
- e) Decompression systems which operate only at engine start are permitted.

### **AACR 6.2 ELECTRONICS**

- a) Ignition/fuel injection control unit (ECU) is free.
- b) Data logging system is free.
- c) Quick shifter is free, downshift blipping is allowed.
- d) Telemetry is not allowed.

### **AACR 6.3 FUEL SYSTEM / INTAKE SECTION**

- a) Maximum relative fuel pressure is 5.0 bar.
- b) Variable length intake systems are not allowed.
- c) Only one throttle control valve per throttle body is permitted to control the power demand by the rider, which must be controlled exclusively by mechanical means (e.g. cable) operated by the rider only. No other powered moving devices (except injectors and the idle control air bypass) are permitted in the inlet tract before the engine intake valve. No interruption of the mechanical connection between the rider's input and the throttle is allowed.
- d) Idle speed (including engine braking) adjustment by means of an air bypass system, controlled by the ECU\* is allowed. The maximum size of such air bypass is 12mm equivalent diameter; control systems may include a butterfly-type control valve.
- e) Fuel injectors must be located upstream of the engine intake valves.
- f) A maximum of 2 fuel injectors per throttle body, and 2 independent fuel injector drivers, controlled by the ECU, is permitted.
- g) Other than engine sump breather gases, only air/fuel mixture is permitted in the inlet tract and combustion chamber.

### **AACR 6.4 EXHAUST**

- a) The outlet of the exhaust must not extend behind a line drawn vertically through the edge of the rear tyre.
- b) For safety reasons the exposed edge of the exhaust pipe outlet must be rounded to avoid any sharp edges.
- c) Variable length exhaust systems are not permitted.
- d) Exhaust Gas Recirculation (EGR) systems are not permitted.
- e) No moving parts (e.g. valves, baffles) are permitted in the exhaust system.

## **AACR 6.5 TRANSMISSION**

- a) A maximum of six gear ratios is permitted.
- b) Twin clutch transmission systems (DSG) are not permitted.
- c) Continuously Variable Transmission systems (CVT) are not permitted.
- d) Automatic transmission systems are not permitted. Manual transmissions with gearshifts assisted by quick-shifter systems are permitted.
- e) Gearbox systems must be of the conventional type. That is; constant- mesh with engagement dogs as an integral part of the gear, and/ or shifters (e.g. "dog rings"), actuated by shift forks and shift cam or drum, with only one set of gears engaging at one time. So-called "seamless shift" transmissions (also known as Automated Manual Transmission, Instantaneous Gearchange System, etc.) are not permitted.
- f) Electro-mechanical and/or electro-hydraulic clutch actuating systems are not permitted.

## **AACR 6.6 MATERIALS**

- a) The use of titanium in the construction of the following parts is forbidden:
  - i. The frame/chassis, excluding bolts and fasteners.
  - ii. The swinging arm, excluding bolts and fasteners.
  - iii. The swinging arm spindles.
  - iv. The wheel spindles (for wheels spindles, the use of light alloys is also forbidden).
  - v. The handlebars.
  - vi. The front suspension inner and outer tubes and bottoms (i.e. axle mounting point).
  - vii. The shock absorber piston shaft and damper tube.
- b) The basic structure of the crankshaft and camshafts must be made from ferrous materials, steel or cast iron. Inserts of a different material are allowed in the crankshaft for the sole purpose of balancing.
- c) Pistons, cylinder heads and cylinder blocks cannot be composite structures which use carbon or aramid fibre reinforcing materials.
- d) Brake callipers must be made from aluminium materials with a modulus of elasticity no greater than 80 Gpa.
- e) All connectors from the brake hose to the brake callipers (front and rear) and the brake master cylinders must have structural components (\*) manufactured from either steel or titanium alloys with a tensile strength no less than 500 Mpa.  
\* Brass connectors are permitted for rear brake hoses only.
- f) No parts of the motorcycle or engine may be made from metallic materials which have a specific modulus of elasticity greater than 50 Gpa/(g/cm<sup>3</sup>).
- g) The use of MMC (Metal Matrix Composite) and FRM (Fibre Reinforced Metal) materials is forbidden.
- h) The following materials restrictions apply:
  - i. Engine crankcases, cylinder blocks and cylinder heads must be made from cast aluminium alloys.
  - ii. Pistons must be made from an aluminium alloy.
  - iii. Piston pins must be made from ferrous materials.
  - iv. Connecting rods, valves and valve springs must be made from either ferrous or titanium-based alloys.
  - v. The use of carbon fibre for the main construction of the swing arm is forbidden.

## **AACR 6.7 MINIMUM WEIGHT**

- a) The minimum total weight (motorcycle + rider) in running condition is 152 kg.
- b) At any time of the event, the total weight (motorcycle + rider) must be higher or equal than the minimum total weight.
- c) There is no tolerance on the minimum weight.

- d) During the final inspection at the end of the race, the selected motorcycles will be weighted in the condition they finished the race, and the established weight limit must be met in this condition. Nothing may be added to the motorcycle. This includes all fluids.
- e) During the practice and qualifying sessions, riders may be asked to submit their motorcycle to a weight control. In all cases the rider must comply with this request.
- f) The use of ballast is allowed to stay over the minimum weight limit and may be required due to the handicap system. The use of ballast and weight handicap must be declared to the Chief Technical Steward at the preliminary checks.
- g) The ballast must be made from solid metal piece(s), firmly and 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 higher). Other equivalent technical solutions must be submitted to the Chief Technical Steward for his approval.
- h) Fuel in the tank can be used as ballast.

## **AACR 6.8 SAFETY AND CONSTRUCTION CRITERIA**

### **AACR 6.8.1 Chassis Design and Construction**

- a) The chassis must be a prototype, the design and construction of which is free within the constraints of the FIM Grand Prix Technical Regulations. The main frame, swingarm, fuel tank, seat and fairing/bodywork from a non-prototype (i.e. series production road-homologated) motorcycle may not be used.

### **AACR 6.8.2 Throttle Twist Grips**

- a) Throttle twist grips must close automatically when released.

### **AACR 6.8.3 Steering**

- a) Handlebars must have a width of not less than 450 mm and their ends must be solid or rubber covered. The width of the handlebar is defined as the width measured between the outside of the handlebar grips or throttle twist grips.
- b) There must be at least 15 degrees of movement of the steering each side of the centre line.
- c) Stops must be fitted to ensure a clearance of at least 30 mm between the handlebar and the fuel tank frame and/or bodywork when at the extremes of steering lock.

### **AACR 6.8.4 Footrests**

- a) Footrests must have rounded ends with a minimum solid spherical radius of 8 mm.

### **AACR 6.8.5 Handlebar Levers**

- a) Levers must not be longer than 200 mm measured from the pivot point.

### **AACR 6.8.6 Clearances**

- a) The motorcycle, unloaded, must be capable of being leaned at an angle of 50 degrees from the vertical without touching the ground, other than with the tyre.
- b) There must be a clearance of at least 15 mm around the circumference of the tyre at all positions of the motorcycle suspension and all positions of the rear wheel adjustment.

### **AACR 6.8.7 Breather Pipes**

- a) Any breather pipe from the engine or gearbox must discharge into the airbox and/or a suitable container.

### **AACR 6.8.8 Chain Guards**

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

### **AACR 6.8.9 Engine Covers**

- a) Lateral engine covers containing oil and which could be in contact with the ground during a crash, should be protected by a second cover made from composite materials, e.g. nylon, carbon or Kevlar®. Plates and/ or bars from aluminium or steel are also permitted. All these devices must be designed to be resistant against sudden shocks and abrasion and must be fixed properly and securely.

#### **AACR 6.8.10 Timing Transponders**

- a) All motorcycles must have a correctly positioned timekeeping transponder. The transponder must be supplied or approved by the official Timekeeper and fixed on the side of the motorcycle in the longitudinal centre of the motorcycle (typically close the swing-arm pivot), on either the left or right side, as low as possible and avoiding being shielded by carbon bodywork. The position will be appointed and controlled by the Technical Director.
- b) Correct attachment of the transponder bracket consists of a minimum of 2 tie-wraps, but preferably by screws or rivets. Any transponder retaining clip must also be secured by a tie-wrap. Hook and loop fasteners (e.g. Velcro®) or adhesive alone will not be accepted.
- c) The Chief Technical Steward has the right to refuse any mounting solution not satisfying these requirements.
- d) The transponder must be working at all times during practices and races, also when the engine is switched off.

#### **AACR 6.8.11 Onboard Cameras**

- a) Onboard cameras can only be used with the permission of the Race Direction.
- b) When a rider/team has obtained this permission, the motorcycle with the camera installed must be presented to the Technical Control.
- c) Cameras must be mounted inside the fairing or on the top of the rear seat bodywork.
- d) Cameras must be fixed securely to the motorcycle. Adhesive will only be accepted when it is originally by the camera manufacturer.
- e) Cameras must be secured to the motorcycle with an additional steel cable.
- f) The Chief Technical Steward has the right to refuse any solution not satisfying these requirements.

#### **AACR 6.8.12 Rear Safety Light**

All motorcycles must have a functioning red light mounted at the rear of the motorcycle. This light must be switched on any time the motorcycle is on the track or is ridden in the pit lane and the Race Direction declares the session WET.

All lights must comply with the following:

- a) The rear light must be mounted on the motorcycle during the whole time of the event.
- b) The rear light must be mounted properly with screws. Mounting the rear light with tape is forbidden. Mounting with hook-and-loop fasteners is allowed when the wiring of the light is connected to the motorcycle.
- c) The luminous field should be at least 4cm<sup>2</sup> (e.g. rectangular 4 cm x 1 cm, circular Ø 2.25 cm).
- d) Lightning direction must be parallel to the motorcycle centre line (motorcycle running direction), and be clearly visible from the rear at least 15 degrees to both left and right sides of the motorcycle centre line.
- e) The rear light must be mounted near the end of the seat/rear bodywork and approximately on the motorcycle centre line, in a position approved by the Chief Technical Steward. In case of dispute over the mounting position or visibility, the decision of the Chief Technical Steward will be final.
- f) Power output/luminosity should be equivalent to minimum 10 W (incandescent) or 1 W (LED).
- g) The output must be continuous - no flashing safety light whilst the motorcycle is on the track. Flashing is allowed only in the pit lane when the pit limiter is active.
- h) The safety light power supply may be separated from the motorcycle.
- i) The Chief Technical Steward has the right to refuse any light system not satisfying this safety purpose.

#### **AACR 6.9 BRAKES**

- a) Motorcycles must have a minimum of one brake on each wheel that is independently operated.
- b) Only brake discs of ferrous materials are allowed.
- c) The proportion of ceramic composite materials in brake discs must not exceed 2% by mass.

- d) Ceramic materials are defined as inorganic, non-metallic solids (e.g. Al<sub>2</sub>O<sub>3</sub>, SiC, B<sub>4</sub>C, Ti<sub>5</sub>Si<sub>3</sub>, SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub>).
- e) Motorcycles must be equipped with brake lever protection, intended to protect the handlebar brake lever(s) from being accidentally activated in case of collision with another machine. Acceptable protection includes the fairing extending sufficiently to cover the brake lever, as viewed from the front.
- f) Such devices must be strong enough to function effectively and designed so that there is no risk for the rider to be injured or trapped by it, and it must not be considered a dangerous fitting (at the sole discretion of the Technical Director).
- g) In case the brake lever protection is attached to any part of the braking system (e.g. brake master cylinder), then the brake system manufacturer must officially confirm in writing to the Technical Director that the device does not interfere with the proper brake operation.
- h) Anti-lock Brake Systems (ABS) are not permitted. Braking inputs must be powered and controlled solely by the rider's manual inputs. Conventional hydraulic hand/foot controls such as master/slave cylinders for brake systems are allowed (refer also to Art. 2.6.3.8 Control Systems) but no increase or control of brake pressure by electronic or mechanical systems apart from the rider's direct manual inputs are allowed. Specifically, brake systems designed to prevent the wheel from locking when the rider applies the brake are forbidden.

#### **AACR 6.10      SUSPENSION AND DAMPERS**

- a) Electric/electronic controlled suspension, ride height and steering damper systems are not allowed. Adjustments to the suspension and steering damper systems may only be made by manual human inputs and mechanical/hydraulic adjusters.

#### **AACR 6.11      FUEL TANKS**

- a) Fuel caps must be leak proof and have a positive closing device.
- b) Fuel tank breather pipes must include a non-return valve. Fuel tank breather pipes must discharge into a suitable container, one per motorcycle with a minimum capacity of 200cc.
- c) Fuel tanks of all construction types must be filled with fire retardant material or be lined with a fuel cell bladder.
- d) In all classes, fuel tanks made of non-metallic composite materials (carbon fibre, aramid fibre, glass fibre, etc.) must be fitted with a fuel cell bladder, or have passed the appropriate FIM test standards for composite material fuel tanks as described in the FIM Fuel Tank Test Procedure for fuel tank approval.
- e) Such composite fuel tanks without a fuel cell bladder must bear a label certifying conformity with FIM Fuel Tank Test Standards. Such labels must include the fuel tank manufacturer's name, date of tank manufacture, and name of testing laboratory.
- f) Each manufacturer is requested to inform the FIM/CCR Secretariat of its fuel tank model(s) which have passed the FIM test standards, together with a copy of the fuel tank label.
- g) Full details of the FIM Fuel Tank Test Standards and Procedures are available from the FIM. (<http://www.fim-live.com/en/library/>).
- h) Fuel cell bladders must conform to or exceed the specification FIM/ FCB-2005. Full details of this standard are available from the FIM.
- i) Except for the case that a fuel tank is fixed on the chassis with bolts, all fuel lines from the fuel tank to the engine/injector system should have a self-sealing breakaway valve. This valve must separate at less than 50% of the load required to break any part of the fuel line or fitting or to pull it out of the fuel tank.
- j) Refuelling may only be carried out from an unpressurised container, and the motorcycle fuel tank may not be artificially pressurised above atmospheric pressure at any time. It is allowed to vent the fuel tank to the atmosphere via the airbox in order to equalise pressure in the airbox and fuel tank.

#### **AACR 6.12      BODYWORK**

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

- b) The maximum width of bodywork must not exceed 600 mm. The width of the seat or anything to its rear shall not be more than 450 mm (exhaust pipes excepted).
- c) Bodywork must not extend more than 150 mm beyond a line drawn vertically from the centre of the front wheel spindle and a line drawn vertically at the rearward edge of the rear tyre. The suspension should be fully extended when the measurement is taken.
- d) When viewed from the side, it must be possible to see:
  - i. At least 180 degrees of the rear wheel rim.
  - ii. The whole of the front rim, other than the part obscured by the mudguard, forks, brake parts or removable air-intake.
  - iii. The rider, seated in a normal position with the exception of the forearms.

Notes: No transparent material may be used to circumvent the above rules. Covers for brake parts or wheels are not considered to be bodywork obstructing the view of wheel rims in regard to the above rules.

- e) No part of the motorcycle may be behind a line drawn vertically at the edge of the rear tyre.
- f) The seat unit shall have a maximum height of the (approximately) vertical section behind the rider's seating position of 150 mm. The measurement will be taken at a 90° angle to the upper surface of the flat base at the rider's seating position, excluding any seat pad or covering. Any on-board camera/antenna mounted on the seat unit is not included in this measurement.
- g) Mudguards are not compulsory. When fitted, front mudguards must not extend:
  - i. Front leading edge: In front of a line drawn upwards and forwards at 45 degrees from a horizontal line through the front wheel spindle.
  - ii. Rear trailing edge: Below a line drawn horizontally through the front wheel spindle.

The mudguard mounts/brackets and fork-leg covers, close to the suspension leg and wheel spindle, and brake disc covers are not considered part of the mudguard.
- h) Devices or shapes protruding from the fairing or bodywork and not integrated in the body streamlining (e.g. wings, fins, bulges, etc.) that may provide an aerodynamic effect (e.g. providing downforce, disrupting aerodynamic wake, etc.) are not allowed.
- i) The Technical Director will be the sole judge of whether a device or fairing design falls into the above definition.
- j) Moving aerodynamic devices are prohibited.
- k) 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 (minimum 2.5 litres for Moto3). This measurement should be taken with the fairing fitted to the motorcycle, whilst both wheels are on the ground and the motorcycle is upright at 90° to the horizontal.
- l) The lower fairing should incorporate a maximum of two holes of 25 mm. These holes must remain closed in dry conditions and must be only opened in wet race conditions, as declared by the Race Director.

### **AACR 6.13 WHEEL RIMS**

- a) Permitted wheel rim sizes are as follows:
  - i. Front: 2.50" x 17" only
  - ii. Rear: 3.50" x 17" only
- b) In all classes, composite construction wheels (including carbon fibre reinforced, glass fibre reinforced, and similar) are not permitted. The permitted materials for wheel construction are magnesium and aluminium alloys.
- c) All wheels must conform to the requirements published in the document "FIM Requirements for Grand Prix Wheels 2018", and be certified by the wheel manufacturer. Wheels approved before the end of 2017 under the previous FIM standard (2015) are permitted to be used until the end of their service life.

#### **AACR 6.14 TYRES**

- a) Number of tyres per event: TBD
- b) Tyre suppliers: TBD
- c) Tyres must be a fully moulded type carrying all size and sidewall markings of the tyres for commercial sale to public.
- d) Any modification or treatment of the tyres (cutting, grooving) is forbidden.
- e) Wet tyres and intermediate tyres can be used only when the Race Direction has declared the race or practice "WET".
- f) The use of any device on the wheel to adjust the tyre pressure whilst the motorcycle is on track is not permitted.

#### **AACR 6.15 NUMBERS AND BACKGROUNDS**

- a) The racing number must be affixed to the front of the motorcycle fairing in a central position. Rear or side numbers are optional.
- b) Numbers should must have a minimum height of 120 mm.
- c) Numbers must be easily legible, in a clear simple font and contrast strongly with the background colour.
- d) Numbers must be of one single colour which contrasts strongly with the background colour. A small outline in a different colour is permitted. Two-digit numbers must have a separation (min. 10 mm) between digits so the background colour is visible between digits. Reflective finishes (e.g. silver, gold, etc.) are not permitted.
- e) Backgrounds must be of one single colour over an area large enough to provide a minimum clear area of 25 mm around the numbers.
- f) Reflective finishes (e.g. silver, gold, etc.) are not permitted.
- g) In case of a dispute concerning the legibility of numbers, the decision of the Technical Director will be final.

#### **AACR 6.16 FUEL AND OIL**

- a) All engines must function on normal unleaded fuel with a maximum lead content of 0.005 g/l (unleaded) and a maximum MON of 90 (refer to FIM WORLD CHAMPIONSHIP GRAND PRIX REGULATIONS 2020, Article 2.6.5.1 "Fuel and Oil").
- b) At the technical control, each rider must declare the brand and type of fuel he is using.

#### **AACR 5.7.19 SOUND LEVEL CONTROL**

- a) Sound level is controlled in a static test at 5.500 rpm.
- b) The standard maximum sound level is 107 dB/A with a 3 dB/A tolerance after the race. Some circuits may determine lower limits. This will be published in the Supplementary Regulations of the respective event.