

## 2.4

### **SUPERBIKE TECHNICAL SPECIFICATIONS**

The following rules are intended to give freedom to modify or replace some parts in the interest of safety, research and development and improved competition between various motorcycle concepts.

#### **EVERYTHING THAT IS NOT AUTHORIZED AND PRESCRIBED IN THIS RULEBOOK IS STRICTLY FORBIDDEN**

**If a change to a part or system is not specifically allowed in any of the following articles, then it is forbidden.**

Superbike motorcycles require an FIM homologation (see FIM homologation procedure for Superstock, Supersport and Superbike motorcycles). All machines must be normally aspirated. All motorcycles must comply in every respect with all the requirements for road racing as specified in these technical regulations, unless they are already equipped as such on the homologated model.

Once a motorcycle has obtained the homologation, it may be used for racing in the corresponding class for a maximum period of 8 years (see Homologation art 1.4.4), or until such time that the homologated motorcycle is disqualified by new rules or changes in the technical specifications of the corresponding class.

The appearance from the front, rear and the profile of Superbike motorcycles must (except when otherwise stated) conform in principle to the homologated shape (as originally produced by the manufacturer). The appearance of the exhaust system is excluded from this rule.

#### **2.4.1 Motorcycle specifications**

All parts and systems not specifically mentioned in the following articles must remain as originally produced by the manufacturer for the homologated motorcycle.

#### **2.4.2 Engine configurations and displacement capacities**

The following engine configurations comprise the Superbike class.

Over 750cc up to 1000cc	4 stroke	3- and 4-cylinder
Over 850cc up to 1200cc	4 stroke	2- cylinder

The displacement capacity bore and stroke must remain at the homologated size. Modifying the bore and stroke to reach class limits is not allowed.

#### **2.4.3 Balancing various motorcycle concepts**

In order to equalize the performance of motorcycles with different engine configurations, an air restrictor may be applied according to their respective racing performances.

This handicap is applied only to the '1200cc 2-cylinder' motorcycles.

A new 2-cylinder entry will not be included in the 'Balancing various motorcycle concepts' rules until the performance is proven during the first two years of use in the MotoAmerica Superbike Championship. In the case that a new 2-cylinder entry wins a race in the Dry in the first year, restrictors will be applied from the start of the second year.

A new 2-cylinder entry is considered an entry by a new manufacturer to the championship, not a new model of machine from an existing manufacturer.

The air restrictor handicap will be applied according to the relevant provisions described in Art 2.4.3.3: the size of the intake ports will be changed by means of air restrictors. These changes to the size of the air restrictor diameter will be applied in 2 mm steps.

**Each racing season will begin with the same balancing level as the preceding season finished.**

The MotoAmerica Permanent Bureau can at any time modify the handicap system to ensure fair competition.

#### **2.4.3.2 Balancing calculation**

- a. After three events, the best manufacturers of the 1000cc 4-cylinders and 1200cc 2-cylinders will be selected according to the sum of the points of the best two riders for each manufacturer.
- b. By taking the race points of the riders of the selected 1000cc 4-cylinder manufacturer and of the selected 1200cc 2-cylinder manufacturer in each race, an average will be calculated after every event, the '*event average*'.

If in any of the races there is only one finisher from one of the selected manufacturers, the '*event average*' will be calculated from the first rider of each selected manufacturer in each race.

No '*event average*' points will be calculated if one of the selected manufacturers has no finishers. The '*event average*' will then be calculated based on the results of the other race from the same event.

If neither race has any finishers from one of the selected manufacturers, the event will not be considered.

- c. 'Wet' races (as declared by the Race Direction) are not taken in account for the calculation of an 'event average'.

### **2.4.3.3 Air restrictors for 1200cc 2-cylinders**

Application: Only the 1200cc 2-cylinder engines may be fitted with air restrictors. Should a restrictor be required, then the first restrictor size to be installed will be equivalent to a Ø52mm circular area. Air restrictor size will be adjusted in steps equivalent to a change of 2mm in diameter, between Ø52mm and to a minimum of Ø46mm (None <> Ø52mm <> Ø50mm <> Ø48mm <> Ø46mm), if needed during the Championship, as described below in Art. 2.4.3.4

Definition: An air restrictor is a metallic device with a tract of constant controlled section which is placed in the induction tract between the throttle body and the cylinder head. The length of the controlled tract must be at least 3 mm. No air and/or air-fuel mixture to the engine must by-pass the restrictor. No part of the fuel injection system (injector, needle, slide, etc.) shall extend through the restrictor.

The manufacturer must supply the FIM/MotoAmerica with 10 sets of plug-calibers (-gauges) to check the diameter of the air restrictor when using one of the prescribed sizes (Ø52, Ø50, Ø48, Ø46 mm).

A manufacturer may have a non-circular air restrictor, provided that the area of this restrictor is equivalent to the area of a nominal circular restrictor. In this case, the manufacturer must supply the FIM/MotoAmerica with 10 sets of plug-calibers (-gauges) for measuring the restrictor during the technical verifications.

The FIM/MotoAmerica may also request the manufacturer to supply a cut section of the air restrictor(s) in each of the prescribed sizes.

### **2.4.3.4 Air restrictor adjustment**

The minimum air restrictor size is increased or decreased in 2 mm steps in diameter of equivalent circular area, according to the following procedure:

- a. If the gap in the average value of 'event averages', calculated as described in Art. 2.4.3.2 is more than 5 points in favor of the 1000cc 4-cylinder manufacturer, **and**

If a rider of a 1000cc 4-cylinder motorcycle is leading the riders' MotoAmerica Superbike Championship standings at that time, **then**

The initial air restrictor size of all the 1200cc 2-cylinder motorcycles will be increased by one size, or as a last step, the air restrictor will be

withdrawn.

- b. If the resulting gap of the average value of 'event averages', calculated as described in Art. 2.4.3.2, is more than 5 points in favor of the 1200cc 2-cylinder manufacturer, **and**

If a rider of a 1200cc 2-cylinder motorcycle is leading the riders' MotoAmerica Superbike Championship standings at that time, **then**

The initial air restrictor size of the 1200cc 2-cylinder manufacturers will be reduced by one size, or as a last step, to a minimum of Ø46 mm (or the equivalent area 1661.9 mm<sup>2</sup>).

If the air restrictor size is not updated, then the results of three more events will be considered and the best manufacturers for each engine configuration will be updated considering the sum of points of the best two riders from each selected manufacturer over six events, and updated every third event. A new average value of the 'event averages' will be calculated over six events, until the points gap of the average value of the 'event averages' from the last minimum weight update is higher than 5 points.

The MotoAmerica technical director will inform all the teams about the possible air restrictor size adjustments, within 24 hours from the end of the last event, where the average value of the 'event averages' was calculated. The new air restrictor size adjustments must be applied from the first following event.

#### **2.4.4 Minimum weight**

All machines	168kg (370.5lbs)
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At any time during the event, the weight of the whole motorcycle (including the tank and its contents) must not be less than the minimum weight.

There is no tolerance on the minimum weight of the motorcycle.

During the final technical inspection at the end of each race, the selected motorcycles will be weighed 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.

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.

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 technical director at the preliminary

checks.

#### **2.4.5 Numbers and number plates**

Numbers must be easily legible, in a clear simple font and contrast strongly with the background color. Backgrounds must be of one single color over an area large enough to provide a minimum clear area of 25mm around the numbers.

The sizes for all the front numbers are:	Minimum height:	140 mm
	Minimum width:	80 mm
	Minimum stroke:	25 mm
	Minimum space	
	between numbers:	10 mm
The sizes for all the side numbers are:	Minimum height:	120 mm
	Minimum width:	70 mm
	Minimum stroke:	20 mm
	Minimum space	
	between numbers:	10 mm

The allocated number (& plate) for the rider must be affixed on the motorcycle as follows:

- a. Once on the front, either in the center of the fairing or slightly off to one side; the number must be on a strongly contrasting background. No advertising is allowed within 25mm in all directions.
- b. Once on each side of the lower rear portion of the lower fairing. The number must be on a strongly contrasting background with no advertising within 25mm in all directions.
- c. Any outlines must be of a contrasting color and the maximum width of the outline is 3mm. The background color must be clearly visible around all edges of the number (including outline). Reflective or mirror type numbers are not permitted.
- d. Numbers cannot overlap.

In case of a dispute concerning the legibility of numbers, the decision of the technical director will be final.

#### **2.4.6 Fuel**

- a) Sunoco Apex is the designated fuel.
- b) Please refer to Article: 2.10 for additional details.

#### **2.4.7 Tires**

- a. The maximum number of tires, of any type, available to each rider during the event will be **specified in Article: 2.3.7.1**
- b. A maximum of 11 tires per rider can be mounted at any time.

- c. For Superbike races only, wet tires will not need to be marked with a tire sticker. They will not be considered in the total number of tires available for use; however normal allocation limits still apply.
- d. After the third free practice session, the tire supplier will allocate one (1) rear 'qualifying tire' to all riders that will participate in Superpole.
- e. Qualifying tires can only be used during Superpole. If the qualifying tire is used during any session (excluding Superpole), the rider will lose his qualifying time and must start from the back of the grid.
- f. During free practices, qualifying practices, Superpole for Superbike, warm up sessions and races, front and rear tires are required to be marked with tire stickers.
- g. See article. 2.3.7

## **2.4.8 Engine**

The following engine specifications and components may not be altered from the homologated motorcycle except as noted:

- a. The homologated engine design model cannot be changed.
- b. The method of cam drive must remain as homologated.
- c. The method of valve retention must remain the same as the homologated model. No pneumatic valve retention devices are allowed unless fitted to the homologated model.
- d. The sequence in which the cylinders are ignited (i.e. 1-2-4-3), must remain as originally designed on the homologated model. Simultaneous firing of two (2) cylinders is also forbidden if not adopted on the homologated motorcycle. Up to five (5) degrees firing difference in two (2) cylinders is regarded as 'simultaneous' firing.

### **2.4.8.1 Fuel injection systems**

'Fuel injection systems' refers to the throttle bodies, fuel injectors, variable length intake tract devices, fuel-pump and fuel pressure regulator.

- a. The original homologated fuel injection system must be used without any modification.
- b. The fuel injectors must be stock and unaltered from the original specification and manufacture.
- c. Air funnels may be altered or replaced.
- d. Primary throttle valves cannot be changed or modified.
- e. Secondary throttle valves and shafts may be removed or fixed in the open position and the electronics may be disconnected or removed.
- f. Variable intake tract devices cannot be added if they are not present on the homologated motorcycle and they must remain identical and operate in the same way as the homologated system. All the parts of the variable intake tract device must remain exactly as homologated (except the air funnels). Variable intake tract devices may be replaced with fixed air funnels.

- g. Air and air-fuel mixture must go to the combustion chamber exclusively through the throttle body valves.
- h. Electronically controlled throttle valves, known as 'ride-by-wire', may be only used if the homologated model is equipped with the same system.
- i. If the variable intake tract actuation mechanism mounts or fuel injector mount is an integrated part of the air funnel, then those parts alone may be redesigned maintaining the exact geometry of the original parts.

#### **2.4.8.2 Cylinder head**

The cylinder head must be the originally fitted and a homologated part. The following modifications are allowed:

- a. The cylinder head must begin as a finished production part using homologated materials and castings. Material may only be added by epoxy or removed by machining. No machining or modification is allowed in the cam box / valve mechanism area.
- b. The intake and exhaust system including the number of valves and/or ports (intake and exhaust) must be as homologated.
- c. Porting and polishing of the cylinder head normally associated with individual tuning such as gas flowing of the cylinder head, including the combustion chamber, is allowed. Epoxy may be used to shape the ports.
- d. The throttle body intake insulators may be modified.
- e. The compression ratio is free.
- f. The combustion chamber may be modified.
- g. Valves must remain as homologated.
- h. Valve seats can be modified or replaced for repair. The material must remain as homologated.
- i. Valve guides must remain as homologated. Modifications in the port area are allowed by machining.
- j. Valve springs may be altered or replaced; their material must remain as homologated. An additional spring may be added or the spring may be removed.
- k. Valve spring retainers, collets and/or spring seats may be altered or replaced.
- l. Valves must remain in the homologated location and at the same angle as the homologated valves.
- m. Rocker arms (if any) must remain as homologated.
- n. The exhaust air bleed system must be blocked and the external fittings on the cam cover(s) may be replaced by plates.
- o. The shim buckets / tappets may be replaced but must be the same height, diameter, material type, surface finish and shim to top surface dimension as the homologated part. The weight must be equal to or greater than the homologated part.
- p. The homologated cylinder head / cam cover may be replaced by a cosmetic replica of higher specific weight material (i.e. replace

magnesium part with aluminum).

#### **2.4.8.3 Camshaft**

- a. Camshafts may be altered or replaced from those fitted to the homologated motorcycle.
- b. Offsetting the camshaft is not allowed. The camshaft must remain in the homologated location.

#### **2.4.8.4 Cam sprockets or cam gears**

- a. Camshaft sprockets, pulleys or gears may be altered or replaced to allow degreeing of the camshafts.
- b. The cam chain or cam belt tensioning device(s) can be modified or changed.
- c. The cam chain may be altered or replaced but must remain the same type.

#### **2.4.8.5 Cylinders**

- a. Cylinders must be the originally fitted and homologated part with no modification allowed.
- b. The cylinder base gasket(s) may be changed.

#### **2.4.8.6 Pistons**

- a. Must be the originally fitted and homologated part with no modification allowed.

#### **2.4.8.7 Piston rings**

- a. Must be the originally fitted and homologated part with no modification allowed.

#### **2.4.8.8 Piston pins and clips**

- a. Must be the originally fitted and homologated part with no modification allowed.

#### **2.4.8.9 Connecting rods**

- a. Connecting rods may be altered or replaced from those fitted to the homologated motorcycle. The weight must be the same or greater than the original homologated part.
- b. The material must be the same type as the homologated item (e.g. steel, titanium, alloy) or steel.
- c. If the original connecting rod is fitted with a little end insert, then



the replacement connecting rods may also have an insert of the same material as fitted in the original homologated connecting rod.

- d. If the original homologated connecting rod is not fitted with a little end insert then the replacement connecting rods may be fitted with an insert of the same material as the connecting rod or steel.
- e. The center to center (little end to big end) length of the rod must be the same as the original homologated item.
- f. Connecting rod bolts are free.

#### **2.4.8.10 Crankshaft**

Only the following modifications are allowed to the homologated crankshaft:

- a. Bearing surfaces may be polished.
- b. Surface treatments may be applied to the crankshaft.
- c. Balancing is allowed but only by the same method as the homologated crankshaft. For example, heavy metal (i.e. Mallory metal inserts), is not permitted unless originally specified in the homologated crankshaft.
- d. The addition or reduction in weight of the crankshaft in order to reach a racing balance can be no higher than **5%** of the homologated weight without the tolerance as shown on the homologation specification of the crankshaft.
- e. The balancing must be performed by the original method (e.g. drilling or machining) and in the same position (e.g. edge of flywheels).
- f. Polishing of the crankshaft is not allowed.
- g. Balance shaft must remain as homologated. No modifications are allowed.

#### **2.4.8.11 Crankcase / Gearbox housing**

- a. Crankcases must be the originally fitted and homologated part with no modification allowed. If the crankcases have integral cylinders, then the top face of the cylinder may be machined to adjust deck height. Oil spray nozzles may be modified. No other modifications are allowed (including painting, polishing and lightening).
- b. It is not allowed to add a pump used to create a vacuum in the crankcase. If a vacuum pump is installed on the homologated motorcycle, then it may be used only as homologated.
- c. Oil-pan (sump) may be altered or replaced and oil pick up may be altered or replaced.
- d. One threaded port may be altered for direct oil pressure/temperature sensor fitting in the crankcases or engine covers.
- e. See 2.4.10.1 f.
- f. The oil breather cover must remain as homologated but the internal breather/damper plate can be modified or replaced.

#### **2.4.8.11.1 Lateral covers and protection**

- a. Lateral (side) covers may be altered, modified or replaced (excluding pump covers). If altered or modified, the cover must have at least the same resistance to impact as the original one. If replaced, the cover must be made in material of the same or higher specific weight and the total weight of the cover must not be less than the original one.
- b. Titanium bolts may be used to fasten lateral covers.
- c. All lateral covers/engine cases containing oil and which could be in contact with the ground during a crash, must be protected by a second cover made from metal such as aluminum alloy, stainless steel, steel or titanium. Composite covers are not permitted.
- d. The secondary cover must cover a minimum of 1/3 of the original cover. It must have no sharp edges to damage the track surface. The technical director's decision on suitability is final.
- e. Plates or crash bars from aluminum or steel also are permitted in addition to these covers. All of these devices must be designed to be resistant against sudden shocks, abrasions and crash damage.
- f. FIM approved covers will be permitted without regard of the material or dimensions.
- g. These covers must be fixed properly and securely with a minimum of three (3) case cover screws that also mount the original covers/engine cases to the crankcases.
- h. Oil containing engine covers cannot be secured with aluminum bolts.
- i. The technical director has the right to refuse any cover not satisfying this safety purpose.

#### **2.4.8.12 Transmission / Gearbox**

- a. Transmission shafts and gear set must begin as originally fitted and homologated. Shimming is allowed.
- b. Undercutting and surface treatments are permitted.
- c. OEM shift drum detent stars may be modified or replaced.
- d. External quick-shift systems are permitted (including wire and potentiometer).
- e. Countershaft sprocket, rear wheel sprocket, chain pitch and size can be changed. Chain master links must be rivet type.
- f. Final drive system, if not by chain, may be modified to chain type using kits specified on the eligible equipment list.
- g. The sprocket cover may be modified or eliminated.

#### **2.4.8.13 Clutch**

- a. Aftermarket or modified clutches are permitted.
- b. Back torque limiters are permitted.
- c. Friction and drive discs may be changed.
- d. Clutch springs may be changed.
- e. No power source (i.e. hydraulic or electric) can be used for clutch operation if not installed in the homologated model for road use. Human power is

- excluded from the ban.
- f. Clutch system type (wet or dry / single or multi-plate) and method of operation (cable/hydraulic) must remain as homologated.
  - g. The clutch basket (outer) must be the originally fitted and homologated part but may be reinforced.

#### **2.4.8.14 Oil pumps and oil lines**

- a. The originally fitted and homologated oil pumps may be modified but only the original pump parts may be modified and/or shims/spacers added. Modifications include:
  - i. Blueprinting
  - ii. Changing the oil pressure relief spring
  - iii. Reducing gear and/or housing thickness
- b. The external appearance must remain as homologated.
- c. Oil lines may be modified or replaced. Oil lines containing positive pressure, if replaced, must be of ~~metal~~ **braided** reinforced construction with swaged or treaded connectors.

#### **2.4.8.15 Radiator / Oil cooler**

- a. The only liquid engine coolant permitted is water.
- b. The original radiator or oil cooler may be altered or replaced from those fitted to the homologated motorcycle.
- c. Additional radiators or oil coolers may be added.
- d. The original oil/water heat exchanger may be modified, replaced or removed.
- e. The cooling system hoses and catch tanks may be changed.
- f. The radiator fan and wiring may be changed, modified or removed.
- g. The oil cooler must not be mounted on or above the rear mudguard.
- h. The appearance from the front, rear and profile of the motorcycle must in principle conform to the homologated shape after the addition of additional radiators or oil coolers.

#### **2.4.8.16 Air box**

- a. The air box must be the originally fitted and homologated part with no modification allowed except as noted in the following:
  - i. If the homologated air box is used to mount top type fuel injectors, then the air box and the attached systems must remain as homologated.
  - ii. If the homologated air box is used to mount variable intake tract devices, then the air box and the attached systems must remain as homologated and function in the same way (excepting the air funnels – see article 2.4.8.1).
  - iii. If used, variable intake tract devices must function in the same way as on the homologated system (see article 2.4.8.1).

- b. Air filters, internal flap type valves, sensors and vacuum fittings may be removed, modified or replaced with aftermarket parts.
- c. Any holes in the air box to the outside atmosphere resulting from the removal of components must be completely sealed from incoming air.
- d. The air box drains must be sealed.
- e. Ram air tubes or ducts running from the fairing to the air box may be modified, replaced or removed. If tubes/ducts are utilized, they must be attached to the original, unmodified air box inlets.
- f. All motorcycles must have a closed breather system. All the oil breather lines must be connected (may pass through an oil catch tank) and exclusively discharge in the air box.
- g. If the top of the air box is formed by the bottom of the tank, then that part of the tank will be considered as the air box and must conform to its homologated shape excepting two (2) mm variance in corner radii and must be the same volume. A dry-break / quick-release connector may be fitted (see article 2.4.8.17).
- h. Additional heat shielding is allowed to be applied to the lower face / side of the air box (i.e. foil heat tape).

#### **2.4.8.17 Fuel supply**

- a. The fuel pump and fuel pressure regulator must be the originally fitted and homologated part with no modification allowed.
- b. The fuel pressure must be as homologated. The pressure tolerance at the technical control is +/- 0.5 bar in respect to the maximum pressure of the homologated motorcycle. All motorcycles must have a special device on the fuel line in accordance with FIM specifications for fuel pressure checks, or teams must provide a temporary adaptor to allow checks.
- c. Fuel lines from the fuel tank up to the injectors (fuel hoses, delivery pipe assembly, joints, clamps, fuel canister) may be replaced and must be located in such a way that they are protected from crash damage.
- d. Quick connectors or dry break connectors may be used.
- e. Fuel vent lines may be replaced.
- f. Fuel filters may be added.

#### **2.4.8.18 Exhaust system**

- a. Exhaust pipes, catalytic converters and silencers may be altered or replaced from those fitted to the homologated motorcycle. Catalytic converters must be removed.
- b. The number of the final exhaust silencer(s) must remain as homologated. The silencer(s) must be on the same side(s) as on the homologated model.
- c. For safety reasons, the exposed edge(s) of the exhaust pipe(s) outlet(s) must be rounded to avoid any sharp edges.
- d. Wrapping of exhaust systems is not allowed except in the area of

the rider's foot or an area in contact with the fairing for protection from heat.

The noise limit for Superbikes will be 115 dB/A (with a 3 dB/A tolerance after the race only) measured at 6000rpm (4-cylinder) and 5500rpm (2-, 3-cylinder).

The test will be carried out according to the details noted in Article 2.14

#### **2.4.9 Electronic control system**

- a. The engine control system (including ECU) must be either:
  - i. A DWO/FIM approved "Superbike Kit" system (See art 2.4.9.1)
  - ii. **The homologated ECU with or without software changes**
  - iii. DWO/FIM approved "Superstock 1000" kit model
- b. No other external ignition/injection controllers, traction control modules or other active expansion modules or calculation units may be fitted.
- c. The central unit (ECU) may be relocated.
- d. The original speedometer and tachometer may be altered or replaced.
- e. Telemetry (remote signals to or from the bike) is not allowed.
- f. No remote or wireless connection to the bike for any data exchange or setting is allowed whilst the engine is running or the bike is moving.
- g. Spark plugs, spark plug caps and HT leads (if applicable) are free.
- h. Battery is free.

##### **2.4.9.1 The DWO/FIM approved "Superbike Kit" system must meet the following:**

- a. The system must be a complete package including all electrical / electronic parts not supplied on the homologated motorcycle required for full operation of all strategies – except the wiring harness.
- b. Only the machine manufacturer or one approved partner can submit a single system for approval.
- c. The total price of the complete system including ECU, dashboard/display, all additional sensors essential for full operation of all strategies, IMU, software, enable codes, data logging, analysis software, ECU 'tuning' or 'setting' software, data logger, download/connection cable, example harness design, manual for use, (not a complete list), is €8000 Euro (excluding taxes). Data logging only sensors are excluded from the price cap.
- d. There must be at least 50 "Superbike Kit" systems (currently approved system) available worldwide per season, if ordered, through authorized distributors or dealers. The "Superbike Kit" system must be marked and considered as for race use only.
- e. Lead time less than 8 weeks
- f. The ECU must be from the FIM/DWO approved superbike ECU list.
- g. The following sensors may be used:
  1. Throttle position (multiple)
  2. Map sensor, map sync (pressure sensor on the intake port used to

- synchronize the engine during the start)
3. Air box pressure
  4. Engine pick-ups (cam, crank) (Crank trigger may be replaced.)
  5. Lambda
  6. Exhaust valve/motor position/feedback
  7. Twist grip position
  8. Front speed
  9. Rear speed
  10. Gearbox output shaft speed
  11. Gear position
  12. Gear shift load cell
  13. Front brake pressure
  14. Rear brake pressure
  15. Oil pressure
  16. Air pressure
  17. Water temperature
  18. Air temperature
  19. IMU (various signals)
  20. Transponder / lap time signal
  21. Knock sensor
  22. Fuel pressure
  23. Oil temperature
  24. Fork position
  25. Shock position
  26. Tilt / tip-over switch
  27. GPS unit
  28. Rear tire temperature (external) (multiple)
  29. Rear tire monitor (temperature and pressure)
- h. Sensors on the above list that are originally fitted to the standard machine may be replaced with alternative sensors, however they must be included in the Superbike Kit System and inside the total price (article 2.4.9.1.c).
  - i. Two (2) additional sensor channels (that are not included in the above list) may be added to the machine.
  - j. Redundant/doubled sensors are allowed but must be included in the "Superbike Kit" system if they are required for safe operation.
  - k. Analog/logic to CAN sensors are allowed.
  - l. The sensors originally fitted to the homologated machine and used as homologated, will not be included in the price limit.
  - m. When the following sensors are damaged through crashes they may be replaced by parts of the same function but do not have to be the same specific part from the "Superbike Kit" system:
    - i. Fork and shock potentiometers
    - ii. Brake pressure sensors
    - iii. Gear shift sensor (but must remain the same type included with the kit – i.e. load cell, switch, etc.)
  - n. Before the pre-season test, before the mid-season test(s) or at the season midpoint and within three hours of the last race of the season any firmware

/ software updates being used by the factory teams must be made available to all same manufacturer customer SBK teams (more frequent updates are allowed).

- o. The manufacturer must provide current strategies but may remove the ability to change or see these settings. Base mapping must be provided.
- p. Only firmware and software from the FIM/DWO approved software and firmware list may be used.
- q. Factory teams may use any development firmware and software which will be made available to teams according to the update schedule.
- r. Any essential hardware updates required must be made available to customer teams from the same race as the factory team and available free of charge to update those "Superbike Kit" systems purchased in the current season.
- s. The transponder is NOT included in the "Superbike Kit" system.
- t. The selection of logged channels is free.
- u. Coils and coil drivers are free and must be included in the "Superbike Kit" system if altered.
- v. No other external ignition/injection controllers, traction control modules or other active expansion modules or calculation units may be fitted unless included in the Superbike System.
- w. The factory teams must use the current season's "Superbike Kit System". No backdated parts may be used.
- x. Superbike kit systems remain approved for three (3) seasons (first season inclusive).

*Manufacturer nominated "Superbike Kit" system suppliers please also see "Superbike Kit System Approval Requirements" documentation.*

#### **2.4.9.2 Homologated ECU and DWO/FIM approved 'Superstock 1000' kit model.**

- a. The originally fitted and homologated ECU may be used with or without software changes.
  - i. The homologated ECU cannot have any hardware or physical modifications.
  - ii. No extra sensors may be added for control strategies except for shift rod sensors and lambda sensors.
  - iii. Software changes may include, but are limited to, the same control strategies as the "Superbike Kit" system. (See 2.4.9.1)
  - iv. Maximum retail price of the ECU, software and combined or separate data logging systems must meet the same requirements as the DWO/FIM Superstock 1000 kit. (See Article 2.6.9.1-)
- b. For complete DWO/FIM approved Superstock 1000 kit requirements, see article 2.6.9.1

#### **2.4.9.3 Generator, alternator, electric starter**

- a. The stator/coils must be the originally fitted and homologated parts with no modification allowed.
- b. The flywheel may be modified or replaced.
- c. The ACG must generate sufficiently to maintain battery charge.
- d. The use of a 'booster' battery is permitted except during parc fermé.
- e. The electric starter must operate normally and always attempt to start the engine during the event.
- f. During parc fermé, the starter must crank the engine at a suitable speed for starting for a minimum of 2 seconds without the use a boost battery. No boost battery may be connected to the machine after the end of the session.
- g. The starter motor gear system must be the originally fitted and homologated parts. Surface and hardening treatments are allowed.
- h. Motorcycles should self-start on the starting grid in neutral. Push-starting on the starting grid is not allowed, however start line officials may push start the motorcycle if necessary (in gear).

#### **2.4.9.4 Wiring harness**

- a. The wiring harness is free.
- b. Each team must provide a download connection lead to the technical director.

#### **2.4.10 Main frame and spare motorcycle**

- a. During the entire duration of the event each rider may only use one (1) complete motorcycle, as presented for technical control, with the frame clearly identified with a seal. In case the frame needs to be replaced, the rider or the team must request the use of a spare frame to the technical director.
- b. One (1) spare complete motorcycle is allowed per rider.
- c. A team may opt to have one (1) spare machine shared by two or more riders.

#### **Explanation of Procedures:**

Only one (1) complete motorcycle may be presented for the preliminary technical checks and it will be the only motorcycle allowed on the track and in the front of pit box during the practices, qualifying, Superpole and races.

The frame of this motorcycle will be officially sealed by the technical director or by his appointed staff. The seal will bear a serial number, which will be recorded. Any attempt made to remove the seal will damage it irreparably.

At any time during the event the technical stewards, under the direction of the technical director, may check the seal and verify that it conforms to the motorcycle and rider it was assigned to. For cross reference every frame must have a unique number (VIN) punched on the steering-head.



If the primary or active motorcycle is damaged in a crash or in any other incident and is declared unrepairable (safely and in the available time) by the technical director or his appointed staff then the seal on the damaged motorcycle will be destroyed by the technical staff and the chassis of this motorcycle must not be used for the remainder of the event. The new serial number will be recorded by the technical director.

During set up day (usually the day before first official practice session) no restrictions apply regarding the location of the spare motorcycle. From the start of the first practice session, any spare motorcycle must be kept out of view. It is recommended that team working areas incorporate an area for this purpose. During an event, minor adjustments may be made to the spare motorcycle, the intent being to allow teams to maintain parity with the primary bike.

In the event the spare motorcycle is used in competition, the primary machine is taken out of competition. At that time, the damaged machine must be kept out of view.

The spare machine can only be used in the next session to which the incident occurred rendering the primary bike not able to be used. In a race situation, if the primary bike is required to be replaced with the spare machine at any time during Race 1, the first opportunity to use the spare machine is the next session or race. A race will be deemed to have begun when the rider exits pit lane for the sighting laps. All restarts, including those three laps or less, are a continuation of the original race or session.

The team may rebuild the original primary machine, however only in the case of TOTAL PROVEN WRECKAGE with the spare bike can an application be made to utilize the original machine. The decision of the technical director regarding this is final.

The damaged frame may be impounded by the technical director for later examination

#### **2.4.10.1 Frame body and rear sub-frame**

The main frame must be the originally fitted and homologated part with only the following modifications allowed:

- a. The main frame may only be altered by the addition of gussets or tubes. No gussets or tubes may be removed; other modifications are allowed within the following section of these rules.
- b. Holes may be drilled on the frame only to fix approved components (e.g. fairing brackets, steering damper mount).
- c. The engine must be mounted in the homologated position.
- d. Suspension linkage mounting points on the frame must remain as homologated.

- e. The steering stem axis/position may be adjusted by moving the steering head bearings. The fore and aft position of each bearing can be a maximum +/-9 mm in respect to the original bearing location (excluding tolerances). Fore and aft is considered at the intersection of the pivot axis and the original bottom plane of the bearing cup/insert. If no insert is fitted in the homologated machine then it is considered along the bottom plane of the original bearing seat.
  - i. If the homologated machine has exchangeable bearing inserts/bushings: The bushings/inserts are free to make the above adjustment and the homologated position is considered as the position in which the production motorcycle is supplied.
  - ii. If the homologated motorcycle has fixed bearing positions for the steering stem: Steering angle changes are permitted by fitting inserts onto the bearing seats of the original steering head. The original bearing seats may be modified (ovaled) or increased in diameter to insert special bushings. No part of these special bushings may protrude axially more than three (3) mm from the original steering head pipe location nor may the bearing be inset. The steering head pipe can be reinforced in the area of the bearing seats. Welding and machining is allowed for the purpose of making these modifications.
- f. The swing arm pivot axis may be moved a maximum of five (5) mm radially (excluding tolerances) measured from the homologated axis. Modifications may be made to the frame at the swing arm pivot area to allow this. Welding and machining is allowed for the purpose of making this modification, regardless of the technology used and the dimensions of the component or section of the frame (e.g. cast, fabricated, etc.). The method of adjustment is free (e.g. bushings, inserts, offset axles). For machines fitted with exchangeable inserts as standard then the homologated position is considered as the position in which the production motorcycle is supplied. Should this pivot / these axles pass through the crankcases then the relevant crankcase mounting hole may be machined larger. No welding or other modifications will be permitted. Crankcases may be machined for swingarm clearance only.
- g. The original lock stops may be removed from the frame body by grinding or machining. However, another form of lock stop must be fitted.
- h. All motorcycles must display a vehicle identification number punched on the frame body (a proper "legal VIN" or a unique designation by the team to which the technical director may choose to append). No detachable plates are permitted.
- i. No polishing or surface refinishing is allowed but the paint scheme is not restricted.
- j. Front and rear sub frame may be changed, altered or removed.

#### **2.4.10.2 Suspension - General**

- a. Participants in the Superbike class must only use the approved

- and listed suspension units for that season.
- b. The approved products from the manufacturers must be available to all participants at least one month before the first round of the Superbike season and remain available all season. The products must be available within six (6) weeks of a confirmed order.
  - c. Setting parts and tuning parts must be provided by the suspension manufacturers to all customers/teams/participants using the manufacturer's products. These parts can be used by all participants during the season. These parts shall be available for immediate delivery to all teams/customers.
  - d. Teams may not modify any part of the forks or shock absorber. All setting parts must be supplied by the suspension manufacturer and available to all teams/riders.
  - e. The suspension manufacturers are allowed to offer service contracts when a team is using the approved and listed suspension products. The suspension manufacturers cannot demand a service contract for a customer or participant in order to obtain a suspension product.
  - f. Electronic suspension must be removed.
  - g. An electronic controlled steering damper can only be used if installed on the homologated model for road use. However, it must be completely standard (any mechanical or electronic part must remain as homologated).

#### **2.4.10.3 Front suspension**

- a. The front fork in whole or part may be changed but must be the same type homologated (e.g. leading link, telescopic, etc.).
- b. The upper and lower fork clamps (triple clamp, fork bridges) and stem may be changed or modified.
- c. A steering damper may be added or replaced with an 'after-market' damper.
- d. The steering damper cannot act as a steering lock limiting device.

#### **2.4.10.4 Swing-arm (rear fork)**

- a. The rear fork may be altered or replaced from those fitted to the homologated motorcycle. However, the type (single or double sided) must remain as homologated.
- b. The use of carbon fiber or Kevlar® materials is not allowed if not homologated on the original motorcycle.
- c. A chain guard must be fitted in such a way as to reduce the possibility that any part of the rider's body may become trapped between the lower chain run and the rear wheel sprocket.
- d. Rear wheel stand brackets may be added to the rear fork by welding or by bolts.
- e. Brackets must have rounded edges (with a large radius). Fastening screws must be recessed.
- f. Swing arm spindle (pivot) may be modified or replaced.

#### **2.4.10.5 Rear suspension unit (shock)**

- a. Rear suspension unit may be changed but a similar system must be used (i.e. dual or mono).
- b. The rear suspension linkage may be modified or replaced.
- c. The original fixing points on the frame (if any) must be used to mount the shock absorber, linkage and/or rod assembly fulcrum (pivot points).
- d. Removable top shock mounts may be replaced. If replaced they must retain their homologated geometry.

#### **2.4.10.6 Wheels**

- a. Wheels may be replaced but not modified (see article 2.3.4) and associated parts may be altered or replaced from those fitted to the homologated motorcycle.
- b. Aftermarket wheels must be made from aluminum (aluminum) alloys.
- c. The use of the following alloy materials for the wheels is not allowed: Beryllium ( $\geq 5\%$ ), Scandium ( $\geq 2\%$ ), Lithium ( $\geq 1\%$ ).
- d. Each specific racing wheel model must be approved and certified according to JASO (Japanese Automotive Standards Organization) T 203-85 where W (maximum design load) of art. 11.1.3 is 195 kg for front wheel and 195 kg for rear wheel, K = 1.5 for front and rear wheels. Static radius of tire: front 0.301 m, rear 0.331 m.
- e. Wheel manufacturers must provide copy of the certificate for their wheel(s) as proof of compliance to the technical director when requested.
- f. The homologated road bike wheel and sprocket carrier assembly may be used with no modification irrespective of material. They must meet article 2.4.10.6(d)(e). Bearings and spacers may be changed.
- g. On motorcycles equipped with a double-sided swing arm (rear fork), the rear sprocket and brake rotor must remain on the rear wheel when the wheel is removed.
- h. Bearings, seals, and axles may be altered or replaced from those fitted to the homologated motorcycle. The use of titanium and light alloys is forbidden for wheel spindles (axles).
- i. Wheel balance weights may be discarded, changed or added to.
- j. Any inflation valves may be used.

Wheel rim diameter size (front and rear)	17 inches
Front wheel rim width:	3.50 inches
Rear wheel rim width:	6.00 inches

#### **2.4.10.7 Brakes**

- a. Participants in the Superbike season must only use the approved and listed front brake parts (calipers, master cylinders, brake discs, brake pads and dry break systems) for that season.

- b. The approved products from the manufacturers must be available to all participants at least one month before the first round of the MotoAmerica Superbike season, and remain available all season. The products must be available within four (4) weeks of a confirmed order.
- c. No parts can be added to the approved list during the current season. Performance related updates are not allowed. Any product changes due to manufacturing or material supply issues must be approved in advance.
- d. Front brake master cylinders may be altered or replaced from those fitted to the homologated motorcycle.
- e. Front brake calipers may be altered or replaced from those fitted to the homologated motorcycle.
- f. Rear brake master cylinders may be altered or replaced from those fitted to the homologated motorcycle.
- g. Rear brake calipers may be altered or replaced from those fitted to the homologated motorcycle.
- h. Brake pads or shoes may be altered or replaced from those fitted to the homologated motorcycle.
- i. Brake hoses and brake couplings may be altered or replaced from those fitted to the homologated motorcycle. The split of the front brake lines for both front brake calipers must be made above the lower fork bridge (lower triple clamp).
- j. Brake discs may be altered or replaced from those fitted to the homologated motorcycle. Only steel (max. carbon content 2.1 wt. %) is allowed for brake discs. Alloys containing beryllium are not allowed to be used for brake calipers.
- k. The Anti-Lock Brake System (ABS) must be removed.
- l. The Anti-Lock Brake System (ABS) can be disconnected and its ECU can be dismantled. The ABS rotor wheel can be deleted, modified or replaced.
- m. Motorcycles must be equipped with brake lever protection, intended to protect the handlebar brake lever from being accidentally activated in case of collision with another motorcycle.
  - i. Composite guards are not permitted. FIM approved guards will be permitted without regard to the material. Only composite guards need to be approved.
  - ii. The technical director has the right to refuse any guard not satisfying this safety purpose.
- n. **Brake caliper bolts must be safety wired; the use of clips is permitted.**

#### **2.4.10.8 Handlebars and hand controls**

- a. Handlebars, hand controls (subject to Art 2.4.8.1) and cables may be altered or replaced from those fitted to the homologated motorcycle.
- b. Cable operated throttles (grip assembly) must be equipped with both an opening and a closing cable including when actuating a remote ride by wire grip/demand sensor.

- c. Motorcycles must be equipped with a functional ignition kill switch or button mounted on the right hand handlebar (within reach of the hand while on the hand grips) that is capable of stopping a running engine. The button or switch must be red.

#### **2.4.10.9 Foot rest and foot controls**

- a. Foot rests, hangers/brackets and hardware may be replaced and relocated but the hangers/brackets must be mounted to their original frame mounting points.
- b. Foot controls: gearshift and rear brake must remain operated manually by foot.
- c. Foot rests may be rigidly mounted or a folding type which must incorporate a device to return them to the normal position.
- d. The end of the foot rest must have at least an eight (8) mm solid spherical radius.
- e. Non-folding footrests must have an end (plug) which is permanently fixed, made of aluminum, plastic, Teflon® or equivalent type of material (min. radius of eight (8) mm). The plug surface must be designed to reach the widest possible area of the footrest. The technical director has the right to refuse any plug not satisfying this safety purpose.

#### **2.4.10.10 Fuel tank**

- a. The fuel tank must conform in principle to the homologated appearance and location of the original tank; however, its actual shape can be slightly changed to suit the rider's preference and increased fuel volume. The tank may also be modified below the upper frame line and under the seat.
- b. The tank may be replaced by a fuel cell and a structural cover.
- c. The material of construction of the fuel tank may be altered from the one of the tank fitted to the homologated motorcycle.
- d. All fuel tanks must be filled with fire retardant material (e.g. fuel cell foam), or be fitted with a fuel cell bladder.
- e. Fuel tanks made of composite materials (carbon fiber, aramid fiber, glass fiber, etc.) must have passed the FIM Standards for fuel tanks or be lined with a fuel cell bladder.
- f. Tanks made of composite material must bear the label certifying conformity with FIM Fuel Tank Test Standards. Fuel tanks without a fuel cell bladder must bear a label certifying conformity with FIM Fuel Tank Test Standards.
- g. Such labels must include the fuel tank manufacturer's name, date of tank manufacture and name of testing laboratory.
- h. Each manufacturer is required 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. Full details of the FIM Fuel Tank Test Standards and Procedures are available from the FIM (See 'Fuel Tank Test Standards' below).
- i. Fuel cell bladders must conform to or exceed the specification FIM/FCB-

2005. Full details of this standard are available from the FIM.

- j. The fuel tank must be fixed to the frame from the front and the rear with a crash-proof assembly system. Bayonet style couplings cannot be used, nor may the tank be fixed to any parts of the streamlining (fairing) or any plastic part. The technical director has the right to refuse a motorcycle if he is of the opinion that the fuel tank fixation is not safe.
- k. The original tank may be modified to achieve the maximum capacity of 24 liters, provided the original profile is as homologated.
- l. A cross over line between each side of the tank is allowed (maximum inside diameter 10 mm).
- m. Fuel tanks with tank breather pipes must be fitted with non-return valves which discharge into a catch tank with a minimum volume of 250 cc made of a suitable material.
- n. Fuel tank filler caps may be altered or replaced from those fitted to the homologated motorcycle, and when closed, must be leak proof. Additionally, they must be secured to prevent accidental opening at any time.
- o. The same size fuel tank used in practice must be used during the entire event.

#### **2.4.10.10.1 Fuel tank homologation**

- a. Any fuel tanks, made of non-ferrous materials (with the exception of aluminum) must be tested according to the test procedure prescribed by the FIM.
- b. Each manufacturer is responsible for testing its own fuel tank model(s) and will certify that the fuel tank exceeds the FIM test standard, if it has passed the FIM test procedure for fuel tanks.
- c. Each manufacturer must affix a quality and test label on each fuel tank type that is produced for competition use. This quality and test label will be the recognition of a fuel tank model which has passed the FIM test procedure.
- d. All fuel tanks that are made to the same design, dimensions, number of fiber layers, grade of fiber, percentage of resin, etc., must be identified with the same quality and test label.
- e. The quality and test label will include the following information on each label affixed to each fuel tank: name of the fuel tank manufacturer, date of fabrication, code or part number, name of testing laboratory, fuel capacity.
- f. Each manufacturer is requested to inform the FIM/CCR Secretariat of its fuel tank model(s) which have passed the FIM test procedure, with a copy of the quality and test label.
- g. Only fuel tanks that have passed the FIM test procedure will be accepted.

#### **2.4.10.11 Fairing / Bodywork**

- a. The fairing, mudguards and body work must conform in principle to the homologated shape as originally produced by the manufacturer. Headlights

must be included even when considered external.

- b. The fairing has a tolerance of +/-15mm from the original homologated road fairing, respecting the design and features of the homologated fairing, with the exception of the oil containing portion of the lower fairing, seat area and the area supporting the screen. The overall width of the frontal area may be +30mm maximum. The decision of the technical director will be final.
- c. The windscreen may be replaced.
- d. The ram-air intake must maintain the originally homologated shape and dimensions.
- e. The original air ducts running between the fairing to the air box may be altered or replaced from those fitted to the homologated motorcycle. Particle grilles or "wire-meshes" originally installed in the openings for the air ducts may be removed.
- f. 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 (min. 5 liters). The lower edge of openings in the fairing must be positioned at least 70 mm above the bottom of the fairing.
- g. There may not be exit air vents in the front half of the lower fairing 40mm below a horizontal centerline between the wheel axles of the machine. The technical director may give permission for the lower fairing to have additional vents added if vents have been filled to meet this and the oil containment requirements.  
*Any added vents will not allow the exit of air in the front half of the fairing lower if they are behind a water or oil radiator.*
- h. Exceptions may be made to 2.4.10.11.f/g with the sole agreement of the technical director if a manufacturer produced an FIM approved close fitting, oil containing engine shroud and it is fitted in addition to the belly pan. In this case, OEM shaped air vents will be allowed in the front lower half of the fairing.
- i. Any vents in the fairing lower must have their inner surface leading edge in-line with the trailing edge or overlap to reduce the risk of liquid spraying from the machine.
- j. The lower fairing must incorporate one hole of 25 mm in the bottom of the front lower area. This hole must remain closed in dry conditions and must be opened only in wet race conditions, as declared by the race director.
- k. Minimal changes are allowed in the fairing to permit the use of an elevator (front stand) for wheel changes and to add plastic protective cones to the frame or the engine.
- l. Holes may be drilled or cut in the fairing or bodywork to allow additional increased intake air to the oil cooler. Holes bigger than 10 mm must be covered with a particle grill or fine wire mesh. Grill/mesh must be painted to match the surrounding material.
- m. Original openings for cooling in the lateral fairing/bodywork sections may be partially closed only to accommodate sponsors' logos/lettering. Such modification shall be made using wire mesh or perforated plate(s). The material is free but the distance between all opening centers, circle centers and their diameters must be constant. Holes or perforations must have an



- open area ratio > 60%.
- n. If the upper fairing has a rear edge/section that returns to the frame, reducing airflow between the fairing and frame (or sealing the fairing to the frame), then slots/notches may be removed from that area only. No material can be removed from the lateral (side) surfaces of the fairing. A maximum of 50% of the rear face may be removed.
  - o. A Gurney flap (lip/deflector) may be fitted at the edge of the lateral air vents or the rear edge of the fairing to increase vent effectiveness. The Gurney flap may project a maximum of four (4) mm from the lateral surface of the fairing and must have a rounded end. It should be formed from the same material and be a molded part of the fairing. The technical director's decision on suitability is final.
  - p. The front fender must conform in principle to the homologated shape originally produced by the manufacturer.
  - q. Holes may be drilled in the front mudguard to allow additional cooling. Holes bigger than 10 mm must be covered with metal gauze or fine mesh. Mesh must be painted to match the surrounding material.
  - r. A rear fender may be added or removed.
  - s. Material of construction of the front mudguard, rear mudguard and fairing is free.

#### **2.4.10.12 Seat**

- a. The seat may be altered or replaced from those fitted to the homologated motorcycle. The appearance from front, rear and profile must conform in principle to the homologated shape.
- b. The top portion of the rear body work around the seat may be modified to a solo seat.
- c. Holes may be drilled in the seat or rear cowl to allow additional cooling. Holes which are bigger than 10 mm must be covered with metal gauze or fine mesh. Mesh must be painted to match the surrounding material.
- d. Material of construction of the seat is free.
- e. All exposed edges must be rounded.

#### **2.4.10.13 Rear safety light**

All motorcycles must have a functioning red light mounted at the rear of the machine. This light must be switched on any time the motorcycle is on the track or being ridden in the pit lane and the session is declared WET. All lights must comply with the following:

- a. Lighting direction must be parallel to the machine center line (motorcycle running direction) and be clearly visible from the rear at least 15 degrees to both left and right sides of the machine center line.
- b. The rear light must be mounted near the end of the seat/rear bodywork and approximately on the machine center line, in a position approved by the technical director. In case of dispute over the mounting position or

- visibility, the decision of the technical director will be final.
- c. Power output/luminosity equivalent to approximately: 10 – 15 (incandescent), 0.6 – 1.8 W (LED).
  - d. The output must be continuous, no flashing safety light is allowed while on track. Flashing is allowed in the pit lane when the pit limiter is active.
  - e. The safety light power supply may be separated from the motorcycle.
  - f. The technical director has the right to refuse any light system not satisfying this safety purpose.

**2.4.11 The following items MAY BE altered or replaced from those fitted to the homologated motorcycle.**

- a. Any type of lubrication, brake or suspension fluid may be used.
- b. Gaskets and gasket material
- c. Bearings (ball, roller, taper, plain, etc.) of any type or brand may be used.
- d. Fasteners (nuts, bolts, screws, etc.) may be altered or replaced. Internal engine bolts must remain of standard homologated materials or materials of higher specific weight.
- e. Thread repair may be made using inserts of different material such as Helicoils® and Timeserts®.
- f. External surface finishes and decals

**2.4.12 The following items MAY BE removed**

- a. Instrument and instrument bracket and associated cables
- b. Tachometer
- c. Speedometer and associated wheel spacers
- d. Chain guard

**2.4.13 The following Items MUST BE removed**

- a. Headlamp, rear lamp and turn signal indicators (when not incorporated in the fairing). Openings must be covered by suitable materials.
- b. Rear-view mirrors
- c. Horn
- d. License plate bracket
- e. Tool box
- f. Helmet hooks and luggage carrier hooks
- g. Passenger foot rests
- h. Passenger grab rails
- i. Safety bars, center and side stand brackets welded to the main frame may be removed.

**2.4.14 The following items MUST BE altered**

- a. All drain plugs must be safety wired. External oil filter(s), screws and bolts that enter an oil cavity must be safety wired (i.e. on crankcases). Clips are

- not permitted.
- b. Where breather or overflow pipes are fitted, they must discharge via existing outlets. The original closed system must be retained; no direct atmospheric emission is permitted.
  - c. Motorcycles must be equipped with a red light on the instrument panel that will illuminate in the event of oil pressure drop.