

2019 UKOPRA OFFSHORE POWERBOAT RULES  
SECTION 5 – TECHNICAL RULES, CLASSES



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# 2019 UKOPRA OFFSHORE POWERBOAT RULES

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#### **500 - Technical Rules, Classes**

##### **500.01 - General**

The group rules contain general technical information.

By word 'boat', it is understood to mean any vessel used in powerboat racing.

When a matter is strongly recommended, the driver (pilot) choosing a different solution may be asked to explain to the measurer or scrutineer the advantages of his solution.

##### **500.02 – International Offshore Classes**

All classes for which the rules have been drawn up by UKOPRA are International.

##### **500.03 – Recognised Classes**

All classes for which the rules have been properly established by UKOPRA.



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#### **501 - Measurement**

A boat is not allowed to take part in any race without being registered and approved by UKOPRA.

##### **501.01 - Hull Measurement**

All hull measurements are to be taken while the boat is ashore.

The length must be measured between perpendiculars of the external moulded length of the boat, taken at the extreme bow and the rear most planning surface (the rear most part of the keel) including all hull planning steps (regardless of height), but excluding trim tabs, either fixed or movable.

Hull extensions beyond the transom shall be deemed to be “fixed trim tabs” and shall not be included in the measured length.

Hull extensions added to the bow and/or any extending parts, rubbing strakes, fenders, outboard motor spacing brackets, stabilising trim tabs and rudder assemblies are not to be included in the measured length.

Trim tabs, either fixed or moveable, shall not exceed a length of 10% of the measured length of the hull.

Multihull tunnel flaps shall not exceed a length of 10% of the measured length of the hull.

When defining “extreme bow”, any form that constitutes the bow and its construction and contributes to the performance of the boat shall be included in the measured length.

Any other attachment that is added to meet a minimum length requirement shall not be included in the measured length.

Should the trailing edge of the planning surface of a hull or sponson terminate with an angle greater than 0 measured between the keel and outer chine in plan view (birds eye view), such excess shall not be included in the measured length.

The beam measurement shall be taken at the widest part of the moulded hull, excluding any extending parts, rubbing strakes and/or fenders.

For Rigid Inflatable Boats (RIBs), the length measurement shall be taken at the extreme of the bow tubing (or rigid hull, whichever is the longer), to the rear most planning surface, excluding any trim tabs as for moulded hulls.



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Tube extensions on RIBs extending beyond the rear most planning surfaces shall not be included in the measured length.

The RIB beam measurement shall be taken at the widest part of the inflatable tubes when fully inflated.



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#### **502 – Inspection (Scrutineering)**

- Hull, motors, fuel, accessories and equipment, subject to restrictions regarding dimensions or other characteristics, must be submitted for verification.
- At every race meeting the boats must be inspected (scrutineered) before the race and practice (if applicable).
- Drivers are at all times responsible for the condition of their boat (hull, motors, accessories, equipment, etc.)
- Errors, if any, on the part of the manufacturer, builder, mechanic or even the previous owner do not justify in any way non-conformity with the rules.
- Any driver refusing to comply with the decisions of the Technical Inspectors (Scrutineers) or who does not comply with the conditions of the rules, is not allowed to take part in a race or, should he have raced, cannot be classified and penalties may be applied.
- Technical inspectors (Scrutineers) have the right, once races are over, to carry out all the checks they consider necessary, even when inspection has taken place before practice, they have the right to inspect as they think fit.



## 502.01 – Definition of Design

### Mono Hull

- A mono hull should be a boat with one hull.
- A minimum distance of 80% of the “Measured Length” should, in the centerline, be the deepest part of the hull.
- Transverse sections should, from the centerline, have positive angles up to the sections maximum beam, except in the following two cases:

(i) Each spray deflector may have a concave and/or negative angled surface with a horizontal width from the outside edge of the spray deflector in to the hull of no more than 8% of the hull’s maximum chine beam (see drawing).

(ii) Steps which are swept aft or forward may have a distance “S” of no more than 2 % of “Measured Length” (see drawing)

### Wings

A wing is defined as a device above the deck that has a downward plus or minus 60 degree lower surface, with an area in excess of 0.1 square (1.08 sq. ft).



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#### **502.02 - Engines**

##### **2-Stroke or 4- Stroke**

The total cylinder capacity/power of the motor or motors forms the basis for eligibility in the corresponding classes.

Fuel may be fed to the engine by a carburetor or by injection.

Manufacturers Engine Homologation data will be adhered to in UKOPRA Class 3 where using stock engines.

##### **Rotary**

Rotary motors of the type covered by the NSU-Wankel patent are admitted on the basis of an equivalent cylinder capacity.

The rotary motor cylinder capacity equivalent is twice the volume determined by the difference between the greatest volume and the least volume of the working chamber.





### **502.03 - Verification and Checking**

Verification of motors are carried out according to the facts contained in the homologation sheet (where applicable).

At World Championships, inspection of the winning motor(s) is compulsory.

Inspections may also be carried out whenever necessary at National events.

The following procedure is mandatory for these inspections:

- Check that the motor type code and visual appearance conforms to the motor homologation sheet.
- The measurements stated in the homologation sheet must be checked on the motor. If the results are within the specified tolerances, the motor should be accepted as legal. Only adjustments to meet dimensions shown in the homologation sheet are allowed.
- When ports in cylinders are adjusted to the dimensions specified in the homologation sheet, material may only be removed in the specified opening to a depth of 10mm, to match the shape of the original adjacent connecting passage (channel) outside the adjusted port opening.
- Parts not specified with measurements in the homologation sheet can only be checked by comparison with standard parts. As the actual manufacturing tolerances are not published, small differences between the measurements of the inspected part and the reference standard part must be accepted.
- Cylinder dimensions are measured when the motor is cold. Allowance is made for the carbon and oil present in the combustion chambers. Checking is done with oil. A large-scale graduated cylinder or burette with adequate orifice is to be used.



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#### **502.03 - Verification and Checking (Continued)**

At any time during an event, the technical inspector, the O.O.D. or the UKOPRA Commissioner reserves the right to change a competitors existing ECU/CDU unit with a standard OEM unit as supplied by UKOPRA.

- UKOPRA race officials must allow each competitor sufficient time to change the ECU and check that it is working.
- UKOPRA scrutineers will supervise the installation and seal the units on completion.
- UKOPRA ECU units will be removed post- race and/or the supervision of UKOPRA scrutineer.
- This process is mandatory.

If a competitor refuses this request, they will be immediately disqualified from the event, without right of protest.



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#### **503 - Equipment**

- During a race, the boat must have on board all the equipment required by UKOPRA rules.
- All attachments, handholds, steering gear, pulleys, fair leads, cleats and anchor bits, etc., must be bolted to the hull.
- Hatches and covers are to remain closed during racing, except for temporary checks.



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#### **504 - Fuel**

N.B. Although International standards exist for petrol and for diesel, there remains a huge imbalance of specification from one country to another regarding the specification of 'pump' fuel available.

Due to these circumstances no specification of fuel is illustrated in the following rules.

Organisers are encouraged to specify a common fuel and its supplier or supply such common fuel for use at International events in an effort to maintain equal opportunity for all competitors.

It is a requirement that all boats use such common fuel.

Testing should take place and boats found not to be using the common fuel will be disqualified.

#### **504.01**

The only fuel to be used by any offshore powerboat must have the same characteristics as the fuel commercially available to the general public as dispensed from roadside pumps or marine fueling facilities.

#### **504.02**

For petrol engines, the fuel used shall be unleaded petrol.

No additives are permitted except lubricating oil for two stroke engines, providing that such oil does not increase the octane or the water content of the fuel or enhance the fuel by any other means.

#### **504.03**

For diesel engines, the fuel shall be that intended for use in diesel engined road vehicles or automotive based marine engines (including red diesel).



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#### **504.04**

Post-race comparison testing may be used to compare petrol fuel samples taken from boats, to that of the original supplied fuel or a locally obtained sample if the fuel was not supplied by the organiser.

Post-race testing shall check:

- Oxygenates by checking the electrical conductivity using the Digatron DT- apparatus.
- Specific Gravity by using a Petroleum Hydrometer.
- Water Solubility for detection of Methanol and other water-soluble additives.
- Ceric Nitrate re-agent test for the detection of Alcohol.



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#### Oxygenates

- Use of Digatron DT-15
- This apparatus is to be used for comparison testing only.
- Comparison of Petrol/Petrol with two-stroke additive.
- Comparison of Petrol/Petrol (no two-stroke additive)
- Stabilise the electrode of the Digatron by immersion in the 'bench mark' fuel.
- Set the indicator to Zero.
- Competitors using two-stroke oil must declare the brand of oil and the ratio of oil used to the CTO.
- A sample of the mixture must be made using a small quantity of the 'bench mark' fuel and the declared oil.
- The 'bench mark' fuel (now containing the appropriate oil) can now be compared to that of the competitor sample.
- The procedure for comparison testing is as per the petrol/petrol comparison.
- Remove the electrode and clean off any residue of 'bench mark' fuel. Wait a few moments for any final residue to evaporate.
- Immerse the electrode into the competitor fuel sample and observe the reading of the indicator.
- It is very unusual to find an identical reading. (This is due to influences of differing temperatures, aeration, etc. of the sample)
- An indication of between -10.0 and +10.0 is normal and indicates a satisfactory comparison.
- An indication exceeding these parameters is justifiable reason for laboratory analysis.



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#### **Specific Gravity**

The use of a Petroleum Hydrometer should be made to compare the specific gravity of the 'bench mark' sample against the competitor sample.

Both readings should be identical. The temperature of both bench mark samples and competitor sample should be the same.

#### **Water Solubility**

This test should be conducted as per the text of the Digatron instructions.

Both 'bench mark' sample and competitor sample readings should be identical.

This test should be conducted as per the Digatron instructions.

Both 'bench mark' sample and competitor sample results should be identical.

#### **Ceric-Nitrate re-agent**

If the results of the above tests show characteristics of similarity between the locally obtained sample (or fuel supplied by race organiser) and the sample taken from the competitor, then the fuel must be accepted as legal.

A judgment of illegality cannot be made on the results of the above tests alone.

Only the results from a laboratory analysis can be used to declare a fuel conclusively illegal or not.

If the results of the above comparison tests do not show characteristics of similarity and give cause for doubt, then the following detailed 'Fuel Sample for Laboratory Analysis' procedures shall be enforced.

#### **504.05 - Fuel Samples for Laboratory Analysis - Procedure**

Fuel samples for laboratory analysis may be taken at any time and place during any event under the authority of the UKOPRA such samples shall be taken at the discretion of the Chief Technical Officer (Scrutineer).

Fuel Test Certificates (in quadruple) shall be made available to the Technical Officers (Scrutineers) responsible for collecting fuel samples.

Only nominated Technical Officials (Scrutineers) may take samples.



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#### **504.06**

At the beginning of the event, the Chief Technical Officer (Scrutineer) must obtain sufficient fuel from the local fuel source (or the fuel supplied by the organiser) for comparison test sampling.

This fuel will be referred to as the 'Bench Mark' fuel and will be the fuel to which all comparisons will be made.

#### **504.07**

It is mandatory to carry out fuel testing on the heat and/or race winners (to third place) at all World Championship events.

In a multi-race Championship, the fuel testing may be carried out by testing or more boats at each race.

#### **504.08**

Any competitor refusing to provide an adequate fuel sample or having insufficient fuel available in the boat's main fuel system or tanks immediately following completion of the race, will be disqualified.

#### **504.09**

Equipment used for the extraction of fuel from boats must be clean and constructed of non-reactive material.

#### **504.10**

Each sample must be divided into two and placed in separate one litre containers, being sample A and sample B.

The containers must be completely filled up and immediately sealed and identified to the boat from which the sample was taken.

This information must be entered on the Fuel Test Certificate and on the sample containers. The Fuel Test Certificate must record; the place and time of taking the sample, the identity of the boat from which the sample was taken and the identity of the driver of the boat.





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#### **504.11**

Sample A must remain in the control of the Chief Technical Officer (Scrutineer) or his deputy and sample B must be given to the driver or a representative of the driver's team.

The driver or the representative must sign the Fuel Test Certificate, acknowledging receipt of the sample.

#### **504.12**

A sealed sample of both the competitor's fuel and the benchmark sample must be sent to an authorised petroleum laboratory for full analysis.

The Chief Technical Officer must deliver all such samples to a courier authorised by the Organising Committee or the UKOPRA Commissioner.

The C.T.O. must return a copy of the Fuel Test Certificate, signed by the courier for the receipt of the samples, to the Organising Committee.

The authorised courier must deliver all "A" samples, together with copies of the relevant Fuel Test Certificate to the nominated laboratory, where they must be tested in accordance with standard International scientific procedures.

If the result of the laboratory analysis proves that the fuel is not within the same characteristics as the benchmark sample, the analysis must be paid for by the competitor.

If the fuel is within the same characteristics as the benchmark sample, the organiser must pay for the analysis. The same rule shall apply for testing diesel.

#### **504.13**

The results obtained from such testing must be attached to the laboratory's copy of the Fuel Test Certificate and delivered to the UKOPRA as soon as practicable after the results have been obtained.



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#### **504.14 – Results Notification**

UKOPRA must as soon as practicable after receipt of the results, notify the following:

- The relevant drivers or team representative.
- The Race Organiser.

#### **504.15 - Air**

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

#### **504.16 - Definition of Petrol**

Petrol described within these rules is defined as one of the following:

- Petrol of a kind recognised by the UKOPRA as being on general and genuine sale to the public in a country where UKOPRA International events are held annually.
- The fuel used in Offshore racing shall be pump petrol as this term is generally understood. The detailed requirements of these rules are intended to achieve this purpose whilst allowing the use of absolutely consistent petrol's for racing purposes.
- Any petrol which appears to have been formulated in order to subvert the purpose of this regulation will be deemed to be illegal.
- Fuel suppliers are invited to supply samples of their petrol's to be checked for conformity before use.



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#### **505 – Crew Safety**

All mono / multi hulls must be equipped with a Reinforced Cockpit(s) with Canopies for all riding crew members and buoyancy to ensure the boat floats.

The crew, who must be seated, must have a restraint system comprising of and conforming with the following rules:

- A Reinforced Cockpit with Canopies is defined as a containment area for crew and can be constructed as an integral part of the boat.
- This Reinforced Cockpit Area must be designed and constructed to a specification capable of withstanding the forces of a water impact when running at the highest design speed of the boat, and therefore protecting all members of the crew in the event of an accident.
- The various components that constitute the Reinforced Cockpit shall be properly maintained to ensure reliable operation of all components, with emphasis being placed on the canopy release mechanism, emergency air supply and restraint systems.

***It is recommended that Sponson Cockpits are not used.***

These rules also apply to any boat in any class using Reinforced Cockpits with Canopies.

Boats with reinforced cockpit are not allowed to be driven faster than the maximum speed set by the designer specified in the closed cockpit registration. Any boats found to be driving faster than their maximum speed will be penalized up to disqualification.

#### **505.01 - Cockpit Evacuation / Immersion Training**

Before racing in a craft with restraint systems, all crews must have passed in the last fourteen months, an immersion training in a restraint system to ensure that they can exit a reinforced cockpit crew compartment successfully.

Prior to taking the Immersion training, all crews must have a valid scuba certificate or have received suitable training.

An immersion Certificate to certify the passed test, showing the expiry date, must be delivered by Experts.

All riding crew members using restraints must sign the UKOPRA indemnity form prior to competing in any race or practice.



### **505.02 - Drawings and Measurement**

Three view drawings (plan, side and elevation) of the design of the Reinforced Crew Cockpits(s), the Bulkheads, the type of Canopy, the Buoyancy System and the Restraint System anchorage Points must be lodged with UKOPRA of the measurer and verified at the time of craft measurement.

Drawings shall be provided showing canopy aperture dimensions for full or partial canopies, single or tandem arrangements. Arrangements shall describe whether fore and aft, or side by side seating is fitted.

Drawings shall show the method and construction of release devices. Drawings should show the material specification of the transparent areas.

Prior to Boat Measurement the drawing and material specifications shall be sent to the Measurer requested to measure the boat.

On completion of measurement, the drawings and material specifications called for by the designer shall be lodged with UKOPRA before they issue a certificate of compliance and measurement.



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#### **505.03 - Reinforced Cockpit Area and Canopy**

The reinforced cockpit(s) shall be of a closed type design with a minimum of one opening hatch and constructed to a similar strength as the running surface of the boat.

This area must be the sides, floor, decking and bulkheads fore and aft.

All new cockpits built after January 1, 2015 shall be accompanied by a Builders certification stating competent design.



## UKOPRA Offshore Cockpit/canopy Test Standard

### Sample Construction Requirements:

- Sample quantity must be, one of which must include a sample of the joint/bonding of the cockpit parts, transverse to the length of the sample.
- Trimmed sample size must be 100 mm  $\pm$  1.0 mm wide x 800 mm  $\pm$  5.0 mm, with the width being parallel.
- For fibre orientation the 800 mm length is to be parallel with the centerline of the boat.
- Sample must be laminated on a flat surface using the same manufacturing process, materials, and fibre orientations as the intended homologated cockpit construction.
- The sample must have a uniform thickness with no core crushing along any edges.
- The sample must have one moulded face and the other face being unmoulded, the moulded face will be taken as being the external surface of the cockpit during testing.
- The sample must be representative of the thinnest lay-up of the cockpit/canopy (excluding the various flanges for windshields, hatches etc.).
- The sample and cockpit must be manufactured using balanced or unbiased materials.
- The sample will be supported across the full width perpendicular to the 800 mm edges by two parallel 2 mm Steel bars at a distance of 500 mm apart. The load will be applied equally through two 2 mm Steel bars, each a distance of 7 mm parallel from each support.
- The moulded face of the sample will have the load applied and the unmoulded face will support the sample.
- The load will be applied at 0.4 mm/sec and the deflection will be measured at the two 2 mm Steel bars applying the load within 2 minutes.



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#### Sample Test Requirements

- The sample when loaded with the force required for the Class must have no more than a maximum deflection of 2 mm without the sample failing.
- The sample weight in gm/sq m will be calculated, skin thickness and sample thickness will be measured to enable inspection and comparison of damaged homologated cockpits/canopies.
- Further non-destructive test analysis methods may be used to compare test samples with homologated cockpits during the life of each cockpit/canopy.

#### Sample Manufacturing Information Requirements

- Ply laminating sequence (stating which ply is the moulded face).
- Ply materials
- Ply weave styles
- Ply material weight in gm/sq m (dry weight i.e. without resin)
- Ply orientation (where 0 is parallel with the 800 mm edges).
- Core material and density in lbs/cu ft or kg/cu m.
- Manufacturing method (stating vacuum, pressure, and temperature).
- A 100 mm x 100 mm sample of all materials used (resin samples not required)
- The completed questionnaire for offshore cockpits (available on the UKOPRA web site) along with the supporting analysis for the question on “Primary Structure Strength”

Samples as per sample construction requirements must be sent to the UKOPRA appointed person/company.

Canopies must be a composite structure.



#### **505.04 - Polycarbonate Areas**

Polycarbonate areas are strongly recommended to be as small as possible while still maintaining that the driver and co-driver have clear, safe and undisturbed visibility ahead at sea level whilst racing.

It is strongly recommended that these polycarbonate areas are built using 2 mm thickness, or more.

The combined visibility of driver and co-driver must be through a horizontal arc of 22 degrees (2 degrees either side of the centre line of the boat).

These polycarbonate panels are to be recessed into the composite structure and may be bonded using a suitable bonding agent, and/or “bobbins”.

It is highly recommended that there is also a through bolted outer flange for the fitting of the polycarbonate panels.

#### **505.05 – Screen Flanges**

Screen flanges shall be a minimum of 50 mm at forward direction and mm towards sides and should be fastened every 100 mm if using “bobbins”; it is recommended to use metal “bobbins” with heads, as opposed to the recessed plastic type.

The outer polycarbonate area of the flange fitting must not be painted, so that the measurer/ scrutineer may monitor any discrepancies.

- Window to flanges joints must be glued and/or use bobbins of nylon or aluminium.
- Bolts: min mm stainless steel, nylock nuts, washers.
- Bolt spacing: max. 10 cm if not glued.
- The outer edges of the canopy surrounding the hatch, must be fitted with a water deflector, (height 0 mm min) to prevent water forcing open the hatch in the event of a capsize.





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#### **505.06 – Roll Bar**

These Restraint Cockpits must be fitted with an internal roll bar, two in a tandem cockpit as a minimum.

There must also be, between the two single cockpits, an anti-compression strut or structure of similar strength to the roll bar.

- Roll bar in front of/around each crew member.
- Roll bar strong enough and well secured to the bottom stringers.
- Central compression strut to hold roll bar, for side by side cockpits. Side compression struts may also be necessary for side by side cockpits.
- Alternatively, instead of a compression strut, the design of the cockpit primary structure will consist of a center roof rib connected to the roll bar and the aft bulkhead with enough strength to satisfactorily react the design impact loads.



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#### 505.07 - Hatches

- Hatch openings shall have a minimum of 2 mm flange.
- Hatches must have a slot for pry bar, on the opposite side of the hinges, use in emergency/rescue.
- Hatches should be recessed on the front and sides.
- The outer edges of the canopy surrounding the hatch, must be fitted with a water deflector, (height 10 mm min) to prevent water forcing open the hatch in the event of a capsize.
- Water deflector to be fitted only on front and sides of hatch, not behind of hatch. (A water deflector on back of hatch might force water into cockpit area.)
- It is mandatory that the hatches are constructed to the same specification as the cockpit.
- The hatches shall be fitted with a catch which has a positive open and positive close mechanism and should hold the hatch against lateral forces.
- These hatches shall be able to be opened from both inside and outside the cockpit and must have a second emergency mechanism to allow the rescue team to easily remove the hatch from outside if necessary.
- These hatches should be fitted with hinges with short release pins. This is important because long pins invariably bind the hinge.
- There should be one or more divers grab handles fitted to the outside of each hatch.

#### 505.08- Release Handles

- Canopy hatch release handles, which must be provided both inside and out, must be painted fluorescent orange or have a fluorescent orange background panel to identify them and directional arrows to indicate the method of opening.

#### 505.09 – Lid Hinges

- The canopy lid hinges and the canopy hatch covers release mechanism must not encroach within the canopy aperture area, and these hinges and release mechanisms must not in any way hinder the exiting of crew members when fully race fitted.



### **505.10 - Canopy Openings**

- Canopy openings should have the entry/exit apertures located directly above the crews' heads.
- The canopy aperture openings should be at least 0.55 m in length and 0.55 m in width.
- If the crew is seated side by side, then the opening should be at least 0.55 m x 0.825 m wide.
- In tandem configuration, the opening(s) should be 0.55 m x 0.55 m per crew member.
- The canopy apertures should be cut with all corners having a radius of 0.02 m minimum or 0.2 m maximum.
- The radius should be constant and have a smooth finish to relieve stress.

### **505.11 - Canopy Aperture**

- The canopy aperture must have a 20 mm wide (minimum) fluorescent orange band around the opening, both inside and outside of the opening.

### **505.12 – Air Supply**

It is mandatory that one single air supply (not oxygen) and a bottle will be provided for each riding crew member.

The air supply must be securely fixed adjacent to, or on each one of them. It is recommended that sufficient air be provided in each individual bottle for ten minutes.

Air bottles must have a pressure gauge fitted for visual checking at pre-race scrutineering. This gauge should be filled with liquid and be at least cm in diameter for easy reading.

Air supply bottles shall be "Turned On" before starting a race or taking part in practice and/or testing.



### **505.13 - Reinforced Cockpits**

Reinforced Cockpits must have flood tubes or other means of flooding the cockpit to equalise the pressure quickly in an accident.

The floor of the cockpit should be as air tight as possible to help the cockpit pressure equalise far more quickly when in an upturned position.

Each Reinforced Cockpit Area shall have one or more water activated light(s) or similar.

### **505.14 - Restraints**

- Boats with restraints must have stop buttons/switches located in the cockpit area, immediately accessible to driver, co-driver and rescue officers.
- The stop buttons/switches must be identified by a fluorescent colour.
- These switches must shut off all fuel pumps as well as the ignition circuit.
- In the case of diesel boats, the stop control cable for the fuel injection pump shall be a non-sleeved cable, so as to eliminate the cable being able to bond in a fire.
- Cockpits with Restraints must be fitted with rear of head protection for each crew member.
- This must be an integral part of the seat, which must be attached directly to the structure of the Restraint Compartment.
- The head protection must be a minimum of 0.2m wide and extend at least 7 % of the height of the safety helmet as worn by the crew whilst in the normal seating position.
- There must be a minimum of 0.2m vertical and lateral clearance between the canopy and each of the crewmembers when in the normal seating position.



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#### **505.14 – Restraints (continued)**

All boats with restraints must have their bows painted fluorescent orange for at least 0.5m.

Only boats with restraints and closed canopies are allowed to use orange coloured bows. If the hull is of a similar colour, then there must be a white separating band of at least 0.15m wide to ensure that the fluorescent orange band is obvious.

If the number of riding crew exceeds two, the number of riding crew members must be written in black in at least 0.2 m high numbering on the orange nose in the following three locations:

- The lower running surface.
- The topside of the hull/sponson.
- The deck of the hull/sponson.

Should any boat be found to have contravened the riding crew number requirement, the penalty shall be disqualification from that event.

NB: Numbers shall be placed on the orange nose, not the white band area.



### **505.15 - Restraint System**

The Restraint System must consist of a 6 point/ strap harness and should utilise belts with a minimum width of 50 mm and grommets to prevent chafing or cutting of the belt. Harness straps must be attached directly to the cockpit structure.

Those straps close behind the driver's head and neck must be 100 mm to 150 mm apart at point of attachment. The shoulder harness should be installed at 90 degrees to the spine at shoulder line to minimise compression injuries under high "G" loading. All straps must be free to run through intermediate loops

or clamps/buckles. All anchor point bolts must be fitted with backing plates of 10cm minimum width.

The driver harness attachment bolts in reinforced cockpits must consist of minimum grade EN8 bolts, with an 8 x 1.25 mm thread and locked nuts. There must be a spacer and plain washers on each bolt. The spacers must be glued to the cockpit structure. Intention of these spacers is to prevent buckling of surface material near bolts. This always leads to local delamination which easily spreads out over cockpit structure, when it is under stress.

On the sides of the structure, which has to take up the force on the attachment bolts, there must be a stainless-steel plate (washer of minimum 3mm thickness and 100 cm<sup>2</sup> area).

When using seats with suspension, and therefore not using a bulkhead restraint anchorage, drawings must be lodged with UKOPRA of the measurer and approved prior to boat measurement.

All restraint systems must have a common method of release. The single lever method (sometimes called the NASCAR type) or rotary type, are both acceptable restraint release systems.

Both types of restraint release must be examined for satisfactory operation by the scrutineer before every race. The harness system must comply with Drawing 2.

The shoulder harness should be installed 90 degrees to the spine at shoulder line to minimise compression injuries and the high "G" loading.

7 mm minimum/maximum to Centre line of Lap Belt at Seat Back, Seat Bottom junction. Lap Belt should continue in straight line to anchorage.



### **505.16 – Class 3 Reinforced Cockpits Criteria**

Reinforced cockpits are permitted in any category of Class 3.

The following specification is the minimum mandatory standard for any reinforced cockpit used in any category of Class boat.

Clearance: helmet to hatch 10 cm min.

#### **Clearance:**

- helmet to hatch 10 cm min.

#### **Cockpit type:**

- The reinforced cockpit(s) shall be of a closed type design with a minimum of one opening hatch and constructed to a similar strength as the running surface of the boat.

#### **Cockpit minimum size:**

- Hatch opening per person: 55 x 50 cm min
- Width: shoulder level 60 cm min
- Clearance: helmet to hatch 10 cm min



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#### **Cockpit construction:**

- Window to flanges joints must be glued and/or use bobbins of nylon or aluminium
- Bolts: min 6mm stainless steel, nylock nuts, washers
- Bolt spacing: max. 10 cm if not glued
- The outer edges of the canopy surrounding the hatch, must be fitted with a water deflector, (height 10 mm min) to prevent water forcing open the hatch in the event of a capsize
- Hatches must have a slot for pry bar use in emergency/rescue

Controlling crew must have clear visibility ahead with adequate panoramic view. Window areas:

- Material: Polycarbonate or similar
- Glass (in any form) is specifically prohibited.

#### **Minimum thickness of window:**

Side by side cockpits min 9.5 mm.

Screens with curvature and/or tandem cockpit min 7.9 mm

***Notwithstanding the foregoing, the efficiency and safety of a cockpit canopy is a matter for the competitor and subject to presentation to a UKOPRA technical official and subsequently the race organiser of a satisfactory builder's design statement and authorisation the canopy will be deemed fit to compete.***

#### **505.17 - Steering Wheel**

A quick release steering wheel may be fitted on a boat with personal restraints, but all drivers must be able to exit the cockpit without removing the steering wheel.

#### **505.18 - Mirrors**

Rear view mirrors are mandatory, as well as a method of cleaning the canopy whilst under way.

Each wing mirror must have a minimum size of 60 sq.cm and be bolted on 2 points to assure proper mounting.





### **505.19 - Fire Extinguishers**

Two fire extinguishers, each a minimum of 2kg, or of equivalent capacity, must be carried and be readily accessible to the crew, for Class 3, one extinguisher is sufficient.

### **505.20 - Flares**

The flares described in UKOPRA minimum requirements may be placed in a shallow locker adjacent to the deck race number.

### **505.21 – Life Raft**

Should a life raft be carried, it may be placed in the same locker as the flares.

### **505.22 - Carbon- Monoxide Alarm**

All crew containment areas of inboard engine canopied boats must be fitted with a carbon-monoxide alarm.

### **505.23 - Racing Vests**

The efficiency of the racing vest is a matter of the exclusive responsibility of the wearer.

Every crew member whilst on board, must wear a racing vest during the practice runs and throughout the race. Racing vests must be coloured high visibility orange or yellow.

The racing vest must have epaulets/handles to help extract crew from the boat. The racing vest must have crutch straps or a method of ensuring that the vest does not “ride up”.

***The use of an inflatable racing vest is prohibited in non-canopied boats.***

### **505.24 - Strobe Light**

All boats shall have a White or Orange High Intensity Strobe Light fitted to indicate “coming off the plane” but not needing assistance.

The strobe light must be able to be operated by the throttle man and should be operated by the throttle man if a problem occurs, to enable any following race boats to take avoiding action.

The strobe light shall be mounted on the top rear of the canopy. When dual canopies are used, the light may be on or behind either one.

This strobe light may also be used as a substitute for the orange retirement flag when returning to port under reduced power.



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#### **505.25 - Buoyancy**

It is recommended that the buoyancy should float the hull as parallel with the surface of the water as is practical, to help in rescue accessibility.

It is mandatory that sufficient buoyancy is provided in the boat, or in the material used for its construction, to ensure that the boat floats if capsized or holed. If extra buoyancy is needed, the buoyancy system described by the designer should be verified.

This added buoyancy must be in at least four separate flotation units.

