

## RUNABOUT LIMITED

### RAL.1 LIMITED CLASS COMPETITION

Intended to promote interest in personal watercraft competition with a limited number of modifications, and to enable individuals to become active competitors with a relatively modest investment. Watercraft competing in this class must conform to the specifications which follow.

RAL.1.1 All watercraft must remain strictly stock (all Stock Class provisions are allowed in Limited Class unless otherwise noted), except where rules allow or require substitutions or modifications. Changes or modifications not listed here are not permitted. The IJSBA may allow additional modifications to Stock Classified PWC which provide for replacement/reinforcements to parts and components (i.e. intercooler end caps, brackets, fittings, etc.) that have known failure risks in race conditions. Such changes will only be allowed if they allow for no volume or performance gains. Such allowances are only legal if published by the IJSBA. Some original equipment components may not comply with IJSBA rules. Hull Identification Numbers must be displayed as furnished by the manufacturer. NOTE: When rules permit or require equipment to be installed, replaced, altered or fabricated, it is the sole responsibility of the rider to select components, materials and/or fabricate the same so that the watercraft operates safely in competition.

RAL.1.2 Original equipment parts may be updated or backdated with original equipment parts of the same model. The part must be a bolt-on requiring no modifications to that part or any other parts except where rules allow substitutions or modifications. (Refer to Model Homologation listing online).

RAL.1.3 Sound level shall not exceed 86 dB(a) at 22.86m (75 ft.). See Section Appendix.

RAL.1.4 Engine fuel must consist of gasoline meeting the criteria defined in Appendix.

### RAL.2 HULL

RAL.2.1 All watercraft must have a flexible tow loop attached to the bow. The tow loop should be made of a flexible material (e.g., nylon strap, rope, etc.) so as not to create a hazard. Tow hooks which protrude beyond the plane of the hull must be removed.

RAL.2.2 Hull and deck repairs may be made. However, these repairs must not alter the original configuration by more than 2.00mm (0.08 in.). Handles, drop-in type storage buckets, bolt-on type mirrors and gauges may be modified, aftermarket or removed provided a hazard is not created. Drop-in type buckets are defined as being able to be removed without the use of any tool. Other than for the use of fasteners and the placement of allowable relocated parts (i.e., ECU), the bulkhead may not be modified.

RAL.2.3 All watercraft may be equipped with a maximum of two sponsons. Original equipment sponsons may be modified, aftermarket, repositioned or removed. Overall length of each sponson shall not exceed 91.45cm (36.00 in.). Sponsons shall not protrude from the side of the hull by more than 100.00mm (3.94 in.) when measured in a level horizontal plane. The vertical channel created by the underside of the sponson shall not exceed 63.5mm (2.50 in.). No part of the sponson shall extend downward below the point at which the side of the hull intersects the bottom surface of the hull by more than 63.5mm (2.50 in.). Aftermarket or modified sponsons must exceed 6mm (0.24 in.) in thickness. All leading edges must be radiused so as not to create a hazard. Sponsons may not be

attached to the planing surfaces of the hull. Fins, rudders, skegs and other appendages that may create a hazard will not be allowed. (See diagrams in Appendix.)

RAL.2.4 Intake grate may be modified or aftermarket. Intake grate is required and must be the full-length type with at least one bar running parallel to the drive shaft. Grates may not extend more than 12.00mm (0.47 in.) below the flat plane of the pump intake area of the hull. All leading edges must be radiused so as not to create a hazard.

RAL.2.5 Pump cover plate may be modified or aftermarket. An extension may be added to the rear of the plate but shall not exceed the width of the original equipment plate. Modified and aftermarket plates must not extend more than 177.80mm (7.00 in.) beyond the end of the original equipment plate. The extension must be connected to the radiused portion of the pump plate so as not to create a hazard. (See diagram in Appendix.) Fins, rudders, skegs and other appendages that may create a hazard will not be allowed.

RAL.2.6 Aftermarket fixed-position trim tabs may be used. Original equipment trim plates that are detachable from the hull may be removed or replaced when installing aftermarket trim tabs. Trim tabs cannot exceed the width of the planing surface or extend rearward more than 100.00mm (3.94 in.) beyond the end of the original planing surface. Manual or automatic trim tabs attached to the hull or ride plate are not allowed. All hull extensions mounted on the hull's transom will be considered as a trim tab. All edges must be radiused so as not to create a hazard. Fins, skegs, rudders and other appendages that may create a hazard are not allowed.

RAL.2.7 Replacement bumpers may be used provided a hazard is not created.

RAL.2.8 A soft, flexible water-spray deflector may be attached to the hull sides or to the bond flange provided a hazard is not created. No part of the deflector may extend beyond the perimeter of the original equipment bumper or side moldings as measured by a plumb line.

RAL.2.9 Handlebar, throttle, throttle cable, and grips may be modified or aftermarket. Handlebar cover may be modified or removed. Aftermarket switches and switch housings may be used. Steering shaft, steering shaft holder and handlebar holder may be aftermarket. The handlebar must be padded at the mounting bracket or, if it has a crossbar, the crossbar must be padded. Aftermarket steering cables will be allowed.

RAL.2.10 7.2.10 Seat assembly may be aftermarket. Seat height may be changed.

RAL.2.11 Padding and/or mat kits may be added and custom painting is allowed. The surface finish of any metal component outside the area above the hull bond flange may be polished, shot peened or painted.

RAL.2.12 Original bilge pump may be modified or disconnected. Aftermarket bilge draining systems that do not create a hazard are allowed.

RAL.2.13 Engine compartment foam may be removed, modified or aftermarket. Only floatation foam within the engine compartment may be removed. Only foam that can be removed without modification to any other part or parts, except where rules allow the parts to be modified, is allowed. Parts may not be relocated based on the removal of the foam. The hull's inner liner or deck may not be cut or modified to remove foam. Removal of foam between layers of the hull and/or deck is not allowed.

RAL.2.14 Engine compartment ventilation tubes may be modified, aftermarket, relocated on the original equipment ducting, or removed. Inlet and outlet openings may not be enlarged (i.e., when the tube is removed, the opening may not be larger than stock). Vents may be shielded or plugged. No other modifications to the hood will be allowed (covers and cowlings are included in this restriction).

RAL.2.15 Handles, drop-in type storage buckets, bolt-on type mirrors and gauges may be modified, aftermarket or removed provided a hazard is not created.

RAL.2.16 Ballast weight may be added within the normally exposed areas of the hull to alter the handling of the watercraft provided a hazard is not created. Only weight consisting of constant mass (i.e., water or other fluid is not allowed) that does not require the modification or relocation of any parts will be allowed unless such modification or relocation is specified by other rules.

RAL.2.17 Original equipment braking devices may be disabled for safety purposes. Reverse buckets may be removed or disabled.

### RAL.3 ENGINE — FOUR-STROKE

RAL.3.1 Engines may be bored. Replacement piston assemblies may be used provided the original compression ratio, dome profile, skirt length and shape and type of material are not changed. Nonconforming pistons (ie skirt shape that is not an exact replica of the OEM piston) may be approved by the IJSBA but such approval must be obtained in writing. Replacement piston assemblies must weigh within  $\pm 25.00\%$  of original equipment. Engine displacement must not exceed class designation unless otherwise noted. Chamfering of cylinder ports must not exceed 1.00mm (0.04 in.) at a 30 degree maximum angle. (See diagram in Appendix.).

RAL.3.2 Crankshaft may be rebuilt/replaced provided by the following: Counterweights and material type must maintain the shape and dimensions as provided by the manufacturer. Stroke and rod lengths may not be changed. Counterweights may be deburred to remove only casting flaws, no other machining or knife edging of counterweights are allowed. Rod journals must maintain their OEM diameters/dimensions, Main journals must maintain their OEM diameters/dimensions. Cross drilling of crankshaft to improve oil flow or redirection is allowed. Replacement bearing shells are allowed provided the following: ( max. allowable undersized bearing is .060 or 1.5mm). Total weight of the crankshaft assembly must be within  $\pm 5.00\%$  of original equipment. Damaged rod or main journals may be welded and machined to their OEM dimensions or within the allowable bearing sizes.

RAL.3.3 Repairs may be made to cracked or damaged cylinders by installing a cylinder sleeve. The head gasket surface of the cylinder block may be machined only to allow for the installation of the new sleeves (see appendix for description). A thicker head gasket must be utilized to return the block deck height to within .155mm (.006in) of original height. The repair must offer no additional performance gains.

RAL.3.4 External modifications to the engine finish (e.g., plating, polishing and/or painting) are allowed for cosmetic purposes only.

RAL.3.5 No internal modifications of any kind, including grinding, surfacing, polishing, machining, shot peening, etc., will be allowed on any engine components.

RAL.3.6 Engine, Intercooler, and Oil Cooler water cooling systems may be modified or aftermarket. Additional water cooling lines and after market water bypass fittings may be added. OEM water bypass fittings may be modified or relocated. All bypass fittings must be directed downward and/or rearward so as not to create a hazard for other riders. Additional cooling supply lines and fittings may be added to the pump. Pump water inlet covers and water strainers (filters) may be modified or aftermarket. Intercooler assembly/housing must remain OEM in stock class, additional cooling supply lines and bypass fittings may be added to the OEM Intercooler Housing. Additional cooling supply lines may be added to water inlet covers that are removable from the engine block. Volume changes to OEM water supply fittings are not allowed. Existing fittings may be aftermarket or modified so long as the OEM thread diameter is maintained. Fittings may not be added to the cylinder head, cylinder, or crankcase. Intercooler pressure relief valves (mechanical) are allowed for the purposes of regulating water pressure. Any valves used within the entire cooling system must be of the fixed type or automatic (e.g., thermostats, pressure regulators, etc.). Electronically controlled valves or water injections systems are not allowed unless originally equipped. Manually controlled devices (by any means of actuation) that alter the flow of cooling water during operation are not allowed. Cooling system flush kits are allowed.”

RAL.3.7 Replacement starter motor and bendix may be used.

RAL.3.8 Replacement engine mounts may be used.

RAL.3.9 Replacement of general maintenance parts (e.g., gaskets, seals, spark plugs, spark plug wires, spark plug caps, wiring, water hoses, fuel lines, clamps and fasteners) shall not be restricted to original equipment providing the following: 1) Replacement gaskets may be used but must be of the same type (e.g., sheet, o-ring, etc.) and thickness as their OEM counterparts 2) Fasteners (e.g., bolts, nuts and washers) may not be substituted with titanium pieces unless originally equipped. Fasteners may integrate locking mechanisms.

7.3.10 Camshafts may be modified or aftermarket.

7.3.11 Valves may be modified or aftermarket. Valve seats may be modified. Springs may be modified or aftermarket. Pushrods may be modified or aftermarket. Replacement valves, pushrods, and seats may not be titanium unless originally equipped.

7.3.12 Blow off valves may be added to extend engine life. A vacuum line and fitting may be added to the intake manifold to accommodate a blow off valve.

7.3.13 Aftermarket valve spring retainers may be used.

## 7.4 ENGINE — TWO-STROKE

7.4.1 Engines may be bored. Replacement piston assemblies may be used provided the original port timing, compression ratio, dome profile, skirt length and shape and type of material are not changed. Replacement piston assemblies must weigh within  $\pm 25.00\%$  of original equipment. Engine displacement must not exceed class designation (e.g., 550cc in 550 Limited, 800cc in 800 Limited, etc.). Chamfering of cylinder ports must not exceed 1.00mm (0.04 in.) at a 30 degree maximum angle. (See diagram in Appendix.) Cylinders may be machined to accept girdle system cylinder heads.

7.4.2 Crankshaft may be rebuilt using replacement counterweights, crank pins, bearings and connecting rods. Counterweights, crank pins and connecting rods made of non-ferrous metals are not allowed. Stroke and rod length may not be changed. Counterweights on non-rebuildable style crankshafts may be machined to accept a press-through crank pin. Replacement bearings must maintain their original type and dimensions. Replacement counterweights must resemble the original part (i.e., holes and/or pockets not existing on the original part may not be on the replacement part). Total weight of the crankshaft assembly must be within  $\pm 5.00\%$  of original equipment. Crankpins may be welded and/or keyed to the counterweights.

7.4.3 Repairs to cracked or punctured crankcases may be made provided only one damaged area affecting one cylinder bank has been repaired. Crankcase drain and cable may be removed and plugged. No other modifications or repairs are allowed.

7.4.4 External modifications to the engine finish (e.g., plating, polishing and/or painting) are allowed for cosmetic purposes only.

7.4.5 No internal modifications of any kind, including grinding, surfacing, polishing, machining, shot peening, etc., will be allowed on any engine components.

7.4.6 Cylinder head and gasket may be modified or aftermarket.

7.4.7 Exhaust manifold, head pipe, expansion chamber, gaskets and hose between expansion chamber and OEM waterbox may be modified/altered or aftermarket. Exhaust location of the exhaust gases may not be relocated. Original size opening must be maintained for exhaust exit. Original equipment waterbox must be used and may not be modified. No tuned portion of the exhaust shall protrude outside the hull. Through-hull exhaust outlet flap may be removed. Two Stroke and Four Stroke Runabout Limited classes: Removal of the plastic resonator is allowed.

7.4.8 Cooling system may be modified or aftermarket. Aftermarket cooling lines and water bypass systems may be used. Additional cooling supply lines and fittings may be added to the pump. Bypass fittings may be modified, aftermarket and/or relocated but must be directed downward and/or rearward so as not to create a hazard for other riders. Any valves used within the entire cooling system must be of the fixed type or automatic (e.g., thermostats, pressure regulators, solenoids, etc.). Manually controlled devices (by any means of actuation) that alter the flow of cooling water during operation are not allowed. Cooling system flush kits are allowed.

7.4.9 Replacement starter motor and bendix may be used.

7.4.10 Replacement engine mounts may be used.

7.4.11 Oil-injection system may be disconnected or removed.

7.4.12 Replacement of general maintenance parts (e.g., gaskets, seals, spark plugs, spark plug wires, spark plug caps, wiring, water hoses, fuel lines, clamps and fasteners) shall not be restricted to original equipment providing the following:

- 1) Replacement gaskets may be used but must be of the same type (e.g., sheet, o-ring, etc.) as their OEM counterparts. Base gasket cannot be thicker than 1.52mm (0.060in).

- 2) Stripped threads must be repaired to the original size.

3) Fasteners (e.g., bolts, nuts and washers) may not be substituted with titanium pieces unless originally equipped. Fasteners may integrate locking mechanisms.

8.4.13 Cylinders may be interchanged between homologated watercraft of the same manufacturer subject to restrictions announced by the IJSBA. Any modifications to the cylinder or crankcase must be approved, in writing, by the IJSBA.

## 7.5 AIR/FUEL DELIVERY — FOUR-STROKE

7.5.1 Turbocharger or Supercharger impeller housing must remain stock as furnished by the manufacturer. All internal supercharger or turbocharger parts may be modified or aftermarket. Pulleys and tensioners may be modified or aftermarket. Where an OEM turbocharger or supercharger housing may be spaced to accommodate a larger impeller, the spacer shall be allowed providing no other modifications are necessary to accommodate the spacer. An oil line fitting may be added to the supercharger shaft. Intercoolers may be modified or aftermarket.

7.5.2 The entire fuel system is a closed system. The watercraft must not vent or spill fuel at any attitude with or without the engine running. Original equipment fuel tank, fuel filler and relief valve must be used and cannot be modified. The fuel pickup, fuel filter and fuel petcock assembly may be removed and/or aftermarket parts may be used. Additional fuel filters may be used and fuel cell foam may be added to the original equipment fuel tank. Fuel tank filler cap may be modified or aftermarket provided a hazard is not created.

7.5.3 Throttle bodies must remain stock as supplied by the manufacturer. No changing of throttle plate angles and/or modifications to the throttle body housing. No phenolic or aluminum spacers are allowed behind the throttle body.

7.5.4 Electronic fuel-injection systems: Flame arresters that meet USCG, UL-1111 or SAE J-1928 Marine backfire flame arrester test standards must be installed. If not equipped with an airflow sensor, the ducting between the flame arrester and throttle body may be modified or aftermarket. If originally equipped with an airflow sensor, the ducting may be modified or aftermarket between the flame arrester and airflow sensor. Modifications to the airflow downstream of the airflow sensor are not allowed. No modifications to the turbocharger and supercharger system, if applicable, are allowed.

7.5.5 Carbureted induction systems: Flame arrestors that meet USCG, UL-1111 or SAE J-1928 Marine backfire flame arrester test standards must be installed. Carburetor jets (replaceable type), needle valves and needle valve springs may be changed. Choke may be removed provided additional air intake for the engine is not created. Aftermarket primer system may be installed. No other carburetor modifications will be allowed.

7.5.6. Fuel pumps may be modified or aftermarket provided a hazard is not created. Fuel pressure regulators may be modified or aftermarket for safety purposes. Fuel return lines must be installed in the fuel pump assembly without modification to the tank. The Race Director or Technical Director shall have final discretion as to whether a fuel return line has been installed sufficiently for safe use in competition.

7.5.7 Fuel injectors may be modified or aftermarket

7.5.8 Aftermarket Valve Spring Retainers may be used so long as OEM valve springs are used.

## 7.6 AIR/FUEL DELIVERY — TWO-STROKE

7.6.1 Carburetor(s) may be modified or aftermarket provided they do not vent or spill fuel at any attitude with or without the engine running. The number of venturis cannot exceed the number of cylinders. No slide-type carburetors. Aftermarket primer may be used. Intake manifold assembly may be modified or aftermarket. Aftermarket crankcase-pressure-operated fuel pumps may be used. Additional carburetor pulse line fittings may be installed on the crankcase.

7.6.2 Modified or aftermarket vapor/air separators must not exceed 2 in. x 6 in., and must have a return line to the fuel tank open at all times. Additional fuel reservoirs may not be used. Aftermarket or modified electric fuel pumps, not exceeding 4 psi, may be used. When the engine is shut off or stops, the fuel pump must automatically stop. No manually operated on/off-type fuel pumps are allowed.

7.6.3 Aftermarket fuel-injection systems and components are allowed provided the following regulations are adhered to: High pressure fuel hose meeting SAE J30R9 must be used; A.N. threaded type fittings or equivalent and non-removable, crimped-type clamps must be used on the high-pressure portion of the system (i.e., hose clamps, tie wraps, etc. are not allowed); only metal-type fuel filters may be used on the high-pressure portion of the system; all other in-line filters must be installed on the low-pressure portion of the system. When the engine is shut off or stops, the fuel pump must automatically stop. No manually operated on/off-type fuel pumps are allowed.

7.6.4 The entire fuel system is a closed system. The watercraft must not vent or spill fuel at any attitude with or without the engine running. Original equipment fuel tank, fuel filler and relief valve must be used and cannot be modified. The fuel pickup, fuel filter and fuel petcock assembly may be removed and/or after-market parts may be used. Additional fuel filters may be used and fuel cell foam may be added to the original equipment fuel tank. Fuel tank filler cap may be modified or aftermarket provided a hazard is not created.

7.6.5 Flame arrester(s) which satisfy United States Coast Guard, SAE-J1928 Marine or UL-1111 Marine backfire flame arrester test standards must be installed. Aftermarket flame arresters satisfying one of these test standards will be allowed. Intake silencer may be removed.

8.6.6 Reed valve assemblies may be modified or aftermarket. Rotary valve may be modified or aftermarket.

## 7.7 IGNITION AND ELECTRONICS — FOUR-STROKE

7.7.1 Replacement batteries are allowed but must fit into the original equipment battery box and be securely fastened.

7.7.2 The original electronic control unit may be modified or aftermarket so long as it does not offer any additional inputs or outputs than the original unit, and it must connect with the original connections. No additional sensors may be added (e.g., exhaust gas temperature, detonation sensors, etc.). Engine temperature sensors may be disabled.

7.7.3 Ignition timing may be altered by slotting ignition trigger mounting plate. An adapter plate may be used for the sole purpose of relocating the ignition trigger.

7.7.4 Aftermarket spark plugs with a different heat rating may be used.

7.7.4 AFR gauges may be affixed to the exhaust system providing the AFR gauge is not attached to, or can communicate with, the ECU or any automatic tuning device on the watercraft.

## 7.8 IGNITION AND ELECTRONICS — TWO-STROKE

7.8.1 RPM limiter function may be bypassed or eliminated. CDI unit may be modified or aftermarket. Ignition timing may be changed. Modifications to the original equipment ignition pickup mount will be allowed. Original equipment charging system must be used. No other ignition system modifications will be allowed.

7.8.2 Flywheel cover may be modified to accept a crankshaft-end bearing support.

7.8.3 Replacement batteries are allowed but must fit into the original equipment battery box and be securely fastened.

7.8.4 Engine temperature sensor may be disconnected and/or removed.

7.8.5 Relocation of electrical components (e.g., battery, box or housing) is allowed in order to fit an aftermarket exhaust system (only the strict minimum needed). Modification will be subject to Race/Tech Directors' approval.

## 7.9 DRIVELINE

7.9.1 Impeller housing, stator vane assembly, pump mounting plate and/or pump shoe may be modified or aftermarket. No titanium driveshaft, impeller housing or stator vane assemblies. Impeller may be modified or aftermarket. Pump nozzle and directional nozzle may be modified or aftermarket. Overall length of the complete pump and nozzle assembly may be no more than 50.00mm (1.97 in.) longer than original equipment. Aftermarket nozzle-trim systems may be used. Additional cooling fittings may be installed. Visibility spout must be removed or plugged. Silicone adhesive sealant may be used in addition to original equipment seal to seal pump inlet. Couplers, bearing housing and driveshaft may be modified or aftermarket provided they maintain a 1:1 drive ratio between the engine and the pump.