

## Formula 1 Engine

The spirit and intent of these technical rules is to provide for a fair and equitable competition. The level of competition, money involved and TV exposure leave no room for anyone that wants to operate outside of the intent herein. The race committee reserves the right to interpret the intention of anyone that violates these rules and impose appropriate penalties.

These rules are subject to change at anytime by approval of the Technical Committee.

	<b>Merc 2.0L Carb</b>	<b>Merc 2.5L Carb</b>	<b>Merc 2.5L Optimax</b>
RPM Limiter	none	none	stock
Gearcase	any	any	stock
Min. Head Vol	23cc	36cc	stock
Intake	SST-120	SST-120	stock
Total Weight	1,100	1,175	1,150
Boat Min. Length	16'	16'	16'

### Motor Fuel:

Only motor fuel consisting of non-oxygenated standard pump and racing gasoline, shall be used. Petroleum based and/or synthetic oils may be added to the fuel. Fuel samples may be taken before launching and during inspections for on site and off site analysis. On site testing will be in accordance with OPC specifications and procedures (Digatron meter zero reading, or below, at ambient temperature). Fuel cooling will not be allowed. Fuel testing will be made available to all contestants prior to testing and racing. It is the race team's responsibility to ensure that the fuel meets aforementioned requirements regardless of where the fuel is purchased.

At each regatta the inspector may purchase samples of local gasolines, mix it with TCW-3 oil at a ratio of 20 to 1 and test it according to OPC procedures. If the test fuel exceeds the OPC testing thresholds, the new thresholds will become the maximum limit of the day. The source and grade of gasoline must be announced when registration opens. The "Fuel of the Day" rule is not applicable at straightaway or competition record races. A contestant appealing a fuel disqualification must bear the expense of the fuel analysis and handling.

APBA General Safety Rule 27 : The use of the following substances greater than that allowed in commercial gasoline by the current EPA upper limits are forbidden to be present in gasoline during any APBA event: Acrylonitrile, Aminodiphenyl, Aniline, Benzene, Benedine, Beryllium compounds, Bromine compounds, Chromoethylether, Chlorine compounds, Ethylene oxide, Hydrazine compounds, Manganese compounds, Nitrobenzene, Nitrochlorobenzene, Nitrogen compounds, Nitrodiphenyl, Propylene oxide and Tert Butyl toluene. The penalty for a first violation will be disqualification from the race and a two-year suspension. A second offense will result in a lifetime suspension.

### Formula 1 Mercury 2.5 Carb

Engine block is a 5 petal front half 2.5L 200hp painted block. No Pro Max blocks, no O'Ring head blocks. The intent is to treat this motor on the same basis as the SST 120 motor, if you can't change the 120 motor you can't change this motor. All parts will be as homologated on the SST 120 with the exception of block, crank, rods, pistons, carburetor plate(s) and heads. It is also designed so that you can put all SST 120 components (dressing) on the 2.5L short block.

1. Please note there are 2 possible exhaust chests; the small exhaust chest dimensions are as follows: 1.03 inches (width) 2.50 inches (height) max. The large exhaust chest dimensions are as follows: 1.10 inches (width) 3.09 at the runner depth max. Absolutely no grinding or blending in the exhaust chest area.
2. Must use top guided rods either stock fishing motor rods or Mercury Racing 280 rod or F1 rod. No modifying or grinding It is recommended if you use fishing motor rod that you use rod bolt # 10-848475.
3. The only legal pistons are listed below. Piston must be run as supplied with two rings, no grinding or modifying.

			.010/.015/.020	.010/.015/.020		
	Std. Port	Std. Star	Port	Star	.030 Port	.030 Star
Mercury	785-9737T9	785-9738T9	785-9737T10	785-9738T10	N/A	N/A
Wiseco	3137PS	3137SS	3137P2	3137S2	3137P3	3137S3
Pro Marine	2500PV	2500SV	2515PV	2515SV	2530PV	2530SV
Vertex	V2500P	V2500S	V2515P	V2515S	V2530P	V2530S
WSM	100-20PK	100-20SK	100-20-04PK	100-20-04SK	100-20-06PK	100-20-06SK
			100-20-045PK	100-20-04SK		
			100-20-05PK	100-20-05SK		

4. Any Mercury production crank is allowed, with the exception of a Mercury crank with heavy metal welded into it (no late model race cranks). No grinding or modifying.
5. The recommended replacement sleeve is the cast iron Advanced Sleeve #1041. No grinding ports.
6. The V-6 crankshaft centerline to crankcase/intake manifold surface to be 4.42 +/- 0.01 inches.
7. Intake manifold thickness is 2.0000 +/- .015 (between carb and reed block). No grinding
8. Cylinders bored to +0.030 inches oversized must have port heights that measure .015 lower than standard bore.
9. Reed blocks are 10 port = 1.10x.056 or 8 port = 1.05x0.63 reed blocks are allowed with no modifications or grinding. 10 port are tear drop shaped port.
10. Any reed material is accepted.
11. The only legal carbs are cast or stamped with WH, carb must have slosh tubes and baffles no other modifications. Carburetors may be confiscated by the inspector at any time during the racing weekend. They will be held for inspection and testing.
12. The recommended cylinder Head is part # 18787 17 Champ 2.5L head 36cc but you may cut a stock head as well and machine the pockets. No O'Ring heads are allowed. Cylinder head combustion chamber volume must not be less than 36.0 cc. The only allowable cylinder heads are manufactured by Mercury Marine using the lost foam method. A head must maintain stock combustion chamber configuration and appearance.  
The minimum distance from the head parting surface to the piston is .040 inches. A micrometer or Vernier caliper will be used to determine the thickness of the head gasket just removed from the inspecting engine. A bridge tool will be used to measure the piston protrusion from the block. The piston protrusion is subtracted from the gasket thickness. An average of all 6 cylinders will be calculated to determine the final dimension. Final dimension must be .040 or greater to be considered legal.  
Head combustion volume (36cc) is measured using the flat-plate method with the standard BUHW spark plug installed. Total combustion chamber volume must not be less than 45.0 cc.
13. The SSM #6 and #4 are ONLY allowed gearcases. Gearcases must run gear ratios as manufactured. Gear cases must run both shafts as manufactured. Gear Cases must meet all SST-120 Race Class dimensions.
14. No grinding or blending on the blocks! No blending ports or passages! If the factory didn't touch it, it shouldn't be touched.
15. Must use stock 120 style exhaust chest cover

16. Crankcase drain lines may or may not be utilized.

17. Power Performance Carb intake plates are a legal replacement for the OEM intake, any color.

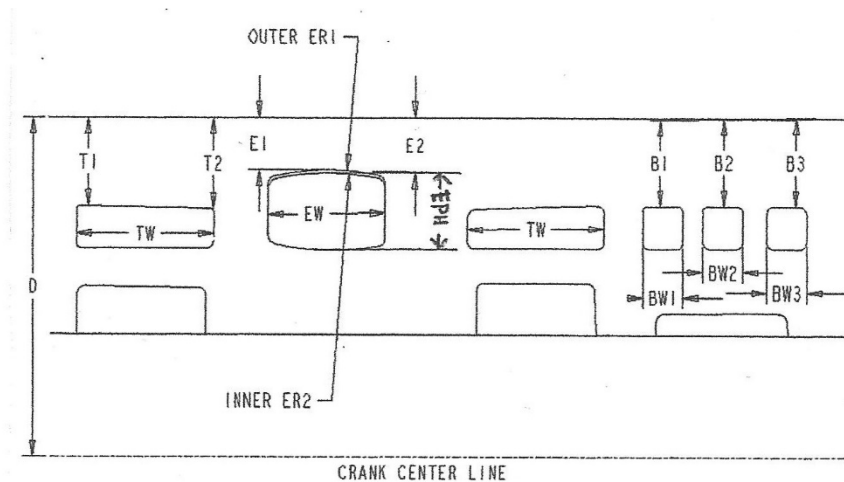
Tuner: SST120 or Optimax 2.5L

Tuner must be as produced with no changes to the exhaust area with the following modifications allowed.

A. Optimax 2.5L tuner when used on a Carb 2.5L engine is allowed to block off the water dump area from the poppet valve.

B. Early SST120 tuner with a  $\frac{1}{2}$ " water supply passage may be increased to  $\frac{3}{4}$ " water supply passage to mimic later tuners.

C. Either tuner may have the water dump holes modified to "dry" stack" the tuner.



B1 2.1 Min. BW1 0.7 Max.

B2 2.1 Min. BW2 0.94 Max.

B3 2.1 Min. BW3 0.7 Max.

T1 2.140 Min

T2 2.180 Min

TW 1.75 Max.

E1 1.470 Min.

E2 1.560 Min.

EW 2.37 Max.

EPH .950 Min.

Mercury 200hp

Class Displacement 153.0

Venturi 1.312 +/- 0.015 Carburetor Bore 1.562 +/- 0.015 Quantity per Engine 3 duplex

Cylinder Bore +/- .003 3.501

Piston Stroke +/- .011 2.650

Rod Length +/- .006 5.500

Flywheel min lbs. 6.6

Centerline of wrist pin to deck of piston 1.490 +/- .010

## Formula 1 SST-200

### D. SST 200 TECHNICAL STANDARDS

Max. Total Cu. In. Displacement Min. Boat Length Min. Boat Weight

154.0 (2.5L) 16' 1,150 Lbs.

122.0 (2.0L) 16' 1,100 Lbs.

SST 200 Boat Standards (see also Rule 21 - Below) 1) Any design of boat including bottom, deck, cockpit openings and seating arrangements is permissible so far as boat meets minimum length.

2) Power trim and/or adjustable spoilers shall be allowed in Super Stock.

SST 200 Motor Standards (see also Rule 23, 25 and 26 - Below)

1) All cowling and engine graphics and colors shall be the same as OEM.

2) The SST 200 class can change engine wiring to a 24-volt starting system.

3) The SST 200 class gear cases may have their outside surfaces refinished; however, they must meet the requirements of OPC Engine Specification sheets and the original design.

4) ECU to remain completely stock including fuel map, ignition map and RPM limiter. At the referees discretion a "Lottery" may be used at any given race.

## Formula 1 SST-120

1. SST 120 head may be cut to minimum head pocket depth of 0.405 all other measurements will stay the same. No fully Machined pockets.

2. May run any tuner.

3. May run any piston, as long as it meets OEM dimensions.

4. May run a light weight flywheel.

5. All other rules for SST 120 apply.

NOTE- THE TIGHT HEADS ARE 23CC, IT IS RECOMMENDED TO RUN SHORT REACH PLUGS WITH THIS SET UP.

**The rules below are included because they are referenced in the Formula 1 SST-200 Rules above.**

### RULE 21 • BOAT STANDARDS

1. The length is to be measured parallel with the fore and aft centerline from the rear of the transom at the point of engine attachment, to the foremost part of the bow. A tolerance of two inches will be allowed in measuring overall boat length dimensions.

2. No add-on extensions to the hull will be permitted to achieve class length. Fins are not included in measurement of boat length (see Figure L).

3. The minimum weights assigned to a specific class shall include motors, steering systems, motor controls, hardware, instruments, and all securely attached cushions, fuel tanks and brackets, batteries and boxes, fire extinguishers, etc. Any fuel remaining in the tanks at the end of the race will be included in the boat weight. Driver's weight will be included with life jacket and helmet and clothing as raced. No water will constitute any part of the total class weight. All weights other than the driver, engine and its controls, and fire extinguishers, must be fastened in such a manner that their centers of gravity cannot be moved during the race. Except in races of longer than one-half hour duration per heat, only one fuel tank will be allowed. No weights, other than the engine and its controls, may be fastened in locations external to the hull where they may constitute a hazard upon impact with another object.

4. In questionable cases, acceptability of a given hull shall be the responsibility of the Referee and his decision shall be final.

5. All boats constructed with false floors, seat box compartment or air filled flotation tanks must be fitted with inspection holes of at least 7/8" diameter such that no point inside said tank is more than 24 inches from inspection hole. These holes may be plugged during competition but must be open for weighing and inspection.

6. There shall be no devices or arrangements specifically to take advantage of external air pressure to produce or assist planing.

#### RULE 23 • OUTBOARD MOTOR STANDARDS

1. An outboard motor is defined as a complete internal combustion power and propulsion unit that can be attached to a boat and which can be lifted bodily from the hull as one unit. Batteries used for ignition and starting, tachometer, throttle control and steering arrangement are excepted.

2. A manufacturer of outboard motors for Outboard Performance Craft Racing is one who filed specifications and is responsible for the original design and manufacture of the following: crankshaft, connecting rod, cylinder head, cylinder, crankcase, gears and valving arrangement, and who complied with such other requirements as provided by these rules. Manufacturers may be of either foreign or USA (domestic) origin, and motors must be or have been available in the USA through dealer networks.

A. Motors must be the product of a recognized manufacturer engaged in the production of outboard motors offered for sale to the general public.

B. There shall be no alterations of parts with the exception of spark plugs, carburetor jets, and propellers, or specific parts approved by the Technical Committee and approved by the Commission. The intention is to race the engine exactly as manufactured and without special performance boosting accessories. The gearcases on motors raced in Stock classes must be raced with either the same surface coating or paint as supplied by the manufacturer, or with no surface coating or paint over part or all of the surface of the gearcase casting, but the smoothness of the metal surface must under no circumstances be better than that supplied by the manufacturer.

C. No special parts or interchange of parts will be allowed, unless approved by the Commission.

D. In all classes the trim tab, thrust and locking washers may be altered or removed from the lower unit to permit the use of any propeller, thrust washer or nut.

E. Cylinder head and power head attaching studs may be substituted for bolts.

F. Electronic engine RPM limiting devices may be eliminated.

3. Stock Engines (Outboard) as referred to in these rules shall be defined as outboard models that:

A. All engines in Stock classes must be capable of shifting from the driver's seat, with one hand on the steering wheel, by electric or mechanical methods; and be capable of forward and reverse shifting at all times.

B. Are manufactured in annual or model year quantities of greater than 250 units.

C. Are intended for sale to and to be used by the general public.

D. Are advertised through the same media, in the same publications and given the same prominence as the manufacturer's other engines.

E. Are distributed through the manufacturer's normal channels.

F. Are not equipped with an accessory or high-speed gearcase.

G. Are equipped with standard under-cavitation plate or through-prop exhaust. 22

4. Super Stock Engines (Outboard) as referred to in these rules shall be defined as outboard models that:

A. Are manufactured in annual or model year quantities of more than 25 units.

B. Are not necessarily intended for sale and to be used by the general non-racing public.

C. Are not necessarily advertised through the same media, in the same publications and given the same prominence as the manufacturer's other engines.

D. Are not necessarily distributed through the manufacturer's normal channels.

E. Accessory gearcases, as submitted by the manufacturer, may be used in these engines provided that they are built in a total quantity of no less than 25.

F. Exhaust stacks not contained in the driveshaft housing will not be permitted.

G. Standard factory production models may run in Super Stock classes.

H. Only one manufacturer's engine should be approved per class.

I. No Stock or Super Stock motor shall be eligible for Outboard Performance Craft (OPC) racing until such time as the model has been approved by the OPC Racing Commission.

5. Engines run in Stock and Super Stock classes may only be run in the configuration that they were homologated in by the Technical Committee.

#### **RULE 25 • REPLACEMENT PARTS**

1. Only such parts shall be permitted as are standard production OEM parts used on the motor as the purchaser may obtain it from the dealer as a stock item or electrical or electronic products as approved by the OPC Technical Committee and the OPC Commission, and published in Propeller and available to the general public through dealers. These products cannot provide any performance advantage over original OEM parts.

A. No replacement part for current production motors (motors currently being produced by the original manufacturer) shall be considered standard production until this part appears on current production motors which can be purchased from the dealers.

B. Engine components are of two categories: primary and secondary parts.

1) Primary components are: Block and crank case assembly; cylinder head; crankshaft; connecting rods; pistons; wrist pins; induction system; reeds (SST 45 & SST 60); cooling system (must retain original cooling concept); midsection; exhaust; and gear case assembly. No alterations of these components are allowed unless specifically specified in the class rules. Primary parts must be OEM for the model.

2) Secondary components are: Bearings; seals; impellers; cylinder sleeves; gaskets (must be same design and thickness); fuel lines and fitting; ignition wires (high tension) and caps or boots. Secondary parts may be of any manufacture and must be of same design intent and configuration as the OEM parts.

C. Any replacement part for non-current motors (motors no longer being produced by the original manufacturer) shall be approved only after the part being replaced is no longer available for the motor model from the manufacturer or is specifically approved by the Commission.

D. Final approval of non-OEM electrical or electronic parts approved for use in OPC racing shall not be given until the Chairman of the OPC Racing Commission has advised the Executive Administrator that he is satisfied that all provisions of the rule have been complied with, and until such time as the manufacturers have built at least 250 units of the part submitted for homologation.

E. For non-OEM electrical or electronic parts, the manufacturer must follow the same rules as specified for motor manufacturer registration with respect to submission of specifications to the Chairman of the Technical Committee and the time period for which the parts are approved.

F. The OPC Technical Committee reserves the right to retain all submitted electrical or electronic parts for a one year period.

#### **RULE 26 • MOTOR MODIFICATIONS Stock and Super Stock classes:**

1. There shall be no modifications whatsoever to the motor as furnished by the manufacturer other than:

A. Any carburetor jets, spark plugs or propellers may be used, provided other parts are not altered to accommodate them with the exception of the trim tab.

B. Only such parts shall be permitted as are used by the motor manufacturer on the particular model as built on the production line (see Rule 23). Modifications covered by a manufacturer's service or engineering bulletins are legal seven days after the date of any such bulletin and approval by the OPC Technical Committee, provided all direct purchasers of affected engines are notified by mail as well as all OPC inspectors, followed by printing in Propeller at the next opportunity. In the event the manufacturer is unwilling or unable to meet these criteria, modifications covered in such bulletins will be legal after printing in Propeller.

C. Oversize pistons furnished by the manufacturer of an outboard motor may be used in the model for which they are furnished. The bore of the engine may be enlarged by the amount that the oversize pistons differ from the standard size pistons. An additional total 0.005 inch enlargement of the bore will be allowed for bore enlargement due to wear or rematching errors, or measuring tolerance. Under no circumstances may the bore be enlarged more than 0.035 inch over the original dimension. It is not permissible to chromium plate cylinder walls unless the motor manufacturer uses chrome plating of cylinder walls as standard production procedure on that particular model.

D. Tachometer, fuel and water pressure, and temperature gauges may be installed if desired.

E. The attachment of a steering bar or its equivalent may be accomplished at any point or points on an engine. Any cowlings or plates removed may be cut, and must be replaced. Any openings created by this operation must be sealed to prevent the engines from pulling in air. Studs or bolts may be exchanged to secure steering bar.

F. Throttle return springs will be allowed on engines; however, no drilling of holes or other modifications to the engine will be permitted to install same. Mounting links may be attached with present fasteners. G. Isolation Mounts: Only those supplied by the engine manufacturer as original equipment or through the service group are acceptable.

H. Any adjustments of mixture control, throttle and shift linkage will be allowed. Any mechanical adjustments of spark advance will be allowed provided no modifications are made either to the spark advance system or the engine as manufactured.

I. Safety tilt switches and safety starting switches may be disconnected or bypassed. 24

J. Fuel pumps, filters, heat exchangers or auxiliary tanks may be installed, provided their use entails no modification to the engine and fuel lines used to connect to the fuel connector provided with the engine.

K. The attachment of a power trim system may be accomplished at any point or points on an engine. Only those parts of the production motor interfering with the attachment and function of the trim system may be altered or removed.

L. Bead blasting will be allowed at the block and crankcase interface only. No other internal parts may be bead-blasted.