American Outboard Federation
Engine Specification Manual

Context

Race Committees take note! Title page "**A.O.F. Engines, Classes and Weights**" is designed to be copied and displayed at registration. This will allow the drivers to find the proper class for their engine, and therefore relieve the registrar of those burdens.

A.O.F. Engines, Classes and Weights

Runabouts Classes		
Class	**Stock Engine**	**Weight**
J	OMC 15A w/ restrictor plate & Mercury 60-J	290/245
O	OMC 15A	350
A	Yamato 80	390
B	Mercury or Mariner 25XS, Yamato 102, 202, 302	420
D	Mercury 44 cu. in.	490
Novice	Yamato 80 w/ restrictor	N/A
Class	**Super Stock Engine**	**Weight**
A	Mercury KG-4 & Mk-15, Hot Rod A	345
B	Mercury Mk-20-H Mk-25, Hot Rod B	365
B1	Mercury 25SXS, 200, & OMC 22 cu. in.	390
C	Mercury 30, Chrysler 302, 304, Yamato 102, 202, 302	465
D	Mercury 40 cu. in.	490
E	Mercury 44 cu. in.	490
SE	OMC 44 & 49 cu. in., Merc. Mk-75, 650 4 & 3 cyl. Yamaha	N/A
80M	Yamato 80	415
Class	**Alcohol**	**Weight**
250R	Up to 257.5 cc	N/A
350R	257.5 to 350 cc	N/A
500R	351 to 500 cc	N/A
Hydro Classes		
Class	**Stock Engine**	**Weight**
J	OMC 15A w/ restrictor & Mercury 60-J	290/245
O	OMC 15A	345
25XS	Mercury or Mariner 25XS	385
80S	Yamato 80	380
102S	Yamato 102, 202, 302	420
D	Mercury 44 cu. in. Tohatsu M10	470
Novice	Yamato 80 w/ restrictor	N/A
Class	**Super Stock Engine**	**Weight**
A	Mercury KG-4 & Mk-15, Hot Rod A	340
B	Mercury Mk-20-H Mk-25, Hot Rod B	365
B1	Mercury 25XS, 200, & OMC 22 cu. in.	365
C	Mercury 30, Chrysler 302, 304, Yamato 202, 302	435
D	Mercury 40 cu. in.	470
E	Mercury 44 cu. in., Tohatsu M10	470
SE	OMC 44 & 49 cu. in., Merc. Mk-75, 650 4 & 3 cyl. Yamaha	N/A
80M	Yamato 80	425
102M	Yamato 102	400
Class	**Alcohol**	**Weight**
125H	Single cylinder up to 128.75	N/A
175H		N/A
250H	Up to 257.5 cc	N/A
350H	257.5 to 350 cc	N/A
1100H	350 to 1133 cc	N/A

NOTE: C through E classes may compete in SE locally, but not at Nationals or for Records.

Weighing

Procedures for Weighing:

1) Overall racing weights shall include the combined total of the boat, motor, driver, secured ballast, and free of water.
2) Driver's Weight
    A) The weight of the driver in regular racing togs worn during competition.
    B) No objects of any kind may be added to a person for the purpose of adding weight.
    C) Driver may not enter the water before weighing, for the purpose of adding weight.
3) Boat Weight includes:
    A) Hardware, steering, throttle, gages, batteries.
    B) Padding cushions, which are securely attached.
    C) Fuel tank(s) with the remaining fuel.
4) All protests concerning the scales must be made prior to the start of the race.
5) Scales must be available one (1) hour before the start of the race for weighing of boats and or drivers.
6) The driver shall be responsible for the complying of weight regulations.
7) At Championship events the Weigh Master must be available on the last day of testing, to show the correct use of the scale.
8) Once set, no changes to the scales except what is needed to balance the scales will be allowed.

Engine Inspections

Inspection Procedures

Inspections are conducted by the designated Inspector(s), subjected to the rules of A.O.F.
All protests concerning the inspection area, inspectors, tools, and current rulebook, must be made prior to the race.

1) Regular Races
    A) Visual inspection, outside measurements, (which include intake port covers) and boat weight.
    B) Protest Equipment – The Inspector may require the Protested Party to disassemble the equipment completely.
2) Championship events
    A) The Inspector will complete forms furnished by A.O.F. for this purpose.
    B) All finishers' engines should be sealed after qualifications, and thoroughly inspected after the final heat.

Inspection

    C) It is mandatory that the engines of the Championship winners be disassembled for inspection.
    D) It is up to the Inspectors as to how far a tear down will go.
    E) All of last years' Champions that did not need to qualify should have the Inspector seal their engines before the final heats.
    F) In case of a protest, the Inspectors decisions must be unanimous and are final.
        1. If the Inspectors don't agree, the questionable equipment is to be confiscated, and forwarded to the Technical Committee.
        2. Prizes and points are to be withheld until a final decision is reached.
3) Speed Records
    A) The Inspector will complete forms furnished by A.O.F. for this purpose.
    B) The boat, engine and equipment must be thoroughly inspected in order to certify the Record.

C) It is mandatory that the engines of the Record winners be disassembled for inspection.

4) The only people allowed at the engine inspection are the Inspectors, Driver (or designee), and his Mechanic. An inspection is not a public exhibit.
5) The Inspectors are in full charge of the Inspection area.
6) The Inspector(s) shall report all discrepancies to the Referee, who will then forward them to the Racing Commission for review.

Class of Inspection

There are two classes of Inspections, Class I and II. The following classes of inspection will apply.

1. Non-Championship events – Class I
2. Record events – Class II
3. Championship events Class II

Inspection Area Requirements

The Race Committee should provide:

1. An enclosed or covered area.
2. Private atmosphere roped off area.
3. At least two tables, one for inspection tools and one for engine tear down.
4. Motor stands.
5. Boat stands, on which boats may rest during engine removal, and visual inspection.
6. Scales, the placement should be in an accessible location.

Inspection Tools

The following list is intended only as a guide in the acquisition of tools. The experienced Inspector has frequently substituted other equally satisfactory tools.

A.O.F. Rule Book and Inspection Manual
Sealing paint
0-1" Outside Micrometer
1-2" Outside Micrometer
Small 5" inside Calipers
Large outside Calipers
Set of Telescoping Gauges
Depth Vernier or Gauge
6" Steel Rule
18" Flexible Steel Rule
Two 25 CC Syringers
Set of Number Drills
Two Parallel blocks
Penlight
8" or 12" Dial or plain Vernier Caliper
1", 2", 3", and 6" Standards for setting tools
Scale that weighs up to 7 Lbs. In ounces
Scale that weighs up to 2000 Grams
½ inch Diameter Rod
5/8 inch diameter rod

FUEL

Gasoline

Permissible fuel shall consist of gasoline and oil. Gasoline may be automotive, aviation, or racing, either leaded or unleaded varieties, so long as it does not contain power-boosting additives such as alcohol, nitrates, or oxygen bearing compounds. Gasohol is not permitted. Oils maybe petroleum, synthetic, or a blend of both, and cannot contain power boosting additives. Any driver using fuel not permitted by these rules will be disqualified.

Alcohol

Any non-pressurized liquid fuel is permitted. Fuels that exist as gases at usual atmosphere temperature and pressure such as propane, butane and nitrous oxide are prohibited. The use of oxygen tanks in connection with engines is prohibited.

FUEL TESTING PROCEDURES - Gasoline

Fuel Test Procedures: If a fuel sample fails on first trial. The following procedures are recommended. Remove a sample of fuel from the boat's tank. This is because certain metals and their combinations can effect the fuel meter reading. Keep the sample in a closed container. This is done so that, any chemicals present in the sample will not evaporate. Continue to keep the sample closed when not testing. Check fuel meter setting for –75 setting, as per instructions below. Re-test sample. If a second fuel meter is available, test sample with it, making sure it is set at –75. If all meters are correctly set to the satisfaction of the Inspector(s), and the sample fails three tests, the fuel sample has failed the meter test.
Fuel Tank Design: Consideration should be given to the filler neck size on the tank, to be over one inch (1") inside diameter. This so that the fuel tests meter probe can be inserted during inspection.

Digatron DT-15 Fuel meter

The purpose of this test is to measure certain electrical properties of the fuel sample to determine if they are within the permissible limits.

Before performing your test, ensure that the fuel meter is in good working order:

1) Sensor Condition – Visually check the sensor and it's connecting wire to assure that it has not been physically damaged.

2) Battery Condition – When the meter is on, the words "LO BAT" will appear in the upper left corner of the display if the battery needs to be replaced. Do not use the meter if the "LO BAT" massage is displayed, the readings will not be accurate.

The recommended fuel test procedure is as indicated below:

1) Turn the meter "ON" and allow it to warm up for at least fifteen (15) minutes before doing any testing. This will allow the internal components to stabilize at their normal operating temperature.

2) Attach the sensor's connecting wire to the meter. Hold the sensor's connecting wire and lower the sensor into the calibration liquid (Cyclohexane – C6H12) in such a way that the sensor is completely submerged. Take care to assure that the sensor is not in contact with the container. (Container should be plastic -- never glass or metal -- with a cover to reduce evaporation or water absorption. This container should be on a plastic or wood base, never metal; as it effects the meter reading.) Gently wiggle the sensor wire to displace any air bubbles, which may be trapped between the sensor plates. Using the knob on the front of the meter, adjust the meter until the display reads "-75" (negative seventy five).

3) Remove the sensor from the calibration liquid, and blow any excess liquid from between the sensor plates. Lower the sensor into the fuel sample just like you did while calibrating the meter. Observe the reading on the meter's display. If the reading is zero (0) or a negative number, the fuel is permitted. If the reading is greater than zero (a positive number), the fuel is not permitted.

The electrical characteristics of gasoline change somewhat with temperature. As such, it is important that the temperature of the fuel sample and the calibration liquid be within 15 degrees of each other.

When a fuel sample is found not to be within specifications, per the above procedure, it is recommended that the following additional steps be performed:

A) Clean the sensor with some spray-on brake cleaner and allow to air dry at least 30 seconds.
B) Re-check the calibration setting (-75) of the meter in Cyclohexane and adjust if necessary.
C) Allow the fuel sample to stabilize to the same temperature as the Cyclohexane and then repeat the test as described in item 3 above.

During the course of the day, it is recommended and necessary to re-check the calibration setting in Cyclohexane.

Specific Gravity Testing Instructions

The purpose of this test is to measure the relative density of the fuel sample and to determine if it is within the permissible limits.

Two pieces of equipment are required to perform this test:

A) Specific gravity hydrometer(s), which cover the range. A clear glass container, which is at least as tall as the hydrometer. A graduated cylinder works well for this purpose.

The recommended fuel testing procedure is as indicated below:

1) Assure that the glass container and hydrometer is clean.

2) Place the glass container on an essentially level surface and fill it with the fuel to be tested. The depth of the fuel should be equal to, or greater than, the length of the hydrometer.

3) Carefully insert the hydrometer into the fuel sample with the weighted end facing down. Take care to minimize the contact between the hydrometer and the container.

4) When the hydrometer has reached a stable free float in the fuel sample, read the specific gravity from the scale within the hydrometer. This is done by visually sighting along the upper surface of the fuel and reading where the scale crosses the fuel's surface. Record this reading.

5) Measure the temperature (degree F) of the fuel.

6) The specific gravity characteristics of the fuel (gasoline and oil) change somewhat with temperature. As such, the minimum and maximum permissible specific gravity reading will change as the fuel temperature changes. Below is a listing of the maximum permissible specific gravity readings and their corresponding fuel temperatures. The standard is from 0.690 to 0.760 @ 60 F.

	Fuel Temp	**Specific Gravity Reading**	
	Degree F	**Min.**	**Max.**
	40	0.699	0.769
	45	0.696	0.767
	50	0.694	0.765
	55	0.692	0.762
Standard	***60***	***0.690***	***0.760***
	65	0.687	0.758
	70	0.685	0.755
	75	0.683	0.753
	80	0.680	0.751
	85	0.678	0.748
	90	0.676	0.746

95	0.673	0.744
100	0.671	0.741

General Technical Rules

The following general modifications apply to all classes, except Alcohol, OMC 15A and Mercury/Mariner 25XS which have those permissible modifications within the specification sheet for those classes.

1) Any type gasket maybe used, provided the thickness agrees with the dimensions shown on the motor specification sheet. If there is no dimension it shall agree with the factory part.
2) Any adapters to secure spark advance will be permitted.
3) Re-sleeving of cylinders is permitted in all classes.
4) Chrome plate cylinder walls is not permitted.
5) The use of overdrive lower units is prohibited except in SE class.
6) The use of tractor style lower units is prohibited.
7) Any devise that can change the final gear ratio while underway is illegal.
8) Two-piece drive shafts are permitted in all classes.
9) The use of power trim is prohibited.
10) Broken or damaged parts may be repaired by welding or the use of plastic compounds; provided the part is repaired to original specifications. The inspector will pass repairs and will disqualify all engines that have been altered to provide an unfair advantage.
11) Removal of thermostats is permitted.
12) After market engine manufacturers, who produce parts for sale in this division must file a print of the engine part or parts to the Tech Committee for its approval. Manufacturers must be members of A.O.F. and run at least one advertisement in the A.O.F. Rule Book or monthly publication to announce the part or parts.

Super Stock General Technical Rules

The following general modifications apply to the Super Stock engines listed. Additional modifications are listed within each class specification sheet.

Class A	Mercury KG-4 & Mk 15; Hot-Rod A
B	Mercury Mk 20-H & 25; Hot-Rod B
B1	Mercury 25SS & 200; OMC 25
C	Mercury 30 & 30-H; Chrysler 302 & 304
D	Mercury 40 cu. in. & 44 cu. in. stock
E	Mercury 44 cu. in.
SE	OMC 44 & 49 cu. in.; Mercury Mk 75-H & 75, 650 4 cyl., & 650 3 cyl., Yamaha 42.6 cu. in.

1) The removal of stock spray shields, protective cowlings, spark plugs protectors, compression release valves, fuel filters, starter mechanisms, and carburetor chokes is permitted so long as the parts removed do not alter the specifications of the motor. Cool cans are permissible with these classes.
2) Any type or make of spark plug (original thread size shall be maintained in the head), spray shield, piston ring, propeller, fuel tank, starter plate, lower cowl, and spacer plate assemblies may be used provided other parts are not altered to accommodate them. Velocity stacks are permitted provided carburetors are not altered to accept them.
3) Motors may be modernized by the use of parts manufactured by the original manufacturer, provided the parts are manufactured for later models and are approved by the Technical Committee.

4) Polishing of all internal parts and passages is permitted in all classes except OMC 25, Mercury 25ss/200 and D 44 stock; provided all tolerances are kept within those shown of the Motor Specification Sheets. Where no measurements exist, the general contours and dimensions of the manufacturer shall be maintained. See individual class specs for exceptions to this rule.
5) It is legal to use thermal barrier coatings and anti-friction coatings on internal engine parts.
6) Material may be removed for the balancing of reciprocating parts provided minimum weights and tolerances are maintained as shown in the Motor Specification Sheets.
7) Beveling of crankshafts is permitted except in the OMC 25, Mercury 25ss/200 and D 44 stock.
8) Machining crankcase split surfaces is permitted in SE and on four cylinder Mercury's. It is not legal in other classes or stock 44 Mercury.
9) Cylinder diameters may be enlarged a maximum of 0.050 inches larger than the standard bore as listed in the Motor Specification Sheets, or as specified.
10) Squaring of the intake and exhaust ports in the motor block is permitted, provided that the dimensions in the Motor Specification Sheets are maintained, except in the OMC 25 and D 44 stock.
11) There shall be no third porting, gully porting, or adding of additional ports or passages other than those shown in the Motor Spec Sheets, except as provided in specific class rules.
12) Open exhaust is permitted provided that there are no alterations of the block or metal removal to accommodate the exhaust. Water relief holes may be drilled in the block but not the combustion chambers.
13) Any make deflector piston is permitted in motors of all classes, provided that the measurements of such piston, including their domes, conform exactly to those of the engine manufacturer. The specified number and width of the ring grooves and the location of the top grooves must be the same as on the factory pistons. Knurling of pistons is permissible in all classes except OMC 25 and D 44 stock.
14) There shall be no indexing of pistons for the purpose of altering port timing, or any alteration to or addition of ring grooves, or the use of additional rings, or the use of multiple rings in one groove. Ring grooves must remain as manufactured, either straight, 'V' or Keystone.
15) Removal of ecology piping is permitted.
16) Any needle and seat is permitted for carburetor float valves as long as alterations to the carburetor are not required for installation.
17) Adjustable high-speed needles and seats are permitted on all Tillotson and Carter carburetors.
18) Adapters of extra length high-speed needles will be permitted.
19) Any driveshaft housing and clamp bracket is permitted.
20) Powerheads may be pivoted on the driveshaft housing.
21) The maximum number of propeller blades for a Super Stock engine is 4.

Yamato General Technical Rules

1) Engines covered by these rules shall remain in stock configuration and condition as intended by the manufacturer except where allowed by these rules. These rules are designed to give the reader the allowable modifications to an engine. The addition or removal of metal that can, in anyway, being a departure from these rules, is prohibited.
2) The tolerances for these engines are determined by the Technical Committee, and are shown in the Specification Sheets. Inspectors should refer to these sheets for the correct inspection procedures.
3) Any type of spray shield, spark plug boot, and throttle hook-up may be used.
4) Any type of bracket for throttle, steering, and spark controls may be used.
5) An ignition advance lock down may be used.
6) The spark advanced lever handle, and gas tank handle may be cut or removed.
7) The use of Mercury clamp brackets is permitted

8) Adjustable kick-out brackets are permitted.
9) Cylinders may be bored or honed up to the maximum of the specification sheet's standard dimension, and Yamato manufactured oversized pistons may be used.
10) It is permissible to drill water drain holes in the ignition casting, and these holes may be tapped and plugged.
11) Spark plug adapters may be used in 18mm cylinder heads.
12) A replacement propeller shaft (9/16" diameter) containing only one shear-pin hole may be used in Yamato Stock lower units. An adapter may be used on the prop shaft to extend the propeller back closer to the water pick up. Cut down Yamato prop shafts are not permitted. (They will break.)
13) No metal removal or addition, nor bead or sand blasting is permitted on any internal engine component. No polishing of any type is allowable on internal passages or other cast surfaces, carburetor, or intake manifold. A machined surface may be re-machined as long as it meets specifications. Any cast or forged surface must remain as is. Machined surfaces without a dimension cannot be altered; this could include but not limited to radius, angles or width.
14) It will be permitted to use model 302 pistons in a model 102. Piston ring location pins must be removed, and new pins located in a similar location to the original 102 piston. No other modifications to the pistons are allowed. Please note that the 302 pistons are virtually identical to the 102, except for the ring location pins. Failure to relocate the pins will allow the ring gap to ride through ports, and catch the port edge. This will break rings, damage your cylinder walls and cause a serve lack of performance.
15) It will be allowed that any Yamato 102, 202 or 302 motor which has been ported past factory specifications to be reconditioned and placed back into legal stock service by replacing the sleeves with factory port dimensions. Factory specified pistons must still be used.

Yamato Super Stock Technical Rules

In addition to the Yamato General Technical Rules, these rules shall apply. Powerhead specifications to be used are those for corresponding stock powerhead.

1) Any type down housing may be used.
2) The powerhead may be pivoted on the down housing.
3) An external water pick-up is permitted.
4) The stock fuel tank may be removed.
5) An external fuel pump that is pressure driven off the engine may used. Fuel filters or regulators are permitted. The inlet of the carburetor may be modified to accept the fuel pump arrangement.
6) Thermal barrier and anti-friction coatings are permitted.
7) The maximum number of blades on a propeller is 4.
8) The 31.8 c.i. OMC motor shall be allowed in the 102M (C-Mod) Class.

Evinrude/Johnson 15A

Notes

A) It is the intent of the Racing Commission that the engine be raced as received from the manufacturer, without modification.
B) Allowable modifications listed here are for either safety or repair purposes. An inspector may compare questionable parts to new parts to assist in making decisions. Use of these rules for an unfair advantage will be grounds for disqualification.
C) The Driver shall be responsible for the condition of the engine as raced. For instance, errors on the part of the manufacturer, mechanic or previous owner will not excuse noncompliance with the rules.
D) Height restriction: There shall be an absolute minimum distance of 1 3/8" between the boat bottom and the prop shaft centerline at the aft end. The measurement of this height shall be as raced with the engine turned straight (prop shaft in line with the fore-aft centerline). The bottom of the boat shall be the lowest planing surface at the back end of the boat. Hydroplanes cannot have a tunnel bottom. This rule does not apply to straight away time trials.

Following is a list of restrictions, descriptions, and modifications, which apply to this engine.

1. The engine shall retain its complete Factory color and decals (or close to it) including powerhead and gearcase.
2. The engine shall be operated with the production upper and lower motor covers installed as originally supplied by the manufacturer.
3. The mounting of a fuel tank to the engine or steering bar is not permitted. (Safety)
4. Any type or make spark plug is permitted.
5. Larger or smaller fixed jets are permitted. An adjustable “high speed” jet is not permitted.
6. The addition or removal of material from any moving part is prohibited, including the flywheel.
7. The addition or removal of material from internal engine components or surfaces is prohibited. Internal metal surfaces will retain their original factory finish. Honing of the cylinder bores is permitted. The exhaust passage in the gearcase shall retain its original cast surface finish.
8. Broken parts may be repaired by welding or with the use of plastic compounds, if all contours and dimensions remain as original. The gearcase may he profiled as long as minimum dimensions and templates are met. Broken skegs and cavitation plates may be used provided that the edges of the break or breaks have not been filed or smoothed or otherwise altered, and provided that reasonable time was not available for repair or replacement. (One or two weeks will he considered a reasonable amount of time.) At championship events the Inspector may rule out the use of broken skegs or cavitation plates.
9. It is permitted to repair stripped threads by tapping oversize, using heli-coils, or threaded inserts.
10. It is permissible to use a thrust bracket of any manufacturer, provided the engine is not altered to accommodate the bracket.
11. The steering bar brackets shall have their retaining bolt’s safety wired as supplied by the manufacturer. (Safety)
12. Only genuine OMC service parts for these models (1986 to 1992) will he considered as permitted replacement parts. This includes steering bracket bolts, steering bar bolts, gear case bolts, connecting rod bolts, throttle plate screws, reed stop screws, and cylinder head

gasket. Other than listed above, any make or type of bolt, nut, screw, washer or gasket may be used, provided it is equivalent to the original.

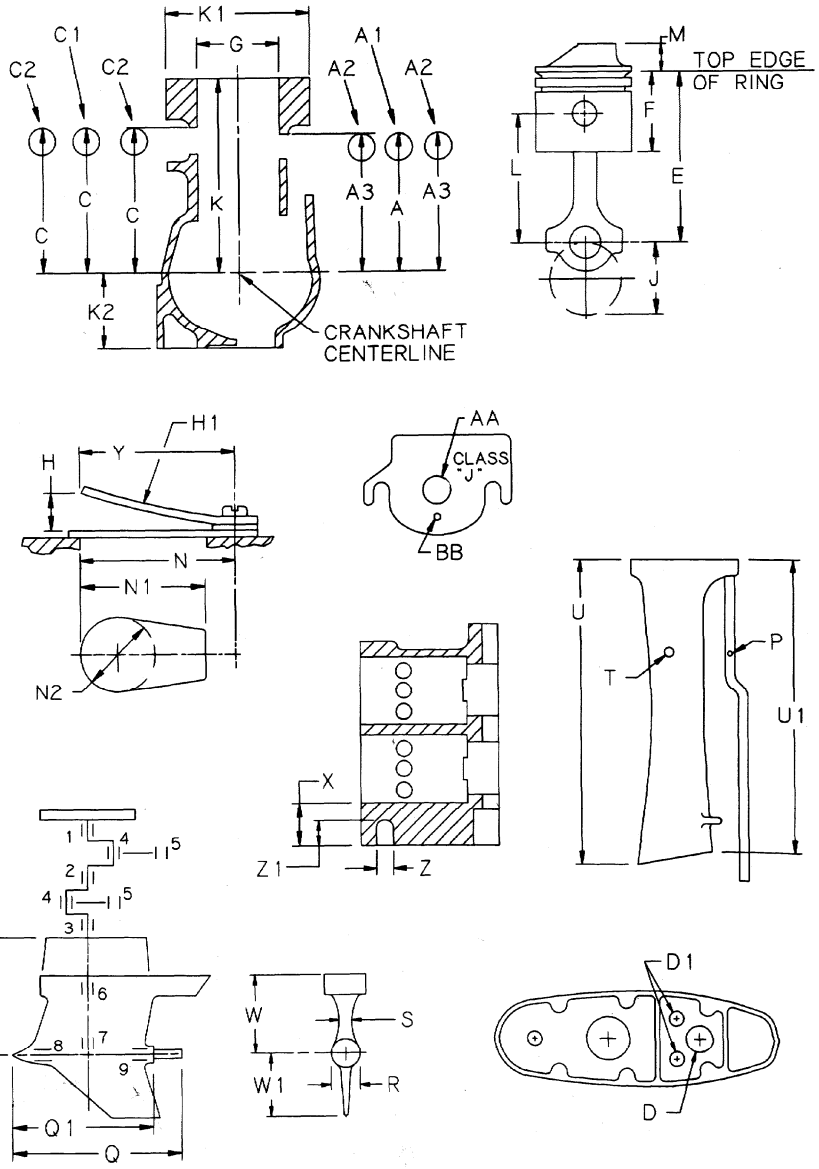
Evinrude/Johnson 15A - continued

13. Only a minimal amount (thin film) of sealer may he used on engine gaskets.
14. The intake and exhaust ports are drilled (round) holes. Only the center transfer port and the center exhaust port for each cylinder break through fully into the cylinder bore. All other ports do not fully break through into the cylinder bore.
15. The gearcase split line cavities shall be left as supplied by the manufacturer (i.e. unfilled).
16. The only permitted cylinder block is OMC part number 396780. The part number is cast on the top of the block on the exhaust side. Service number 396010 includes block 396780.
17. Boyesen reeds number 122 and 122R are permitted replacement parts. Except for reed thickness, and the shim may he removed, all other specs apply.
18. The only permitted flywheels are either OMC part number 583077 or 583913. The part number is cast on the under side of the flywheel.
19. The only permitted carburetor assembly is OMC part number 397653, and service carburetor with 388275 stamped into the top of the carburetor body. When converting a service carburetor, a full butterfly, similar to the original must be used.
20. It is permitted to remove the transom cleats, which are located in the transom surface of the stern clamp bracket.
21. The engine must meet the requirements of the OMC inspection template as listed below:
    OMC part number 568050 (for the gear case.)
    OMC part number 568051 (for the shape of the combustion chamber.)
    OMC part number 568052 (for the height of the ports.)
22. For the J class it is required that the engine utilize an intake restrictor plate, either the A.O.F. issued plate, OMC part numbers 561277 or 568226. The intake restrictor plate shall have its port and orifice edges as supplied by the manufacturer (i.e. sharp corner).
23. For the O class, it is permissible to use two standard gaskets, OMC part number 318932 between the carburetor and the intake manifold. For the J class it is permissible to use a single standard gasket, OMC 318932, on both sides of the intake restrictor plate.
24. The only permitted transfer port covers are part number 328820, 333733, or 336637.
25. Any OEM piston ring manufactured for this year and model engine is permissible for use in the 15A engine. This includes the standard (P.N.386279) or the 0.030" oversize (P.N. 386288) piston rings. The 0.030" oversize ring may be used on the 0.010" oversize piston in addition to the 0.030" oversize piston, and may be cut down to fit the cylinder bore for use on the 0.010" oversize piston.
26. The bore dimension should be increased by the size of the oversize pistons.
27. O and J Runabouts must meet a minimum boat length of 10', with minimum beam 44".
28. Because the following parts are no longer available from OMC, they maybe reproduced by any manufacturer.
    Steering bar brackets (must be steel)
    Steering bars
    Stator plate locking bracket
    Carburetor linkages and bowden wire mounts
    Carburetor baffle plate
    Driveshaft
29. Allow 25xs remanufactured throttle on all O/J/A motors.

Evinrude/Johnson 15A - continued

CC's	13.5
Venturi	0.875 +/- 0.005
A	3.480 max.
A1	0.625 +/- 0.010
A2	0.625 +/- 0.025
A3	3.490 max.
C	3.680 max.
C1	0.626 +/- 0.010
C2	0.625 +/- 0.025
G Bore	2.188 + 0.005, - 0.003
K	4.880 +/- 0.015
K1	4.520 +/- 0.025
K2	1.830 +/- 0.020
X	1.086 +/- 0.010
E	3.918 +/- 0.010
F	1.868 +/- 0.010
J	1.760 +/- 0.008
L	3.000 +/- 0.006
M	0.642 +/- 0.014
H	0.256 +/- 0.020
H1	5.000 +/- 0.50
N	1.430 +/- 0.015
N1	1.010 +/- 0.030
N2	0.675 +/- 0.025
Y	1.260 +/- 0.030
U	10.633 +/- 0.050
U1	10.510 +/- 0.050
P	0.040 +/- 0.010
T	0.280 +/- 0.060
D	0.880 +/- 0.020
D1	0.500 +/- 0.020
Q	11.550 +/- 0.200
Q1	9.100 +/- 0.200
V	18.000 +/- 0.060
R	2.050 min.
S	0. 980 min.
W	4.765 +/- 0.020
W1	4.340 +/- 0.100
Ratio	14:19
Restrictor plate J class	
AA	0.482 max.
BB	0.047 max.
Thickness	0.037+/-0.005

Throat	1.000 +/- 0.005
Stainless Steel Reed Thickness	0.011 +/- 0.005



Hot-Rod A and B

Class I Inspection

1) Remove spark plug and measure bore and stroke.
2) Measure carburetor.
3) Measure CC's.

Class II Inspection

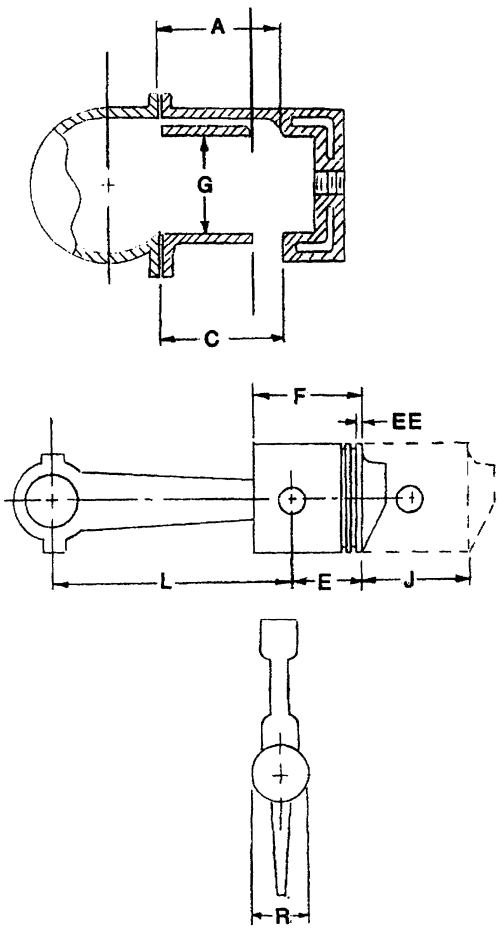
In addition to the above:

1) Disassemble block: measure pistons, intake and exhaust ports.

Notes:

1) Any ignition system is permitted.
2) Water pumps may be removed from gear case.
3) Carter carb may be converted to a floatless type.
4) Lectron has a HV(High Velocity) model which meets rear specs.

Gear Ratios	Open	
C C 's min. A B	11 Top of spark 17 plug hole	
Carbs +/- 0.016	Venturi/Throat	
Lectron 30mm	1.181max at rear	
Lectron 34mm	1.339max at rear	
Tillotson CR1A	0.875 x 1	
Tillotson HL 293	0.875 x 1	
Tillotson HR	1.28 x 1.375	
Tillotson KA	1 x 1.125	
Tillotson KC	1.062 x 1.25	
Tillotson KC	1.1875 x 1.25	
Carter N	0.938 x 1.312	
Walbro WR	1.28 x 1.375	
A includes gasket	2.265 +- 0.062	
C includes gasket	2.639 max.	
E	1.187 +- 0.062	
EE	0.1875 +- 0.062	
G Bore A B	2.166 + 0.050 2.500 + 0.050	
J	2.032+.015 -.032	
L	3.562 +/- 0.015	
Rod & piston assembly.	A 9oz.	B 12 oz.



Mercury KG-4, Mark 15, Mark 20-H, Mark 25

Class I & II Inspection.

1) Remove spark plug and measure bore and stroke.

Notes:

1) Any ignition system is permitted.
2) Water pumps may be removed from gear cases.
3) All parts from the Mercury Mark 20-H, 25, except for the block and pistons are permitted with the KG-4, Mark 15. Removal of metal from the 'A' block for rod clearance is permitted.
4) No restrictions will apply to the pistons and rings on these Mercury's, except that they be a deflector type (also known as cross-flow). Any number, type, and thickness of rings may be used. Piston weights and dimensions E, EE, and F, do not apply. Reduction in compression volume may be accomplished by padding the combustion chamber and or piston change.

Bore: KG-4/Mk 15	2.112 + 0.050"
Mk 20-H/25	2.440 + 0.050"
Stroke	2.125 +- 0.004"
Rod length	3.719 +- 0.006"
Gear Ratios	Open

Evinrude/Johnson 25hp and Mercury 25ss and 200

Class I Inspection

1) Visually inspect components looking for parts that are not permitted.
2) Remove spark plug and measure bore and stroke.
3) Measure carburetor.
4) Measure CC's.

Class II Inspection

In addition to the above:

5) Measure reed stop height.
6) Measure intake and exhaust ports, inspect block for tampering.
7) Measure length of block.

Notes:

1) Some of the Super Stock General Technical rules apply, and rules contained here are specific to Class B1. The intent of these rules are to keep the powerhead as stock as possible with the exception of tuned exhaust. Cowlings may be removed. The Mercury engines have been opened up to keep them competitive with the OMC.
2) It is permitted to balance one rod, one piston, and the crankshaft.
3) Any high-speed jet may be used (fixed or adjustable) with no alterations to the carburetor.
4) Any production ignition system designed for a motor from the same manufacturer may be used.
5) If the flywheel has a removable starter gear, it may be removed. If the gear is not removable the teeth can be cut to the depth of the teeth, or to dimensions shown on the Motor Spec Sheet.
6) Allow OMC flywheels (OMC Part Numbers #513444 or #513745) on all Evinrude/Johnson and Mercury 25ss and 200 motors.
7) Allow the use of 1995 and newer flywheel from 6-8 hp OMC (Part #513444) 2-cycle with removal of srating cog on top of flywheel and removal of rope starting at bottom. Minimum weight 4 pounds.

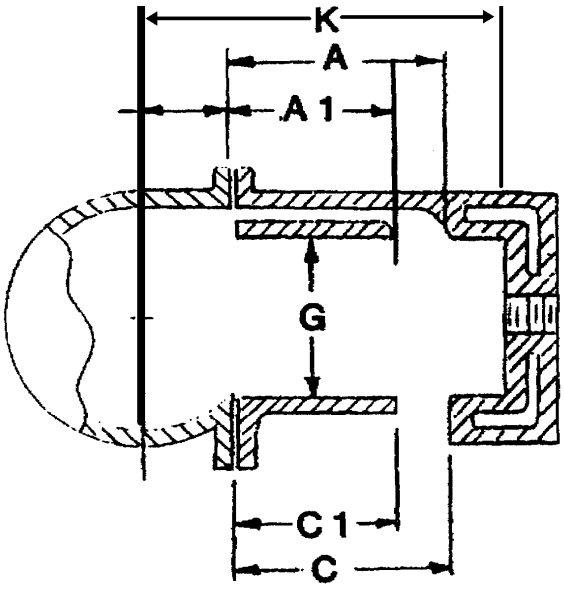
OMC 25hp only:

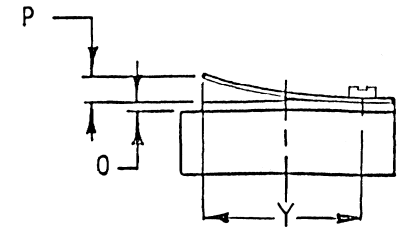
1) No internal polishing is permissible. Intake and exhaust ports maybe machined within the specifications. Squared or squaring of ports is illegal, ports must retain a radius, a basic oval shape.
2) The 18 and 20 hp pistons are not legal.
3) Permitted pistons have a "25" casting mark on the wrist pin boss. Straight ring pistons with this mark that meet dimensions F, E, EE are permitted.
4) The upper crankshaft bearing and seal arrangement may be used on the lower end of the crankshaft. This includes removal of the bottom carbon seal and spring set-up.

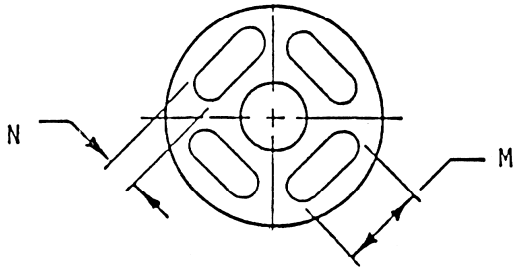
Mercury only:

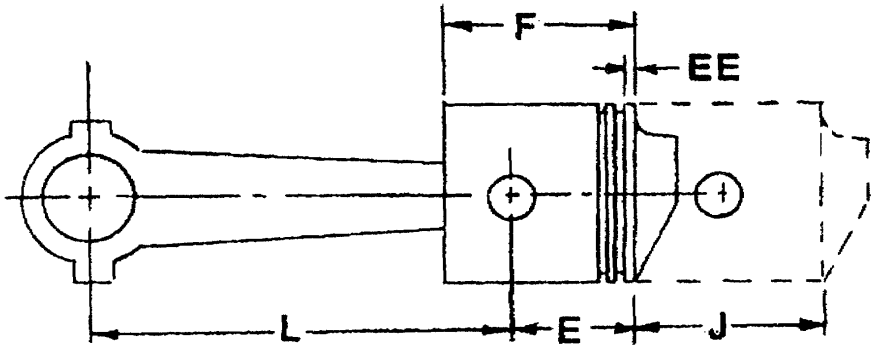
1) Intake and exhaust ports may be squared, no specs apply, and there must remain 3 port holes.
2) Aluminum or brass reed gages with 8 openings are permitted.
3) The Mercury two ring pistons or the Wiseco replacement pistons are permitted.
4) Fiberglass reeds are permitted.
5) The short Mercury reed stops are permitted.

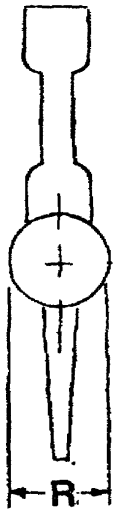
Evinrude/Johnson 25hp and Mercury 25ss and 200



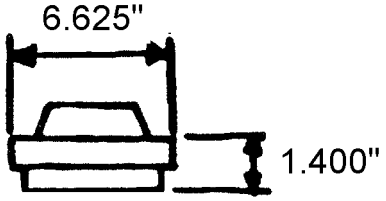








OMC Flywheel



Evinrude/Johnson 25hp and Mercury 25ss and 200

	OMC 22	Mercury
Gear ratio	Open	
CC's	19 Min.	20 Min.
Carb	1.125 x 1.375	------
A	4.011 - 4.051	------
A1	3.449 - 3.489	------
C	4.307 - 4.347	------
C1	3.634 - 3.674	------
E	1.110 - 1.130	0.961 - 0.981
F	2.162 - 2.198 2.220 - 2.256	2.156 - 2.220
G	2.450 - 2.550	2.516 - 2.616
J	2.242 - 2.258	2.059 - 2.191
K	5.935 - 6.005	------
L	3.494 - 3.506	3.625 +/- 0.005
M	0.531 - 0.563	------
N	Round hole	------
P	0.114 - 0.146	------
O	0.006 - 0.009	------
Y	0.915	------
Piston Wt.	8 oz. Min.	8.7 0z. Min.
Flywheel Wt. (Minimum)	3 lb. 13 oz. Outside coils 2 lb. 8 oz. Magneto	4-lb.8 oz.

Mercury and Mariner 25XS

Class I Inspection

1) Visually inspect external components for non-stock parts.
2) Inspect lower unit dimensions and gear ratio.
3) Measure carburetor, look for tampering.
4) Remove spark plug and measure bore and stroke.
5) Measure CC's.
6) Check for illegal venting of cowlings.

Class II Inspection

In addition to above:

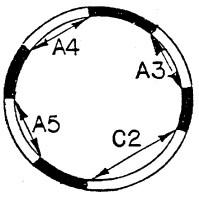
7) Measure reed stop height.
8) Disassemble look for polishing and grinding that is not permitted.
9) Measure intake, exhaust ports and block length.

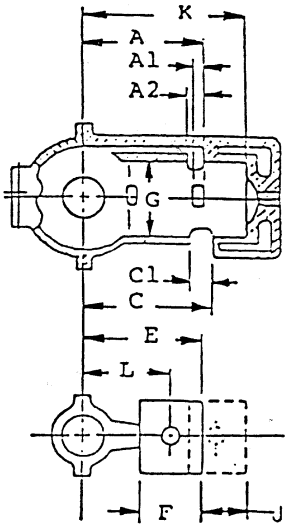
Notes:

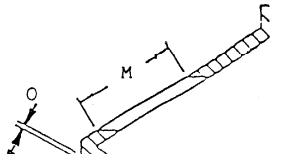
1) This engine is to be raced in its stock configuration. No alterations are allowed to the powerhead, down housing or lower unit. A steering bar and gas tank may be added. Replacement parts must come from the corresponding service model, and meet the Motor Specification Sheet.
2) No material may be removed from internal parts. This includes reciprocating parts, ports or passages.
3) No thermal or anti-friction coatings are permitted.
4) The carburetor restrictor plate is not required in A.O.F. (You will need to jet richer without it.)
5) It is permissible to use any size carburetor jet available.
6) The choke assembly may be removed.
7) It is allowable to resurface a damaged reed block. No other dimensions can be changed, only the flattening the reed surface area.
8) The newer OEM neoprene coated reed block is permitted.
9) Any fiberglass reeds are permitted. (Mercury only has steel reeds available.)
10) The heavier 25XS flywheel must be used; the ultra light one is not permitted. A service flywheel may also be used, note that it is heavier and would be of no advantage.
11) It is permissible to add a louvered vent on top of the engine cowling. Maximum size is 2" x 7".
12) It is permissible to drill up to seven (7) one inch (1") holes in the base pan.
13) The maximum number of propeller blades is 3.
14) New style Hot Rod gear foot shall be allowed so long as no modifications are made to the tower or gear foot.
15) Allow the following aftermarket parts as listed:
    a. Tower – Tad Olsen
    b. Adapter & Tuner Pipe – Dave Young, Doug Pearsall
    c. 16:21 Gears – Racing Outboards, LLC
    d. Shafts – Ron Thomas
    e. Ignition Components – Repair INC.
    f. Decals – Ron Collins, Dick Duncan
16) Any remanufactured recoil housing shall be permitted.
17) IKO Bearings shall be allow in 25xs lower units
18) Only the factory Mercury stator set to factory specifications shall be allowed.

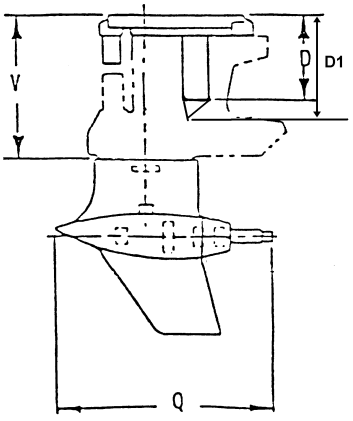
Mercury and Mariner 25XS - continued

CC's	21.7 min.
Carb Walbro WX-2263	1.12 x 1.25 +/-0.015
A	4.493 +/- 0.030
A1	0.395 +/- 0.030
A2	0.450 +/- 0.030
A3	1.079 +/- 0.030
A4	0.957 +/- 0.030
A5	1.114 +/- 0.030
C	4.863 +/- 0.030
C1	0.750 +/- 0.030
C2	1.488 +/- 0.030
D	7.120 +/- 0.150
E	5.277 +/- 0.020
F	2.525 +/- 0.030
G	2.563 +/- 0.003
J	2.362 +/- 0.005
K	6.528 +/- 0.010
L	4.062 +/- 0.005
M	0.700 +/- 0.030
N	0.550 +/- 0.020
P	0.260 +/- 0.030
Gear Ratios	15:15, 16:21
Q	11.25 max.
R	2.09 min.
S	.950 min.
V	9.750 +/- 0.060
Piston Wt. w/ rings & fasteners, pin	9.17 oz. or 260 grams
Rod Wt. w/ bearings & washers	7.2 oz. or 204 grams
Flywheel Wt. (25XS) (25HP)	7 lbs. 8 oz. 9 lbs. 7 oz.









Mercury 30-H and Chrysler 302, 304

Class I Inspection

1) Measure carburetor venturi.
2) Remove spark plug and measure bore, stroke, and CC's.
3) Remove deflector cover and check for ring number and port openings.

Class II Inspection

In addition to above:

4) Split crankcase half and remove crank assembly.
5) Check for illegal padding in block.
6) Measure rod.

Notes:

A) Removal of material is allowed, but none can be added.
B) Any ignition system is permitted.
C) Carburetors may be modified. The venturi must meet specifications.
D) No port specifications apply, except for the proper number.
E) All other Super Stock General Technical Rules apply.

Mercury Notes:

A) Pistons must have 3 rings.
B) Mercury reed cages having 8 openings per cage are permitted.
C) Reed cages may be modified at will.
D) Any type of reed material is permitted.
E) It is permissible to relocate the carburetor-mounting studs in the crankcase to assist carburetor mounting.

Chrysler Notes:

A) No flywheel weight will apply, but flywheel must be deemed safe in design.

	Mercury 30H	Chrysler 302 / 304
CC's	16 min.	29.4 min.
Venturi - Tillotson	0.891 max.	1.123 max.
E	---	1.19 +/- 0.010
EE	---	0.16 +/- 0.010
F	---	2.61 +/- 0.030
G	2.112 + 0.050	2.81 + 0.050
J	2.125 +/- 0.004	2.414 +/- 0.006
L	3.719 +/- 0.006	4.25 +/- 0.006
Reed Ports	NA	8@ 1.11 x 0.56
Reed Ht.	NA	0.282
Intake ports	3	4
Exhaust ports	3	4
Gear Ratios	Open	

Mercury 40 cubic inch

Class I Inspection

1) Measure carburetor venturi.
2) Remove spark plug and measure bore, stroke, and CC's.
3) Remove deflector cover and check for ring number and port openings.

Class II Inspection

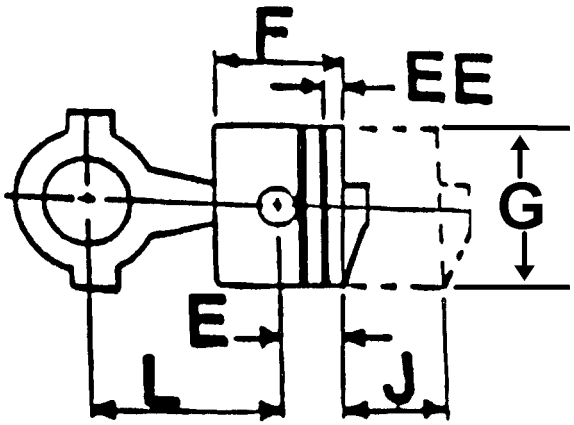
In addition to above:

4) Split crankcase half and remove crank assembly.
5) Check for illegal padding in block.
6) Measure rod.

Notes:

A) Removal of material is allowed, but none can be added.
B) Any ignition system is permitted.
C) Carburetors may be modified. Venturi must meet specifications.
D) No port specifications apply, other than the proper number, (three intake and exhaust.)
E) All other Super Stock General Technical Rules apply.
F) Pistons must have 3 rings.
G) Mercury reed cages having 8 openings per cage are permitted.
H) Reed cages may be modified at will.
I) Any type of reed material is permitted.
J) Carter carburetor may be float-less.

Gear Ratios	Open
CC's	20.5 min.
Carburetors: Carter Tillotson	 0.954 max. 1.016 max.
G	2.440 + 0.050
J	2.125 +/- 0.004
L	3.719 +/-0.006



Mercury Stock 44 cubic inch

Class I Inspection

1) Measure carburetor venturi.
2) Remove spark plug and measure bore, stroke, and CC's.
3) Remove deflector cover and check for ring number and round port openings.

Class II Inspection

In addition to above:

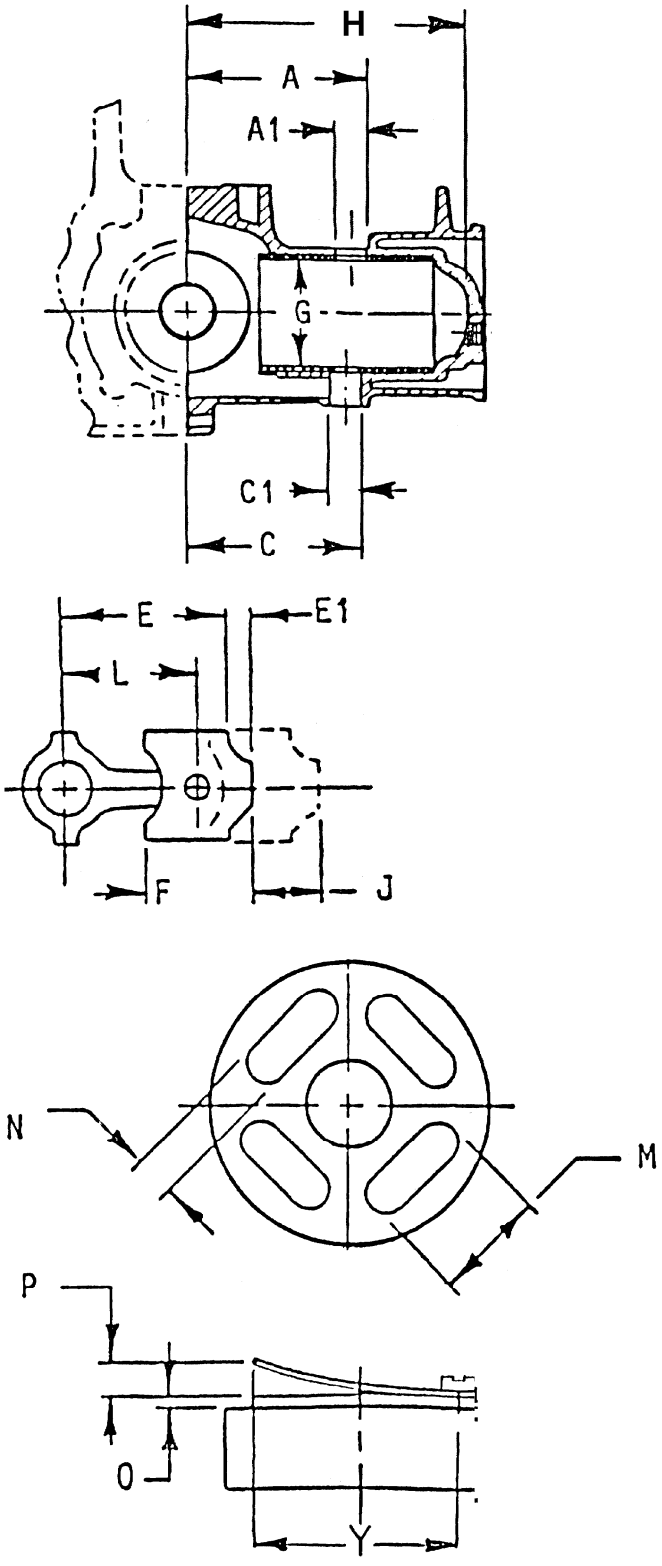
4) Split crankcase half and remove crank assembly.
5) Check for illegal padding in block, and polishing.
6) Measure intake and exhaust port dimensions.
7) Measure piston dimensions. Look for tampering.
8) Measure rod.
9) Measure reed stop height and other reed port openings; look for filing and polishing that is not permitted.

Notes:

A) The intent is to race this powerhead in stock configuration, no internal modifications are allowed, no polishing is allowed, no balancing is allowed.
B) The exhaust must be run out of the bottom of the powerhead, after that you are free to use any exhaust tuning.
C) Thermal and anti-friction coatings are not permitted.
D) Any ignition system is permitted.
E) Any carburetor used by Mercury with a 1"venturi is permitted.
F) Ports must be round.
G) The only permitted pistons are: Mercury 3 ring, 2 ring and Wiseco 2 ring.
H) Any type of reed material is permitted.
I) Sierra pistons .015 and .030 in 44xs motors shall be allowed.
J) Remanufactured recoil housings shall be permitted.
K) IKO Bearings may be used in 44xs lower units.
L) Aftermarket plastic reeds may be used to replace factory reeds.

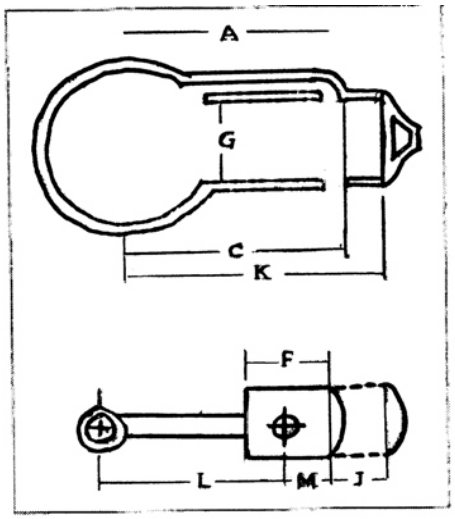
Mercury Stock 44 cubic inch

Gear Ratios	Open
CC's	21.5 min.
Carb Venturi	1.016 max.
A	4.007 +/- 0.010
A1	3.382 +/- 0.010
C	4.221 +/- 0.010
C1	3.596 +/- 0.010
C '92-97'	4.280 +/- 0.010
C1'92-97'	3.655 +/- 0.010
A1 & C1	Round hole - 0.625 +/- 0.010
E	4.595 +/- 0.010
E1	0.562 +/- 0.005
F	2.756 +/- 0.031
G	2.563 +0.050
H Mk 58 Merc 500	6.307 +/- 0.010 6.468 +/- 0.010
J	2.125 +/- 0.004
L - Long rod Short rod	3.719 +/- 0.006 3.625 +/- 0.005
M	1.315 Max.
N	0.625 +/- 0.032
P	0.156 +/- 0.032
Piston Wt. w/ rings, wrist pin, fasteners	9.1oz min.
Rod Wt. w/ washers & bearings	6.5oz min.



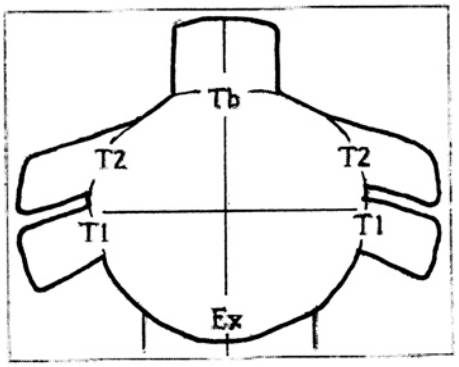
Tohatsu M50D2 Specifications

G	Standard Bore	68 +/- 0.03	mm	2.667 +/- 0.001	in.
	Over Size Piston	68.5 +/- 0.03	mm	2.697 +/- 0.001	in
J	Stroke	64 +/- 0.05	mm	2.520 +/- 0.002	in.
	Displacement per Cylinder	232.8 cc		14.2 cu. In.	
	# of Cylinders	3			
	Total Displacement	698.4 cc		42.6 cu. In.	
	Combustion Chamber (to top of plug hole)	25.0 cc			
A	Crankshaft Centerline to Top Edge of Transfer Ports	127 +/- 1.00	mm	5.000 +/- 0.039	in.
C	Crankshaft Centerline to Top Edge of Exhaust Ports	139.5 +/- 1.00	mm	5.492 +/- 0.039	in.
F	Piston Height	67 +/- 0.40	mm	2.638 +/- 0.016	in.
K	Face of Block at Centerline of Cylinders	180.0 +/- 0.20	mm	7.087 +/- 0.008	in.
L	Connecting Rod on Centers	116 +/- 0.05	mm	4.587 +/- 0.002	in.
M	Centerline of Wrist Pin to Top of Piston at Perimeter	32.0 +/- 0.20	mm	1.260 +/- 0.008	in.
	2 – Piston Rings, Thickness	2.0	mm	0.079	in.
	Head Gasket Compressed	1.2 +/- 0.20	mm	0.047 +/- 0.008	in.
	Flywheel	4000 min.	gr	8.818 min.	lb.



Port Specifications

Ex	Exhaust Port Width	40.0 +/- 1.50	mm	1.575 +/- 0.059	in.
He	Exhaust Finger Height	10.5 +/- 0.50	mm	0.413 +/- 0.059	in.
T	Exhaust Finger Width	3.0 +/- 0.50	mm	0.118 +/- 0.020	in.
T1	Transfer Port Width	15.5 +/- 1.5	mm	0.610 +/- 0.059	in.
T2	Transfer Port Width	21.0 +/- 1.5	mm	0.827 +/- 0.059	in.
Tb	Transfer Port Width	20.0 +/- 1.5	mm	0.787 +/- 0.059	in.



Notes:
No exhaust down pipe
Crankshaft pins may or may not be welded

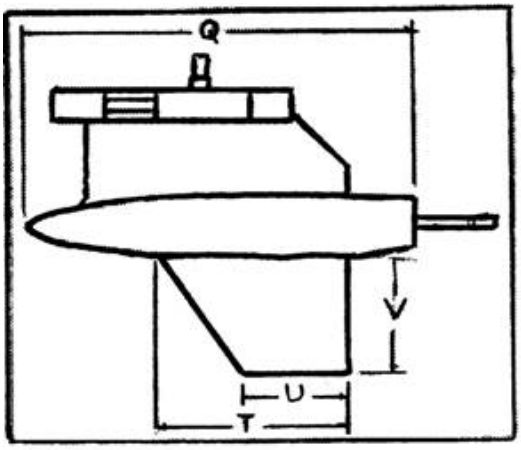
Intake Specifications

4 Reed Valve Ports per Cylinder				
Port Length	30.0 +/- 0.50	mm	1.181 +/- 0.020	in.
Port Width	15.0 +/- 0.50	mm	0.591 +/- 0.020	in.

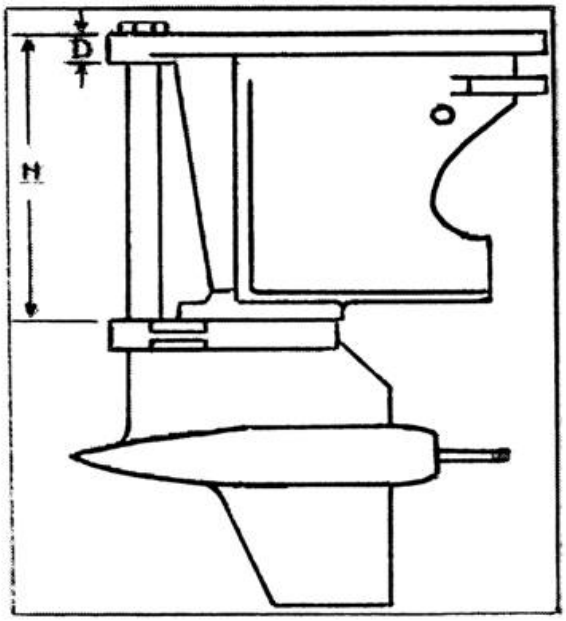
1 – Carburetor per Cylinder				
Carburetor Venturi	26.0 +/- 0.50	mm	1.024 +/- 0.020	in.
Throttle Housing	32.0 +/- 0.70	mm	1.260 +/- 0.028	in.

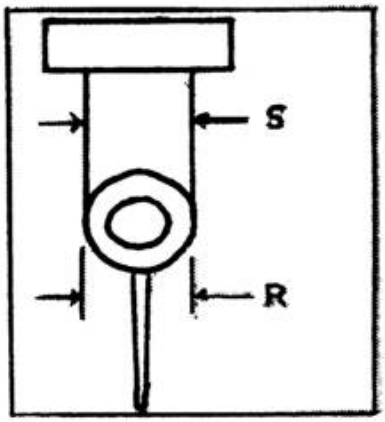
Tohatsu M50D2 Specifications

O	Bullet Length	297.2 min	mm	11.70 min.	in.
V	Skag Length	95.3 min.	mm	3.75 min.	in.
T	Skag Width at Bullet	127.0 min.	mm	5.00 min.	in.
U	Skag Width at End	76.2 min.	mm	3.00 min.	in.
S	Foot Thickness	49.5 min.	mm	1.95 min.	in.
R	Bullet Thickness	49.5 min.	mm	1.95 min.	in.
H	Approx. Tower Height	215.0 approx.	mm	8.5 approx.	in.
D	Approx. Adapter Thickness	25.4 approx.	mm	1.0 approx.	in.



Pinion Gear	16 or 17 Tooth
Propeller Shaft Gear	17 Tooth
Propeller Shaft Diameter	11/16 in.
Shear Pin Diameter	0.25 in.





Transom mounting system not shown

Mercury 44 cubic inch

Class I Inspection

1) Remove spark plug and measure bore, stroke, and CC's.
2) Remove deflector cover and check for ring number and port openings.

Class II Inspection

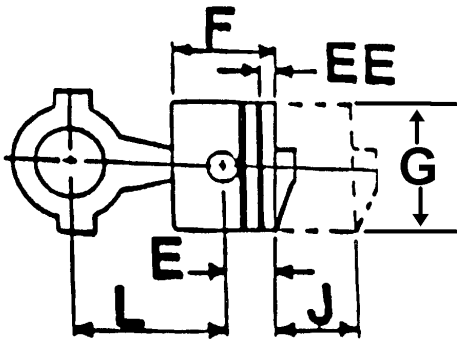
In addition to above:

3) Split crankcase half and remove crank assembly.
4) Check for illegal padding in block.
5) Measure rod.

Notes:

A) Removal of material is allowed, but none can be added.
B) Any ignition system is permitted.
C) Any carburetor is permitted, but only two conventionally mounted. Carter carburetors may be floatless.
D) No port specifications apply, except for proper number, three intake and exhaust.
E) Piston porting, a.k.a. third porting or gully porting is legal.
F) Legal pistons are: Mercury 3 ring, 2 ring and Wiseco 2 ring.
G) Mercury reed cages may be modified at will.
H) Any type of reed material is permitted.
I) All other Super Stock General Technical Rules apply.
J) All Tohatsu M50D2 power heads mounted on Bass Machines tower and lower units shall be legal motors in the "E" Modified class. Blue printing and any type of pipe is allowed.

Gear Ratios	Open
CC's	21.5
G	2.563 + 0.050
J	2.125 +/- 0.004
L Long Rod	3.719 +/- 0.006
Short Rod	3.625 +/- 0.005



Super E

The only permitted engines are:

Group 1: OMC 44.9 cu. in. 2 cylinder, 40 to 60 hp.
Group 2: Mercury 59.4 cu. in. 6 cylinder, Mark 75 & 75-H.
Group 3: Mercury 62.43 and 59.78 cu. in. 4 cylinder, Mercury 650.
Group 4: OMC 49.7 cu. in. 3 cylinder, 55 to 75 hp.
Mercury 49.9 cu. in. 3 cylinder, Mercury 650.
Tohatsu Model M50D2 powerheads mounted on Bass Machines tower and lower units
Group 5: Yamaha 42.6 cu. in. 3 cylinder 40/50 hp.
Group 6: AOF C, D, E engines a local option only. Not available at National or Record events. Modified to the same restrictions as the three

Inspection

1) Identify engine and which group of specifications apply.
2) Measure cylinder bore and stroke.
3) Inspect for proper number of carburetors.
4) Inspect reed port openings.

Modifications

The extreme differences in configuration and displacement size of these engines makes it necessary to impose certain rules to control the potential horsepower of each engine. The engine block selected, determines which Group it falls under for modifications and specifications.

Notes:

1) There are no restrictions on intake air scoops or length tuning of intake and exhaust systems.
2) No superchargers, turbochargers, or other similar mechanical devices are allowed. Engine must be normally aspirated.
3) No nitrous oxide or other power boost injection is permitted. See also Fuel.
4) Other than the rules and specifications described in this section, there are no technical limitations on modification of SE engines. There are no specifications or restrictions on: porting, reciprocating or rotating parts as long as the bore and stroke criteria are met.
5) Lower units: see Super Stock General Technical Rules, for restrictions.
6) The Racing Commission has the authority to change, disapprove, or approve rules, which violate the spirit of this class.

Group 1: OMC 44.9 cu. in. 2 cylinder

Except for the bore and stroke limitations, these powerheads are basically open for modification. In short, you may modify "at will" as long as the completed engine block can be identified.

Group 2: Mercury 59.7 cu. in. 6 cylinder

A) No removable cylinder heads.
B) Air/fuel mixture may only be induced via 3 conventionally front mounted single barrel carburetors. No specifications apply, any make, type, size is permitted.
C) Reed cages must be conventionally located. No specifications apply, any make, type, or size is permitted.

Group 3: Mercury 62.43 and 59.78 cu. in. 4 cylinder

A) Air/fuel mixture may only be induced via 2 conventionally front mounted single barrel carburetors. No specifications apply, any make, type, and size is permitted.

B) Reed cages must be conventionally located with the same number of ports as specified in the speciation sheet. No size or measurements apply.

Group 4: OMC 49.7 cu. in. and Mercury 49.9 cu. in. 3 cylinder

A) No additional reed cages or carburetors are permitted other than the number specified by the specification sheet.
B) No other means shall be used to introduce air/fuel mixture into the crankcase, other than the service carburetors supplied by the original manufacturer.
C) Reed cages and carburetors must be conventionally located. No size or measurement specifications apply to either.
D) Material may not be added to the engine block to increase the size of the reed cages.
E) Material may not be added to the carburetor to gain a size advantage.

Group 5: Yamaha 42.6 cu. in. (see also specification sheet)

A) Powerhead to remain stock internally.
B) Any ignition system, including flywheel.
C) Any exhaust system.

Group	**1**	**2**	**3**	**4**	**4**	**5**
Engine	**OMC**	**Merc**	**Merc**	**OMC**	**Merc**	**Yamaha**
Cubic Inch	44.99	59.4	62.43 59.78	49.7	49.9	42.6
# of Cyl.	2	6	4	3	3	3
Bore + 0.070	3.187	2.44	2.875/2.375	3.0	2.875	2.638
Stroke+/-0.010	2.82	2.125	2.602	2.344	2.564	2.598
# of Carburetors	NA	3	2	3	2	3
Reed openings	NA	NA	4	NA	NA	4

Super E – Yamaha 42.6 cubic inch specifications

Minimum cc's	30
Venturi	1.024 +/- 0.015
Throat	1.260 +/- 0.015
Rod length	4.567 +/- 0.006
Deck height	7.205 +/-0.012
Piston length	2.76 +/- 0.030
Height of piston port	0.866 +/- 0.030
Port height - transfer	3@ 0.610 +/- 0.035 @ 123 +/-2*
Port height - exhaust	1@ 1.004 +/- 0.035 @ 98 +/- 2*
Exhaust port distance from head	1.673 +/-0.035
Reed material	Steel
Reed thickness	0.008 +/-0.001
Reed stop height	0.250 max.
Checking distance	1.34 +/-0.030
Reed port size	1.200 x 0.602 maximum
Piston, rings, pin, bearing weight	285.76 grams minimum
Crankshaft weight	16 lbs. minimum
* Measured in degrees	

Useful Conversions and Formulas

One inch = 25.4 mm

One MM = 0.03937 inch

Cubic inch = 16.39 cc

CC = 0.06102 cubic inch

U. S. Gallon = 231 cubic inch

Liter = 0.2642 U. S. gallon

Ounce = 28.349527 grams

Gram = 0.035274 ounces

Horsepower = 0.7457 Kilowatts

Kilowatts = 1.341 HP

MPH = 1.609 Kilometer/hour

Kilometer/hour = 0.6214 MPH

Mile (statute) = 5,280 feet

Mile (statute) = 1,609 Meters

Area of a circle = Diameter squared x 0.785

Area of a rectangle = Length x Width

Volume of a cylinder = Diameter squared x 0.785 x height

Prop shaft rpm = engine rpm x gear ratio as a decimal

Theoretical boat speed = Pitch x prop rpm x 0.0009496

Yamato 80 Stock

Notes:

1) It is permissible to plug one of the two water intake pick-up holes.
2) It is permissible to drill up to a 3/16" diameter hole in the head to prevent air locking. It is also permissible to add an additional water outlet on the exhaust plate.
3) The nose of the lower unit may be shaped to a point vertically. The bulb located on the bottom of the skeg, may be thinned to the same width as the rest of the skeg. The other foot dimensions must remain in stock condition.
4) Propellers used with this engine are limited to a maximum of 3 blades.

Yamato 80 Super Stock

Notes:

1) It is not permissible to block any water passages in the block to re-route water, etc. It is permissible to bring extra water into the block via the exhaust stack plate. It is permissible to vent water through the exhaust stack plate.
2) It is permissible to use the stock tuned exhaust system and it may be modified within the rules.
3) There are no measurements on the reed port size in the OEM reed block, however no alterations are allowed to the block, reed or shim and they must remain stock OEM parts.
4) It is permissible to mill the cylinder head beyond the stock 'H' or 'I' dimension, however the head must CC, and the squish and combustion chamber must meet specifications
5) A float-less carburetor system may be used, provided that the carburetor body is not altered in any way. (i.e.: Filing, drilling, sanding, or polishing.)
6) It is permissible to notch, drill, or slot the top and bottom ends of the connecting rod at the crankshaft end of the rod.
7) Any type of tuned exhaust is permitted, so long as the powerhead is not modified to accept the exhaust.

Yamato 102, 202, 302 Stock

Notes:

1) The legal engines are models: 102C, 202D, 202E and 302F.
2) The engine cooling system must remain stock with no additional water outlets permitted. Water outlet holes must not be plugged nor changed in size. Outlet hoses may be routed at will.
3) The bulb located on the bottom of the lower unit skeg, may be thinned to the same width as the rest of the skeg. The other foot dimensions must remain in stock condition.
4) The 302 ignition can be used on the 202 model.
5) All model gear cases are considered legal and interchangeable.
6) Propellers used with these engines are limited to a maximum of 3 blades.

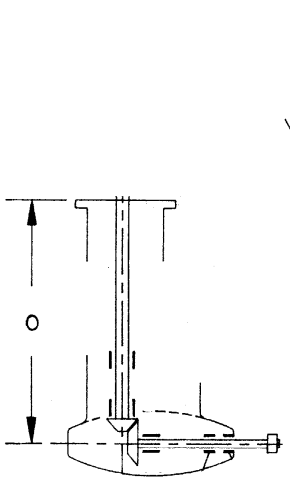
Yamato 102, 202, 302 Super Stock

102 Notes:

1) Water relief holes can be drilled in the block and the exhaust plate.
2) Connecting rod caps may be slotted to improve lubrication.
3) The only permitted ignition is the Model 102 factory unit.
4) Any type of tuned exhaust is permitted, so long as the powerhead is not modified to accept the exhaust.
5) Any type or make lower unit, available to the membership, is permitted.

202, 302 Notes:

1) Any type or make expansion chamber is permitted. You may add a filler block and exhaust plate. No open systems are permitted
2) Water relief holes may be drilled anywhere in the powerhead.
3) Any make of lower unit may be used; the gear ratio is limited to a one-tooth reduction. (i.e. 14:15, 15:16, etc.)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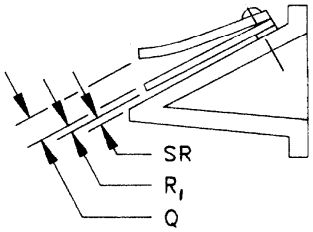
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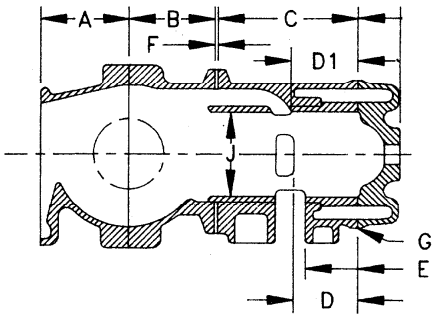
R1
Q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B
C
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D1
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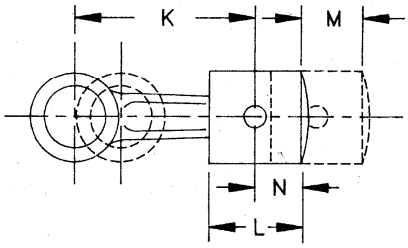
K
M
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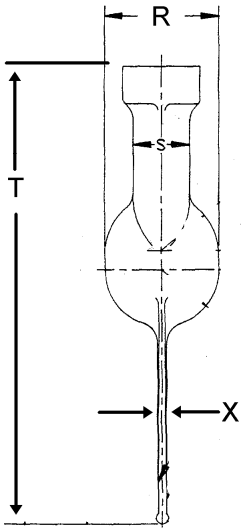
L


R
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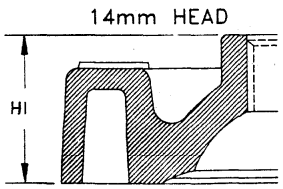
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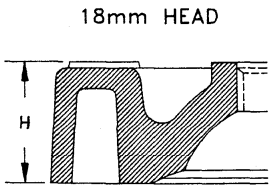
HI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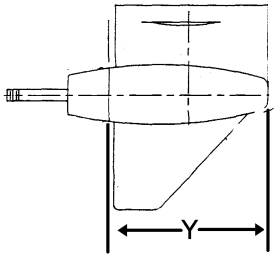
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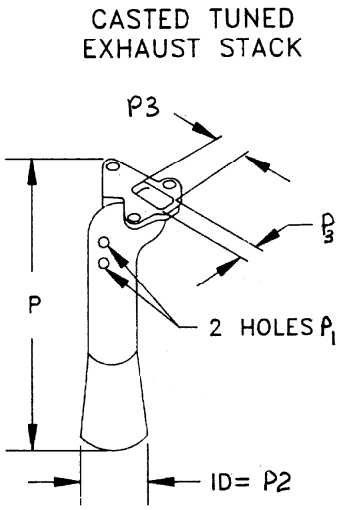
CASTED TUNED
EXHAUST STACK
P3
P3
P
2 HOLES P1
ID= P2

Yamato 80, 102, 202, 302

Model	80	102	202 / 302
CC's 14mm 18mm	18 19	25.5 26	25.5 26
Carb - Mikuni	BV-30	BV-36	BV-36
Venturi	0.999 – 0.969	1.103 +/- 0.003	1.102 +/- 0.012
Gear Ratio	14:16	14:15	14:15
A	3.228 – 3.264	2.540 – 2.560	2.827 – 2.843
B	2.752 – 2.760	2.535 – 2.555	2.539 – 2.251
C	3.885 – 3.906	4.094 – 4.114	4.102 – 4.114
D	1.800 – 1.830	1.890 – 1.915	1.890 – 1.913
D1	1.840 – 1.875	1.855 – 1.900	1.772 – 1.827
E	1.420 – 1.460	1.430 – 1.455	1.389 – 1.402
E1 Exhaust Oval height x width	--------	--------	1.811 +/- 0.020 x 0.890 +/- 0.012
F	0.010 – 0.020	0.004 – 0.012	0.004 – 0.012
G	0.020 – 0.040	0.016 – 0.022	0.016 – 0.022
H	1.115 – 1.144	1.244 - 1.280	1.244 - 1.280
H1	1.309 – 1.338	1.420 – 1.470	1.420 – 1.470
J	2.358 – 2.362	2.594 – 2.604	2.609 max.
K	4.204 – 4.221	4.204 – 4.221	4.204 – 4. 221
L	2.322 – 2.402	2.322 – 2.402	2.346 – 2.378
M	2.279 – 2.288	2.286 +/- 0.010	2.276 – 2.291
N	1.291 – 1.307	1.281 – 1.301	1.291 – 1.301
P	10.562 – 10.688	11.575 – 11.675	10.118 – 10.354
P1	--------	2 @ 0.203 max.	2 @ 0.197 max.
P2	2.548 – 2.648	2.400 +/- 0.025	2.469 +/- 0.040
P3 max.	--------	2.175 x 1.010	1.772 x 1.575
O	18.464 – 18.622	18.464 – 18.622 *	17.283 – 17.402 *
T	8.415 – 8.515	8.415 – 8.515	8.415 – 8.515
S	1.161 min.	1.195 min.	1.195 min.
R	2.204 min.	2.205 min.	2.205 min.
X ½ way up skeg	0.200 min.	--------	--------
Y	6.840 max.	--------	--------
Q	0.295 max.	0.290 max.	0.290 max.
R1	0.010 – 0.014	0.010 – 0.014	0.010 – 0.014
SR shim	0.006 – 0.009	--------	--------
Reed port opening max.	--------	0.788 x 1.036	0.512 x 1.142
Flywheel Wt. min	1297g / 2.86 lbs.	1500g / 3.31 lb.	1500g / 3.31 lb.
* Note: 202D is same length as 102.			

Novice

1) The only eligible motor for this class is the Yamato 80 Stock.
   A) A restrictor plate must be used.
   B) The restrictor plate will be available through A.O.F.
   C) The plate will have a 9/16" round hole in the center, and a 1/8" hole at the bottom.
2) This class will consist of both Runabouts and Hydros, run separately or together.
   A) To be decided at Driver's meeting.
   B) Boats will be at least 10 foot in length.
3) Age requirement minimum is 9. There is no maximum.
   A) Open to Men, Women and children.
4) Once a driver leaves this class to race in any other class, he/she will not be allowed to return to this class without first getting the approval of the Racing Commission.
5) Any Driver may run in this class to make a full field, or to give racecourse guidance, but will receive no points.
6) Due to water conditions, driver ability, and competition, a Referee or Safety Inspector, has the right to remove a driver from the race if they feel it is unsafe.
7) The cost of membership in this class will be $35.00.

Class Purpose:

This class is for fun and pleasure, and for anyone who wants to compete at slower speeds. This class takes the place of Formula 1 Ladies and Formula 1 Kids, and Powder Puffs. It can also serve as an entry-level class and can be used to teach safety and boat racing technique. Older drivers no longer driving in regular classes are also urged to participate.

Fierce competition will not be allowed, and a Referee or Safety Inspector can expel a Driver from this class that they feel they are a detriment to the philosophy of the Novice class.

NOTE: All Safety Rules and Regulations apply to this class.

ALCOHOL (ALKY) CLASSES

Engines

1. One outboard engine, this may be any reciprocating two or four-cycle engine.
2. Turbochargers or Superchargers are prohibited.
3. There shall be no more rotary valves than number of cylinders.
   A. Multiple rotary valves may not be interconnected to form a positive displacement devise such as a Roots blower.
   B. Shall not have a peripheral speed of more than twice the engine speed.
4. Tuned intake and exhaust is permitted.
5. Propulsion must be by water propeller.
   A. Maximum length dimension of a gear case is 24.25 inches including prop nut.
   B. Tractor lower units are not legal.
   C. The propeller shaft to drive shaft angle may not exceed 100 degrees.
6. Any deflector engine may step down one class.
   A. Step-downs are not allowed at National or Record events.
   B. The 44-deflector engine is eligible to step down to 500R.
   C. A 250cc deflector engine cannot step down to 125H.
   D. A deflector step down must meet proper boat specs.
7. Engine displacement = bore squared x 0.785 x stroke x number of cylinders
   A. To convert cubic inch into c.c. multiply by 16.387.

Boats

No minimum weights apply.

1. Hydroplanes shall be free of all restrictions; sponsons shall not exceed 60% of the hull length.
2. Runabouts
   A. The bottom must not have any of the following:
      1. The bottom shall have no steps or breaks in the longitudinal continuity.
      2. A concave greater than 1/16 of an inch within the planing surface.
      3. Any design that uses a tunnel effect.
   B. The deck is not allowed to protrude beyond the side of the hull.
   C. Turning fins cannot protrude the chine sheer line more than inch (1”), except when mounted directly to the transom.
   D. Rub rails are allowed as long as attachment is on the extreme outside of the boat and do not exceed 1.5” in depth and width.
   E. Trim tabs that are adjustable while underway are illegal.
   F. Minimum length measured along centerline from top of transom to bow, excluding any hardware that extends overall length.
      1. 250R & 350R 12 feet.
      2. 500R 13 feet.

CLASS	DISPLACEMENT
125 H	Single cylinder up to 128.75cc
250 R	Up to 257.5 cc
250 H	128.75 to 257.5 cc
350 H & R	257.5 to 350 cc
500 R	350 to 500 cc
1100 H	350 to 1133 cc