706 BRIGGS & STRATTON ANIMAL MODIFIED ENGINE

NOTE: All parts must be Briggs & Stratton Series 12 factory production parts unless otherwise specified in this manual. No machining or alteration of parts is permitted unless specifically noted. All parts are subject to be compared to a known stock Briggs & Stratton part. No reading between the lines. If it is not in the rules, it must remain, stock. UNLESS OTHERWISE STATED ENGINE WILL BE TECHED AS RACED. See Section 362.14 for supplemental Road Racing Series rules.

NOTE: Tech tools to be used to inspect part / parts or used in a tech procedure are noted with the part number of tool shown in parenthesis. (Example: (A12)).

706.1 SHROUDS & COVERS:

Plastic top cover and control bracket may be replaced with aluminum or steel cover plate of safe design for mounting of pump (fuel pump must be visible), throttle, etc. or new Briggs & Stratton Air shield/guard Part # 555680 may be used. New style engine shroud part # 555623 must be used. Cylinder cover may be cut for thermo coupler, intake manifold and exhaust flange clearance. Flywheel guard mandatory. All flywheel guards must be bolted to blower housing. Taping of flywheel guard allowed. Tape on block disallowed. No part of Flywheel guard may not protrude inside of the flat plane of the blower housing. NO revolving flywheel guards allowed. Any bolt utilized to secure sheet metal, shrouding, etc., with the exception of sheet metal secured by the head bolts, may be replaced with larger diameter bolt(s).

706.2 HEADER / SILENCER:

Exhaust pipe/header must not extend past rear bumper (including silencer, where applicable) and have no exposed sharp edges. Header shall have a maximum length of 24" to be measured in the ID using a 0.250" wide tape measure. Measurement is to be made with silencer off of pipe and tape tight. If any part of the pipe is less than maximum the pipe is legal. Loop Header pipes NOT ALLOWED. Header/exhaust pipe MAY NOT PROTRUDE inside of exhaust port. Studs allowed for header pipe attachment to block. Header pipes MUST be wrapped to protect driver from burns.

706.2.1

Gasket and/or Silicone allowed to seal the header.

706.2.2

Header must be of fixed design. NO SLIPPY PIPES allowed. No extra tubes or holes allowed in header except hole for EGT sensor. If EGT sensor hole is present, sensor must be in place or hole must be plugged

706.2.3

Extra HEAT SHIELD above chain guard is allowed. Shield to be no higher than a level plane to the top of the valve cover.

706.2.4

All header pipes must be of continuous length from flange to end of pipe with stages or butt welds permitted (no chamber, infusers, or covers of any type allowed on muffler etc.). A header support brace and safety wiring of header bolts or studs is MANDATORY to assure header bolts remain tight. It is required that the safety wire wrap around pipe to insure that bolts remain with pipe in case they are stripped out of block. Silencer must be tight, secure, and completely intact on the header through out the entire event. Silencer must be clamped to header tube and no welding of silencer in any area. Silencer must be visible when viewed from any angle. Header tube and silencer only legal parts.

706.2.5 SILENCER:

In events where silencing device is MANDATORY (Divisional, National, etc., points event and where required for non-points, local events), use of RLV B91MO SILENCER IS MANDATORY. Silencer must be utilized as produced, with no modifications or alterations permitted.

706.2.6

Internal silencer baffle holes 0.1285" (#30) drill bit.

706.2.7

Silencer discharge side baffle holes #10 drill blank, size 0.1935" NO-GO for round holes and 13/64" drill blank, size 0.2031" NO-GO for square holes.

706.2.8

The flange that bolts the header to the block cannot be thicker than 0.312" Max..

706.3 AIR FILTER:

AIR FILTER NOT REQUIRED. Any air filter is permitted. Air filter must be installed directly to carburetor. Filter may not be used as an air ram and must filter from all areas as raced. Any open areas in filter must be covered with a filter sock.

706.4 CARBURETOR:

Any HL series or similar carb with maximum throttle bore of 1.005" and venturi maximum of 0.900". Throttle shutter must be held by a screw. Filter adapter allowed, single or double pump stacks allowed. Carb to intake sealer is by gasket only. Use of studs allowed.

706.5 INTAKE:

Any steel or aluminum intake manifold. May be drilled and tapped for fitting to pulse fuel pump.

706.5.1 INTAKE TO BLOCK GASKET:

After market gaskets are allowed. No sealants are allowed. Gasket thickness 0.070" max..

706.6 FUEL PUMP:

Auxiliary pulse-type fuel pump allowed. Fuel pump must be externally mounted. Fuel pump must be pulsed only from the crankcase upper oil fill cap or intake manifold.

706.7 VALVE COVER:

Stock valve cover as from factory, that includes the breather hole for the tube that runs to the catch can (no threading of hole allowed). The breather by-pass kit part # 555687 may be used. If by-pass kit is used a 0.625" hole must be drilled in the opposite size of the valve cover from the existing

breather hole.

706.7.1
Breather by-pass kit part # 555687 may be used. If by-pass kit is used a 0.625” hole must be drilled in the opposite size of the valve cover from the existing breather hole.

706.7.2
Valve cover gasket must meet stock configuration. No sealer allowed.

706.8 ROCKER ARMS:
Must be stock as from the factory. Minimum length is 2.820”

706.9 CAMSHAFT:
Max. Lift 0.310”. Maximum valve lift of 0.307” taken directly off the valve assembly at zero valve lash. Place dial indicator on valve keeper then tighten ball rocker till you see indicator move 0.001” to 0.002”. This will assure that all the lash is taken out of the valve. Set dial indicator to zero and then check lift. When checking the lift off the valve keeper the only dial indicator holder that will be used is a three leg holder Sox holder #AT320A or similar indicator holder.

706.9.1 CAM DURATION:
Max. Duration at 0.050” - 248 degrees. Max. Duration at 0.200” - 153 degrees. Check with zero lash.

706.10 BALL ROCKER:
As Stock from factory. May be girdled or reinforced by similar means. A bolt or stud may replace set screw so that a girdle may be used.

706.10.1
0.590” NO-GO – 0.610” MUST-GO (A16).

706.11 PUSH ROD:
Stock as from factory.

706.11.1
0.185” - 0.190” diameter.

706.11.2
Length 5.638” NO-GO - 5.658” MUST-GO (A5).

706.12 HEAD BOLTS:
Stock head bolts must be utilized and four are mandatory. All other external metric bolts may be replaced with American standard bolts of the appropriate size.

706.13 HEAD GASKET:
Briggs & Stratton and after market head gaskets are allowed of stock design. Gasket sealer cannot be utilized on head gasket. No aluminum or copper head gaskets allowed.

706.13.1 FIRE RING HEAD GASKET:
Briggs & Stratton fire ring head gasket part # 555698 allowed. Minimum thickness 0.042” on the metal fire ring part of the gasket.

706.13.2
0.049” Min. thickness measured in four places between head bolts. Measurement to be made from inside of gasket. Measurement to be made with micrometer.

706.14 CYLINDER HEAD PLATE STOCK:
Cylinder head plate must be stock. Bolt on reinforcement plate allowed. No welding on stock plate allowed. Reinforcement plate must measure a maximum of 0.375” thick. Gasket or silicone may be used to seal reinforcement place to stock cylinder head plate. No extra holes allowed in stock cylinder head plate. Longer length bolts may be used to attach the reinforcement plate and stock cylinder head plate to cylinder head.

706.14.1
Cylinder head plate gasket must be stock configuration. 0.055” Max thickness.

706.15 ROCKER ARM STUDS:
MUST be stock but may be girdled or reinforced. The top of the stud may be cut off if reinforcement plate is used. Stud must screw into stock cylinder head plate. Set screw in the rocker assembly is open.

706.16 VALVES:
Stock valves ONLY. Must be one angle. Valves may not be polished or lightened.]If the valve is cleaned, no material may be removed from the valve, No alterations to surface finish or shape allowed. Tip of valve must be at 90 degrees to stem. Keeper groove location must remain stock. Minimum intake and exhaust valve length 3.250”.

706.16.1 INTAKE VALVE:
45 degrees (A22). Intake valve diameter is 1.055” NO-GO - 1.065” MUST-GO (A17). Depth of dish in valve 0.099” - 0.119”. Minimum height from angle of valve face to top of valve 0.057” using gauge (A26) (Check using a depth micrometer from top of valve to the gauge). Refer to Figure

704.17.2

706.16.2 EXHAUST VALVE:

45 degrees (A22). Exhaust valve diameter is 0.935” NO-GO - 0.945” MUST-GO (A18). Depth if dish in valve 0.084” - 0.104”. Minimum height from angle of valve face to top of valve 0.060”using gauge (A27) (Check using a depth micrometer from top of valve to top of gauge). Refer to 704.17.2

706.17 INTAKE AND EXHAUST SPRINGS:

Any single or dual valve springs allowed.

706.18 VALVE SPRINGS RETAINERS:

Any aluminum or steel retainers allowed. No titanium retainers allowed.

706.19 CYLINDER HEAD:

Stock Briggs & Stratton animal cylinder head part # 555635. Machining of head gasket surface only allowed. Porting allowed, but seat must remain stock and cannot be touched with porting modifications, no rifling or pin punching allowed, no addition of material allowed in ports. Bosses on head may be tapped to allow for the attaching of a header brace.

706.19.1

Depth of head at shallow part of head 0.011” Min The measurement on the shallow side of the combustion chamber will be taken with a depth gauge on the push rod side of an imaginary line drawn from dowel pin to dowel pin on the valve side of the dowel. It will also be taken over the spark plug area. The rest of the recess area in the head has no depth dimension, but the recess must remain visible. Depth at floor of head .319” min.

706.19.2

Depth to top of valve seat: Max 0.360”. Old style head Min. 0.335”. RT-1 head Min 0.320”.

706.19.3

Head thickness measured from head gasket surface to head plate gasket surface is Min 2.420” on old style heads, Min 2.405” on RT-1 heads. Head thickness to be checked in four places through the valve guides and the push rod holes with gauge. Not calipers.

706.19.4

Width of combustion chamber at the widest part across the valve seats area to be checked with NO-GO (A30) the shoulders of no-go may not touch head gasket surface when tool is placed into combustion chamber. (Figure 704.20.3)

706.19.5

The maximum diameter of the bowl is 0.951” checked with a 0.952” NO-GO gauge parallel to the intake port.

706.20 VALVE SEATS:

Must be one angle ONLY on valve seats -- 45 degree’s -- Stock Briggs & Stratton valve seats are mandatory.

706.20.1

1 Intake seat inside diameter, 0.966” MUST-GO - 0.972” (A2) NO-GO.

706.20.2

Exhaust seat inside diameter, 0.844” MUST-GO- 0.850” (A1) NO-GO.

706.21 PORTS:

Porting allowed. Intake inlet and exhaust outlet must remain stock.

706.21.1 INTAKE PORT INLET:

0.918” NO-GO (A6) when checking 90 degrees to stud pattern, NO-GO will be straight; when checking in line with stud pattern, NO-GO will set on floor of port at bottom and stop at upper edge of port on top.

706.21.2 EXHAUST PORT OUTLET:

0.980” NO-GO (A6). The port is legal if (1) there is at least one entry point to the port where the NO-GO gauge cannot enter the port and (2) the port is as supplied from the factory with no grinding or alteration

706.22 VALVE GUIDES:

Stock or after market valve guides are allowed. Intake valve guide height is not a tech item.

706.23 DECK/PISTON CLEARANCE:

Machining of deck surface is permitted. No peak decking allowed. Piston pop-up CANNOT exceed 0.010” above block surface in the center of the piston. When measuring piston pop-up, it should be accomplished with bar stock (A25) on a parallel with the piston wrist pin and, using a dial indicator check the piston pop-up in this area. Then without moving the dial indicator rotate the bar 90 degrees on the centerline of the piston and check the pop-up it should not exceed 0.010”

706.24 CYLINDER BORE:

No circular or machined grooving of cylinder is allowed in any position of cylinder.

706.24.1

Stock cylinder bore is 2.690” and overbore is permitted providing it does not exceed 2.725” (approximately 0.035” overbore).

706.25 STROKE:

Stroke is 2.204” Max. Check with stroke pin (A21) or dial indicator. Stroke is checked by pushing piston down up play of rod clearance. Stroke is checked from bottom dead center (BDC) to top dead center (TDC).

706.26 STARTER:
Recoil starter may be retained as produced and intact, if recoil is removed, starter cup must also be removed. Any style nut and use of electric starter allowed.

706.27: FLYWHEEL AND IGNITION
PVL flywheel # 555683 using the stock PVL # 555681 magneto. Must be used in unaltered form. No slotting of mounting holes or machining of attaching bolts is permitted. Spark plug connector must be the stock factory type. Rubber plug boot is allowed. Minimum flywheel weight 4 lbs.1oz.

706.28 SPARK PLUG:
Any commercially available, 14 mm thread, spark plug allowed.

706.29 CRANKCASE SIDE COVER:
Side cover must remain stock

706.30 CRANKCASE SIDE COVER GASKET:
Aftermarket gaskets approved, however, they must be of same size and material as stock gasket(s). One or two crankcase gaskets are allowed.

706.31 VALVE LIFTERS:
Open, but must have the same dimensions and material as either the stock Animal or stock World Formula lifter.

706.31.1
Stock Animal face diameter is a minimum of 0.820” NO-GO and a maximum of 0.860” MUST-GO (A19).

706.31.2
World Formula face diameter is a minimum of 0.969” and a maximum of 0.972”.

706.31.3
Length of stock lifter 1.515” NO-GO - 1.525” MUST-GO (A14).

706.31.4
Maximum length of World Formula lifter 1.526”.

706.32 CONNECTING ROD:
Billet aluminum rod with or without inserts allowed -- Length of rod non tech -- No titanium rods allowed.

706.33 WRIST PIN:
Wrist pin must not be altered ---- OD = 0.490” min

706.34 RINGS:
Aftermarket rings allowed.

706.35 PISTON:
Aftermarket two ring pistons allowed. Flat top only. NO domed pistons allowed. No tech on piston and rings. No titanium parts allowed anywhere in engine.

706.36 CRANKSHAFT:
Stock factory crankshaft mandatory. Stock factory or aftermarket timing gear allowed, and must be installed properly. Lightening, polishing of counter weights, addition of metal or other material is not permitted. Offset crankshafts are not permitted. Aftermarket bearing of non self-aligning type, with or without shield, is permitted. Shims if used must be installed as from factory. No ceramic bearings allowed.

706.36.1:
Crankshaft journal diameter is 1.094” - 1.100”.

706.37 BLOCK:
Must be as produced with no alterations or reworking. Blocks repaired from broken rod damage, are permitted providing that repair does not constitute a functional modification of original block. No bushings of any kind allowed except for bushings approved in this Tech Manual. The repair of one coil post is allowed, as long as the remaining post is factory and unaltered. No KNURLING of guides allowed. The hole between the valve lifters shall be a maximum of 0.250” no-go.

706.38 WELDING:
No welding can be done to an engine from the cooling fins upwards. Cam boss repair or welding not allowed. External welding of block is only allowed to repair damage from broken rod.

706.39 CLUTCH:
Dry clutches are mandatory (same clutch used in all other Briggs & Stratton classes).

706.40 ENGINE SEALS:
The engine will be sealed with two wires one wire will run between a hole drilled in a valve cover bolt and a hole drilled in the carb at a place it does not allow the carb to leak air. The other will seal the front side cover bolt.

706.41 FUEL LINES:
Fuel lines must be safety-wrapped at all connecting points.