



# 2019 TAG™ Animal Tech Specifications



## Engine Specific Tech Sheet for: BRIGGS AND STRATTON ANIMAL

**BRIGGS & STRATTON ANIMAL:** NOTE: All parts must be original Briggs & Stratton 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.

**SHROUD&COVERS:** Engine shroud and covers and control bracket must be intact and not modified, except control cover which can be modified to attach fuel pump (fuel pump must be visible) and throttle bracket also cylinder cover maybe cut for thermal 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 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). Stock kill switch must remain in stock location but may or may not be used.

**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 to be made with silencer off of the 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.

Gasket and/or Silicone allowed to seal the header.

Header must be of fixed design. NO SLIPPY PIPES allowed. No extra tubes or extra holes allowed except hole for heat sensor probe if sensor is used.

Extra heat shield above chain guard allowed.

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.

**SILENCER:** In events where silencing device is MANDATORY (Divisional, National, etc., points event and where required for non-points, local events), use of RLV 8-91 SILENCER IS MANDATORY. Silencer must be utilized as produced, with no modifications or alterations permitted. Silencer Baffle holes 0.1285" maximum all baffles.

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

**AIRFILTER:** Any air cleaner permitted. Must be installed directly to carb. No filter adapter allowed. 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. (No open areas allowed)

**CARBURETOR:** PZ model Carburetors are the only legal Carb and are recognizable by the Walbro PZ stamping or the Briggs and Stratton Diamond Logo. Must be stock as from the factory except any parts that are inside the float bowl or that can be removed through the float bowl are non-tech items. Any 1/4" bolts may be used to attach Carb to intake. NO STUDS ALLOWED. Carb to intake sealer is by O-Ring only. No sealer allowed. Air must enter carb at air horn ONLY. Choke must be as stock as from the factory except choke arm may be secured in the open position. Adapter will be allowed on end of fuel inlet of carburetor for attachment of 1/4" fuel line. The Fuel nozzle must protrude into the Venturi between 0.040" and 0.060".

Maximum throttle bore inside dimension is 0.874" NO-GO. Must be as cast.

**CHOKE BORE:** 1.149" No-Go. Must be as cast.

**CHOKE LEVER:** Pin punching is allowed to tighten choke cover. Silicone or Epoxy may be used to secure choke lever in place.

**VENTURI:** Vertical 0.792" No-Go Horizontal 0.618" NO-GO for top and bottom of venturi (widest part), and 0.605" NO-GO will be for the horizontal check for the narrowest part of venturi, and this NO-GO may not enter slide area. No machining allowed. The 0.618" no-go gauge must be held horizontal to properly check carburetor bore.

Air pick off hole Maximum 0.065 " No-Go

**SLIDE:** Deepest part of Slide cutaway at the bottom of the slide must be a maximum of 0.074". Must be stock as from the factory.

**NEEDLE JET:** 1.677" minimum length. and 1.692" maximum length. Taper on needle must remain stock and will be checked at 0.500" from the tip of the needle and must not be smaller than 0.070" NO-GO.

**RESTRICTOR PLATES:** Must be stock as manufactured, NO ALTERATIONS ALLOWED. Single hole restrictor plate will be used A 0.505" to be checked with 0.506" NO-GO gold restrictor will be used for the Briggs Sportsman 2 classes. A 0.575" to be checked with a 0.576" NO-GO Black restrictor plate will be used in the Briggs Jr. classes. A 3 hole Purple restrictor plate with 0.225" holes to be checked with a 0.226" no-go and will be used in the Jr. Sportsman 1 classes. A two hole restrictor plate with a top hole 0.275" and a

bottom hole of 0.325" turquoise restrictor plate to be checked with a 0.276" and 0.326 no-go will be used in the Jr. Sportsman 2 classes. Restrictor plate must be flat and placed between carb and intake, and sealed within gasket area. There must be one gasket between the restrictor plate and the intake manifold. Addition of material or funneling of gasket(s) not allowed. Any attempt to bypass, modify restrictor is prohibited. Anodizing may not be removed from restrictor plate. Horstman lettering must be present, and tang on plate must be on right side when looked at from the carb side. Intake restrictors are to be unaltered, and must be as originally manufactured. Along with NO-GO gauges, officials may use a known factory plate, or any other tool necessary to determine legality of part. Restrictor plate violations subject competitor to disqualification and suspension.

Note: In all divisions, issued restrictor plates may be required to be used at selected events.

**INTAKE:** Stock Animal intake as supplied from the factory. The gasket surfaces may be machined to meet the length specification, but the gasket surfaces must remain flat for proper gasket seal. The two intake to block mounting holes and one intake to carburetor mounting hole may be drilled out and will be checked with a 0.328" NOGO and the width of the intake to carb slotted hole will be checked with the same NO-GO. , also the intake may NOT be drilled and tapped for fitting to pulse fuel pump.

**LENGTH:** 1.740" NO-GO 1.760 MUST- GO. Inside ID. 0.885" NO-GO. 0.905" MUST- GO.

**INSIDE DIAMETER:** Inside I.D.0.885" MUST GO. 0.905" NO-GO. Minor paint runs or welding slag inside manifold are not grounds for disqualification

**INTAKE TO BLOCK GASKET:** After market gaskets are allowed. No sealants are allowed. Gasket thickness 0.070" max.

**FUEL PUMP:** Auxiliary pulse-type fuel pump allowed. Fuel pump must be externally mounted. Fuel pump must be pulsed from the crankcase upper oil fill cap or intake manifold only. Fuel pump must be mounted on engine. Pulse line from crankcase to fuel pump not to exceed 15". Fuel pump pulse line must be standard 1/4" inch or smaller inside diameter fuel line. Single diaphragm type fuel pump only. No double or triple diaphragm pumps allowed. A fuel pump return line to fuel tank is not allowed.

**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).

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

**ROCKER ARMS:** Must be stock as from the factory.

Minimum length is 2.850"

**CAMSHAFT:** All cam profile readings must be taken with zero valve lash and degree wheel at top dead center (TDC) of compression stroke. Readings shall be measured from push rods. Set dial indicator at zero and do not reset during the profile process. Only stock factory camshaft cores from Briggs & Stratton are permitted, part numbers 555532 and 555584. Lobes may be ground, but not to exceed 0.870 base circle. Mechanical compression relief is non-tech. Camshaft lobes must remain flat and of original width. Maximum valve lift of 0.255" 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. When checking the lift off the valve keeper the only dial indicator holder that will be used is a three leg holder Sox holder #AT32OA or similar indicator holder.

#### 704.10.2 CAMSHAFTPROFILE LIMITS:

##### INTAKE

Lift Degrees

0.020" 18° TO 13° BTDC

0.050" 0 TDC TO 4° ATDC

0.1 00" 16° ATDC TO 20° ATDC

0.1 50" 33° ATDC TO 37° ATDC

0.1 75" 42° ATDC TO 46° ATDC

0.200" 53° ATDC TO 57° ATDC

0.225" 67° ATDC TO 71° ATDC

MAX Max. lift is 0.257"

0.225" 39° BBDC TO 35° BBDC

0.200" 25° BBDC TO 21° BBDC

0.175" 15° BBDC TO 11° BBDC

0.150" 5° BBDC TO 10° BBDC

0.1 00" 1 2° ABDC TO 1 6° ABDC

0.050" 28° ABDC TO 32° ABDC

0.020" 44° ABDC TO 49° ABDC

##### EXHAUST

Lift Degrees

0.020" 61° BBDC TO 56° BBDC

0.050" 44° BBDC TO 40° BBDC

0.1 00" 27° BBDC TO 23° BBDC

0.150" 1 10° BBDC TO 7° BBDC

0.175" 10° BBDC TO 3° ABDC

0.200" 10° ABDC TO 14° ABDC

0.225" 24° ABDC TO 28° ABDC

MAX Max. lift is 0.257"

0.225" 78° BTDC TO 74° BTDC

0.200" 64° BTDC TO 60° BTDC

0.1 75" 53° BTDC TO 49° BTDC

0.1 50" 43° BTDC TO 39° BTDC

0.100" 27° BTDC TO 23° BTDC  
0.050" 1 0° BTDC TO 6° BTDC  
0.020" 5 ATDC TO 1 0° ATDC

**BALL ROCKER:** As Stock from factory.

0.590" NO-GO — 0.610" MUST-GO.

**PUSH ROD:** Stock as from factory. .185" - 0.190" diameter. Length 5.638" NO-GO – 5.658" MUST. GO.

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

**HEAD GASKET:** B & S 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 0.049" Min. thickness measured in four places between head bolts. Measurement to be made from inside of gasket. Measurement to be made with micrometers. Briggs and Stratton Fire Ring head Gaskets are allowed. Minimum thickness is 0.042" measured on the metal Fire Ring part of the gasket.

**CYLINDER HEAD PLATE:** Must be stock as from the factory.

Cylinder head plate gasket must be stock configuration. 0.060" Max thickness.

**ROCKER ARM STUDS:** Must be in stock as from the factory.

**VALVES:** Stock valves ONLY. Must be one angle. Valves may not be polished or lightened. If working area (that portion of the valve stem translating with the valve guide area) of valve stem is cleaned, no material may be removed, such as linear grooves, cross-hatching, etc. Minimum intake and exhaust valve length 3.372" + or - 0.010".

**INTAKE VALVE:** 45 degrees. Intake valve diameter is 1.055" NO-GO - 1.065" MUST- GO. Depth of dish in valve 0.084" – 0.104" Minimum height from angle of valve face to top of valve 0.057" using gauge (Check using a depth micrometer from top of valve to the gauge).

**EXHAUST VALVE:** 45 degrees. Exhaust valve diameter is 0.935" NO-GO - .945" MUST-GO. Depth if dish in valve 0.084" - 0.104". Minimum height from angle of valve face to top of valve 0.060" using gauge (Check using a depth micrometer from top of valve to top of gauge).

**VALVE SPRINGS:** Stock Briggs & Stratton valve springs and keepers are mandatory. Springs must remain unaltered as supplied by factory.

**INTAKE AND EXHAUST SPRING** Maximum valve spring length is 0.940" NO-GO.

0.103" -0.107" wire diameter, measured in three places on spring. Inside diameter of spring 0.615" minimum, 0.635" maximum.

**VALVE SPRING RETAINERS:** Stock as from the factory. 0.060" - 0.075" thickness.

**CYLINDER HEAD:** Stock Briggs & Stratton cylinder head part # 555635. Machining of head gasket surface only allowed. No machining of ports allowed. Bosses on head may be tapped to allow for the attaching of a header brace.

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 0.319" mm..

**DEPTH TO TOP OF VALVE SEAT** 0.360" max. 0.335" mm ( Old Style Head), RT-1 Head – Min 0.320".

Head thickness measured from head gasket surface to head plate gasket surface is 2.420" ( RT-1 Head Min 2.405"). Head thickness to be checked in four places through the valve guides and the push rod holes with gauge. Not calipers.

Width of combustion chamber at the widest part across the valve seats area check with a 2.640" NO-GO at a depth of 0.200 in the combustion chamber.

**VALVE SEATS:** Must be one angle ONLY on valve seats. Stock Briggs & Stratton valve seats are mandatory.

Intake seat inside diameter, 0.966" NO- GO - 0.972" MUST-GO.

Exhaust seat inside diameter, 0.841" NO-GO- 0.850" MUST-GO.

Exhaust and Intake seat 45 ° angles.

**PORTS:** Must have stock configuration. No porting or modifications of any kind allowed.

**INTAKE INLET:** 0.918" NO-GO 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.

0.864" NO-GO cannot touch the valve guide of the intake port. 0.860" plug gage will be used as a visual check of the eyebrow area this is not a no-go but a visual assist tool.

**EXHAUST OUTLET:** 0.980" NO-GO.

**VALVE GUIDES:** Stock valve guides as supplied from factory. Stock replacement guide part # 555645 allowed. Maximum depth from cylinder gasket surface to top of intake valve guide is 1.255.

**DECK/PISTON CLEARANCE:** Machining of deck surface is permitted. No peak decking allowed. Piston pop-up CANNOT exceed 0.005" above block surface in the center of the piston. When measuring piston popup, it should be accomplished with bar stock 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 center line of the piston and check the popup it should not exceed 0.005".

**CYLINDER BORE:** No circular or machined grooving of cylinder is allowed in any position of cylinder.

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

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

**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.

**FLYWHEEL.** Any flywheel key or NO flywheel key is allowed. No machining, glass beading or sandblasting of flywheel is allowed. Flywheel washer must be stock.

**WEIGHT OF THE PVL FLYWHEEL:** 4lbs. 1oz. MINIMUM.

**IGNITION:** If stock flywheel part # 555625 is used the coil must be stock Briggs coil part # 557040 must be utilized in unaltered form. NO slotting of mounting holes or machining of attaching bolts is permitted. There must be resistance from ground to the spark end of the plug Wire. SPARK PLUG CONNECTOR must be stock factory type. Rubber plug boot is allowed.

If PVL flywheel part # 555683 is used the stock PVL Magneto Briggs Part # 555681 must be utilized in unaltered form. NO slotting of mounting holes or machining of attaching bolts is permitted SPARK PLUG CONNECTOR must be Stock factory type. Rubber plug boot is allowed.

**CRANKCASE SIDE-COVER:** Side-Cover must remain stock

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

**VALVE LIFTERS:** Stock lifter as supplied oem factory.

Head of lifter 0.820" NO-GO - 0.860" MUSTGO. Length of lifter 1.515" NO-GO - 1.525" MUST-GO.

**CONNECTING ROD:** Stock ANIMAL, World Formula or commercially available Billet Rods, with or without inserts are allowed. No polishing or grinding allowed. Minimum Rod length is 2.414". Maximum length is 2.429 measured from bottom of wrist pin to top of crankshaft journal. Oil hole opening is 0.185".

Stock rod length is 2.419" minimum, 2.429" maximum. Measured from bottom of wrist pin to top of crankshaft journal.

Oil hole opening, new and old style rod, is 0.185" NO-GO.

**WRIST PIN:** Wrist pin must not be altered.

Maximum inside dimension of wrist pin is 0.414"

Outside dimension is 0.624" - 0.626"

Minimum length, 1.901.

**RINGS** Three rings are MANDATORY. Compression, or top ring, chamfer or 0 must face up, and must remain as manufactured.

Scraper Ring must be installed with inside chamfer down and 0 up. Stock oil ring must be installed as from factory. Ends of ring must remain flat. Excessive end gapping of rings not allowed. Rings must conform to all listed factory specifications and be of stock configuration. Known, standards for piston/ring configurations are Briggs & Stratton factory approved parts. No machining of rings allowed. Exception; lapping and end gapping allowed. Rings must be in one piece when removed from block.

Minimum width top two rings 0.095"

Thickness top two rings 0.059" - 0.064".

Oil ring minimum width 0.065" ring groove must be present. Expander ring must be installed.

Oil ring Thickness 0.098" - 0.102".

**PISTON:** Stock, unaltered Briggs & Stratton Animal piston MANDATORY. Wrist Pin bore must not be altered or relocated except minimum honing of wrist pin bore allowed. New style Briggs & Stratton piston with circlip on both sides of wrist pin bore allowed.

Deck above top ring must not be altered. NO machining is allowed on piston. Arrow must point toward flywheel.

From top piston to wrist pin bore 0.658" minimum measurement. Check on circlip side of piston.

Minimum piston length is 1.762".

**CRANKSHAFT:** Stock factory crankshaft mandatory. Stock factory timing gear mandatory, 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.

Crankshaft journal diameter is 1.094" - 1.100".

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.

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.

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

**ENGINE SEALS:** The engine will be sealed with two wires one wire will run between a valve cover bolt and a intake to engine bolt to a the nut side of a carb to intake bolt the other wire seal will seal the front side cover bolt.