



POWRi Junior Sprint Engine Rules

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Overview

- a. All parts must be Briggs & Stratton factory production parts unless otherwise noted in these rules. No machining, polishing or alteration of any parts is permitted unless specifically noted in this technical manual.
- b. All parts are subject to comparison with a known stock part. All dimensional specifications in this tech manual will have a plus or minus .001 inch tolerance when using dial indicators, micrometers, dial calipers or any type variable gauge, except camshaft dial indicator lobe lift values during camshaft profile check do not have the .001 inch tolerance and/or otherwise specified. The .001 inch tolerance does not apply to no/go pins and no/go gauge technical specifications.

Shrouds & Covers

- a. All shrouds and covers must be run as supplied except any color is legal. Cylinder shield may be bent slightly or cut around the spark plug hole to allow fitting cylinder head temperature lead and clearance for Coil Ground lead. Flywheel finger guard cover, Top Cover and Plate are non tech items. They are replaced by Part # 555699.

Header & Silencer

- a. Factory RLV header part number EXP 5930.. Any exhaust gasket or no exhaust gasket allowed. Sealer allowed on header. Header nuts are not required to be safety wired. Bottom bracing must be bolted to the head. Factory header may be cut and turned to fit the car as long as the overall length and tube size remains the same as the stock factory header. No additional grinding or machining is legal. OAL 19.0" +/- 1/2 "measured on the inside diameter with a 1/4" wide tape measure. OD .9375" x .065 wall (ID .807 +/- .005). Ceramic coating of the pipe is legal. It is also legal to add a small spot weld on header OD to prevent the muffler from sliding up the pipe.
- b. Exhaust gas temp sensor is optional.
- c. RLV Silencer #4100 required. Baffle rattle is allowed however if baffles have been altered or removed, the muffler will be deemed illegal. Baffle holes are .128 inch(#30 drill bit) no go gauge. Ceramic coating is allowed.
- d. Springs attaching Silencer to header must be safety wired. Silencer must be attached and functional to header or car at the end of the race or driver and car will be DQ'd

Electric Starter

- a. Starter motor must be operational and capable of starting engine. The battery must be a minimum of 8 AH rating and capable of starting a warm engine. Recoil starter and flywheel starter cone optional. Starter support bracket P\N 557119 is optional.

Air Filter

- a. Air filter must be Green Brand 40 X 75 filter attached directly to Carb. No Extensions or Adapters.

Spark Plug

- a. Any commercially available, 10 mm thread, spark plug allowed. The spark plug must be stock as OEM manufactured. Indexing washers are allowed. Removal of factory sealing washer is not allowed unless using a head temp sensor ring.

Fuel Pump

- a. Fuel pump must be Briggs and Stratton number 597338 or 808656. Must be pulsed from the intake manifold only.

Clutch

- a. May be engine or Jackshaft mounted. Belt or chain drive from engine to jackshaft. May use #219 or #35 sprocket. No torque converter or shifter type allowed.

Rev Limiter

- a. Rev Limit is 7100 rpm +/- 50 rpm. Rev limiter may be checked at any point in the race program. Rev limit will be checked with a suitable memory capable tachometer attached to the plug lead and the motor accelerated until the rev limiter begins to function. All rev limiters must function within 100 rpm when checked with the same instrument. Each competitor is allowed one courtesy check of the rev limiter with the instrument to be used at the event.

Fuel

- a. Pure Methanol only! Specific Gravity for Methanol is 0.7913@68 degrees F. Use a Temperature Correction Chart to determine exact SG. Legal Methanol Corrected Specific Gravity is 0.760 to 0.800. VP M1 Methanol is the standard for Zeroing a Digitron or any device for testing Methanol for power enhancing additives. VP M3 and M5 and other brands of like chemistry are illegal.

Oil

- a. Any crankcase oil is allowed BUT MUST PASS THE BURN TEST AND/OR THE SNIFFER TEST. (Recommend TIFF Industries Sniffer)

Carburetor

- a. Stock Walbro PZ26 carburetor only. No alterations allowed; choke excluded. Carb rubber mount boot Briggs #557130 is required. New carburetor may have different color and exterior appearance. Carburetor float and needle. It is now legal to use aftermarket plastic (black or white color) floats and needles for the WF carburetors. However these aftermarket parts must have the same basic shape, size and function as OEM parts. This update is necessary because the current Walbro OEM supplier is no longer manufacturing these components for replacement.
- b. Slide must remain unaltered. Unaltered Stock needle marked CDB is required.
- c. Choke assembly is optional and may be removed and shaft holes plugged with silicon. If choke is retained choke lever may be fastened open with spring, rubber band or tie wrap.

Methanol Jets

- a. Drilling or reaming of gas carb jets is allowed: Nozzle .111" no go; pilot\slow jet .026" no go; Main jet .072" no go. NOGO Gauge must NOT pass thru. No drilling / chamfering and or modifications to the main jet E tube. No additional tolerance is allowed.

Venturi Measurement

- a. Vertical .9902" max
- b. Horizontal .7382" max

Camshaft

- a. No alteration of the camshaft by machining, polishing, or altering is allowed. Must compare to the stock Briggs part. First camshaft check will be taken at the valve spring retainers. With the lash set at zero, the movement of the valve spring retainer may not exceed .312". Any camshaft with a measurement at the push rod of less than .306 should be removed and measured on the

grind and checked for alteration. Camshaft must be as supplied with Stock Profile and compression relief. Max lift at pushrod is .312”.

- b. Install degree wheel, using positive stop method.
- c. Check ignition timing. With the right edge of the flywheel magnet (not the magnet holder) aligned with the right edge of the notch on the bottom of the right leg of the coil. The degree wheel must indicate between 23 and 29 degrees BTDC. Coil legs to flywheel O.D. gap is a non tech item. The flywheel key must have the B&S logo. Minimum key width is .182 inch.

Camshaft Tech

- a. Tech camshaft at pushrods. Push gently down on the dial indicator stem to ensure that there is no lash when pushrods are going down.

Intake Lobe Profile Specs.

.020 - 34 to 30 BTDC

.050 – 18 to 14 BTDC

.100 – 2 BTDC to 2 ATDC

.150 – 13 to 17 ATDC

.200 – 29 to 33 ATDC

.250 – 49 to 53 ATDC

.275 – 63 to 67 ATDC

Lift - .303” min - .312” max

.275 – 42 to 28 BBDC

.250 – 18 to 14 BBDC

.200 – 2 to 6 ABDC

.150 – 18 to 22 ABDC

.100 – 33 to 37 ABDC

.050 – 49 to 53 ABDC

.020 - 66 to 70 ABDC

Exhaust Lobe Profile Specs.

.020 - 75 to 71 BBDC

.050 – 57 to 53 BBDC

.100 – 39 to 35 BBDC

.150 – 25 to 21 BBDC

.200 – 9 to 5 BBDC

.250 – 12 to 16 ABDC

.275 – 25 to 29 ABDC

Lift - .303” min - .312” max

.275 – 70 to 66 BTDC

.250 – 57 to 53 BTDC

.200 – 37 to 33 BTDC

.150 – 21 to 17 BTDC

.100 – 6 to 2 BTDC

.050 – 11 to 15 ATDC

.020 - 29 to 33 ATDC

Deck/Piston Clearance

- a. Machining of deck surface is permitted. There will be no knife edge finishes allowed, Smooth finish only. Piston pop up cannot exceed .035" above block surface in the center of the piston. When measuring piston pop up, relieve protrusions left by number stamp on top of piston. Set flat bar stock across piston parallel to wrist pin. Use dial indicator to check pop up on center of this bar. Carbon may be removed from the top of the piston prior to measuring. Top of piston may be filed to relieve protrusions left by number stamp on top of piston.

Bore

- a. A. Maximum bore 2.725". Factory oversize pistons allowed.

Stroke

- a. Maximum stroke is 2.206". Push the piston down to take up rod play.

Head Gasket

- a. Any commercially available head gasket may be used but must maintain the same basic configuration of shape of standard Briggs World Formula gasket. Minimum thickness is .038" measured with a micrometer from inside of the cylinder hole of the gasket at 4 points between the head bolts. Fire Ring B&S gasket is legal.

Head

- a. Head may not be altered in any way from factory specifications. EXCEPTION: Oil drain back hole may be enlarged to .375 no go. NO PORTING OF ANY SHAPE OR WAY! Heat sink P\N 555690 is allowed.

Cylinder Head

- a. Cylinder head gasket surface may be machined. Remove Carbon first. Depth from gasket surface to head surface between valves must be a minimum of .319". Measure by using a depth micrometer. No knife edges or angle milling of head. Cylinder head must be as furnished from Briggs & Stratton. No polishing, grinding, or machining of valve seat angles, or intake and exhaust runners allowed. Valve seats (Int & exh) - One 45° angle and a small 30 degree top angle only. Valve seats of additional angles and/or angles not comparable to the factory stock head are not permitted.
- b. Cylinder head- Intake valve guide may be replaced with factory replacement guide , part number 555645 must be installed in stock location, no pushing guide up out of the intake port . A maximum height from top of guide boss measuring .255 max to top portion of guide. Machining of valve guide length is prohibited. Stock length guide to measure 1.250 " , + or - .005. Exhaust guide replacement legal with part# 555645 factory guide.
- c. Cylinder head- no machining of top of head, under the rocker arm plate. Maybe compared to stock known part. This means visual inspection and dimensions may be compared to sample stock head.

Rocker Arms / Push Rods

- a. Rocker arms must be as produced. Length must be 2.820 inches minimum. Push rod length 5.638" no go to 5.656 must go. Push rod diameter is .185 to .190".

Intake Port & Manifold

- a. No media blasting of any type allowed on intake port in/on the head or manifold. Must be as cast. Maximum diagonal measurement is 1.101". Maximum vertical measurement is 1.044".

Exhaust Port

- a. No media blasting of any type allowed on exhaust port. Must be as factory OEM cast. Maximum I.D. of shoulder in bottom of exhaust port is .854"

Valve Seats

- a. One 45° angle and a small 30 degree top angle only. Valve seats of additional angles and/or angles not comparable to the factory stock head are not permitted.
- b. Intake valve seat diameter is .966" - .972".
- c. Exhaust valve seat diameter is .844" - .850".

Valves

- a. Intake valve head diameter is 1.055" - 1.065". Intake valve length is 3.372" +\-.010". Intake valve weight - 27.90 grams minimum
- b. Exhaust valve head diameter is .935" - .945". Exhaust valve length is 3.372" +\-.010". Exhaust valve weight - 27.70 grams minimum
- c. Valve stem diameter is .232" - .238".
- d. Valve face must have one 45° sealing surface only.

Valve Springs

- a. Dual valve springs as supplied by the factory are required.
- b. Inner spring wire diameter is .066" - .068".
- c. Outer spring wire diameter is .112" - .114".

Valve Guides

- a. Replacement of valve guides with B&S factory part 555645, is allowed.

Ignition

- a. Unaltered B&S stock ignition part #555125 or #84012325 with the red shell is mandatory. If using part #84012325, the LED must flash red when the engine is running. Maximum RPM: 7,150. Ignition coil and/or its position, other than air gap may not be altered in any way. Coil attachment bolts must be stock and cannot be altered in any way to advance or retard timing.
- b. Spark plug connector must be stock factory type.
- c. Rubber plug boot is allowed.
- d. There must be resistance from plug wire to ground on coil #557040. Resistance must be between 3000 ohms, minimum, to 6000 ohms, maximum. Coil resistance may be rechecked after a minimum of 10 minutes if correct reading is not attained upon first check. No spec available on P\N #557125.
- e. Coil air gap is non tech.

Flywheel

- a. Only stock Cast Aluminum Briggs #557126 flywheel is permitted. Starter ring gear and all cooling fins must be in place. No machining, glass beading, sandblasting, painting or coating of flywheel is allowed. Minimum Flywheel Weight with starter ring, cooling fins, and attachment bolts 4 pounds 3 oz.
- b. Completely broken off flywheel fan fins are not allowed. Minimum 1.750 inch Flywheel cover opening inch allowed.
- c. Stock flywheel key with B & S logo is required and will determine Aluminum flywheel ignition timing. The flywheel key must be aluminum .182 minimum width. NO offset keys permitted.

Crankcase Gasket

- a. One or two stock crankcase gaskets are required. Silicone with no gasket is not legal.

Valve Lifters

- a. Must be stock. No Polishing allowed.
- b. Lifter head diameter must be .964" - .984".

Connecting Rod

- a. Stock B&S part #557005 or 557117 or any commercially available billet aluminum aftermarket rod with or without the bearing insert. Rod may not be altered or modified from factory produced configuration. Rod may be clearanced, providing that it is in stock configuration and finish, with no dimpling or media blasting. Only aluminum material can be used. Rod ends must be concentric with crank journal and wrist pin with no chamfer or breaking of edges.
- b. Rod length, measured from bottom of wrist pin hole to top of crank journal hole, is 2.419" minimum to 2.429" maximum.
- c. Oil hole opening is .185" no-go for the B&S rod. The crank end of the oil hole can be chamfered.

Wrist Pin

- a. Maximum I.D. is .414".
- b. O.D. is .624"-626". 717.23.3: Minimum length is 1.901".

Piston Rings

- a. Three rings mandatory. Top compression ring must have chamfer or O toward top of piston. Second scraper ring must be installed with inside chamfer down and O toward top of piston. Oil ring must be installed as from factory. No alteration of rings allowed except end gapping and lapping. Maximum RING GAP of Rings .050. Rings must be self supported in the cylinder bore of the engine being inspected. Rings must remain flat. Rings must be in one piece when removed from block. Aftermarket rings are allowed if they meet the Specifications listed below.
- b. Minimum width of top two rings is .095".
- c. Thickness of top two rings is .059" - .064".
- d. Minimum width of oil ring is .065". Ring groove must be present. Expander must be installed but may be trimmed in overall length.
- e. Thickness of oil ring is .098" - .102".

Piston

- a. Stock "kidney bean" piston required. No alteration, polishing or machining allowed. Only piston skirts are coated and coating cannot be removed and skirts or any part of piston be polished. Factory finish only.
- b. Minimum from top of piston to top of wrist pin on circlip side is .658".
- c. Minimum piston length is 1.768".
- d. Factory oversize World Formula pistons are allowed.

Crankshaft

- a. Stock B&S crankshaft casting #772 and #052 only allowed, all finishes being as factory supplied, with stock timing gear installed in stock location only. No alteration or polishing in any manner allowed. Offset crankshafts not permitted. Stock bearings required. Side cover may be peened to retain side cover bearing. The use of Loctite and or staking to retain crank gear secure to crankshaft is acceptable and legal.

- b. Shim(s) if used, must be installed as from factory.
- c. Crankshaft journal diameter is 1.094" - 1.100".

Block

- a. Must be stock with no alterations, except blocks may be repaired to prevent cracking on the flywheel side in the bearing support area. Bracing of engine block behind flywheel is legal. No machining of flywheel allowed. Support can be fastened by epoxy, glue, fasteners. Addition of fasteners is legal. Welding is not legal in this area. Support bracing plate only aluminum, no titanium or magnesium. Sleeving of ignition side bearing bore and repair in block is legal. Means of tightening bearing/bore fit by means of shim, sleeve retaining compound, and coating of outside diameter of bearing only is legal. Slip fitting of crank bearing on ignition side is legal. No after market bearings allowed. Addition of 3rd and/or 4th bearing support for crankshaft is legal. Can be mounted to motor mount or stand alone bolting to side cover and blower guard housing. Replacement of flywheel nut for use with bearing is legal. Blower guard block of plate center hole minimum diameter is 1.750"

The oil drain hole between the lifters can be drilled out to any size hole.

Venting with a tube going to valve cover or catch can is legal.