

420cc Builder Modified Predator OHV engine Technical Specifications

5/27/13

BM (Builder Modified) Predator 420cc OHV engine With Electric Start –Approved Engine: OHV Predator 420cc engine modified only according to these BM OHV Engine Spec.

ENGINE SPEC SHEET FOR BM 420cc OHV CLASS

Description: Single cylinder, 2-valve overhead Electric Start, 4-cycle engine. No aftermarket coatings of any type are permitted on any part of the engine (exception Blower Housing and Shrouds, (Paint).

Cylinder Head Requirements: Predator 420 cc cylinder head only. Machining of gasket surface is allowed. No addition of material in ports or to cylinder head allowed. Porting and / or grinding of ports are not permitted. Grinding/machining of combustion chamber is allowed. Valves, retainers and lash cap must be stock. No aftermarket valves allowed. Valve seats may have two angles, 45° valve face and 30° top relief. Inside diameter of valve seats must be stock (Int. 1.200” max ID and Ex 1.020” max ID) (Both measured at the largest diameter of the steel seat). Valve seats must appear stock and must be in stock position and depth. All four Head Bolts/Studs are required. Head bolt washers are allowed. Head studs/nuts/washers are allowed. Head gasket/s may be after market, must be of stock configuration, and gasket thickness non-tech. Cylinder head guide plate for pushrods must remain stock. No other alterations to the head are permitted.

Bore and Stroke: Stock bore is 3.543” +/-0.005” (90 mm) and may not be over-bored. Stroke is 2.598” +/-0.005”.(66 mm)

Connecting Rod: Stock or ARC 6272 Billet aluminum rod, (use of this rod requires clearancing balance shaft for dipper.) with or without bearing inserts allowed. No titanium rods allowed. Rod length is specified as 4.410” (112mm)/.

Combustion Chamber Volume: A minimum of 48.5 cc. combustion chamber volume is allowed. CC's are measured with the engine together, at TDC, with valves closed. Using a 100 cc burette or larger using marvel mystery oil, using a LAD gage, and a process similar to two-stroke method in WKA Manual, section 504

NOTE: Weight of engine and placement of plug hole make it difficult to prevent trapped air. Cylinder head must be close to level as measured on top fin. Oil must come to lowest portion of LAD gage without overflow. Rotate flywheel SLOWLY!

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Carburetor/Intake Requirements: Stock Huayi or RUI*ING carburetor. Maximum bore of 0.827" Carburetor Air Filter adapter overall length of a max 1.375" length allowed of any material. Pulse-type fuel pump is mandatory. Fuel pump must be pulsed from one of the following: Black phenolic carburetor spacer, the engine block or the valve cover. Black phenolic carburetor insulator must be in stock form except for the addition of a pulse line fitting, Minimum length of phenolic insulator .551". (14.5mm) Choke assembly must be present and in working order. Jet openings, air bleeds jets, and emulsion tubes are non-tech. The use of remote jetting adjuster is allowed. Throttle shaft, washer, and butterfly must be present, butterfly screw non tech. Stock intake runner gasket configuration only. Fuel bowl may have an overflow system. .

Piston Requirements: Must be stock dished piston (Overall height: Minimum 2.255", (67.27mm) with no further modifications. Rings must appear stock and all rings must be installed. Piston may not pop out above cylinder deck. Rings may not fall through bore. Wrist pin: Minimum diameter of 0.786" (20 mm), Minimum length of 2.431" (61.6 mm) Center of wrist pin to top of piston: 1.106" +/- 0.005". (28.1 mm)

Valve Train: Stock valve-train only in stock configuration including stock rocker ratio, stamped steel rocker arms. Exception: Any single or dual valve springs and valve spring shims are allowed must use Stock OEM valve retainers. Lifter overall length: min 1.891":. Push rod cup depth of 0.138" max. Push rod length: min length 6.443". Intake valve head Max OD 1.425" and Exhaust valve head Max OD 1.263". Valves must be one angle only, 45°. No knife edging of valves (1mm min. margin). Valves may be polished. Valve length: Intake valve 3.390" +/- 0.002", Exhaust valve 3.349" +/- 0.002". , Valve length to top of keeper slot; Intake: 3.209" +/- 0.002", Exhaust: 3.189" +/- 0.002". No additional support for rocker studs permitted. (No stud girdles). Outside face of valve head may **not** be below the combustion chamber floor. (i.e. don't sink the valves) Valve cover may be drilled for crankcase equalizer tube fitting and a fitting installed in the stock hole for oil catch can hose. Otherwise, it must remain unaltered. Valve cover gasket is non-tech.

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Camshaft Requirements: Stock camshaft only, ez-spin assembly must remain as stock. The duration check for Intake and exhaust lobes is listed below. (Measured at top of valve retainer).

Valve Chart

Valve lift	BTDC	ATDC		Valve lift	ATDC	BTDC
Intake	+/- 2 Degrees	+/- 2 Degrees		Exhaust	+/- 2 Degrees	+/- 2 Degrees
0.050		8		0.050		270
0.100		22		0.100		190
0.150		35		0.150		173
0.200		48		0.200		158
0.250		63		0.250		127
0.300		85				
0.323		114		0.271		91
0.300		140				
0.250		162		0.250		60
0.200		174		0.200		23
0.150		189		0.150		14
0.100		208		0.100	3	
0.050		215		0.050	20	

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Crankshaft Requirements: Stock, factory crankshaft only, with stock, factory timing gears in factory location. No modifications to crankshaft allowed. Aftermarket steel main bearings of non-self-aligning type, with or without seal are allowed. No ceramic bearings. Crankshaft throw diameter is 1.180", 1.168" (30 mm – 29.66 mm) minimum. Crankshaft length may be cut for clutch fitment.

Block Requirements: Stock Block, as cast and produced with no alterations or modifications other than those specifically permitted. Block head mating surface may be machined, however, no piston pop out is allowed. Blocks may NOT be welded for repairs. No addition of material to block (i.e. welding, JB weld, etc.). All bolt bosses in block may be drilled and tapped for repairs or other uses. Additional side cover gaskets as required for crankshaft thrust are permitted. All parts associated with the governor and the low oil sensor may be removed, plugging any associated holes allowed.

Flywheel/Ignition: Stock, unaltered flywheel only. Weight 13#. No aftermarket flywheels allowed. Flywheel key required. All magnets including charging magnets must be in place in the factory location. Starter ring gear and starter must be in place and operable. Grinding/ machining on flywheel are not allowed. Cutting down the starter cup is allowed for clearance of an aftermarket flywheel screen. Plastic fan is not a tech item. Ignition timing is non tech. Stock ignition module only, no modifications of any type allowed. Sparkplug connector must be stock as from factory. All Electrical Components must be intact.

Header and Muffler Requirements: Header Pipe Length: Minimum 18"- Maximum 25". The diameter of pipe is to be 1 ¼" to 1 3/8" OD or a combination of both. Arrestor must be a RLV 1139 or RLV 4106, 1 5/16" inlet type. Muffler can be clamped or welded to the header pipe. Holes must be 0.128 Max in spark arrestor.

Clutch Requirements: 1" Bore, Shoe Type Clutch only. Clutch springs are not a tech item.

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Revision History			
Revision	Date	Detail	Initials
00	6/4/13	Initial Release	JBR
01	6/18/13	Modified from original to clarify statements.	JTS
02	7/16/13	Corrections and modifications	JTS