ENGINE EVALUATION GUIDE

Name:_____ Model #_____ Serial # _____

Customer Problem: _____

QUICK CHECKS----------

1. ☐ Make a quick visual inspection of the machine:
   - ☐ Is the machine safe to operate?
     Missing or damaged guards/shields/throttle lockouts, loose saw chain, broken chain brake, etc.
   - ☐ Make visual inspection of fuel = is oil present?
2. ☐ Does the engine start easily and run?
   If YES, skip #3.
3. ☐ If the engine won't start check the following:
   - ☐ Compression – Do Compression Test NOW!
   - ☐ Install new spark plug – *Retry*
   - ☐ PET-4000 inline spark test *(minimum 4mm gap)*
     No Spark = disconnect stop switch-Retry
   - ☐ Fuel – Prime carb with approved spray - *Retry*

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PRELIMINARY CHECKS----------

4. ☐ Check for engine/equip. maintenance problems:
   - ☐ Dirt in the air filter housing
   - ☐ Signs of engine cooling blockage
   - ☐ Damaged engine shrouds & missing hardware
   - ☐ Operation of choke and throttle linkage
   - ☐ Excessive engine loads
     Missing string cut-offs, dull chain, missing blow tubes, etc.

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5. ☐ Pull the spark plug and check its condition:
   - ☐ Correct type and heat range
   - ☐ Firing end *black soot, heavy carbon, cracked insulator*
   - ☐ Excessive plug gap (.024" is standard)

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COMPRESSION----------

6. ☐ Check the cold engine compression: _____psi
   - ☐ Specs: _____min _____ max
     Keep pulling the starter rope until needle stops rising.

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7. ☐ 4-Stroke Only – Check the valve clearance:
   - ☐ _____intake _____exhaust _____spec

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8. ☐ 4-Stroke Only – Leak Down Test _____% Leakage
   Perform Leak Down test only if engine has low compression.
   - ☐ Noise at: ☐ Exhaust ☐ Intake ☐ Crankcase

FUEL SYSTEM----------

9. ☐ Take a sample of the fuel mix:
   - ☐ Is the fuel mixed correctly?
   - ☐ Does the fuel smell stale?
   - ☐ Is there water in the fuel?
   - ☐ Test the ethanol content _____%
     Any concentration above 10% will cause problems.

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10. ☐ Pull the fuel filter and check its condition.

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11. ☐ Test the carburetor and fuel lines for leaks:
    - ☐ Pressure test fuel inlet line/carb to 10psi (.7 bar)
      If pressure is not held, hook up to carb inlet and retest.
    - ☐ Carb still holding 10psi, push the purge bulb
      The needle should drop and hold at 7psi (.5 bar).
      Continue to push the bulb until the gauge reads zero.
    - ☐ Switch tester to vacuum mode & push bulb
      The carb should hold up to 10"(.4 bar) vacuum
    - ☐ Hook pressure tester to purge outlet-push bulb
      Push bulb & pump to 7psi (.5 bar). Pressure should hold

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12. ☐ Pressure/Vacuum test of the remote tank vent:
    - ☐ Hook vent up to tester – *Pump on pressure mode*
      It should release excess pressure & hold 1½ - 5psi (.1-.3 bar)
    - ☐ Switch vent test to the vacuum mode & pump
      The vent should hold NO Vacuum.

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13. ☐ Vented Cap 1-way check valve test:
    - ☐ Hook vac tester to one tank line & block others
      Pump tester – the tank should hold NO vacuum.

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14. ☐ Pressure test fuel tank for leaks:
    Keep same line hook up as #13
    - ☐ Pump tester on pressure mode
      Tank should hold 7psi (.5bar)

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EXHAUST RESTRICTION----------

15. ☐ Pull the muffler and check for exhaust restrictions:
    - ☐ Is the spark screen blocked?
    - ☐ Check the exhaust port for restrictions.
      A catalytic muffler can have a clean screen & plugged port.
    - ☐ Check for muffler restrictions

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IMPULSE TEST----------

16. ☐ Pull the carburetor and verify fuel pump pulse:
    - ☐ Put a few drops of oil in pulse hole & pull rope
      Oil should blow out of hole indicating a strong pulse.

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17. ☐ Look through the intake manifold port:
    - ☐ Check the condition of the intake side of piston
    - ☐ Reed Valve Engines – Check for debris in reed

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CARBURETOR----------

18. ☐ Is the throttle shaft loose? *If so carb needs replacement*

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19. ☐ Disassemble major carburetor components:
    - ☐ Are there signs of corrosion or rust inside?
    - ☐ Check the filter screen
    - ☐ Is the metering diaphragm pliable?
    - ☐ What is the condition of fuel pump diaphragm and check valves?
    - ☐ Check metering lever height
      Adjust with Walbro "W" or Zama "Z" gauge if needed.
    - ☐ Do any corrosion & deposits remain in carb after cleaning?

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ENGINE PRESSURE/VACUUM TEST----------

20. ☐ Check for engine crankcase pressure/vac leaks:
    - ☐ Install block-off gaskets, plug adaptor, & tester
    - ☐ Will the engine hold 7psi (.5 bar) for 1-minute?
      Look for leaks by spaying engine with soapy solution.
    - ☐ Can the engine hold 14" (.5 bar) vac for 1-min?
      Good pressure test, failed vac test = leaking crank seals

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21. ☐ Replace defective parts and reassemble engine√
    √ If ign. module is exposed, check air gap before reassembly.

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IGNITION TEST*----------

**The best method to fully test the ignition is with the PET-9000*

22. ☐ Install PET-4000 Spark Tester inline with plug:
    - ☐ Will engine fire a 4mm gap at cranking speed?
    - ☐ Will it fire a 6mm gap with the engine running?
    - ☐ Are the any signs of intermittent spark?
      Check primary/secondary leads & module air gap – Retest

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23. ☐ Install PET-9000 Ignition Analyzer:
    - ☐ Primary voltage _____ _____ spec
    - ☐ Timing 3,000rpm _____ _____ spec
    - ☐ Timing 8,000rpm _____ _____ spec
    - ☐ Governor/Limiter _____ _____ spec
    - ☐ Secondary voltage _____ _____ spec

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FINAL TEST----------

24. ☐ Warm up engine and test run:
    - ☐ Adjust idle speed to spec
      Make sure the cutting attachment is not moving.
    - ☐ Does the engine accelerate smoothly?
    - ☐ Is WOT RPMs to spec?
    - ☐ Load test equipment

25. ☐ If engine is not performing correctly adjust carb to emissions specifications

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NOTES:_____

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