

Customer: \_\_\_\_\_ Model # \_\_\_\_\_ Serial # \_\_\_\_\_

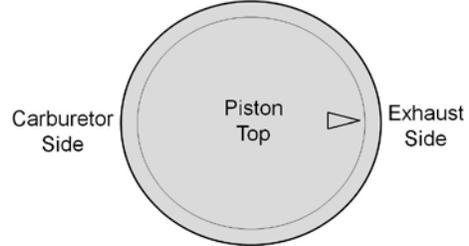
Date of Purchase: \_\_\_\_\_ Manufacturing Date (On emissions label): \_\_\_\_\_

### VISUAL CHECKS & TESTING *(Before Engine Disassembly)*

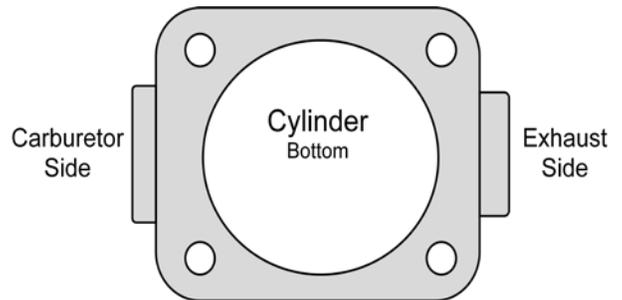
1.  Make a quick visual inspection of the machine:
  - Clean & appears in good condition?  Yes  No
  - Dirty or in poor looking condition?  Yes  No
  
2.  Check for engine/equip. maintenance problems:
  - Dirty or damaged air filter element?  Yes  No
  - Dirt in air filter housing?  Yes  No
  - Engine cooling blockage?  Yes  No
  - Oil or fuel leaks?  Yes  No
  - Excessive engine loads?  Yes  No  
*Missing string cut-offs, dull chain, missing blow tubes, etc.*
  
3.  Spark plug part number? \_\_\_\_\_
  - Correct type and heat range?  Yes  No \_\_\_\_\_
  - Firing end? *soot, heavy carbon, cracked insulator, etc.*
  
4.  What is cold engine compression? \_\_\_\_\_ psi
  - Specs: \_\_\_\_\_ min \_\_\_\_\_ max  
*Keep pulling the starter rope until needle stops rising.*
  
5.  What is the condition of the fuel mix?
  - Is fuel mixed correctly?  Yes  No \_\_\_\_\_
  - Is fuel stale?  Yes  No \_\_\_\_\_
  - What is the ethanol content? \_\_\_\_\_ %
  
6.  Pull the fuel filter and check its condition:
  - Dirty or plugged fuel filter?  Yes  No
  
7.  Pressure test fuel line & carb up to 10psi (.7 bar)  
*If pressure does not hold, hook up to carb inlet and retest*
  
8.  Check for engine crankcase pressure/vac leaks:
  - Will the engine hold 7psi (.5 bar) for 1-minute?  
*Look for leaks by spraying engine with soapy solution.*
  - Can the engine hold 14" (.5 bar) vac for 1-min?  
*Good pressure test, failed vac test = leaking crank seals*
  
9.  Pull the muffler and check for exhaust restrictions:
  - Spark screen restricted     Exhaust port restricted

### ENGINE ANALYSIS *(After Engine Is Disassembled)*

10.  What is the condition of the piston? \_\_\_\_\_
- Scored (S)     Worn (W)     Deposits (D)  
*Locate piston damage by marking "S" for scored, "W" for worn & "D" for deposits next to the illustrated piston below*



11.  Signs of lubrication under piston skirt?  Yes  No
12.  Does piston have mechanical damage?  Yes  No  
 Cause of piston damage? – *Pin clip, broken ring, etc*
  
13.  Does the piston have worn ring grooves?  Yes  No  
 Piston ring side clearance? \_\_\_\_\_  
*.004" (.1mm) to .006" (.15mm) limit on most engines*
14.  What is the condition of the piston rings? \_\_\_\_\_
  - Stuck piston ring?  Yes  No
  - Cause of stuck ring?  Deposits  Scoring
  - Broken piston ring?  Yes  No
  - Break cause:  Damage  Ring wear  Groove wear
  
15.  What is the condition of the cylinder? \_\_\_\_\_
  - Scored (S)     Worn below plating (W)*Locate cylinder damage by marking "S" for scored, "W" for wear*



16.  Check condition of crankcase:
  - Are there signs of lubrication inside?  Yes  No
  - Dirt and debris inside crankcase?  Yes  No
  - Deposits inside crankcase?  Yes  No
  
17.  Check for loose, rough or damaged bearings:
  - Defective main bearings?  Drive side  Starter side
  - Bad crankpin bearing?  Piston pin bearing?

## ENGINE FAILURE CAUSES

### RAW GAS



*Intake scored*



*Heavy exhaust score*

- Caused by running the engine on raw fuel
- Heavy dry piston score (*Wraps around much of piston*)
- Score often wraps around piston even to intake side
- Crankcase often dries out when opened up

### OVER HEATING



*Intake side heat discoloration*



*Exhaust discolored & scored*

- Can be caused by blocked engine cooling air intake
- Other causes include heavy engine load
- Restricted exhaust will contribute to over heating
- Oil breakdown darkens piston (*Early stage rings stay free*)
- Heat expands piston past limits scoring piston
- Extreme heat can cause detonation & pre-ignition

### DIRT INGESTION



*High piston intake wear*



*Cylinder worn below plating*

- Look for signs of dirt ingested through air filter housing
- High piston & cylinder wear (*Especially on the intake side*)
- Heavy scaly carbon on top of piston (*May be tan in color*)
- Heavy carbon in exhaust port
- High piston ring & ring groove wear (*Can break ring*)
- Dirt usually in crankcase & bearing wear possible

## ENGINE FAILURE CAUSES

### LEAN SEIZE



*Intake side looks good*



*Spot score exhaust side*

- Caused by over lean carb adjustment, fuel restriction or air leak
- Spot score on piston exhaust side (*Sticks piston ring*)
- Intake side of piston looks good (*Light intake score possible*)
- Heavy exhaust score possible (*If engine continues to run*)

### STALE FUEL



*Varnished Piston*



*Varnish also inside crankcase*

- Caused by running engine on old fuel (*Note varnish smell*)
- Heavy varnish deposits all around piston
- Varnish usually sticks piston rings
- Varnish deposits also inside crankcase
- Stuck rings can cause exhaust side piston scoring

### UNCERTIFIED 2-STROKE OIL



*Deposits on piston skirt*



*Stuck piston rings*

- Caused by running an engine on uncertified 2-Stroke oil
- Dark deposits all around piston
- Stuck piston rings (*Caused by carbon in ring grooves*)
- Carbon can plug exhaust port & spark screen
- Crankcase usually stays clean