Skills Compétences Canada

Engine Tear Down and Measure

Outdoor Power and Recreation

SECONDARY

Competitor Name: _____Province/Territory___

Engine Tear Down and Measurement

Do not start this lab until told that the competition is ready to start.

If there is something you don't understand, you may ask for clarification from a judge.

You will be disassembling this engine completely to measure the internal components. Follow the manual for the proper procedures and specs.

All gaskets will be reused. If you damage a component, marks will be deducted. Please take pride in your workspace.

*Ensure all measurement specifications are in metric and all of your measurements are in metric. Always indicate the unit of measure is indicated.

Disassembly: Following the service manual procedure, disassemble and measure the internal engine components. Answer all questions and fill in all tables. Ensure you have the judge verify your work at the appropriate times indicated. Using the service manual, locate and record the following specifications and perform the required measurements.

Cylinder Head:

Component	Measurement
Intake Valve Guide ID	
Intake Valve Stem Dia.	
Calculate: Intake Valve to Guide Clearance	
Exhaust Valve Guide ID	
Exhaust Valve Stem Dia.	
Calculate: Exhaust Valve to Guide Clearance	

Competitor Name: _____Province/Territory___

Piston and Rings:

Component	Measurement
Piston Pin Diameter	
Compression Ring	**Side Clearance:**
	End Gap:
Wiper Ring	**End Gap:**
Oil Control Ring	**End Gap:**
Piston Diameter	

- Where did you measure the Piston diameter?

  _____

Crankshaft and Connecting Rod:

Component	Measurement
Crankshaft Crank Pin Journal Diameter	
Connecting Rod to Crank Pin Clearance	**Plasti-gauge width:**
Calculate Connecting Rod Crank Pin Bearing Bore Diameter	

Competitor Name: _____Province/Territory___

Crankshaft Continued:

Crankshaft MAG Bearing Journal Diameter	
Crankshaft PTO Bearing Journal Diameter	

Cylinder Bore:

Make your 6 bore measurements and then calculate Taper, Out of Round, and Piston to Cylinder Clearance.

Cylinder Diameter	Measurements	Measurements	Out Of Round Measurement
Top	**A**	**B**	
Middle	**C**	**D**	
Bottom	**E**	**F**	
Taper Measurement			
Calculate Piston to Cylinder Clearance			

Competitor Name: _____Province/Territory___

Camshaft:

Component	Measurement
MAG Camshaft Journal	
PTO Camshaft Journal	
Intake Lobe Height	
Calculate Intake Cam Lobe Lift	

Reassembly:

If you have completed all of the previous tables, you are now ready to reassemble your engine.

Fill in the torque table and torque all fasteners to spec.

Ensure that you call your Judge over to inspect before you:

- **Put piston in the ring compressor**
- **Install cylinder head**
- **Install sump cover**
- **Adjust Valve clearance to specification**

Answer all the reassembly related questions.

Competitor Name: _____Province/Territory___

Torques and Specifications:

Component	Specification
Connecting Rod Bolts	
Flywheel Nut	
Sump Cover Bolts	
Cylinder Head Bolts	
Valve Cover Bolts	
Rocker Arm Ball Lock Nut	
Spark Plug	
Muffler Nuts	
Armature Screws	
Measure and set the IGN coil air gap to a spec you would recommend	
Armature air gap setting recommendation	

Competitor Name: _____Province/Territory___

Reassembly Questions:

- When reassembling the piston and rings, what are 3 points we need to remember in reference to ring orientation?
    - _____
    - _____
    - _____
- What orientation are the oil holes on the connecting rod?
    - _____
      _____
- Why does the piston have a raised dot on the crown?
    - _____
      _____
- Which way does this raised dot face?
    - _____
      _____
- When do we need to De-Glaze the cylinder?
    - _____
      _____
- When would you need to hone or resize the cylinder?
    - _____
      _____
- When you finish honing the cylinder, how is it final cleaned before reassembly?
    - _____
      _____
- What is the recommended engine oil for this engine?
    - _____
      _____
- What type of lubrication system does this engine use?
    - _____
      _____

Competitor Name: _____Province/Territory___

- What needs to be done to the flywheel taper prior to installing the flywheel?
  - _____
    _____

<u>You are now finished the Lab. Clean your work area and return special tools.</u>