Stratified Intake

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Good luck,

Jeff

Abstract: An engine stand was assembled to test the possibilities of running a stratified intake mode engine fueled by Producer-Gas. Charcoal, corn and wood-gas was tested.

Test Stand: An intake manifold was fabricated that replaced the gasoline carburetor. A 6.5 Hp engine was used as the test engine. A blower from an air mattress was adapted as the fuel pump or gas mover that feed the stratified intake manifold. A router speed control was used to vary the speed of this blower. Both wood and corn gas was manufactured by the Gas-of-Fire 1000 Gas-Producer (open top down draft). Charcoal gas was manufactured by the Gas-of-Fire 2000 Gas-Producer (up draft) also refereed to as an Air-Carbon Fuel Cell.

Modes of Intake: Homogeneous and stratified are the two common modes of engine intakes. In the homogeneous mode the fuel and air are properly mixed before entering the engine cylinders. The common gasoline and natural gas carburetors are of this type. Stratified intake mode is a lean burn scheme like the diesel engine. The idea is to have no vacuum at the intake and the fuel is delivered via the fuel pump/injector or blower. The fuel burns as it mixes in the cylinders. This is claimed to be more fuel efficient which is gleaned from a higher volumetric efficiency and leaner burn or so “they” claim.

Disclaimer: I'm confident that this fabricated intake manifold does NOT produce a true stratified intake but it is a starting point.

Below, in Photo 1, is a side view of the manifold.

Photo 1

Below, in photo 2, is an end view of the air intake.

Photo 2

Below, in photo 3, is an end view that bolts to the engine.

Photo 3

Below, in photo 4, is the stratified manifold being attached to the engine intake.

Photo 4

Below, in photo 5, is the adapted blower.

Photo 5

Corn Gas: With the blower adjusted at a low setting the engine ran OK at an idle. As the blower speed was increased the engine seemed to flood out. Observation; this experiment was performed too long ago to recall for sure but I do not recall much or any tar found in the system.

Charcoal Gas: With the blower adjusted at a low setting the engine ran OK at an idle. As the blower speed was increased the engine seemed to flood out. When I choked the air intake off, somewhat, with my hand the engine quickly gained RPM and gave the impression of power. My hypothesis is that the intake became more of a homogeneous mode than stratified. Observation; there was no trace of any tar in any of the system.

Wood-Gas (& tar vapor): With the blower adjusted at a low setting the engine ran OK at an idle. As the blower speed was increased the engine also increased RPM. It would be easy to exceed the 3600 RPM max rating of the engine. It seemed quite lively. Observation; tar was found in the system after tear down, even on the valve stem. Not a large quantity but enough to be noticed easily.

There was no attempt to load the engine in any of these test runs.

Hypothesis: It is possible that H2 aids to kindle the fuel when in the stratified intake mode and that this charcoal gas was anemic in H2 thus only an idle was achieved. Possibly corn gas is H2 anemic or it was diluted significantly by CO2 thus it only achieved an idle. Possibly this Wood-Gas was H2 rich thus achieving full RPMs or possibly the tar was at work here.

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