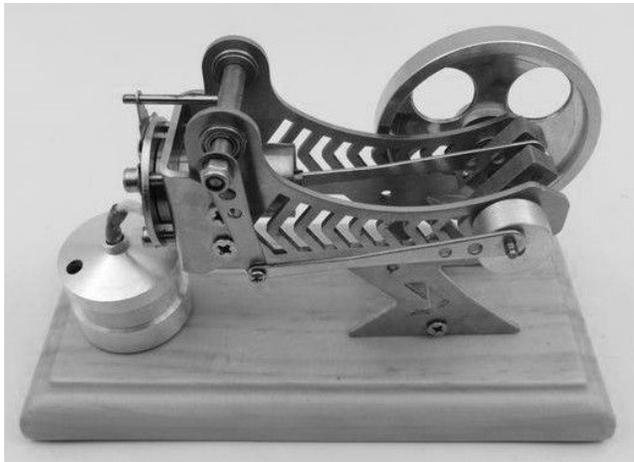


D Star VACUUM/FLAME LICKER ENGINE



The Vacuum/Flame Licker Engine is a heat engine that uses direct flame and a partial vacuum to operate. The Vacuum/Flame Licker Engine can be used for classroom demonstrations, or by hobbyists who enjoy heat-to-mechanical energy engines.

Components

Your Basic Stirling Engine comes with the following:

- 1 - Vacuum/Flame Licker Engine
- 1 - Metal alcohol lamp, nozzle & wick
- 1 - Plastic filling bottle
- 1 - Bag of replacement parts and tools

Set-Up

Please note that your Vacuum/Flame Licker Engine was tested before shipping. This may result in small burn marks on the body of the engine. This is normal.

The Vacuum/Flame Licker Engine should be placed on a flat, level surface away from anything flammable.

Thread the wick through the alcohol lamp

nozzle. The wick is a little larger than the nozzle so you may need to wet the end of the wick or guide it through with the aid of a bent paper clip.

Fill the plastic bottle with either 91% or 99% rubbing alcohol. Use the bottle to fill the alcohol lamp bottle. Then place the nozzle on the bottle. The majority of the wick should be in the alcohol with only a small part of the wick (1/4") sticking out through the top.

Never try to fill the burner while the wick is lit!

Place the lamp so that the bent tube points the wick directly at or on the back of the engine.

Operation

Using a match or a lighter, ignite the wick on the alcohol lamp. The flame will touch the front of the Engine. It will not require time to heat up like Stirling Engines.

Now give the Vacuum/Flame Licker Engine's wheel a good spin. If it has been sufficiently heated the Engine should 'kick in' and start spinning under its own power. Watch as it spins from the power of the flame. You can even watch as the flame gets pulled into the engine chamber, hence the reason for the name 'Flame Licker' or sometimes 'Flame Eater' Engine.

If the flame gets too close or too high, carefully move the lamp further away from the engine.

Once you are finished, extinguish the flame and allow the Stirling Engine time to cool down before moving it or performing any maintenance.

An easy way to see how it runs (for a short duration) is to use a regular butane lighter and put it near the hole, spin the fly wheel, and the flame will get sucked in the hole. You should see it start to run on its own.

The Vacuum/Flame Licker Engine can be made to run faster if you clamp it to the table. This will also prevent it from 'walking' on smoother surfaces.

Do not touch the engine or burner when they are hot.

Never leave the flame unattended

Fuel

In addition to 91% or 99% rubbing alcohol. You can also use any alcohol of 180 proof or better.

Maintenance

Use a light machine oil (no more than 5W – knife honing oil works great) on metal parts, only if needed. Use a cotton swab to apply the oil. Do not get oil on glass or plastic parts.

If the front of the engine gets excessively sooty from flame contact, wait for it to cool and clean it gently with a soft cloth. Be very careful not to bend any of the parts on the front of the engine.

How does a Vacuum/Flame Licker Engine Work?

A Vacuum/Flame Licker Engine runs by air pressure against one side of the piston, which has a partial vacuum the opposite side. When the chamber is heated by the flame the air expands and pushes the cylinder out. When it is cooled by the air it contracts, using the vacuum pressure it pulls the piston which opens the valve and restarts the process.

During this process, the engine's chamber door will open and the low pressure will draw in the flame, giving the engine its 'Flame Licker' or 'Flame Eater' nickname.

What are Vacuum Engines used for?

Vacuum engines had limited usage in the era of steam and heat engines, but some of the very earliest steam-powered engines did resemble the Vacuum Engine. They found use as part of the steam railway system. Since vacuum pumps are needed on larger scale Vacuum engines (this model unit you have gets its partial vacuum from the rotation of the wheel)

Vacuum Engines were inefficient since only a portion of the heat from the flame is used to power the engine. As a result the Vacuum Engines were only used in a small number of specialty applications.

Warranty

D Star Engines have a limited lifetime warranty. This warranty covers defects in manufacture. It does not cover any defects caused by misuse, modification, or damage

Parts and repairs to your Stirling Engine are available at reasonable cost from D Star Engines. Please contact the number below for parts and service either in our out of warranty.

Other Stirling Engines from D Star

D Star Engines produce several different models of Stirling Engine. Here are a few examples:

D Star Low-Temp Sterling Engine – runs off a hot cup of coffee!

D-Star Basic Stirling Engine – Operate your own efficient model heat engine.

Need Help?

Need a hand getting your engine working?
You can call 831-338-8354 or email
rex@dstarengines.com