

How Thermo-acoustic engines work.

The thermo-acoustic engine works by converting sound waves into motion. The sound waves are generated by heating one end of a 'stack' of coiled material and allowing the other end to remain cool.

The engine is fired by a small spirit burner underneath the brass heat ring. By heating the end of the coiled 'stack' a bouncing pressure wave is set up inside the tube. The crucial element in the thermo-acoustic engine is the 'choke'. Without the smaller diameter of the choke the engine simply will not run.

As the standing wave propagates up and down the tube the air inside is subject to fluctuations in speed and pressure. The phasing of these fluctuations is governed by several factors, including the temperature of the heat source, the diameter of the choke and the diameter and length of the test tube.

It is the pressure fluctuations that ultimately drive the engine, in the expansion phase the piston is pushed outwards, in the contraction phase the piston is pulled inwards.

The KTA18 engine requires a small push of the flywheel for it to start. Without the small push the pressure and velocity of the standing wave remain at equilibrium. Move the flywheel and the equilibrium is shifted, thus allowing the cyclic variations to take place.

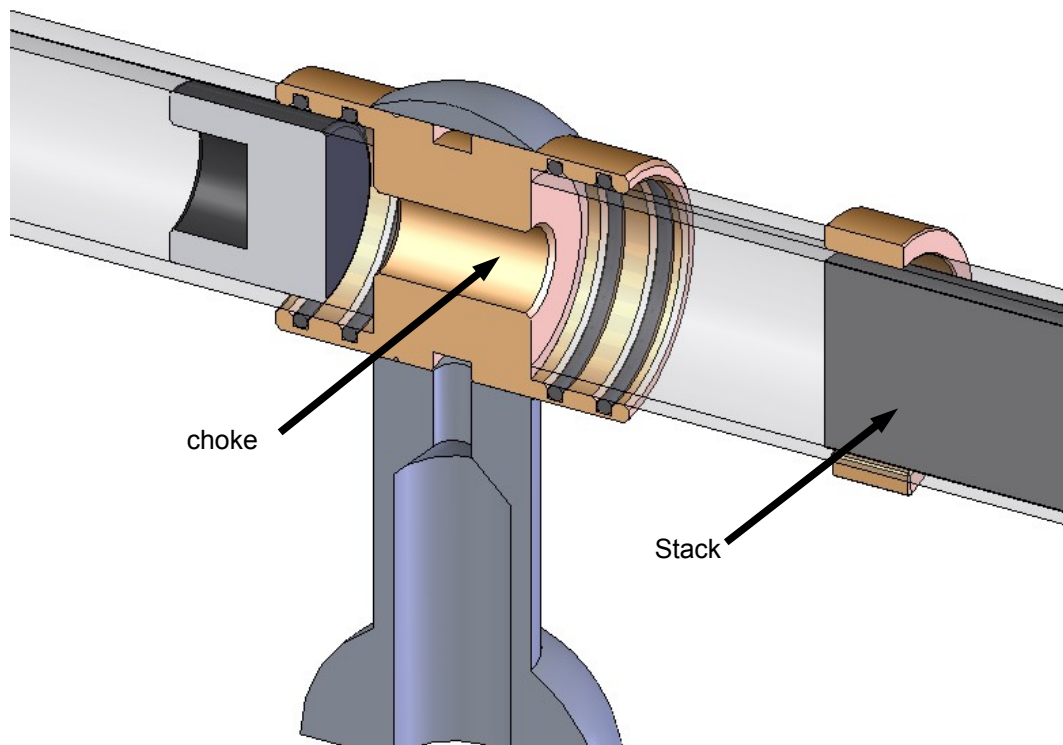


Figure 1