

Solar Powered Stirling Engine

*Thor Thorup, Jesper Oxbøl, Niels Hvid, Stefan Høngaard Andersen, and
Jesper Hyldig*

DTU Mechanical Engineering, Technical University of Denmark
s082866@student.dtu.dk, s082883@student.dtu.dk, s082875@student.dtu.dk,
s082878@student.dtu.dk, s072110@student.dtu.dk

WHY STIRLING?

A Stirling Engine is an external combustion engine that can run on any external heat source, as long as the source is hot enough. Stirling Engines can run on anything from a blowtorch to the rays of the sun. The Stirling Engine can utilize the effect of an internal regenerative heat exchanger, thus enabling the thermal efficiency of the engine to approach the maximum achievable efficiency, the Carnot efficiency. The Stirling Engine has the capability to produce power from both bio-fuels and focused sun rays, thus making it a viable green technology.

THE SOLAR POWERED GAMMA-TYPE STIRLING ENGINE

A gamma-type Stirling engine consists of two different pistons, the displacer piston and the power piston, in two different cylinders, connected to the same crankshaft. The hot cylinder, which contains the displacer piston is connected to the cold cylinder by a tube. A Fresnel lens is utilized to direct the rays of the sun onto the heat exchanger of the Stirling Engine. The Fresnel lens is advantageous to a standard lens as it, due to its unique design, is lightweight and transportable, just like a simple sheet of plastic.