

The Efficiencies of Heat Engines

The operating principle of all heat engines involves the transformation of the thermal energy of burning fuel into the kinetic energy of moving parts. There are many different designs of heat engines, some of which are discussed in your textbook.

As the name suggests, a four-stroke engine completes four separate operations through one complete cycle. Two-stroke engines complete one cycle of operation after two strokes. The typical efficiency of both types of engine is between 25% and 35%. Two-stroke diesel engines, which operate at a higher temperature, have efficiencies up to about 40%.

There are several other types of heat engines. Among these is the Wankel rotary engine, which is currently used in some automobiles. It is a four-stroke engine, but its design is very different from conventional four-stroke engines that use pistons.

Research the rotary engine, and compare it with the four-stroke engine discussed in your textbook. Use the following questions to guide your research.



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1. How is the design and operation of the rotary engine similar to that of the four-stroke piston engine? How is it different?

2. What are the advantages of a rotary engine over a four-stroke piston engine? What are the disadvantages?

3. How does the efficiency of a rotary engine compare to the efficiency of a four-stroke piston engine?

4. Describe the environmental effects of both the rotary engine and the four-stroke engine.