

## **Wankel Rotary Engine – Less Weight, More Power**

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*The Wankel engine is a sort of heat engine, which has a rotary piston. In other words instead of going up and down, the Wankel piston rotates in the cylinder. Both cylinder and piston are quite different in shape from those of conventional engine.*

The Wankel engine is a type of internal combustion engine which uses a rotary design to convert pressure into a rotating motion. In 1951, the German engineer Felix Wankel started working out of the engine at Motorenwerke Company, where he first conceived his rotary engine in 1954. [1]. It is a variable-volume progressing-cavity system. Thus there are 3 cavities per housing, all repeating the same cycle. Note that one full orbit of the rotor equates to 3 turns of the e-shaft.

Wankel rotor housings are constantly heated on one side and cooled on the other, leading to high local temperatures and unequal thermal expansion. While this places high demands on the materials used, the simplicity of the Wankel makes it easier to use alternative materials like exotic alloys and ceramics. Early engine designs had a high incidence of sealing loss, both between the rotor and the housing and also between the various pieces making up the housing [2]. Also, in earlier model Wankel engines carbon particles could become trapped between the seal and the casing, jamming the engine and requiring a partial rebuild. It was common for very early Mazda engines to require rebuilding after 50,000 miles (80,000 km). Further sealing problems arise from the uneven thermal distribution within the housings causing distortion and loss of sealing and compression.

The Wankel engine is resistant to preignition and will run on lower-octane rating gasoline than a comparable conventional piston engine; it also leads to relatively incomplete combustion of the air-fuel charge, with a larger amount of unburned

hydrocarbons released into the exhaust. The exhaust is, however, relatively low in emissions. Wankel engines are considerably simpler, lighter, and contain far fewer moving parts than piston engines of equivalent power output.

The most important fact is that Wankel engines operating within their original design parameters are almost immune to catastrophic failure [3]. A Wankel engine may lose compression when cooling or oil pressure may lose a large amount of power, both leading to cease functions of the engine in a short period of time. But, in any case, it will continue to produce some power during that dying-time. The less effective sealing of the Wankel is the only factor reducing its efficiency, confining its success mainly to its application in the engines for racing and sports vehicles where neither efficiency nor long engine life are major considerations.

As a conclusion it is important to mention that the Wankel engine has many advantages over the conventional reciprocating piston engine. Fewer moving parts are necessary because it produces a rotary movement without using a connecting rod and a crankshaft. Because of this rotary movement it has no vibration. In addition it has no valves, it is smaller and lighter than conventional engine of the same power and it runs economically on diesel and several other fuels.

### **Bibliography:**

1. *Karl Benz*. The life of a German inventors: Longman, Oxford, 1984, p.192.
2. *Peter Donovan*. Basic English for Science: Oxford University press, Oxford, 1995, p.147.
3. [www.wikipedia.org](http://www.wikipedia.org) 21.02.2010.