

# WANKEL ENGINE



Wankel Engine in Deutsches Museum Munich, Germany

The Wankel rotary engine is a type of internal combustion engine, invented by German engineer Felix Wankel, which uses a rotor instead of reciprocating pistons. This design promises smooth high-rpm power from a compact, lightweight engine;

## **Criticism**

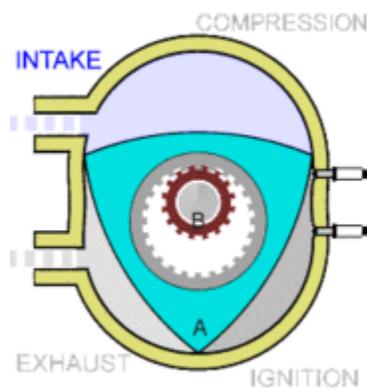
Wankel engines however are criticized for poor fuel efficiency and exhaust emissions.

## Naming

Since its introduction in the NSU Motorenwerke AG (NSU) and Mazda cars of the 1960s, the engine has been commonly referred to as the rotary engine, a name which has also been applied to several completely different engine designs.

Although many manufacturers licensed the design, and Mercedes-Benz used it for their C-111 concept car, only Mazda has produced Wankel engines in large numbers. As of 2005, the engine is only available in the Mazda RX-8.

## How it works



The Wankel cycle. The "A" marks one of the three apices of the rotor. The "B" marks the eccentric shaft, turning three times for every revolution of the rotor.

In the Wankel engine, the four strokes of a typical Otto cycle engine are arranged sequentially around an oval, unlike the reciprocating motion of a piston engine.

In the basic single rotor Wankel engine, a single oval (technically an epitrochoid) housing surrounds a three-sided rotor (a Reuleaux triangle) which turns and moves within the housing. The sides of the rotor seal against the sides of the housing, and the corners of the rotor seal against the inner periphery of the housing, dividing it into three combustion chambers.

As the rotor turns, its motion and the shape of the housing cause each side of the rotor to get closer and farther from the wall of the housing, compressing and expanding combustion chamber similarly to the "strokes" in a reciprocating engine. However, whereas a normal Four-stroke\_cycle engine produces one combustion stroke per cylinder for every two revolutions (that is, one half power stroke per revolution per cylinder) each combustion chamber of each rotor in the Wankel generates one combustion 'stroke' per revolution (that is, three power strokes per rotor revolution). Since the Wankel output shaft is geared to spin at three times the rotor speed, this becomes one combustion 'stroke' per output shaft revolution per rotor, twice as many as the four-stroke piston engine, and similar to the output of a two stroke cycle engine. Thus, power output of a Wankel engine is generally higher than that of a four-stroke piston engine of similar engine displacement in a similar state of tune, and higher than that of a four-stroke piston engine of similar physical dimensions and weight.

## **Taxation**

National agencies which tax automobiles according to displacement and regulatory bodies in automobile racing variously consider the Wankel engine to be equivalent to a four-stroke engine of 1.5 to 2 times the displacement; some racing regulatory agencies view it as offering so pronounced an advantage that they ban it altogether.

Source: [http://engineering.wikia.com/wiki/Wankel\\_engine](http://engineering.wikia.com/wiki/Wankel_engine)