



**PIERBURG  
PUMP TECHNOLOGY**



## **MECHANICAL COOLANT PUMPS**

Long Service Life, Low Noise Level,  
High Efficiency

## Mechanical coolant pumps

High demands are placed on the cooling system of a combustion engine:

- It must work reliably, even under extreme heat and cold, so that the engine is always operating within the best possible temperature range.
- Furthermore, the vehicle heating and air conditioning systems must provide the highest degree of comfort possible.

The requirements to be derived from this are a long service life, low noise level, and high efficiency.

Using state-of-the-art development methods and tools, Pierburg Pump Technology has taken on the responsibility of developing these important engine components for its customers. The vast development competence of the engineers and technicians has set new standards, especially in the area of reliability for the bearings and seals. An example of this is a mechanical coolant pump with external bearings that has recently gone into production. Despite its more compact design, the reliability has been improved even more.

Mechanical coolant pumps produced by Pierburg Pump Technology for combustion engines are distinguished by their top quality, working properties, and extremely long service life.



Fig. 1: Renault water pump for 1.9l Gasoline engine



Fig. 2: Low-cost steel impeller

Fig. 3: Two-dimensional plastic impeller

About six million coolant pumps for automobiles and commercial vehicles are produced annually in the manufacturing centers in Germany, France, Italy, Brazil, India, China and the USA.

Pierburg Pump Technology uses different types of closed and open impellers. State-of-the-art calculation methods and flow simulation tools are used to optimize the manufacturing process for these impellers with respect to hydraulic requirements, pump efficiency, and geometry. Tailored solutions with diverse materials such as aluminum, stainless steel and plastic are evaluated in design drafts and calculations and the best solution according to engineering and cost-efficiency criteria is developed for series production. In computer-monitored test laboratories, the most extreme conditions in the daily operation of a coolant pump are reproduced to ensure full reliability of function.

Since Pierburg Pump Technology is one of the leading oil pump suppliers on the market, we can also offer our customers complete solutions at the lowest cost. An example of this is an oil-coolant pump module. It is a module for the engine, which integrates the oil and coolant pump with all its necessary connections and seals. It can be installed on the engine very easily and thus also cost-effectively.

## Switchable coolant pumps

Pierburg Pump Technology also proposes switchable water pump in order to meet extreme power efficiency and emis-

sion reduction for the complete engine. Basic design uses a dry clutch (see pictures) actuated by an electro-magnet. Two product families exist:

- A “two-speed” clutch: this design is ideally suited for applications which do not request a “zero flow” function but a reduced flow in fact (e.g. 20% of the nominal flow rate). Such a pump has got two states: either full flow (or nominal flow) with a driving ratio of 1:1 between impeller and pulley, or the reduced flow (here the impeller rotates with a lower speed in comparison to full flow).

- A “on/off” clutch. It enables a pure switch-off the pump impeller during engine warming-up phase for example.

Switchable water pumps have achieved a good maturity level at Pierburg Pump Technology with regards to durability, electric power consumption and noise. The production of these switchable water pumps started end 2009 at Pierburg Pump Technology.

Based on Pierburg Pumps Technology’s innovation, other clutch design or throttle system are in development phase too.



Fig. 4: Mechanical coolant pump with outer bearing

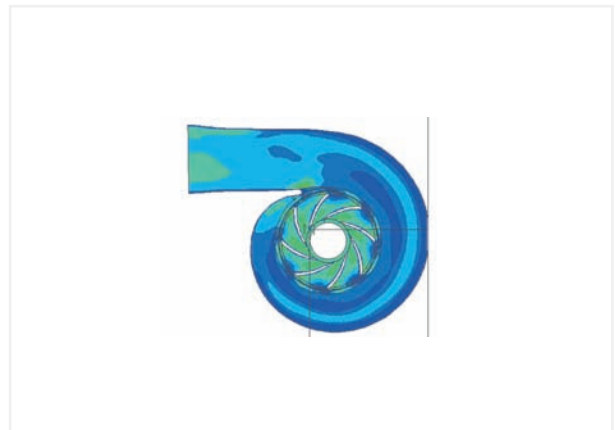


Fig. 5: Hydraulic flow optimization using CFD



Fig. 6: Closed plastic impeller



Fig. 7: Switchable water pump