



**NRF TECHNICAL ARTICLE**

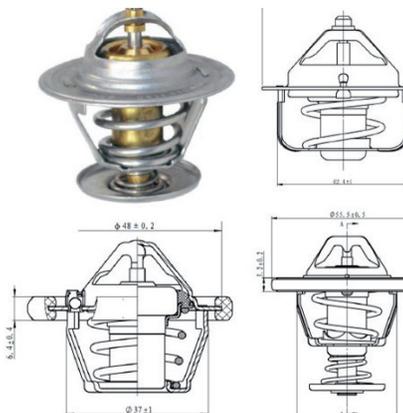
# EVERYTHING YOU SHOULD KNOW ABOUT THERMOSTATS



\*by Dave Talbot technical specialist

**THERMOSTATS VERSIONS**

- > Conventional ('Insert') Thermostat  
Housing material corrosion resistant - Stainless steel/brass.

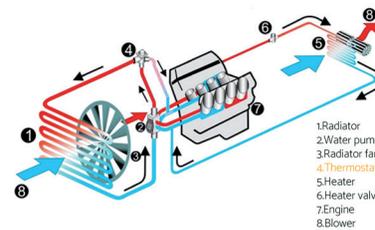
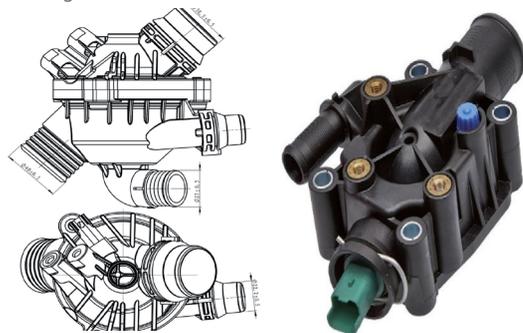


- > It increases fuel efficiency and reduces harmful emissions
- > It improves cold climate usability

**HOW THERMOSTAT WORKS**

When the engine is cold started, the temperature of the coolant is equal to the ambient temperature, which is far from the normal operating temperature of the engine. To accelerate the engine warm-up, the thermostat blocks the flow of coolant to the radiator and letting coolant through the so-called small circle - through the engine cooling water jacket (thermostat is closed). When the temperature of the coolant rises, the thermostat valve opens slightly, turning on a large circle of the cooling system with the main radiator. While the valve is in an intermediate position, only part of the coolant is flow to the radiator, which is then mixed into the hot stream from the small circle - this is how the thermostat maintains the optimum operating temperature of the engine. When the thermostat opens completely, all coolant flow begins to circulate through the radiator.

- > Housing Thermostat  
Housing material corrosion resistant - either plastic or aluminium. Also MAP controlled versions available (including heating element).



**THERMOSTAT FUNCTIONS**

- > Regulates & controls the engine operating temperature
- > It accelerates the engine warm up
- > It prevents engine overheating

The conventional thermostat has an expansion element (wax component) that opens the valve at approx. 88 +5°C. At ± 100°C latest it should be fully opened! The wax starts melting above 80° and thereby the volume increases and pushes out the piston. Thereby the valve opens towards the radiator and the short circuit is closing.



**MAP CONTROLLED THERMOSTATS**

The function and mechanical structure of the MAP thermostat is basically the same as that of the conventional thermostat. The MAP thermostat has an integrated heating resistor/coil in the expansion element (wax component) and forms a unit with the thermostat housing. To prevent engine overheating, for example, when driving up a hill, the ECU activates the MAP thermostat, before the cooling system temperature gets critical. By heating the wax, the thermostat will open far before the coolant temperature increases.



**NRF THERMOSTATS**

- > Designed and manufactured according to OE specifications
- > Extensively performance tested
- > All validated to guarantee a perfect fit
- > EASY FIT = supplied with gasket



**MOST COMMON CAUSES OF THERMOSTAT ERRORS**

- > The main reason for failure is a stuck valve, caused by rust/corrosion and/or contamination: either stuck and it's always open (Doesn't reach temperature) or it's stuck and doesn't open (Overheating)
- > MAP heating device: Contact corrosion (high resistance) or defective heating coil (No resistance) causes short circuit and hence blown fuse
- > Leakage around the thermostat housing
- > Broken baseplate/frame

