

Technical Service Bulletin

Date: 8/29/2003

Product Description: Flowzair Air Filters

Subject: Mass Airflow Sensors

DESCRIPTION:

The mass airflow sensor (MAF) is a common engine component on nearly all electronically fuel injected engines. A MAF is an electronic unit that measures the volume of air being drawn into the engine and allows the engine computer to calculate how long the fuel injectors need to be open to maintain the correct fuel to air ratio under all operating conditions. MAF sensors have no moving parts. Instead, they use a heated sensing element to measure air flow.

There are two types of MAF sensors: hot-wire and hot-film. In a hot-wire MAF, a platinum wire is heated approximately 212 degrees F above the incoming air temperature. In a hot-film MAF, a foil grid is heated about 170 degrees F above ambient air temperature. As air flows past the sensor element it cools the wire increasing the current needed to keep the element at its operating temperature.

The wire element is very sensitive to any form of contamination such as oil vapor from PVC systems, dirt, silicon, moisture, etc. To eliminate any possible deposits on the wire it undergoes a burn off cycle every time the engine is switched off. Approximately 4 to 5 seconds after the engine is stopped, the wire is heated to 1,000 degrees C for about 1 second through the use of a relay switch. Because of the high temperature and the presence of oxygen in the air, a reaction occurs called wire erosion. Eventually, due to the erosion, the MAF's output will inevitably reach a point where the output voltage is skewed and not allow the engine to run correctly. As with the filament within a light bulb, the sensor wires within a MAF will eventually fail and require its replacement.

In some instances contamination becomes

substantial enough to produce skewed information causing the sensor to over-estimate air flow at idle, and under-estimate air flow at higher air flow volumes. The symptoms of a improperly functioning MAF are hard starting, engine stall, pinging, lack of power, jerking, hesitation/surge on acceleration, and high emissions.

Besides contamination, there are other causes for the MAF to fail. These include the burn off relay not functioning, shorting of the MAF harness, overheating of the hot wire assembly due to grounding, engine backfire, cracking of MAF housing, dead spot in the throttle position sensor, vibration or shock, sensor wire fatigue and physical damage due to poor handling or physically trying to clean the wire element.

Due to the high number of possible reasons for a MAF failure, the exact cause is often improperly diagnosed. This is even more likely as diagnostic tools available can only indicate that a MAF is not functioning and provides virtually no information as to why it failed. All too often, the air filter currently in use is blamed for the MAF failure, whether it be a conventional pleated paper or an oil wetted foam such as the AMSOIL Flowzair. However, the likelihood of it resulting from the air filter is minimal at best.

AMSOIL Flowzair air filters will not cause MAF failures for the following reasons:

- **Filter oil is tackified preventing oil migration.**
- **MAF sensors are designed to function in the presence of contaminates.**
- **Filters are centrifuged to insure the proper amount of oil is in the filter upon installation.**

A rare exception could be if during field servicing the AMSOIL Flowzair air filter was *grossly* over-oiled or re-oiled using the wrong (non-tackified) oil.

In conclusion, AMSOIL Flowzair air filters can be used with confidence in applications utilizing MAF sensors.



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Approval Date: 9/08/03

Distribution: Internal All

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