Tech Tip

FILTERS 165

FILTER INSPECTIONS

Thorough Inspections Prevent Costly Repairs

AIR FILTER INSPECTION

When examining an air filter, there is more to consider than the presence of a dirty filter. The shop owner had just bragged about how thorough his lube service technicians were in performing vehicle inspections and making service recommendations. Imagine the embarrassment and potential liability when it was brought to his attention that two of the last three vehicles that passed through his shop's inspection process were missing at least one filter housing hold-down clamp, which seals the filter in the housing. Neither repair order made reference to the missing clamps, but reflected that new air filters had been installed.

Considering the increased service life of the vehicles on the road today, it is not uncommon to identify missing clamps or damaged filter housings. Distorted or damaged housings due to extreme heat conditions are another concern. This condition is common with a taxi or similar vehicle, which may encounter extended periods of idling, especially in high ambient temperatures. Excessive heat can create some major problems, including costly engine or component damage. Performing a thorough inspection of the system is imperative in maintaining the integrity of the system and assuring that the system is sealed and functions in the proper manner.

Assuming Liability…When performing an inspection and it becomes obvious that the filter cannot be properly sealed due to a damaged housing or missing clamps, it would be wise to refrain from replacing the filter. Make the condition known to the customer and let them make the call on whether the filter is replaced or not. A damaged filter housing is much like playing Russian roulette. You have no way of knowing:

1) How long the damage has been incurred.
2) How much debris has been ingested into the engine/turbocharger.

If housing damage is present, or any evidence of an improperly sealed filter, look for dust trails or an accumulation of dust on the clean air side of the filter housing. The presence of this condition indicates filter bypass or dusting. Dusting is a condition whereby debris is pulled through the filter media. Both conditions almost guarantee some level of engine damage. Make certain that you document any damage or missing components on the repair order and have the customer sign it, especially if they insist on the installation of a new filter. Retaining a copy of the repair order and a picture of the damaged component is just good business. Hopefully, you will never need it.

Contaminated Mass Airflow Sensor…The mass airflow sensor (MAF) provides a measurement of airflow/volume and density of the incoming air into the engine. This measurement allows the powertrain control module (PCM) to calculate the proper fuel mixture for a given engine demand. The MAF sensor reading affects the injector pulse width and engine timing requirements. A defective or contaminated MAF sensor can affect the performance of the engine, resulting in a myriad of performance related symptoms including surging, stalling, hesitation, lean/rich conditions, transmission related symptoms, etc.

A defective or contaminated MAF sensor may or may not illuminate the check engine light, which can make a performance diagnosis more challenging. Normally, an electrical failure is required to illuminate the check engine light. Contamination is the leading cause of MAF sensor failure. Replacement of the sensor may not be necessary, as the sensor can often be cleaned and returned to service. A MAF sensor cleaner or electrical contact cleaner is recommended. Spray the chemical directly onto the heating element and allow it to air dry before re-establishing electrical current. Do not touch or rub the sensing element in an effort to clean the sensor.

The major cause of a MAF sensor failure is air leaks in the air inlet plumbing, allowing contaminates to bypass the air filter and deposit debris on the MAF sensor. Also, leakage allows false or unmetered air to enter the system, which affects the fuel calibration, prompting numerous driveability symptoms, many of which can be difficult to diagnose. Foreign material such as dust, debris, oil, bugs, etc. is the most common cause of MAF sensor failure. Some vehicle manufacturers claim that excessively lubed aftermarket performance air filters will damage the MAF sensor due to oil deposits forming on the sensing element. Dealerships have been known to refuse warranty on vehicles fitted with those filters. Back-pressure in the engine can promote the same MAF sensor oil contamination concerns.

Check all ducts/hoses for splits, the integrity of the filter housing for proper sealing, and make certain all clamps are secured. Dust and debris can be pulled through a heavily contaminated air filter. Keeping the system sealed and a clean air filter in the filter housing may prevent a costly MAF sensor failure.

CONTROLLING CABIN AIR

Seasonal changes often promote an increase in the number of customer complaints concerning a deficiency in the amount of heat or air conditioning the system can provide for the comfort of the occupants. These complaints require several checks the technician must make in the troubleshooting process.

For Poor AC Cooling Complaints… the first step almost always involves attaching a set of AC pressure gauges and adding freon, with little or no consideration to other conditions that can promote the described symptoms.

For Heating Complaints… for poor heater output the service recommendation most often involves a system flush, new thermostat, radiator cap, new coolant and possibly a new heater control valve. These are good considerations and important services and components that could promote poor heater output.

There are two additional areas of concern that can promote heat and air conditioning related complaints, but they are seldom considered until the vehicle is taken to a specialty facility. Read on for a thorough description:

Blend Door Operation… When the customer complains of poor heat or air conditioning, the troubleshooting procedure should involve the proper operation of the blend doors. They are out-of-sight and out-of-mind and are seldom considered when troubleshooting heat and air conditioning related complaints. The blend doors are positioned in the heat/air conditioning plenum and depending upon the temperature selection, they either direct the air flow across the heater core, evaporator, or a blend of both to maintain the desired cabin temperature. Examples of vehicle manufacturers that have encountered challenges with the blend doors are as follows:

a) Ford has encountered its fair share of blend door related problems starting in 1995 through 2010 production vehicles. Many of the failures involve broken blend door actuators. For many of the applications, new service plenums are required to correct the condition. This can be a labor intensive repair requiring removal of the dash on some applications.

b) 2009–2010 Dodge Ram Trucks (1500, 2500 and 3500 series) may encounter broken heating and AC mode actuator gears, resulting in the inability to control temperature settings. New mode door actuators may be required. All vehicles will require a control head software update. Dash removal may be necessary on some applications.

c) 2007 Chevrolet Monte Carlo and 2007–2008 Impala vehicles will require a reprogram of the Heating Ventilation and Air Conditioning (HVAC) control module to correct blend doors that have lost their position.

d) 2008 Buick Enclave, 2007 Escalade, 2007–2008 Avalanche, Silverado, Suburban, Tahoe, 2007–2008 GMC Acadia, Sierra, Yukon, 2008 Hummer H2 models and 2007–2008 Saturn Outlook vehicles may require an HVAC control module reprogram and the relocation of the ambient air temperature sensor to correctly position the temperature blend doors.

Cabin Air Filter… When you question a customer about the frequency in which they replace their cabin air filter, most respond with: "What is a cabin air filter?" They are not aware that their vehicle has such a filter, and they don't have a clue as to the purpose of the filter, much less know enough to request that it be changed.

Often we remove cabin air filters that are totally encrusted with debris, including bugs and other decaying critters. These conditions can promote some unpleasant odors, in addition to creating air flow problems within the vehicle's heating and air conditioning system. In addition to foul odors, one of the first symptoms of a contaminated cabin air filter is reduced airflow from the ventilation system, especially when the controls are positioned for outside air. On some applications, the cabin air filter is positioned between the blower motor and evaporator. In this case the airflow would be restricted in both outside air and the max position, which recycles inside air.

Keeping the cabin air filter changed is imperative in preventing the evaporator and heater core from becoming clogged with debris that can restrict the heating and cooling capacity. The filter also prevents the promotion of fungal growth and unpleasant odors in the passenger compartment. Further, the cabin air filter protects the occupants from dust, bacteria, mold spores, pollens and other pollutants. Carbon impregnated filters remove harmful gases and odors. The removal of these particulates, many of which are microscopic in size, is a must for occupants with respiratory conditions.

We recommend keeping a contaminated filter available to show the customer when explaining the purpose of the filter.

When performing a filter inspection, perform a thorough evaluation of the filter and related housings. A good inspection can save the customer some costly repairs and eliminate potential shop liability. Make the cabin air filter a part of your routine inspection process…the ventilation system and your customer will appreciate the clean air.

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