



## **TROUBLESHOOTING OIL AND COOLANT LEAKAGE**

### ***A Challenge for the Lube Shop Technician***

**N**othing can be more frustrating for the vehicle owner than an oil or coolant leak, especially when it stains their driveway or carport floor. And then there is the stench of oil or coolant on a hot engine or exhaust system that can really be annoying.

If you have performed a lube service you may get the blame for the symptoms, even if the leakage condition may have been present prior to your service. Before performing the lube service, make certain you document any evidence of leakage on the repair order and discuss this with the vehicle owner. Leakage repairs can be labor-intensive and expensive, especially if you must provide the service for free just to keep a good customer happy and returning for additional service. Following are some examples of leakage complaints that have become common failures with 3.5L EcoBoost applications.

#### ***ECOBOOST OIL LEAKAGE***

A common complaint with the 3.5L EcoBoost engine is the stench of burnt oil and smoke coming from the passenger side fender well. The HVAC system transfers the foul odors to the passenger compartment, and the result is a customer complaint of burnt oil odors.

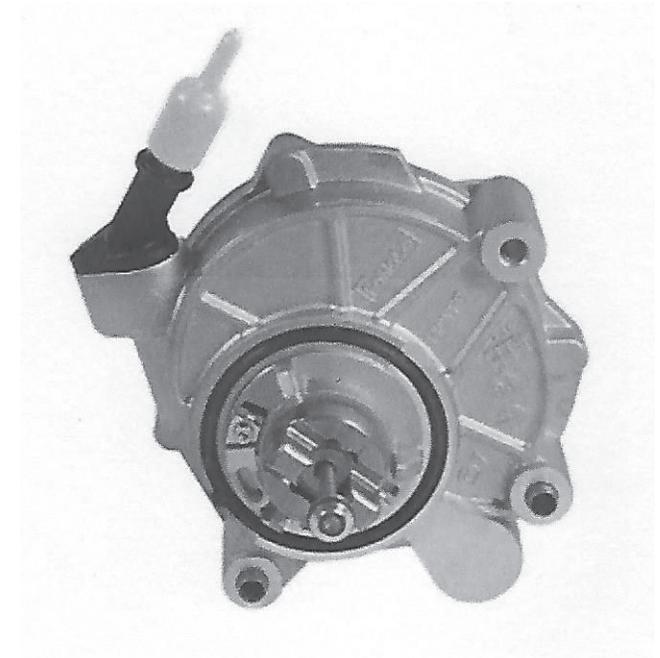
To pinpoint the source of the odors, the first step in the diagnostic process should involve a thorough clean-up to identify the source of the leakage. Most likely, you will determine the source of the leakage in one of the two following areas:

#### ***Vacuum Pump***

The vacuum pump on the 3.5L EcoBoost is mounted on the back of the Bank 1 cylinder head (passenger side) and supplies vacuum to the power brake booster. While this pump arrangement may fit other applications, most

of the complaints involve 2013–2016 Ford F150 trucks. This may be due to the length of time the vehicles have been in service and the popularity of the vehicles. Extreme heat from the engine, turbocharger, exhaust manifold and catalytic converter takes its toll on the O-ring, which seals the vacuum pump to the cylinder head. While the O-ring is a replacement item from Ford, we recommend a vacuum pump replacement, especially if the engine is high mileage.

Three bolts attach the vacuum pump to the back of the cylinder head. There is minimal clearance between the pump and the firewall. The inboard upper bolt will have to remain with the pump when it is loosened from its mounting, due to the clearance issue. The pump can be removed from top side, however Ford's recommended procedure calls for removing the inner fender splash shield to gain access to the vacuum pump.



Prior to installing the new vacuum pump, it is imperative that the sealing surface be cleaned with a suitable cleaner instead of a wire brush or abrasive disc, which can damage the surface. Follow Ford's torque spec for tightening and the application of RTV sealant at two locations where the pump seals against the cylinder head. These locations can be evidenced by viewing the old pump. Failure to apply the sealant will result in leakage.

### **Valve Cover Leakage**

The valve covers are constructed of plastic and may fail due to extreme engine heat over a prolonged period.

Cracked or warped valve covers have been an issue with the EcoBoost. When these conditions occur, the symptoms include:

- 1) Oil leakage
- 2) Oil in the spark plug tubes
- 3) The stench of burning oil due to contact with a hot engine, exhaust components or turbocharger

The valve covers are approximately \$121 each and the labor rate is six hours to replace both covers. Make an accurate diagnosis prior to replacing components. Many of these leakage complaints have been misdiagnosed as a leaking rear main seal.

### **ECOBOOST COOLANT LEAKS**

Antifreeze has a distinct odor especially when the coolant contacts a hot engine, exhaust system components or a turbocharger. Most technicians can walk past a vehicle in a parking lot and identify an antifreeze leak without raising the hood.

With the Ford 3.5L EcoBoost, chances are great you will encounter customer complaints of coolant leaks. With the twin turbocharger arrangement, coolant leakage is almost certain, especially as the vehicle mileage and age accumulate. Each turbocharger is fitted with a coolant tube and return tube, sealed to the engine and turbocharger via O-rings. Vehicle year models 2013–2016 utilize spring lock connectors to attach the

coolant tubes. This connection arrangement has been plagued with leakage complaints. In addition to O-ring leakage, the tubes have a history of deteriorating, promoting leakage. The 2017 trucks secure the coolant and return tubes with a bracket and bolt instead of the spring lock connector. This attachment has resulted in fewer leakage complaints.

The repair is labor-intensive, so be certain to check the repair procedure and labor hours for a given application prior to quoting the job to a customer. Consider the following:

#### **2013–2014 F150 3.5L**

##### Coolant Feed

Left Side 2.0 Hours

Right Side 1.7 Hours

##### Coolant Return

Left Side 4.4 Hours

Right Side 6.7 Hours

#### **2015–2016 F150 3.5L**

##### Coolant Feed

Left Side 3.5 Hours

Right Side 4.4 Hours

##### Coolant Return

Left Side 1.5 Hours

Right Side 1.5 Hours

Some technicians recommend removing the body from the chassis to make the repairs. We have never attempted that procedure; therefore, we cannot offer an opinion. That sure sounds like a lot of work. I have had technicians swear that they would never do another and instead send the next one to the dealer.

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