



# Tech Tip

AIR FILTERS 174

## AIR FILTER RESTRICTIONS Due to Snow and Water Related Conditions

In previous articles we have cautioned on the importance of air filter maintenance on diesel applications to prevent catastrophic engine and turbocharger failures. This information is included in Tech Tips #110 Ford's Power Stroke, #124 Servicing Dodge's Turbo Diesel, and #139 Filtering GM's Duramax Diesel. Those articles illustrated how heavily contaminated air filters could be distorted or pulled from their mounted position into the air box and in some cases consumed by the turbocharger, resulting in costly repairs. Many of the failures involve filters that have encountered seal damage or dislocation, allowing contaminants to bypass the filter and be pulled into the engine, causing accelerated engine component wear. Filter service intervals vary greatly in relation to the environment in which the vehicle is being operated. In extreme conditions it is not uncommon to encounter a restricted air filter in 3K miles or less. This usually involves vehicles operated in dusty conditions such as construction sites, road building, farming, etc. Further, you must consider vehicles that encounter prolonged idling, which would not be reflected in terms of mileage. Unfortunately, passenger vehicles are not fitted with hour meters. Water and snow are seldom considered when diagnosing filter related restrictions, but they can be a major contributor due to air intake locations. Many vehicle manufacturers have been forced to modify or re-position the air intake ducts, due to water or snow related conditions.

### WATER RESTRICTION

Vehicles operated during heavy rains or flood conditions are subject to the same failures, as the water hydro-locks the filter media, restricting the airflow into the engine. The results are the same as a filter heavily contaminated with debris. The engine may encounter a stalling condition, the air box can collapse, or the filter can be sucked into the air box, resulting in unfiltered air entering the engine. Wet filters often disintegrate and are consumed by the turbocharger and engine, which can result in major expensive repairs.

### SNOW RESTRICTION

Have you considered the effects of snow when diagnosing engine performance symptoms? It can promote the same symptoms as a filter heavily contaminated with debris or water. The engine will encounter a loss of power, stalling, Malfunction Indicator Lamp (MIL) illumination, or an Engine Power Reduced message may be displayed.

Performance symptoms resulting from water or snow can be elusive, as the snow or ice may have melted, or the water may have evaporated by the time the technician performs the diagnostics. The loss of evidence makes for a difficult or uncertain diagnosis.

Following are some applications and factory fixes for snow/water related conditions that can affect the engine's air induction system, resulting in surging or stalling conditions:

#### 2008-2010 FORD F-SUPER DUTY 6.4L TURBO DIESEL

The mentioned applications may encounter a loss of power during acceleration accompanied by an illuminated "Check Air Filter" message in the instrument panel. The loss of power can occur due to the air filter becoming impacted with snow, restricting air flow to the engine.

- 1) If the vehicle is not equipped with a winter grille cover, one should be secured and installed.
- 2) Remove the air box cover.
- 3) Replace the air filter if it is wet or frozen.
- 4) Ford recommends installing a snow deflector gasket (9C3Z-9C664-A), which should be secured to the top of the filter and will rest on the edge of the air box. (The gasket should be used in conjunction with the winter grille cover).
- 5) Reinstall the air box cover.
- 6) Replace the air filter minder if it does not have engineering part number 8C3Z-9N622-AB on the part. The part number for the revised air filter minder is listed below.

**IMPORTANT:** The winter grille cover must be removed when temperatures are greater than 50 degrees F or 32 degrees F when towing, to prevent engine damage. The snow deflector gasket can remain installed year-round.

#### PART NUMBER

#### PART NAME

8C3Z-19A414-A

Winter Grille Cover

8C3Z-9N622-A

Air Filter Minder

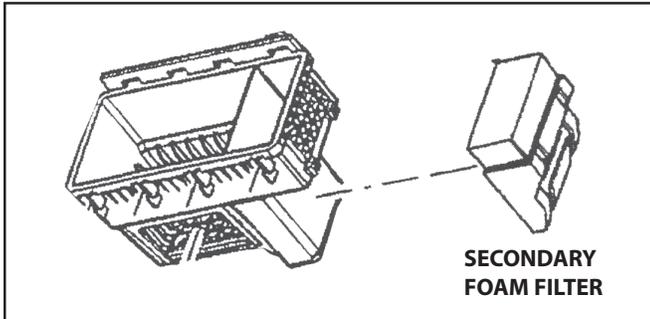
9C3Z-9C664-A

Snow Deflector Gasket

#### 2011-2014 FORD F-SUPER DUTY 6.7L TURBO DIESEL

The mentioned applications equipped with the 6.7L diesel engine may encounter a loss of power due to snow accumulating in the air cleaner, restricting the air flow.

This condition often occurs when the vehicle is operated in extreme snow conditions and especially with those applications that are equipped with a snow plow. When the condition is present, trouble codes P0299 (Turbocharger Underboost) and P1247 (Turbocharger Boost Pressure Low) may be stored in diagnostic memory. Ford recommends the installation of new design low restriction secondary foam filter (Part # BC3Z-9601-D) to alleviate the symptoms (see illustration).



### 2007–2010 CHEVROLET DURAMAX 6.6L TURBO DIESEL

Snow or ice accumulation on the air filter may result in an illuminated Malfunction Indicator Lamp (MIL), accompanied by a Power Reduced Message displayed on the instrument cluster. Further, diagnostic trouble code PO101 (Mass Air Flow Sensor) may be stored as a current and/or history code. The mentioned symptoms occur due to the accumulation of ice and snow on the air filter media, restricting the air flow to the engine.

Inspect the air filter for evidence of snow, ice, or any moisture condition that would indicate a previous exposure. If any of those conditions are present, the air filter should be replaced.

**IMPORTANT:** Trucks equipped with the Duramax Diesel Engine come equipped with winter covers, if they are shipped to the following locations...All of Canada, Alaska, Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, North Dakota, South Dakota, Vermont, Wisconsin, Wyoming. If the customer does not have a cover, one can be ordered from GM ...P/N 25822811 for GMC or P/N 25822812 for Chevrolet. The cover must be installed in the grille opening section before encountering snow. The cover allows warm air to be circulated into the air cleaner. Refer to the owner's manual for appropriate cover and installation procedure.

**Restoring Engine Power...** If the vehicle encounters an air flow restriction due to snow, water or ice and the engine is down on power with a Power Reduced Message displayed and PO101 trouble code stored, the engine performance can be restored by performing the following procedure recommended by GM.

- 1) Remove any ice or snow from the air intake duct and replace the air filter.

- 2) Install the winter cover.
- 3) Turn OFF ignition, and all electrical accessories and components.
- 4) Remove the key from the vehicle, then OPEN and CLOSE the door.
- 5) Wait for 2 minutes to allow the engine control module (ECM) to power down. This can be determined by observing the instrument gauge needles, as they will drop slightly.

**Allowing the ECM to power down will let the PO101 code revert to a history code, allowing the engine to return to full power.**

### MITSUBISHI WITH REDUCED POWER SYMPTOMS

Owners of Mitsubishi vehicles may complain about engine performance symptoms or reduced power accompanied by an illuminated Service Engine Soon lamp. Based on year model, the following codes may be stored in diagnostic memory...P1235, P1241, PO61A and PO068. The symptoms may be the result of snow being drawn into the air intake, restricting the air flow. Further, once the engine is shut-down the high underhood temperatures can melt the snow/ice, resulting in an accumulation of water at the bottom of the air cleaner housing. When the engine is re-started, the water can be drawn through the lower section of the air cleaner, contaminating the airflow sensor. This affects the sensor readings and the ECM places the system in the fail safe mode, resulting in poor engine performance/loss of power.

#### Affected Vehicles Include:

- 2007–2013 Outlander w/3.0L engine
- 2008–2013 Outlander w/2.4L engine
- 2011–2012 Outlander Sport/RVR
- 2008–2012 Lancer w/2.0L non-turbo engine
- 2009–2014 Lancer w/2.4L engine (5 M/T, CVT)
- 2011–2012 Lancer Sportback w/2.0L non-turbo engine
- 2009–2014 Lancer Sportback w/2.4L engine (5 M/T, CVT)

Mitsubishi Technical Service Bulletin 13-13-008 will illustrate the necessary modification to the air cleaner cover to allow the water (from melted snow) to drain from the air filter housing.

**Summary:** Water or snow contamination should be a part of your diagnostics when diagnosing power loss related symptoms and trouble codes, especially when there is a lack of evidence. Remember, once the water evaporates or the snow melts, the symptoms usually subside. In those cases the air filter should be replaced, as permanent damage to the filter is likely and that can spell major turbocharger or engine failure.

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