POWERSTROKE HIGH FAILURE OF INJECTORS AND STICTION

The Causes and The Solution

By Harry Johnson

Master certified diagnostic technician for Mercedes Benz U.S.A. – ASE certified technician ASE L1 certified advanced engine performance specialist.

Injector stiction is most noticeable in the winter, however the problem, although less, is still present wearing out the injectors.

Depending on how bad the issue is per truck, they all have different levels of stiction issues when stiction is present. (Spool valve bore wear or contaminates)

The problem lies in the ability for the oil to flow through the spool valve and if one is running a heaver oil like 15w40, then the stiction can occur in nearly any temp when the engine is cold, but may not occur if one is running a 5w40 or 5w30 oil until ambient outside temps get into the 50s or lower.

Some of the additional benefits of **AR9100 Friction Modifier** are a smooth running and idling Powerstroke, and it's so quiet at cruise speeds that you think you're driving a gas engine instead of a diesel. It's a very noticeable difference with AR9100, regained power and torque is also restored.

Another thing is every 6.0L Powerstroke will shear any 40W rated oil into 30W oil within a short period of time. I

believe all this happens within the fuel injector itself. The 6.0 hi-pressure oil system will not allow a 40W rated oil to exist unless it was a straight 40W which does not contain viscosity index polymers, but that has not yet been tried yet to my knowledge and could cause excessive cold start engine wear.

Example: 5W40 oil is basically 5W base oil and the viscosity index polymers uncoil and expand with engine heat and thicken it all the way up to a 40W grade, then coil back again when cold.
So, when the polymers get sheared, they lose the ability to thicken the oil as much, and loose the 40W protection. The 6.0 seems to only shear down to 30W then stays there pretty much through the drain cycle.

The Powerstroke 6.0 injectors do not allow a 40W grade oil to exist for very long, it's just too thick, this has been said to happen within the first 1000 miles of a fresh oil change.

So the **ARCHOIL AR9100 Friction Modifier** is composed of nanoborate and 4 organic esters all serving a different function to liquefy all fluid system deposits- carbon, varnish and sludge which creates a clean host surface for the nanoborate to form a chelate bond and reducing friction measured at COF of 0.037, practically frictionless and also is an extreme pressure (EP) agent which protect metal to metal contact under heavy loads. Using 9100 at every oil drain year round will maintain the fluid system free from all deposit buildup and lower viscosity oil can be used like 5W30.

AR9100 will eliminate stiction from occurring and protect the injectors from wear. A major notice is also a smother running engine, quieter with less vibration. The oil drain cycle can also be extended.

Ford Powerstroke High Failure of Injectors and Stiction Explained By Harry Johnson

The 6.0 liter Ford Powerstroke engine (actually a Navistar International VT365 engine) model was from 2003-2007. This is the Ford Powerstroke engine with the highest failure rate for injectors and stiction issues. The previous model Ford Powerstroke 7.3L engine(also a Navistar International engine), model years 1994-2003 were also prone to stiction issues as well, but not as badly as the 6.0L. In 2003, it was a year that they offered both Powerstroke engines in the same year model, the last of the 7.3L and the introduction of the 6.0L. By 2008 year model, they went away from the HEUI (Hydraulic Electronic Unit Injector) type fuel injectors and went to the most common widely used type nowadays, peizo ceramic electronic injectors, which only have fuel running through them and no motor oil like HEUI type injectors. Many of the International medium duty trucks ran HEUI type injectors in many different models for many years. Ford no longer has a relationship with Navistar International truck and engine, which started to go sour with the 6.0L powerstroke and progressed till it ended in 2010. The 2011 model Ford Powerstroke is now made in house by Ford.

The issue why the 6.0L is more prone to injector issues, is due to a few factors.

1. It runs the high pressure engine oil system almost twice as high as it was in the 7.3L Powerstrokes. "4000 psi" in the high pressure engine oil system is achieved instantly when accelerating hard in a 6.0L.(very hard on motor oil), causing shearing of the oil molecules themselves, and can reduce the base oil long and short chain polymers ineffective in a short period of time, thus reducing the oil to a thinner grade, broken down oil.

2. The 6.0L injector itself is also much more complex. It uses 2 internal electric coils to operate the opening and closing of the injector fuel flow via the spool valve (the one that is prone to stiction or sticking and not moving freely as commanded) where the 7.3L Powerstrokes used a return spring to close the injector, and only one coil to open it. The 6.0L injector is capable of much faster reaction times to changing conditions or commands from the engine electronics, than the 7.3 was.

3. This extreme high pressure engine oil system inside the 6.0L engine (which uses a separate high pressure oil pump, called the HPOP) is used to pressurize the fuel within the fuel injector for proper atomization and direct injection into the cylinders.

4. So, in a nutshell, the fuel injector "spool valve" is trying to move back and forth inside the injector while trying overcome anywhere from 700-4000 psi oil pressures being generated. It needs to be clean and slippery inside the very small orifice that the spool valve operates in. Any contamination can cause sticking, especially when the oil is cold and thicker and isn't flowing as well through the injector. Any wear can cause sticking, or side loading (where it gets stuck due to free play-wear of the spool valve).

5. My theory, if these injectors are capable of breaking the motor oil down on a molecular level, then it's working very very hard, which will generate heat and varnish build up, especially when the oil is being worked that hard in this small area inside the fuel injector.

6. My normal, fully warmed up engine idling, high pressure oil readings, used to be at 770psi with Rev-X, but are now reading 790psi with the AR9100 in my oil and I have run the same motor oil from day one (5w40 Shell Rotella synthetic). So the benefits of AR9100 are not only for the rest of the friction generating areas of the motor, but the all so important high pressure oil system of the 6.0L and for the older 7.3L Powerstroke engines, or any mechanical engines or systems for that matter.