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Technical Service Bulletin

Date: 8/20/2003

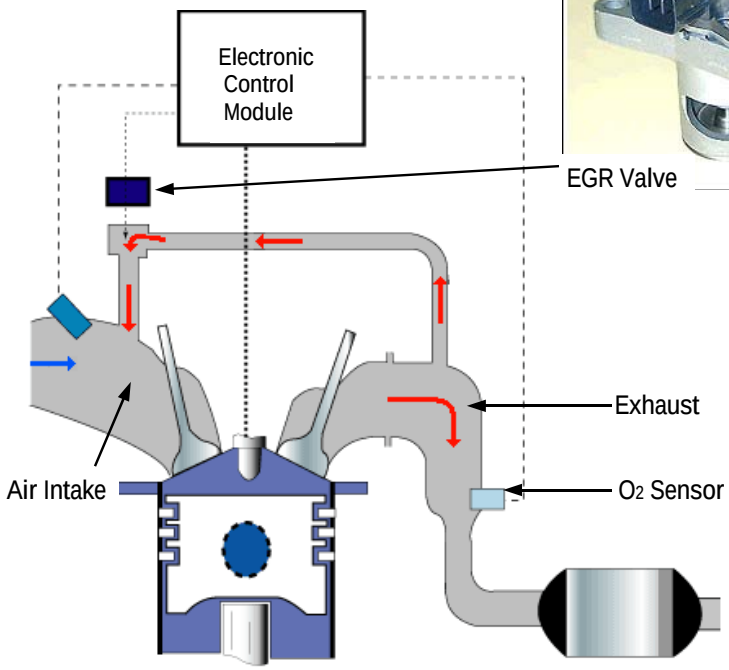
Product Description: All Motor Oils/Oil Analysis

Subject: EGR Valves

DESCRIPTION:

In today's internal combustion engines, Exhaust Gas Recirculation (EGR) valves are one of the key emission control components. Their task is to minimize the formation of oxides of nitrogen (NOx), which is a byproduct of the combustion process.

EGR valves function by recycling a small amount of spent exhaust gas back into the combustion chamber. This dilutes the air/fuel mixture and result in a lowering of the combustion chamber temperature to less than 2,500ºF. This is important as NOx production is greatest at temperatures above 2,500ºF.



Operated by either electronic (computer/servo) or mechanical (vacuum) means, EGR valves are designed to be closed at lower engine speeds. At such speeds, combustion temperatures are relatively low and NOx production is at a minimum. As speed and loads increase so does the combustion chamber temperature. The EGR valve will then open to minimize the temperature and resulting increase in NOx production.

If the EGR valve malfunctions engine performance is dramatically reduced. An EGR valve remaining in the open position will result in the engine to stumble or stalling at idle speeds. In the event the EGR fails to open, combustion temperatures can not be limited causing higher cylinder temperatures and an increase in NOx emissions. Engine pinging or knock may occur, especially when the engine is under load.

In either case, drivability problems arise and NOx control is lost. An additional drawback is that the loss of the NOx control results in a rapid degradation of the motor oil being used. Shortening the oil's life, NOx results in increased oil nitration and a depletion of its ability to neutralize acids (TBN) and maintain internal cleanliness. The results are oil thickening and/or the formation of sludge within the engine.

A malfunctioning EGR valve can be detected through engine diagnostics or sometimes through oil analysis. Checking vacuum lines, wire connections, engine computer diagnostics, emissions testing and checking for leaking gaskets are the primary means of diagnosing a problem with the EGR valve.

Oil analysis can also be helpful in determining if the EGR valve is malfunctioning. In normal situations the oxidation and nitration levels will be about the same. If the nitration level approaches double the oxidation level, a faulty EGR valve may be the cause. Note: A faulty MAF (mass air flow) sensor may also result in elevated levels of nitration.

In any event, to insure the best performance of the engine and the integrity and longevity of the motor oil, it is important to insure the EGR valve is working properly.

Submitted By: DA/DW **Approved By: DRA** **Approval Date: 9/15/2003**

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