



Technical Service Bulletin

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Product Description: All Motor Oils/Oil Analysis

Subject: EGR Valves

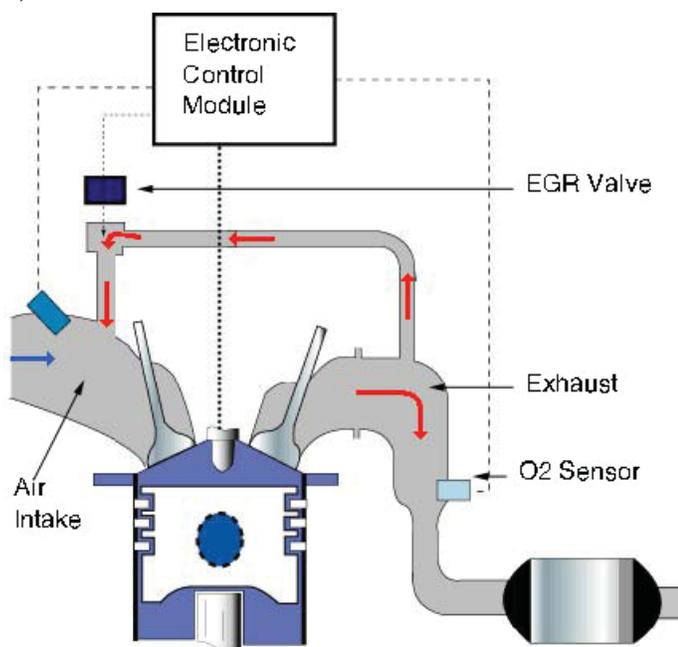
DESCRIPTION:

As one of the key emission control components in modern internal combustion engines, exhaust gas recirculation (EGR) valves minimize the formation of oxides of nitrogen (NOx), a byproduct of the combustion process. NOx production is greatest at temperatures above 2,500°F. EGR valves function by recycling a small amount of spent exhaust gas back into the combustion chamber, diluting the air/fuel mixture and lowering the combustion chamber temperature to below 2,500°F.¹

EGR valve malfunction leads to dramatically reduced engine performance. An EGR valve remaining in the open position will cause the engine to stumble or stall at idle speeds, while an EGR valve failing to open will lead to increased combustion temperatures that cause higher cylinder temperatures and increased NOx emissions. Engine ping or knock may occur, especially when the engine is under load.³



In either case, a malfunctioning EGR valve leads to drivability problems and loss of NOx control. Increased NOx results in rapid degradation of the engine's motor oil, including increased oil nitration, decreased ability to neutralize acids (TBN) and maintain internal cleanliness, oil thickening and/or sludge formation.



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 EGR valve problems. Oil analysis can be helpful in determining if an EGR valve is malfunctioning. While oxidation and nitration levels will normally be about equal, a nitration level that approaches double the oxidation level can indicate a faulty EGR valve. Note: A faulty mass air flow (MAF) sensor may also cause elevated nitration levels.³

To ensure optimum engine performance and the integrity and longevity of the motor oil, it is important to ensure the EGR valve is working properly.

REFERENCES:

1. What Causes High Nitrous Oxide (NOx)? Retrieved from <http://www.smogtips.com/failed-high-NOx-nitrous-oxide.cfm>.
2. Guzman, Henry. (1997, December 18). EGR Systems: Operation and Diagnosis. Retrieved from <http://www.asashop.org/autoinc/dec97/egr.htm>.
3. Guzman, Henry. (1997, November 5). Understanding Exhaust Gas Recirculation Systems. Retrieved from <http://www.asashop.org/autoinc/nov97/gas.htm>.

Operated by either electronic (computer/servo) or mechanical (vacuum) means, EGR valves are designed to be closed at lower engine speeds, when combustion temperatures and NOx production are relatively low. As speed and loads increase, the EGR valve opens to minimize the combustion chamber temperature and resulting increase in NOx production.²

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