



## Exhaust Gas Recirculation Valves

EGR Valves or exhaust gas recirculation valves have been around since the early 70's. Their purpose is to reduce emissions of oxides of nitrogen (NOx), a major source of air pollution. Smog is created when nitrogen oxide is emitted from the tailpipe of your vehicle and combines with moisture and dust in the presence of sunlight. A lot of sunlight is needed to create smog, which is why we have more smog in the summer than in winter.

It was discovered, that high combustion chamber temperatures of cleaner running engines caused oxygen and nitrogen to combine chemically and form oxides of nitrogen. Most of the anti-pollution devices in the early 70's did a pretty good job of reducing other by-products of combustion, hydrocarbons and carbon monoxide however, this tended to cause the formation of "Oxides of Nitrogen". The automotive engineers discovered that they needed to do something to lower the combustion temperature, which only occurred under certain high load driving conditions. They didn't have to look too far since, it was proven that if they added carbon dioxide, which is also found in exhaust gas, to the combustion chamber it would cool the combustion temperatures and reduce NOx gas emissions.

A simple way to achieve this was to meter a certain amount of exhaust gas, or carbon dioxide back into the intake manifold under strict control. This would cool the combustion chamber and prevent the formation of the NOx. The device that performs this function is the EGR valve or Exhaust Gas Recirculation Valve. There are many different types of EGR valves, some of which work strictly on vacuum, and others which work on a combination of vacuum and pressure. Some have electronic controls, and some have mechanical controls.

So what can go wrong with an EGR valve and what are the symptoms? In layman's terms, the valve can be open when it should be closed or it can be closed when it should be open. If it is open at idle for instance, it will act like a giant vacuum leak and the engine will not idle or will run really rough. If it doesn't open when it is supposed to open you may experience a symptom of "pinging" since the combustion chamber temperature will be higher than normal.

Operating them with vacuum or commanding them with a diagnostic scan tool can check most EGR valves. On vacuum operated EGR valves, the vacuum diaphragm can rupture and cause the valve to fail or, there may be a chunk of carbon logged under the seat causing it to stick open or, the vacuum hoses or sensors that operate them can fail. The electronic valves can have electrical failures, or they can just seize up and not function. Any of these malfunctions can cause an emission failure on your vehicle, so one can see the importance in the proper operation of this emission control device. Newer vehicles will turn on the "check engine" light if there is an EGR malfunction.

Southern Ontario has been called the "smog capital" of Canada. High levels of smog can aggravate a wide range of serious health problems, such as asthma, bronchitis, and other respiratory diseases. On-road vehicles are the largest single source of smog-causing emission. By keeping your vehicle emissions "clean", you are doing your part on cleaning up the environment.