

The ABCs Of PCVs

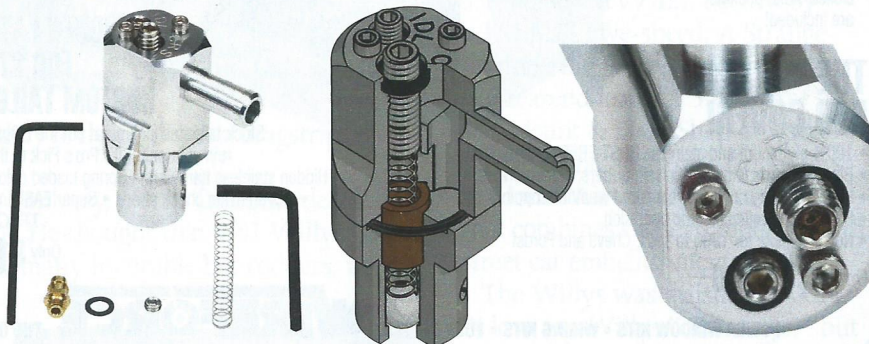
◆ **Every engine, regardless of its condition,** has a certain amount of blow-by or air/fuel mixture that slips past the pistons and rings and finds its way into the crankcase. In addition, during normal operation, a certain amount of water vapor collects in the crankcase, which leads to corrosion and the formation of sludge.

At one time a road draft tube, basically an open pipe that ran from the top of the engine to the bottom of the chassis, was used to draw blow-by gases and moisture from the pan. When the car was in motion the slipstream under the car created enough of a vacuum to pull out at least some of the nasty stuff—of course when the car wasn't moving the road draft tube didn't work. That often leads to smoke rolling out from under the car when stopped.

Because blow-by contains unburned fuel it was identified as an HC, or unburned hydrocarbon emission. As a result the PCV system was the first of the smog control devices becoming mandatory on all new '61-model cars first sold in California. Basically a PCV system draws vapor from the crankcase into the intake tract and introduces fresh air to replace it. (In an open PCV system that fresh air comes in through a breather, in a closed system it comes from a hose connected to the air cleaner assembly.)

The main purpose of the PCV valve is to control the vacuum level in the crankcase (too much and oil will be sucked out, too little and the system won't work properly). Another function of the PCV valve is to protect the engine in case of a backfire. The valve shuts off the reverse, high-pressure airflow preventing a flame from reaching the potentially explosive mixture in the pan.

In operation the amount of blow-by produced is dependent on engine speed and load and the typical PCV valve accommodates that with two modes of operation. At idle when vacuum is highest and there is little or no blow-by, the PCV valve restricts flow (in part to prevent sucking oil out of the pan). When the engine is under a load (cruise mode) and the vacuum level has dropped while the amount of blow-by



1. M/E Wagner's Dual Flow PCV Valve allows adjustment of all aspects of the PCV system's performance. This style plugs into a rocker cover grommet; an inline version is also available.

2. The patented technology allows adjustment of the PCV system's flow rate, as well as the vacuum level where the valve transitions from idle to cruise mode.

3. On top of the valve are two adjustments, one for idle airflow and the other for transition to the cruise mode.

is now greater the valve opens to allow increased flow. While this usually works well on stock engines with the correct PCV valve, in high-performance applications the flow rates may need recalibration. In addition for some engines the proper valve is no longer available (or the engine was never equipped with one). Since there is no available data on PCV valve flow selecting an appropriate part is a guessing game. In such cases the best option we've found is an adjustable PCV valve from M/E Wagner Performance.

According to Wagner Performance some of the issues that result from an improper PCV valve are:

Idle issues: carburetor idle mixture screws unresponsive; engine won't idle smoothly; idle is not stable; excessive crankcase pressure; oil around valve cover breathers after driving; dipstick pushing out of the dipstick tube;

rear main seal leaks; fuel smell in oil; oil consumed through the PCV system

Like conventional designs the M/E Dual Flow PCV valve can be in idle or cruise mode, depending on driving conditions; idle mode has a low flow rate, cruise mode has a high flow rate. What sets the M/E valve apart is the two rates are adjustable.

Vacuum at idle is measured with a gauge, then based on that figure and the engine's displacement a chart in the instructions will supply a recommended setting. A similar process is used to set the transition point to cruise mode. Detailed instructions on making custom calibrations as well as using the fixed orifice mode for engines with extremely low vacuum levels at idle. For more information contact M/E Wagner Performance at (570) 899-4544 or mewagner.com.