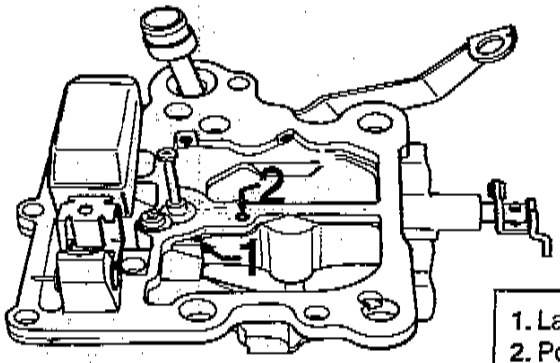
Specific Problems

Here is an example of a specific problem I have encountered on pre- 1988 Suzuki Samurai's which causes a CO failure in the AirCare driving test. Although this is a common problem with these vehicles many Asian import carburettors have similar design features which produce the same type of problems.



1. Labyrinth hole
2. Power cushion jet

Take a look at Fig # 1 (above) of the Suzuki power valve circuit from a 1987 Samurai. You will note that the vacuum supply from the intake manifold passes through a restriction orifice which Suzuki calls a "cushion jet". This feature is common to a number of Asian manufactured carburettors and is intended to slow power valve operation. The other design feature which Suzuki uses on this carburettor is a labyrinth hole which bleeds off some of the vacuum signal from above the power valve piston. The combination of these features allows the valve to open quickly but close slowly.

Now lets look at what happens as the power valve piston and bore wear. As the clearance between the piston and the bore increase so does the amount of vacuum which leaks around the piston. As we noted in the previous paragraph this vacuum is supplied through the "cushion jet" so the volume that can be supplied is limited by the size of the jet. To make matters worse we are already bleeding off some of the available volume through the labyrinth hole. As wear increases the power valve opens at higher manifold vacuum levels and loaded mode AirCare failures are the result. As the wear gets worse the problem will show up during high idle operation as well.

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There are several ways to correct this problem other than replacement with a "new" (not rebuilt) carburettor. I prefer to do all three at once so the repair lasts. Step one, drill out the cushion jet to $^{7}/_{64}$" to increase the flow volume. Step two, plug the labyrinth hole to remove this bleed point. Step three, replace the power valve piston, if it as available, to minimize piston to bore clearance and bleed off. With there modifications the power valve resumes normal operation even as the carburettor body continues to wear over time, since the powervalve spring rate becomes the only major control factor.

I hope this article has shed some light on the type of problems to look for when diagnosing power valve related CO problems on carburetted vehicles. I plan to include some parts tables listing power valves, springs etc. for the most commonly used carburettors in the next issue of The AirCare Repair.

Techline: 775-1903

Call our Techline for help with difficult repairs.
Ron Leavitt, Emissions Technical Advisor or Brad Coupland, Emissions Testing Specialist, will assist you with more complex repairs
– those not normally encountered.