

Why Do a Brake Fluid Exchange?

For many years the automotive service industry, ourselves included, believed that the best indication of the need to replace brake fluid was the presence of water. While it is still true that excessive amounts of water in the brake fluid will create problems such as brake fade, corrosion of parts, and premature failure of internal brake parts, there are more effective indicators now available. Brake fluid is by nature hygroscopic, meaning it attracts moisture. Over time it will attract water and lower the boiling point of the fluid, as well as allow oxidation to take place in the system.

Today's braking systems have done a good job overall of reducing the likelihood of component failure due to moisture in the system. But these same systems have much tighter clearances and a wider variety of metallic components, making elimination of contamination even more critical. Extensive research has now shown that the best early indicator of brake component failure is the presence of copper in the system. Copper is the first or "Alpha Contaminant" and will show up before other metals in brake system.

How does copper get in the brake fluid? The answer is from the brake lines. The inside surface of the brake lines is coated with a copper brazing alloy. Brake lines represent the largest surface area in the brake system. The rate of corrosion of the copper is dependent on the level of corrosion inhibitors in the brake fluid. Copper acts as an early warning for the next types of corrosion that will appear in the system. Water does play a role, but only in allowing the copper to more rapidly precipitate and form hydrogen ions. These ions act as oxidation catalysts allowing corrosion of iron components, and can interfere with proper ABS valve operation. Copper ions also provide an indicator that the buffering capability of the brake fluid has been reduced and relate in general to the age of the vehicle. In other words as the vehicles get older copper ions are a natural occurrence that indicate the need to replace the degrading fluid with fresh fluid before it allows damage to occur.

To measure copper in the brake fluid we use a patented litmus type test (FASCAR®) to measure copper levels. Similar to measuring the PH level of a fluid, we dip a special test strip into the brake fluid of the reservoir for one second. In 30 to 120 seconds, the reaction zone will change colors depending on the condition of the brake fluid.