



Technology & Maintenance Council¹ RP1407 – Brake Fluid Maintenance Guidelines

The U.S. Department of Transportation has set specifications for three types of brake fluid for automotive use: DOT 3, DOT 4 and DOT 5. Each type has a specified color.

DOT 3 (or SAE J1703) and DOT 4 are amber to clear in color. The major difference between the two formulations is that DOT 4 has a higher wet boiling point and absorbs moisture more slowly than DOT 3 fluid.

DOT 5 brake fluid is silicone-based, purple in color, and has a higher boiling point than either DOT 3 or 4. Both DOT 3 and 4 are interchangeable/mixable. However, DOT 5 should not be mixed with either DOT 3 or 4.

Brake Fluid Change Intervals

Brake fluid—as with engine oil or antifreeze—eventually becomes contaminated with moisture and dirt. Depending on the type of contamination, the fluid may look dark, and the boiling point will drop.

Note → Brake fluid should be changed at each major brake repair. Mineral or petroleum-based substances (gasoline, carbon tetrachloride, paint thinner, diesel fuel, etc.) attack the rubber compounds used in brake systems. Soft or swollen rubber parts in the hydraulic system indicate that the brake fluid is contaminated. Often the first sign is brake drag or lock, occurring when the swollen rubber parts prevent brake release. The only remedy is to drain the fluid, flush the system, clean the cylinders, replace all rubber parts including brake hoses, and refill the system with clean brake fluid.

NOTE: Rubber parts should only be cleaned in isopropyl (denatured) alcohol or brake fluid. If metal parts are degreased or washed in any solvent, rinse them thoroughly with alcohol or brake fluid to remove all traces of solvent residue. Always use clean containers for brake fluid and make sure stored fluid is tightly capped.

Brake Fluid Handling and Storage

Always keep brake fluid clean. Do not allow any foreign material or petroleum product to get into the fluid. Never use fluid from containers contaminated with dirt, oil, grease, rust, etc.

Don't leave brake fluid cans partially filled. Always keep them tightly capped. Brake fluid—except DOT 5—tends to absorb moisture when exposed to air, and this greatly reduces their boiling point. High temperature fluids (specified for heavy-duty and disc brake use) lose their boiling point more quickly than regular

fluids. Absorption of even three percent moisture brings down the boiling point of high temperature fluids by about 50 percent. This can happen if the master cylinder cap is left off overnight or if a can is left partially filled with brake fluid even for a day or two.

← Note

If hard brake use causes the fluid to boil, a condition called "fluid-boil" or vapor lock may occur, dangerously reducing braking efficiency. In this condition, the driver runs out of pedal stroke before the brakes are applied. Often, this condition disappears before being checked, since the vapor reverts back to fluid state when cooled.

The following actions will help prevent brake fluid from being contaminated with moisture during servicing:

- **Keep the master cylinder tightly covered.** Reinstall the cover tightly immediately after the master cylinder is filled with new fluid.
- **Use the smallest possible can of brake fluid to fill the master cylinder.** Use two small cans rather than half a large can, for example.
- **Tightly cap the fluid container after use.**
- **If the remaining fluid in the can can't be used the same day, dispose of it.** Using small cans helps reduce waste. Discard any fluid that is suspected of being contaminated.
- **Keep the fluid reservoir in a pressure brake bleeder tightly closed** except when refilling.

Fluid Level Inspection

Should the fluid level in the reservoir fall below the master cylinder intake ports, air will enter the system. Since it would take many brake applications to pump in enough air to run out of pedal, this condition is not as imminently dangerous as fluid-boil. Usually, it is only necessary to refill the reservoir and purge the system of air by slowly stroking the pedal a few times. If this fails to restore a solid pedal, the system must be bled.

Always clean off the top of the fluid reservoir before opening it. Restore the fluid level to 3/8" (10 mm) below the top of the reservoir.

Inspect the brake fluid at regular vehicle lubrication intervals. Most brake fluids should be changed at the time of brake relining. Extreme high temperature fluids should be changed at six-month intervals.

¹ www.truckline.com/Federation/Councils/TMC/Pages/default.aspx