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# Brake Fluids

*by Kenneth Streeter,  
with input from Mike Burdick, Shane Ingate, Chris Kantarjiev, a "Skinned Knuckles" article, and  
various other sources*

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The discussion of whether to use DOT3, DOT4, DOT5, or the new DOT5.1 brake fluids in Triumphs is a common topic. The information provided herein should help you to decide which of these brake fluids are best for you and your car. I would point out that I am not an "expert" on the topic, but have collected the experiences of many other Triumph enthusiasts, as well as opinions of professional auto restorers. I have tempered my findings with my own experiences and opinions.

I would also take this opportunity to point out that the **type** of brake fluid used in your car is far less important, from a safety standpoint, than a properly functioning braking system. If you are working on your own brakes, be extremely careful, don't skimp on poor components, and bleed the brake system very carefully and thoroughly.

## DOT3

DOT3 brake fluid is the "conventional" brake fluid used in most vehicles. One of the most familiar brands is "Prestone."

### **Advantages:**

DOT3 fluid is inexpensive, and available at most gas stations, department stores, and any auto parts store.

### **Disadvantages:**

DOT3 will damage natural rubber brake seals and should **not** be used in any car suspected of having natural rubber seals (most Triumphs prior to 1968).

DOT3 fluid eats paint!

DOT3 fluid absorbs water very readily. (This is often referred to as being hydroscopic.) As such, once a container of DOT3 has been opened, it should not be stored for periods much longer than a week before use.

Since DOT3 fluid absorbs water, any moisture absorbed by the fluid can encourage corrosion in the brake lines and cylinders.

## DOT4

DOT4 brake fluid is the brake fluid suggested for use in late model Triumphs. The most familiar brand is "Castrol GT-LMA"

### **Advantages:**

DOT4 fluid is available at most auto parts stores, and at some (but not all) gas stations or department stores.

DOT4 fluid does not absorb water as readily as DOT3 fluid.

DOT4 fluid has a higher boiling point than DOT3 fluid, making it more suitable for high performance applications where the brake systems are expected to get hot.

**Disadvantages:**

DOT4 fluid eats paint! Small leaks around the master cylinder will eventually dissolve away the paint on your bodywork in the general vicinity of the leak, and then give rust a chance to attack the body of your car!

DOT4 fluid is generally about 50% more expensive than DOT3 fluid.

Since DOT4 fluid still absorbs some water, any moisture absorbed by the fluid can encourage corrosion in the brake lines and cylinders.

**DOT5**

DOT5 brake fluid is also known as "silicone" brake fluid.

**Advantages:**

DOT5 doesn't eat paint.

DOT5 does not absorb water and may be useful where water absorption is a problem.

DOT5 is compatible with all rubber formulations. (See more on this under disadvantages, below.)

**Disadvantages:**

DOT5 does NOT mix with DOT3 or DOT4. Most reported problems with DOT5 are probably due to some degree of mixing with other fluid types. The best way to convert to DOT5 is to totally rebuild the hydraulic system.

Reports of DOT5 causing premature failure of rubber brake parts were more common with early DOT5 formulations. This is thought to be due to improper addition of swelling agents and has been fixed in recent formulations.

Since DOT5 does not absorb water, any moisture in the hydraulic system will "puddle" in one place. This can cause localized corrosion in the hydraulics.

Careful bleeding is required to get all of the air out of the system. Small bubbles can form in the fluid that will form large bubbles over time. It may be necessary to do a series of bleeds.

DOT5 is slightly compressible (giving a very slightly soft pedal), and has a lower boiling point than DOT4.

DOT5 is about twice as expensive as DOT4 fluid. It is also difficult to find, generally only available at selected auto parts stores.

**DOT5.1**

DOT5.1 is a relatively new brake fluid that is causing no end of confusion amongst mechanics. The DOT could avoid a lot of confusion by giving this new fluid a different designation. The 5.1 designation could lead one to believe that it's a modification of silicone-based DOT 5 brake fluid. Calling it 4.1 or 6 might have been more appropriate since it's a glycol-based fluid like the DOT 3 and 4 types, not silicone-based like DOT 5 fluid. (In fact, Spectro is marketing a similar new fluid which they are calling Supreme DOT 4, which seems less confusing.)

As far as the basic behavior of 5.1 fluids, they are much like "high performance" DOT4 fluids, rather than traditional DOT5 brake fluids.

**Advantages:**

DOT5.1 provides superior performance over the other brake fluids discussed here.

It has a higher boiling point, either dry or wet, than DOT 3 or 4. In fact, its dry boiling point (about 275 degrees C) is almost as high as racing fluid (about 300 degrees C) and 5.1's wet boiling point (about 175 to 200 degrees C) is naturally much higher than racing's (about 145 C).

DOT5.1 is said to be compatible with all rubber formulations.

**Disadvantages:**

DOT5.1 fluids (and Spectro's Supreme DOT4) are non-silicone fluids and will absorb water.

DOT5.1 fluids, like DOT3 & DOT4 will eat paint.

DOT 5.1 fluids are difficult to find for sale, typically at very few auto parts stores, mostly limited to "speed shops."

DOT 5.1 will be more expensive than DOT3 or DOT4, and more difficult to find.

**General Recommendations:**

1. If you have a brake system that doesn't leak or show any other signs of failure, but has old seals in it, don't change fluid types as a result of reading this article. If it isn't broken, don't "fix" it -- you may simply break it instead!
2. Flushing of the brake system every couple years to remove any absorbed or collected water is probably a good idea to prevent corrosion, regardless of the type of brake fluid used.
3. DOT3 is dangerous to use in Triumphs with natural rubber seals, and thus should **not** be used in such cars, except as a temporary "quick fix to get me home" solution. (If this is used as a "get-me-home" solution, bleed the system as soon as possible, and be prepared to replace all your seals.)
4. DOT3 is an adequate brake fluid for use in later Triumphs, although it is rarely preferred. My recommendation would be to simply not use it.
5. DOT4 fluid, for a slight increase in cost, will give significantly increased resistance to moisture absorption, thus decreasing the likelihood of corrosion compared to DOT3.
6. DOT4 fluid has a higher boiling point than DOT3, making it preferable for high performance uses such as racing, autocross, or excessive use of the brakes in mountainous areas. For even greater braking performance, consider going to DOT5.1 or a high-performance version of DOT4 fluid.
7. DOT5 is a good choice for the weekend driver/show car. It doesn't absorb water and it doesn't eat paint. One caveat is that because it doesn't absorb water, water that gets in the system will tend to collect at low points. In this scenario, it would actually be promoting corrosion!
8. DOT5 is probably not the thing to use in your race car although it is rated to stand up to the heat generated during racing conditions. The reason for this recommendation is the difficult bleeding mentioned above.
9. When changing from one fluid type to another, as a minimum, bleed all of the old fluid out of the system completely. For best results, all the seals in the system should be replaced.
10. As always, your experiences may vary.