

Service Bulletin

Apollo North America, Inc.

Bleeding Hydraulic Disc Brakes – Master Cylinder - Main Plunger Unseating or Getting Destroyed

August 4, 2006

Revision 0

Background

Recently we have received some master cylinders back from customers (more than one) that had supposedly gone bad. Upon further examination it seems like the master cylinder main plunger was unseated. This can happen while bleeding the brakes when the **user over-extends the stroke on the pedal**. Short strokes are recommended when using the conventional method of bleeding the brakes. Once the master cylinder main plunger has been unseated, no amount of bleeding will help until its re-seated (assuming it did not get destroyed by the pumping movements after being unseated).

Also, spooge holes in the reservoir and the master cylinder need to be cleaned at the time of bleeding to clear any impurities that may have taken hold. Spooge holes in the reservoir are at the bottom of the reservoir and on the master cylinder are located under the plastic 90 degree bend. Calipers can also accumulate spooge and proper bleeding and flush will get rid of it. This cleaning can easily be done by inserting and moving a pin inside the spooge holes before a flush and bleed.

Using MityVac 07300 PneumatiVac (Highly Recommended)

A MityVac 07300 PneumatiVac (http://www.mityvac.com/pages/products_fee.asp#07300) tool can save you time and effort when bleeding your brakes. Its especially worth it for a mechanic, shop or a dealer providing service. It cuts the time from hours to 10 to 15 minutes. It is the only supported and recommended way from the factory along with using DOT 4 brake fluid from a sealed container to cut out the possibility of contaminating the brake system and rendering it useless. No funnel or any other surface previously used for any other chemicals including gasoline, petroleum based liquids etc. should be used to pour the

brake fluid through. That's a sure shot way of creating a big problem when there didn't need to be one at all.

MityVac products are available at most auto parts stores, and many online outlets.

Clean your brake system first of dirt and grime.



If you are already familiar with bleeding brakes the conventional way, here is the **quick version** of the quirks of using the MityVac:

The tubing that comes with the MityVac will allow some air in around the bleed screw, so you need to use a tie-wrap, or insulated wire, to snug the tubing. Take care not to pull air in through the master cylinder – the MityVac can draw a lot of fluid through pretty quickly, so keep refilling the master cylinder with DOT 4 brake fluid (**this WILL require two people**). Open the bleed screw $\frac{1}{2}$ to $\frac{3}{4}$ turn only, secure the tubing on it, and pump the MityVac until no air bubbles are evident, refilling the master cylinder as needed, close the bleed screw, and onto the next caliper.

Sometimes I find the need to finish the job off by hand in the conventional way but please **only use short strokes to pump the pedal with disc/rotor on the calipers then hold the pedal depressed with a short stroke (DO NOT OVER-EXTEND) and have your partner open the bleeder a ½ turn and see if air bubbles come out.**

The banjo bolts and splitters can trap air even when using Mighty-Vac. You can tap on it with a rubber mallet or screwdriver handle and may see some bubbles come up into the master cylinder reservoir.

Step-by-step version:

If your brakes feel spongy, if you find the lever creeping closer to the bar after you give it a good squeeze, you need to bleed your brakes. If you haven't done it for over a year, you need to flush all the old fluid out.

DOT3 and DOT4 are compatible, if you don't know what's in there already. Apollo highly recommends DOT 4 fluid. **DO NOT mix DOT 5 and DOT 3 or 4 fluids under any circumstances.**

Brake fluid is nasty stuff that will eat your paint and plastic, so take preventive measures in case you spill a little around the master cylinder or reservoir. Wrap and secure a damp rag around the base of the master cylinder, put a damp towel on painted metal areas.

Remove the master cylinder cover, put it someplace it won't get dirty or wet.

The tool of choice for turning the bleed screw is an adjustable open face wrench. Take care not to round off the bleeder valve.

Loosen the bleed screw about ½ to ¾ of a turn, and put the tubing from the MityVac on the bleed screw, securing it by twisting a small piece of insulated wire around it. This is to keep air bubbles from entering the tubing from outside the bleed screw and misleading you into thinking you are still getting air bubbles from the brake system.

Pump up the MityVac, it will start drawing fluid through the system. Check frequently to make sure the fluid in the master cylinder reservoir doesn't fall below half-full – you don't want to pull more air in. After a few fillings of the master cylinder reservoir, you should be getting no more air bubbles appearing in the tubing. You want to keep pumping fluid through until all the old fluid is out of the system and you're drawing clean fluid with no air bubbles. If you've filled the MityVac's reservoir more than once and are still getting air, it might be that you didn't really get the tubing secured around the bleed screw.

While the MityVac is drawing fluid with no bubbles, close the bleed screw. (The torque spec is 4 ft-lbs – don't crank this down like superman, okay?)

Remove the MityVac tubing, empty the fluid from its reservoir.

Repeat above on other calipers.

After bleeding calipers tap on the splitter with a screwdriver handle or something lightly and look for air bubbles appearing the in master cylinder reservoir. In stubborn cases, you might have to let things sit overnight (secure the master cylinder cover to prevent moisture in your fresh brake fluid!) and do some more tapping (or even bleeding) in the morning.

If the lever feels anything but solid and firm when you give it a squeeze, you may need to finish the job using the conventional method outlined below. MityVac has done most of the job.

Why Does Brake Fluid Need to Be Replaced Periodically?

DOT 3 and DOT 4 brake fluid are glycol based and absorb moisture over time. Moisture contamination causes fluid boiling point to drop (which could lead to fluid boil and brake fade during hard use).

Moisture contamination also contributes to internal corrosion in the calipers, wheel cylinders, and steel brake lines. The reason for replacing fluid periodically is to get rid of contaminated fluid and restore fluid heat and corrosion resistance.

Moisture seeps in through microscopic pores in rubber seals and hoses. It also enters every time someone opens the master cylinder reservoir to check the fluid level. Most fluid reservoirs are transparent so level can be checked without having to open the lid.

Brake fluid is so "hygroscopic" (attracts water) that leaving the lid off a can of fresh brake fluid can ruin it overnight. It will absorb so much moisture from the air that it becomes too badly contaminated to use.

How often should the fluid be replaced? After several years of service, it is not unusual to find brake fluid containing seven to eight percent water and that badly needs replacement. If you left your brake fluid reservoir off for an extended period of time, that can introduce enough water content that will then require bleeding as well.

For this reason, many experts recommend replacing the fluid as a preventative maintenance service every two to three years. At the very least, it should be replaced when brakes start feeling spongy and there is chance of you stomping on the brakes and over-extending the stroke and unseating the master cylinder plunger.