

Raybestos Bulletin 18-06

Brake Job Tools: What You Need to Perform a Quality Brake Job

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Vehicles Involved: All

Condition: Vehicle in Shop for a Brake Job

Doing a brake job requires special tools and materials. These tools are separate from the sockets, ratchets and air tools that you use every day in your shop. These tools include:

- Specifications Guide
- Micrometer
- Hub Cleaning Tools
- Dish Soap and Water
- Conical Washers
- Dial Indicator
- Hose Clamps
- Torque Sticks

Repair Procedure:

Specifications Guide

Brake specifications guides are available in both print and digital formats (See Figure 1). Spec guides provide valuable specifications for most modern applications.

Rotor/Drum Discard

Rotor/drum discard thickness/diameter is the thickness/diameter at which a rotor or drum is not safe to use. When you reach discard, you must replace the rotor or drum.

Torque Specifications

Brake spec guides provide torque specs for the following:

- Caliper to bracket
- Bracket/Caliper to knuckle

- Nut torque

Lateral Runout

In most late-model vehicles, lateral runout specifications are .002 or less.



Figure 1

Bleeding Sequence

In today's vehicles, the bleeding sequence isn't always right rear, left rear, right front, left front. Spec guides will tell you the proper bleeding sequence for each vehicle.

Micrometer

To get an accurate measurement of a rotor's thickness, it is vital to have a micrometer (See Figure 2) on hand in your shop.



Figure 2

Before you measure the rotor's thickness, make sure to check your spec guide for the rotor discard. If the thickness of the rotor is below the discard thickness, it is not safe to use that rotor. You must replace it. If the rotor thickness is above the discard thickness, the rotor is safe to machine using a brake lathe.

Hub Cleaning Tools

Rust and corrosion builds up on the wheel hub over time. This buildup can affect the lateral runout of the rotor. To avoid this, it is imperative that you have a clean hub surface before you install the rotor.

There are several tools out there that shops use to clean hub surfaces (See Figure 3). We recommend using the following two tools:

- **Hub Cleaners:** Make sure that you use a cleaner that has the ability to go over the wheel studs. This helps get the area around the studs clean of any debris. Most hub cleaning tools are compatible with an impact gun, giving you the ability to quickly blast the buildup away.
- **Wire Brush:** Once you finish with the hub cleaners, we recommend doing a quick once-over of the hub with a wire brush. This removes any leftover debris on the hub, giving you a clean surface.



Figure 3

Depending on where you live, this process could take anywhere from a few seconds to a few minutes. It all depends on the climate you live in.

Dish Soap and Water

Having dish soap and water on hand in your shop can come in handy when you need to clean a rotor before installation. There are two reasons that you should wash off a rotor before installation:

- Manufacturers put anti-rust preventative on rotors. Sometimes, this material looks like oil. Other times, it looks almost like varnish. Either way, you need to wash this material off the rotor.
- Machined rotors leave metal shavings and residue on the rotor's surface. If you install the rotor without washing off these shavings, they will become embedded in the rotor. This will cause brake noise.

***Note: If you are installing a coated rotor, you do not need to wash it off. It is ready to install right out of the box.**

Why soap and water instead of brake cleaner? Brake cleaner does a great job removing the anti-rust preventative. However, it does not do a good job of removing the metal shavings.

Conical Washers

With today's tight lateral runout specs, it's important to always check lateral runout during a brake job. To do this, you need to tighten the rotor down. However, tightening the lug nuts against the rotor can damage the lug nuts, the rotor or both.

Using conical washers (See Figure 4) can protect the lug nuts and rotor from damage. This will allow you to safely check the lateral runout of the rotor. Slide the washers over the studs before tightening down the rotor.



Figure 4

Dial Indicator

If you don't take the time to measure lateral runout, you are at a higher risk of a comeback.

Checking Lateral Runout Steps:

- 1.) Slide conical washers over the studs of the wheel.
- 2.) Tighten down the lug nuts. It does not have to be to specifications. But you must tighten down the lug nuts evenly. We use the yellow torque stick (65 ft-lb).
- 3.) Install the dial indicator (See Figure 5).
- 4.) Turn the rotor and measure the lateral runout. Check the rotor's runout against the specifications in your spec guide. Most modern vehicles have a lateral runout of .002.



Figure 5

Brake Hose Clamps

The dirtiest brake fluid is found at the bottom of the hydraulic system, near the caliper. If you push in the caliper piston without clamping off the brake hose, you will push the dirty fluid back up into the hydraulic system. By doing this, you run the risk of the debris in the brake fluid getting caught in the ABS system. This can lead to problems such as a low brake pedal and brake pull.

Be sure to clamp off the hose with an appropriate tool (See Figure 6). Using locking pliers or a similar tool will damage the brake hose.



Figure 6

Using a Brake Hose Clamp:

- 1.) Apply an approved clamp to the brake hose.
- 2.) Open the bleeder screw.
- 3.) Use a C-Clamp or channel locks to push the piston back into its housing. Make sure to use a tube or bucket to catch the dirty fluid.
- 4.) Close the bleeder screw.

Torque Sticks

You just finished performing a quality brake job. You took the time and used the proper tools to ensure that you won't receive a comeback. Don't ruin things at the end by tightening the lug nuts down with a regular socket.

If you tighten the lug nuts down unevenly, you affect the ability of the rotor to expand as it heats up in certain spots. If the rotor expands unevenly, the rotor will have an excessive lateral runout.

It is critical that you torque the lug nuts down evenly and to specifications. We recommend using torque sticks to do this (See Figure 7), but a torque wrench can work as well.



Figure 7

Look up the torque specs in your specifications guide and choose the right stick. When tightening down the lug nuts, make sure to use the cross or star pattern.