

Bearing the Load

Wheel bearings operate under the adverse factors of load, driving force and braking inertia – and in the hostile environment of heat, cold, water, dust and dirt. That's why they need to be routinely inspected.



The amount of force exerted on wheel bearings is astounding. Each bearing is required to smoothly control the rotation of the wheel to the tune of about a thousand revolutions per mile, support the transfer of power to the wheels for rapid starts and sudden stops, and handle the powerful lateral twisting force of the tires changing direction against the pavement – all while supporting a vertical load of hundreds of pounds. And, we expect them to perform flawlessly just about forever? Not realistic.

The “Achilles Heel” of a wheel bearing is the seal. Although wheel bearings can fail due to damage, improper installation or material imperfection, the most common cause of failure is the seal losing its ability to hold the lubricating grease in and/or dirt and water out.

However, the best seal, applied to the best bearing, cannot be expected to last if not correctly installed. This primer can help you properly service Subaru wheel bearings.

Subaru Wheel Hub Bearing Types

From 1992 to the present, Subaru has used three types of wheel hub bearings:

- **Serviceable Ball Bearing**
- **Serviceable Tapered Roller Bearing**
- **Integrated Hub Unit**

The Serviceable Ball Bearing type is the basic system utilizing a replaceable ball bearing core. It is a preloaded, non-adjustable, angular contact type. These ball bearing types are found on rear wheels.

The Serviceable Tapered Roller Bearing type utilizes a preloaded, non-adjustable tapered roller design.

Tapered roller bearings are found on front wheels.

The Integrated Hub Unit is, as the name implies, a sealed unit that contains the hub, bearings and seals as a complete, non-serviceable component. It is replaced as a unit. First used on the rear wheels of 2001-2005 Legacy and Outback models, it is now used on both front and rear of many newer Subaru models.

> Preloaded ball and tapered roller bearings are the most common types. The hub should only be replaced if found to be worn or damaged.



> The Integrated Hub Unit is a sealed component combining the hub, bearing and seals. It is replaced as a whole unit.

Subaru Wheel Bearing Applications

SVX

1992-1997

Front: Tapered Roller Bearing

Rear: Ball Bearing

Impreza

1993-2004

Front: Tapered Roller

Rear: Ball Bearing

2005-2007 (except STI)

Front: Tapered

Roller Bearing

Rear: Ball Bearing

2005-2007 STI

Front: Integrated

Hub Unit

Rear: Integrated

Hub Unit

Legacy

1995-1999

Front: Tapered Roller Bearing

Rear: Ball Bearing

2000-2004

Front: Tapered Roller Bearing

Rear: Integrated Hub Unit

2005-2007

Front: Integrated Hub Unit

Rear: Integrated Hub Unit

Outback

1995-1999

Front: Tapered Roller Bearing

Rear: Ball Bearing

2000-2004

Front: Tapered Roller Bearing

Rear: Integrated Hub Unit

2005-2007

Front: Integrated Hub Unit

Rear: Integrated Hub Unit

Outback Sport

1995-2004

Front: Tapered Roller Bearing

Rear: Ball Bearing

2005

Front: Integrated Hub Unit

Rear: Ball Bearing

2006-2007

Outback Sport a trim level of Impreza

Forester

1998-2007

Front: Tapered Roller Bearing

Rear: Ball Bearing

Baja

2003

Front: Tapered Roller Bearing

Rear: Ball Bearing

2004-2006

Front: Tapered Roller Bearing

Rear: Integrated Hub Unit

Tribeca B-9

2006-2007

Front: Integrated Hub Unit

Rear: Integrated Hub Unit

Wheel Bearing Inspection

Subaru maintenance schedules call for wheel bearing inspection every 60,000 miles for safe vehicle operation. Here are the common indicators of wheel bearing failure to check during inspection:

> Noise

Normally, noise is the first indicator of a bad wheel bearing. It may come as a complaint from a customer, or you may notice the noise as the vehicle is driven into your shop. The noise can be a crackling or crunching sound, caused by a damaged race, bearing cage, ball or roller. In severe

cases, it may appear as a squeak or squeal, from lack of lubrication, rust or interior contamination.

A quick test drive will usually pinpoint the noise and which wheel is the culprit. The noise may increase during turning or acceleration as the forces applied to the wheel bearing increase.

Although the noise will usually be worse loaded with the weight of the vehicle, it will still appear when the vehicle is raised and the wheels are turned by hand.

> Restricted Rotation

The whole purpose of wheel bearings is to allow the wheel to spin in a smooth and free manner. Damaged or contaminated bearings will not rotate easily. Check for restricted movement by raising the vehicle and turning the wheel by hand.

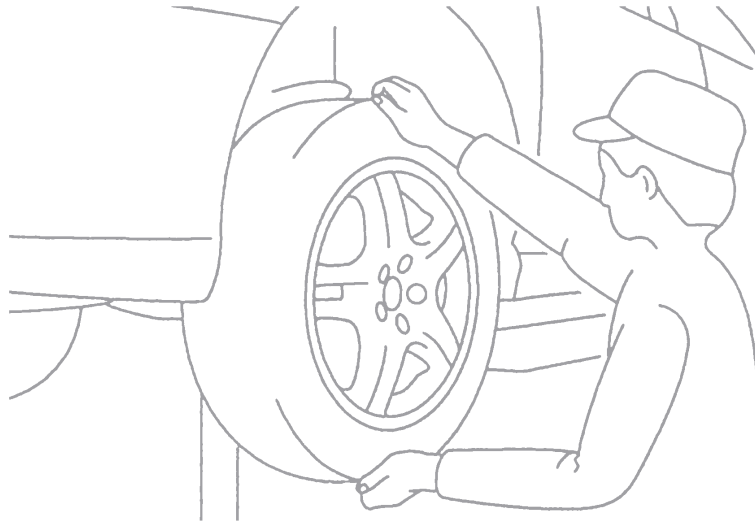
> Excessive Play

A worn or damaged wheel bearing may cause the wheel to wobble a bit. With the vehicle elevated, check for excessive bearing play by grasping the wheel at the top and bottom, then alternately pushing and pulling at the top. Perform the same procedure by grasping the wheel at the sides.

If you have any doubts about the amount of play present, you should check the lean of axis play at the hub using a dial gauge. Position the gauge against the hub, then attempt to move the hub back and forth toward the vehicle. Rotate the hub to expose any lateral runout variation. The maximum limit of variation acceptable is 0.0020 in. (0.05mm).

> Damaged Seals

Closely inspect the seals. Look for any signs of damage, wear or evidence of water or contamination having penetrated the seal. Manually rotate



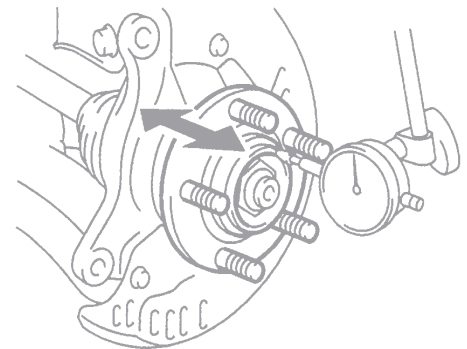
the hub and observe the seal for any oozing of grease, water or dirt. When in doubt, replacement is always best.

> Hub Damage

Inspect the hub and races for any signs of damage. Excessive wear, pitting, grooving or corrosion calls for replacement. If you find a problem with one wheel, check the remaining wheels – especially on high-mileage vehicles.

> *Below:* This tapered roller bearing was damaged by faulty seals that allowed water and dirt to enter the bearing.

> *Above:* You can check for excessive bearing play by rocking the wheel by hand.



> Inspect for hub play with a dial gauge.



Bearing Replacement Procedures

The following is a summary of replacement procedures for Subaru vehicles. Specific procedures will vary for disc and drum-style brakes. When performing any wheel bearing service, always obtain the specific information for the model you are servicing by referring to the correct service manual, or visiting the Subaru Technical Information System website at <http://techinfo.subaru.com>.

For best results, always use the Subaru J-45697 Hub Remover/Replacer Kit. It is available through your local Subaru N.E.W. Horizons Dealer or on the Subaru Special Service Tools website at <http://subaru.spx.com>.



➤ The J-45697 Hub Remover/Replacer Kit is available through your Subaru N.E.W. Horizons Dealer or on the Subaru Special Service Tools website.

For this example, we will detail the procedures for a rear wheel, which most commonly are fitted with ball bearing-type wheel bearings. The procedure for replacing tapered roller bearings is similar, however vehicle-specific information must be used.

- 1 After lifting the vehicle and removing the wheel, remove the caliper and suspend it out of the way, then remove the rotor. Remove the axle nut. Remove the lateral link bolt.
- 2 Disengage the ball joint assembly from the housing, then remove the axle. Set the axle below the lateral link and reinstall the bolt. Inspect the axle for damage.
- 3 Mount a slide hammer adaptor to the wheel bearing hub, tighten the adaptor bolts, then screw in the slide hammer. Using the slide hammer, remove the wheel bearing hub.
- 4 Using a small screwdriver, remove the retaining snap ring, then the inner oil seals.

➤ *Below:* The correct tools must be used to remove the bearing.

- 5 Position the correct bearing puller sleeve onto the bearing housing. Lubricate the bearing puller bolt, washer and nut, then insert the puller bolt through the bearing housing and affix the washer and nut on the back.
- 6 Place a wrench on the nut located on the back of the bearing housing, then, using a breaker bar and socket, begin to pull the bearing from the housing. Once the bearing begins to unseat, replace the breaker bar with an air tool to finish the removal procedure.

➤ Start the bearing removal with a breaker bar, then switch to an air tool to finish the job.



- 7 | Clean and inspect the bearing housing for wear or damage. Check the roundness of the bearing cavity using a cylinder bore gauge. If the difference is more than .008 in. (0.20mm), replace the housing.
- 8 | Set a new bearing assembly (with plastic spacer intact) onto the bearing housing. Select the correct spacers and adaptors for installing the new bearing, then position the installation tools and bearing onto the housing.



- 9 | Screw the installation bolt through the housing and into the nut on the back of the housing. Secure the nut with a wrench and begin tightening the bolt with an air wrench and socket to seat the bearing.



➤ Tools positioned to install the bearing.

- 10 | The bearing is fully seated when the bearing makes contact with the housing. Tighten the last few turns with a breaker bar, as necessary.

Remove the installation tools and insert a new snap ring. If the snap ring does not engage the groove properly, the bearing is not fully seated.

- 11 | Install the new outer seal using the correct seating tool adaptor and carefully remove the plastic bearing spacer.



➤ If the snap ring doesn't properly engage the groove, the bearing isn't fully seated.

- 13 | Install the outer seal as directed by the service information and seat with the proper spacers, adaptors and tools. The seal is fully seated when it's flush with the bearing housing.

- 14 | Check the rolling resistance of the hub with a torque wrench. Initial movement should begin at 7-17 inch pounds.

To reassemble the suspension, brake and wheel components, reverse the steps, following the model-specific procedures for tool applications, tightening, inspection and service notes.

Integrated Hub Unit

Replacing an Integrated Hub Unit will obviously require fewer procedures. However, hub unit replacement *will* require other types of special tools and different procedures depending on whether you are servicing a front or rear wheel, and which model is being serviced. Please refer to the correct service manual or visit the Subaru Technical Information System website at <http://techinfo.subaru.com>. ◀

Note: If the vehicle is equipped with ABS, you will need to follow the model-specific procedures listed in the correct service manual or on the Subaru Technical Information System website at <http://techinfo.subaru.com> before installing the wheel hub.

- 12 | Install the hub using the proper information and selection of spacers, adaptors and tools called for by the vehicle-specific information. Check the seating depth.