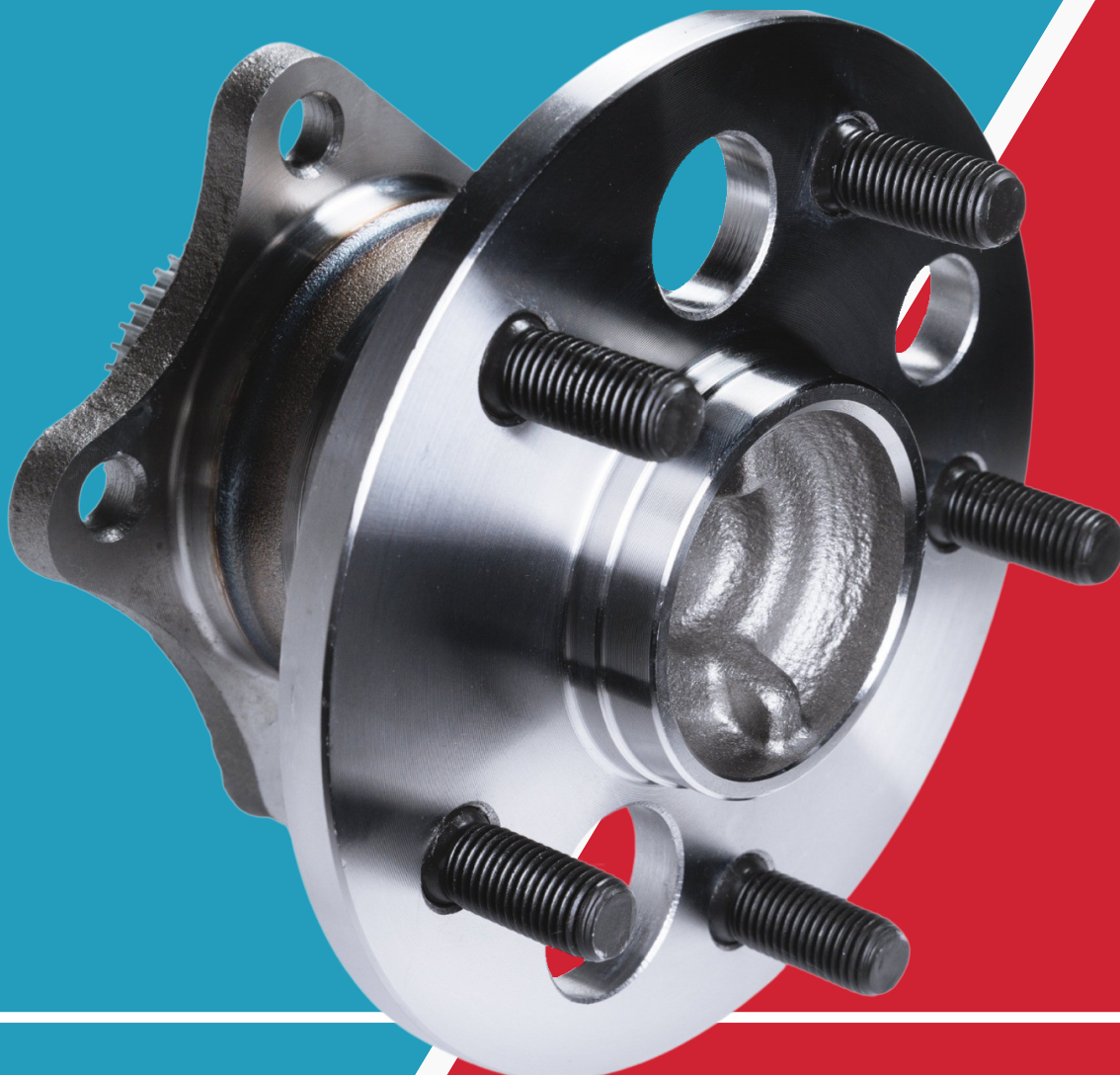


**GMB**

**The Repair Shop's  
GUIDE  
To The Wheel Hub  
Assembly**



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# Intro

The wheel hub is a critical component of a vehicle. It's solely responsible for ensuring that the wheel stays attached to the car, among other important functions.

As an OE bearing manufacturer for 75 years, GMB knows bearings. All our hubs and bearings are manufactured to OE standards. That means that all the components, including our ABS sensors, exactly match OE specifications. This is critical for the ABS and traction control systems to work correctly. And of course, we make our own bearings. GMB has been manufacturing bearings for over seven decades. If you're seeking a sturdy and reliable wheel hub assembly to offer to your customers with confidence, look for the following:



- High-strength steel
- OE type ABS sensors
- Preloaded hub bearings
- Roll formed hub
- High-quality triple-lip wheel bearing seals
- Thoroughly bearing noise tested

Thank you for reading our Guide To Wheel Hub Assemblies. If you have questions or would like to purchase parts, we hope you will reach out.

**GMB North America**  
[www.gmb.net](http://www.gmb.net)





A new wheel hub assembly.  
Photo Credit: [CJ Pony Parts](#)

# Wheel Hub Assembly Failure

When you're evaluating a customer's vehicle, you want to be able to detect the most common signs of a failing wheel hub assembly or a bad wheel bearing.

## Symptoms Of Failure While Driving

WHEN DOING A TEST DRIVE, CHECK FOR THE FOLLOWING SYMPTOMS:

### ✓ Knocking

Knocking while turning could indicate a problem with the CV joints or U-joints. A failing wheel bearing can create additional wear on these components. Checking for this symptom can help rule out other failures or issues.

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### ✓ Snap, Crackle, and Pop

Could be a sign of excessive bearing endplay because of inadequate clamping. This sound typically presents when making sharp turns. A bad CV joint can make similar sounds. Checking for this symptom can help rule out other failures or issues.

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### ✓ Humming, Rumbling, or Growling

This sound usually occurs when driving in a straight line or turning slightly at 15 to 50 mph. This sound is difficult to hear in modern, well insulated cars. It may be possible to hear it when driving slowly with the window down, or by having someone walk beside the suspect bearing at low speeds.

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### ✓ Grinding While Driving

A grinding noise while the vehicle is in motion typically means there's damage to the wheel bearing.

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### ✓ Side Pulls During Brake Application

When bearings become severely loose, it can cause excessive runout, which causes the vehicle to pull when braking. Whichever side the car pulls to is the side of the failed wheel bearing. This will cause customers to report that they have a brake problem when they really have a worn bearing.

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### ✓ Wheel Vibration and Wobble

Usually caused by worn tires or extreme chassis misalignment, wheel vibrations and wobble could mean the bearing has lost its clamp or has severe mechanical damage. This can be seen from another vehicle when the customer's car is on the highway. This symptom is a sign that the bearing has severe wear, and the vehicle is unsafe to drive.

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# What Causes A Wheel Hub Assembly To Go Bad?

Good wheel hub assemblies are built like tanks. But sometimes they break or wear out, like any other part of a vehicle. There are four common causes of bearing failure:



## 1. Impacts

If the tire hits a pothole, curb, or another large obstacle hard enough, the wheel bearing may be damaged. The bearing may become weaker, leading to eventual failure.

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## 2. Contamination

Wheel hubs are continually exposed to water, dirt, dust, and other contaminants. Vehicles in cold climates are subject to salt and magnesium chloride. (More about winter weather's impact [in this blog post on GMB.net](#).) Dirt and dust on the bearing seal causes abrasion, and eventually the seal will let contaminants pass through to the bearings. The moisture and grit will cause corrosion and abrasion in the bearings.

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## 3. Improper Alignment

The wheel hub connects the axle and wheel so that the wheel can spin smoothly. Most of the time a vehicle is traveling in a straight line, which puts only minimal stress on the wheel bearing. However, if the vehicle is out of alignment and pulling, the bearing is under the added stress of a slight turn all the time. This may cause the bearing to wear faster.

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## 4. Oversize Wheels/Tires

Wheels with more offset are more popular than ever and can be found on trucks, SUVs, and sports cars. Increasing offset means that the centerline of the wheel is further outboard than the stock wheel. This increases the leverage that the wheel places on the hub, and shortens the life of the bearing. Oversize tires can greatly increase the both the weight and leverage that the bearing must handle. [This can result in premature wear even on relatively sturdy truck and SUV bearings.](#)

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# High-Quality vs Low-Quality Wheel Hub Assembly Parts

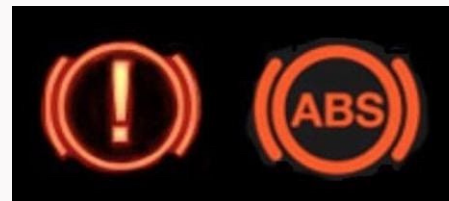
When it comes to wheel hubs, quality is everything. When looking for a high-quality wheel hub assembly, look for the following features:

- OEM-grade
- Made of high-strength steel
- Bearing noise tested
- OE type sensors (to support proper ABS function)
- Preloaded hub bearings
- Premium triple-lip seals (to protect the bearings from contaminants)
- Roll formed hub
- High-quality triple-lip wheel bearing seals

It might be tempting to install a low-priced wheel hub assembly to save some money; however, low-price is usually a decrease in quality and could cause several major problems, including:

## 1. Malfunctioning ABS System

Every hub on a modern vehicle has an ABS wheel speed sensor. The sensor communicates with the ABS control system and the traction control system about how fast the wheel is turning. The ABS control system manages the brakes during a panic stop. The traction control system helps the driver regain control of the car when it begins to skid.



Auto manufacturers spend a lot of engineering time on ABS and traction control components as they are a key part of a vehicle's safety system. As a result, these components vary in design from manufacturer to manufacturer, and even from vehicle to vehicle.

Aftermarket companies that manufacture cheap wheel hub assemblies often economize by trying to use the same component for many vehicles. This is why it's quite common for cheap hubs to cause problems with ABS or traction control systems.

When an ABS sensor malfunctions or fails, several things may happen:

- The ABS warning light comes on, which requires a service visit every time it lights up.
- The ABS system won't work correctly or at all.
- The traction control system won't function.

Failure of the ABS or traction control system is a serious safety problem. And, if a customer were to be in a serious accident, and the malfunctioning system were traced back to your shop, their insurance company will undoubtedly sue your shop.

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## 2. Noise and Vibration

With a low-quality wheel hub assembly, there may be more noise and vibration. These aren't necessarily indicative of failure but are still bothersome and will affect the ride quality of your customer's vehicle.

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## 3. Premature Wheel Hub Failure

Cheap wheel hubs usually come with a low-quality bearing seal. If it allows moisture and/or dirt into the bearing, the bearing will fail quickly. Sometimes this can happen in less than a year. While it sounds dramatic, cheap wheel hub assemblies can also suffer from catastrophic failure as soon as they hit a pothole or curb.

In all, a vehicle's wheel hub failure is most likely caused by something other than the hub. Fixing the hub failure is relatively simple (especially with GMB's quality [bearings and hub assemblies](#)), but diagnosing the cause of the failure may not be as easy.

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# How To Inspect A Wheel Hub Assembly



## Inspecting A Wheel Hub Assembly - Look For These Things

### 1. Uneven Tire Wear

There are plenty of common reasons why tires wear unevenly—misalignment, a damaged suspension, and low air pressure to name a few. However, extreme bearing wear and looseness can cause it, too. However, the broken wheel bearing will likely be detected before there's tire wear.

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### 2. Uneven Brake Pad Wear

Like uneven tire tread, uneven brake pad wear can indicate extreme bearing wear or looseness. However, the usual causes of uneven brake pads are not bearing related. Long before a bearing would cause brake pad wear, the noise from the bearing would be more than loud enough to warn the driver of a problem.

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### 3. Lateral Play With Tires On/At The Hub Face

Stabilize the vehicle on jack stands with blocks on the rear wheels. Grab the tire at the 3 o'clock and 9 o'clock positions and shake it in a back-and-forth motion. If the wheel bearing is bad, you will likely be able to see play and hear the bad bearing. Shake again at 12 o'clock and 6 o'clock positions to verify play.

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### 4. Runout Higher Than Spec

Most OEMs spec runout measured at the hub face at .0002" or less. If runout measures higher, the bearing is most likely worn. If the bearing was pressed into the hub, it is also possible that this was done incorrectly. A contaminant between the hub and bearing during assembly can cause runout.

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## 5. Excessive Friction

With both opposing wheels and brake pads removed rotate the suspect bearing. Compare it to the bearing on the opposite side. A worn bearing will produce more friction and more noise.

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## 6. Noise

Noise from a bad wheel bearing can travel throughout a vehicle, making it difficult to find the source, especially in a loud shop environment. You can use a mechanic's stethoscope to confirm which bearing is bad. Place the tip on the hub or knuckle while rotating the flange. The bad bearing will be easily identifiable with this method.

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**Don't forget to check the other components under the car. Worn ball joints, tie rod ends, and CVC joints can cause symptoms similar to those caused by a bad wheel bearing.**



### BLAME THE POTHOLE

It's a good idea to relate regular repairs back to pothole damage. If the customer's vehicle needs a new wheel hub and bearing, you can explain that every pothole impact causes wear and tear. If the customer's vehicle is a few years old, it's undoubtedly hit a few potholes. For more on the damage potholes cause, [check out this blog post on GMB.net.](#)

# How To Replace A Wheel Bearing Or Wheel Hub Assembly



There are many different types of wheel bearings. For the most common types, we'll outline some key factors to replacing a bearing successfully.

## Conventional Tapered Bearings

There are three key items to get right in order to ensure a good bearing installation:

- ✓ Make sure the hub bore is in good shape and perfectly clean before installing the bearing races. Any debris will cause the race to be installed slightly crooked, which will cause premature wear.
- ✓ Make sure the new bearings are fully packed with grease.
- ✓ Check the service manual to see how to preload the bearing. There are many different methods for different vehicles, but it is important to use the correct method.

## Pressed-In Bearings

With pressed-in bearings, as the name suggests, you'll need a shop press to remove and install the bearing. Here are a few key items to ensure the job is done correctly.

- Make sure the hub bore is perfectly clean before pressing in the bearing. Any debris will cause runout that can be felt by the driver.

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- Make sure the new bearings are fully packed with grease.

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- Measure runout on a bench before installing the assembly. It should be .000".

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- Clean the rotor flange thoroughly before reinstalling the brake rotor. Any debris will cause vibration in the brake pedal, which can lead to a comeback.

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- If reusing the old brake rotor, clean the mounting surface thoroughly.

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## Hub-Bearing Assemblies

Hub-bearing assemblies are becoming more popular because it's more cost effective for a factory to assemble the hub and bearing. The assembly is done in a clean environment with minimal chance of misalignment. This speeds up the process in the shop. To ensure a successful repair:

- Clean the rotor flange thoroughly before reinstalling the brake rotor. Any debris will cause vibration in the brake pedal, which can lead to a comeback.

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- If reusing the old brake rotor, clean the mounting surface thoroughly.

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# Wheel Hub Repair Tips And Tricks

Standard or digital, torque wrenches are better than impact wrenches for these jobs.

## Common Mistakes To Avoid When Replacing Wheel Hubs

### 1. Don't Use An Impact Wrench Instead Of A Torque Wrench

Modern impact wrenches are powerful. Many can produce 500 to 1000 ft. lbs. of torque, which is more than most automotive engines. Because they are so powerful, you should not use an impact wrench to:

- Loosen axle shaft nuts - The large amount of instant torque can damage CV joints
- Tighten any nuts - It's easy to over-tighten any nut with an impact wrench.

### 2. Use A New Self-Staking Nut

Sometimes it's tempting to reuse the old nut. We strongly recommend against it. Self-staking nuts are only intended to be tightened once. A reused nut can loosen on the road. A quality bearing assembly includes a new self-staking nut.

### 3. Don't Fail To Clean The Axle Shaft And Wheel Speed Sensor

There may be debris in the axle shaft and on the wheel speed sensor that could affect your new hub's performance. It's important to ensure that both areas are clean before installing the new hub. It only takes a few minutes. You can use a wire brush, emery cloth, or a fine file. Don't use any lubricants on the axle shaft threads. Lubricants affect torque readings.

#### 4. Don't Fail To Inspect The Bore

When you have a failed wheel hub, it's possible that the bore of the knuckle is damaged, too. That can cause premature wheel bearing failure. When the old hub is removed, use the opportunity to inspect the knuckle for damage. Look for corrosion and make sure a bore gauge rotates in the bore without any trouble.

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#### 5. Measure Flange Runout Before Installing A New Hub

Also, before installing the new hub check it's runout. As a rule of thumb, on a modern vehicle, hub runout should be between .000" and .002". Some OEM's spec .000" runout. If you take the time to verify the hub before installation, any other runout issues will be easier to troubleshoot. For example, if the rotor shows runout when it is re-installed, you'll know that either:

- The rotor is bad.
  - The interface between the rotor and hub has rust or debris causing the runout.
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#### 6. Don't Use A Low-Quality Replacement Wheel Hub Assembly

A wheel hub is a part you absolutely should not skimp on. A low-quality wheel hub can cause safety issues with the ABS and traction control system. It is also likely to fail relatively soon.

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# Prevent Repair Comebacks



It's vital to avoid comebacks related to wheel hub bearings and hub assemblies. Not only because these comebacks can harm the shop's reputation and profitability but also because the consumer's safety is at stake.

Here are three things that can be done to reduce or eliminate comebacks and keep the customer safe.

## 1. Proper Installation

It seems obvious, but taking the time to ensure proper installation is the best way to avoid comebacks for any repair work. With wheel hub bearings and assemblies, this is critical.

The most common causes of improper installation are:

- Misalignment of the bearings
- Improper use of tools during removal of the old bearings
- Improper use of tools when installing the new bearings
- Improper axle nut torque (where applicable)

With standard wheel bearings, correct alignment is essential. They must be properly packed and installed to avoid failure later. With pressed-in bearings, which are much more common today, the proper tools must be used to remove and replace the bearings or damage to the wheel hub can happen.

Likewise, replacement of the hub and the proper installation of the bolts that hold it in place is also critical.

## 2. Ensure The Problem Is Repaired

Sometimes the problem with the wheel hub bearings is merely a symptom of a larger problem. In these cases, replacing the bearings won't repair the problem but rather allay the symptoms until the new bearings also fail.

Common problems leading to wheel hub bearings or hub assembly failure include steering misalignment, tire/wheel imbalance, or damage to related components. The latter is a primary reason for bearing failure. If a bearing replacement is needed, check for these issues before completing the repair.

### GET IN FRONT OF WHEEL HUB PROBLEMS

Whenever you're rotating tires, regardless of whether the customer complains of noise or steering problems, check the hub assembly to confirm it's all on the up and up.

## 3. Thoroughly Test

Finally, thoroughly testing the vehicle after repair is key to any shop's quality assurance. With wheel hubs, the testing may not come up with a problem, as those tend to develop over time. The testing should focus not only on the hub and bearings but on finding other issues that could be causing the failure. It's best to have a mechanic other than the one performing the work do the after-repair testing. This puts another pair of eyes on the install, which can help spot issues and reduce the likelihood of a comeback.

If you're looking for the key to reducing comebacks, it's to use high-quality replacement parts. Installing a quality part means that there's a low chance the customer will come back.

