

Diagnosis and Testing**General Equipment**

Ford diagnostic equipment

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical damage.

VISUAL INSPECTION CHART

Mechanical
Wheel(s)
Tire(s)
Tire pressure(s) *
Valve stem(s)
Wheel nuts
Wheel studs
* Vehicles equipped with a tire pressure monitoring system must be inspected for correct operation using the Ford diagnostic equipment.

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

Tires should be checked for correct:

- tire pressure(s)
- tire sizes
- speed rating
- load range.
- tire construction type

The use of any other tire/wheel size, load range or type can seriously affect:

- ride
- handling
- speedometer/odometer calibration
- vehicle ground clearance
- tire clearance between the body and chassis
- wheel bearing life.
- braking performance

New wheels need to be installed when the vehicle wheels:

- are bent
- are cracked
- are dented
- are heavily corroded
- are leaking
- have elongated wheel hub bolt holes
- have excessive lateral or radial runout

It is mandatory to use only the tire sizes recommended on the tire label located on the door pillar attached to the vehicle. Larger or smaller tires can damage the vehicle, affect durability and require changing the speedometer calibration. Make sure wheel size and offsets match those recommended for the tire in use.

Inspect the tires for signs of uneven wear. the following descriptions to identify the type of wear.

Check the tires for:

- cuts
- stone bruises
- abrasions
- blisters
- embedded objects

Check the valve stems for:

- cracks
- cuts

Install a new valve stem when damage is found or when a new tire is installed.

Normal Tire Wear

Normal tire wear is identified as even wear around and across the tread. Because there are many factors (driving style, road surfaces, type of vehicle, type of tire) that can affect tire wear, there is no absolute mileage expectation for a normal wear condition. A tire is considered worn-out when the tread has worn to the level of the tread-wear indicators.

Abnormal/Incorrect Tire Wear

Abnormal/incorrect tire wear is identified as tire wear that is not even around or across the tread and that creates performance-related issues.

Abnormal/incorrect wear can be caused by numerous factors, some of which include driving style (aggressive, passive), climate (hot, cold), road conditions, vehicle loading and maintenance (correct tire pressure, rotation intervals and balance). It is important to determine the root cause of wear on a vehicle before carrying out repair. Tires exhibiting abnormal/incorrect tire wear may still be serviceable provided that the minimum tread depth is greater than and the tire is not causing a vehicle performance (noise/vibration) concern.

Inner Edge/Shoulder Wear

Inner edge (or shoulder) wear occurs on the inside edge of the tire and is usually caused by excessive toe out and/or excessive negative camber. If the tread depth of the outer shoulder is at least 50% greater than the tread depth of the inner shoulder, the tire is experiencing inner edge/shoulder wear. To determine whether tires have this type of wear, visually inspect the tires. In some instances, it may be necessary to measure the tread depth of each rib and compare it to that of the shoulder.

NOTE: Right-Front tire shown, others similar.

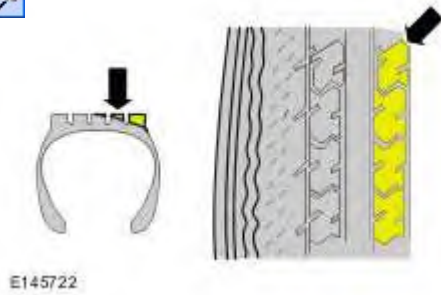


E145721

Outer Edge/Shoulder Wear

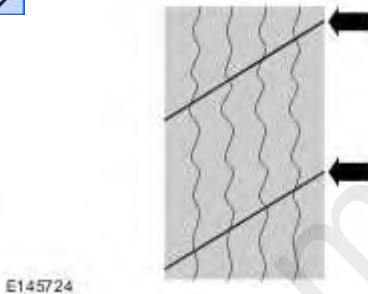
Outer edge (or shoulder) wear occurs on the outside edge of the tire and is usually caused by excessive toe in and/or excessive positive camber. If the tread depth of the inner shoulder is at least 50% greater than the tread depth of the outer shoulder, the tire is experiencing outer edge/shoulder wear. To determine whether tires have this type of wear, visually inspect the tires. In some instances, it may be necessary to measure the tread depth of each rib and compare it to that of the shoulder.

NOTE: Right-Front tire shown, others similar.



Heel/Toe Wear

Heel/toe wear (also known as feathering) occurs along the outside or inside edge/shoulder of the tire. To determine whether tires have this type of wear, visually inspect the tires in both the inside and outside shoulder ribs. In some instances, it may be necessary to measure the difference in tread depth of leading versus trailing edge of each lug in the inside and outside shoulder rib.



Diagonal Wear

Diagonal wear occurs diagonally across the tread area and around the circumference of the tire. To determine whether tires have this type of wear, visually inspect the tires to determine if the wear pattern runs diagonally across the tread and around the circumference of the tire. In some instances, the difference in tread depth along the diagonal wear pattern may need to be measured.

Tire Vibration Diagnosis

A tire vibration diagnostic procedure should begin with a road test. The road test and customer interview (if available) will provide much of the information needed to find the source of a vibration.

During the road test, drive the vehicle on a road that is smooth and free of undulations. If vibration is apparent, note and record the following:

- the speed at which the vibration occurs
- what type of vibration occurs in each speed range.
mechanical or audible
- how the vibration is affected by changes in the following:

- engine torque
- vehicle speed
- engine speed
- type of vibration - sensitivity:
 - torque sensitive
 - vehicle speed sensitive
 - engine speed sensitive

The following explanations help isolate the source of the vibration.

Torque Sensitive

This means that the condition can be improved or made worse by accelerating, decelerating, coasting, maintaining a steady vehicle speed or applying engine torque.

Vehicle Speed Sensitive

This means that the vibration always occurs at the same vehicle speed and is not affected by engine torque, engine speed or the transmission gear selected.

Engine Speed Sensitive

This means that the vibration occurs at varying vehicle speeds when a different transmission gear is selected. It can sometimes be isolated by increasing or decreasing engine speed with the transmission in NEUTRAL or by stall testing with the transmission in gear. If the condition is engine speed sensitive, the cause is probably not related to the tires.

If the road test indicates that there is tire whine, but no shake or vibration, the noise originates with the contact between the tire and the road surface.

A thumping noise usually means that the tire is flat or has soft spots making a noise as they slap the roadway. Tire whine can be distinguished from axle noise. Tire whine remains the same over a range of speeds.

1. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

Symptom Chart

The table provides all possible Wheels and Tires symptoms. For a detailed diagnostics, proceed to the **Ford diagnostic equipment**.

Symptom	Possible Sources
Tire(s) show excess wear on edge of tread	Tire(s) under-inflated
	Vehicle overloaded
	Incorrect wheel alignment
Tire(s) show excess wear in center of tread	Tire(s) over-inflated
Other excessive tire wear concerns	Incorrect tire pressure(s)
	Wheel and tire assemblies need rotating
	Incorrect wheel alignment
	Vehicle overloaded
	Loose or leaking front strut and spring assembly
	Wheel bearings worn
	Suspension components, bushings and ball joints
	Excessive lateral or radial runout of wheel or tire
Wobble or shimmy affecting wheel runout	Damaged wheel
	Front wheel bearing
Excessive vehicle vibration, rough steering	Suspension components
	Incorrect tire pressure(s)
	Wheel or tire imbalance
	Uneven tire wear
	Brake disc imbalance

	Water in tire(s) / Damaged wheel
	Incorrectly seated tire bead
	Excessive lateral or radial runout of wheel or tire
	Foreign material between wheel mounting face and hub mounting surface
	Front wheel bearing
Rust streaks from the wheel stud holes in the wheel	Wheel nuts
Seized wheel nuts	Corrosion
	Vehicle overloaded

mcx30.com