

# Technical Service Bulletin



## 44 Steering wheel shimmy, vibration, and/or oscillation

44 23 97 2022563/22 January 20, 2023. Supersedes Technical Service Bulletin Group 44 number 22-92 dated May 10, 2022, for reasons listed below.

Model(s)	Year	VIN Range	Vehicle-Specific Equipment
All Audi Models	2012 – 2023	All	Not Applicable

## Condition

REVISION HISTORY		
Revision	Date	Purpose
22	-	Revised <i>Warranty</i> (Updated Labor Operations)
21	02/09/2021	Revised header (Added model year)
20	02/09/2021	Revised header (Added model year) Revised <i>Warranty</i> (Updated Labor Operations)

### Customer States:

- A vibration is felt in the seat, vehicle floor, footwell, pedals, or steering wheel. This condition does not lead to any handling concerns or loss of vehicle control.
- A vibration is felt while driving at highway speeds from 55 – 80 mph (88 – 128 km/h).

### NOTICE

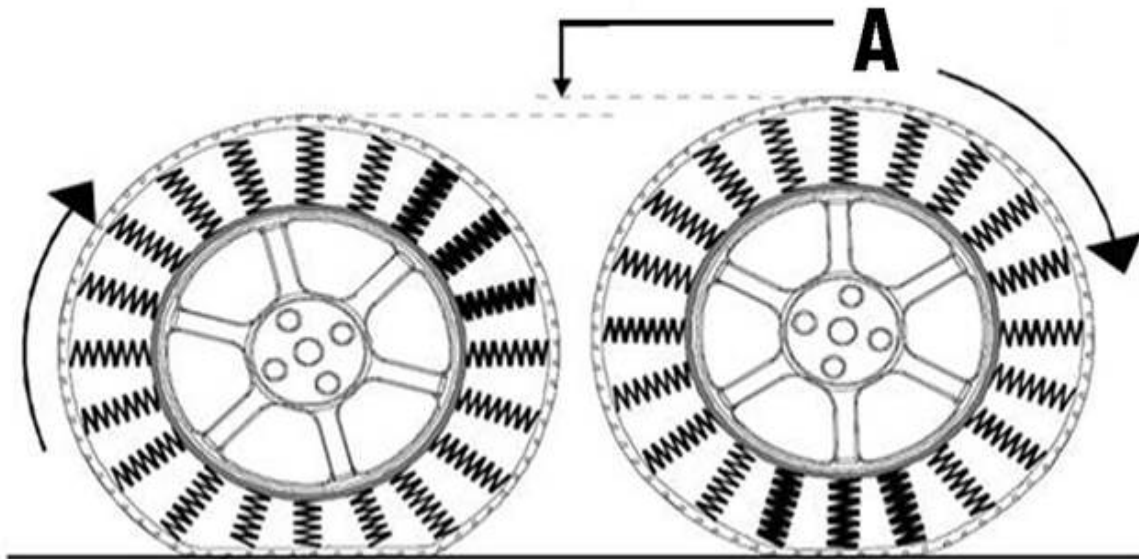
This bulletin is not applicable if this vehicle has a Repair Authorization on this topic. If an applicable Repair Authorization is not followed, the claim will not be paid.

## Technical Background

The vibrations felt by the customer could be a result of the harmonic vibrations caused by the radial force variation (RFV) of the tires or an imbalance of the wheel and tire assembly.

### Tire RFV (also referred to as tire uniformity):

To understand the effects of RFV, imagine the tire as a collection of springs between the rim and the tire tread. If the “springs” are not uniform stiffness, a varied force is exerted on the axle as the tire rotates and flexes (Figure 1). This creates a vibration in the vehicle.



**Figure 1.** Vibration source from radial force variation (A).

The table below explains common causes of wheel-related and tire-related vibrations in the vehicle. Refer to Elsa at *Wheel and Tire Guide >> Diagnosis and Testing* for further diagnostic procedures and other possible causes of vibration.

Vibration Description	Possible Cause
Vibration felt in the steering wheel while at a constant speed	Increased radial forces or imbalance on the front tires
Vibration in the entire vehicle	Increased or critical radial forces or imbalance on the rear tires and possibly on the front tires.

**i Tip:** Tires with higher mileage and/or wear should be inspected to determine the best correction for the issue (repair or replacement). Tire life and condition should be determined before starting any diagnosis or repair for a vibration.

## Production Solution

Not applicable.

## Service



## NOTICE

**For all warranty vibration repairs, a completed Tire Data Sheet and Hunter RFV printouts must be retained for warranty claim payment. Failure to do so will result in non-payment of the claim.**

Sections 1-4 must be completed in their entirety and the order listed:

### 1. Prepare Tires for RFV Measurement:

**i** **Tip:** Flat spots are not a sign of a defect and therefore are not a warrantable condition. More information about flat spots is available in Elsa at Repair Manual, *Suspension, Wheels, Steering >> Wheel and Tire Guide >> 44 Wheels, Tires, Wheel Alignment >> Diagnosis and Testing >> Wheel and Tire Vibration >> Tire Flat Spots from Standing.*

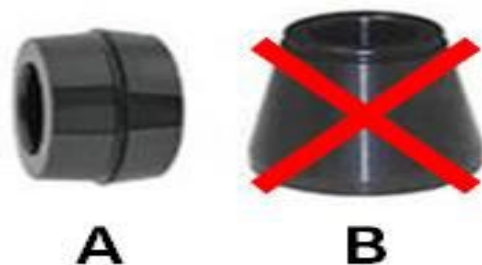
Temporary flat spots falsify the radial force fluctuation and must be driven out before the balance and the radial forces are checked. Flat spots develop after a warm tire has cooled down after a stationary period of a few hours. Flat spots vary based on the type, size, and make of the tire.

To eliminate temporary flat spots:

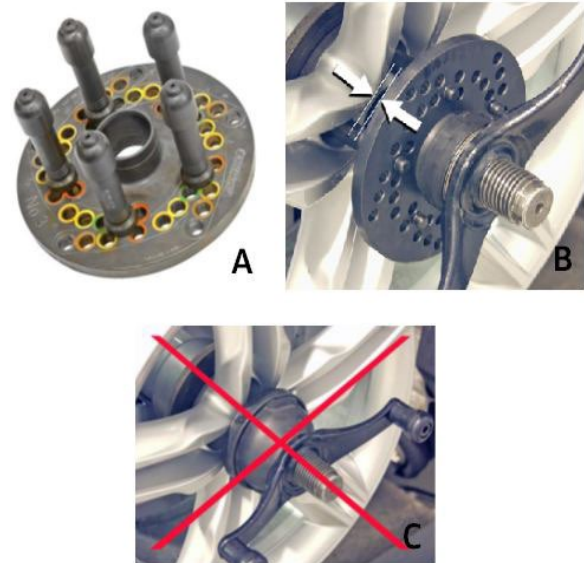
- Set all tire pressures according to the owner's manual based on the customer's requirements (normal load vs. full load).
- Test drive the vehicle a distance of at least 12-15 miles at various speeds (up to 62 mph). Some tires may require longer test drives to eliminate these temporary flat spots.
- Raise the vehicle on a lift/hoist immediately after the test drive to check the balance and RFV before the tires cool down again.

### 2. Measure RFV and balance:

- Ensure that the contact surfaces of the tire balancer flange and wheel are clean. It is mandatory that the appropriate centering collet (Figure 2, Image A)--not a cone (Figure 2, Image B)--and a five-finger style clamping plate (Figure 3, Image A) are used to mount the wheel on the balancer.
- The use of these tools ensures proper centering and mounting of the wheel on the balancer. Audi-recommended collets can be ordered through *Equipment Solutions* (part number **HUN2018451**).
- An incorrect style of clamp could damage the wheel (Figure 3, Image C).



**Figure 2.** Example of a collet (A) vs. a centering cone (B).



**Figure 3.** Five-finger style clamping plate (A), wheel properly mounted with a five-finger style clamp (B), and wheel-mounted using an incorrect clamping tool/method (C).

- Set the tire pressure of each wheel to 36 psi (2.5 bar). Use this pressure during all measurements.
- Perform a *CenteringCheck*<sup>®</sup> to ensure that the wheel has been properly mounted on the VAS 6230/Hunter GSP9700 Road Force Measurement<sup>®</sup> system.
- With the *SmartWeight*<sup>®</sup> feature turned on, measure the RFV and balance of the wheel/tire assembly. This feature will check both static (hop) and couple (wobble) vibrations to give the best possible weight and placement. Do not use the “Quick Match” mode since it does not measure radial force.

### 3. Optimize RFV and balance:



**Tip:** If a tire needs to be repositioned (match-mounted) on a wheel, use adequate lubrication to properly seat the tire on the wheel:

- Not enough lubricant can prevent the tire from properly seating on the wheel.
- Excessive lubricant may cause the tire to slip on the wheel, impacting the balance, and RFV values.

Correct the balance and, if necessary, reduce RFV by match-mounting each wheel according to the instructions from the machine. Use 18lbs (80N) or less for the first harmonic vibration as the maximum. If the first harmonic of the radial force of the tire that is the source of the vibration cannot be reduced to 18lbs (80N) or less, it should be replaced.

After balancing and/or optimizing the RFV, perform a “check-spin” to ensure balance values are consistent. If consistent values cannot be obtained, check the following:



- Calibration of the machine.
- Wheel and tire assembly mounting to the machine.

#### 4. Reinstall Wheel and Tire Assemblies:

Follow the instructions in Elsa at Repair Manual, *Chassis >> Wheels and Tire General Information >> 44 Wheels, Tires, Wheel Alignment >> Wheels/Tires/Tire Pressure Monitoring Assembly >> Wheel, Changing and Mounting.*

Install the wheels according to VAS 6230 instructions for the lowest vibration. The wheel/tire assembly with the lowest road force values should be installed closest to the driver:

- Lowest road force value: Left front.
- Second-lowest road force value: Right front.
- Third-lowest road force value: Left rear.
- Highest road force value: Right rear.
- Set all tire pressures according to the owner's manual based on the customer's requirements (normal load vs. full load).
- Test drive the vehicle at the speed at which the customer felt the vibrations to verify that the condition is repaired.

#### 5. Upload the following document to Doc-IT:

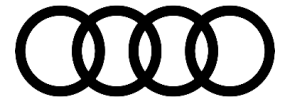
- A completed Tire Data Sheet (attached to this TSB).

#### 6. If the vibration concern cannot be resolved:

- Open a TAC ticket and advise TAC that you have uploaded a completed Tire Data Sheet to the TAC case.

## Warranty

<b>Claim Type:</b>	<ul style="list-style-type: none"> <li>• 910 Before vehicle delivery.</li> <li>• 110 Up to 12 Months/12,000 Miles</li> <li>• If the vehicle is outside any warranty, this Technical Service Bulletin is informational only.</li> </ul>		
<b>Service Number:</b>	4412		
<b>Damage Code:</b>	0013		
<b>Labor Operations:</b>	Balance and radial force balance all 4 wheels	4412 9499	190 TU



	(Includes additional time for extended road test prior to service procedure. Note that documents listed in Step 5 must be uploaded to DOC-IT for claim validation.)		
	4 wheels, remove + reinstall	4405 2004	See SRT with associated operations
<b>Diagnostic Time:</b>	GFF	No allowance	0 TU
	Road test prior to service procedure	0121 0002	10 TU
	Road test after service procedure	0121 0004	10 TU
<b>Claim Comment:</b>	As per TSB 2022563/22		

All warranty claims submitted for payment must be in accordance with the *Audi Warranty Policies and Procedures Manual*. Claims are subject to review or audit by Audi Warranty.

## Tire Warranty

Audi of America, Inc. does not warranty tires originally installed or sold as a replacement for use on Audi vehicles. Individual tire manufacturers provide all the underlying tire warranties.

Please refer to the Audi Tire Center website for tire warranty coverage and claim submission details.

## Required Parts and Tools

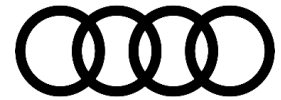
### Tools

- Use VAS 6230/Hunter GSP9700 Road Force Measurement® System to check balance, Road Force values, and to make necessary adjustments.
- Use centering collet in conjunction with VAS 6243 model-specific clamping plate (5 finger clamping device) or similar device to ensure proper mounting of wheel and to prevent damage to wheels.
- Vetronix MTS 4100 NVH Analyzer is helpful when diagnosing vibration concerns and can help narrow the list of possible sources of the vibration.

## Additional Information

More information can be found in the following resources:

- Elsa: Wheel and Tire Guide >> Diagnosis and Testing.
- Elsa: Suspension, Wheels, Steering >> Wheel and Tire Guide >> 44 Wheels, Tires, Wheel Alignment >> Diagnosis and Testing >> Wheel and Tire Vibration >> Tire Flat Spots from Standing.



- Elsa: Chassis >> Wheels and Tire General Information >> 44 Wheels, Tires, Wheel Alignment >> Wheels/Tires/Tire Pressure Monitoring Assembly >> Wheel, Changing and Mounting.
- SSP: *Noise, Vibration, and Harshness 961403.*

The following repair procedure(s) will be necessary to complete this procedure:

- *Chassis >> Wheel and Tire Guide >> Diagnosis and Testing.*

All parts and service references provided in this TSB (**2022563**) are subject to change and/or removal. Always check with your Parts Department and/or ETKA for the latest information and parts bulletins. Please check the Repair Manual for fasteners, bolts, nuts, and screws that require replacement during the repair.

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