

Technical Service Bulletin



44 Steering wheel shimmy, vibration, and/or oscillation

44 16 59 2022563/13 February 11, 2016. Supersedes Technical Service Bulletin Group 44 number 15-57 dated October 5, 2015 for reasons listed below.

Model(s)	Year	VIN Range	Vehicle-Specific Equipment
All	2008 - 2017	All	Not Applicable

Condition

REVISION HISTORY		
Revision	Date	Purpose
13	-	Revised <i>Service</i> (Revised instructions) Revised attachments (Updated Tire Data Sheet)
12	10/5/2015	Revised attachments (Updated Tire Data Sheet)
11	12/8/2014	Revised header data (Added models and model years) Revised <i>Service</i> (Revised instructions) Revised attachments (Updated Tire Data Sheet)

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



Tip: 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.

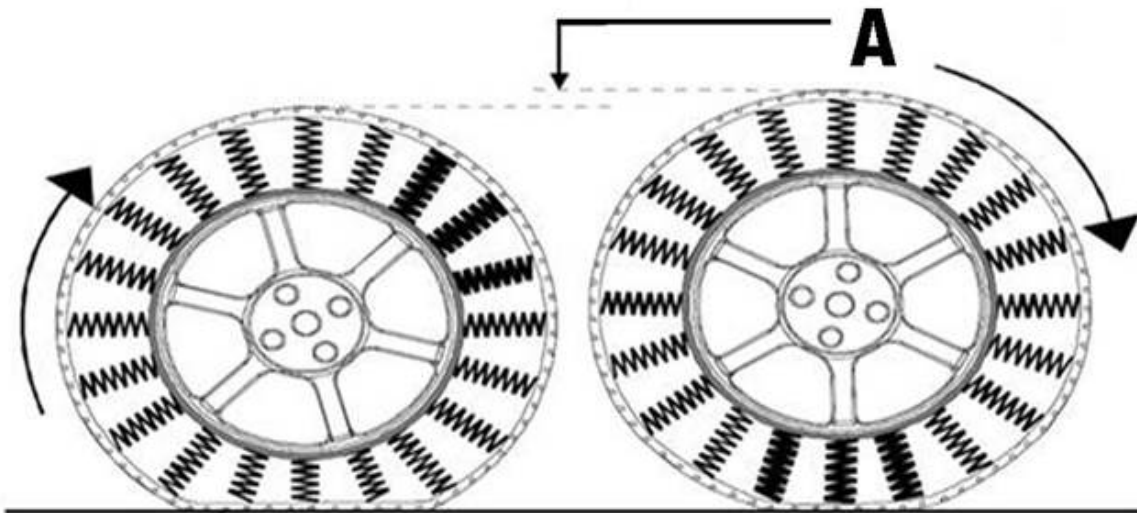


Figure 1. Vibration source from radial force variation (A).

The table below explains common causes of wheel-related and tire-related vibrations in the vehicle. Refer to *Elsa>>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 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 possible on the front tires.



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 prior to starting any diagnosis or repair for a vibration.

Production Solution\

Not applicable.

Service

Note that 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 in the order listed:

1. Prepare Tires for RFV Measurement:



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 under *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 force 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 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 in order 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 3, A)--not a cone (Figure 3, B)--and a five-finger style clamping plate (Figure 4, A) are used to mount the wheel on the balancer. 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 4, C).



Figure 3. Example of a collet (A) vs. a centering cone (B).

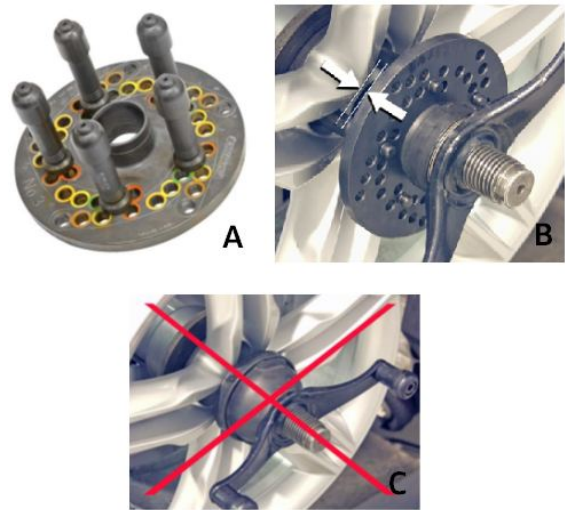


Figure 4. Five-finger style clamping plate (A), wheel properly mounted with a five-finger style clamp (B), and wheel mounted using an incorrect clamping tool/method (C).

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

Technical Service Bulletin



Warranty

Claim Type:	Use applicable claim type: <ul style="list-style-type: none"> • Up to 6/6: 110 claim type • 6/6 to 12/12: 1EB claim type If vehicle is outside any warranty, this Technical Service Bulletin is informational only.		
Service Number:	4412		
Damage Code:	0013		
Labor Operations:	Balance and radial force balance all 4 wheels (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.)	4412 9999	190 TU
	2 wheels, remove and reinstall	4405 2000	20 TU (per axle)
Diagnostic Time:	GFF	No allowance	0 TU
	Road test prior to service procedure	0121 0002	10 TU
	Road test after service procedure	0121 0004	10 TU
	Technical diagnosis at dealer's discretion (Refer to Section 2.2.1.2 and Audi Warranty Online for DADP allowance details)		
Claim Comment:	As per TSB #2022563/13		

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 replacement for use on Audi vehicles. Individual tire manufacturers provide all the underlying tire warranties.

Please refer to 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:

- ElsaWeb: *Wheel and Tire Guide >> Diagnosis and Testing*
- 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 service manuals for the latest information.

Tire Data Sheet



- > This document is only applicable to either factory-installed or OEM replacement tires!
- > ALL fields are mandatory!

VIN	DATE	MILEAGE	REPAIR ORDER #
	/ /		

CUSTOMER COMPLAINT

Description of complaint:									
At what speed? mph		Felt in: steering wheel entire vehicle floorboard				Tire mileage (if replacement tires): miles			
Only while braking? Yes No		Tire type: Factory-installed OEM replacement				Manufacturer labeling: AO RO1 AOE			
Only when vehicle is cold? Yes No		Tire brand:			Tire model:			Tire size:	

TIRE CONDITION A (Cold tires – prior to any diagnosis or repairs)

	Left front		Right front		Left rear		Right rear	
Wheel damage?	Yes	No	Yes	No	Yes	No	Yes	No
Tire damage?	Yes	No	Yes	No	Yes	No	Yes	No
Tire pressure (PSI):								
DOT (MM-YY):								
Tread depth (outer/center/inner):								
Weights attached to wheel (Oz):	Outer Inner		Outer Inner		Outer Inner		Outer Inner	

TIRE CONDITION B (Tires warmed prior to the radial-force variation (RFV) measurement)

(Preliminary test drive of at least 12mph with top speed of ≥ 62mph for 15 miles)

	Left front		Right front		Left rear		Right rear	
Tire pressure (PSI):								
RFV (lbs):	Before	After	Before	After	Before	After	Before	After