

Technical Service Bulletin



44 Steering wheel shimmy, vibration and/or oscillation

44 13 44 2022563/8 November 21, 2013. Supersedes Technical Service Bulletin Group 44 number 13-42 dated September 27, 2013 for reasons listed below.

Model(s)	Year	VIN Range	Vehicle-Specific Equipment
All	2008 - 2014	All	Not Applicable

Condition

REVISION HISTORY		
Revision	Date	Purpose
8	-	Revised <i>Condition</i> (Removed scenarios) Revised <i>Service</i> (Revised instructions)
7	9/27/2013	Revised header data (Updated customer codes) Revised <i>Condition</i> (Clarified description; added scenarios) Revised <i>Technical Background</i> (Removed RFV description; added table and reference to Elsa) Revised <i>Service</i> (Revised instructions)
6	2/18/2013	Revised title (corrected ElsaWeb error)
5	1/18/2013	Revised header data (Added model years) Revised <i>Service</i> (Revised repair procedure)
4	4/15/2011	Revised <i>Warranty</i>
3	4/7/2011	Revised header data
2	1/24/2011	Revised <i>Warranty</i> (Service Number, Labor Operation)
1	1/27/2010	Original publication

- 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.
- The 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.

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 (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.

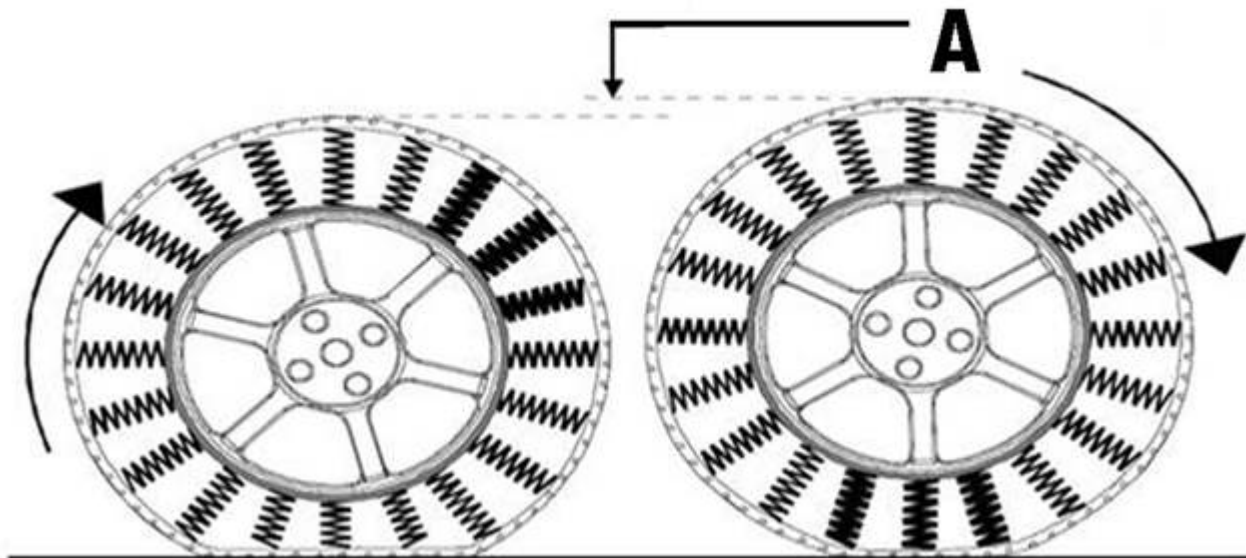


Figure 1. Vibration source from radial force variation (A).

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, the Tire Data Sheet and Hunter RFV printouts must be completed and retained for warranty claim payment. Tire Data Sheet and Hunter RFV printouts should be sent to chassis@audi.com. Failure to do so will result in non-payment of the claim.

1. Complete all of the following sections of this bulletin:

- *Prepare Tires for RFV Measurement*
- *Measure Radial Force Variation and imbalance*
- *Reduce Radial Force Variation and imbalance*
- *Reinstall Wheel and Tire Assemblies*

2. Only if vibrations are still present after completing all four sections, open a TAC ticket and include the completed Tire Data Sheet and a copy of the Hunter RFV printouts from the VAS 6230 / Hunter GSP9700 Road Force Measurement[®] system (Figure 2).

*The data sheet **must** be completed before a TAC ticket is opened.*

3. After a TAC ticket has been created, send the VAS 6230 / Hunter GSP9700 Road Force Measurement[®] system printouts and Tire Data Sheet to chassis@audi.com. Failure to upload the Hunter RFV printouts will result in non-payment of the claim.

The e-mail must include the following information:

- VIN
- Repair Order number or claim ID
- Mileage (from Repair Order)
- Dealer Code

Prepare Tires for RFV Measurement:

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. The flat spots will vary based on the type, size, and make of the tire. If the vibration disappears after the tires are warmed up, the following repairs may not be successful.

To eliminate temporary flat spots:

1. Test drive the vehicle a distance of at least 12-15 miles at various speed ranges (up to 62 mph). Some tires may require longer test drives to eliminate these temporary flat spots.
2. Raise the vehicle on a lift/hoist immediately after the test drive in order to check the balance and radial force before the tires cool down again.



Tip: Flat spots are not a sign of a defect and therefore are not a warrantable condition.



Tip: 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.*

Measure RFV:

1. Ensure that the tires are warm and the temporary flats spots have been eliminated.
2. Mount the wheels on the balancing machine, making sure that the contact surfaces of the flange and wheel are clean.



Note:

It is mandatory that the appropriate centering cone or collet (Figure 3) and a five-finger style clamping plate (Figure 4, A) are used when the wheel is being mounted on the balancer.

A five-finger style clamp centers the wheel on the balancer in the same way the wheel is centered on the vehicle (Figure 4, B).

An incorrect style of clamp could damage the wheel (Figure 4, C).



Figure 3. Example of collets (A and B), and centering cone (C).

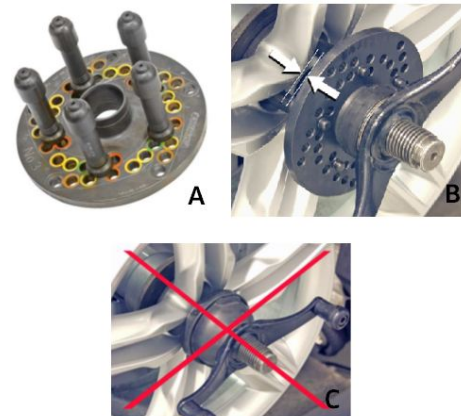


Figure 4. Five-finger style clamping plate (A), wheel properly mounted with a five-finger style clamp (B), and wheel mounted using an incorrect clamping tool/method (C).



Tip: Use adequate lubrication to ensure that tires are properly seated on the wheel. Do not use excessive lubricant, which may cause the tire to slip on the wheel, impacting the balance and road force values.



Tip: Audi recommends using the correct collet when mounting the wheel/tire on the balancing machine. To order, please refer to *Equipment Solutions* (part number **HUN2018451**)

3. Perform a centering check to ensure the wheel has been properly mounted on the VAS 6230 / Hunter GSP9700 Road Force Measurement® system.



Tip: Do not use “Quick Match” mode; this mode does not measure radial force. Ensure that the “Smart Weight” balance feature is on. This feature will check both static (hop) and couple (wobble) vibrations to give the best possible weight and placement.

Reduce RFV:

1. Optimize the radial forces:

- Set the tire pressure of each wheel to 36 psi (2.5 bar).

Measure, balance, and, if necessary, force match each wheel according to the instructions from the machine. Use 18lbs (80N) or less for the first harmonic vibration as the maximum.



Note:

If the first harmonic of the radial force of the tire that is the source of the vibration cannot be reduced to less than 18lbs (80N), *and* the tire is an original factory-installed tire, it should be replaced.



Tip: After balancing the wheel/tire, perform a “Check Spin” to ensure balance values are consistent. If consistent values cannot be obtained, conduct a calibration of the machine (Figure 5). This operation is located in the “Logo” screen under “Calibration”.

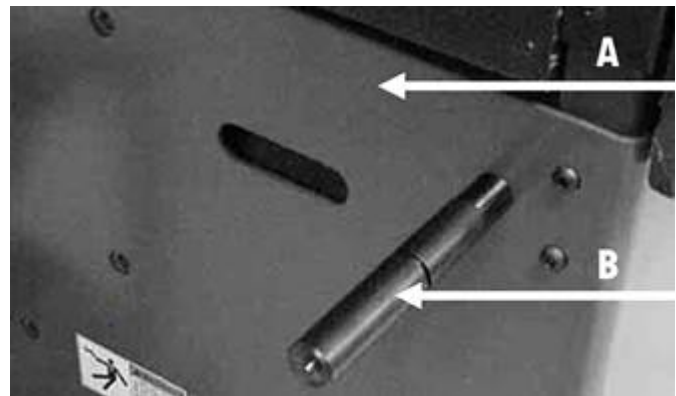


Figure 5. Back of balancer (A), calibration weight (B)

Reinstall Wheel and Tire Assemblies:

1. 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

Follow the instructions in Elsa under *Repair Manual >> Running gear >> 44 wheels, tires, wheel alignment >> Installation of wheels/ tires/ tire pressure warning >> Instructions on wheel change/installation.*

2. Adjust tire pressure. Refer to the owner's manual for appropriate "normal load" tire pressure. The pressure displayed on the B pillar placard should only be used if vehicle is being operated at "full load".
3. Test drive the vehicle at the speed at which the customer felt the vibrations to verify that the condition is repaired.

Technical Service Bulletin



Warranty

Claim Type:	Use applicable 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 (A copy of the before-and-after radial force and balance values must be attached to the Repair Order). <i>Includes additional time for extended road test prior to service procedure.</i>	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 #2022563/8		

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.

Audi Tire Warranty Assistance Program (ATAP)

The Audi Tire Assistance Program is not an Audi of America, Inc. factory 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 warranty coverage and claim submission details.

Dealer Tire 1-866-487-2834

Audi warranty 1-866-677-AUDI

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.