Document Information

Location: Suspension – Wheels & Tyres
Topic: Steering wheel vibration
Condition: Intermittent at various or specific vehicle speed
Diagnostic Trouble Codes: N/A

Measure

Vibration (general or at the steering wheel) felt when driving the vehicle at a certain speed or a speed range (e.g. 70 to 80kph), can be a result of tyre flat spots and/or out of specification wheel balancing.

If a vehicle is received at the workshop with a customer complaint for running gear vibration felt while driving, please follow the procedure outlined below to successfully identify and rectify the concern.

The procedure below also outlines the actions and information required for successfully submitting a Warranty claim for diagnosis and repair of this type.

Care Point: Wheel vibration claims must be submitted as a result of a reported vibration while driving.

At the start of the diagnosis, the following two questions will help you to assess the contributing factors in this concern and identify the direction of actions (Part A or Part B below) required to rectify it:

- Was the vehicle received with all four wheels at the specified pressure for shipping purposes (this is relevant to PDI claims)?
- Has the vehicle been driven regularly or stored taking reasonable precautions (increased tyre pressures, tyre cradles etc.)?

If the answer to the above two questions is Yes, proceed directly to Part B
If the answer to the above two questions is No or Unknown, proceed to Part A first.

Care Point: Complete the "Wheel Vibration Form" which can be found in the Attachments section of this article, for the imbalanced wheels and ensure the form is attached into the warranty claim (if there is a valid claim).

Care Point: If visible, supply a photo of the wheel label sticker. This can be found either in the centre bore of the wheel or on the rim underneath the tyre as per Figure 1
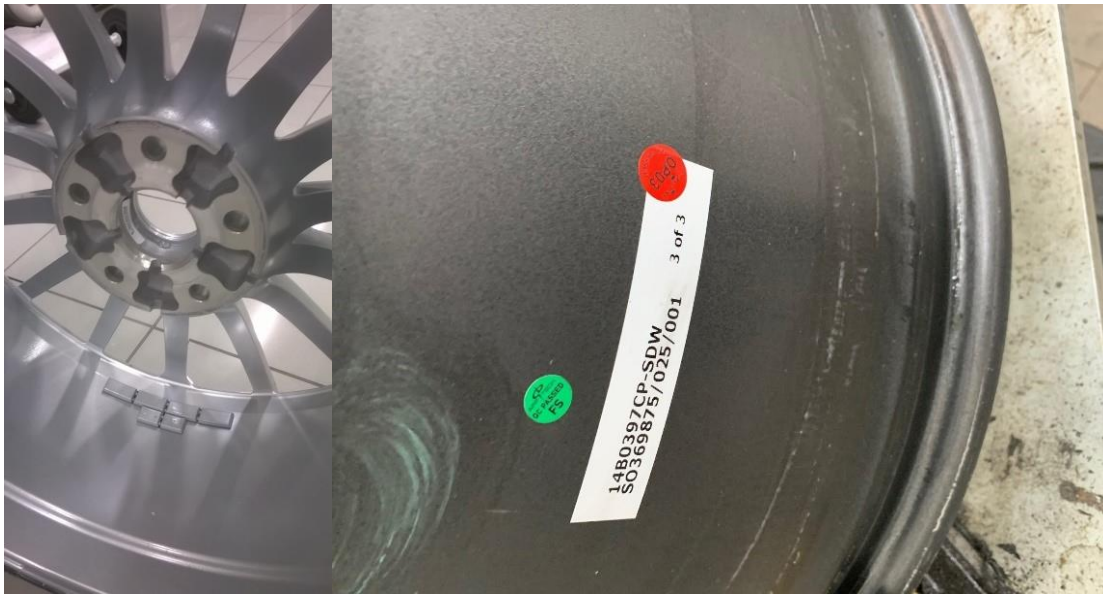
Figure 1

Part A - Flat Spots

Tyre flat spots can cause steering wheel vibration. Flat spots can occur if the vehicle is parked when the tyres are hot after a long journey or extreme use (for example on a racetrack). They can also be caused if the vehicle is stored for a long period of time. The following procedure is recommended in order to eliminate tyre flat spots and allow the tyre to return to its original shape.

It is necessary to get heat into the tyres to do the procedure that follows. Because of this you must drive the vehicle for a sufficient distance. Record the odometer indication before and after the test drive.

Care Point: If you need to collect and drive the vehicle from the Customer to the workshop, you can do the step that follows during the journey.

Care Point: Prior to commencing this procedure ensure that a two-post lift in the workshop has been kept immediately available upon return from the tyre heating test drive. It is paramount that the tyre pressures are increased while heat is still retained in the tyre.

- Drive the car on the road for a minimum of 15 miles (24 km) at between 50 and 70 mph (80 and 112 km/h)
- Check with your hand that the tyres feel warm. If they do not, drive the vehicle more until they are warm
- Immediately after driving the vehicle (in less than five minutes), lift the vehicle on a two-post lift so that the wheels are off the floor

- Increase the tyre pressures of all four tyres to 60 psi (4.12 bar)
- Leave the vehicle lifted for a minimum of four hours. Though where possible, it is recommended that you leave the vehicle overnight to maximise the effect (donor set of wheels can be fitted to the vehicle to free up the ramp for other work)
- Reduce the tyre pressures to the correct level
- Lower the vehicle
- Perform another road test of the vehicle

If the vibration is no longer present, it is most likely that the vibration was related to how the car has been stored. Please see advice for how to avoid flat spots.

Care Point: There is no valid warranty claim for flat spotted tyres

If the vibration is still present, proceed to Part B below.

Part B – Wheel Imbalance

Care Point: Hunter GSP9700 Road Force Measurement System is required to carry out this procedure

Care Point: Record all the figures measured in the procedure that follows, on the "Wheel Vibration Form".

Use Hunter GSP9700 to measure the Radial Force Variation (RFV) and the balance of each wheel and tyre assembly. The maximum permitted balance weight specification (Table 1) and RFV figures (Table 2) are shown below.

Care Point: Ensure all tyres are inflated to the correct normal operating pressures before carrying out these procedures.

Balance Weight Requirements
Inner RIM max 40 g
Behind spokes max 100 g
Total Max 140 g

Table 1

Tyre Type	RFV at Normal Pressure
Pzero and Corsa	< 110 N (11.2 kg)
Trofeo	< 140 N (14.2 kg)
Winter	< 140 N (14.2 kg)

Table 2

Care Point: The Hunter GSP9700 may have different default Road Force Values, ensure the values above are setup on your device. It is advisable that the operator sets up the Hunter GSP9700 machine's Road Force™ Limits to the above figures (use the operational manual of the machine to find the 'Service Mode Set Up' and 'Setting the "P" Limits')

If the RFV figure is higher than the specification in the table above, use the Hunter GSP9700 to force-match the tyre to the wheel. This is to try and bring the wheel and tyre assembly in the correct specification. Try and get the lowest figure that is possible, the Hunter GSP9700 will guide you through this process. For additional instructions, use the operation manual and follow the 'ForceMatching™ Procedures' section.

If the RFV cannot be reduced below the figures stated in Table 2, rotate the tyre by 90 Degrees and repeat the ForceMatching™. Otherwise, Part A will need to be repeated as a flat spot may still exist in the tyre.

If you cannot get the wheel and tyre in the correct specification after completing both parts, contact Technical Support for further instructions.

Parts Information

N/A

Warranty Information

Resolution Category
Casual Part Number: N/A
Casual Part Name: N/A
Casual Issue: N/A
Rectification: N/A
Time: N/A

Attachments

Wheel Vibration Form

KA Updates Information

N/A