



HYUNDAI

Technical Service Bulletin

GROUP	NUMBER
SUSPENSION	20-SS-004H
DATE	MODEL(S)
NOVEMBER 2020	ALL

SUBJECT: WHEEL/TIRE VIBRATION – BALANCE AND RADIAL FORCE VARIATION (RFV) SERVICE PROCEDURES

THIS BULLETIN SUPERSEDES TSB# 15-SS-002 TO INCLUDE UPDATED TIRE VIBRATION SERVICE PROCEDURES AND A NEW TIRE BALANCE DATA SHEET.

Description: This bulletin provides tire vibration service procedures, including how to optimize vehicle vibration performance. For all wheel/tire balance claims, the “Tire Balance Data Sheet” must be fully completed including imbalance and Road Force Variation (RFV) data. The Data Sheet can be found at the end of this bulletin.



Applicable Vehicles: All Hyundai vehicles

Warranty Information:
Normal warranty applies.

Important Notes About Wheel/Tire Balance and RFV Measurements:

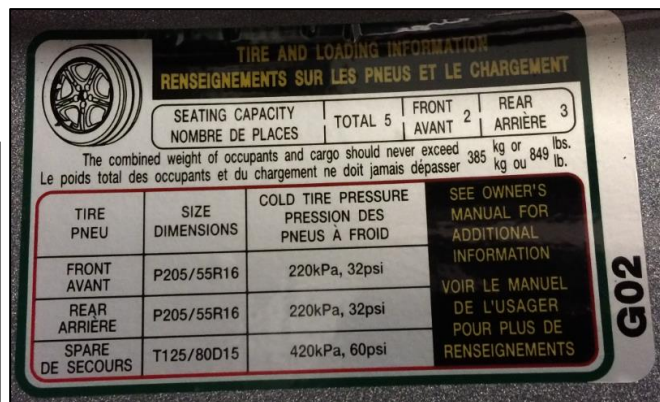
- For all wheel/tire balance and RFV vibration claims, the Data Sheet (attached at the end of this TSB) must be completed and attached with the repair order documentation.
- Air pressure must be set to specification (cold) according to the vehicle placard **BEFORE** performing any service procedures.
- **ALL RFV measurements MUST be taken with warm tires.**
 - If the RFV measurements cannot be taken immediately after the warm up drive, lift the vehicle on a hoist to remove weight from the tires. Raising the wheels will help prevent temporary flat spots from developing.
- Identify the customer concern accurately, and record the concern on the Data Sheet.
 - If the concern is vibration that occurs during the first few minutes of driving, but improves over time, temporary tire flat spotting is likely the cause. Inform the customer that all tires may develop some level of temporary flat spotting after being parked for long periods of time, and that the effects diminish as the vehicle is driven.
- Periodic calibration of wheel balancing equipment is needed for accurate measurements. Contact your local Hunter representative (if using a GSP9700 wheel balancer) for service.

Service Procedure – Wheel/Tire Assemblies Balance And RFV Measurement:

1. Inspect the wheel and tire assemblies for damage, aftermarket equipment, bent rims, missing balance weights, irregular tire wear, debris in the wheels, etc. Record any findings on the tire balance sheet.
2. Record “as-received” tire pressure, then set cold tire pressure to placard pressure.

NOTICE

Environmental factors can affect tire pressure. The two main environmental factors are ambient air temperature and elevation. Colder ambient air will reduce tire pressure, while hotter ambient air will increase tire pressure. High elevation may also increase tire pressure.



3. Identify the customer concerns accurately. Record on the attached Data Sheet the conditions which cause the vibration to occur: speed, ambient air temperature, road condition, first 10 minutes of driving, etc.

4. Test drive the vehicle. The vehicles should be driven for at least 20 minutes at freeway speeds to properly warm the tires and minimize the effects of temporary tire flat spotting.

If the complaint is confirmed, the wheel and tire assemblies' balance and RFV must be measured and recorded on the Data Sheet.

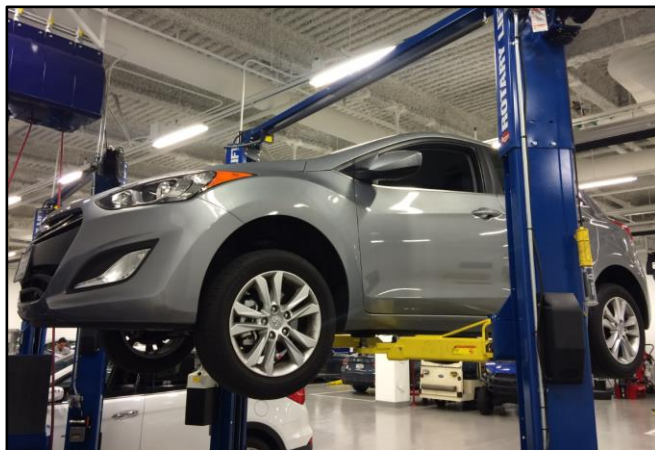


5. Immediately following the drive, lift the vehicle off the tires on a hoist.

Mark the tires with their initial positions (front left, front right, rear left, rear right) with chalk on the inside of the tires.

Remove the wheel/tire assemblies from the vehicle to check balance and RFV.

Record all initial balance and RFV information on the data sheet.



Lug Nut Torque

lb-ft	• 65.1-79.6
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kgf.m	• 9.0-11.0
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N.m	• 88.3-107.9
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NOTICE

The wheel/tire assembly RFV values listed below are intended to be used as a guide only to aid in reducing vibration. It is possible to have RFV values that are greater than these numbers without a vibration issue.

- P-metric passenger vehicle wheel and tire assemblies: **18 lbs or less**
- P-metric SUV and van wheel and tire assemblies: **24 lbs or less**

6. If the RFV values are below the guidelines, but there are assembly imbalance issues, rebalance as necessary and then test drive the vehicle to confirm vehicle repair.
7. If the RFV values exceed the guidelines, or to minimize an RFV vibration, the force-matching procedure may be required to resolve the vibration complaint. See **Service Procedure – Force-Matching and Tire Placement (Page 4)**.

8. After force-matching, arrange and install the wheel/tire assemblies according to the guidelines given in **Service Procedure – Force-Matching and Tire Placement (Page 4)**, if applicable.
9. Test drive to confirm vehicle repair.

NOTICE

If the vibration complaint is not resolved, contact the Hyundai Technical Assistance line at 800.325.6604 prior to replacing a wheel or tire. It may be necessary to investigate other sources of vibration.

Service Procedure – Force-Matching and Tire Placement

Force-matching involves aligning the high point of the tire (stiffest spot) with the low point of the wheel to minimize RFV values. To reduce RFV on a given wheel/tire assembly, perform the force-matching procedure as described below. For assistance on any Hunter balancer, please contact your local Hunter representative.

1. Remove the balance weights from the wheel.

Mount the wheel/tire assembly on the machine to begin the balance and RFV measuring procedure.

Mark the high point on the inside of the tire as indicated on the balance machine.



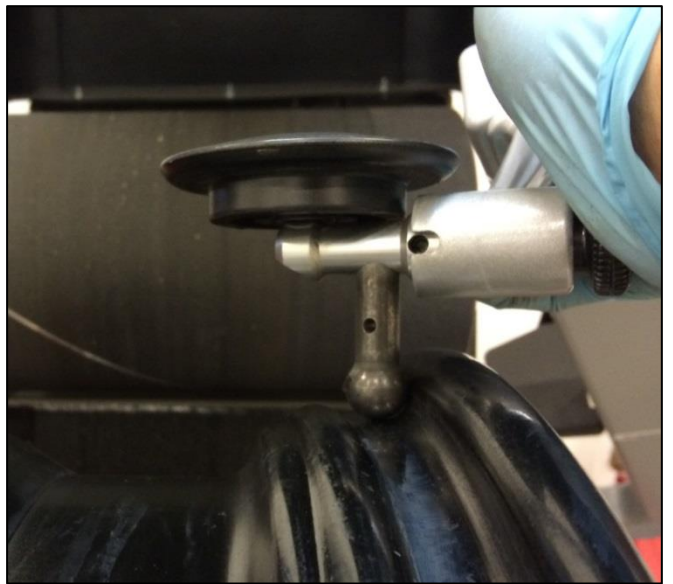
2. Measure the rim runout. Perform the rim runout measurement according to the instructions given on the wheel balancer.

Mark the low point on the inside of the wheel.



NOTICE

Some wheels may not have a lip on the outside face, which will require the rim runout to be measured on a bare rim (no tire).



3. After marking the tire and the wheel, move the assembly to a tire changing machine to break the bead and align the two marks.

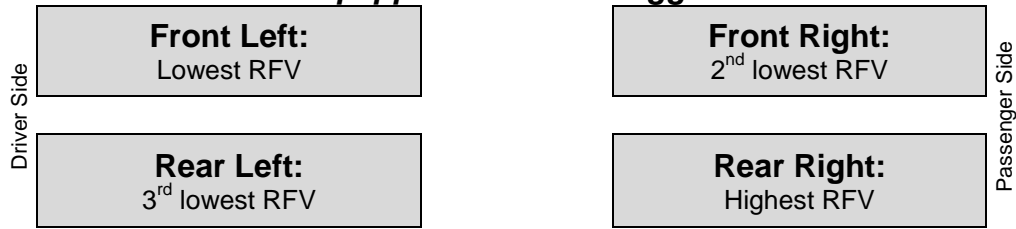
Then re-seat the bead and inflate the tire to specification. Confirm that the RFV value has reduced on the wheel balancer.

Record the final RFV values on the data sheet.

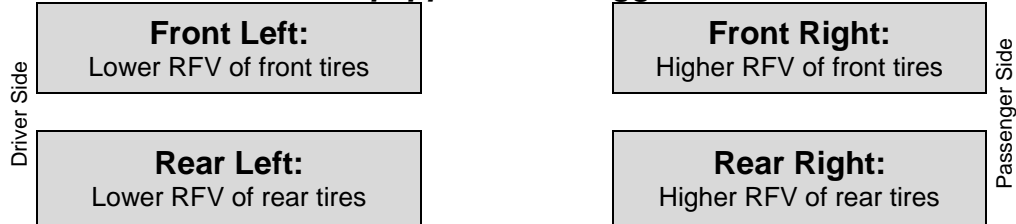


4. To further reduce vibration felt by the driver, arrange the wheel/tire assemblies according to the charts below.

For models equipped with non-staggered tire sizes



For models equipped with staggered tire sizes



5. The service is now complete.

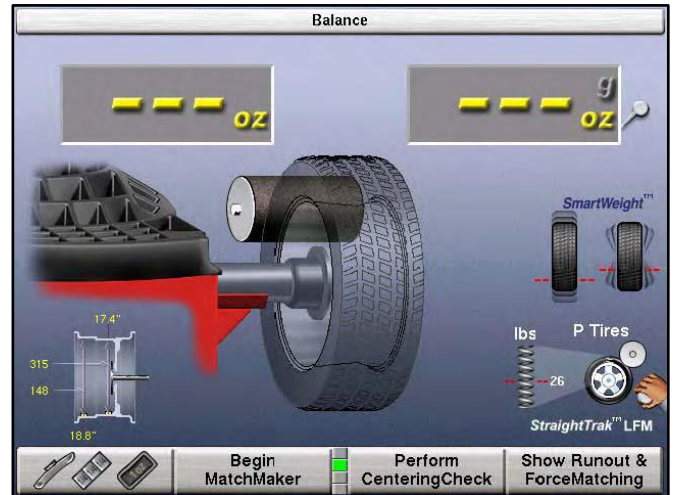
Best Practices – Hunter GSP9700 Wheel Balancer

Centering Check: For reliable and accurate measurements, the wheel must be properly mounted on the balancing machine.

1. Select the proper cone:
- Use the correctly sized cone for the wheel hub bore. For most Hyundai applications, use the cone sized for 65-70mm wheel hub bore diameters.
 - Inspect the cone surface for damage. Replace the cone if any damage is found.
 - The wheel hub should sit as close to the middle of the cone's tapered surface as possible, and not at the largest or smallest ends of the cone. If the wheel fits close to the ends of the cone, if possible, select another cone size.

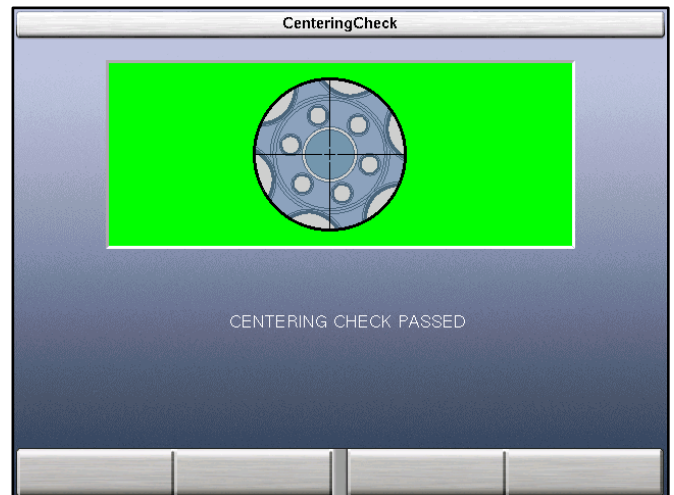


2. From the menu, select “Perform Centering Check” and follow the on-screen prompts.



3. If the mounting assembly is properly centered, a green screen will be displayed.

If the mounting assembly is not properly centered, a red screen will be displayed. In this case, balance and RFV results will not be accurate. Try re-centering the assembly, or a better mounting method should be used.



Calibration: All wheel balancers must be correctly calibrated for accurate results. If calibration has not been performed within the past 6 months, contact your local Hunter representative to schedule calibration.

NOTICE

The latest calibration date is required on the Tire Balance Data Sheet.



Tire Balance Data Sheet

Date:

Dealer Code:

Technician:

IMPORTANT

This completed worksheet must be scanned and submitted with the warranty claim. If no RFV measurements are taken (only a wheel balance was performed) write "NO RFV, wheel balance only" in the Technician Notes below.

VIN:

Year/Model:

Prod Date:

Mileage:

Customer Complaint:

Occurrence:

- In the morning
 For only a few miles after driving
 After driving for a few miles
 All the time
 Other:

MPH range:

Air temp:

Hrs/Mins vehicle sat before driving:

hrs

mins

Technician Notes:

Wheel/Tire Condition & Other

Tire Brand and Model:

Tire Size: F:

R:

Initial Measurements

Final Measurements

Wheel Position	Tire Pressure (PSI)	TPMS ID	Tire DOT Number (All digits)	Weights Present* (g)		RFV – Warm tires (lbs)	Tire Pressure (PSI)	TPMS ID (if rotated)**	Weights Added (g)		Final RFV (lbs)
				Inner	Outer				Inner	Outer	
FL											
FR											
RL											
RR											

*Record the total amount of physical weights on the wheel (inner and outer planes).

For models with staggered size tires front vs. rear, **install the narrower wheel/tires assemblies on the front, and wider assemblies on the rear of the vehicle. For either pair of front or rear wheel/tire assemblies, install the assemblies with lower RFV on the driver's side of the vehicle.

Wheel Balancer Model:

Calibration Date: