

▶▶ *Sensor Manufacturer Recommendation for Replacement of Sealing Components on a Schrader TPMS Aluminum Valve Sensor*

Schrader Technical Service Bulletin

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I. Scope

In keeping with Schrader's leadership role in TPMS training, the following documents Schrader's recommendation regarding Schrader TPMS aluminum valve sensor service, and in particular the use of TPMS service packs for the replacement of TPMS sensor sealing components. Since the implementation of mandated TPMS by the TREAD Act, Schrader has included this recommendation in all TPMS training activities.

II. References

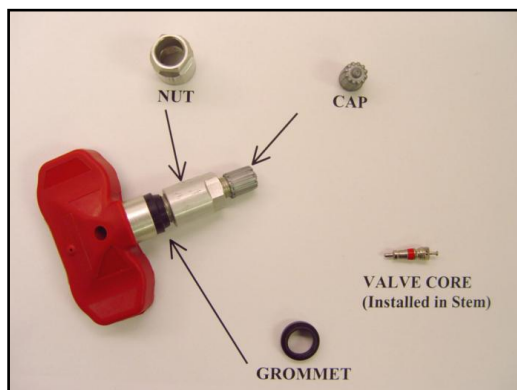
1. Schrader TPMS Sensor & Service Pack Application Catalog

III. Definitions

1. **TPMS** – Tire Pressure Monitoring System
2. **Galvanic Corrosion** – accelerated corrosion of a metal caused by a union of dissimilar metals in a corrosive environment.
In the case of TPMS, the most common, but not exclusive corrosive environment is a combination of air, water and road salt.
3. **Dissimilar metals** – different metals that could form a corrosive relationship in an electrolyte when connected by a metallic path (i.e. Aluminum and brass in physical contact exposed to saltwater, or the aluminum stem in contact with the steel wheel).
4. **Electrolyte** - a substance that when dissolved in a suitable solvent becomes a conductor in which current is carried, thereby causing accelerated corrosion.

IV. Schrader Requirement for Replacing the Sealing Components on a Schrader Aluminum Valve TPMS Sensor

As the sensor manufacturer, Schrader instructs that the sealing components must be replaced when reinstalling a Schrader TPMS aluminum valve sensor, and also when the tire is removed from the wheel, using a genuine OEM validated Schrader TPMS service kit*. Commonly supplied TPMS service kit components are the cap, valve core, aluminum nut & rubber grommet, and may include a replaceable aluminum valve and attachment screw.



Technical Explanations for Replacing the Sealing Components & Affects on Performance



Why Replace the Nut?

The TPMS nut is designed in anodized aluminum to eliminate the contact of two dissimilar metals that would create galvanic corrosion and material deterioration. The aluminum nut for the TPMS does not have the strength of a steel nut and can be damaged by over torque, removal or misuse. The replacement nut has a fully anodized surface. The nut is treated with OE approved bonded lubricant to enhance assembly, to further prevent galvanic corrosion, and help to provide the proper torque required for seating a new grommet. In addition to the engineered advantages, esthetically the new nut will provide a "fresh look" to the wheel.

Note: Proper torque on the nut is essential to ensure proper sealing of the grommet to the wheel rim. It has been shown that over torque on the nut during installation can shear the sensor body from the stem. Use Nut Torque Wrench #65278-67 or Nut Torque Screwdriver #65062-67. Both tools can be set to torque the nut to the correct value of 4.5Nm nominally.

Affects on Performance if the nut is not replaced

1. The aluminum nut does not have the strength of a steel nut and could have been damaged by over torque, removal, or misuse when trying to reuse the nut.
2. The anodized finish and OE bonded lubricant on the original nut may have worn or been scratched during installation, service, or removal and will not provide the full corrosion protection that a new replacement nut will provide.



Nut w/ external corrosion



Nut w/ internal corrosion

3. The torque required during assembly may be misleading if the nut condition (e.g. Corrosion, scratches, damaged threads) is such that it binds or is difficult to reinstall. A new nut in good condition will ensure that the proper torque is achieved to seal the grommet to the wheel rim.



V. Why Replace the Valve Core?

Heat and compressive forces over time causes deterioration of all elastomeric (e.g. Rubber, plastic) components. Standard practice has historically been to replace these components whenever a tire is serviced, through the replacement of a standard tire valve, which contains a new valve core. For a standard tire valve this pertains to the tire stem and the valve core, both of which have elastomeric components. Following the standard practices, it is necessary to replace the valve core when re-installing a TPMS sensor.

There are two reasons for replacing the in service valve core with the one supplied in the Schrader-Bridgeport TPMS kit. One, the valve core has two distinct elastomeric components, the rubber cup seal and the red tapered teflon seal on the OD of the valve core, that are both subject to deterioration as described above; and two, the replacement valve core is uniquely plated and provides protection against galvanic corrosion.

Note: Cap & Core Screwdriver #2025000105 has been designed to remove and install the valve core without damaging the valve core or the stem.

Affects on Performance if the valve core is not replaced

1. If a non-OE approved, valve core is used in place of the specially plated replacement core provided in the Schrader-Bridgeport TPMS Kit, galvanic corrosion and complete deterioration of the valve core may occur, which could result in air loss or the inability of the valve core to actuate. Market research has shown instances where a dissimilar metal core was improperly installed into the aluminum stem and the accelerated galvanic corrosion resulted in the core becoming “frozen” and seized, stuck in the stem and could not be removed.

ALWAYS use a nickel plated valve core with aluminum TPMS valve stems

NEVER use a standard unplated brass valve core in replacement situations with TPMS aluminum stems

Only the nickel plated Schrader core supplied in the service kits should be used



Unplated Valve Core, Corroded in Stem
(Valve core will not actuate)

2. Compressing the red tapered teflon seal as the valve core is installed into the stem creates the static seal between the valve core and the stem. The seal will take a compression set after exposure to this compressive force and changes in temperature over time. Attempting to reseal the valve core may result in a poor mate between the valve core seal and the stem, resulting in air loss.



VI. Why Replace the Cap?

The cap is the primary seal to the external corrosive environment. The cap contains a rubber seal, which prevents contamination (e.g. salt, abrasives) and moisture (e.g. water, oil, harmful solvents) from entering the stem and contaminating the seal of the valve core, making the cap an integral component in the overall sealing system of the TPMS sensor. Note the use of a sealing grommet in the cap, unlike most passenger car type dust caps.

It is also important to use the plastic replacement cap to ensure that a dissimilar metal cap is not used to contact the aluminum stem. Field studies have shown that using a dissimilar metal cap (brass) can cause galvanic corrosion between the cap and the stem, resulting in the cap being stuck to the stem. Use of excessive force, or improper tools, can also damage the cap and or stem.

Note: To install and remove the cap, tighten or loosen by hand, or use the specially designed handle on the OEM approved plastic Cap & Core screwdriver tool. **DO NOT** use any type of metal gripping tool to tighten or loosen the cap.

Affects on Performance if the cap is not replaced

1. The rubber seal in the original cap will have taken a compression set when subjected to the compressive forces of installation and exposure to changes in temperature over time, potentially degrading the seal and creating a potential leak path for contaminants and moisture to enter the stem.



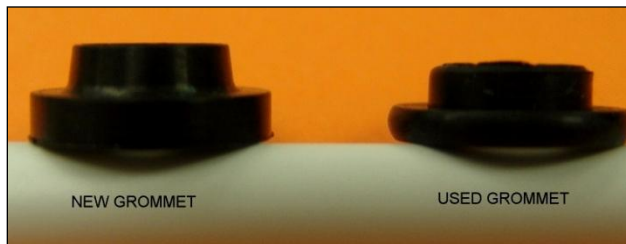
VII. Why Replace the Grommet?



The grommet is the principal sealing gasket between the stem and the wheel rim hole. The grommet is subjected to intense compressive forces and high temperatures over time. The grommet will conform to the mating surface of the rim taking a compression set over time. The grommet, as with any gasket much like a head gasket or a thermostat gasket, is a one-time use only component, and therefore must be replaced whenever it has been disassembled.

Affects on Performance if the grommet is not replaced

1. The in service grommet will have taken a compression set due to the forces created by the initial torque nut installation. Additional torque to compress the grommet further in order to seal will result in the over torque of the nut and increased compression set on the grommet. Increased torque may damage the nut, damage the stem, or fracture the sensor body.
2. There is a likelihood that the in service grommet will not seat properly with the wheel rim hole or the nut, therefore creating a leak path.



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