

Schrader® Snap-In TPMS Valve Differentiation – Why Not All Valves are Created Equal

Evolution of the Tire Valve

Schrader® invented the first tire valve for bicycles in 1891, the tire valve cap in 1896, the first tubeless tire valve in 1956, and most recently, Snap-In valves for tire-pressure monitoring systems (TPMS). For more than a century, Schrader® has continued to provide the highest-quality, innovative valves that meet not only Original Equipment (OE) vehicle manufacturer specifications, but also for daily consumer use in the Aftermarket service repair environment. The newest evolution is Schrader® Snap-In TPMS valves, which allow for easy installation, and connection to the TPMS sensor, with the same superior quality and air-control features.

While other providers do indeed manufacture rubber snap-in valves, there are very important characteristics to be aware of because not all valves are created equal. The information below was generated via in-depth product testing of a variety of different valves in the marketplace today. It is important to make sure you know you're buying a Schrader® valve before purchasing.

Valve differentiation occurs across three important areas; **First**, the construction of the Schrader® valve itself; **Next**, the manufacturing and assembly processes that ensure quality and accuracy in each and every valve; **Lastly**, the rigorous testing that each valve goes through before leaving the worldwide Schrader manufacturing facilities.

Manufacturing & Product Differentiation

- Schrader® uses a specially formulated rubber compound, made with EPDM rubber, for TPMS Snap-In valves to prevent the valve from twisting or bending, which could cause leakage at high speeds or under hard acceleration and deceleration in extreme temperature conditions. This specially formulated rubber is important because of the added weight of the TPMS sensor attached to the valve in vehicles today.
- Schrader® formulates the rubber compound to meet important ozone resistance. Ozone can prematurely cause rubber to crack and leak. Schrader's rubber is tested and validated to meet OE, SAE and international standards for ozone resistance. Additionally, Schrader® is a member of ISO, Tire & Rim Association, and ETRTO committees, tasked with driving global product specifications for quality and safety.
- Schrader® recommends that all tire valve caps use a rubber seal inside to provide a secondary sealing barrier from potential environmental hazards.

- Schrader® has the capacity to produce over 500 million valve cores each year. These Schrader valve cores have seven specially engineered components (barrel, cup, pin, screw plug, spring, cup washer, and flouropolymer sleeve) that combine to create the valve core. The valve core is an access valve that will self close, or seal, with sealing being the important aspect after access. Schrader® valve cores can be found in different applications, but are always included in Aftermarket TPMS service packs that are used to ensure the continued proper performance of the TPMS system (sensor & valve). The TPMS service kit, which includes the valve core, (sealing) cap, nut and grommet (stem seal), must be replaced whenever a tire is dismantled for service or replacement.

Assembly & Process Differentiation

- Schrader® uses a rubber injection molding process to ensure superior metal valve body-to-rubber bonding which provides an excellent no-leak seal.
- Schrader® has fully-automated valve assembly lines providing 100% in-process leak checks and dimensional measurement conformance. These in-process checks ensure that Schrader® valves are 100% verified across a variety of critical measures before they ever leave the assembly line for final testing.

Testing Differentiation

- Schrader® TPMS valves are fully tested and validated in accordance to OE specifications across a vast array of performance requirements.

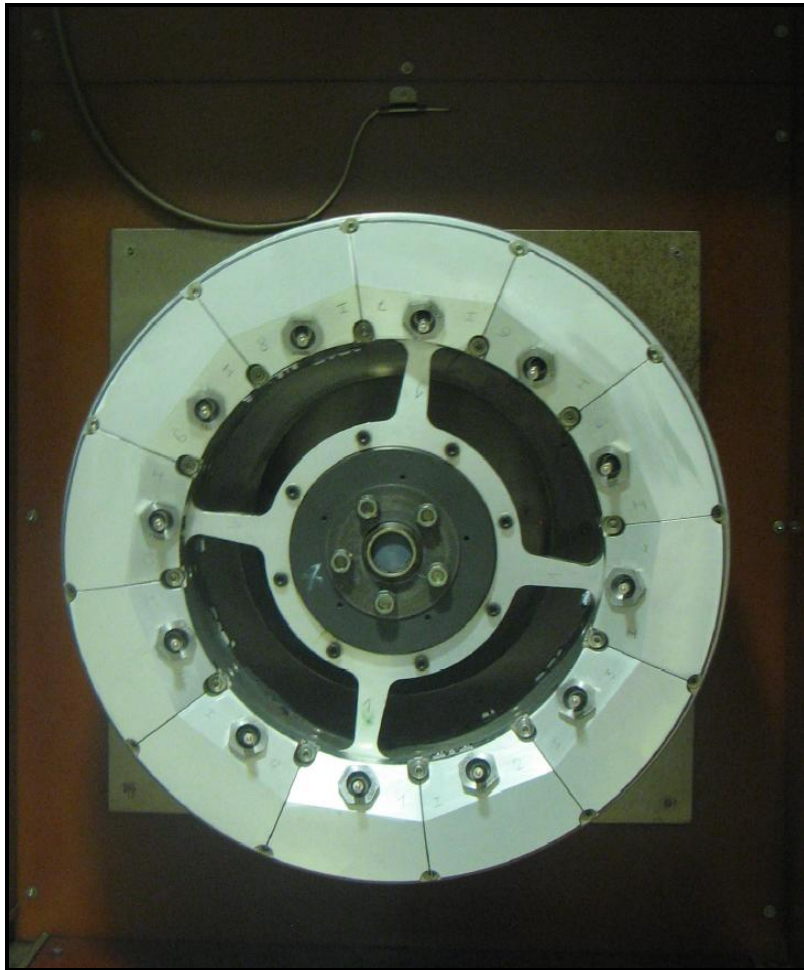


(Vision System for 100% verification check of valve core functionality)

- Schrader® tests all manufactured valves, including Snap-In TPMS valves, in specially designed and constructed high-speed spin chambers (shown below) to simulate real world driving conditions. For example, testing elements include high G-force testing, in hot and cold conditions. These are testing conditions that Original Equipment Car Manufacturers specify for their final vehicles.



(High-speed spin tests simulating real world driving conditions)



(High-speed spin chambers for valve testing)

Why Not All Valves Are Created Equal

It is true that not all valves are created equal. When short-cuts are taken across any of the three areas of Manufacturing, Assembly, or Test, critical errors can occur and safety may become a risk. Potential valve failure areas are explained below. Again, it is important to make sure you know you're buying a Schrader® valve before purchasing.

Adhesion

The valve stem shown below exhibits an absence of adhesion/bonding of the rubber to the brass body insert. Loss of adherence is caused by contaminated brass, improper molding conditions, and poor rubber composition. Adhesion is important since it keeps the metal insert in place and prevents loss of air pressure. A stem with poor adhesion may exhibit slow air leaks, bulging of the stem above the rim surface, and in extreme cases, loss of the metal insert and rapid deflation of the tire. Schrader® valve stems are subjected to adhesion testing during assembly to provide assurance that the stem will provide premium performance.



Damaged Valve Cores & Washers

Damaged valve cores can cause slow and fast leaks of air pressure due to leak paths created by improperly formed parts, contamination, or substandard materials. The valve core has two principle functions; to allow air to be added and removed from the tire while providing a seal to maintain the set pressure.



Excessive Flash

Excess flash is caused by worn molds or excessive molding pressures. Excess flash causes issues with tire assembly automation and may also interfere with proper seating of the valve within the wheel. Flash caught between the valve stem and wheel may also cause leaks. Schrader® uses continually well-maintained molds and electronic process controls to ensure that proper molding pressures and temperatures are maintained each and every time.



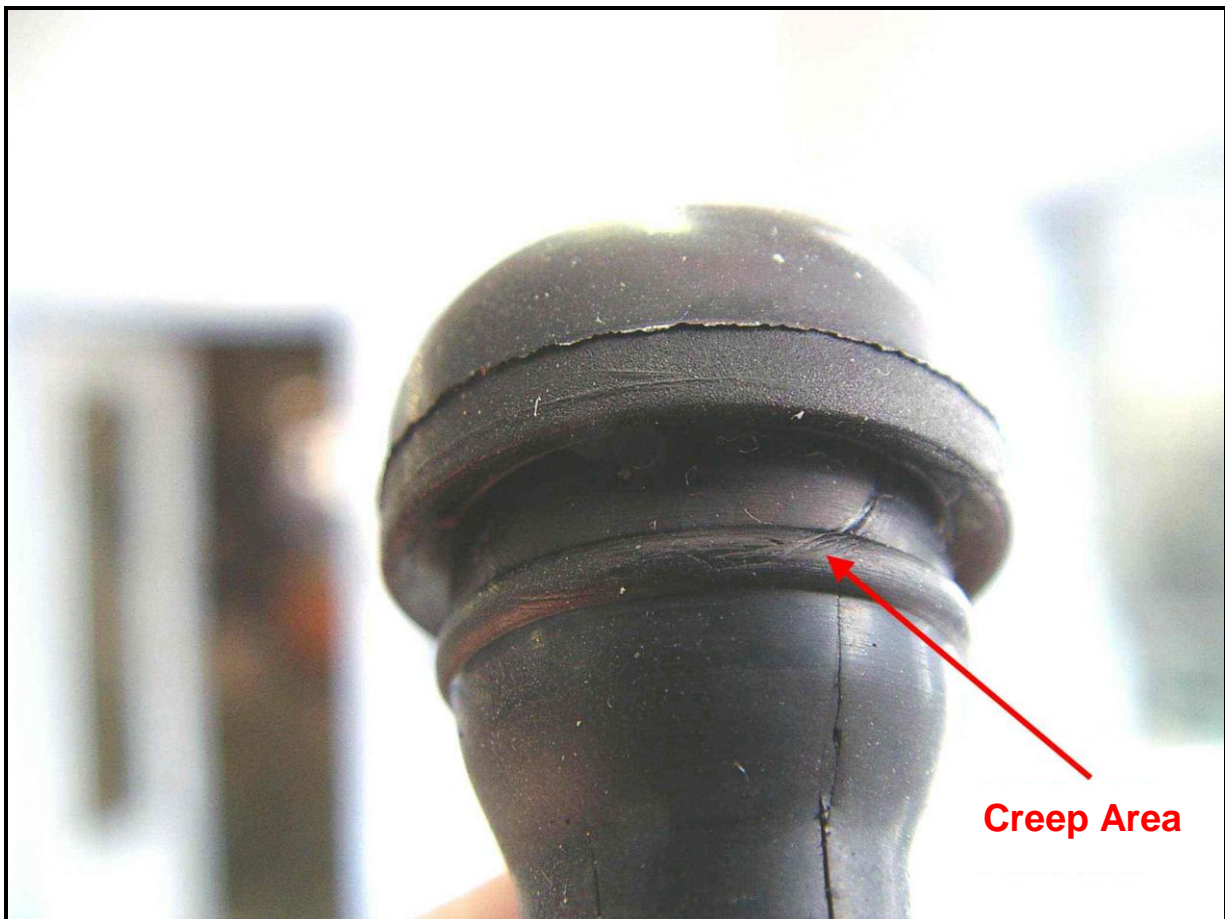
Deformation

Valve deformation is mainly linked to a lack of rubber vulcanization; therefore Schrader® utilizes a specific process able to automatically discard the valve if the cure time or cure temperatures are beyond the required level. During valve production, functional shapes are under video control and mechanical rubber properties are tested.



Creep Areas

Creep is caused by applying a load to the rubber before it is fully cured, or using a rubber compound without good compression set qualities. This leaves a permanent change in the surface of the rubber that can become a surface leak path and/or potentially hidden inner rubber fault. The load can be applied as the rubber is ejected from the mold due to sticking or later. Schrader® uses a rubber compound that is inherently creep resistant and electronic machine controls ensure a complete cure cycle on all molded valve stems.



Ozone Resistance

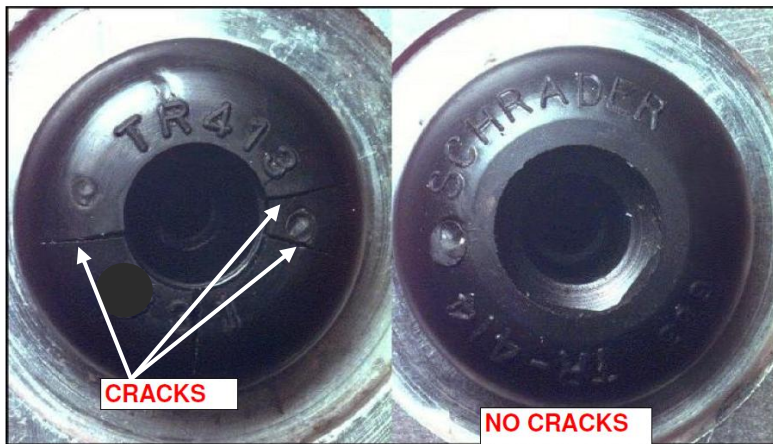
Rubber tire valves must be ozone resistant to prevent rubber deterioration in the form of surface cracks, and in extreme cases, rubber splitting and breakage throughout the entire rubber part. A common term for ozone attack on rubber is “dry rot.” In extreme cases, this can cause a rapid loss of air pressure within the affected tire. Schrader® uses a specially-formulated rubber compound that provides extreme ozone resistance.

Ozone Testing with a Schrader® Valve & Non-Schrader Valve



COMPETITOR VALVE

SCHRADER VALVE



COMPETITOR VALVE

SCHRADER VALVE