

# TECBLOG SMALL BUT NOT FORGOTTEN

## VALVE STEM SEALS ARE SMALL RELATIVE TO OTHER GASKETS AND SEALS IN AN ENGINE, BUT THEY PLAY AN IMPORTANT ROLE IN LUBRICATION. WHAT MAKES VALVE STEM SEALS DIFFERENT THAN ALMOST EVERY OTHER TYPE OF SEAL?

The answer is simple – they are designed to leak. Seals designed to leak may sound counter-intuitive, but the amount and way in which they leak is precisely controlled to achieve a specific goal.

### VALVE STEM SEAL TYPES

1. **Deflector seals**, also called umbrella seals, deflect oil away from the valve stem. They are secured to the valve stem and move with the valve to shield the valve guide from excess oil. Umbrella type seals were commonly used prior to the development of positive type seals.
2. **Positive seals** attach to the valve guide boss and function as squeegees, wiping and metering oil on the stem as they pass through the seals.



Deflector seals move with valve stem

Positive seals are fixed to the valve guide boss

### APPLICATION-SPECIFIC DESIGN

As with all of our products, before beginning production of valve stem seals, we sample the OE design for every application. Each OE design is tested and benchmarked – we determine the OE material used, the durometer (relative hardness) of the rubber, temperature resistance (to both extreme heat and extreme cold), resistance to common oil types, tear resistance, and leak rate. This type of analysis makes one thing clear: Not all valve stem seals are created equal. Visually, a lower-quality seal may look very similar to the high quality seal appropriate for a given engine platform, but a lower-quality seal will not work as intended.



In the case of the Chrysler PowerTech 4.7L V8 (SS 71041), the base of the valve springs seat on the specially-designed valve stem seals.

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### OIL CONTROL

Valve stem seals provide a controlled leak of oil to allow the valve stem to be lubricated as it slides in the valve guide. The amount of oil that passes by the valve stem seal must be precisely controlled, as too little oil causes stem and guide wear. Too much oil causes carbon buildup, leading to valve seat damage, decreased volumetric efficiency, increased emissions and excessive oil consumption.

## FEL-PRO DESIGN

Fel-Pro uses a variety of materials, including nylon, PTFE, rubber, steel, synthetic rubber, or some combination of these. A seal with insufficient heat resistance will harden and crack prematurely, which is why Fel-Pro engineers always use the right material for every application. Viton® is used in many Fel-Pro valve stem seals for hotter-running, late-model vehicles. It is often combined with a metal “jacket” or covering that totally surrounds the Viton positive seal. Viton offers excellent resistance to heat (up to 450° F) and abrasion alike.

### In a recent post on our ‘Break Room’ Forum, a user asked:

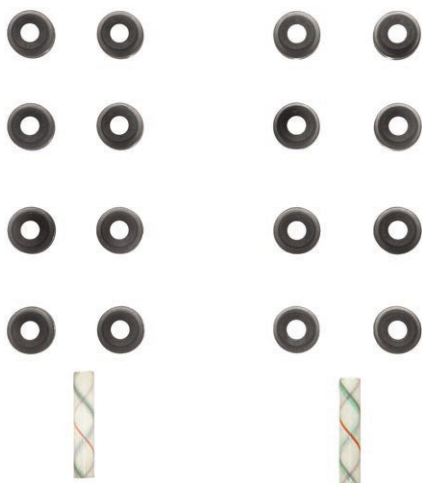
“I recently purchased your valve stem seals for my Honda Del Sol. In my shop manual it says the seals for the intake valves are a different color than the seals for the exhaust valves. Your seals are all the same. Will this be a problem?”

### Our team of engineers explain the difference:

The Fel-Pro valve stem seal set that we offer for this application is part number SS 70283-1. This set contains 16 of the same valve stem seals. The seals in this set utilize a premium FKM material and are designed to function properly on both the intake and exhaust valves, and replace both the OE intake and OE exhaust valve stem seals.

You can count on Fel-Pro to always use the right material for the application. On some applications, the valve stem seals are interchangeable between the intake and exhaust valves, and will look exactly the same. On applications that use different seals on the intake and exhaust valves, due to needing higher temperature material on the exhaust side or different design, the seals will be bagged and labeled appropriately.

An installation tool is included in Fel-Pro valve stem seal (VS) sets using positive seals. This tool is a thin plastic sleeve that is placed over the tip of each valve stem during installation. It protects the inner lip of the seal from damage by the lock grooves in the valve stem.



SS 70283-1 Valve Stem Seal Set