

CAPTIVE VALVE CAPS

Store and Photos by Harry Lewellyn

I just inventoried the valve caps on Jenna's Toyota. There were three different types. Do you know why? Because long ago I'd given up on maintaining a matched set. It seems regardless of how hard I try, I loose valve caps right and left. Hey, on the last San Felipe trip, I not only lost a valve cap, but forgot to air that tire up! Here's a way to never lose 'em and place in the money in the air up-down race every time.

PRODUCT DESCRIPTION

Here's a valve cap that not only looks good and functions as promised, but makes airing down and up quicker and easier than you might expect. Each cap has a retainer leash that tethers it to the valve stem (see Figure 1). You can't lose 'em, uh, provided you install them correctly!

TESTS

I tested the caps four ways. I drove with them leashed to the stem, but not screwed on (see below, LEASHED, UNSCREWED). You could forget to reattach them. Then I performed a use test (INSTALLATION). How easy is everyday installation and removal? Finally, I tested how well they held air with no valve cores. That is, the only thing that kept the air in the tire was the cap (CAP ONLY and STREET PRESSURE TEST).

LEASHED, UNSCREWED

Figuring the caps could end up anyplace around the stem, I tested two positions: pointing directly at the center of the wheel and fully away from the center. These seemed like the two worst positions. Fully in (see Figure 1 B), they could try to rotate outward or they could twist and try to tear the leash. Fully out (see Figure 1 C) would have the greatest "tear away" force.

Position means nada! It appears the caps are incapable of tearing the leash, short of snagging on rocks or brush.

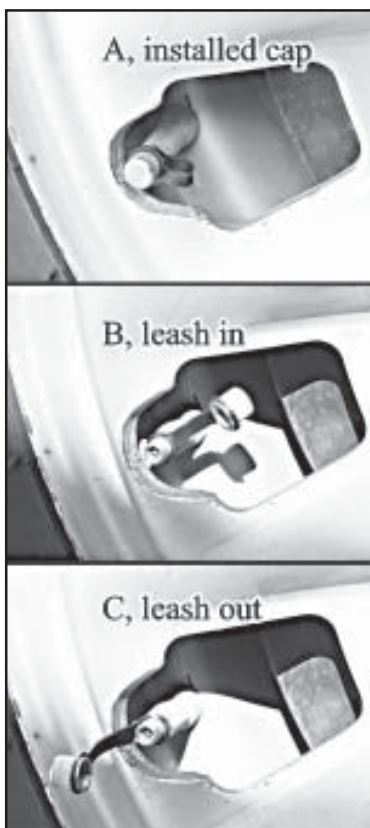


Figure 1 Leashed valve cap

INSTALLATION

Once the leash is attached, installation and removal are almost identical to those of normal, lose caps. You just have to be marginally careful to only turn the cap and not catch the leash with your fingertips. I found a wrist action vs. finger action reduced finger complications.

Regarding leash position, I prefer it pointing in. This seems to make it just a little easier to install and tighten. This may vary by wheel design.

How tight is up to you. The nicely knurled cap allows a torquer like me to cinch 'em down tight enough to challenge Godzilla's removal power, but beware. The elements, like salt water, could lock them on so tightly that you and the scaly serpent's removal efforts fail forever. This is very unlikely, though, since they're made of brass and have a protective plating the English call anodizing.

Another overtightening consideration is damaging the seal. You could possible squash the seal and destroy it. I snugged them up just beyond "kid" tight. It seems on the Copper Canyon tour, the kids regularly steal any and all valve caps.

CAP ONLY

It's possible to remove the core for air down and use the cap seal only, but this may not appeal to the "quarter PSI" critical folks. However, with a special test fixture I investigated cap installation air loss. Even the most particular PSI prudes may find this acceptable.

AIR LOSS MEASUREMENT

The special fixture (see Figure 2) was a getagauge.com EZ Air gauge. It allowed us to measure the pressure after installing the cap. That's a little tough to do with just the stem on the wheel. You'd have to remove the cap and lose more pressure to put the gauge back on the stem! The "simulation stem," was actually the EZ Air's compressor port. This is not identical to a wheel valve stem, but is acceptably close.



Figure 2 Test fixture

Jenna and I would remove the EZ Air valve core, then air down to 10 PSI. As quickly as we could (explained below), we installed the leashed cap and noted the final pressure. We consistently lost only about 0.5 PSI, and never more than 0.8 PSI. To compensate for the cap "installation" loss, we simply aired down to 1 PSI higher (11 PSI). In round numbers, figure you lose about a pound while installing a cap. Here's how to minimize air loss.

We used two hands. We got close by counting as I've described in other articles. We then used our thumbs to temporarily plug the port for a quick measurement. You'd do the same on the wheel stem, only with a finger. The final action was to screw the cap on with the other hand.

STREET PRESSURE TEST

Thinking like a getchaback coyote (lost valve stem), we tried the core-less caps at street pressure. In a day, as best I could tell, they lost no air and here's why.

O-RINGS

Most caps have flat sealing washers. Although it doesn't affect small as much as large, they can bunch and wrinkle, making an imperfect seal. The captive cap's O-rings worked perfectly throughout all of our tests (see Figure 3).



Figure 3 Cap O-ring

CORE LESS AIR UP

The dissected valve core and stem show why airing up and down are faster without the core. The air simply has a bigger, less restricted hole to move through. Figure 4, A shows an unrestricted valve stem hole. B shows a valve core passage. Besides being smaller, flow is further encumbered by the valve shaft and face (C) that normally resides in the hole.

Come air up time, connect your compressor to the coreless stem and air up to a little above your desired street pressure. You'll learn to estimate it pretty closely. If you use the EZ Air gauge, you should also remove the valve core in the compressor port.

I measured the "cored" vs. coreless air up time. The bigger the compressor, the more difference this makes. Low output compressors don't suffer too much, but my Big Red compressor showed a 10% air

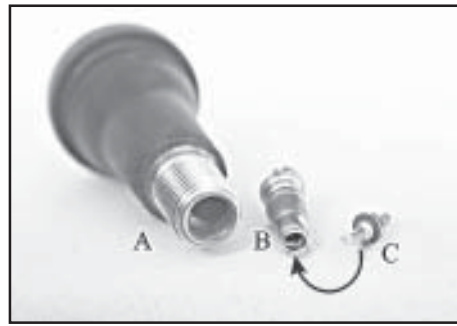


Figure 4 Air passages

up increase and my garage compressor was hit to the tune of a 75% inflation time increase! Extreme Outback Products supplies the Big Red and other premium compressors (www.extremeoutback.com).

VALVE CORE REMOVAL TOOLS

Figure 5 shows four kinds of valve core removal tools. I had to draw in one type. Note all of the working ends (at the center) are identical. The multipurpose and the valve cap tools are small and cumbersome to use. The screwdriver and sketched types are bigger and easier to use. Practice safety.

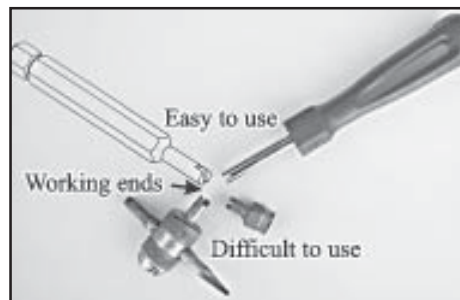


Figure 5 Valve core removal tools

VALVE CORE REMOVAL SAFETY

Don't look down the valve stem "barrel" while removing the core. Carry extra cores until you perfect the removal art. At 30 or 40 PSI, these babies can launch into never-never land, never to be found again. Worse yet, your eyeball becomes the bull's-eye, so wear glasses and practice at home.

SOURCE

At \$14.00 (tax and shipping included) per set of four, how can you go wrong? Great stocking stuffer come Dec. 25.

