Get Rid of the Damn Creep!

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Ya Damn Creep!

Without stating the obvious elicited feelings of annoyance and frustration associated with it, regulator creep is an absolute occurrence in all regulators—whether they're from Huma, AGT, or Taipan and even if there are absolutely no leaks from perfectly fine O-rings—in PCP systems. Its manifestation is even more certain for regulators paired with larger plenums. Provided one has a fundamental understanding of the thermal effect on air pressure vessels and the simple mechanics of a PCP regulator, it would be quite clear that either dynamic or static temperatures dictate whether the phenomenon is or isn't, respectively, exhibited.

Internal pressure changes can be easily observed when filling an air vessel equipped with a pressure gauge. After a half hour or so of filling to a desired pressure, the gauge's indicator would settle to a nominally lower pressure reading than it was immediately after the fill and when the vessel was warm. It's because heat causes air molecules to expand and, conversely, the cold causes them to contract.

For obvious reasons, more molecules can be crammed together in a larger rather than smaller space. The problem, however, is that filling such space with extremely high-pressure air too quickly introduces heat. And because it's easy to dump a large amount of it into a much smaller PCP reservoir with a regulated system (say, from an SCBA tank), heat is an accompaniment.

Consider the following two premises: (1) It's permissible to refill a plenum when the air already in it has cooled and internal pressure has decreased to the pressure vessel's recommended pressure; thus, the plenum would be able to provide more volume (i.e. additional compressed air at high pressure) because the air molecules have shrunk and have contracted and therefore occupy less space (volume). (2) A PCP's plenum is recharged with air from the reservoir at a rapid rate following the expulsion of some of or all its air. Putting the two together, when the plenum is subjected to continuous recharge cycles, there really isn't time at all for the air temperature to stabilize because the regulator's springs would quickly compress and close the air inlet once the maximum allowable plenum pressure—not necessarily volume—is reached. It's the reason for consistent velocities in a shooting session because, again, the air in the plenum isn't given sufficient cooling time to cause any detectable pressure changes and, as one might guess, a creeping regulator.

It's not until the PCP has been left sitting for a substantial period one would notice a slower or faster first shot, either of which would depend on the PCP's state of tune.

As stated above, the air in the plenum contracts when it has had the time to cool after going through its last recharge cycle (e.g. from storage after the previous day's shooting session), thereby allowing for more volume to be squeezed in. To delve deeper into the subject, however, it is at this stage that some of the pressure from the regulator's springs is relieved, causing them to slightly decompress. The effect of this is the air inlet allowing passage of a tiny amount of air from the reservoir into the plenum until the maximum allowable volume is again reached. The entire process repeats until the plenum is unable to go through another heating and cooling cycle, and it's at this stage additional volume would no longer

be available and the internal pressure finally stabilizes. The difference—or rather, the *culprit*—between the velocities of shots from a shooting session and the first (or second) shot taken after storage is the *resting duration* the plenum undergoes; the longer the charge-and-recharge cycle, the more time is given for the air to cool. Note that all of this happens within an unspecified time frame—*unspecified* because temperatures and the rate at which they rise and drop can vary from one location to another (and it has just been discussed the key role they play).

Having now learned the cause of regulator creep, how then would it translate to either a slower- or faster-than-normal first shot? And what would be the means to counteract it? Again, it's the hammer and valving system's state of tune.

Be Gone, Ya Creep!

There's really just one ideal spring tension rate that works harmoniously with a given narrow pressure range, so every full turn of the hammer spring adjuster, if so equipped, would likewise require finding the correct plenum pressure range to attain any consistency and therefore the correct tune. If the hammer spring tension is insufficient or is overpowered by too great a pressure, the result will be a slower first shot. On the other hand, a higher-velocity first shot would be resultant from too much spring tension against a particular pressure range.

Digesting everything said, hence, achieving first-shot accuracy—*consistency*—is a matter of finding a balance between spring tension and plenum pressure, the discussion to attain which has been a regular occurrence on many forums and the plethora of information for which can easily be found through a search. It's as simple as that, and here's hoping some of the air surrounding this dreaded topic has been cleared for those who've previously searched high and low for a solution (pun somewhat intended).