M14 Maintenance, *part two*

[gas system maintenance]

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It's probably simplistic to say that the gas system is the heart of an M14, but this rifle will in no way, shape, or form shoot well if the system is incorrectly fitted or insufficiently maintained.

Note: I asked Derrick Martin, owner of Accuracy Speaks, to address many of the points that are brought up in this article.

Note, too: M1A™ is a trademark for the Springfield Armory® version of this rifle. I prefer to use the "M14" label to identify this rifle type. While it's true that an M14 may be a select-fire weapon, I'm talking only about semi-automatic competition rifles.

The whole reason an M14 is called a "gas-gun" is because of its operating system. Technically, all semi-automatic firearms are "gas operated," but there are varied means by which the gas -- which is really just pressure created by burnt gunpowder -- is put to work to operate the system.

The M14 rifle uses about the most "advanced" (read: complex) means. First, there is a gas cylinder attached to the underside of the barrel. This cylinder contains a piston about 3.25 inches long and is capped by part called the gas plug. One end of the piston is larger than the other. The large end, which is open and hollow, is housed within the gas cylinder; the crescent-shaped small end, which is also hollow but solid at its base, protrudes out the back of the cylinder and contacts the operating rod. Inside the barrel is a gas port hole; on top of the piston is a gas port hole. When the bolt is locked down, these holes line up.

[Note: If you've ever had an experience where your gun fires but doesn't cycle, that can be the result of improper sizing of the cartridge case. The bolt closes, but doesn't close far enough for the operating rod to locate the piston such that the holes in the piston and barrel line up. If these holes aren't aligned, the system can't operate. The bolt should push fully against the op-rod, which should push the piston fully against the gas cylinder plug -- and everything should line up. If the cartridge case isn't sized "down" enough at its base, or if the shoulder isn't pushed back an adequate amount, or a combination, then this problem can exist. Likewise, the brass you use can itself be the problem. Don't, for instance, attempt to reload cases that were first-fired in a machine gun. The easiest way to prevent this problem is to purchase and use a cartridge case gage, such as LE Wilson manufactures, and adjust your sizing die according to what it shows you. And what you want it to show is that your case is sized the maximum safe amount (case head flush with the lower step in the gage). Go get the M14 reloading article and look it over.]

Now, when the rifle is fired the bullet skips on out and the pressure behind the bullet sprays through the barrel port hole and into the piston via its port hole. The pressure exits the hollow end of the piston and expands inside the plugged cylinder. When

About the time you decide that your gas system is good for one more match and your zero gets out of whack once you get there, you'll be wishing you'd have taken an extra few minutes after the last barrel swabbing.

If it gets cleaned each time back from the range, then there's no question about when it will be cleaned next, or when it should be. There are accuracy and zero changes from dirty systems, and not as dirty as all that.

the pressure builds an adequate amount -- which is regulated by the internal capacities of the cylinder and piston -- the piston begins moving rearward, misaligning the port holes such that no more gas is admitted into the cylinder. As the piston moves rearward, it pushes against the operating rod -- which is connected to the bolt -- which cycles the rifle. Simple.

With all these parts clanging around toward the end of the barrel, it's also plain to see that gas system operation is crucial to the accuracy of an M14. This article won't concern itself with modifications made to the gas system (which, essentially, involve attaching the cylinder more securely to the rifle and aligning all the parts such that the "timing" is correct), but will discuss maintenance of this system, and why correct maintenance is important to ensure both top accuracy and to retain zero.

Referring to the previous description, it's obvious that the *entire* gas piston is hollow. It's also obvious that gasses generated from burnt gunpowder are dirty. The same coat of powder fouling you swab out of the bore each cleaning has likewise collected inside the gas system. Left alone, this residue cakes inside the piston. As the carbon coating builds, internal dimensions change such that the volume is reduced. The effect that has on your rifle might vary depending on, among other things, the actual internal dimensions of your gas cylinder and piston (there is always a parts variance). Regardless, chances are extremely good that your gun will shoot its best, most consistent groups when there's no fouling present. A tell-tale sign that your piston is clogging is vertical zero changes.

So Rule-One is to clean the system. How often? *Each time you bring the gun home from the range*. Most rifles actually *require* less frequent cleaning, but the best time to clean the gas system is the same time you clean the barrel. That way it's part of your routine.

Step-one is to disassemble the system so the piston can be removed. You'll need a 3/8-inch wrench to fit the plug nut and some means to secure the cylinder from movement under torque as the plug is loosened (and later tightened). Securing the cylinder can be accomplished by *lightly* clamping it in a vise or by the use of a special gas cylinder wrench. Large screwdrivers and the like used as pry-bars are not recommended. The specialty wrench is a good choice because it works well and can be carried in a cleaning kit. Not that you'd necessarily want to clean the system on the 600-yard line, but if you're at an out-of-town match you should keep up your maintenance schedule. Things, like zeros, might change if you don't.

The best way to clean the piston is with a set of appropriately-sized drill bits. Nifty screwdriver-style tools to handle this chore are available from numerous outlets. There is no solvent required when you use the drill bits: just spin them inside the piston and tap out the fouling. Done.

If you want to rig your own, go to a machinist's supply and request a number-15 bit for the small hole and a 5/16-inch or letter-P for the big one. Machinist's drill bits are sequenced in finer graduations than the inch-designated varieties at the hardware store and are necessary to precisely match diameters.

Wipe down the outside of the piston with a rag. Some people recommend using steel

wool, crocus cloth, and various other abrasives, but abrasives shouldn't be necessary (use solvent if the fouling is stubborn). A good waste of time is polishing the piston with emery cloth until it looks like chrome. This is sometimes done to reduce fouling buildup; however, it also reduces the diameter of the piston (which cleaning with abrasives can also do). The reduced diameter can increase gas blow-by and alter the rifle's function. Equally unnecessary are the aftermarket coated pistons that are also supposed to reduce buildup. If maintenance is done on an each-firing schedule, you'll never have excess buildup in the system. Also, since these are coated with titanium-nitride (which is extremely hard), they can cause excessive wear on the cylinder.

Another often-given means of treating the fouling is to add a drop or two of solvent through the port on the underside of the gas cylinder. This solvent runs around the piston and loosens the exterior fouling, which is supposedly "blown out" on the next shot. That might happen, but, one, that method does nothing to clean the interior of the piston and, two, the solvent residue actually attracts more fouling on subsequent shots. Losing proposition.

Rule Two, then, is to keep solvents, oils, and the like out of the gas system entirely. Last time we talked about cleaning an M14 when it's set upside down and with the muzzle angled slightly downward. This way, any solvents introduced into the bore aren't as likely to run into the gas system through the barrel port hole. One note: when you finish cleaning the barrel, you might want to snake a pipe cleaner through the barrel port hole to clean it out.

Swab out the interior of the gas cylinder before you button it back up. A pistol cleaning rod with an eyelet jag works well. It may or may not be necessary to use solvent. It's best if you don't, and the fact that you're now cleaning the system after each range session should eliminate the need for it. If you're refurbishing a neglected system, then solvent will likely be necessary. Make sure you thoroughly "degrease" the interior, though, before you call it done.

Wipe down the entire area around the cylinder's attachment point with the barrel; gas can leak into this area. And when you have the gun broken down, thoroughly clean the rear portion of the cylinder that you can't normally reach. This area can pick up smudge.

After taking the big drill to the inside of the gas plug, you're ready to put it all back in order. Use the gas cylinder wrench and tighten down the piston. According to Derrick Martin, all that's necessary is to get it "snug." *If* the gas system was fitted correctly, the amount of pressure against the gas cylinder lock shouldn't affect zero. To play it safe, though, you can paint an index mark from the plug to the cylinder. Tighten the plug until your marks line up and that's that. Al Baker, former Marine Corps Armorer, recommends setting the gas plug torque to 20-ft.lbs. That's not a "magic" number; the 20-ft.lb. figure resulted from the Corp's need to arrive at a constant they could use for every rifle. They found 20-ft.lbs. high enough to keep the plug from coming loose but not so high as to crack it. That's mighty durn high. I put 5 on mine and never had one come aloose.

Next article finishes this series with a look at lubrication and general maintenance.

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