I've spent the last few months trying to get a better understanding of what a barrel break-in process is and how to properly clean a rifle. What to do and what not to do.

I've spent a lot of time on this board, the BR board and other shooting boards listening to members and what works for them. Conclusion, what works for some, doesn't work for others. Being an engineer in the telecommunications field, when it's broke or you don't understand something you go back to manufactures specs and schematics. So that's kinda what I did on this subject.

I've talked with 4 metallurgist and 3 barrel manufactures (Rock Creek, Hart and Shilen), on the subject. From a scientific point of view, they all said and agreed to pretty much the same thing.

First, barrel break-in processes keep them in business. This shoot and clean, shoot and clean every round or few rounds break-in process only damages your brand new match barrel. Think of a car engine for a moment. Why do we use oil in the engine? To prevent metal-to-metal contact and reduce friction between two metal surfaces. Your barrel is no different from the engine. Mike Rock at Rock Creek barrels gave me the most detailed explanations on barrels and ballistics. Mike has his degree in metallurgy; he was also the chief ballistics engineer for the Army for many years at the Aberdeen Proving grounds. Stan Rivenbark was one of the top ballistic engineers for Raytheon before he retired in the 70's and also has a degree in metallurgy. I also talked with two local metallurgists here in North TX. I confirmed my findings with each person to see if they agreed or disagreed. Conclusion, they all agreed with each other's assessments.

When Mike worked at Aberdeen proving grounds, the Army used high speed bore videos with mirrors, thermal imaging and computers to analyze any and everything that happens when the firing pin hits the primer and the round goes off. When the primer ignites there is enough pressure to move the bullet forward into the lands. The bullet then stops. As the primer ignites the powder, more pressure builds moving the bullet forward where it can stop again. Once there is enough pressure from the round going off, the bullet is moved down out the barrel. All of this happens in nanoseconds (billionths of a second). Your bullet starts and stops at least twice and sometimes three times before it leaves the barrel. This is fact.

If you clean every round or every few rounds during your barrel break-in process or clean your rifle so well after shooting that you take it down to the bare metal, you've created a metal-to-metal contact surface for the next time you shoot the gun. So what's the problem with this you ask? Just like your car engine, metal-to-metal contact will sheer away layers of metal from each surface. So if

your bullet is starting and stopping two or three times as it leaves the barrel, that's two or three places for metal-to-metal contact to happen as well as the rest of your bore. The use of JB's and Flitz can and will take you down to metal-to-metal contact. For all intents and purposes, JB's and Flitz are not the most ideal products for cleaning your rifle.

According to Mike Rock, and the other barrel manufactures agreed, all you need to avoid this metal-to-metal contact is a good burnish in the barrel. Shilen, Hart and Rock Creek will all void your barrel warranty if you shoot moly bullets and for good reason. This is not to say that moly is necessarily bad for a barrel, but it is when applied to bullets. There is no way possible to coat a bore with moly bullets. The bullet contact surface in the barrel is only so big. But when your round goes off, moly comes off the contact surface of the bullet in the throat area of the rifle and is bonded to the barrel due to the excessive heat and pressure. We're not talking coated or adhered to, we're talking bonded, d**n near permanent. With this, some of the jacket coating comes off the bullet. Follow this up with another round and you've now embedded the copper jacket between layers of bonded moly. This is the beginning of the black moly ring, which ruins countless barrels and is so hard; it can hardly be scraped off with a screwdriver's corner edge. This is what happened to a new Shilen SS select match barrel I had to have replaced with less than 400 rounds through it. I can't talk for Fastex as I don't or none of the folks I talked to knew enough about the product to comment on it. When I talked to Mike about my new barrel and the barrel break-in process, this is what he had to say. He first hand laps each barrel with a lead lap. He then uses two products from Sentry Solutions, a product called Smooth Coat, which is an alcohol and moly based product. He applies wet patches of Smooth Coats until the bore is good and saturated and lets it sit until the alcohol evaporates. The barrel now has loose moly in it. Next he uses a product called BP-2000, which is a very fine moly powder. Applied to a patch wrapped around a bore brush, he makes a hundred passes or so through the barrel very rapidly before having to rest. He repeats this process with fresh patches containing the moly powder a few more times. What he is doing is burnishing the barrel surface with moly and filling in any fine micro lines left by the hand lapping. He then uses a couple of clean patches to knock out any remaining moly left in the bore.

With the barrel burnished with moly, this will prevent any metal-to-metal contact during the barrel break-in process. My instructions for barrel break-in were quite simple. Shoot 20 rounds (non-moly bullets) with no cleaning, as this will further burnish the barrel. Done! Now shoot and clean using your regular regimen of cleaning and if you have to use JB's or flitz type products, go very easy with them, or better yet avoid them. Never clean down to bare metal. He said most of the cleaning products do a great job, don't be afraid to use a brush and go easy on the ammonia-based products for removing copper fouling. Basically don't let the ammonia-based products remain in the barrel for long lengths of time.

Well that's the long and skinny from the scientific point of view on the subject. If you're ever in doubt about the real condition of your barrel, take it to someone who has a bore scope and even better if someone has a bore scope that can magnify the view. You may be surprised at what is really going on in your barrel.

I'm sure this will spark a debate here and there, but that's good thing. The more information we have, the better off we'll be.