



Kroil

Most of the new products are just slight changes to what already exists, and some of their advertisements are flat-out lies. If it sounds too good to be true, it generally is.

As with all cleaning products, store these chemicals in a safe place and do your best to keep these off of your hands while cleaning the rifle. In recent times, I have seen a trend where shooters are mixing cleaning chemicals to develop one “super” solvent. Don’t do this. Unless you are a chemist by trade, you stand a better chance of making a solvent that can etch the steel in your barrel or create a vapor which will lay you out on the floor of your reloading room. Leave chemical mixing to the professionals.

## Cleaning Cradles

It’s best to clean a gun in a proper cleaning cradle. It prevents the rifle from jumping around and gives you much more control over the cleaning rod.

I use the MTM cradle for my gun cleaning because it’s light, has places to hold jags and parts, and the rubberized feet and cradle arms hold the rifle in place.

There are quite a few different cradles on the market, so take the time and find one that fits your needs.

One thing I do change about the cradle is that I add weight to the bottom of the unit. Since I don’t use the main storage trays underneath, I filled it with small bags of lead shot. This helps put some downward pressure on the tray and increase the traction of the rubber feet.

Brownell’s and Sinclair International both sell nice cleaning cradles that fit a variety of rifles and are worth a look.



MTM Cleaning Cradle

## Cleaning Patches

Cleaning patches are pretty much the same, no matter what brand you purchase, just make sure you purchase enough.

Cutting them out by hand is a waste of time and rarely do you find a material better than the standard cotton patch.

There are a few options in shape, but I mostly use either round or square patches. For most rimfire applications, I keep 0.75” patches



Cleaning Patches

on hand for my 0.17" barrels and 1.0" to 1.25" for the 0.22" caliber barrels.

Because each manufacturer varies slightly in size, I keep my smaller patches separate from the rest. This is because getting a patch stuck in a 0.17" caliber barrel is pretty easy and a real pain to remove.

## Pull-Through Cleaners

Over the years I have looked at these various devices, often referred to as "Bore Snakes," with some skepticism, yet they seem to be popular with enough shooters to keep them in production.

There are two basic types in use today; one being a thick fabric cord or rope which is pulled through the barrel from the muzzle, and the other a much thinner plastic coated steel cable or plastic line used in a similar fashion.

The thicker version which features a fiber cord or rope, is larger in diameter than the bore, and uses its size to press against the insides of the barrel, wiping away the fouling. The softer cord material compresses as it is pulled through the barrel.

The manufacturers of the fabric cord design state that one pass with this kind of bore snake is like making hundreds of passes with a conventional patch and rod. In a sense, they are correct when looking at the volume of fabric material between the two, but it does not mean that it is hundreds of times better.

These fabric cords also are found with some bronze bristles woven into the cord's body at various intervals to help remove lead and other stubborn fouling residue.



Cable styled pull-through cleaner



Feed the cable through the ejection port.

The only down-side to this pull-through system is that the more you use it, the dirtier it becomes, and over time you end up pulling debris back into the barrel. The cord becomes embedded with the very same material you are trying to remove.

If you do use one of these systems, take the time to scrub it down with a brush and soapy water. This should help remove the larger particles of powder fouling and primer material.

The other type is based on a thin cable or plastic line, which pulls a patch or brush down the barrel. These are often made from plastic coated steel cables, or even just simple thick plastic line, such as a weed trimming cord. These systems

are much easier to clean than the fabric rope.

Pull-through cleaners became popular with the Ruger 10/22 semi-auto or other auto-loaders where you cannot easily access the rear

of the receiver to run rod down through the barrel. The pull-through cleaner allows the user to feed the front of the cable through the ejection port and into the breech, and the pull it out from the muzzle of the barrel.

This is a far better option than running rod backwards through the barrel, starting from the muzzling of the rifle.



The cable can damage a crown if pulled through at an angle.

After running a number of passes with a pull-through cleaner on a dirty barrel, I checked the inside of the barrel with a borescope to see how well the chamber and bore was being cleaned.

As I expected, it wasn't doing a very good job. While it removed most of the fouling from a barrel, both systems did very little in removing the black ring from the chamber.

I continued on with additional passes, and after a while the chamber started to look somewhat decent. I feel that if you are willing to make enough passes with the system, it will get about 80% of the fouling out that a cleaning rod would remove.

I find that using a pull-through system that much is actually more work than just using a rod and patch, but it does have a place in your cleaning gear if you have a semi-auto that won't allow the use of a rod.

When using one of these systems, it's very important to make sure you are pulling the cable out perfectly straight from the muzzle. If you allow it to rub against the side of the crown, it can act as an abrading agent and quickly cut into the delicate angle of the muzzle.

In a field setting, I think they work fine for instances where you may have gotten dirt, water, or something in the bore. But compared to a cleaning rod and patches, they do not do as good of a job. I keep the Otis cleaner in my field kit for such instances, and a few times I found a need to use it.

## Borescopes

To truly know what's going on inside of a barrel, it's essential to have a borescope.

Simply looking down the bore of a rifle with the unaided eye tells you very little about the level fouling and the presence of machining marks, damage, or even a burned-out throat.

The unit I use is made by Gradient Lens Corporation, called the Hawkeye Pro Borescope.

This particular borescope is a precision made optical instrument that allows the shooter to inspect the inside of a bore and see tooling marks, erosion, and fouling at a 90 degree angle. Rather than looking down the bore, parallel to the direction of the lands and grooves, the borescope lets you look directly at the bore itself.



Borescope, Sony camera, and angled eye piece.

The borescope's major component is a stainless steel tube with a series of special glass rods mounted at specific intervals inside the tube.

These glass rods are precisely shaped with their ends ground and polished, much like the lens in your



Inspecting the barrel on the computer with the attached Sony video camera.

reading glasses, and designed to carry light images down the tube.

At the far end of the borescope, there is the subject objective lens and a reflective mirror.

The reflective mirror is mounted at a 45-degree angle, allowing the shooter to have a perpendicular view of the bore. At the user end is the eye piece, which contains an adjustable lens for the user to focus.

Just in front of the Eyepiece, a light source is located, comprised of a small flashlight and connective

aluminum housing, and also acts as a handle to the borescope. Light emitted from the flashlight is carried down the steel tube through a small sleeve of fiber optic filaments that surround the glass rods, and projecting light into the subject objective lens and against the reflective mirror.

As the light strikes the reflective mirror, it is projected against the inside of the bore. When the light strikes the bore, it is reflected back into the mirror, which angles it back 90 degrees into the subject objective lens, and back towards the eyepiece via the glass tubes. This image is what the user sees when looking through the borescope.

With a borescope, you will be able to see detail inside the barrel that you never imagined. A barrel which looks clean when casually inspected with the naked eye can reveal all kinds of fouling when scrutinized with a borescope.

The trick is to not use the borescope as a single source of information, but rather to use the data collected from it as validation of other ideas.

When I think a rifle is shooting erratically, borescoping will help trouble shoot the problem, but may not give a definitive answer. It will certainly show such accuracy robbing attributes such as black chamber rings and copper fouling.

The cost of a borescope may prohibit some shooters from purchasing one, but often times your local gunsmith will have one that you may be able to use at their shop.



Sony camera hooked up to the borescope.

Borescopes take much of the guesswork out of cleaning and of barrel condition and quality. They are also very helpful in bore inspection when shopping for a used rifle.

Current borescope packages from Gradient Lens also have the option of hooking up a digital video camera to the unit and specialized software for your computer. This is what I use to capture the images you see on the website. As you add features to the borescope package, the price climbs quickly. That said, a base model will run about \$800.00.

The standard borescope will allow you to look down a 0.22" caliber barrel and larger with no trouble. They have a new, slimmer borescope which allows you to inspect 0.17" barrels, but it's a very delicate instrument and about double the price.

## The Process

Rather than trying to lump all the different rimfire calibers and types into a specific processes, I have decided to break the process of cleaning apart by bullet type, then by caliber, and



Getting Started

even by rifle type in some instances.

I feel that there are enough differences between these that they merit their own discussion.

I will also address some particular areas of cleaning such as removing the black ring from the chamber and cleaning various muzzle attachments.

But before we begin, I have added in a few more comments that I feel are important to cover before we start running patches down the barrel.

## Cleaning Rod Setup

I added this section in the beginning so I didn't have to repeat it under every topic heading. I know that some readers may skip to a section that applies to their particular needs and may not catch this information.

Below is the process I use to set up all of my cleaning rods, no matter which manufacturer they're from or what caliber they are specific to.

I don't rotate between jags and brushes on a cleaning rod, rather I just use multiple rods. I find it far better to have two rods, one fitted with the jag and the other fitted with a brush, versus swapping jags and brushes between a single cleaning rod.



Jag fitted to rod

I have seen brushes unscrew themselves on rods even when the rods are allowed to rotate, and often times this is because solvent has soaked in-between the threads of the jag and the rod, allowing them to work loose.

When fitting a new jag to a rod, I carefully thread in the jag to make sure it will reach its full depth and have the shoulder stop on the end of the rod. Once I know the jag fits properly, I remove it and clean the jag's threads in the inside threads of the rod. Then I add a drop of blue Loctite to the threads of the jag and thread back into the rod. Once seated on the shoulder, I give the jag a good firm twist and then let it dry.

After about 15 minutes, I inspect the seam between the jag and the rod. If there is any part of the jag sticking out above the rod due to a slight misalignment or sizing issue, I polish it off using a rotary tool and rubber wheel. Taking 5 minutes to fix this is well worth the effort.



On my second rod I installed a nylon brush, depending on which caliber I'll be using. Unlike jags and rods which can be used slightly undersized, I always use the correct size of nylon brush for the bore that I'm working with.

When it's a 0.22" caliber bore, I use the proper 0.22" caliber nylon brush. You're basically wasting time by using a nylon brush that is undersized. Some people prefer slightly worn out bronze brush, but I rarely use them so I leave that choice up to the reader.

Once I have the correct brush selected, I repeat the same process I did

Fitted brush

before, checking the fit first, then cleaning both thread forms and

applying a small amount of Loctite and reassembling.

On just about every rod I have worked with there had to be some slight buffing between the junction of the jag or brush and the cleaning rod. At this point the rods are ready to use.

## Removing the Brush Before the Backstroke

I have seen this little detail of cleaning discussed far too many times to let it go without comment, and I plan to ruffle some feathers with this following diatribe.

I have watched a few shooters do this; that is after running their brush through the barrel, they stop everything, let the brush hang out the muzzle, then walk around and remove the brush. After unscrewing the brush, they pull the cleaning rod back through the barrel, and then reattach the brush. The process is then repeated.

The idea is that this prevents the brush core from slamming into the edge of the muzzle, and dragging back across before the brush centers itself back in the bore.

This process is an absolute, utter, and complete waste of time. You may as well have a wad of Spanish moss tucked into your left pocket to help improve your accuracy and protect the crown. If you can't reverse the direction of your cleaning rod without looking like you are trying to start a neglected Briggs and Stratton lawn mower from 1983, the brush bouncing up against the muzzle is the least of your worries.

First off, all crowns should have some break in the edge, however small, between the flat of the crown and the lands and grooves. Some of these chamfers are very small, but most factory barrels have a very generous transition. This transition is plenty wide enough to allow the rod to be gently pulled up against the angle and not damage the muzzle by raising a burr.

I mean that is the problem, right, raising a burr by the rearward motion of knocking the brush core against the muzzle? If you are yanking hard enough back to cause a wound bronze wire core to dent and lift a burr on either stainless steel or chromoly barrel, you have to really stop and reassess what you're doing.

Second, by removing the brush, the end of the rod will skip across the tops of the lands as you remove the rod because there is nothing causing it to rotate in the same direction as the twist of the rifling. Something has to be sitting in the bottom of the barrel as the rod is removed, and that's the end of the rod. It's not suspended in mid-air for most of its travel back out the barrel, even with a rod guide. It just bounces along across the tops of the lands. This already happens when you use a bronze jag (much softer material than the end of a steel rod), so why do it more when you can avoid it.

It seems pretty logical to me that just a gentle reversal of the rod, easing it up into the muzzle and back down the barrel is the best approach. If you handle the equipment with care, some basic caution, and maybe even a touch of grace, you can skip this nonsense.



Leave the brush on the rod.

## Depth of Stroke

The term, "Depth of Stroke," is something that I use to indicate just how far your rod should be pushed out past the end of the barrel.

I don't know if there's a conventional wisdom approach to this, but for me I let it exit the absolute minimum distance possible. There is no point in jamming a jag 10" past the exit of the muzzle, letting the side of the rod run along the edge of the crown.



Stop Here..! Pushing any further is a waste.

The same thing goes for brushes; you don't have to push until the base of your handle bumps up against the receiver or rod guide.

Now some will wonder how they going to know when to stop, or that they push with so much force that once the brush or patch exit the muzzle, the rod jumps forward some distance or until something stops it (receiver, rod guide, knuckles ramming against the scope's eye piece).

Well there's a few ways to reduce the amount of over-travel of your cleaning rod, the first is that you need to stop pushing so hard.

When you put so much force on the rod that once the jag or brush clears the muzzle, it pops out like a cork, you are more than likely bowing the rod inside the bore, causing it to rub up against the lands of the barrel.

Try using a smaller brush, smaller patch, or more solvent on the patch.



Is this necessary?



Cleaning Rod Stop Collar

The second option is to use a cleaning rod stop-collar. These are pretty nifty devices that can be found in Sinclair International's catalog, and fit around the shaft of a cleaning rod to indicate where you can stop pushing.

I actually don't use these for a brush or jag often, but I do use these when I'm short-stroking the chamber with some JB cleaning compound.

The stop collars are made from plastic with a nylon screw in the side. You can set how deep you want the rod to go, whether it's just for short stroking the chamber, or if you want the patch to just clear the muzzle.

Simply place the stop up against the rod guide and once you reach the desired depth with the cleaning rod, tighten down the nylon screw and you'll know exactly where to stop.

The nylon screw holds the collar in place on the rod without marking the surface, but it's not going to give it enough grip on the shaft to stop you from ramming the rod in the deeper. With pressure, the collar will simply slide along the rod. It's more of a little visual reminder to show you when to stop pushing. I have a number of these devices on various rods and use them from time to time.

### Bolt Action Sporting Rifle - .22lr

Starting with the bolt-action sporting rifle, the cleaning process

begins with unloading the firearm to make sure it's in a safe condition to work on.

From there the bolt is set aside on a cloth and the rifle is placed in a cleaning cradle.

To begin, I take a short cleaning rod fitted with a large 0.40" caliber nylon brush, wrapped with a small cotton cloth. Working from the rear of the receiver towards the breach, I gently insert the short rod and rotate it, collecting as much of the loose fouling in the receiver as possible.



Squirrel Relocation Rifle

When there is a considerable amount of loose fouling, a few drops of oil such as Break Free will help the fouling stick to the cloth. Do not over saturate the cloth because the pressure of squeezing the cloth into the receiver can cause some of the oil to drip down into the trigger group.

By working from the rear of the receiver towards the breech, you are keeping any loose fouling out of the trigger group. Some internal workings, such as fixed ejectors, may require a smaller diameter brush or even using a toothbrush wrapped in a cotton patch.



Cleaning the receiver

Once I have all the loose fouling removed, I take a couple of Q-tips soaked in a general solvent and wipe down the feed ramp and a flat surface of the breech face.

If you don't clean the breech face before you start running patches down the bore, the patch will collect the fouling off of the breech face and drag it through the barrel.

Often times the breech face on a rimfire has a thick layer of fouling, so this process may take a little bit of time. Resist the temptation to scrape off fouling with a hard tool because it's easy to scratch the breech face or mouth to the chamber.

When necessary, use a plastic-tipped tool or a toothpick to dislodge heavier deposits. For stubborn layers of fouling, a Q-tip rolled in some JB bore paste will speed up the process. By alternating between JB bore paste and a solvent like Kroil, you will eventually get down to the bare metal.

Once that is complete, run a dry cloth through the receiver again up to the breech face, making sure there is no loose fouling or solvents from the cleaning process. I skip cleaning out the extractor slots at this point, saving that for near the end of the process. The reason why is that when you use bore paste or some other thick chemical agent to clean your barrel, some of it will inevitably end up packed into the extractor slot. Save the effort until the end of the cleaning session.

With the receiver clean, it's time to insert the rod guide and get down to business.

For the first pass, I use a loose fitting patch which has been soaked in cleaning solvent. The wet patch grabs the loose fouling inside without pressing it against the sides of the bore with excessive force.

The idea is that you want to gently lift and remove the coarse primer material and any loose fouling. I repeat the process a few times to further coat the bore with cleaning solvent.



A leather cover to protect the stock's finish.

As the solvent is worked down the entire length of the bore, it will begin to loosen the fouling from the lands and grooves.

The next step is to run a nylon brush, soaked in solvent, down the bore a number of times. I tend to make at least ten passes; sometimes more if I feel the rod sticking in some areas. You can feel the brush grab over areas where there is lead accumulation or heavy fouling. I keep scrubbing in long, smooth strokes and add more solvent when the bore feels like it needs it. It's a good idea to wipe down the rod after every pass, making sure that no loose fouling has stuck to the cleaning rod.

Once the solvent and scrubbing action of the brush has loosened up much of the fouling, it's time to run a few patches down the barrel. Rather than starting with a dry patch, you should run a few solvent soaked patches down the bore first. This will help make for a smooth pass through the bore, but it will also continue the cleaning action of the solvent.

After about three of wet patches, I switch to a dry patch and run those until they come out dry. Chances are they will not be clean, but they need to be dry. This will help ensure any loose fouling and dirty solvent has been removed from the bore.



JB Bore Paste on a patch and felt pellet.

As this point, I run two more wet patches down the bore and then change my focus to the chamber and lead angle. As with many sporting rifle shooters, I tend to shoot a considerable number of rounds (hundreds) every time I head out to the field.

This will leave some level of fouling in the chamber, and I don't like to have any accumulation build up over time in that area, creating the dreaded "Black Ring." I also don't put rifles away that are dirty.

You can remove this with either a VFG pellet rolled in some JB bore paste, or a small patch coated in the similar cleaning

agent.

With the rod stop set to limit the travel to only an inch deep into the rifling, I make a few short passes back and forth. In some instances I don't use a rod guide and just let my hands guide the rod. Since you are only traveling a few inches inside the bore, you can eyeball this part.

If you are uncomfortable with that, then use a rod guide. Just know that most of your cleaning paste is going to end up on the inside of the rod guide and not make it to the barrel. You will just have to make more passes with coated patches to eventually get the paste to the bore.

It seems that no matter how clean you think your rifle is, the first few strokes of bore paste in a chamber is going to turn the patch black. Don't work about this and keep scrubbing gently back and forth. After a few passes, I get a new patch and apply more bore paste and continue on, leaving the old paste in the chamber. This process should only take a few minutes of scrubbing and you will be done.

Once you think you have scrubbed enough, wipe away the paste on the surface of the breech face and clean the rod guide if you used it.

Then run a few wet patches down the bore to collect the paste and fouling that you loosened. It may surprise you how black the patches are, so keep running more solvent soaked patches until they are clean.

You don't want to leave any bore paste in the barrel. These can be followed by a number of dry patches. Finish up with about

five dry patches.

It's at this point when I take a small screwdriver and remove any bore paste from the extractor slots. A Q-tip or tooth pick will also work. Make sure you don't get any in the chamber.

At this point, your rifle will either be done, or may need a bit more work with the brush and patches. It just depends on how your last few cleaning patches looked. If they are still streaked with black, then continue to rotate between the brush and the patches. Some barrels just take more cleaning than others. If it was a heavily fouled rifle, I tend to spend a little more time working on the chamber. Of course if you have a borescope handy, you can visually inspect your progress.



If you feel that you are done, then run a few more dry patches down the bore and follow it up with one wet patch, not soaked, of light-weight oil. This is just to get a protective layer in the barrel. I follow that with a few dry patches to remove the excess oil and call the rifle's barrel done.

On Anschutz rifles, it is easy to break down the bolt and clean the internals, so I do that as well. For more complicated bolt, you can judge when the bolt seems to really need a cleaning. Just be sure to wipe down the outside of the bolt, brush off the bolt face and clean out the extractors. Then apply new grease to the lugs.

I also wipe down the outside of the rifle and apply a light bit of oil to any exposed metal surfaces. Optics are checked for dust or water spots on the lenses, and magazines are wiped down and inspected.



Anschutz 2013 Unlimited Rifle

an even greater bore uniformity and internal finish.

These attributes tend to cause the barrels to foul much less than a regular sporting barrel, and make them much easier to clean. This does not mean they don't need to be cleaned, even though that was the conventional wisdom from years past.

Often times the target shooter will clean the rifle based on any perceived change in accuracy. We often refer to this as exceeding the "accuracy window," which is an approximate number of rounds where a barrel is most accurate. The accuracy window starts after the barrel has been properly fouled with a minimum number of rounds needed to reach its accuracy potential. Some barrels only need a few rounds after cleaning while others may need a few dozen.

In a target rifle, fouling is a combination of the wax lubrication evenly spread out through the entire length of the bore, mixed with some carbon residue. In these barrels, lead does not seem to collect on the smooth surface, so it does not play a part in this type of

### Bolt Action Target Rifles - .22lr

For this section, I'm going to lump a few different types of target rifles together because they all fit into a similar role when it comes to cleaning.

This section will include two parts: Benchrest and Position Shooters ( Prone, 3-Position, Silhouette), and this discussion will also cover any other bolt-action platform designed for precise, slow fire. It's a bit of a grab, but I think once you read through this section it will make sense.

Unlike the general sporting rifles, target rifles tend to feature smooth, well-made barrels which are free from tooling marks. Most custom barrels are hand-lapped for

beneficial fouling.

Once an optimal level of accuracy is reached, the shooter will be able to fire subsequent rounds with a high confidence in the rifle's ability to place the bullets in the desired location on the target. For some rifles, this window of accuracy is narrow, consisting of just a few hundred rounds before a loss of accuracy is noticed, while other rifles have a surprisingly large window consisting of hundreds of rounds before there's a change.

The trick here is to take the time and test your rifle to learn how many rounds dictate its accuracy window and then clean the barrel at the correct intervals to stay within this accuracy window during competition.

## Benchrest

When it comes to cleaning, the Benchrest crowd has to be the most vexing group of the bunch. With countless methods and formulas to pick from, each method has been attributed to some match victory, *somewhere*, so surely they must all work.

More likely that is not the case, but cleaning a benchrest rifle properly is critical for success in this sport.

One thing for sure is that at every major rimfire benchrest event I've competed in, I noticed every shooter cleaning their rifle at some point during the match. Some more frequently than others, but just about everybody cleans their barrel at some point.



Hall Unlimited BR

There is the odd shooter who will wait until the end of a match to clean their barrel, but they number in the few and often times the rifle is on a "hot streak" racking up good scores, so they're reluctant to change anything. These people also get burned from time to time by the random "flier" which knocks them well back into the pack. Then the question arises as to if they should have pushed their accuracy window as far as they did. Was the flier caused by the excessive buildup of fouling in the bore, or was it a bad round? It's a tough question to answer.

That situation aside, I'll clean my rifle a few times during a match, often on a break after I have shot two cards, which is approximately 75 to 100 rounds fired on two 25-Bulls-eye scoring targets ( I call them cards ) like RBA or ARA. A relay in a match will consist of a single card, and most matches are scored based on multiple cards. Some events are short with only a few cards being shot in total, while other events can be as many as eight cards.

As a side note, when Joe Friedrich shot is 2,462 agg for 4 ARA cards, he was cleaning his rifle ever other card. When we discussed this further, he stated that cleaning every other card has been his standard practice for years, and with multiple 9,850/10,000 scores back to back, it's worth taking note.

I find that after I foul a barrel with 10 rounds (sometimes as many as 20 depending on the barrel) I'm at the front part of the accuracy window. As I shoot more rounds on target, I will start to notice a slight drop in accuracy between 100 and 150 rounds down the barrel. With most benchrest events based on multiple targets, I don't like to gamble and have my accuracy start to drop off in the middle of a card. So by the completion of the second card, I know it's a good time to clean.

This slight change in accuracy is noticeable in a benchrest rifle, but most other disciplines where the rifle is being held or influenced by other variables, this slight initial loss of accuracy will go unnoticed. But don't fool yourself into thinking that just because you can't see your accuracy fading that it's not; you are more than likely in a situation where your rifle or the conditions can't resolve it.

When I attend a major event like the ARA Nationals, and I see all 100+ competitors cleaning their rifles throughout the day; it's not because they're fools. It's because clean rifles are accurate rifles. Here is another side note; no one is using a bore snake of any kind.



ARA will punish you for having a dirty barrel.

At the start of a match, I typically foul the barrel with 10 to 20 rounds using the sighter targets during my first relay to establish the correct level of fouling in the bore.

During these sighters, I make any adjustments for the wind condition as well. Once I start getting small groups and predictable shot placement, I move over to the scoring targets and get to work. In mild conditions, I usually shoot just under 50 shots to complete the 25 scoring targets.

If the wind is tricky or for some reason I feel the need to shoot additional sighters, the round count can reach 75 before I am done with the card.

When it's time to clean, I don't scrub the bore in the same fashion as a sporting rifle. What I do is follow the same process of cleaning the receiver and installing the bore guide, but then I run a few wet patches of solvent down the bore followed by a few dry patches, and that is all.

The key here is not to remove all of the wax lubrication from the barrel; just the heavy buildup in the first few inches of the barrel and any other loose debris throughout the length of the bore. With some fouling left in the bore, I only need to take 5 to 10 fouling shots on the next card and be right back into my accuracy window. As the day progresses and I shoot multiple cards, I repeat this process.

If the rifle seems to be acting up by throwing shots, especially when they do not relate to the wind conditions, I will take a moment a short stroke the chamber with a nylon brush and soaked in solvent. I will then make one or two passes down the entire length of the bore with the nylon brush. Then I run a series of wet and dry patches down the bore and go back to the sighter targets and re-foul the barrel. The last thing you want to do is clean the barrel and then take a shot for score. Typically the shot will be about an inch off at 50 yards.

At the end of that match, I clean the barrel completely with patches and a nylon brush, and use a little bit of the JB bore paste in the chamber just to make sure that a black ring does not have a chance to develop. It's very critical for accuracy to never allow that black ring to start in the first place.

This process has worked well for most of my benchrest rifles, and it is still what I follow today when competing. Some barrels seem to have a larger accuracy window than others, but I tend to stick to the same cleaning routine just to be on the safe side.

## Position Shooters

### (Prone, 3-Position, & Silhouette)

Position shooters have a bit of a tricky situation to deal with. In some events, the competitor is shooting hundreds of rounds before they have a chance to clean their barrel, and like other old habits which die hard, many traditional prone shooters are reluctant to ever clean their barrel.

This may have been a trend in years past, but just about every top prone shooter cleans their rifle. At the AMU, it's about 100% who clean their prone rifle often. What is interesting is that while Olympian Eric Uptagrafft cleans his rifle with bronze brushes, cleaning rods, and solvent, and it seems to not keep him from shooting a 628.1 and 632.2 (new final qualification record). I asked Eric if there are any shooters at his level who don't clean, and his answer was simply; "No." *"Well, those who place top three and win with any consistency clean their rifles. I don't know what last place does, and for*



Eric Uptagrafft, 2x Olympian, cleans after every practice session.