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Cleaning

Probably the hardest task when cleaning your gun is deciding about cleaning the barrel chamber and bore. The primary problem is a lack of well documented information. An additional problem results because the steel which has been most commonly used for pistol barrels has some characteristics which complicate the decision. A detailed explanation of some of the characteristics of the 416 stainless steel used to make custom and replacement pistol barrels can be found in the "steel facts" section of the website.

Precision Shooting Magazine, December,'93,"Rifle Barrel Cleaning Materials and Barrel Corrosion", by Jim Borden, presented information about the etching of 416 barrel surfaces by various chemicals.

"... doing inspections of a number of rifle barrels with a very high quality borescope over the past two years has shown that a number of shooters are doing significant damage to their very expensive Stainless Steel barrels..." "illustrate the impact that improper use of some cleaning materials and methods can have on barrel steel. The barrel in the picture had somewhere between 150 and 350 rounds through it when it was retired - it quit shooting well and was very difficult to pass a patch through. Note the gross pitting and cracking evident on the surface of the barrel..."

"...to provide some basic information on stainless steel and some of the materials and conditions that adversely affect the corrosion rate of 416SS..."

Most of the chemicals Jim Borden listed, many of which are used in commercial barrel cleaning compounds, etched the surface away at rates between 0.020 and 0.050 inches per year. We at Schuemann Barrels regard a barrel to have been substantially worn out when the bore radius is enlarged by 0.0005 inches (a bore diameter increase of 0.001 inch). Therefore, exposure to some of these bore cleaner chemicals for about 4 days would eat away the bore as much as would have resulted from wearing out the bore by firing tens of thousands of rounds through the barrel.

"... if the mixtures result in a more aggressive corrosion condition - two particular areas to be pursued are the mixing of Sweet's and Shooter's Choice MC#7, and the mixing of some of the chlorinated aerosols (used to dry out chambers by some shooters) with moisture and some of the cleaning compounds." Here Jim is specifically worried about using any of the TriChloro solvents, such as gun cleaner or carburetor cleaner, in combination with humidity, and/or barrel cleaning compounds.

Precision Shooting Magazine, May,'94,"A Closer Look at Bore Corrosion", by Mark D Stouse, presented a detailed look at 416 stainless surfaces and their corrosion susceptibility. He showed high magnification photos of 416 surfaces and discussed how the inherent roughness of the barrel surface and the presence of lead or copper and powder residues helps degrade the meager ability of the 416 stainless surface to resist corrosion.

Precision Shooting Magazine, Editorial, December,'97, referencing an article in American Single Shot Rifle Association News by Dr. Geoffrey Kolbe. "... There is a warning on the label of Shooter's Choice MC#7 bore cleaner that it should not be mixed with other bore cleaners... Mixing solvents that contain 111 Trichloroethane with Shooter's Choice is also bad news!... Most American barrel makers hesitate to recommend Sweets as a regular bore cleaner because experience seems to show that barrels last longer with other petro-chemical based bore cleaners like Hoppes No. 9 or Shooter's Choice. Ammonia is present in bore cleaners like Hoppes No. 9 in the form of ammonia oleate..."

Precision Shooting Magazine, January,'98, letters to the editor, the first from Michael Anzalone pertaining to cleaning barrels used with moly coated bullets. "... We're talking about 4-5 inch vertical spread here (at 100 yards). Anyway, after cleaning with Shooter's Choice, the same thing happened again. So, a light went on in my head, and I realized I was removing all or most of the moly with Shooter's Choice. A call to Berger Bullets provided the following information: Clean only with Kroil and a small amount of JB bore compound. Anything else removes the moly..."

January,'98, a second letter to the editor, this one from Walt Berger (the individual referenced above - Wil) pertaining to the lifetime of a bench rest barrel which had only moly coated bullets shot through it. "... I now have better than 4,000 rounds through my moly-bullet-only barrel, and I won ... at the NBRSA Nationals ... and it still looks good through the bore scope." (this is somewhat greater than the normal lifetime for such a barrel - Wil)

Precision Shooting Magazine February,'98, letters to the editor, the first from Glen Fryxell, PhD, who is a chemist. He starts out quoting from an earlier article, and then offers comments of his own, "... mixing (ammonia) with solvents that contain 1,1,1-trichloroethane... is also bad news!" This is excellent advise and should be bold-faced, underlined, and extended to include any chlorinated solvent (TCE, carbon tetrachloride, etc.). Ammonia reacts with chlorinated solvents to form ammonium chloride salts. Ammonium salts are hygroscopic (absorb water from humid atmosphere), and the chloride ion is one of the most corrosive species around as far as steel is concerned. This combination will corrode any steel surface, stainless or otherwise. The take home lesson here is, "Don't mix cleaning solvents." (Personally, I won't allow anything than has chlorine in it anywhere near my barrels for this reason)."

February,'98, a second letter to the editor, this one from Greg Bowman, pertaining to corrosion and solvents. "... In the absence of detailed information on the makeup of the various bore cleaners, good advice may be: 1) Do not mix (or use in tandem) bore cleaners of different manufacture..."

Certainly DO NOT ever use a stainless steel brush to clean out a barrel. The stainless bristles are much harder than the steel bore and the result will be to create deep scratches in the bore surface. When we use our IPSC pistols like sub-guns, as we often do, we apparently can raise the bore surface temperature up to the annealing range, based on the color I have seen on some barrel bore surfaces. Therefore, the bore surface of our barrels likely has been preferentially annealed, and could be quite a bit softer than the barrel outer surface would test. Even the brass/bronze brushes, which have bristles which are as hard as mild steel, or the lead removers, which use a hard brass mesh to scrape the lead from the bore, may well be able to scatch the bore surface of a stainless steel barrel. Any scratching of the bore surface will naturally lead to increased bore surface wear, leading, and coppering. My recommendation would be to never use any kind of a bore brush to clean a 416 stainless steel pistol barrel, especially if it has been exposed to strings of rapid fire.

I've been watching the knowledge about 416 stainless barrel cleaning grow over the last few years. Unfortunately, I am not aware of the new information spreading outside of the bench rest rifle world. Hopefully, these short segments of some of the published information will help.

One possibility is that the contribution of the millions of microscopic deep grooves in the barrel bore, created by the possible melting away of the sulphur compounds, which were originally a part of the 416 steel barrel, in enhancing corrosion of the bore may be considerable. On the other hand, studies of surface wear often show that the sulphur in steel migrates to the surface where it reduces wear and friction. My "feeling" is that the grooves are likely capable of holding liquid cleaning chemicals, or their residual component chemicals, for long periods of time, and no amount of wiping or rinsing is going to get all the chemicals out of the grooves. The chemical's persistence would be enhanced if the microgrooves are also packed full of propellant and bullet residues, thereby sealing the chemicals into the grooves. These residual chemicals could be slowly eating away the walls of the grooves, especially at the higher temperatures generated when we are shooting. The consequences of such corrosion would not be apparent until the grooves reached some critical size, and then the rate of gas erosion of the bore would increase markedly, shortening the life of the barrel. Some references I have read in the past, that I did not save, indicated significant bore damage apparently had been caused by using one bore cleaner one year and switching to a different cleaner the following year. If the bore's microscopic grooves are capable of holding cleaning solvent residues for long periods of time such damage might well be plausible.

I'd initially been excited about the molybdenum disulphide powder coating technology which has been introduced into the shooting sports. Initially it seems to be reducing bore wear, reducing bullet friction, reducing barrel heating, and reducing peak pressures, were all pluses. Seldom does a new idea produce only pluses. Possible liabilities are documented elsewhere in the web site. My thought is that, in this case. The millions of microscopic grooves in 416 stainless barrels are likely a plus where moly disulphide is concerned.

The moly disulphide will likely be packed into the grooves which might both anchor the moly disulphide, and also thereby reduce the erosion of the bore by preventing the propellant gas from eating away at the otherwise exposed edges and surfaces of the grooves. The bench rest shooters, to whom clean bores historically have been accorded the status of a religion, are gradually ceasing to clean the bores of their barrels which are used exclusively with moly coated bullets. This both proves the effectiveness of the moly coating and should allow everyone to stop cleaning the bores of their barrels. But, the precision rifle shooters seldom shoot more than a few thousand rounds through their guns before their barrel loses accuracy. We shoot many tens of times more rounds through our guns and that may be important. In precision rifle shooting the mild polishing action of the moly disulphide, which is beneficial to precision rifles, will wear out our barrels prematurely.

My Personal Practice has become to never clean the bore of my barrels. I do use a brass rod to scrape the deposits out of the chamber. But, I've learned to leave the bore alone and it very slowly becomes shinier and cleaner all by itself. Years ago I occasionally scrubbed the bore with a brass bore brush. But, doing so always seemed to cause the bore to revert to a dirtier look with more shooting, so I eventually stopped ever putting anything down the bore except bullets...