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HANDLOADER®

Ammunition Reloading Journal

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6mm-06
New Powders and Bullets Make It Sing

Propellant Profiles:
IMR-4350

Pet Loads®

.327 FEDERAL MAGNUM
Increasing Accuracy and Versatility

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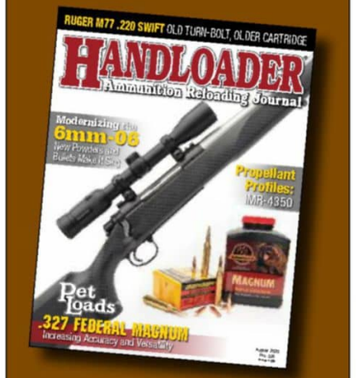

On the cover . . .
A custom Remington Model 700 6mm-06 with a Shaw barrel, Swarovski Z3 3-9x 36mm scope and Stocky's NextGen UltraLite Carbon Fiber M50 stock. Photo by Chris Downs.

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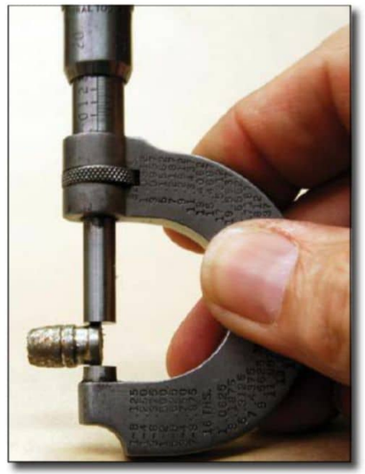

FEATURES

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NEW!

HANDLOADER is now on YouTube!
Go to YouTube.com and check out our new channel: HANDLOADER TV.
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There Are No .32, .38 or .44 Calibers

RELOADER'S PRESS by Dave Scovill

For those who are just beginning to experience psychotic withdrawal from being "alone together" for the last few months, not that it hasn't become obvious that there will be no immediate relief from watching reruns of old reruns of even older movies, the following is an offering to folks who are suffering from what is akin to watching paint dry. For veterans who served in the armed services, we have experience to draw from. Such duties were often posted on the midwatch, which in many instances really was watching paint dry.

To continue with the subject at hand, the most interesting fact regarding the modern crop of .44-caliber handguns is that none of them are .44s. Moreover, way back in the beginning, those Colt and Remington .44 percussion revolvers were actually .45s. It's enough to make you wonder about the words to that old Gene Autry song, "Back in the Saddle Again," ". . . ridin' the range once more, totin' my old 44 . . ." What .44 was he singing about?

Research indicates there was only one .44, the .44 Colt, that was manufactured by Frankford Arsenal in the early 1870s, in which the heel bullet measured on average .444 inch at the rearmost edge of the nose immediately ahead of the case mouth. According to Charles Suydam's *U.S. Cartridges and Their Handguns*, the powder charge and bullet weight in the commercial versions of the .44 Colt varied a bit, but the diameter was fairly consistent. The heel of the bullet seated inside the case neck was closer to .429 inch.

The Colt revolver was a Richards Model 1871 conversion and the Richards-Mason 1872 improvement of the Colt percussion 1860 .44 Colt with a .45-caliber barrel. The Remington Model 1863 .44 sixgun was also a throwback to the Civil War configuration with the .45-caliber barrel.

The Uberti Model 1871/1872 replica appears to be an amalgamation of the two 1860 conversions with a .429-inch barrel groove diameter and a cylinder chambered for a .44 Colt case made by Starline that is little more than a shortened .44 Special case, or slightly longer .44 Russian, albeit with a slightly smaller rim diameter.

The other two so-called .44 calibers in the mid-to-late 1860s were the American and Russian with .438- and .429-inch bullets, respectively. There has been some debate as to whether the first Russian

Colt Single Action Army .44-caliber barrels have remained .427 inch from the introduction of the .44 WCF in 1878.

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loads were outside or inside lubricated, but according to collectors there was indeed an early outside lubricated version, though it hardly matters since samples in both variations measure .429 inch, give or take. For general information, if you just happen to have a Smith & Wesson .44 American, brass can be made from .41 Magnum brass.

There were also Smith & Wesson and Colt .44 rimfires, the latter being the Henry cartridge, pointed and flat, with bullets that measure from .418 inch to the mid-.44s. No one seems to know the diameter of the S&W version. Colt converted 1,800 1860 Colts to fire the Henry loads that, according to Charles R. Suydam in his book mentioned above, were discontinued by the mid-to-late 1920s.

The misfit in the so-called .44 lineup was and still is the .44 WCF, aka .44-40 Marlin, Remington or Colt Lightning Magazine Rifle (CLMR) that started out as .427 inch plus/minus and has not changed, albeit some rifle and handgun manufacturers offer barrels that measure closer to .429 and/or .430 inch in spite of the .424- to .427-inch bullet diameter in post-World War II Remington and Winchester, respectively, factory loads. Either way, Colt .44 S&W Special and .44 WCF barrels measure .427 inch, and Colt chambers for the latter cylinders will normally not accept a loaded round with a bullet diameter larger than .428 inch.

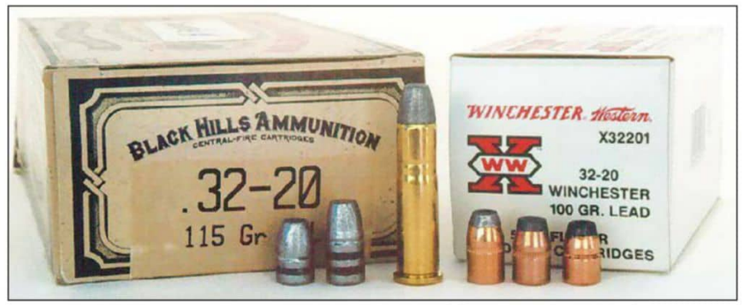
Smith & Wesson barrels for the .44 Remington Magnum and .44 S&W Special measure .429 inch, albeit bullet diameters vary from .429 to .430 inch in most factory loads. As a rule then, all so-called .44-caliber revolver bullets are roughly .43s.

Finally, to add a bit more confusion to the legacy of the .44s, most percussion revolvers of the Civil War period up until the advent of self-contained cartridges were .45 caliber that were commonly referred to as .44s that fired a .451-inch round or conical lead ball. Since there weren't any real .44s in the first place, no one seemed to care.

The Smith & Wesson .44 Russian introduced the era of the .429/.430-inch .44-caliber bullets in Smith & Wesson revolvers, circa 1870, with the earliest patent date 1860. **(Smith & Wesson Hand Guns,** ***Roy C. McHenry & Walter F. Roper, 1945)***

Next up are the .38 calibers, of which there have been none since the 1870s that featured outside lubricated bullets measuring on average .378 to .380 inch. After 1905 or thereabouts, the .38 Long Colt outside-lubricated bullet became an inside-lubricated bullet that measured the same as the inside case neck diameter, .357 inch. With one exception, all .38s have been .35s or, if you prefer, .357 calibers ever since. The exception is the .38 Smith & Wesson, aka Police Special, with a bullet diameter of .360 inch. Some scribes have written that the .38 S&W can be fired in .38 Special revolvers, but the former is tapered and a bit too fat to fit in the latter.

Oddly enough, the only cartridge that has been on the books as a .38 since the late 1800s – and is still called a .38 but is actually a .40 caliber – is everybody's favorite, the .38 WCF, aka .38-40 Marlin, Remington and CLMR. The "oddly" part is that I received a letter a number of years ago from Harold McCallum, the well-known Winchester rifle collector, that stated Winchester did not use the powder charge number, e.g., .38-40, until long after World War II, even though everybody else did and seemed to be confused by powder charges and bullet diameters. No one seems to know why it was called a .38 but have no reservations about guessing why it was apparently mislabeled on purpose. Is that an oxymoron?



Current .32-caliber lead bullets run from .314/5 inch for cast and swaged lead bullets to .312 inch for jacketed designs.

While I'm at it, according to Charles Suydam, et. al, there was also a Smith & Wesson .41 sometime between 1890 and 1910, but the bullet was .373 inch. Ponder that during recess from homeschooling the children, cleaning the garage, painting bedrooms, mowing the lawn or watching old movies.

The .32 calibers can get a bit complicated, so what follows are the basic rules. Back in the 1860s or so, most .32-caliber factory loads for the .32 Long (New Police) and Short Colt used outside-lubricated, lead-alloy bullets measuring, on average, .317 inch. That was followed by inside-lubricated bullets that averaged around .308 inch. When the .32 S&W Long was introduced around 1896 or so, inside-lubricated bullets measured from .308 to .312 inch. When Winchester introduced the .32-20 in 1884, inside-lubricated, lead-alloy bullets measured from .308 to .311 inch.

Lead-alloy bullets pulled from relatively recent .32-20 Winchester and Remington factory loads measure .312 and .310, respectively. The *Speer Reloading Manual Number 13* lists a 98-grain lead wadcutter and a 98-grain, lead-alloy SWC, both at .314 inch, and a 100-grain JHP at .312 inch. Can we logically assume the bullets pulled from factory loads were slightly larger in diameter prior to seating?

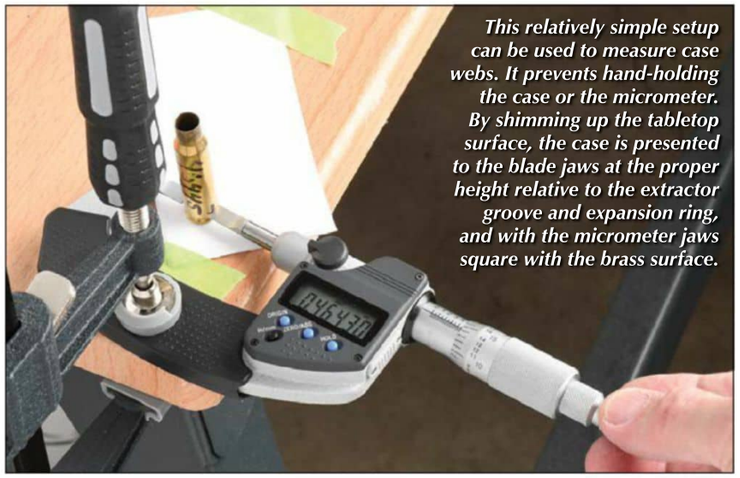
Where so-called .32-caliber bullets appear to range from .309 to .317, we can't make the same assumptions regarding barrel diameters of revolvers or rifles. For example, a circa 1922 Colt Single Action Army .32-20 has a barrel groove diameter of .314 inch, and all six chamber throats measure .314 inch as well. Conversely, a .314-inch bullet pulled from a Winchester factory load requires only a slight amount of push from a cleaning rod to pass nearly friction free through the barrel of a circa 1884 Winchester Model 73 .32-20 rifle that shoots minute-of-cottontail at 50 to 75 yards with the same load.

Then Thompson/Center decided to make a run of .32-20 barrels for Field Pistol competition. Apparently, Field Pistol competitors were unhappy with the bullet selection in .32 caliber for their pet sport, and someone convinced T/C to make those barrels with a .308-inch groove diameter to facilitate a larger range of bullet designs in that caliber. Given the historical record for .32-caliber handgun cartridges, we can assume the standard bullet diameter should be .314 inch or so, but as the late Al Miller used to opine, larger is better, or unsized up to .316 inch if the cartridge will chamber.

Winchester and Remington continue to offer factory loads with lead-alloy bullets that are apparently designed to "bump up" upon firing and form a closer fit in the barrel, which has averaged historically around .314/5 inch, but reduced to .308/9 inch for T/C barrels. Either way, in the last 120 years or so, there have been no .32s. •

Case Expansion Measurement

PRACTICAL HANDLOADING by Rick Jamison



This relatively simple setup can be used to measure case webs. It prevents hand-holding the case or the micrometer. By shimming up the tabletop surface, the case is presented to the blade jaws at the proper height relative to the extractor groove and expansion ring, and with the micrometer jaws square with the brass surface.

Handloaders have seen the recommendations in load manuals and elsewhere for determining a maximum load with a micrometer. The usual method is to mark each case at the web, then using a blade micrometer, measure each case after firing to see how much the diameter enlarges. Through the years there have been variations on this process. The locations to measure, whether web, expansion ring, extractor groove, rim or belt have varied, as has the amount of acceptable expansion.

Today, however, there appears to be more of a consensus than ever about measuring, at least from the bullet and powder companies. The web is reported to be the best location on a rimless case, and one should quit adding powder when .0005 inch of expansion has been observed. They say it's best to measure a minimum of three cases at each level as a handloader progresses in small charge weight increments.

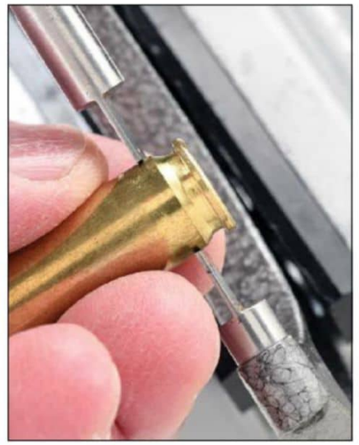
This is one of those ideas that sounds straightforward and simple. Try it sometime. It brings to mind the words of the late gunsmith Bob West. He once commented that anyone who claims to be able to hold machining tolerances to .0001 inch is kidding himself. Those were in the days when gunsmiths relied on manually operated lathes and milling machines, but the point was made. The idea that someone can tote a micrometer to the range in a shooting box and whip it out to determine a maximum load is a similar situation.

Off and on for many years, I have attempted to measure cases to determine a maximum load, and it never seemed to work for me. I remember when I did not have a blade micrometer but read about measuring the expansion ring,

If measuring the projecting expansion ring rather than the web, it can be done with a conventional micrometer with normal anvils. A small vise to hold the micrometer is an aid.

When measuring cases for expansion, mark the measurement location and write the measurement on two sides of each case before going to the range, so there is no mix-up.

Even with the use of a vise, it is next to impossible to get repeatable measurements while properly positioning the case with one hand and keeping tension on the spindle ratchet with the other.



If the blades are not presented perfectly square to the brass surfaces, there will be an error in measurement. By hand-holding the case, the measurement errors can easily exceed the parameters necessary for the process to be valid.

rather than the web, to determine a maximum load. I gave it a shot with my flat-anvil Fowler micrometer that could be used to measure a projecting expansion ring. I was left scratching my head. It just did not work for me.

Then one day I bought a blade micrometer and thought my case measuring problems would be solved because I could mic the web. It was the usual NSK with a vernier scale that all micrometers used to have. I reread directions and tried again. Think about trying to hold a case and a micrometer while aligning the blade along the narrow band of web just forward of the extractor groove, and doing this while holding tension on the spindle ratchet and craning your neck to see around the shaft of the vernier scale for the marks that line up. The measurement is constantly shifting – just what you need to measure to .0001 inch. Needless to say, that project ended with frustration too. I chalked it up to a lack of patience.

Years passed. Then one day along came COVID-19. Quarantining seemed made to order for projects that require patience. As a handloading writer, I felt it was my duty to overcome a lack of ability to determine a maximum load with a micrometer. After all, nearly all loading manuals tell how to do it. It is currently on the Hodgdon website labeled as a "simple trick for monitoring pressure of your rifle reloads." If it's simple, I figured I ought to be able to do it.

This time I was not messing around. I went whole hog and bought a Mitutoyo Digimatic blade micrometer. I just *knew* this baby would permit me near-unlimited accuracy in case measurement. I swallowed hard at the $855 price tag from MSC, and told myself that my reputation depended on it. It has six digits in the window and shows five decimal places! A tenth, heck! It measures to a half of a tenth (ten-thousandth). No longer would I have to deal with a vernier scale. I would clamp it in a small portable vise and be able to mic cases lickety-split.

The first thing learned with this device is how easy it is to get inaccurate readings just by how you hold the case in relation to the blade jaws. Though they are very thin, the slightest out-of-square presentation of the brass surface to the jaws makes for an error that is far too large to fit within the accuracy requirement needed for this process. I have well over 1,500 practice measurements written down just for this piece. It is a learning process requiring patience and perseverance. The only way to measure cases accurately is to make some sort of fixture to present the exact location of the case squarely to the jaws.

You can clamp the flat-sided portion of the micrometer onto a tabletop so that the spindle extends out over the edge with the blades parallel with the tabletop. Check the distance of each blade from the tabletop to make certain they are parallel. Then shim up the tabletop with a piece of steel, thin flat plastic or sheets of paper until the base of the case is presented to the blade jaws at the right height just forward of the case's extractor groove. If one gets

Table I .308 Winchester Web Diameter Increase

bullet (*grains*)	powder	charge (*grains*)	peak chamber pressure (*psi M43*)	24-inch test barrel velocity (*fps*)	22-inch barrel* velocity (*fps*)	web diameter increase (*inches*)
165 Sierra HPBT	IMR-3031	38.0	38,200	2,369	2,244	.0000
		39.0	40,200	2,429	2,326	.0001
		40.0	50,200	2,608	2,428	.0003
		40.5	50,900	2,629	2,469	.0002
		41.0	51,600	2,623	2,554	.0006
		41.5	56,900	2,717	2,574	.0005
		42.0	59,900	2,748	2,600	.0005
		42.5	60,300	2,770	2,630	.0005
		43.0	62,900	2,802	2,650	.0006

* Denotes the use of a Winchester Model 88

Notes: Federal 210 primers were used throughout. Overall loaded length was 2.750 inches. Results are for an average of five shots with new brass.

For more data on this cartridge please visit LoadData.com.

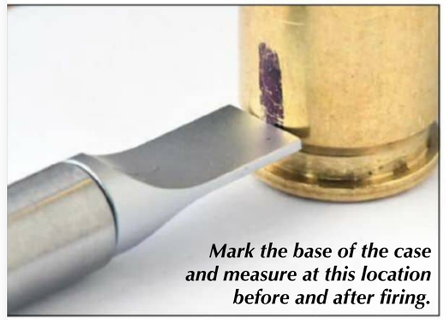
Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

Table II .308 Winchester Factory Load Web Diameter Increase

load (*grains*)	peak chamber pressure (*psi M43*)	24-inch test barrel velocity (*fps*)	22-inch barrel* velocity (*fps*)	web diameter increase (*inches*)
165 Federal Premium BTSP	49,800	2,652	2,542	.0004
165 Hornady InterLock BTSP	52,200	2,669	2,548	.0002
165 Remington Core-Lokt PSP	58,100	2,683	2,557	.0002
150 Winchester Silvertip	55,600	2,834	2,626	.0002

* Denotes the use of a Winchester Model 88

Notes: Results are for an average of five shots.



Mark the base of the case and measure at this location before and after firing.

too far forward, the brass begins to swell into the expansion ring so that the acceptable measurement band is really narrow, at least on the sample .308 Winchester cases.

This way, a person does not have to hold the mic or the case. Just align the prescribed mark (Sharpie pen) with the midpoint of one blade, make certain that the other side of the case is contacting the midpoint of the other blade, and slowly turn the ratchet until it contacts the case and clicks over once. With the base on a smooth surface, the case can slide a tiny bit and self-align squarely with the blades. It truly makes precise measuring of cases a lot easier and far more precise. The measurements are repeatable.

With the measuring part whipped, I was ready for testing. I had it all figured out. I would load the .308 in increments, progressing gradually while firing them in a pressure barrel. That way, I would know the pressure that each individual case endured, and I could equate it to the web expansion measurement received. Then the same loads would be fired in a production rifle, a Model 88 Winchester. What a handloading column it would make!

The pressures and velocities tracked beautifully as the powder charge weights increased. I could hardly wait to measure cases and show how velocity, chamber pressure and case expansion measurements all fit nicely together. I could overcome my lack of ability in this area and wow readers with the results at the same time.

The results are listed in accompanying tables. While pressure increased incrementally in the test barrel as expected, and velocities increased in the same manner in both rifles, the case measurements do not. There is no doubt that brass expands as pressure goes up, but it does not expand with the same regularity or predictability. It sort of tracks sometimes, but there are so many instances where measurements are far outside the bounds of what one would expect or be able to explain. Measuring three or five cases for an average does smooth out the numbers. But if I did not have the benefit of already knowing the pressure of the loads, it would be disconcerting when a measurement exceeds the recommended .0005-inch maximum expansion. The truth is, this is a common occurrence. Sometimes the error is on the order of 100 percent or more! You don't find that with pressure and velocity testing. The tables shown here present some of the better results. Earlier tests were so far off the mark that I abandoned them and started over, several times.

I do not believe measuring cases is something for the average handloader. Because of the glaring and frequent anomalies, I cannot rely on the process to determine a maximum load. Measuring cases is tedious business. I marked and measured cases before going to the range and wrote the measurements on the cases so that there would be no mix-up. That alone is a frustrating process when you have all the ammunition loaded and are itching to go shoot. For me, loading and shooting are a more enjoyable manner to self-quarantine. Shooting sage John Redmon related he doesn't even want to be distracted by knowing his load's velocity. His enjoyment is about shooting a small group.

Perhaps I am too spoiled by having used Ken Oehler's utterly reliable Model 43 PBL for years, the best test unit ever devised. Alas, it is no longer available. The next best thing is to use pressure-tested data from powder and bullet companies made instantly available on the internet almost

Some sources report that factory rounds can be measured for case expansion and then the handloader can use this measurement as a "do not exceed" level for load testing. These are the four factory rounds measured for case expansion.

before a new cartridge or component erupts on the scene. Wildcatters may attempt to use the case expansion measurement system, but based on my own experience, I do not trust it to tell me much. •

6.5 Weatherby Rebated Precision Magnum

BULLETS & BRASS by Brian Pearce

Q: I am handloading for the 6.5 Weatherby Rebated Precision Magnum and using select data based on your handloads presented in your article in *RIFLE* magazine (March/April 2020). I am having trouble ejecting spent brass. I am hoping you can offer some insight into what I might be doing wrong. I am using factory once-fired cases, Nosler 140-grain AccuBond bullets and Alliant Reloder 25 powder with loads containing 62.0 to 66.0 grains. Any help that you can offer will be appreciated.

J.G., via email

A: *If you are having trouble ejecting spent brass, that is a mechanical problem with the rifle, not a problem with the ammunition. However, if you are having trouble extracting cases (sticky extraction) from the chamber, then you are probably experiencing high pressure. My maximum load for the 6.5 RPM using the 140-grain Nosler Partition bullet was 66.0 grains of Alliant Reloder 25 powder. This load was working fine in my rifle, as extraction was easy (or normal), and neither were there any signs of excess pressure.*

By you changing to the 140-grain Nosler AccuBond bullet, pressures will be different. Also, you do not specify what primer you selected. Please note that I chose the CCI BR-2 primer to develop my data, which is a standard non-magnum primer. If you are using a magnum primer, pressures will increase, and the powder charge will necessarily need to be reduced. Another factor may have to do with burn rate variances within powder lot numbers. For example, if my lot number of powder has a slightly slower burn rate than is targeted for this particular powder, and yours has a slightly faster burn rate, then your loads will produce greater pressures and usually higher velocities. This is a good example of why handloaders are generally encouraged to begin with reduced or "starting" loads, then work up carefully to maximum charges while watching for signs of excess pressure. This advice likewise applies every time a new lot number of powder is obtained. And last, perhaps your rifle is showing signs of higher pressure due to a shorter leade, tighter throat, tighter bore, etc.

Incidentally, using the Nosler 140-grain Partition bullet with 64.0 grains of Alliant Reloder 25 powder produced 2,955 fps, which more or less duplicates the factory load pressures and velocities.

.27 Nosler Duplication Loads

Q: I recently obtained a new Nosler Model 48 chambered in .27 Nosler. I am very pleased with the accuracy and consistent velocities that I am obtaining with the Nosler factory loads containing the Nosler

Alliant Reloder 25 is an excellent powder choice when handloading the 6.5 Weatherby RPM with 140-grain bullets.

150-grain AccuBond bullet. I am getting around 3,260 fps, and extreme spreads are usually between 10 and 20 fps for a five-shot string. I would like to duplicate their loads. Can you tell me the powder type and charge weight that they are using? In addition to the 150-grain AccuBond, I will probably try the 150-grain AccuBond Long Range bullet at about the same velocity. Any insight that you can offer will be appreciated.

J.T., Rifle CO

A: *I do not know what powder (or powders) Nosler*

Alliant Reloder 25 and Hodgdon US 869 powders can duplicate .27 Nosler factory load velocities with 150-grain AccuBond bullets.

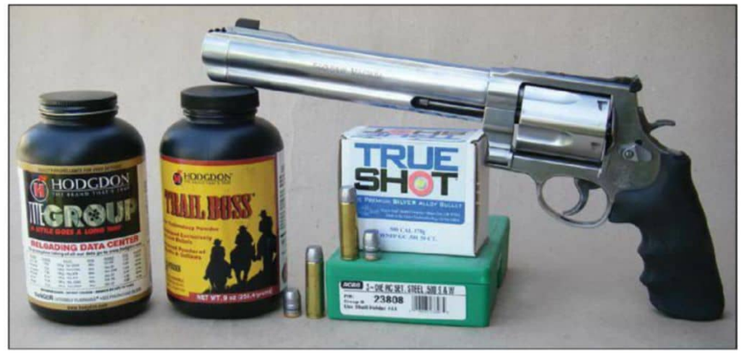
is using in its factory loads. Usually, ammunition companies select bulk OEM products that are not available to handloaders, or at least have a different name or number and a slightly different burn rate. It is also common that different powders are used for a given load or cartridge, depending on current availability and other factors. The point is that you could purchase the same factory load, but with a different lot number, and the powder used could be different.

I suggest using either 87.5 grains of Alliant Reloder 25, or 89.0 grains of Hodgdon US 869 powder to duplicate factory load velocities with either the 150-grain AccuBond or AccuBond Long Range bullet. Naturally, you will want to use a large rifle magnum primer, such as the Federal 215, or for lower extreme spreads, try the Federal 215GM Match. You can seat bullets to the same overall length as factory loads, which is around 3.315 inches; however, by seating bullets out, closer to your rifle's leade, you will probably further increase accuracy.

.500 S&W Reduced Loads

Q: Several years ago I purchased a Smith & Wesson Model 500 chambered in .500 S&W Magnum with the 4-inch barrel to take on Alaskan fishing trips. When I first purchased it, I fired it enough to become reasonably competent, but I never really liked shooting it due to its recoil. Unfortunately, since my last fishing trip, it only rests quietly in the safe. After reading your comments on reduced magnum revolver loads, I thought that perhaps I could enjoy the gun with a load that is going around 800 to 900 fps with a 350- to 400-grain cast bullet. And I would like a second load that will push the same bullet to around 1,200 fps. Do you have any suggestions for bullet choice and powder type and charge weights?

J.S., Hermiston OR



Through careful selection of components, the .500 Smith & Wesson can be downloaded for substantially reduced recoil.

A: *For your light load I would suggest using the Oregon Trail Laser Cast True Shot 370-grain WNFP with 14.0 grains of Hodgdon Trail Boss powder, which produced 995 fps from my revolver that has the 8⅜-inch barrel, and is probably within your targeted 800 to 900 fps when fired from your revolver with a 4-inch barrel. For a bit more velocity, try 15.0 grains of Hodgdon Titegroup powder, which produced 1,258 fps from my gun and is probably around 1,200 fps from your gun's shorter barrel. Incidentally, the above loads were assembled in Starline cases with the "R," which indicates that primer pockets are designed for rifle primers. Both loads were ignited with CCI 200 primers. Hope that helps!*

.44 Magnum Options

Q: I very much enjoyed your "Pet Loads" piece for the .44 Magnum, which is the most extensive, informative and useful article I have ever read on this subject. I have read it three times and learn something each time. Please keep up the good work.

I have been shooting the .44 Magnum since 1957 and reading *Handloader* magazine since 1976. In recent years, due to my age and weakened grip and forearms, I have stopped shooting my pet .44 Magnum revolvers as I simply can't take the recoil anymore. With your suggested light target loads containing cast bullets, I have been renewed and am thoroughly enjoying my guns again. I have had pretty good results with the Rim Rock Cowboy 240-grain RNFP bullet with 6.0 grains of Accurate No. 2 powder. However, as you indicate, the same powder charge behind the 250-grain Lyman/Keith 429521 bullet is even more accurate.

I would like to try the Hornady 240-grain XTP HP bullet at around 1,000 fps from my Smith & Wesson pre-Model 29 .44 Magnum with a 6½-inch barrel. Now to my questions; do you think this bullet will expand at such low velocity? And if so, can you suggest a powder and charge weight? Thanks so much for your many fine articles and insight on so many different subjects.

S.D., Laramie WY

A: *First, thank you for your kind remarks and I am glad that you enjoyed the "Pet Loads" article. The Hornady .44-caliber 240-grain XTP bullet will expand reliably at 900 fps or higher velocity, which I have determined through testing in various mediums, and is what Hornady states as well. You don't specify any particular powder you would like to use. I suggest using 10.5 grains of Hodgdon Longshot powder, which will produce the 1,000 fps you desire. Other options include 12.0 grains of Ramshot True Blue or 9.3 grains of Alliant Power Pistol for approximately the same velocity. I suggest using a "standard" large pistol primer, such as the CCI 300 or Federal 150 which will serve to lower pressure and reduce extreme spreads when compared with the same loads used with magnum primers. All loads will give excellent accuracy in a good sixgun.*

I hope that you continue enjoying your "pet" .44 Magnum sixguns for many years! •

For midrange .44 Magnum handloads containing the Hornady 240-grain XTP bullet, Ramshot True Blue, Alliant Power Pistol and Hodgdon Longshot are top choices.

.310 Cadet

CARTRIDGE BOARD by Gil Sengel

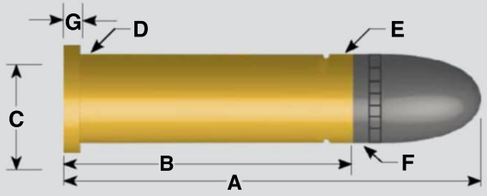
Students of the rifle know of the Boer War (1899-1902) between Britain and Dutch settlers in South Africa. This little dustup rudely illustrated, to even the dullest British officer, the capability of an accurate rifle when managed by a man skilled in practical marksmanship. Suddenly, marksmanship training, or "musketry instruction," as it was then called, became a hot topic.

The upshot of this was the birth of the Rifle Club Movement to promote marksmanship in Britain. Two pillars of this endeavor were Lord Roberts and Lord Salisbury, the latter often quoted as saying he "would like to see a rifle in every cottage in the land." If he could see his country today it would bring tears to his eyes.

Most of Britain was simply too populous for long outdoor rifle ranges. Indoor ranges of 25 to 50 yards were possible, however, and soon appeared in every important town and village. Finding low-powered training rifles then became a problem because in 1900, ammunition production was in flux. Most cartridges, except for military rounds, were still available only as black-powder loadings. Semi-smokeless (a blend of black and smokeless) worked well sometimes but was erosive, and primer compounds then in use rusted bores in a few hours in humid Britain.

Several British rook and rabbit rifles were tried, but they were hunting rifles shot offhand using black-powder cartridges. They fared poorly when fired hundreds of times at a paper target, fouling so badly accuracy degraded unless cleaned frequently. Gunmaker W.W. Greener stated in his book *The Gun and Its Development, Ninth Edition*, that he was the first English maker to meet this demand for an adequate small bore, short range target rifle. It was built on a scaled-down Martini action and of .310 caliber, the cartridge also being specially designed by him (Greener), and suitable for all ranges from 50 yards to 300 yards. The year was 1901.

Despite Greener's statement, the .310 Cadet was overpowered for the short-range rifle clubs. It was much more suitable for military training ranges where targets out to 200 yards were available. Thus the word "Cadet" in the cartridge name? The rifle/cartridge combination would also make perfect sense as a training tool for British and Commonwealth troops issued the .577/450 Martini rifle.



Cartridge Dimensions

A - Overall Length	1.595	**D** - Head Diameter	0.352
B - Case Length	1.125	**E** - Neck Diameter	0.324
C - Rim Diameter	0.405	**F** - Bullet Diameter	0.327
		G - Rim Thickness	0.039

NOTE: Dimensions may vary among manufacturers.

An Australian .310 Cadet "lightly sporterized" along with a factory cartridge, chamber cast and bore slug. All are mandatory if handloading is desired.

A Kynoch "stab crimp" of three indentations spaced 120 degrees around the case neck.

A chamber cast of a .310 throat (left) shows it to be just a tapered hole. A .30-30 is shown at right for comparison.

A new, unfired Starline .32-20 case would fit in the .310 chamber once the rim was thinned. The case was loaded with a pistol bullet. The bullet still didn't touch the throat (left). A factory .310 cartridge is shown at right.

The .310 Cadet used an outside lubed bullet (left) just like the .22 rimfire (right).

A .32-20 Winchester (left) is what the .310 Cadet (right) should have been.

.310 Cadet Handloads

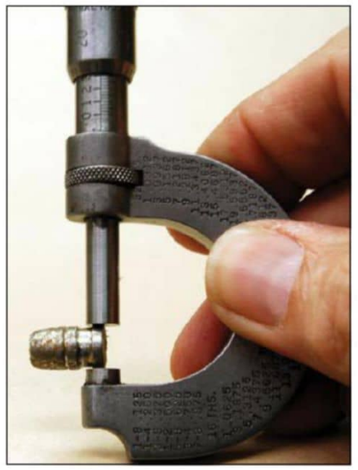
bullet (grains)	powder	charge (grains)	overall loaded length (inches)	velocity (fps)
106 Lyman 313493*	Unique	4.2	1.8	1,128
		4.5	1.8	1,209
		4.8	1.8	1,240
	Green Dot	3.5	1.8	1,004
		3.8	1.8	1,114
		4.1	1.8	1,183
	Red Dot	3.2	1.8	1,039
		3.5	1.8	1,051
		3.8	1.8	1,126

* Bullet diameter was .317 inch

Notes: A Martini .310 Cadet with a 20.5-inch barrel was used to test all loads. Starline .32-20 brass with thinned rims and Winchester Small Pistol primers were used throughout. Five-shot groups ranged from 2.5 to 3 inches at 50 yards, indicating the .310's unique problems were not solved. Velocities were chronographed at 10 feet with an Oehler M35P.

For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.



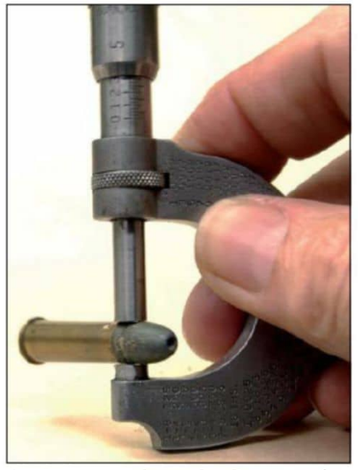
This .317-inch pistol bullet was the largest that could be found in the .310's weight range.

Hard facts on the creation of the .310 Cadet cartridge are few. Why it used a heeled, outside-lubed lead bullet (like a .22 rimfire) at this late date is baffling. Retaining this type of bullet in the case has always been a problem since a conventional case mouth crimp can't be applied. Kynoch rounds use what is called a stab crimp; a small flatnosed punch is pushed into the case a little way behind the mouth, driving metal into the bullet body. It's hardly an operation that would add to accuracy!

Here we should mention the sometimes noted Australian ammunition using jacketed bullets, but of one diameter of .315 inch. The purpose was home guard use in Australia's Martini Cadet training rifles in the event the Japanese could not be stopped from invading the country during World War II.

Another mystery is case length. Six references give different case lengths, only one of which equals the 1.125 inches of the Kynoch rounds in my collection. The others are up to .2 inch shorter. Cartridge maker Eley lists five different lengths.

Part of this stems from the ex-



A micrometer shows the diameter of an unhandled .310 bullet is .327/.328 inch, but this is over dried lube.

These small cartridges include the (1) .32 Ideal, (2) .300 Sherwood, (3) .32 Extra Long, (4) Jeffrey .275, (5) .310 Cadet, (6) .300 Rook, (7) 297/250 Rook, (8) 297/230 Long and (9) 297/230 Short.

istence of a device called Greeners Humane Cattle Killer. Intended for killing animals for meat production or veterinary purposes, it fired a ".310 caliber" cartridge. Design was such that different sizes were required "for killing horses, cattle, sheep, pigs or dogs," according to Greener, but the cartridge remained ".310 caliber." Three of the five case lengths listed by Eley are for this device.

References can't even agree on the type of powder used. Some people insist only smokeless was loaded, but going back to Eley's list, it shows a .310 Cadet (case length 1.095 inches) in both black and smokeless loadings. There is also a .310 Commonwealth Pattern (case length 1.046 inches) in smokeless only. Nothing could be found regarding what a Commonwealth Pattern might be.

One fact that is not in question is origin of the .310 Cadet case. Despite being "specially designed" (as Greener put it), it is just the .32-20 Winchester, which was then loaded all over the world for use in lever-action rifles. Granted, the case was shortened to allow for the outside lubed bullet, the rim was thinned to prevent chambering a .32-20 and bore dimensions increased to make a .32-20 bullet inaccurate even if the case rim was thinned to fit. Greener was a very smart guy when it came to firearms. What he created was such a screwed-up thing from an ammunition standpoint that no one would have considered handloading fired cases. Given the multiple case lengths and heeled bullet, few foreign ammunition makers would have been interested either. Only the British trade would supply cartridges. What a coincidence.

Factory cartridges were available using a 120- to 125-grain lead roundnose at 1,200 to 1,320 fps, the same bullet with a tiny hollow-


Most .310 Cadets were broken down for just the action.


The factory cartridge marking on this Australian .310 barrel is partially covered by an added rear sight.

point at the same velocity and an 84-grain lead hollowpoint with no velocity data given. The 84-grain hollowpoint was reportedly not very accurate.

Speaking of bullets, another of the .310 Cadet's mysteries is bullet diameter. References vary from .316 to .328 inch. The largest figures were obviously obtained by measuring the exposed driving surface of a loaded round and thus include dried bullet lube. The cartridge drawing with this article is from an unhandled Kynoch round; cartridges showing more wear are smaller. Since bullets were dip-lubed, thickness of the lube coating varies.

The only way to determine proper bullet diameter for a rifle is to slug the bore. This was done to the rifle shown, which has what appears to be a perfect bore. Bore diameter was measured, using plug gauges, at exactly .310 inch. Grooves are .3180 to .3184 inch.

The .310 Cadet would have disappeared if it hadn't been for Australia buying thousands of the little Martinis for use as training rifles. They became available on the surplus market in the U.S. in the 1950s. Most were disassembled for their neat little actions, but a few were unaltered or rechambered to .32-20, which just deepened the rim cut, allowing that cartridge to be fired. Accuracy was poor due to the small diameter bullet.

Many owners would like to handload for their rifles. Proper cases, special bullets and even custom ammunition are sometimes seen on the internet. RCBS offers a heeled bullet mould, but because of the COVID-19 foolishness, I could not obtain one in time to try it. Some Lyman 313493 bullets were cast in an ancient mould that came out .317 inch in diameter, with a weight of 106 grains. These were loaded in unfired Starline .32-20 cases after the rims were thinned.

As the accompanying table indicates, accuracy was not very good. Some of this is due to the bullet, but a lot is the chamber throat, which like most British rook rifles, is just a tapered hole from somewhere in the chamber to somewhere down the bore. It is unbelievable. A target rifle cartridge?

The .310 Cadet is definitely a graduate school project for handloaders. Too bad it wasn't designed using the .32-20 case firing a special target bullet in a proper chamber with matching rifling twist. It could still be popular today. •

IMR-4350

PROPELLANT PROFILES by Randy Bimson

Readers of this column may soon discover I have a passion for classics as well as modern technologies. It will come as little surprise then, that this, the first "Propellant Profiles" column I pen, takes a look at one of the all-time classic centerfire rifle propellants.

Purportedly at the time of its introduction, noted authority Phil Sharpe reported that DuPont developed IMR-4350 to optimize the performance of the only "magnum" cartridge of the time, the .300 Holland & Holland Magnum. True or not, with the introduction of IMR-4350, cartridges like the then-wildcat .22 Varminter (.22-250) and .25-06, the .270 Winchester and the .300 H&H Magnum, all of which would have been considered overbore capacity at the time, received a much heralded boost in performance from IMR-4350.

In the first "Propellent Profiles" review of IMR-4350 in 1970, John Wootters described it as a "landmark" powder (*Handloader* No. 27, September-October). IMR-4350 was a game-changer when it was introduced in 1940 and continues, 80 years later, to define the velocity and accuracy potential of many of the latest cartridge designs. IMR-4350 has become the propellant of choice of handloaders who find it a well-balanced powder for a broad selection of the "fat case, small diameter projectile" cartridges that have become, some more, some less, popular in more recent times. These include cartridges like the .22 CHeetah MKI & MKII, 6.5-284 Norma, 6mm and 6.5 Creedmoor, .270 and .300 Winchester Short Magnum, 7mm and .300 Remington Short Action Ultra Magnum and the .300 Ruger Compact Magnum.

IMR-4350 is an extruded and longitudinally-perforated, long-grained, nitrocellulose single-based propellant. Its characteristics have changed little since its introduction, with the granular characteristics of current lot production being .083 inch in length by .038 inch in diameter with a hole diameter of .006 inch. The resulting web (grain wall thickness) is .016 inch. Bulk density is .945g/cm^3. One of the very first so-called "progressive" burning powders, IMR-4350 incorporates a 6½ percent dinitro toluene (DNT) coating to retard burning. This aids in enabling IMR-4350 to produce high energy yields over a sustained period of burn time. Until the introduction of IMR-4831 in 1973, IMR-4350 had the slowest burn rate of the IMR series powders.

While cartridges using large charges of IMR-4350 benefit from the use of high-brisance primers like the CCI 250, Federal 215, Remington 9½M and Winchester's LRM, most loading data for cartridges in the .22-250 to .30-06 range calls for standard large rifle primers.

Like IMR-4831 and other long grain powders, IMR-4350 can be a challenge for many powder measures to throw charges consistent enough to be agreeable to some handloaders. I am a notorious reloading tool junky and have owned no less than 10 different makes of powder measures. While I have not run IMR-4350 through all 10, I have three that stand out from the rest as being consistently capable of throwing charges of 65 to 73 grains of IMR-4350 within ⅒ of a grain. They are a Forster Products Bench Rest® Powder Measure, a Neil Jones Custom Products Micro Measure and an aged Belding and Mull "Visible" measure with a micrometer charge tube. The Belding and Mull has not been made for years, but I suspect the MVA "Visible" measure, an improved version of the Belding and Mull, would do just as well.

.10-inch squares

IMR-4350 Select Handloads

cartridge (*grains*)	bullet (*grains*)	charge (*grains*)	velocity (*fps*)
.22 CHeetah MKI	55	50.5	4,011
6mm Remington	85	46.2	3,275
6.5-06	140	46.5	2,880
6.5 Creedmoor	140	41.0	2,699
.280 Remington	140	52.1	2,918
.30-06	165	56.9	2,825
.300 H&H	165	68.0	3,005

Notes: .22 CHeetah cases were formed from .308 Winchester brass using RCBS form dies. Winchester WLR primers were used for all cartridges except the .22 CHeetah (Remington 9½) and the .300 H&H (Remington 9½ M). All barrel lengths were 24 inches with the exception of the .300 H&H, which was 26 inches. Velocities were chronographed at 15 feet.

For more data on these cartridges please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

I became infatuated with the .300 H&H Magnum in 1971, when through the efforts of an acquaintance, a standard grade pre-64 Winchester Model 70 became available. My reloading records show "Brutus," as the Model 70 was so named by one of my longtime hunting companions, having consumed six pounds of an eight-pound canister of IMR-4350 (lot number P86MY07A). That rifle shows a distinct penchant for 68 grains of IMR-4350 topped off with either the Sierra 165-grain GameKing spitzer boat-tail or Nosler 165-grain spitzer Partition. It will send either bullet down range with a velocity of 3,110 to 3,120 fps from the 26-inch factory barrel. Typical five-shot groups with either bullet fall between the perimeters of .750 and .875 inch off the bench at 100 yards, when I do my part.

The bulk of the 165-grain bullets that go downrange are the Sierras, with the intended targets being paper or steel, with the odd jackrabbit and coyote thrown in for some real-world practice. The Nosler Partitions are reserved for hunting the likes of whitetail and mule deer, elk, moose and African plains game – and what a fine job they do. Of all big-game hunting caliber rifles I own, this rifle and cartridge combination is my go-to rig for most of my hunting.

One note of caution: one reloading data source back in 1970 listed a maximum load of 70 grains of IMR-4350 and a 165-grain bullet. **This is way too hot for my Model 70 or its stablemate, a Sako M85 prototype commissioned for a special project during my tenure as manager of technical services with Beretta USA.** Most data sources of today show a maximum charge of 67 to 68 grains with a 165-grain bullet. This just reinforces the longstanding axiom that loading data is definitive only for the actual make and type of bullet used to develop the data and the test barrel it is fired from. Fired from any other rifle barrel – with a bullet of a different profile or construction – and all bets are off. Always start with a reduced or minimum listed load when developing loads for a specific rifle and bullet.

Over the years IMR powders have made the transition of ownership from DuPont to IMR Powder and more recently to Hodgdon Powders, which rebranded the product line as IMR Legendary Powders. The IMR series of powders continue to be manufactured at the powder works located in Valleyfield, Quebec, Canada, where they have been made since the early years of World War II. Interestingly, many shooting publications incorrectly reference the Valleyfield plant as being situated in the Canadian province of Ontario.

In a recent conversation with Ron Rieber of Hodgdon Powders, he mentioned the fact that whether it be IMR-4350 or its close cousin, H-4350, Hodgdon's annual production quantities never meet the ongoing demand for these two exceptionally broad-spectrum propellants.

A classic is defined as "an outstanding example of its kind, something of lasting worth." I think it is fair to say that IMR-4350 is an outstanding example of a propellant that, over the last 80 years, has and continues to prove its worth. It's truly one of the classic propellant powders of all-time. •

Glock G40 Gen4 MOS 10mm Auto

FROM THE HIP by Brian Pearce

In 1980, the Austrian Armed Forces announced it was searching for a new sidearm for military use and outlined a rather lengthy criteria list. Gaston Glock had no experience at designing firearms; however, he did have extensive experience with synthetic polymers and engineering. He assembled a team of European handgun experts to help in working out design features and details of the new pistol. His first gun was the Glock 17, which was the first commercially successful handgun to feature a polymer frame.

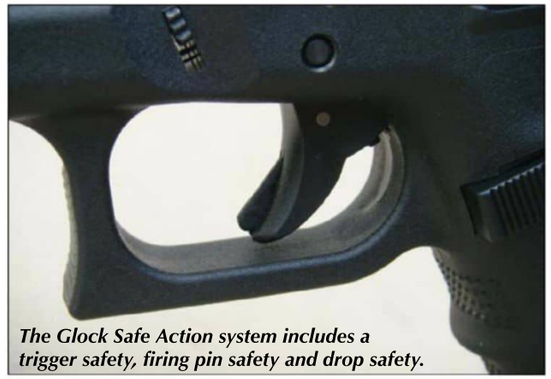
In spite of great skepticism from many sources to the effect that a pistol with a synthetic frame "could not possibly withstand the stresses necessary for endurance," the Glock 17 proved durable and reliable. After extensive testing, the Glock 17 was adopted in 1982 by the Austrian Army and police. In the decades since, Glock has introduced more than 170 variations of the original design, chambered from .22 Long Rifle to .45 ACP. Glock pistols have gained huge worldwide popularity with countless military and police organizations, but also civilians that use them for recreation, competition, personal protection, etc. To date, around 10 million guns have been sold.

For this column, I selected the G40 Gen4 MOS chambered in 10mm Auto, which is built on the large frame and is Glock's largest pistol. As such, it is probably not ideal for all shooters, especially those with smaller hands. It does offer a four-piece modular backstrap that allows the shooter to change the feel and size of the grip frame, but does not permit making it smaller than its original form. Other features include a 6.02-inch barrel and 15-round magazine capacity (with two extra magazines included). The flat black slide is gas nitride treated, which has proven rust resistant, tough and durable. And it has the familiar "safe action" that is a constant operating system that includes a trigger safety (with protected pivoting center), firing pin safety and drop safety. Like most out-of-the-box Glock pistols, trigger pull was heavy, even heavier than most others, at 6.5 pounds. For left-handed shooters, the magazine catch is reversible. In spite of its size, it weighs 35.45 ounces empty (with magazine installed).

Glock's G40 Gen4 MOS includes three 15-round magazines.

The G40 Gen4 MOS (bottom) is a large pistol. For comparison, it is shown next to a Kimber Model 1911.

It only takes a few seconds to fully fieldstrip the Glock G40 Gen4 MOS.



The Glock Safe Action system includes a trigger safety, firing pin safety and drop safety.

The Glock features a modular back strap that allows the shooter to change the feel and size of the grip frame.

The G40 includes the Glock Modular Optic System (MOS) adapter set that offers four additional options (plus the factory installed plate) for mounting reflex sights and other accessories. The MOS mounts just forward of the rear sight on the top of the frame and is flush with the contours of the slide. This pistol is probably going to be pressed into action mostly by outdoorsman and hunters, and reflex sights are already becoming more reliable, practical and popular, which is certain to make the MOS even more appealing.

A brief discussion of the 10mm Auto cartridge seems appropriate. It was originally more or less the brainchild of Jeff Cooper and others, with early wildcats being based on cut down .30 Remington cases and loaded with .38-40 Winchester bullets (.400 inch), which became known as .40 Super and 10mm Auto. While it was primarily chambered in heavily-modified Browning Hi-Power pistols, it was also easily housed in the Model 1911. While Cooper loved the .45 ACP as a combat cartridge, he recognized that a powerful autoloading cartridge with higher velocities would offer certain advantages, including a flatter trajectory, increased range, better penetration (especially on car bodies, glass, barriers, etc.), but would still be controllable in rapid fire by strong and experienced shooters. And it could be housed in pistols of practical size and weight.

The 10mm Auto probably would have died, but

10mm Auto Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)	5-shot 25-yard group* (*inches*)
150 Nosler JHP	Power Pistol	9.5	1.260	1,385	2.70
165 Speer Gold Dot HP	A-7	12.0	1.260	1,266	2.55
180 Hornady XTP	Longshot	8.0	1.255	1,170	2.20
"	"	8.4	"	1,222	2.35

Factory Loads

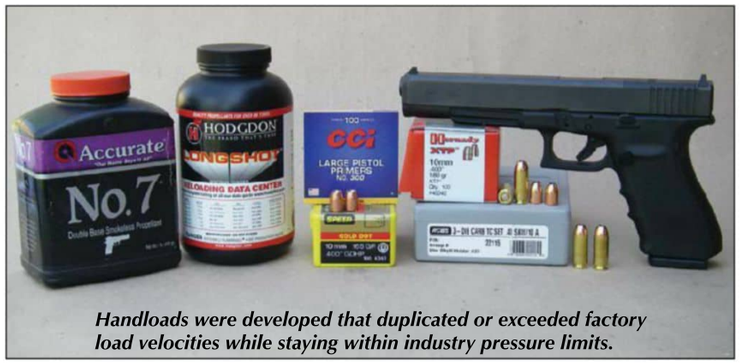
load (*grains*)	advertised velocity (*fps*)	actual velocity (*fps*)	5-shot 25-yard group* (*inches*)
155 Hornady XTP	1,265	1,291	3.00
175 Hornady Flexlock	1,160	1,185	2.80
180 Buffalo Bore JHP	1,350	1,348	2.35
180 Federal American Eagle FMJ	1,030	1,039	3.15
200 Blazer TMJ	1,050	1,047	3.25
200 Speer PP Gold Dot HP	1,100	1,094	2.40

* Indicates best group

Notes: A Glock G40 Gen4 MOS with a 6.02-inch barrel was used to test all loads. Starline cases and CCI 300 primers were used throughout. Bullet diameter is .400 inch; maximum case length is .992 inch; suggested trim-to length is .987 inch.

For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used.



Handloads were developed that duplicated or exceeded factory load velocities while staying within industry pressure limits.

Glock G40 Gen4 MOS Specifications

Caliber: 10mm Auto
Barrel Length: 6.02 inches
Slide Finish: Gas nitride, flat black
Rifling: Right hand, hexagonal
Capacity: 15+1
Trigger Pull: 6.5 pounds
Trigger Travel: .049 inch
Sights: White outline drift-adjustable rear, white dot front
Safety: Safe Action system includes trigger safety, firing pin safety and drop safety
Weight Empty: 35.45 ounces with magazine, 32.28 without magazine
Overall Length: 9.02 inches
Height: 5.47 inches
Overall Width: 1.34 inches
Slide Width: 1.12 inches
MSRP: $840

as FBI Lite or subsonic loads). Smith & Wesson quickly realized that by shortening the 10mm case and changing to a small pistol primer pocket, the FBI Lite ballistics could be duplicated, and the new cartridge could be housed in most 9mm-size pistols that were lighter and more compact. This resulted in the birth of the .40 S&W in 1990, which became widely popular and almost made the 10mm obsolete. I did not find great favor with the .40 S&W, except in compact pistols; rather, I wanted the horsepower associated with full power 10mm Auto loads in full-size pistols.

Shooters eventually began to once again recognize the 10mm Auto and its advantages over the 9mm Luger, .40 S&W and .45 ACP cartridges. Manufacturers have responded with many new pistols (and even revolvers), including Ruger, Colt, Smith & Wesson, Kimber, Springfield Armory, Glock, Remington, Dan Wesson, SIG SAUER and others. The 10mm Auto has truly made a comeback and has become a hot-selling handgun cartridge.

Current pressure limits from the Sporting Arms and Ammunition Manufacturers' Institute (SAAMI) list the 10mm Auto with a maximum average pressure of 37,500 psi. But in studying factory loads, including velocities and pressures, it seems as though nothing is standardized. Some companies still offer the FBI Lite or subsonic, but most offer loads that are supersonic; however, they are still well below maximum pressure limits. I have talked with several company representatives and ballisticians on this matter, and most are nervous about some of the early guns that had poorly-supported chambers. The feed ramps were excessive or poorly engineered, and full-power loads pose the risk of ruptured cases.

The second problem is that they ". . . don't have the perfect powder for ideal performance in the 10mm Auto." Therefore, most companies are limiting pressure to around 25,000 to not over 30,000 psi. Many

The new pistol offers better chamber support than previous Glock variations chambered in 10mm Auto.

handloading manuals do the same. (At least two major powder manufacturers are currently working on new powders designed specifically to maximize the 10mm Auto, with pre-production samples on their way here. If those products turn out as expected, perhaps handloaders will have a high performance 10mm powder by year's end.)

As indicated, when the 10mm is loaded to its full potential, it is capable of pushing a 200-grain bullet at 1,200 fps, or a 180-grain at nearly 1,350 fps (even with currently available powders), but it's best if these near maximum loads are used in guns with proper chambers, barrel lockup, etc. At least two companies are still offering high performing loads, including Winchester with its 175-grain SilverTip HP at 1,290 fps, and Buffalo Bore with a 180-grain JHP at 1,350 or 200-grain TMJ at 1,200 fps. The G40 features better chamber support than previous Glock 10mms I have worked with; however, I suggest limiting handload data with 180-grain jacketed bullets to between 1,275 to 1,300 fps maximum in the G40, but those velocities can only be reached safely with select powders that offer the correct burn rate.

Six factory loads were tried in the G40, with all offering perfect feeding and functioning. Overall, accuracy was only fair, but I noticed that accuracy increased throughout the shooting sessions, which is common as pistols wear in.

The two most accurate factory loads include the Speer Personal Protection 200-grain Gold Dot HP (1,094 fps) and Buffalo Bore 180-grain JHP (1,348 fps). Twenty-five-yard five-shot groups hovered around 2.5 inches with each load. Not outstanding, but good enough to tag a buck at 50 yards.

Handloads were assembled in new Starline cases that were full-length sized then capped with a CCI 300 primer. After bullets were seated to the correct overall cartridge length, cases were taper crimped as a separate step. While industry specification lists a .423-inch crimp, I chose to crimp cases to .421 inch, which is actually similar to most factory loads.

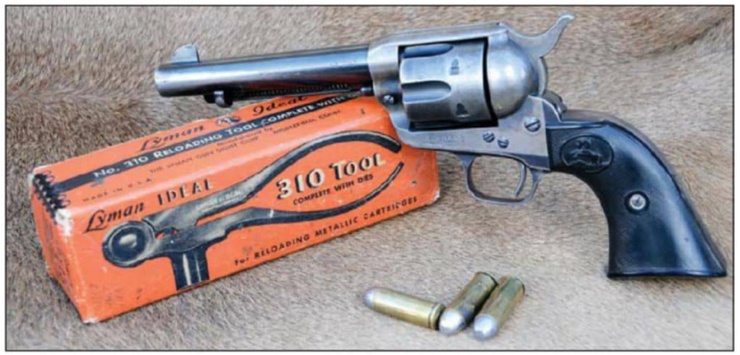
The Nosler 150-grain JHP bullet loaded with 9.5 grains of Alliant Power Pistol reached 1,385 fps and grouped into 2.70 inches at 25 yards. The Speer 165-grain Gold Dot HP bullet pushed with 12.0 grains of Accurate No. 7 powder reached 1,266 fps with groups around 2.5 inches. The Hornady 180-grain XTP bullet proved the most accurate of all (including factory loads), with 8.0 grains of Hodgdon Longshot powder producing 1,170 fps and groups as small as 2.20 inches. As expected, all handloads functioned flawlessly.

Overall the G40 performed well. It is reliable, moderately lightweight and is certain to catch the attention of anyone wanting a powerful autoloading pistol with a high magazine capacity. •

Lyman 310 Tool

MIKE'S SHOOTIN' SHACK by Mike Venturino

A short while back, I bought a Colt SAA .45 from an internet dealer. Its factory lettered as having been sent to a Maine hardware store in 1926. When it arrived, the package also contained a pleasant surprise. In it was an Ideal 310 Tool complete with .45 Colt dies. (The Ideal Company was bought by the Lyman Gun Sight Company in 1926.) I'd guess the 310 Tool set dates from about the same time as that Colt .45 because the handles were steel instead of a lighter alloy, as have been all 310 handles of my personal experience.



Mike's newly acquired Colt SAA .45 made in 1926 came with an Ideal/Lyman 310 kit, likely from the same era.

That true "hand-loading" tool brought back memories from 50 years gone by. Although I had a well-equipped reloading bench at home in West Virginia, during college years I worked summers "out West." For those trips, I took Lyman 310 Tools with me. The first was a full kit for .38 Special/.357 Magnum. Others came later.

Using that first 310 Tool was indeed a learning experience. One summer, five of us who worked together had .357 Magnum revolvers. We spent several pleasant evenings on the bunkhouse porch using the 310 Tool. The first thing learned was that not all .357 Magnum chambers were alike. The handguns involved were a Smith & Wesson Model 19, Colt SAA, a Uberti Cattleman and two Ruger Blackhawks. We pooled our fired brass from those sixguns and loaded it all together. That was a mistake. Sizing dies in 310 Tools do not full-length resize a case, and we ended up having to sort loaded rounds for all revolvers. At this late date, I don't remember exactly which revolvers had the largest chambers, but my Colt SAA certainly had the tightest ones. It wouldn't accept neck-sized cases previously fired in any of the other .357s.

Another fact learned was that brass differed greatly in hardness. Nickel-plated cases were hardest. Sizing 100 or so of those would wear blisters on the user's hands, albeit handling horses daily made our hands far from soft. Unplated brass was far easier to size. One facet of 310 Tools that I liked immensely was the primer seating die. You could both feel and see primers seating.

Lyman's 310 Tools operated like old fashioned nutcrackers with the effort supplied by one's hands. Included in a set were dies for sizing/decapping, case mouth expanding and belling and a priming and seating/crimping die. I took along a fixed-charge powder measure made by the long defunct Lachmiller Company. Its rotor was set for 14 grains of 2400. Not trusting my new-to-reloading buddies, I let them do most of the hand work while I dispensed powder and started bullets in charged cases. Along with the tool, I had brought about 1,000 sized and lubed 150-grain SWCs from Lyman mould 358477.

Instead of aluminum handles and four die sets as Mike used in the 1970s, this older 310 kit came with steel handles and a six die set.

The history of Ideal/Lyman "nutcracker" tools is too detailed to cover here. Suffice it to say, according to a reprint of a black-powder-era *Ideal Handbook No. 5* and an original 1927 *Ideal Handbook No. 28*, their hand tools were numbered from No. 1 to No. 10. Collectively, reloaders could use them for rifle cartridges from .22-15-45 WCF to .50-110-30 Winchester Express, and for revolver cartridges from .32 Colt Short to .45 Colt.

Obviously, sometime after Lyman Gun Sight Company absorbed the Ideal Company, its No. 3 and No. 10 tools were combined into the 310 Tool, which Lyman Products Corporation still offers today. My search on the company's website revealed that for 2020, dies are available only for .45 Colt and .38-55. However, a look at eBay showed many die sets and/or complete 310 Tool kits for sale.

Let's return to the .45 Colt 310 Tool I received with the Colt SAA. During the pandemic shutdown, some time was available to delve into actual "hand" reloading again. However, some familiarization was required to use the kit properly. As noted, the 310 Tools I used 50 years ago came with four dies. This old one had six.

In previous experience, the first die was for neck sizing and punching out old primers. Starting with the die holding the decapping rod, pressed in cases received no resizing at all. I thought, "Okay, what's going on here?" Bullets intended were from NEI mould 324, dropping at 250 grains from my 1:20 (tin-to-lead) alloy. Sized to .454 inch, they slid loosely into cases that had passed through the 310 Tool's decapping die.

Therefore, I began searching through the extra dies, and sure enough, I found a separate die just for neck sizing. It worked perfectly, sizing .45 Colt cases to the base of bullets, which incidentally was what those old *Ideal Handbooks* recommended. My randomly-picked .45 Colt cases could have been fired though no fewer than 10 different revolvers, but after neck sizing, all chambered perfectly in the 1926 Colt SAA.

Next up was case mouth expanding and belling. That die's stem was marked ".452," which was fine for .454-inch bullets, but there was a minor problem. The expanding/belling stem increased in diameter quickly. There was a fine line between not belling case mouths enough and belling them too much. If not belled enough, bullets couldn't enter case mouths. If belled too much, it was difficult to remove cases from the tool. In fact, cases expanded too much had to be pulled free with pliers. With some trial and error I found that fine line where cases were belled properly to accept bullet bases and yet fell freely from the die after belling. That die was then locked down tightly.

Priming cases was next, and just as I remembered, seating primers was a joy. They slipped into primer pockets perfectly and evenly. The powder charge intended was 6 grains of Trail Boss. Since I envisioned loading only 50 rounds with the 310 Tool, charges were hand weighed.

Bullets seated easily with the die I thought was for seating/crimping. Only it was not, as no crimp was applied. That was where the sixth die came into play. It only provided a crimp. Long story short, my actual "hand-reloaded" 50 rounds of .45 Colt shot perfectly. Of course, the test gun was that 1926 vintage SAA with which the 310 Tool arrived. They grouped from about 2.5 to 3.5 inches at 25 yards, and pleasingly printed dead center.

The era when "nutcracker" reloading tools were all that were available for reloading is long past. That said, they can still be feasible if time is available and space is not.●

.375 JDJ

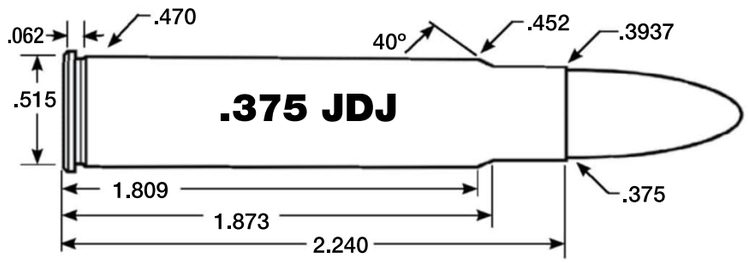
WILDCAT CARTRIDGES by Layne Simpson

The .375 JDJ was introduced in 1978 and was the first of six cartridges eventually developed on the .444 Marlin case by J.D. Jones of SSK Industries for the Thompson/Center Contender single-shot pistol. With the exception of their bullet diameters, the .309, 8mm, .338, .358, .375 and .416 JDJ cartridges are the same. All are formed by necking down the .444 Marlin case and fireforming to slightly less body taper and a 40-degree shoulder angle. Gross water capacity is about 12 grains more than for the .308 Winchester case.

Mention "improved" and the first thing most shooters think of is higher velocity due to an increase in powder capacity. Blowing out the .444 Marlin case to the JDJ shape increases its capacity by less than four percent, so velocity gain over simply necking down the case is slight. But there is another more important benefit. As experiments performed many years ago by P.O. Ackley revealed, decreasing the body taper of a case decreases its thrust against the locking mechanism of a firearm because, during firing, it does a better job of clinging to the wall of the chamber than a cartridge with considerable taper in its case. This assumes the case and the wall of the chamber are dry with no trace of oil or other lubricant.

I have been shooting the .375 JDJ since the 1980s, when only Remington made .444 Marlin cases. The relatively low chamber pressure of the cartridge, along with occasional annealing, has kept most of them going to this day, but they are gradually being replaced by .444 cases made by Starline. The base of that case measures .467 inch in diameter compared to .464 inch for the Remington case. The larger base presents no problem for my SSK barrels in .375 JDJ, .358 JDJ and 8mm JDJ, but it won't work in the tighter chamber of my .309 JDJ barrel. For that barrel I have more than enough Remington cases remaining.

For fireforming cases, 45.0 grains of H-322 behind the Sierra 200-grain bullet is a good place to start. For people who don't have



Cases are formed by using a full-length resizing die to neck down the .444 Marlin case (left) and fireforming to the .375 JDJ shape (right).

The .375 JDJ chamber throat is long enough to seat bullets with their bases no deeper in the case than the shoulder/neck junction: (1) Sierra 200-grain FN, (2) Sierra 250-grain SBT, (3) Swift 250-grain A-Frame, (4) Nosler 260-grain Ballistic Tip, (5) Swift 270-grain A-Frame, (6) Swift 270-grain A-frame.

Layne's 14-inch SSK .375 JDJ barrel has a full-length rib with integral T'SOB scope mounting base. It is shown here with one of a limited run of Contender "flat-side" (no etching) frames, Pachmayr rubber grip and forearm, quick-detachable carrying sling and a Bausch & Lomb 2x handgun scope.

The .375 JDJ is commonly loaded with heavier bullets, but most hunters who use it will find those weighing from 200 to 260 grains the most useful. Bullets from left: Sierra 200-grain FN, Swift 250-grain A-Frame, Nosler 260-grain Ballistic Tip.

the time or inclination to form cases, Quality Cartridge makes .309 JDJ brass, and it is available from Graf and Sons. The chamber throat of my barrel is long enough to allow seating all bullets with their bases no deeper in the case than its shoulder/neck junction. Bullets still have a bit of a jump prior to rifling engagement.

As propellants go, A-2520 ranks high among the favorites of J.D. Jones. When loading bullets weighing from 200 to 260 grains, I have burned more H-322 than anything else. It meters nicely from a good powder measure, burns cleanly in a 14-inch barrel and muzzle flash is mild during early morning and late afternoon low-light conditions when game movement is often at its best. H-4895 and IMR-4064 deliver slightly higher velocities with a 300-grain bullet, but I seldom load bullets heavier than 260 grains so H-322 is the powder for me.

.375 JDJ Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)	3-shot 100-yard group (*inches*)
200 Sierra FN	H-322	50.5	2.800	2,311	1.80
200 Sierra FN	H-4895	53.0	2.800	2,257	2.18
250 Swift A-Frame	H-322	46.5	2.950	2,114	1.87
250 Sierra SBT	H-322	46.5	2.985	2,140	2.10
260 Nosler Ballistic Tip	H-322	47.0	3.170	2,118	1.64
260 Nosler AccuBond	A-2520	53.0	3.170	2,079	1.77
275 Swift A-Frame	H-4895	46.5	3.020	2,031	2.30
300 Swift A-Frame	IMR-4064	47.0	3.015	1,967	2.44

Notes: An SSK Industries custom Contender .375 JDJ handgun with a 14-inch Shilen barrel (1:12 twist) was used to test all loads. All powder charges were maximum or close to it in the test gun and should be reduced by 10 grains for starting loads in other guns. Cases were formed by necking down and fireforming Starline .444 Marlin cases in a .375 JDJ full-length resizing die. Federal 210 primers were used throughout. Accuracy is the average of four groups. Velocities are the average of five rounds chronographed at 12 feet. For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

In the hands of J.D. Jones and others, the .375 JDJ has been used successfully on all North American game. Moving to the African continent, it has accounted for eland, elephant, Cape buffalo, hippo and other game. When hunting the big stuff of Africa, I'll stick with my rifle in .416 Rigby, but I have used the .375 JDJ to take several whitetail deer and find the 200-grain flatnose bullet made by Sierra for the .375 Winchester to be quite effective. I have bumped off more feral hogs than deer with the cartridge, and while the Sierra 200-grain bullet works nicely on lung shots, they sometimes drop more quickly with a side-on shot through the shoulders with the Sierra 250-grain SBT, the Swift 250-grain A-Frame or the Nosler 260-grain Ballistic Tip. I have not tried the Nosler 260-grain AccuBond on anything tougher than paper, but it will likely work equally well. It, along with the 250-grain Sierra and Swift bullets and the Nosler Ballistic Tip, should also be excellent performers on larger game such as moose and elk.

There is some recoil, but the Contender is actually more comfortable to shoot than some rifles chambered for the same cartridges. Here are examples: I also have SSK 14-inch barrels in .444 Marlin and .45-70, and like my .375 JDJ barrels, they have full-length aluminum ribs with the integral T'SOB scope mounting base. The Pachmayr rubber grips fitted to my Contender frames are much kinder to the hand than the factory wood stocks. Due to the smaller bore of the .375 JDJ barrel, it weighs a couple of ounces more than the other two, but with scopes the complete guns weigh around 5 pounds with either of those barrels. My Marlin lever-action rifles in .444 Marlin and .45-70 weigh around 7.5 pounds and the discomfort factor when firing them is higher than when shooting the Contenders. How can this be? The secret lies in knowing the proper way to shoot the Contender handgun.

During firing, a rifle recoils against the shoulder while also delivering shock to the cheek, which is one of the more sensitive areas of the human body. In other words, the body receives a double-whammy when a .444 or .45-70 round is touched off in a rifle. Not so with the Contender; as it recoils in its upward arc, the arms add weight to the gun, and as they bend at the elbows the arms serve as very efficient shock absorbers. Arms relaxed and a firm, but not excessively hard, grip applied makes it work. Anyone capable of tolerating the .44 Magnum in a S&W Model 29 should be able to handle the .375 JDJ in a heavy Contender. •

Modernizing the 6mm-06

The 6mm-06 will work great on big game such as mule deer and black bear.

New Powders and Bullets Make It Sing

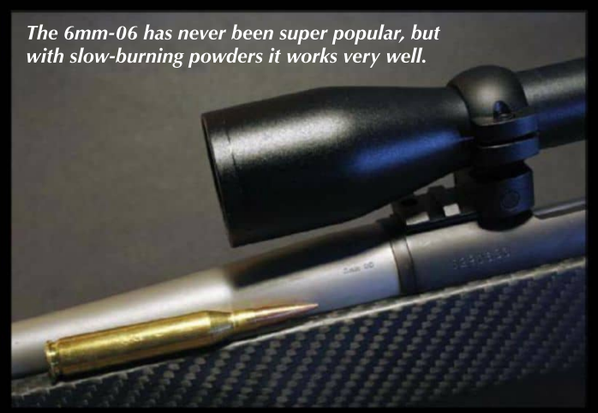
John Barsness

While many handloaders claim to be weary of amazing new 6.5mm rounds, about as many new 6mm cartridges have appeared since 2000. These newer 6mms have faster rifling twists to stabilize heavier, high-ballistic coefficient bullets, but 6mms with faster twists and heavier bullets did not suddenly appear during the past 20 years. In fact, America's earliest 6mm featured a 1:8 rifling twist, because the original bullet tested during the 6mm Lee Navy's development in the mid-1890s was a 135-grain roundnose. Why? For the same reason most other early smokeless military cartridges used heavy, roundnosed bullets: The black-powder cartridges they replaced used heavy, blunt bullets.

Several other 6mm rounds soon appeared, primarily designed for hunting, including the 6x57 Mauser – the 7x57 necked down and almost identical to the .244 Remington, which appeared in 1955, the same year as the .243 Winchester. However, the .244's factory "deer" bullet weighed 90 grains due to the 1:12 twist in the Model 722 rifle and the 6x57's factory bullet weighed 123 grains.

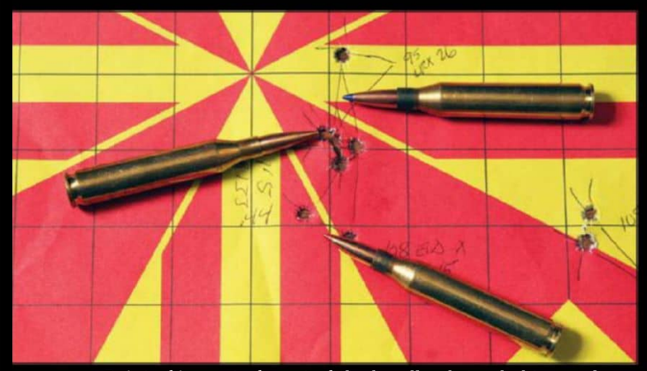
As smokeless hunting cartridges evolved, emphasis soon changed to lighter spitzers at higher muzzle velocities, often in *slower* rifling twists for better accuracy with the relatively poorly-balanced bullets of the day. The .250-3000 Savage is a classic example, originally featuring 87-grain spitzers in a 1:14 twist. The 6mm epitome of the light-bullet/high-velocity trend appeared in 1955 (apparently "The Year" of the 6mm) when Holland & Holland introduced its .244 Belted Magnum, the .375 H&H case necked down. The 100-grain factory load supposedly started at 3,500 fps, and may have in a longer test barrel (a common practice back then), but factory ammunition independently tested in a 26-inch barreled H&H rifle chronographed a little under 3,300 (fps).

Remington changed the .244's name to 6mm Remington in 1963 and started offering a 100-grain factory load, even though the company had already (quietly) changed the .244 to a faster twist. In 1968,



The 6mm-06 has never been super popular, but with slow-burning powders it works very well.

Neither the .240 Weatherby Magnum (left) or the 6mm-284 Winchester (center) has quite as much powder capacity as the 6mm-06 (right).

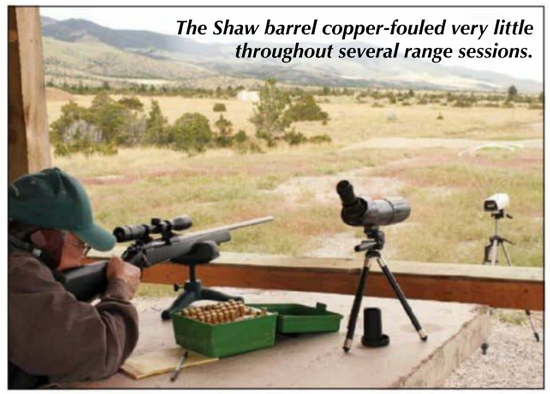


Point of impact of most of the handloads tended to overlap at 100 yards.

Modernizing the 6mm-06

Instead of using 6mm-06 dies, John used a combination of two sets of Redding dies for the .25-06 and 6mm Creedmoor, which worked very well.

The 6mm-06 kicks too much and erodes barrels too quickly to be considered ideal for target shooting these days, but it works great as an open-country hunting cartridge for anything from varmints to medium-sized big game.



The Shaw barrel copper-fouled very little throughout several range sessions.

Roy Weatherby finally entered the 6mm market with his .240 Weatherby Magnum on what some shooters call a belted .30-06 case, claiming 3,395 fps with a 100-grain bullet.

Somewhere in there, the 6mm-06 wildcat also appeared, but apparently never became very popular. In fact, the wildcat section of my modest collection of *Cartridges of the World*, ranging from the 1979 to 2013 editions, does not mention the 6mm-06. Neither does P.O. Ackley's 1962 *Handbook for Shooters and Reloaders*, probably the most complete compendium of mid-twentieth-century wildcats, but it does include the .240 Super Varminter, the .270 Winchester necked down, essentially the 6mm-06 with a longer neck.

Shaw Barrels recently offered to rebarrel a rifle for me. I had been using its barrels since 1989 in chamberings from .223 Remington to .338 Winchester Magnum, and around 2000, visited the company's Pennsylvania factory. However, my last Shaw barrel was a 6.5-06 from 2008 on one of its Mark VII custom rifles, with a 1:9 rifling twist, the slowest twist Shaw then offered in 6.5mm. (It shot very well despite the "slow" twist, because I live in southwestern Montana, where the air is thin enough to allow bullets to stabilize with slightly slower twists.)

Shaw's 2019 chamberings included the 6mm-06, but none of the rifles in my collection were a good candidate. Instead, I visited Capital Sports & Western Wear in Helena, Montana, and found an early Remington 700 .30-06 on the used rack, from the era when Remington 700 safeties actually locked the bolt down, and their walnut stocks had impressed checkering.

Early 700s tended to be *very* accurate, but like a good little rifle loony, I refused to "shoot the donor" and sent the barreled action to Shaw, asking for a stainless, 1:8 twist 6mm-06 barrel in the company's standard Remington 700 sporter contour. Shaw also faced-off the receiver and lapped the locking lugs, then bead-blasted and reblued the action.

This would be a hunting rifle, because smaller, sharper-shouldered 6mm rounds have taken over target shooting due to their longer barrel life and lighter recoil. Rather than use the relatively heavy 700 stock, I ordered a NextGen UltraLite Carbon Fiber M50 from Stocky's Stocks (stockysstocks.com) shaped like the Long Range Composite injection-molded stock reported on in "Synthetic Stocks, An Abbreviated History" in *Rifle* No. 311 (July-August 2020.)

The new stock only weighed 27 ounces, less than half of the composite stock – and even less than listed on the Stocky's website. This may be partly because it came "bare," not painted in one of several camouflage

The Stocky's NextGen UltraLite Carbon Fiber stock weighed 27 ounces.

MODERNIZING THE 6MM-06

The best powders ranged from old favorite H-380 to modern slow-burners with decoppering agents.

The Quality Cartridge brass turned out to be very consistent in both weight and dimension.

options. This revealed the cross-hatched carbon fibers, which to me seem at least as attractive as any camouflage pattern. Its AccuBlock bedding block is also molded synthetic, instead of the aluminum AccuBlock in the composite, saving a little more weight.

AccuBlocks are essentially V-blocks at the front and rear of the action, reducing block/action contact considerably compared to the full-length bedding blocks used in many other stocks. Variations on this minimal action contact have become common over the last decade both in custom and factory stocks, and in my experience, usually result in fine drop-in accuracy, due to placing less stress on the action. This had proven true with the composite stock, so I simply screwed the 6mm-06 barreled action into the carbon fiber stock. My test-scope collection included a Swarovski 3-9x 36mm Z3. Since the 6mm-06 would be a relatively light hunting rifle, the 12-ounce Z3 seemed appropriate, and with the scope the rifle weighed 7 pounds, 13 ounces.

Shaw had test-fired the barrel with a necked-down .25-06 Remington case, included in the package with the barreled action, but Quality Cartridge makes properly headstamped 6mm-06 brass. It sent three bags of 20, and I weighed the cases from one bag, finding they averaged 181.5 grains, varying only 1.1 grain. Neck thickness was checked with an RCBS Casemaster gauge. Eighteen (90 percent) of the necks varied no more than 0.001 inch, and the other two only varied slightly more. This is indeed quality brass.

The next problem involved loading data. My office library contains several shelves of handloading manuals, including several with plenty of wildcat data. The only manual including any 6mm-06 loads was Ackley's, and I have always been a little leery of its data.

An internet search turned up an article written by Layne Simpson in 2011, where he suggested starting with 6mm-284 or .240 Weatherby data. I was already familiar with handloading the .240 due to owning a Weatherby Mark V Ultra Lightweight for several years.

However, data for newer powders in both the 6mm-284 and .240 is pretty scarce. Hodgdon lists 6mm-284 loads, but obviously only includes powders it distributes – and does not include some of the latest, such as the IMR Endurons. While several companies list .240 Weatherby data, the cartridge has never been as popular as the .257 Weatherby Magnum, so powder selection tends to be limited. Plus, most data only includes bullets up to 100/105 grains, due to the standard 1:10 twist in Weatherby's .240s. Hodgdon does list data for three powders with a 115-grain bullet, obviously a desired option in a 1:8 twist 6mm-06, but the bullet is the discontinued Barnes roundnose – and one of the powders is H-570, also discontinued.

6mm-06 Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)	3-shot 100-yard group* (*inches*)
55 Nosler Ballistic Tip	H-380	58.0	3.150	4,250	1.08
70 Sierra BlitzKing	IMR-4451	57.0	3.143	3,827	.93
87 Hornady V-MAX	RL-17	52.5	3.125	3,664	.58
90 Nosler E-Tip	Magnum	58.5	3.064	3,395	1.01
90 Swift Scirocco II	H-4831sc	55.0	3.166	3,336	.68
95 Barnes LRX	RL-26	55.0	3.200	3,303	.72
100 Nosler Partition	Magnum	58.0	3.099	3,248	.96
105 Berger Hunting VLD	Retumbo	57.0	3.244	3,189	.93
108 Hornady ELD-X	IMR-8133	57.0	3.219	3,093	.63
115 Berger Hunting VLD	IMR-8133	56.5	3.255	3,049	.47

* Accuracy is the average of a minimum of three groups.

Notes: A Remington 700 6mm-06 with a 24-inch Shaw barrel (1:8 twist) was used to test all loads. All powder charges were maximum or close to it in the test rifle and should be reduced 10 percent for starting loads in other rifles. Quality Cartridge 6mm-06 brass with the body initially slightly resized in a Redding .25-06 full-length sizing die, and after the first firing neck-sized with a Redding 6mm Creedmoor die were used throughout. Winchester Large Rifle primers were used throughout. Velocities are the average of at least nine rounds chronographed 10 feet.

For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

Bullets tested include the (1) Nosler 55-grain Ballistic Tip, (2) Sierra 70 BlitzKing, (3) Hornady 87 V-MAX, (4) Nosler 90 E-Tip, (5) Swift 90 Scirocco II, (6) Barnes 95 LRX, (7) Nosler 100 Partition, (8) Berger 105 Hunting VLD, (9) Hornady 108 ELD-M and the (10) Berger 115-grain Berger Hunting VLD.

Eventually I decided to add data extrapolated from the very popular .25-06 Remington, because powder and bullet companies keep updating the .25-06 with newer powder and normally list 115-grain bullets. It turned out that recommended starting loads for the 6mm-284 and .240 averaged around 92 percent of listed starting .25-06 loads with the same powders and bullet weights. The end result was a list of powders that would potentially provide the highest velocities with various bullet weights – and the 6mm-06 is definitely a high-velocity round.

I also compared the 6mm-06 to the .243 Winchester, using my 4-to-1 formula developed a number of years ago by crunching the numbers from published, pressure-tested data. The results indicated any increase in powder room in cartridges of the same caliber would result in about ¼ as much additional velocity when handloading the same bullet weights to the same approximate pressure. (This rule does not apply to the *same* powder, but powders producing the highest velocities in each round.)

This required measuring the powder capacity of both the .243 and the 6mm-06, with a bullet seated in a fired case. Many handloaders (and some manuals) measure powder room by filling a case to its mouth with water, but case necks do not generally hold much powder – and vary considerably in length.

I compared the water capacity of a fired .243 Winchester case to a Quality Cartridge case (fired with a load from Layne's article), using a Berger 105-grain Hunting VLD. In both rounds, the bullet was seated just short of the lands in the Shaw-barreled 700 and Eileen's

(Continued on page 67)

.327 Federal Magnum

Duplicating Factory Loads, Increasing Accuracy and Versatility

Pet Loads®

A Ruger Single-Seven was used to develop loads for the .327 Federal Magnum.

Brian Pearce

The .327 Federal Magnum was introduced in 2008 as a joint development between Federal and Ruger. To many shooters a high-velocity, high-pressure .32-caliber magnum cartridge was something of a surprise, and its success was certainly in question. Twelve years later, it has been offered in a variety of guns, including rifles, and it appears to be here to stay.

Cast plain-base bullets can be very accurate for light target and mid-range loads. For high-velocity loads, bullets featuring a gas check are generally preferred as they prevent barrel leading and can be pushed to velocities of 1,500 fps or beyond.

It was initially offered in the small-framed Ruger SP101 double-action revolver with a 3⅛-inch barrel as a defensive cartridge that would offer less recoil than larger calibers while producing comparable or greater penetration in ballistic gelatins. It also increased cylinder capacity by one cartridge when compared to the same gun chambered in .38 Special or .357 Magnum. The cartridge has also gained acceptance among sportsmen wanting a flat-shooting, low-recoiling field cartridge, but chambered in revolvers featuring adjustable sights and longer barrels. Through careful handload development, factory load velocities can be duplicated and even exceeded, and accuracy increased. Special purpose handloads will increase

.327 Federal Magnum

With proper load development and experimentation, the .327 Federal Magnum can produce excellent accuracy.

the cartridge's versatility and accuracy while offering substantial savings.

While the .327 is a lengthened .32 H&R Magnum case, which increases powder capacity, it is also loaded to much greater pressures and has some additional engineering features. For example, the .32 H&R has an industry maximum average pressure of 21,000 CUP (Piezoelectric pressure is not established at this time.) while the .327 has a maximum average pressure of 45,000 psi (CUP pressures not established). In order to load this case to such high pressures, it had to be strengthened (or thickened) in the web and in the sidewalls. While I won't get into too many details, suffice to say that the case metallurgy was changed and is heat-treated to safely withstand the 45,000 psi pressure and permit normal extraction.

During the development of the .327, Federal discovered that many commonly available magnum revolver powders failed to perform as needed. Specifically, it was experiencing high extreme spreads. As a result, it had a special proprietary powder engineered that would reach the desired velocities and help to keep extreme spreads relatively low, which will be discussed further in a moment.

A variety of powders were tried in the .327 Federal Magnum.

Shooters World Heavy Pistol powder produced good accuracy and velocity with cast bullets.

A maximum roll crimp should be applied to all handloads, but the crimp should never be so heavy that it causes damage to the bullet.

Federal factory loads listed an 85-grain Hydra-Shok bullet (listed as "Low Recoil") at 1,330 fps, an 85-grain Hydra-Shok at 1,400 fps and the 100-grain American Eagle JSP load was advertised at 1,400 fps, but has now been increased to 1,500 fps. Sister company Speer lists its law enforcement load with a 115-grain Gold Dot HP at 1,300 fps while Buffalo Bore offers jacketed and heavyweight cast bullet loads. Again, handloaders can duplicate or exceed factory load performance.

Manufacturers that have offered or are offering revolvers so chambered include Ruger, Freedom Arms, Charter Arms, Smith & Wesson, Taurus and U.S. Fire Arms (USFA); and Henry Repeating Arms offers a lever-action rifle. For developing this data, a Ruger Single-Seven with a 7½-inch barrel was selected. A 4⅝-inch Single-Seven was used to cross-reference velocities with factory loads. Interestingly, factory loads only showed a slight velocity increase from the 7½-inch revolver versus the 4⅝-inch gun.

For the record, throat dimensions of both Single-Seven revolvers measured .314 inch, while groove diameter measured around

Table I

.327 Federal Magnum Handloads

bullet (grains)	powder	charge (grains)	overall loaded length (inches)	velocity (fps)
85 Hornady XTP-HP	H-110	13.0	1.45	1,310
		13.5		1,341
		14.0		1,365
		14.5		1,405
	Enforcer	11.0		1,255
		11.5		1,297
		12.0		1,333
		12.5		1,370
		12.8		1,400
	A-11FS	13.0		1,340
		13.5		1,348
		14.0		1,360
		14.5		1,380
		15.0		1,422
	TCM	10.0		1,186
		10.5		1,218
		11.0		1,277
		11.5		1,320
		12.0		1,356
	Heavy Pistol	9.5		1,116
		10.0		1,175
		10.5		1,260
		11.0		1,331
		11.5		1,395
		12.0		1,455
	Universal	5.0		1,202
		5.5		1,290
		6.0		1,395
		6.5		1,488
	A-9	11.0		1,369
		11.5		1,431
		12.0		1,465
		12.5		1,524
		13.0		1,590
		13.5		1,637
	A-7	9.0		1,375
		9.5		1,441
		10.0		1,502
	A-5	7.5		1,274
		7.8		1,349
		8.2		1,443
		8.5		1,515
	Longshot	6.5		1,311
		7.0		1,397
		7.5		1,491
		8.0		1,577
		8.2		1,604
	Power Pistol	6.5		1,340
		7.0		1,371
		7.5		1,424
		8.0*		1,466
		8.3		1,500
	CFE Pistol	6.0		1,155
		6.5		1,235
		7.0		1,356
		7.3		1,411
	True Blue	7.5		1,285
		7.9		1,339
		8.3		1,396
		8.7		1,451

(Continued)

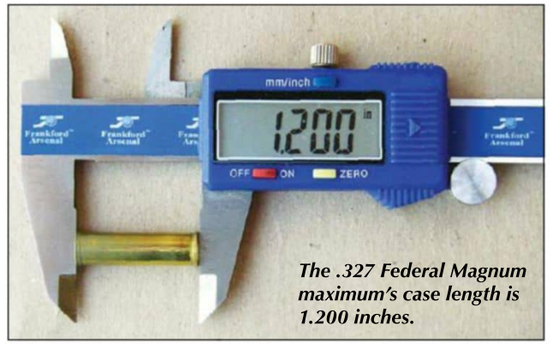
Table I *(Continued)*

.327 Federal Magnum Handloads

bullet (grains)	powder	charge (grains)	overall loaded length (inches)	velocity (fps)
85 Hornady XTP-HP	2400	10.0	1.45	1,279
		10.5		1,307
		11.0		1,345
		11.5		1,371
		12.0		1,388
		12.5		1,430
		13.0		1,459
		13.3		1,490
100 Speer Gold Dot HP	A-9	10.5	1.453	1,265
		11.0		1,301
		11.5		1,369
		12.0		1,420
		12.5		1,472
		13.0		1,510
	Power Pistol	6.0		1,103
		6.4		1,172
		6.8		1,239
		7.2		1,288
		7.8*		1,353
	Lil'Gun	13.0		1,244
		13.5		1,293
		14.0		1,302
		14.3		1,341
	True Blue	7.0		1,118
		7.5		1,187
		8.0		1,271
		8.4		1,344
	Titegroup	4.0		1,008
		4.4		1,061
		4.9		1,156
		5.3		1,221
	A-2	4.0		819
		4.3		855
		4.6		900
		4.9		947
		5.2		990
		5.5		1,029
		5.8		1,074
		6.1		1,124
100 Hornady XTP-HP	2400	10.0	1.455	1,222
		10.5		1,250
		11.0		1,288
		11.5		1,343
		12.0		1,389
		12.5		1,427
		13.0		1,466
	Enforcer	12.0		1,253
		12.5		1,307
		13.0		1,386
		13.5		1,455
		14.0		1,504
	W-N110	10.0		1,240
		10.5		1,271
		11.0		1,294
		11.5		1,333
		12.0		1,368
		12.5		1,409
	A-7	8.0		1,204
		8.5		1,258
		9.0		1,312

(Continued)

.327 Federal Magnum



The .327 Federal Magnum maximum's case length is 1.200 inches.

While the .327 Federal Magnum is available in several small revolvers intended for personal protection, Brian feels that it is at its best as a field cartridge in larger revolvers. Examples include the (1) Ruger Single-Seven (7½-inch barrel), (2) Ruger Single-Seven (4⅝-inch barrel), (3) USFA eight-shot Sparrow Hawk (7½-inch barrel) and a (4) USFA Pre War (5½-inch barrel).

.3125. Ruger specifies a .313-inch groove and .304-inch bore, plus or minus .001 inch. My USFA Sparrow Hawk features .312-inch throats, while a USFA Pre War (probably the only one ever manufactured in .327) has .311-inch throats. Groove diameter for both is .312 inch.

The .32 S&W cartridge (circa 1878), the .32 S&W Long (1902) and the .32 H&R Magnum (1983) can each be fired in guns chambered for the .327. However, due to the long bullet jump, firing the above "short" cartridges in the long .327 chamber generally fails to produce good accuracy.

In thumbing through my correspondence from readers and others, it becomes clear that the .327 has given many handloaders considerable difficulty in producing loads that perform as they should. Some have reported stuck cases with loads that are well below maximum. Others have experienced chambering issues, and many report wild extreme spreads and poor accuracy. I have been handloading the .327 Federal Magnum since it first appeared, developed hundreds of handloads and have consulted with ammunition companies that have struggled with the above issues and used it in more than a dozen guns.

As indicated, cases are constructed of a special brass formula, then heat-treated to handle the 45,000-psi pressures associated with this cartridge. In testing I have found some cases will stick with a given load, while others from the same manufacturer offer normal extraction with the identical load. In at least one instance, cases left the factory without being heat-treated. I have tested recently-produced cases from Speer, Federal and Starline, and all performed properly. It seems that the above issues were mostly associated with early production cases.

The .327 Federal Magnum (right) is the offspring of the .32 H&R Magnum (left).

(Keeping chambers clean will help prevent cases from sticking.)

I recently received a call from a gentleman that was having occasional stuck case issues in his Ruger Single-Seven revolver with loads that were within pressure limits. Most cases extracted easily, but occasionally one would stick severely, and he had to pound the extractor rod with a plastic mallet to eject the case. I suggested that the next time this happens, remove the cylinder and see if the "stuck" case could be removed easily with a fingernail or pushed out using the cylinder base pin. He called me back and stated that the sticky case simply fell out when he removed the cylinder. Next, I had him measure the rim diameter of that case, which was slightly larger than the specified .375 inch. In other words, it was the overly large rim that was hanging up on the loading trough and was not from a high-pressure load. I might add that some of the early Ruger Single-Seven revolvers suffered from a too-small loading trough, which could cause cases to hang-up when being ejected, which again gave the false impression that the loads were producing excessive pressure.

As indicated, Federal had a proprietary powder developed specifi-

Table I *(Continued)*

.327 Federal Magnum Handloads

bullet (grains)	powder	charge (grains)	overall loaded length (inches)	velocity (fps)
100 Hornady XTP-HP	A-7	9.2	1.455	1,329
	Power Pistol	6.0		1,129
		6.3		1,161
		6.6		1,223
		7.0		1,274
		7.4		1,326
		7.8		1,371
	A-11FS	12.0		1,098
		12.5		1,140
		13.0		1,200
		13.5		1,269
		14.0		1,313
		14.5		1,360
		14.8		1,402
	TCM	9.0		1,050
		9.5		1,071
		10.0		1,106
		10.5		1,144
		11.0		1,170
		11.5		1,297
		12.0		1,320
		12.5		1,351
		13.0		1,394
		13.5		1,420
		14.0		1,446
	Heavy Pistol	8.5		981
		9.0		1,033
		9.5		1,101
		10.0		1,176
		10.5		1,231
		11.0		1,355
		11.5		1,397
		12.0		1,449
	Longshot	5.5		1,118
		6.0		1,189
		6.5*		1,285
		7.0		1,360
115 Speer Gold Dot	A-9	10.5	1.450	1,203
		11.0		1,260
		11.5		1,277
		12.0*		1,320
		12.5		1,364
	Longshot	5.0		988
		5.4		1,042
		5.8		1,130
		6.2		1,199
		6.6		1,235
	Power Pro 300-MP	13.0		1,194
		13.5		1,261
		14.0		1,295
90 Hornady Swaged Lead SWC	Titegroup	3.0*	1.435	955
		3.5		1,015
	A-2	3.2		894
		3.7		985
95 Redding 325 SWC	Titegroup	3.6	1.440	994
		4.0		1,071
		4.4*		1,143
		4.9		1,233
		5.3		1,313
	Trail Boss	3.7		913

(Continued)

Table I *(Continued)*

.327 Federal Magnum Handloads

bullet (grains)	powder	charge (grains)	overall loaded length (inches)	velocity (fps)
95 Redding 325 SWC	A-2	4.0	1.440	952
		4.3		999
		4.6		1,054
		4.9		1,111
		5.2		1,168
		5.5		1,229
		5.8		1,273
	A-7	8.0		1,318
		8.5		1,352
		9.0		1,420
		9.2		1,448
	Power Pistol	6.0		1,330
		6.3		1,366
		6.6		1,411
		7.0		1,470
		7.4		1,515
		7.8		1,556
	Longshot	5.5		1,163
		6.0		1,236
		6.5		1,332
		7.0		1,409
98 Speer Hollow-Base Wadcutter	A-2	2.4	1.225	754
		2.6		806
		2.8*		843
		3.0		870
	Titegroup	2.2		753
		2.4		811
		2.6		872
98 Missouri Bullet Co. Wadcutter	A-2	2.6	1.230	788
		2.9		847
		3.2		922
	Titegroup	2.4		820
		2.6*		859
		2.8		910
100 Rim Rock RNFP	Power Pistol	4.0	1.498	965
		4.5		1,047
		5.0		1,162
		5.5		1,277
		6.0		1,371
	A-2	4.0*		1,017
		4.5		1,108
		5.0		1,211
		5.5		1,277
	Trail Boss	3.7		893
	A-7	8.0		1,311
		8.5		1,344
		9.0		1,399
		9.2		1,436
	Longshot	5.5		1,150
		6.0		1,221
		6.5		1,327
		7.0		1,399
115 Hunters Supply RNFP Cast	Autocomp	4.0	1.465	938
		4.5		1,010
		5.0		1,128
		5.5		1,206
	Red Dot	3.2*		1,020
		3.5		1,046
		3.8		1,098
		4.1		1,152

(Continued)

Table I *(Continued)*

.327 Federal Magnum Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)
115 Hunters Supply RNFP Cast	Titegroup	3.0	1.465	931
		3.5		1,027
		4.0		1,124
	Power Pistol	3.5		840
		4.0		936
		4.5		1,038
		5.0		1,131
		5.5		1,215
115 Rim Rock RNFP W/GC	Longshot	4.0	1.485	1,030
		4.5		1,118
		5.0		1,206
		5.5*		1,296
		6.0		1,369
	A-9	8.5		1,137
		9.0		1,185
		9.5		1,250
		10.0		1,299
		10.5		1,344
		11.0		1,374
		11.5		1,428
	Power Pistol	5.0		1,151
		5.5		1,212
		6.0		1,241
		6.5		1,322
		7.0		1,386
	A-11FS	11.0		1,134
		11.5		1,177
		12.0		1,231
		12.5		1,300
		13.0		1,347
		13.5		1,405
	Heavy Pistol	8.5		1,223
		9.0		1,265
		9.5		1,317
		10.0		1,395
		10.5		1,463
	TCM	8.5		1,184
		9.0		1,210
		9.5		1,255
		10.0		1,290
		10.5		1,320
		11.0		1,351
		11.3		1,390
130 Rim Rock SWC Keith	A-9	8.0	1.435	1,165
		8.5		1,203
		9.0		1,270
		9.5		1,309
		10.5		1,405
	Power Pistol	5.0		1,111
		5.5		1,185
		6.0		1,290
		6.2		1,351
	Heavy Pistol	7.0		1,083
		7.5		1,135
		8.0		1,190
		8.5		1,264
		9.0		1,323
		9.5		1,376
	Longshot	4.0		1,002
		4.5		1,086

(Continued)

Table I *(Continued)*

.327 Federal Magnum Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)
130 Rim Rock SWC Keith	Longshot	5.0*	1.435	1,192
		5.5		1,288
		6.0		1,363

* Potentially most accurate load with that particular bullet

Notes: A Ruger New Model Single-Seven with a 7½-inch barrel was used to test all loads. Federal cases and CCI 500 primers were used throughout. Jacketed bullet diameter is .312 inch; cast bullets were sized to .313 inch; swaged lead bullets measured .314 inch. SAAMI maximum overall cartridge length is 1.475 inches; however, select loads were seated to longer lengths (see table). **Do not seat bullets to shorter overall lengths or high pressures can occur.** Maximum case length is 1.200 inches; suggested trim-to length is 1.195 inches. For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used.

cally for this cartridge. Unfortunately, it is not offered as a canister-grade powder to handloaders. But with detailed load development and choosing a correct combination of components, handloaders can assemble loads that perform very well and fully equal or exceed factory load accuracy and velocities. (In spite of having access to a proprietary powder, even Federal has struggled with excessive extreme spreads, as early ammunition was recorded with around 200 fps variances for a 10-shot string.)

Incorrect die specification has been a bit of a problem for the .327. For example, carbide sizing dies from several manufactures fail to full-length size the case, even if the die is turned down until it contacts the shell holder. The problem is that the carbide ring has too much bevel or the die body is crimped too far over the carbide ring. In either instance, the die will not fully size the case all the way down to the solid head. This leaves a bulge just forward of the head that sometimes will not allow reloaded cases to re-chamber, or at least they must be pushed into the chamber, all of which is a problem. The best die in this respect is the carbide Lee Precision.

Another problem most dies feature is an excessively large expander ball that often measures around .312 inch and results in an insufficient case-to-bullet fit, or pull. I have lathe-turned expander balls to sizes measuring from .307 inch to .312 and then tested accordingly. Ideally, the ball should measure around

Table II

.327 Federal Magnum Factory Loads

load (*grains*)	advertised velocity (*fps*)	actual velocity 4⅜" barrel (*fps*)	actual velocity 7½" barrel (*fps*)
85 Federal Hydra-Shok (Low Recoil)	1,330	1,444	1,455
100 Buffalo Bore JHP	1,450	1,373	1,401
100 Federal American Eagle JSP	1,500	1,501	1,522
100 Speer Gold Dot	1,600	1,574	1,589
115 Speer LE Gold Dot HP	1,300	1,298	1,309
130 Buffalo Bore Cast Keith	1,300	1,330	1,358

Notes: Two Ruger Single-Seven revolvers with 4⅜- and 7½-inch barrels were used to test all loads.

A variety of .32-caliber bullets were used for velocity and accuracy testing.

.308 to not over .3085 inch, which seems to provide ideal bullet pull with both .312-inch jacketed and .313-inch cast bullets. This snug case-to-bullet fit helps in obtaining proper powder ignition, serves to lower extreme spreads and improves accuracy.

Industry maximum overall cartridge length is 1.475 inches, with almost all loads in the accompanying data being within that limit. The two exceptions included the Rim Rock 100-grain RNFP and Rim Rock 115-grain RNFP with gas check that were seated to 1.498 and 1.485 inches, respectively. Incidentally, the Ruger Single-Seven test revolver only allows a maximum cartridge length of 1.504 inches; however, most other .327 revolvers will accept cartridges with an even longer overall length.

A maximum roll crimp should be applied with all loads, with satisfactory results being obtained with RCBS and Lyman seat/crimp dies. Be careful to avoid over crimping, which can cause damage to the bullet and potentially decrease accuracy. Generally, best results will be obtained if bullets are first seated to the correct overall cartridge length, then as a separate step, the roll crimp applied.

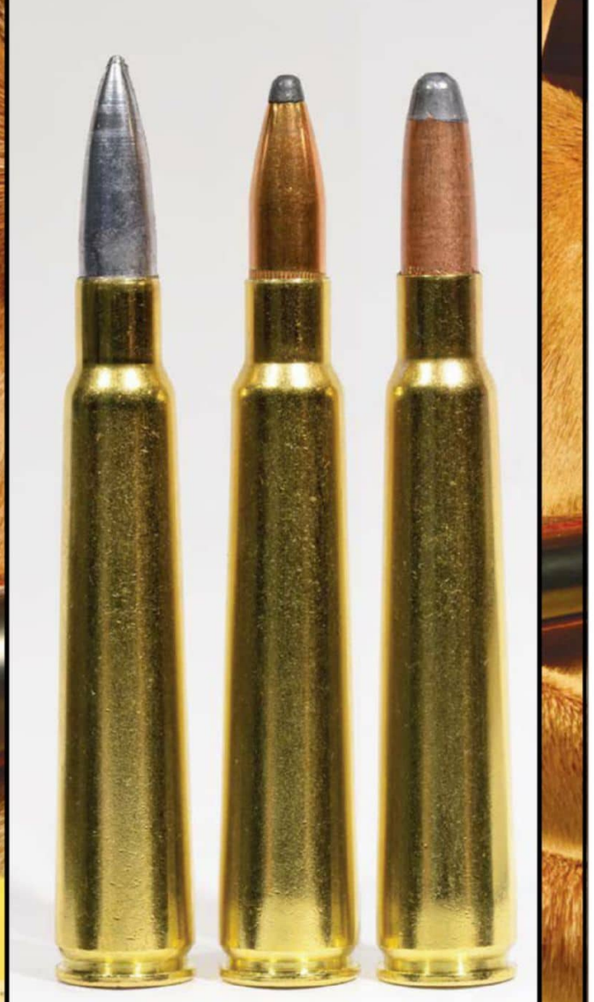
Primer choice is especially important for the .327, which may even be controversial. Federal uses its No. 200 primer in factory ammunition, which is a small pistol magnum primer. I cannot express an opinion in regard to this primer choice used in conjunction with Federal's proprietary OEM powder, as I have never worked with it. However, I have tried both magnum and standard primers from Federal, Winchester, Remington and CCI with many powder and bullet weight combinations. To keep the primer's role in perspective, they need to provide proper ignition under all reasonable temperature ranges, and the cup must be strong enough (Note that I did not say "thick" enough.) to withstand the pressures of a given cartridge. Some powder and bullet combinations will show a distinct preference for standard primers, while a few select powders will produce a lower extreme spread with magnum primers. My testing has shown that standard primers usually produce lower extreme spreads, but not always. Even when using maximum charges of slow-burning, magnum revolver powders, the charge weights are usually 14.0 grains or less. These smallish powder charges do not require a magnum primer to obtain proper ignition. Many of the best loads utilize revolver powders with a medium burn rate and only require charge weights of around 6.0 to 9.0 grains. Again, magnum primers are not required to reliably ignite such small charge weights.

For this article, the standard CCI 500 Small Pistol Primer was selected. It offers enough strength to easily handle maximum loads generating 45,000 psi (without piercing or rupturing) and serves to reduce extreme spreads when compared to the same loads ignited with magnum primers. If a magnum primer is substituted with the accompanying data, the impulse time is shortened, pressures will be increased and

(Continued on page 66)

.280 Ross

For a rifle and cartridge combination that is 110 years old, the .280 Ross still performs to the level of a modern 7mm magnum, and is adaptable to new powders like the IMR Enduron series. The Ross M-10 sporting rifle was manufactured to "London best" standards for a bolt action.



Bullets for the .280 Ross, ranging in diameter from .286 to .290 inch, are scarce, but there are a few sources. From left: a 140-grain bullet from Lyman mould 287377, Huntington Die Specialties' 150-grain softnose and a Hawk 160-grain roundnose. These bullets load to quite different overall lengths when crimped into their cannelures.

Testing New Brass and IMR Powders

The .280 Ross Quality Cartridge brass was very consistent and easy to condition. Federal's 215M primers were used exclusively.

Terry Wieland

The .280 Ross was one of the three most influential cartridges of the twentieth-century, the other two being the .30-06 and the .375 Holland & Holland (H&H). Unlike the latter two, the Ross' influence lay not in the family of descendants based on its case – there are none – but on its concept: The .280 Ross was the first "Big Seven." Every subsequent development in that line, including the phenomenally successful 7mm Remington Magnum, sought to equal or better the Ross' performance.

How good was that performance? The .280 Ross saw the light of day around 1910, in England. It launched a 140-grain bullet at 3,047 feet per second, making it the first factory cartridge ever to do that. (Savage's .250-3000, which came along five years later, was the first *American* factory cartridge to do so.)

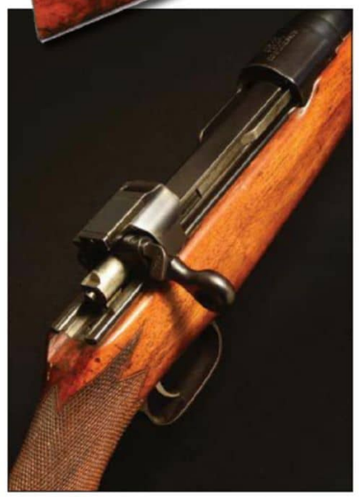
Although the .280 Ross cartridge will forever be entangled in the controversy that embroiled the Ross Rifle Co. during the Great War and its aftermath, it really should be considered separately. Unlike its parent rifle, it lived a long and fruitful life, and the last factory ammunition (Kynoch of England) was not discontinued until 1967.

In the intervening 50-plus years, the .280 Ross had been chambered not only in the Ross M-10 sporting rifle, but in rifles built on the Oberndorf Magnum Mauser action (where it was a standard) and any number of rifles built in England. Foremost among the Ross admirers was London's Charles Lancaster & Co., which built bolt actions, double rifles and single shots in .280 Ross and a rimmed counterpart it developed for the purpose. How many custom rifles were chambered for it in England, Germany and America is anyone's guess?

As for factory ammunition, it was produced by Eley, Kynoch, U.S. Cartridge and several other companies, often with the simple headstamp ".280." For decades, the Ross was the .280 and a .280 was a Ross, pure and simple. Not until the .280 Remington came along in 1957 did that change. At the risk of offending a mini-legion of Remington admirers out there, their .280 not only never achieved the worldwide popularity of the Ross, it was merely an American factory rendering of a cartridge (the .28/06) originally designed

.280 Ross

The Ross M-10 was a sleek and beautifully made hunting rifle – the premier bolt-action hunting rifle of its era.



Sir Charles Ross employed skilled English and American craftsmen at his Quebec factory. The Ross M-10 and other sporting models were made to the London standards of Charles Lancaster, Rigby and Holland & Holland.

.280 Ross Handloads

bullet (*grains*)	powder	charge (*grains*)	overall loaded length (*inches*)	velocity (*fps*)	extreme spread (*fps*)
140 Lyman 287377	Trail Boss	18.5	3.440	1,738	45
|	H-4895**	30.0	3.440	1,851	36
150 Huntington Die Specialties softnose	IMR-4451	50.0	3.315	2,594	26
|	|	55.0	3.315	2,857	61
|	IMR-4955	55.0	3.315	2,732	101
|	|	60.0	3.315	2,967	47
|	H-4831	65.0*	3.315	3,012	34
160 Hawk roundnose	IMR-7977	60.0	3.350	2,487	84
|	|	65.0*	3.350	2,719	99

* Compressed charge ** Reduced load – 60 percent of published maximum

Notes: A Ross M-10 .280 Ross, (circa 1914), with a 28-inch barrel (1:11 twist) was used to test all loads. Quality Cartridge brass and Federal 215M primers were used throughout.

For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

by Sir Charles Ross in 1906, and it was given European life as the 7x64 by Wilhelm Brenneke around 1917.

The .280 Ross was ahead of its time in other ways, too. It was intended to serve the triple purpose of military, sporting and target round. Ross and his ballistician, F.W. Jones, designed a 180-grain spitzer bullet with a long ogive for long-range target work – probably the very first "ultra-low drag" match bullet, and in a 7mm, 180 grains is long for caliber even by today's standards. In the years immediately preceding 1914, the combination was unbeatable. Ross even persuaded the DuPont chemical company to develop a special slow-burning powder (No. 10) that would allow U.S. Cartridge to produce American ammunition that reached the magical 3,000-fps threshold. Sir Charles was nothing if not well connected.

The cartridge case is long with an almost nonexistent semi-rim. Its pronounced taper prevents a case from sticking in the Ross's straight-pull action, and also promotes smooth feeding.

The case was based on no existing cartridge, and no later cartridge was based on it, which presents a serious problem for those today who want to shoot their .280 Ross. Original ammunition and brass cases are collectors' items – hence, expensive – even if you would want to shoot them, which is questionable at best. Elderly brass deteriorates and becomes brittle. English ammunition also uses Berdan primers – another obstacle.

The bullet is larger than conventional 7mm and .280 cartridges, measuring anywhere from .286 to .289 inch, compared to .284. This varies from rifle-to-rifle, and bullet-to-bullet, not because production was sloppy, but because there were conflicting opinions as to which were more accurate – bullets of groove diameter or bore diameter. Anyone acquiring a .280 Ross should slug the bore before looking for bullets or starting to load for it.

Out of 40 new cases from Quality Cartridge, four had flaws. These things happen, and Quality Cartridge is quick to replace defective cases, which are rare.

The .280 Ross (center) is flanked by the .280 Remington (left) and 7x61 Super (right). Case capacity is a great help in determining safe starting loads for cartridges of the same caliber.

Bullets can be hard to find. Huntington Die Specialties used to carry jacketed bullets under the HDS label, but they have disappeared. Hawk Bullets lists several different weights and configurations. Those are not always in stock, and there can be a long wait. Lyman made moulds for .287-diameter bullets, which means you can usually find cast bullets for low-velocity shooting.

Bob Hayley (Hayley's Custom Ammunition) in Texas can provide cast bullets such as the Lyman 287377, a streamlined spitzer that accepts a gas check. Hayley also makes .280 Ross brass by starting with .300 Remington Ultra Mag brass, reducing the base diameter in a rotary swage, then using a combination of trimming and sizing to get it to shape.

Now, Quality Cartridge has added .280 Ross to its listings. Like Hawk Bullets, it is produced when the number of back orders makes it worthwhile, which means it can be out of stock. However, it's factory brass with the .280 Ross headstamp. At $100 for a bag of 20, it's not cheap, but when you have a rifle you want to shoot, what does that matter?

Quality Cartridge brass has slightly greater case capacity than Hayley's refashioned brass (77.1 grains of W-748 to the lip, compared to 74 grains). This is something to keep in mind when applying load data developed with Hayley brass.

Finally, the other difficulty with the .280 Ross is finding load data. Little has appeared since at least the 1950s, and data published before that often calls for powders that are long-since discontinued and unavailable.

Three years ago, *Handloader* No. 310 (October-November 2017) included an article in which I developed loads for the .280 Ross using Hayley brass and the modern powders usually recommended – IMR-4350 and H-4831.

With Quality Cartridge brass, I wanted to develop some new loads using IMR's new Enduron line of 4451, 4955 and 7977, as well as Trail Boss with cast bullets. The bullets used were my remaining HDS 150-grain spitzers and 140-grain cast Lyman 287377s, as well as the Hawk 160-grain roundnose, which was not available three years ago.

On the advice of Ron Reiber, Hodgdon's ballistician, I compared the case capacity of the .280 Remington and the .280 Ross, which were 71.5 and 77.1 grains of spherical powder, respectively. Since new loading data exists for the .280 Remington using Enduron powders, I took a medium load for each as a starting point for the Ross. With Trail Boss, I used the IMR recommended procedure of measuring the amount of Trail

.280 Ross

Hawk Bullets of New Jersey lists the 160-grain, .286-inch bullet for the .280 Ross and, incidentally, the .275 H&H. Hawk will make other bullet weights as a custom order.

Boss the case holds to the base of the bullet, then loading 80 percent of that amount.

The Enduron powders are recommended by Hodgdon as being comparable to older, established

Original factory .280 Ross ammunition from left: U.S. Cartridge 140-grain "copper tube" expanding, Kynoch 160-grain hollowpoint and a Ross Cartridge Company 180-grain match round.

The Ross's interrupted-thread locking lugs were modeled on naval guns of the time, and were immensely strong – reputedly able to withstand 120,000 psi. Charles Newton copied the lug design for his rifles, and the later Weatherby Mark V was a variation on it.

powders – IMR-4451 to H-4350, IMR-4955 to H-4831 and IMR-7977 to H-1000. That is a general comparison only. Respective charge weights and loading data bear no direct relationship. However, since IMR-4350 and H-4831 have been the preferred powders for loading the Ross since about 1960, it made sense to see how IMR-4451 and IMR-4955 would perform.

The starting loads with all three powder/bullet combinations were very conservative and performed accordingly. Velocities were modest and pressure signs nonexistent.

The heavier IMR-4451 load of 55 grains with the HDS 150-grain bullet was not compressed (it did not even fill the case to the neck) and delivered a very decent velocity of 2,857 fps. One primer was flattened, otherwise there were no adverse pressure signs. I wouldn't hesitate to increase that load a grain at a time until I reached maximum, then back off at the same rate while shooting for groups in order to obtain optimum accuracy with maximum velocity.

The IMR-4955 load of 60 grains, also with the HDS 150 bullet, raised the velocity to 2,967 fps, also with one case out of five showing a flattened primer but no other adverse signs. This charge did not even fill the case to the shoulder. Again, there is room for very gradually increasing the charge as described above.

Moving to a heavier bullet and slower powder – the 160-grain Hawk with 65 grains of IMR-7977 – the charge was moderately compressed. There were no adverse pressure signs whatsoever, but there is simply a limit to how much powder you can get in the case. A handloader could probably squeeze in a few more grains, and squeeze out a few more feet per second, but I think the practical limit was hit with this one.

Finally, for comparison, I loaded some of the Quality Cartridge brass with my favorite load from three years ago. In Bob Hayley's brass, with slightly less capacity, 65 grains of H-4831 delivered 3,072 fps with a 150-grain bullet, and an extreme spread of only 14 fps. One could hardly ask for better. In the Quality Cartridge brass, the same load delivered 3,012 fps, with an extreme spread of 34 fps, which reflects its slightly greater capacity. This was a moderately compressed load in both cases.

Shooting the cast Lyman 287377 spitzer bullets was simple. With Trail Boss, I filled the case to the base of the bullet, which was 23 grains, then took 80 percent of that (18.5 grains) to start. Velocity was 1,738 fps, and a handloader would not want to go much faster with a lead bullet and no gas check. Using H-4895 and Hodgdon's formula of 60 percent of a maximum published load (in this case, using data for the .280 Remington), I got 1,851 fps. Again, no need to go any higher.

Of the Enduron powders, the two with the most potential and greatest application seem to be IMR-4451 and IMR-4955 – which makes sense, given their resemblance to the 4350s and H-4831.

The groove diameter on my barrel is .287 inch; the HDS bullet is .287, the Hawk is .286 and the cast bullet (unsized) is .290.

Unfortunately, as this article was being prepared, the country was in near-lockdown, some components were not available and deliveries were delayed everywhere. I had a limited number of the Huntington Die Specialties' 150-grain bullets left, and Huntington's no longer lists it. I felt it was better to give a variety of good starting points than to pursue one load for maximum velocity and accuracy. Huntington does import .287-inch Woodleigh bullets in 160- and 175-grain softnose; Hawk makes the 160-grain roundnose as standard, but will produce other weights as a custom order.

The Ross has the slight advantage that the original .275 H&H also used .287-inch bullets (hence the Woodleighs) and since no sensible person would rebarrel a Holland & Holland rifle, there is always that residual demand. Two other bullets I found, searching around, were 130- and 154-grain jacketed spitzers offered by Buffalo Arms. At $36 and $43 for a box of 100, respectively, it would be worth getting a supply while the getting's good – assuming it is by the time you read this. The 130-grain, particularly, would seem like a good combination with IMR-4451 using the load-development method described above. I expect it would deliver velocity even Sir Charles Ross never expected.

Still, the .280 Ross was intended as a long-range, big-game cartridge – big as the Edwardians thought of big game, which is everything short of elephant – and was designed to use 160- and 180-grain bullets. They have been made in the past, and searching eBay and odd corners of the internet to find some gives one something to do while hunkering in place.

Obviously, at the age of 110 and counting, the genuinely legendary .280 Ross will still deliver the goods. •

.25-06 REMINGTON

Loading for a Classic .25

This lineup of bullets makes the .25-06 a versatile cartridge for hunting anything up to elk: (1) Hornady 75-grain V-MAX, (2) Sierra 75 BlitzKing, (3) Nosler 85 Ballistic Tip, (4) Sierra 87 Varminter, (5) Barnes 100 Tipped Triple-Shock, (6) Sierra 100 GameKing, (7) Swift 100 Scirocco II and (8) Nosler 120-grain Partition.

John Haviland

At one time, the .25-06 Remington was synonymous with long-range shooting. The cartridge's case contained plenty of powder to fire 100- to 120-grain bullets well above 3,000 fps to produce a trajectory sufficient to aim right on game well past 300 yards. Times change, though, and today that distance is considered by many just the starting point of far shots at game. Nevertheless, I'd be embarrassed to say I had shot at a game animal at 600 yards or farther, because that would imply I was lazy, or such a poor hunter I could not narrow the distance. For people who still consider a stalk and a sure shot the perfect end to a hunt, the .25-06 is a versatile cartridge for handloading, with plenty of bullet and powder combinations that deliver light recoil and good accuracy.

The old rifle provided this group with Hornady factory-loaded 110-grain ELD-X bullets.

John's Ruger M77 .25-06 has been used to shoot targets and game for more than 40 years. A new barrel installed a few years ago will keep the rifle shooting for years to come.

.25-06 Remington

In recent years, several other cartridges have eclipsed the .25-06 as a long-range cartridge. This lineup includes the (1) 6mm Creedmoor, (2) .25-06, (3) 6.5 Creedmoor and the (4) 7mm Remington Magnum.

The .250-3000 Savage (right) is a great cartridge for hunting deer. The larger .25-06 is even more of a good thing.

Three different handloads make the .25-06 a good choice for coyotes to elk. From left: Hornady 75-grain V-MAX, Sierra 100-grain GameKing and the Nosler 120-grain Partition.

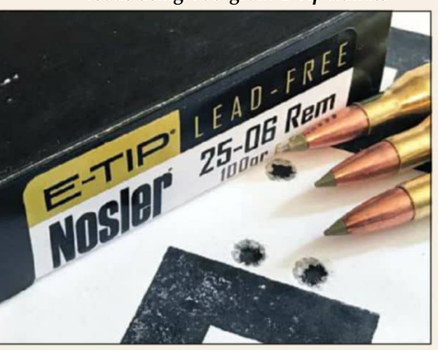
I bought my first .25-06 45 years ago, which dates me. The Ruger M77 .25-06 was my second centerfire rifle, and I bought it in part because of its wide popularity at the time and endorsement by gun writer Bob Milek, a regular contributor to this magazine. But mainly I bought the Ruger because when my brothers and I were boys, we had hunted deer and antelope with complete success shooting a .250-3000 Savage chambered in a Winchester Model 54, and I reasoned the .25-06 would be even more of a good thing.

The clerk at the local sporting goods store said I could sort through the Ruger rifles stored in the back room to find one with a nice stock. In the back room sat a stack of at least 10 boxes that contained Ruger rifles chambered in .25-06, which provided a hint of the cartridge's popularity. I picked a rifle with some nice flame and curl running through its stock butt and up into the forend.

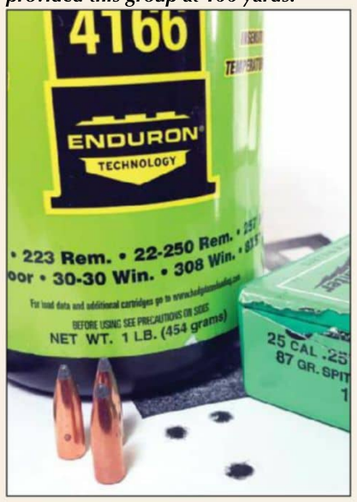
Enough money remained in the checking account to either buy a few boxes of .25-06 factory loads or reloading dies and .25-caliber bullets. Reloading seemed to be the economical route, as I could form .25-06 cases by necking down .30-06 cases in the sizer die and load them with IMR-4350, the same powder I handloaded in my other rifle, a .30-06.

The first spring, I was set to use the rifle to shoot ground squirrels with Sierra 75-grain HP bullets handloaded with the maximum amount of IMR-4350 listed in the Sierra manual. The bullets had a guesstimated muzzle velocity of 3,600 fps. Why that high-velocity

This group was shot with Nosler factory loads using 100-grain E-Tip bullets.



Handloaded .25-06 cartridges with Sierra 87-grain bullets and IMR-4166 provided this group at 100 yards.



A case nearly full of Reloder 17 pushes Barnes 100-grain bullets at more than 3,400 fps.

The .25-06 Remington (center) is sort of a cross between the .22-250 Remington (left) and the .270 Winchester (right).

was necessary escapes me now, as "gophers," as everyone called them, are about the size of a pop can and they were difficult to see much past 200 yards through the 4x scope on the rifle. The Ruger's bore was as rough as old concrete, and after an afternoon of shooting a light shined inside the muzzle showed a glow of copper fouling. Cleaning the bore required several days of brushing and soaking it with solvent, with drops of solvent turned blue from the copper dripping out of the muzzle.

Sierra 100-grain spitzer bullets fired by 53 grains of IMR-4350 worked fine for deer and antelope hunting. The bullets had an estimated velocity of 3,300 fps and I used that load in the rifle to shoot my first antelope standing way across an alfalfa field. There were no landmarks in the field to divide it into segments to help estimate distance, so I aimed right on, hoping for the best. The buck fell over at the shot. Pacing off the distance, the buck was somewhat short of 300 yards. I was impressed, though, because I had never shot a game animal that far away.

Years later, I shot that 100-grain bullet and IMR-4350 load over a chronograph, and its velocity of 3,245 fps was pretty close to what I had estimated. IMR-4350 is still an okay powder for handloading the .25-06. Still, other and more recent powders also perform well in the cartridge.

H-4831 has been a standard powder for the .25-06 years before Remington took the cartridge under its corporate wing in 1969. My regular load is 54 grains of H-4831, which fires various 117- and 120-grain bullets at 3,050 to 3,170 fps. That powder charge is a grain or two over the maximum listed in some of today's reloading manuals. Still, different brands of .25-06 cases and necked down .30-06 cases remain sound and primer pockets tight after being fired several times with that charge of the powder. That amount of H-4831 and a seated bullet fill a .25-06

.25-06 Remington Handloads

bullet (grains)	powder	charge (grains)	primer	overall loaded length (inches)	velocity (fps)	3-shot 100-yard group (inches)
70 Sierra BlitzKing	Varget	43.0	Remington 9½	3.130	3,082	1.44
|	|	45.0	|	|	3,282	1.07
75 Hornady V-MAX	A-4350	56.5	Winchester	3.190	3,508	1.54
|	H-4350	57.5	|	|	3,653	1.45
|	IMR-4320	42.0	|	|	2,960	1.06
|	|	49.0	|	|	3,456	1.46
|	IMR-4451	58.0	|	|	3,337	1.05
|	W-760	55.0	|	|	3,685	1.34
85 Nosler Ballistic Tip	IMR-4166	46.5	|	3.200	3,349	1.17
|	IMR-4451	52.0	|	|	3,300	1.00
87 Sierra Varminter	IMR-4166	43.5	|	3.150	3,115	1.94
|	|	47.0	|	|	3,333	.87
100 Barnes TTS	MAGPRO	60.0	|	3.160	3,266	1.98
|	RL-17	53.0	|	|	3,441	1.44
|	RL-22	55.0	|	|	3,199	.81
|	Retumbo	60.0	|	|	3,235	.85
100 Sierra GameKing	Hunter	55.0	|	3.130	3,405	.76
|	IMR-4350	53.0	|	|	3,275	.80
|	IMR-4831	56.0	|	|	3,321	.68
|	RL-22	55.5	|	|	3,191	.53
100 Swift Scirocco II	H-1000	59.0	Remington 9½	3.170	3,197	1.20
|	IMR-7828	57.0	|	|	3,335	2.22
|	RL-19	55.0	|	|	3,328	1.62
120 Nosler Partition	H-1000	55.0	Winchester	3.190	2,911	.84
|	H-4831	54.0	|	|	3,114	1.17
|	Magnum	60.0	|	|	3,176	1.76

Factory Loads

load (grains)	advertised velocity (fps)	actual velocity (fps)	100-yard group (inches)
100 Nosler E-Tip Lead-Free	3,200	2,942	.89
110 Hornady Precision Hunter ELD-X	3,140	3,013	.98

Notes: A Ruger M77 with a 24-inch barrel (1:10) and Leupold VX-3i 3.5-10x 40mm scope was used to test all loads. Remington brass was used throughout.
For more data on this cartridge please visit LoadData.com.
Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

.25-06 Remington

case, and tightly confining the powder helps it burn evenly. Recently, I shot Nosler 120-grain Partition bullets with that charge weight of H-4831, and extreme spread of velocity was 32 fps over 15 shots.

Among others, Ramshot Hunter and Reloder 22 have also produced low extreme spreads of velocity. Sierra 100-grain GameKing bullets varied 49 fps for 15 shots fired by 55 grains of Hunter. Velocity fluctuated 39 fps with Barnes 100-grain Tipped Triple-Shock bullets fired with 55 grains of Reloder 22. However, velocity was somewhat slow at 3,199 fps.

Relatively slow-burning powders produce the highest velocities in the .25-06 due to its rather large powder capacity and narrow bullet diameter. Hunter, IMR-7828, H-4831, Magnum and Reloder 17 delivered top velocities for 100- to 120-grain bullets. Barnes 100-grain Tipped Triple-Shock bullets fired at 3,441 fps from 53 grains of Reloder 17 stands right on the heels of the much larger .257 Weatherby Magnum.

Another fast load includes Sierra 100-grain GameKing bullets fired at 3,405 fps from 55 grains of Hunter as shot from the Ruger's 24-inch barrel. My son shot that load when he carried the Ruger antelope hunting a few years ago. Thomas hiked up a coulee toward a band of antelope in the middle of a wide basin. Cover ran out far out of range. He could have determined the distance with a rangefinder, dialed up the elevation turret on his scope to compensate, and taken a shot, but that takes the fun out of hunting. Instead, he sat and waited. The band started drifting, as antelope often do for no apparent reason. They came Thomas' direction, and when they passed, he shot a buck bringing up the rear. The buck lagged behind the running herd, slowed and fell over. I met up with Thomas and the distance of his shot looked far. "I aimed up just a bit, at the top of the shoulder," he said.

All that bullet velocity is unnecessary for some shooting. After years of shooting lightweight bullets as fast as possible for varmint hunting, the first several inches of the Ruger's barrel bore looked like an eroded sewer pipe. So after the barrel was replaced, I started exclusively shooting reduced-velocity loads in the spring when gophers and marmots emerge from their burrows.

IMR-4320 has been a favorite powder for these easygoing loads, and accuracy has always been good shooting Hornady 75-grain V-MAX bullets. Yet extreme spread of velocity was often 80 fps over five shots firing 42 grains of the powder for a slow velocity of 2,960 fps. Extreme velocity spread has been much lower with other powders with burn rates similar to IMR-4320. Varget turned in a narrow velocity spread of 39 fps shooting five Sierra 70-grain BlitzKing bullets. Velocity spread was 30 fps for five Sierra 87-grain Varminter bullets fired by 43 grains of IMR-4166.

That amount of IMR-4166 pushes the Sierra bullets at 3,115 fps from the Ruger's 24-inch barrel. With the bullets hitting an inch above aim at 100 yards, they drop an inch at 200 yards, and 4 inches at 250 yards. That's about as far as the tiny target of a gopher is easily seen through the rifle's current scope, a Leupold VX-3i 3.5-10x 40mm.

The .25-06 is so versatile because it's pretty much a cross between the .22-250 Remington and .270 Winchester. On the light side, the .22-250 and .25-06 shoot bullets with about the same ballistic coefficients (BC) at nearly equal velocities. Similarly, the .25-06 shoots 120-grain bullets at about the same speed as the .270 fires 130-grain bullets, with both bullet weights carrying approximately the same flight form.

I've carried my .25-06 hunting elk over the years with the same confidence as I do with a .270 in hand. I've shot two elk with Speer 120-grain Grand Slams and two with Nosler 120-grain Partitions. The elk were in the timber at no great distance, and all of the bullets plowed clear through the elk.

Like the .270, the .25 caliber has been neglected in the development of long and slender bullets for extreme long-range shooting. The .25 caliber is pinched on the narrow side by .22- and .24-caliber bullets, with a G1 BC in the upper vicinity of .450 for .22-caliber bullets to .530 for .24-caliber bullets. On the wider side, .25-caliber bullets are hemmed in by 6.5mm bullets with BCs upward of .625, and 7mm bullets featuring a BC of .672, such as the Nosler 175-grain AccuBond Long Range. The highest .25-caliber BC I've found is .483 for the Berger 115-grain VLD Hunting bullet.

Rifles that shoot cartridges firing these high BC bullets attained their rifling twists to stabilize long bullets through evolution. The faster than normal rifling twists for .22-caliber cartridges came from the 5.56 NATO's 1:7 twist that eventually transferred to the .223 Remington and the recent .224 Valkyrie. The .243 Winchester's standard 1:10 and 1:9.125 twist stabilizes slender bullets up to the Hornady 105-grain A-MAX. The 6mm Creedmoor, though, was intended as a target cartridge, and to that end has a 1:7.5 twist to stabilize bullets such as the Hornady 108-grain ELD Match and even Berger's 115-grain VLD Target bullets. The 6.5 Creedmoor took its twist from the ancient 6.5x55 Swedish Mauser. The 7mm cartridges' 1:9 twist has been standard since the 7mm Remington Magnum came along nearly 60 years ago, and even the rather new .28 Nosler uses that twist to shoot bullets such as the Nosler 175-grain AccuBond Long Range with a .672 BC.

The .25-06's standard 1:10 twist marginally stabilizes Berger 115-grain VLD Hunting bullets. A much faster twist, though, would be required to stabilize, say, a 135-grain boat-tail bullet with a slender nose to update the .25-06 to compete for a share of the long-range market. However, enough cartridges already compete in that pastime, so little to no interest exists for such a fast rifling twist and sleek bullets for the .25-06.

So I'm going to keep handloading .25-06 cartridges and shooting the rifle the same way I have all these years. When the hills turn green with spring, the rifle will shoot lightweight bullets at a velocity gentle on the barrel, but hard on ground squirrels and marmots. As the quaking aspen shiver gold in fall, the rifle will be loaded with 100-grain bullets at top velocity to hunt deer and antelope, or a 120-grain Partition if an elk might appear on the menu. Once winter arrives, Hornady 75-grain V-MAX bullets flying fast from the rifle will help clear out the cobwebs of cabin fever when chasing coyotes. With some more time spent at the handloading bench, the .25-06 will be ready for another year. •

The .220 Swift was designed by Winchester and released in 1935. It is based on the semi-rimmed 6mm Lee Navy case. After 85 years on the market it is still considered one of the highest velocity cartridges around.

Ruger M77 .220 Swift

This Ruger M77V rifle was topped with a 2020 Meopta Optika6 4.5-27x 50mm FFP scope with BDC reticle. The Optika6 proves an ideal pairing with a hot rod varmint cartridge like the Swift.

The .220 Swift is still the largest of the .22-caliber cartridges. This lineup includes the (1) .222 Remington, (2) .223 Remington, (3) .225 Winchester, (4) .22-250 Remington and the (5) .220 Swift.

An Old Turn-Bolt in an Even Older Cartridge

Patrick Meitin

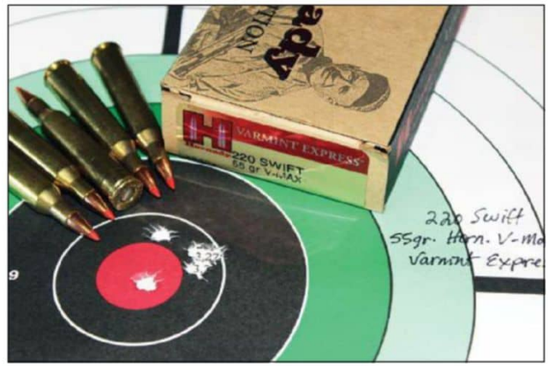
Sturm, Ruger & Company introduced the M77 bolt-action rifle in 1968, a design refined by Jim Sullivan during his three-year stint with the company. The M77 is often described as a modernized Mauser '98, including a two-lug bolt with a claw extractor, though several revisions were introduced. Legendary stockmaker Lenard Brownell was tapped to create the classically-lined stock of straight-grained walnut. Bill Ruger made the decision to create receivers through investment casting instead of more costly traditional forging methods. Sullivan's bolt design eliminated the Mauser blade-style ejector and replaced it with a simpler plunger-style version. The inherently-intuitive, two-position tang safety (which locks the bolt when engaged), crisp, user-adjustable trigger system and angled action screw were also new.

The latter is significant and another example of Ruger's genius for streamlining mass production. The Mauser's forward action screw draws the receiver straight down into the stock, while the M77's angled action screw pulls the action both down and rearward. The traditional vertical configuration used on Mauser designs pulls the receiver flat straight down behind the recoil lug and into the wood. This requires precise inletting to assure the stock doesn't split in that area, a task that can add an hour of handwork while assembling a rifle, increasing labor costs. The M77 is inletted to close, but not precise, specifications and the angled screw is used to pull wood and metal together to produce a close-fitted, well-bedded mating while minimizing labor costs.

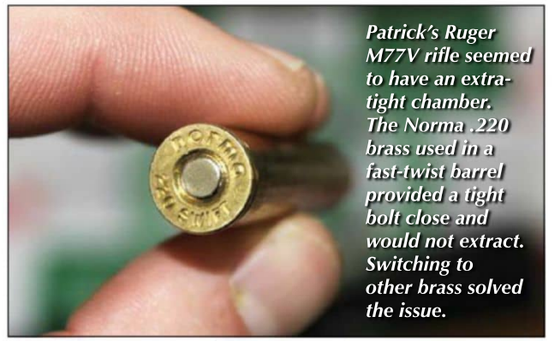
Ruger M77 centerfire rifles remained in full production through 1991, supplanted by the Mark II version with three-position, bolt-sleeve wing safety that replaced original tang safeties. From the get-go, the M77 gave Remington and Winchester a run for their money. Consumers liked the M77's clean, classic lines and Mauser '98 origins, including dual opposing lugs on the head of a one-piece bolt and an external claw extractor. Use of investment casting technology (bolt and receiver) and coil springs whenever possible meant M77s were priced competitively. The M77 introduced an accurate, reliable rifle with sleek lines and a working-man's price tag.

The usual suspects must pick their nits, however. The M77 wasn't a true controlled-feed design (That changed in 1989 with the MKII version.) It includes a side-mounted extractor, but this snapped over the cartridge rim only after being pushed into full battery (allowing the rifle to be single fed), with the cartridge riding on the follower loosely during cycling. The cast

This handload of 38.2 grains of IMR-4064 beneath a Nosler 52-grain Match BTHP bullet proved to be the most accurate load tested.



This 100-yard, five-shot group from Patrick's old Ruger M77V proved fairly par. Hornady's 55-grain V-MAX Varmint Express ammunition grouped into less than an inch. Only a couple of the handloads shot better.



Patrick's Ruger M77V rifle seemed to have an extra-tight chamber. The Norma .220 brass used in a fast-twist barrel provided a tight bolt close and would not extract. Switching to other brass solved the issue.

Ruger M77 .220 Swift

A compressed load of IMR-4350 under a Nosler 53-grain Tipped Varmegeddon proved both accurate and consistent.

bolt included a new plunger-style ejector, which supposedly gave handloaders fits (A blade ejector was added with the introduction of the MKII.) The strength of cast receivers and bolts was initially questioned, until independent testing showed that new alloys and heat-treating actually created stronger parts than original forged versions.

As for the ground-breaking .220 Swift, it is still one of the fastest commercial cartridges after 85 years in production; one of only a handful of rounds to effortlessly propel 40- to 45-grain varmint bullets to more than 4,000 fps. Winchester's 1935 cartridge has also seen a marked resurgence of late.

Here are some quick vital stats: The Swift was introduced in Winchester's Model 54 bolt rifle and then added to the Model 70 lineup a year later. Developer Grosvenor Wotkyns originally chose the .250 Savage as the parent case (If this sounds familiar, think in terms of the modern .22-250 Remington.), but Winchester ultimately chose the semi-rimmed 6mm Lee Navy case to build the cartridge around.

.220 Swift Handloads

bullet (grains)	powder	case	charge (grains)	overall loaded length (inches)	velocity (fps)	5-shot 100-yard group (inches)
150 Sierra BlitzKing	A-2520	Remington	34.5	2.66	3,440	.96
52 Nosler Match BTHP	IMR-4064	Winchester	38.2	2.64	3,778	.63
53 Nosler Tipped Varmegeddon	IMR-4350	Remington	42.0*	2.67	3,609	.82
55 Midsouth VN BTSP	VV-N160	Norma	44.0*	2.635	3,573	.98
55 Hornady V-MAX	StaBALL 6.5	Remington	42.0	2.67	3,565	.89

Factory Loads

load (grains)	stated velocity (fps)	actual velocity (fps)	extreme spread (fps)	5-shot 100-yard group (inches)
50 Hornady V-MAX Moly Varmint Express	3,850	3,653	67	1.05
50 Remington PSP High Performance Rifle	3,780	3,756	90	1.02
55 Hornady V-MAX Varmint Express	3,680	3,520	54	.66

* Compressed charge

Notes: A Ruger M77 with a 26-inch barrel (1:12 twist) and Meopta Optika6 4.5-27x 50mm SFP scope was used to test all loads. Redding B-Series full-length resizing dies and Federal Premium GM210M primers were used throughout. Accuracy and velocity are the average of three, 5-shot groups.

For more data on this cartridge please visit LoadData.com.

Be Alert – Publisher cannot accept responsibility for errors in published load data. Listed loads are only valid in the test firearms used. Reduce initial powder charge by 10 percent and work up while watching for signs of excessive pressure.

Factory ammunition is loaded for the venerable Swift, just not on a frequent schedule. Patrick was only able to secure three factory loads.

As is tradition in the outdoor press with anything well ahead of its time and fully misunderstood, reams of bad press heralded the Swift's release. And also according to gun lore tradition, that 85-year-old information is passed down through generations as etched-in-stone fact, typically by people without the smallest amount of hands-on experience or the smallest consideration of technological advancements. For instance, some – not all – original .220 Swifts were assembled from .223-inch barrels borrowed from .22 Hornet and even .22 rimfire rifles, so abrupt pressure excursions often occurred. Many early Swift barrels were also milled from relatively soft steel, so the cartridge developed a reputation for burning barrels after as few as 1,000 rounds. Powders available before World War II generally lacked burn rates suitable for generating maximum performance from the Swift, so its true potential was greatly limited. To this day factory ammunition is commonly loaded to .22-250 Remington levels, with only handloading unleashing the Swift's top velocities – if that is your goal.

The Hornet barrels were quickly replaced by standard .224-inch versions and given wider, wear-resistant lands. Modern metallurgy

Original Ruger M77 bolt-action rifles include a user-adjustable trigger. Tweaking the trigger requires removing the action from the stock, a small flat-head screwdriver and tiny Allen wrench.

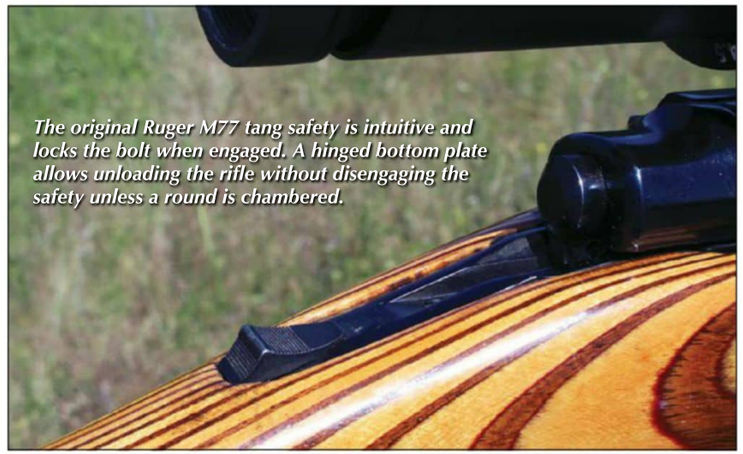
created more durable steels, slower-burning propellants revealed the Swift's full potential and modern cleaning techniques solved remaining premature barrel-wear issues. Still, some common sense is indicated, like taking a break when Swift barrels become hot to the touch, and using a bore-snake every 25 shots. These precautions go a long way toward prolonging the life of any hot rod cartridge's barrel (whether a .204 Ruger or .264 Winchester Magnum) as well as improving accuracy.

This Ruger M77V rifle, like other early M77s, includes a one-piece investment-cast bolt with plunger ejector and snap-over extractor. Unlike the Mauser action, which the M77 was loosely based on, rounds are not controlled during feeding.

The .220 Swift Ruger M77 under discussion here caused some amount of confusion initially. Discovered on the used market, it includes a target-style, laminated wood stock with a conspicuous cheekpiece and wide forend, blued metalwork, original tang safety and gold trigger guard and bottom metal. The laminated stock hinted at later 77VT MKII stainless steel models, though the blued metal and tang safety made that impossible. Its serial number marked it with a 1969 manufacture date. The barrel measures 26 inches from receiver to muzzle, which mics out at .73 inch. Inquiries were made at Ruger for additional insight, where it was determined the laminated stock was not Ruger's work, and that someone had been creative with the gold bottom metal highlights – a gaudy touch that makes me cringe. My educated guess is that the stock is an early Boyds with an added Pachmayr recoil pad to create its longish length of pull. From all indications, the action is a M77V (Varmint).

Either this M77V includes extra tight chamber dimensions, or another Swift I have access to – a heavy-barreled custom job with 1:9 twist chosen to stabilize 69- to 77-grain bullets – has a sloppy chamber. Initially, I used Norma brass in the fast-twist Swift to assemble test loads for this M77. Running those fired cases through a Redding Series B die set resulted in the bolt turning down tightly and failure to extract after. I first tried trimming brass back to Hornady's recommended 2.195-inch trim-to length. I then set the full-length resizing die to firmly touch the ram while fully engaged before adding a quarter turn so each full pull "over-cammed" conspicuously

Ruger M77 .220 Swift



The original Ruger M77 tang safety is intuitive and locks the bolt when engaged. A hinged bottom plate allows unloading the rifle without disengaging the safety unless a round is chambered.

to set shoulders back. This solved my chambering issues somewhat. The bolt was at least closing easier, but extraction remained problematic. Using an RCBS micrometer I found the web, just in front of the Norma case rim, measured .445 inch, and Remington brass, .442 inch – all other dimensions remaining essentially equal. Not willing to invest any more time solving this mystery, I turned to other once-fired brass, including piecemeal cases from Remington, Winchester and Hornady that had not seen the inside of the fast-twist Swift's chamber. The problem disappeared.

I also worked on the trigger pull, as it had been set so light that a sharp rap with the heel of my hand to the side of the stock caused the firing pin to drop on an empty chamber. Removing the action from the stock, manipulating a slotted rear screw and trigger shoe hex head screw brought the trigger pull to three pounds after a bit of trial and error. The trigger breaks crisply, without any conspicuous creep or overtravel. It really is a remarkable trigger, especially considering its manufacturing date. While the rifle was disassembled, I also discovered the action and barrel channel had been glass bedded.

I added a Meopta Optika6 4.5-27x 50mm SFP scope with BDC Reticle, a superlative varmint scope with exposed/locking turrets, "frog-hair-fine" crosshairs, compact geometry and clear optics. The glass includes anti-reflective and hydrophobic coatings for outstanding light transmission and moisture and fog repellency. The six-level illumination switches off between clicks. Windage and elevation movements are mutually independent and turrets included a zero-stop feature for quick and easy returns to zero. It is a true long-range varmint optic fitting of this cartridge.

I was able to secure only three factory loads for comparative testing, while also adding five handloads. The Swift is one of those cartridges that is factory loaded only sporadically, so Federal Premium 40-grain Nosler Ballistic Tip Varmint & Predator and 50-grain NoslerCustom Ballistic Tip Varmint loads were unavailable during testing. The Hornady 50-grain V-MAX Moly Varmint Express load was a pawn shop find and is now discontinued. The listed Hornady 55-grain V-MAX Varmint Express is current. Remington supplied a box of PSP High Performance Rifle. That's pretty much the extent of mainstream factory Swift ammunition in the times we live in. If you're depending on factory loads to feed your Swift, grab it when you can.

Handloads were mostly proven recipes taken from notes kept during load development with other .220 Swift rifles (some performing better in this M77 than others), plus my father's favorite load for this specific rifle (Nosler 52-grain Match BTHP over IMR-4064). Only the IMR-4350 load pushes maximum velocity in my rifle, the others are tailored for accuracy alone. I've never understood the need for 40-grain bullets from the Swift, so all are a mixture of various bullet styles from 50 to 55 grains, where standard 1:14 rifling provides its best results. The Winchester StaBALL 6.5/Hornady 55-grain V-MAX combination was a shot in the dark, as I've experienced excellent results with this new powder from several other rifle/cartridge combinations.

The Hornady V-MAX Moly and Remington PSP factory loads both produced 100-yard, five-shot groups averaging around an inch. The best showing with factory loads was Hornady's 55-grain V-MAX Varmint Express, which averaged .66 inch under the same conditions. Velocity proved a bit disappointing, at least for those counting on hitting the magic 4,000-fps mark. Remington's High-Performance Rifle loads were the fastest factory load, at 3,756 fps – not far off the company's listed velocity. All of the handloads produced 100-yard, five-shot groups measuring less than an inch, including the StaBALL 6.5 load. The most accurate average was produced by 38.2 grains of IMR-4064 beneath Nosler's Match BTHP (.63 inch), likely because it was a load tailored specifically for this rifle. That was also the fastest load, at 3,778 fps. All loads were shot in gusty wind, so accuracy could no doubt have been better. All handloads show enough promise to offer solid starting points with any .220 Swift.

Ruger M77 .220 Swift

The Ruger M77V test rifle weighed a solid 12.06 pounds with a 1.94-pound Meopta Optika6 4.5-27x 50mm scope added. That extra weight marked it for a portable bench.

I owned a Ruger M77 just like this – albeit with a factory walnut stock – back in those days right out of high school when raw fur prices hit all-time highs and I spent a couple of winters trapping and calling for a living during winter months. Back then, in the early 1980s, a skinned and stretched New Mexico mountain coyote fetched $55 to $65 on the raw-fur market at a time when a new Ford F150 4x4 pickup with all the extras cost only $8,500. In the time that I owned that .220 Swift, it accounted for several hundred predators and maybe a half dozen predator-calling-contest wins.

That rifle spent most of its time with its muzzle jammed into a dirty passenger floorboard, bouncing on a Land Cruiser seat, receiving only very sporadic cleaning and shooting everything from summer prairie dogs and jackrabbits to frequent winter coyotes and occasional bobcats. My late outfitting partner ran it over with a 4x4 pickup after I stupidly left it leaning against the rear tire while answering a call of nature. He decided the truck desperately needed to be turned around while he waited. Just as Bill Ruger designed it, that M77 was a low-maintenance, straight-shooting working rifle that took a licking and kept on shooting straight. Until a truck tire bent its barrel . . . •

.327 Federal Magnum

(Continued from page 45)

maximum loads might produce excessive pressures.

Using a standard primer does not magically cure the extreme spread problems associated with the .327. Experimenting is still necessary to find the perfect load. For example, many (but not all) of the starting powder charge weights only gave mediocre accuracy and greater extreme spreads than I would normally be happy with. But as the powder charge was increased, at some point most powders would settle down and produce respectable extreme spreads and good accuracy. Many loads produced their best accuracy with powder charge weights that were in the "middle," rather than starting or maximum charges.

A good example was observed with Shooters World Heavy Pistol powder with the 115-grain Rim Rock RNFP gas check bullet. The starting charge was 8.5 grains (1,223 fps) and extreme spreads were running nearly 100 fps. As the charge was increased to 10.0 grains, extreme spread dropped to just over 30 fps (outstanding for this cartridge) and velocity was just under 1,400 fps. After bumping the charge to 10.5 and 11.0 grains, extreme spreads increased and gas spitting from the barrel-cylinder gap was notably increased. Several other powder and bullet combinations showed a similar pattern. In extreme instances, velocity actually decreased as the charge weight was increased (those loads being omitted).

Pistol and revolver powders with a medium burn rate, such as Alliant Power Pistol, Hodgdon Longshot, Accurate No. 5 and No. 7, Ramshot True Blue and others, have proven top choices for the .327, as they usually duplicate factory load velocities, produce comparably mild muzzle report and are accurate. Although slower burning, Accurate No. 9 and Alliant 2400 are likewise excellent choices.

Jacketed bullet selection for the .327 is reasonable. The .312-inch 85- and 100-grain Hornady XTP bullets are proven, reliable performers that expand at impact velocities of 800 fps or higher, and they easily withstand the high velocities and pressures associated with maximum loads. Furthermore, they are especially accurate and have given many 25-yard groups that are well below an inch. I have used them many times on rockchucks and other pests, and even managed to take a coyote (with the 7½-inch barreled Single-Seven) at something over 70 yards offhand with the 100-grain XTP pushed to around 1,350 fps using 7.0 grains of Longshot powder. The Speer 100-grain Gold Dot HP is another outstanding bullet that offers consistent performance at all velocities. And being bonded, it holds together in practical mediums, even when pushed to high velocities. Unfortunately, Speer has discontinued (at least as a handloading component) the 115-grain Gold Dot bullet. In the event that readers still have some on hand or find some on dealer's shelves, load data has been included that duplicates factory load performance.

Swaged lead and cast bullets can perform very well in the .327. The Hornady 90-grain SWC and Speer 98-grain hollowbase wadcutter work well when pushed at 800 to 950 fps. However, due to their soft nature and limited quantity of spray-on lubricants, if pushed to higher velocities they can cause excess barrel leading. Plain-base cast bullets, such as the 95-grain SWC from Redding mould 325, Rim Rock 100-grain RNFP and Hunters Supply 115-grain RNFP that are usually cast at between 14 and 16 BHN, can be pushed to 1,200 fps without leading, and in good barrels can be pushed even faster. For high-velocity loads a gas check is preferred, such as the Rim Rock 115-grain RNFP w/GC. Several powders pushed this bullet to 1,400 fps and up to 1,463 fps. Incidentally, select cast bullet loads produced the lowest extreme spreads of all loads (including factory loads).

The .327 Federal Magnum is a fun, fast and low recoiling cartridge, but it does require testing and experimenting to develop handloads that produce the velocity and accuracy desired by most shooters. •

Modernizing the 6mm-06

(Continued from page 37)

custom .243 Winchester built on a Husqvarna small-ring 98 Mauser action. Both rifles have magazines long enough for *any* bullet to be seated to the lands.

The .243 case held 48.4 grains of water, and the 6mm-06 case, 64.4 grains, an additional 33 percent. Thirty-three divided by four is 8.25, so the 6mm-06 should be safely capable of around eight percent more velocity than the .243 Winchester. Averaging maximum velocity loads from various sources of .243 data ended up with a list of potentially reasonable 6mm-06 velocities of approximately 4,300 fps with 55-grain bullets, 3,800 with 70s, 3,400 with 90s, 3,250 with 100s, 3,200 with 105s and 3,100 with 115-grain bullets.

I then compared powder capacity of the 6mm-06 with the 6mm-284 and .240 Weatherby. My friend Jay Rightnour owns a very accurate 6mm-284, built on a short Winchester Model 70 action by Helena, Montana, gunsmith Dennis Erhardt. Jay provided a fired case made from necked-down Winchester .284 brass, and I still had a few fired .240 Weatherby cases. Using the water technique with the 105-grain Berger, the 6mm-284 case held 61.4 grains, and the .240 case, 58.9 grains.

This may surprise handloaders who believe the .240 Weatherby is essentially a belted 6mm-06, but the .240's case body measures .453 inch in front of the belt, somewhat slimmer than the .473 of the .30-06 case. Many riflemen also believe the .240 chamber has the typical Weatherby "freebore," a longer throat/leade than most other centerfire cartridges, allowing more powder to be used without raising maximum pressure. However, the .240's factory throat is only .169 inch long, a little shorter than the SAAMI .25-06 throat length of .177 inch. Neither is as long the .236-inch throat of the Shaw 6mm-06 chamber, measured by seating a flat-based bullet backward in a case and closing the bolt.

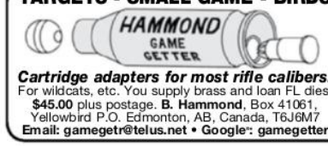
During the first range session, I fired 17 rounds of cautious starting loads with bullets from 55 to 115 grains. The rifle shot accurately from the get-go – and also tended to put most bullets close to the same point of impact, probably due to the relatively stout barrel that measures .665 inch in diameter at the muzzle.

Afterward, I cleaned the powder fouling from the bore with rubbing alcohol and took a look with my Gradient Lens borescope, finding only faint traces of copper, which disappeared completely after a half hour soaking with Montana X-Treme Copper Killer. I had seen this general resistance to fouling in previous Shaw barrels, even though they are not lapped like some other custom barrels. Several more range sessions resulted in the list of handloads selected for both accuracy and *reasonable* maximum velocity in this particular rifle. In addition to chronograph indications, the primer pockets stayed tight, and the barrel never copper-fouled much at all – certainly not enough to affect accuracy, partly because some of the newer powders included a de-coppering agent.

As noted in the handload table, I did not use dedicated 6mm-06 dies, instead using the full-length sizer in my set of Redding .25-06 dies as a body die. However, that turned out to be necessary only once, before they were fired, since the Quality Cartridge cases' fit required considerable effort on the bolt handle to enter the Shaw chamber.

After the first firing, cases only required neck sizing with the bushing die from my set of Type S 6mm Creedmoor Match Dies, accomplished by screwing the die into the press until it sized the neck to just above the shoulder. This resulted in very straight case necks, and bullets seated with the 6mm Creedmoor micrometer die – screwed into the press above a stack of 0.1-inch thick washers – showed very slight runout on a Casemaster gauge, contributing to the excellent accuracy.

The 6mm-06 would obviously be a great round for open-country hunting of anything from larger varmints to deer-sized game up to black bears and caribou. I am also well acquainted enough with the performance of similar-sized cartridges on "meat" elk to have no qualms about taking on a cow or raghorn bull. Now I just have to decide exactly where the rifle fits into my fall hunting plans! •



In Range

(Continued from page 70)

At the time, a major worry was how the time and date "00:00:01 01-01-00" would affect the clocks and computers that ran the nation's electrical utilities. Would all the nuclear stations automatically close down? As it turned out, the witching hour passed without so much as a flicker of a lightbulb. Many of those who had been on the verge of panic an hour earlier then rounded on the engineers who ran the system and derided them for their unfounded fears.

Those of us who had bought a generator – and yes, I was one – were a little sheepish and stowed them in the back of the garage. We were afraid our wiser neighbors who, according to them, had known all along nothing would happen, would spot the new generator and make fun of us.

Two-and-a half-years later, on a bright, sunny day in the summer of 2003, we got our own back. I was shooting skeet one afternoon when suddenly the thrower stopped working. We checked the fuses. Nothing. We tried the lights in the clubhouse. Same thing. We locked up, went home and found there was no electricity there either. In fact, there was no electrical power anywhere across a broad swath of Ontario, Quebec, the Midwest and the northeastern U.S.

What had occurred was an "unknown unknown" wherein a completely trivial event at a small power station in Ohio had triggered a response, which set in motion a bizarre domino effect across the Northeast, putting Ontario's Hydro One's entire system – the largest in the world – out of commission. The blackout lasted for three long days. The very event the engineers said "could not happen" had indeed happened.

Country people with electric pumps had no water. Cars low on gas could not get more. Unless you had a battery-powered radio (remember those?) you could not even find out what was going on. Cooking? Break out the Coleman stove. ("No naphtha? You idiot! I told you last fall to get naphtha…!) Being summer, it was hot and humid, and no one had air conditioning. In the current idiom, they were "sweltering in place" with nowhere to go, and no way of getting there anyway. Old people died, to be found in their homes a month later.

The Great Blackout of 2003 was the vindication of the backup system principle and those of us – survivalist in all but name – who owned generators enjoyed a brief period of popularity such as we had longed for in high school but – being survivalist in all but name – had never enjoyed.

One obvious explanation for the current surge in demand for reloading supplies of all kinds is that, unable to buy factory ammunition, guys are rolling their own, preparing for Armageddon. All very admirable, I'm sure, and vastly superior to bingeing on Hollywood zombie flicks.

Another explanation, and one I increasingly favor, is sheer boredom. Loading ammunition is one creative and productive activity that can be done in the home, and just about every serious shooter I know has a basement full of brass, lead ingots, boxes of bullets and a variety of primers that would do credit to the Smithsonian. With time on your hands and all that wherewithal, what better way to wile away the days than assembling fodder for the "nine-mil," the AR and your trusty skeet gun?

And, if you run short of this component or that powder, you click on to Graf & Sons, order a supply and eventually the UPS truck shows up at your door. No donning the face mask and venturing forth into the perilous streets like Charlton Heston's *Omega Man* – a 1971 glimpse into the future that may seem, these days, all too real: A worldwide plague, a lone survivor, a desperate search for a cure. *(Oh, wait a minute. That's not a movie. That's the news on NPR. . .)*

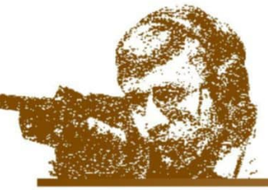
Speaking of UPS, in my area we have a feature wherein you can call up a map and see where your delivery truck is at that very moment, when you are waiting to sign for anything "hazardous" like ammunition. Like a cat with an immutable routine, it goes something like this: pull the handle on the reloading press 25 times, pack the shotshells in a box, walk over to the computer and check for emails, call up the UPS map and see how close the truck is, walk back to the reloading press and pull the lever another 25 times.

Another wrinkle in this area: They have given up actually getting the signature that they demand you must be there to provide, otherwise they won't leave your powder and primers. Instead, the driver looks you up and down from a safe distance, asks for your name, then scrawls an undecipherable initial on the screen and says, "Good day."

The one-in-two-million chance of you not being the right guy, and using the package for nefarious purposes, is trumped by the one-in-one-million chance of contracting a virus which, statistically, has only a one-in-a-thousand chance of causing you any discomfort, and a one-in-ten-thousand chance of killing you.

I'm sure there is logic there somewhere. I just don't see what it is. Kind of like Y2K. In retrospect, anyway. •

AD INDEX



Lockdown Update

IN RANGE by Terry Wieland

The undercover survivalist's creed: "Just in case. You never know. Better to have too much . . ."

One hopes – sincerely, devoutly and reverently – that by the time you read this sometime in the fall, the COVID-19 crisis will have passed into history, departing not with a bang but a whimper, as so many crises do. (If you doubt that, think back to Y2K, bird flu and mad cow disease). The future, it has been observed, is rarely as bad, but never as good, as we predict it will be.

In the last issue, I noted that Graf & Sons, the handloading supply outfit, was backed up, with orders not being filled for eight to 10 days – a far cry from its usual overnight response. In the intervening eight weeks, things have not improved. When I spoke with someone there in mid-May, non-hazmat orders were not leaving the warehouse for at least 14 days, and hazardous materials like primers and gunpowder were taking considerably longer. For such items, which require special handling from the shipping department to your door, they were not even committing to a time.

It's impossible not to feel sympathetic toward companies like Graf & Sons or MidwayUSA, confronted with almost unprecedented demand at a time when not only is supply restricted, but their capability to physically ship orders is hampered by unfamiliar safety rules imposed by the government – federal, state and local.

It's not difficult to figure out why, in the early days of pandemic panic, that supplies of 9mm, .223 and .308 flew off the Walmart shelves, creating one of the artificial shortages so familiar to those in the shooting game. Such shortages can occur for any number of reasons, from the dire predictions surrounding Y2K to an anti-gun politician unexpectedly soaring in the polls.

Hard as it is to believe (to me, anyway) the Y2K phenomenon occurred more than 20 years ago and is not even a faint memory to many people alive today. For those who do remember, it's mildly embarrassing, like recalling the outlandish bell-bottoms we wore in the 1970s. Just because dire predictions don't come to pass, however, does not mean the fears were unwarranted or silly in the first place.

I hate to stray into such a minefield as Donald Rumsfeld's "unknowns" – both "known" and "unknown" – but while the press was only too eager to lampoon the defense secretary for his statements, he was absolutely right. What happened with Y2K is a case in point. It was a "known" unknown. We knew it was coming, but we didn't know how it would play out. Many people, realizing this, stocked up on canned goods, bottled water and firepower. Others laid out cash for a generator, just in case.

(Continued on page 68)

SHOOTERS

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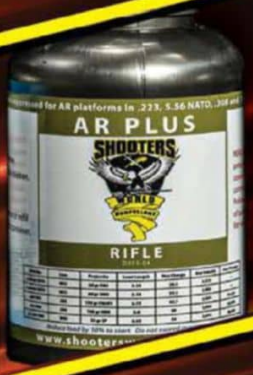
THE HUNTER

PRE-MEASURED PELLETS CONVENIENCE FOR SERIOUS HUNTERS



AR PLUS

USED FOR 5.56 AND 7.62

MULTI PURPOSE BLACK

PERFECT FOR HUNTER AND COWBOY ACTION

USA Midway

GRAF & SONS
THE RELOADING AUTHORITY

MIDSOUTH SHOOTERS
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