

## John Barsness

**T**he desire for superior accuracy has been around as long as rifles, but the modern accuracy game started in the years after World War II, one of the peak periods for hunting and shooting in America. Many returning servicemen had developed an interest in rifle shooting, and wild animals rebounded during the war, recovering from their low populations during the Depression. Even the populated Northeast still held lots of open country, and landowners often allowed hunters to shoot the woodchucks that ate crops and dug holes in fields.

Super-accurate varmint rifles developed in the Northeast long before World War II, but after the war so many men started building rifles on “war-surplus” bolt actions that informal matches were often held to prove whose woodchuck rifle shot most accurately. Soon this benchrest shooting became organized, with the first formal matches held in 1947 in Johnstown, New York.

Over the next half-century, the accuracy techniques learned from benchrest competition became a big part of American hunting and shooting. Most rifle loonies are benchrest shooters, whether they know it or not. Witness the constant striving for the magical .5-inch group at 100 yards, even by deer hunters who never shoot beyond 300 yards. At those ranges .5-inch accuracy is as superfluous as a pearl necklace on a wild hog, yet the boys keep plugging away. As a result, at least half the questions received by gun writers involve dissatisfaction with deer rifle accuracy. In order to answer these mournful requests, many of us perform experiments like those performed by benchrest shooters.

About a decade ago, a Remington 700 varmint rifle became the center of several serious accuracy experiments. Chambered for the .223 Remington and “accurized” with a few basic gunsmithing tricks, it proved so accurate that carefully assembled handloads averaged .25 inch for five-shot groups at 100 yards. The smallest group measured .227 inch, center to center; the two widest bullet holes essentially touched each other.

Much of the .223 experiment’s success, of course, came from stealing benchrest shooting techniques. A few years prior, several avid shooters attended one of the Groundhog Shooters and Prevaricators Conferences held annually at an old farmhouse in West Virginia. Among the conference attendees were host Melvin Forbes of New Ultra Light Arms, editor of *Gun Digest* Ken Warner, *Field & Stream* rifle columnist Dave Petzal, president of Douglas barrels Tim Gardner, well-known accuracy gunsmith Mickey Coleman and me.

Between forays after groundhogs (as woodchucks are known in most of the East), we sat around the front porch of the lodge, prevaricating and telling tales. Once in awhile some of us actually shot rifles at the 100-yard benchrest range within sight of the porch.

One day Mickey Coleman asked if I’d like to shoot a real benchrest rifle. The rifle didn’t seem all that much different than many varmint rifles, but between the bench and the target, Mickey set up several complex wind flags, saying they should all be pointing the same way for each shot. The first three shots on the target “just made the hole darker,” as Mickey put it. I started thinking this was pretty easy, but the fourth bullet landed outside the dark hole by about the thickness of a playing card.

“The third flag gotcha,” Mickey said. “It flipped a little just before you shot.”

Benchrest flags normally consist of at least three elements: a propeller, a rear vane and a strip of flagging tape. For the .223 experiment, I acquired a couple of Sinclair wind flags with plastic propellers shaped like large sunflowers. These helped a lot when trying to put five, 50-grain bullets in one hole.



# 6MM PPC

## Loads for a Benchrest Rifle



*With the 4.5-30x Bushnell scope, John's 6mm PPC Erhardt weighs exactly 13.5 pounds, the Heavy Varmint Rifle weight limit in benchrest matches.*

# 6MM PPC

The success of the .223 experiment created a hankering for a real benchrest rifle, but I was too cheap to spend the money on a rifle designed to punch holes in paper, for the next few years blowing most spare cash on hunting rifles and hunting trips instead. Then one day late in the summer of 2011, I stopped by Capital Sports and Western Wear in Helena, Montana, to look over the racks of used firearms. These racks swell in the weeks before deer and elk season, and on one stood a bulky, heavy-barreled rifle with a synthetic stock painted a metal-flake emerald green. It turned out to be a genuine benchrest rifle made by one of the store's gunsmiths, Arnold Erhardt, chambered in 6mm PPC. The rifle showed evidence of long use, but the price was too low to pass up.

There are two main risks in buying a used benchrest rifle, the first is a barrel worn out by shooting, over-cleaning, or both. Benchrest shooters are addicted to brushing the heck out of their rifle bores, sometimes wearing out the throat and crown before the barrel gets shot out, but this rifle's heavy 25-inch barrel looked good through a Hawkeye borescope. The other common problem is another by-product of clumsy cleaning. Today's benchrest rifles have the action epoxied into the stock, a



*Hodgdon H-322 and IMR-8208 XBR are often preferred for the 6mm PPC, but in this instance they didn't show any significant advantage over Benchmark.*

more consistent and sturdy arrangement than action screws. Sloppy cleaning often results in cleaning solvents dripping onto the action tang and inside the front receiver ring. Eventually this loosens the action, but this rifle appeared to be firmly bedded.

## ***Super-accurate varmint rifles developed in the Northeast long before World War II.***

The action was a "sleeved" Remington 700. Many benchrest rifles are built on custom actions, but occasionally blueprinted 700s are used, usually with an aluminum tube (sleeve) epoxied around the receiver, stiffening the action.

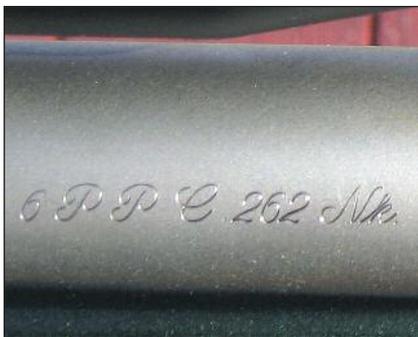
The biggest unattached scope on hand turned out to be a 4.5-30x Bushnell Elite 6500. Most bench-

rest shooters use fixed-power scopes of at least 35x, but I mounted the Bushnell in Talley steel rings, using bases filed to fit the sleeve, then ordered Redding Competition reloading dies and Norma 6mm PPC cases. I already had a Caldwell BR front rifle rest and a selection of Berger 6mm target bullets.

While waiting for everything to show up, I began rereading my small collection of literature on benchrest rifles and shooting, especially Glen Newick's fine book *The Ultimate In Rifle Accuracy*, a gift from Walt Berger. Some good information also came from an Internet acquaintance named Butch Lambert, a rifle loony and benchrest competitor from Poetry, Texas. Butch had read an article of mine about using wind flags and contacted me, claiming that his company, Shade Tree Engineering ([www.shadetreeea.com](http://www.shadetreeea.com)) sold some of

*Left, Redding Competition dies resulted in a maximum bullet runout of .0005 inch. Below, case necks were turned using the Forster tool John has owned for decades. A real benchrest shooter would use a specialized hand tool.*





Precise neck diameter is engraved alongside the chamber designation.

the best wind flags ever made – designed and manufactured by Australian benchrest shooters Annie and Stuart Elliott. Butch sent along some of the flags, suggesting putting a couple in my yard for a day or two, just to see how they worked. They proved much more sensitive than my old sunflower flags.

The first handloading task turned out to be turning the necks of the cases. Benchrest rifles normally have minimum chambers, with the neck smaller than the normal SAAMI diameter, eliminating as much “slop” as possible. My rifle’s barrel was marked “6PPC .262 Nk.,”

*The best load (top) turned out to be 30.0 grains of Hodgdon Benchmark and the 65-grain Berger Flat-Base Target bullet seated into the lands. The one-hole target (bottom) is two shots of the same load, a test to see if point of impact shifted with a perfectly clean bore. It didn't.*



meaning the necks of the brass had to be lathe-turned to measure no more than .262 inch in diameter with bullets seated. This meant the neck walls should be no more than .0095 inch thick. I used a Forster trimmer that’s been bolted to my reloading bench for over 35 years, but a real benchrest shooter would use one of the precise hand tools on the market.

Cases were then weight-sorted, and the 50 cases in the middle of the bell-curve were run through the Redding neck-sizing die with a .262-inch bushing. The cases would have to be fireformed in the rifle’s chamber to obtain the finest accuracy, so I loaded them with 65-grain Berger flatbase target bullets and a starting charge of Hodgdon Benchmark, a rather unusual choice, though Butch Lambert says some bench shooters use it and suggested a couple of loads.

The modern benchrest game is almost totally dominated by the 6mm PPC cartridge, designed after considerable experimentation by Dr. Lou Palmisano and gunsmith Ferris Pindell in the mid-1970s. Their first round was the .22 PPC, but the 6mm version soon took over because 6mm bullets drifted less in wind, and 6mm is the minimum required for the Hunter benchrest game. While a few people still experiment with other rounds, during the 2011 Super Shoot (one of the biggest benchrest events), the top 20 competitors in both the Light Varmint (10.5-pound rifle) and Heavy Varmint (13.5-pound rifle) categories all shot 6mm PPCs.

Most competitors use bullets in the mid-60-grain range. Hodgdon H-322 was the preferred powder for many years; however, all but two of the top competitors at the Super Shoot used Vihtavuori N133. (The others used IMR-8208 XBR, which caused a stir in 2009 when former Wolfe Publishing staffer Jim Carmichel used the new powder to win the International Benchrest Shooters Heavy Varmint championship.)

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... says Ron Wood from Flagstaff, Az. Ron shot this Blighorn on a hunt with his son in Foote Creek, Arizona. He waited 27 years to get drawn for this hunt, so he spent a great deal of time scouting and preparing. “I shot the ram at 296 yards. He traveled less than 10 yards.”

Ron shot a Remington 700 Sendero, chambered in 700 Rem Mag, with a Krieger barrel and Shilen trigger. He used Nosler brass, Winchester primers, Reloader 19 powder, and Berger 7mm 168gr Match Grade VLD Hunting bullets.

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# 6mm PPC

Unfortunately, VV-N133 is pretty expensive, and the ultimate goal for my rifle was shooting prairie dogs, where a lot of powder gets burned. My powder collection included small amounts of 8208 and H-322, but also most of an 8-pound jug of Benchmark, used for prairie dog loads in a couple of other rounds; so it became the powder for fireforming cases, plus seeing which bullet and seating depth the rifle preferred.

Seating depth with the first 50 rounds was what benchrest shooters call “jammed” – full contact with the lands. Many bench rifles shoot best with jammed bullets, and it’s also the best place to start, since seating bullets slightly deeper reduces pressures. The jammed depth is easily found by seating a bullet just slightly into a case, then running the case into the chamber.

Since the case neck is sized only about .001 inch smaller than the bullet, closing the bolt seats the bullet to its jammed depth.

The first 50 rounds also tested which style of shooting worked best for me. The rifle has a typical 2-ounce benchrest trigger, and many top competitors touch only the trigger – possible with a heavy rifle sitting firmly on a sturdy rest. They aim the scope primarily by squeezing the rear bag, then carefully touch the trigger when all the wind flags turn in the right direction. Some shooters do better with a firm but light conventional hold. I turned out to be one of these, which was fine since that’s the way the rifle will be held to shoot varmints. The five-shot groups from



*BRT wind flags proved to be highly sensitive. They are colored differently on each side to help shooters see which way the wind is blowing.*

the fireforming rounds measured anywhere from .373 to .822 inch, about the same as many factory varmint rifles with good handloads, but shrank dramatically after that initial session.

With neck-turned, fireformed Norma brass and Berger target bullets, the second batch of 6mm

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Photo courtesy of Scott Mayer.



Model 12 Palma



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PPC handloads had a maximum of .0005 inch runout,  $\frac{1}{2000}$  inch, and most rounds didn't even move the concentricity gauge's dial. Powder charges in this second batch started at 27.5 grains, increasing in small increments up to 30.0 grains, 1.7 grains above Hodgdon's listed maximum. Berger target bullets, however, use thinner jackets and softer lead cores than typical varmint bullets like the 65-grain Hornady V-MAX used in Hodgdon's data, and also they're often slightly smaller in diameter. Butch Lambert suggested the 30-grain maximum, saying he knew some shooters who used it with no problem. (It's also worth noting that Jim Carmichel's winning 2009 load used 31.5 grains of 8208 with a 68-grain match bullet, two grains more than the maximum listed by Hodgdon for either 65- or 70-grain bullets.)

With these loads, the largest group matched the smallest group from the first range session. The smallest group measured .170 – with the 30-grain powder charge. Since the goal of most benchrest shooters is to have their rifle average somewhere “in the teens” (below .20 inch), this group was quite encouraging.

I stuck with Benchmark for the next range session. Seventeen rounds were loaded with 65-grain Bergers seated into the lands, but two, five-round batches were loaded with bullets seated .001 and .002 inch deeper. Another five cases were loaded with the 65-grain bullet jammed into the lands and 30.4 grains of powder; and two, five-round batches were loaded with 62- and 68-grain Bergers seated into the lands.

The shooting took place in an erratic breeze of 2 to 8 mph, according to a Minox Windwatch, but by then I was reading the flags pretty well. Two of the 30.0/jammed-65 loads were used to foul the bore and to see whether the first bullet from a clean bore would land in the same place as from a fouled bore. They made a slightly oblong hole measuring .281 inch, mean-

ing the second bullet landed .038 inch from the first. The most accurate load again turned out to be 30.0 grains of Benchmark with the 65-grain Berger seated into the rifling, three groups averaging .183 inch.

The final range session tested IMR-8208 XBR and H-322 with the 65s jammed, but neither powder grouped significantly tighter than Benchmark. Soon afterward Butch

Lambert sent along about 150 handmade 66-grain bullets, and I started thinking some VV-N133 might be a good investment, and maybe even a 45x Leupold benchrest scope. It sure would be great to go from the high teens to the low teens.

It turns out that benchrest shooting is all about minutiae, which is, of course, what rifle addiction is all about. ●

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