The Los Angeles Silhouette Club

The .338 GEF Revisited

By: Glen E. Fryxell

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The Thompson-Center Contender is a wildcatter's playmate. The ease with which barrels can be interchanged, and that a single frame can be used with a wide variety of cartridge diameters, rim types, etc. make this a very versatile platform. A key concept that must be born in mind is that the Contender frame is not as strong as a bolt-action rifle, and the back-thrust of the cartridge must be held to approximately the level of the .44 Magnum cartridge for safe operation and long service life from the frame. Back-thrust can be thought of as basically peak pressure times cross-sectional area. In slender cartridges (e.g. the .223 Remington), higher pressures are easily tolerated, while in fatter cartridges (e.g. the .45-70), pressures must be held to much more modest levels to keep the back-thrust within the Contender frame's limitations. This is why skinny cases like the .223 Remington and .221 Fireball have been chosen as the foundation for several popular Contender-based wildcats. This is also why the handloader can't just blindly work up loads looking for sticky extraction as a sign of excessive pressures. "Excessive pressures" in one cartridge case may be 55,000 CUP, and may happen to correlate with sticky extraction. In another cartridge case, 30,000 CUP may be excessive, but sticky extraction might not show up until 50,000 CUP. Even though the cases in these high pressure loads might extract easily, the shooter would be inflicting frame damage each time a shot was fired. It is important that one understand this if one wishes to wildcat the Contender.

For .30-06 diameter cases, the Contender will work just fine as long as loads are tailored to operate at 42,000 CUP or less. The .308 Winchester is a fine handgun cartridge in guns like the XP-100 or Lone Eagle, but the fact that factory ammo is loaded to 50,000+CUP make this cartridge a no-no in the Contender.

Back in the early 1990's, I asked J. D. Jones of SSK Industries to make a custom wildcat barrel for me. It was a .338 wildcat, based on the .356 Winchester case necked down, with the body taper shoulder blown out. The cartridge was named the ".338 GEF" in order to differentiate it from other similar wildcats, which were generally designed for bolt-action guns (and loaded to higher pressures, like the new .338 Federal). The exceptional quality of the Contender barrels turned out by SSK Industries is well-known, and this barrel was no exception. With proper loads, this barrel showed its ability to go sub-MOA on a regular basis, and with the right loads it would flirt with 0.5 MOA. J. D. suggested that we cut the throat on this barrel to allow the Nosler 250 grain Partition to be seated even with the bottom of the neck, and this turned out to be an excellent suggestion, as this cartridge works best with bullets in the 200-250 grain range. In order to keep pressures in a reasonable range for the Contender, slower powders work best (e.g. 4350, H380, etc.), and loads are held within specific velocity limits to keep pressures moderate. The bottom line is that the .338 GEF can launch 200s at 2100 fps, 225s at 2000 fps and 250s at 1900 fps (from a 12" Contender).

Preferred jacketed bullets for hunting are the *old* 200 grain Nosler Ballistic Tip for deer/antelope (fortunately I have a stash of these older bullets), and the 250 Partition for elk. The 200 Speer shows excellent expansion at these velocities, but for some strange reason I just haven't been able to get it to group worth beans out of this gun. The 200 Hornady SP is a very accurate bullet, but a little on the hard side for these speeds (although it penetrates exceptionally well -- I ran one of these lengthwise, on the diagonal, completely through a large mule deer). The 200 Hornady FP (designed for the .33 Winchester) is both accurate and expands well, making an excellent hunting bullet, but is rumored to be discontinued and can be very hard to find. The .338 GEF has accounted for antelope, whitetail, mule deer and wild hogs, as well as a whole pile of smaller vermin (varmint hunting is a great way to fire-form brass!). Early experiences with this round were originally written up for HHI's *The Sixgunner* back in 1994.


The .338 GEF Contender (12" barrel) and a round loaded with the Nosler 200 grain Ballistic Tip.

I've been on a cast bullet kick for many years now. In recent years, a lot of my reloading efforts have been focused on sixguns and leverguns due to their natural affinity for the poured projectile. During a introspective moment, I was rolling a .338 GEF round through my fingers and idly reviewing its history and attributes -- short fat case, loaded to moderate pressures, works best with slower powders, moderate velocities -- when suddenly it hit me, this round should be an excellent fit for cast bullets! Back in '93, I had used the RCBS 200 grain GC-FP for fire-forming cases, but I hadn't done any systematic load development for the round as a cast bullet hunting round. It was time to correct this oversight.

Cast bullets:

When J.D. made this barrel for me, I had him Magnaport it, so plain-based cast bullets probably aren't going to work very well (PB bullets are damaged when they pass over the ports; the escaping gases etch the bullet's base, leading to asymmetric venting when the bullet leaves the muzzle, which in turn leads to excessive bullet yaw and poor accuracy). Gas-checked bullet handle ports just fine. This would be a gas-checked project.

Previous experience has shown that cast bullets can expand very nicely in the 1600-1800 fps range (depending on alloy), while cast HP's expand rapidly at 1500-1600 fps, and explosively at 1800 fps and above. As a result, for these bullets I was looking for loads in the 1600-1800 fps range, with the best possible accuracy. For the cast HP's, I was most interested in the lower end of this range, while for the solids, whatever gave me the best accuracy above 1600 fps (with suitable alloys) was my target.

I like lots of bearing surface on a cast bullet, so I had Dan Lynch of Mountain Molds (www.mountainmolds.com) make me a 230-235 grain GC-FP specifically to fit the throat of this gun. He very quickly turned the order around, and made me just what I asked for -- .340" diameter, 73% meplat, bearing surface the same length as the Nosler 250 grain Partition (what this throat was originally cut for), 3 beveled lube grooves and

an as-cast weight of 230 grains (232 checked and lubed, at a BHN of 13). In some ways, this bullet was inspired by the Hornady 200 grain FP profile, with a little bit of added weight for more penetration.

I stumbled across an old 2-cavity Lyman 33889 at Shapel's in Boise (sadly, Shapel's is now closed), and found that these GC-FP bullets weigh 258 grains after being checked and lubed. The Lyman 33889 was first mentioned in the 42nd edition of the Lyman Handbook, published in 1960, and was designed for the .338 Winchester Magnum cartridge. It's interesting to note that in the load data for the .338 Win Mag in the 43rd edition of the Lyman Handbook, they report loads from 1600 to 1900 fps, and mention that this bullet "Should prove very effective with hollow point." My fondness for cast hollow points is no secret. Another old Lyman 33889, this one a single-cavity mould, was obtained, and subjected to a little lathe work, and modified to drop HP bullets, with a .130” tapered HP cavity. These 33889 HP's ended up weighing 246 grains after being checked and lubed.

So I had 4 cast bullets to work with on this project -- the RCBS 33-200-GCFP, the Mountain Molds 235 grain GCFP, the 246 grain Lyman 33889 HP, and the 258 grain Lyman 33889. For initial load development, these bullets were cast to a BHN of about 13 (a little harder than typical WW alloy), checked with Hornady crimp-on GC's, sized .340" and lubed with my home-made Moly lube (equal parts by weight beeswax and automotive Moly grease).

Test loads:

The cast bullets used in these tests: (l-r) Lyman 33889 HP, Lyman 33889 GC-FP, RCBS 200 grain GC-FP, and the Mountain Molds 235 grain GC-FP.

RCBS 33-200-GC. I started off the .338 GEF project off back in 1993 with the RCBS 33-200-GC, as that was the bullet I originally used to fire-form the cases. Test loads with this bullet sized .338” using medium burning rifle powders (e.g. H4895, 3031, etc.) turned in lousy accuracy. So I turned to larger bullets (.340”) and slower powders. While these loads were significantly more accurate, they still weren't grouping as well as I had hoped for. The best of the lot was 49.0 grains of H414, which put 5 shots into 1 1/2" at 50 yards and generated 1766 fps. The other loads tested with this bullet were notably worse (generally 2 1/2" to 6" at 50 yards). I suspect that somewhat slower velocities might deliver better accuracy with this bullet.

Mountain Molds 235: In contrast, the Mountain Molds 235 grain FP consistently turned in good accuracy, and did its best when loaded over 44.5 grains of 4350, for over 1700 fps, putting 5 shots into just under an inch at 50 yards. This should make an excellent, deep-penetrating hunting load for deer, boar, black bear and elk in heavy timber and thick brush. Conveniently, this load shoots to almost exactly the same point of impact as the 200 grain Nosler Ballistic Tip load that this gun is typically sighted in for.

Lyman 33889 HP: I tried various loads that were targeting velocities in the 1700-1800 fps range, using faster powders like 4198 and 4895 (which had worked well for me with cast bullets in smaller Contender cartridges). In this case, the results were uniformly disappointing, with groups sometimes running 8" (or more) at 50 yards. Time to go back to the slower powders. Several combinations with various slow powders were tried, most of which gave acceptable accuracy, but real success with the 33889 HP was found with H4831. When the 33889 HP was loaded over 46.5 grains of H4831, the first 4 shots went into 1/2" (at 50 yards), with the 5th shot being a called flyer (high/left), that opened up the group up to just under an inch. Velocities consistently hovered right at 1600 fps -- a very comfortable and useful velocity for a cast HP. Once again, serendipity raised its head when this load was found to shoot to almost exactly the same point of impact as the 235 grain Mountain Molds FP load.

Lyman 33889: Overall, the Lyman 33889 wasn't as accurate as the HP version, but it did turn in a decent showing when paired with H4831 at 1600 fps (5 shots into 1 1/4" at 50 yards). Higher speeds were detrimental to accuracy. Once again, this load prints to the same point of impact as the other accurate cast bullet loads. A 258 grain .338" cast bullet at 1600 fps is a combination that I would expect to provide deep, deep penetration. This load could be particularly interesting with the bullet cast soft.

Now, for shooters that are mentally "calibrated" with jacketed bullets and the high velocities that they require to function properly, velocities of 1600-1700 fps might not sound all that impressive or interesting, but with a cast bullet, especially a cast HP, 1600 fps is a very useful velocity. We are no longer constrained by a hard metal jacket confining the soft metal core that we want to expand, and past experience has shown that a WW alloy cast bullet can mushroom at 1600 fps, and a cast HP will expand rapidly at 1600 fps. A bullet carries a certain amount of energy with it, some of that energy is used to crush meat and bone, and some of that energy is used to deform the bullet.

For a jacketed bullet, a lot of energy is consumed in deforming the relatively hard bullet. Therefore, higher velocities are necessary for optimum bullet expansion and performance. A cast bullet consumes less energy in bullet deformation, leaving more for tissue destruction. Therefore, in terms of wound characteristics, a similar level of performance can be obtained with cast bullets at lesser velocities simply because the bullets are more malleable (I'm not talking hard-cast bullets made out of linotype here, but rather bullets made of malleable alloys, below BHN 12). Yes, the trajectories of these slower bullets will be more curvaceous than higher velocity jacketed loads, but that's OK, I hunt with a handgun because I like getting "up close and personal" to shoot a critter. These loads suit me just fine.

Expansion testing: My standard testing procedure to see how handgun bullets expand in hunting loads is to fill a 2 liter plastic pop bottle with water, lay it on its side, and back it with a tightly packed "bale" of newspapers (about 6", tightly bound with duct tape so the bullet passes through the duct tape, leaving a permanent record of its diameter after water expansion), then shoot through the bottle lengthwise, into the newspaper. It's important to set things up such that the bale of papers is free to fall away with the shot, as this soaks up some of the momentum of the bullet and

commonly limits penetration to a few inches (for a “fixed” bale of papers, the bale needs to be MUCH thicker). The 2L water bottle provides a water bath of uniform thickness for bullet expansion, and the newspapers stop the expanded bullet, allowing for recovery and measurement (the dry newspaper is much harder on a bullet than is typical animal tissue, so expanded “petals” typically break off in this test, whereas they may or may not in a hunting situation). This is a simple test that provides a uniform, and easily reproducible, comparison of bullet expansion (after doing a number of these tests, it’s often possible to predict the degree of expansion of a bullet based simply on the reaction of the water bottle to the shot). While I make no claim that this test reproduces the exact degree of bullet expansion obtained when shooting game animals, experience has shown that bullets that expand in this test, expand on deer in the hunting fields, and bullets that don’t expand in this test, don’t expand on deer-sized game; a valuable starting point for the handgun hunter.

Performing this test with the Lyman 33889 HP at 1600 fps revealed rapid and reliable expansion. Bullets recovered from the newspapers looked like .38 wadcutters, with a bulbous nose. On average, the recovered 33889 HP's weighed 138 grains (56% weight retention). This is very typical behavior for a cast HP at these speeds, to expand down to the base of the cavity and then have the petals shear off, leaving a bulbous wadcutter to keep penetrating (similar to the respected Nosler Partition, both in terms of expansion behavior and retained weight). For medium-sized game, this provides for violent expansion, as well as for something to punch through the other side.

The Lyman 33889 HP, as-cast, and recovered after being expansion tested at 1600 fps.

Repeating these tests with the 235 grain Mountain Molds bullet revealed that it hit like a sledgehammer. When cast to a BHN of 13 and run at a muzzle velocity of 1700+ fps, expansion was limited judging from the .35 to .40 caliber holes punched in the duct tape. However penetration was excellent, as these bullets tore big, gaping holes all the way through the newspaper backstop (they weren't recovered as they all completely penetrated the test materials, even though the bale was free to fall away). When cast to a BHN of 9, significantly more expansion was observed from these bullets as the holes in the duct tape were now over 1/2” across. Recovered bullets had expanded back to the base of the ogive, and retained an average of 178.8 grains (75% of the original 238 grains). Thus, cast bullets can be tailored to provide rapid expansion with the cast HP, controlled mushrooming with the Mountain Molds FP cast soft (BHN = 9), and limited expansion, deep penetration with the Mountain Molds FP cast somewhat harder (BHN = 13). These results show in a nutshell how a bullet caster has the freedom to tailor a cast bullet’s expansion properties to fit his exact hunting needs and his own specific tastes.

Hunting stories:

The first cast bullet load I hunted with was the 33889 HP over 4350 (this was before I had done any load development H4831), and late doe season was fast approaching. I wanted to make sure that I introduced the bullet to the lands in a slow and gentle fashion, in order to extract the best accuracy possible from the loads, so I

started with 38.0 grains of 4350. Accuracy was reasonable, with 5-shot groups running about 1 1/4" at 50 yards. My chronograph was on the fritz that day, so I couldn't get any velocity readings, but recoil felt like it was more or less in the .44 Mag range, accuracy was decent, the gun was sighted in and late doe season would open in a couple of days. I decided to take that 33889 HP load hunting. That next Saturday morning found me in one of my favorite canyons on the Snake River in eastern Washington, overlooking several of the access trails leading into the canyon-bottom thickets that the local mule deer population use for cover. Around about 9:30 in the morning, a large mulie doe came in below me, along with a big-bodied 3x3 buck (where was he during buck season?). They were about 60 yards below me when the doe started acting nervous; she sensed danger, but couldn't tell where it was. The buck just stood stock-still and watched the doe go through her antics. She stomped and turned and fidgeted and walked nervously around in circles, looking over the brush and canyons, trying to find the danger that she sensed (i.e. me). She stopped, quartering away from me, and was clearly skittish and ready to bolt. I decided to take the shot. I lined up on the last rib on her right side and angled the cast HP through the heart/lung region, towards the far shoulder. At the shot, her head drooped and she trotted meekly into the thicket below her. I reloaded in case I needed to shoot again, and covered the spot where her trail came out of the far side of the thicket. She never came out. Halfway through, I heard her collapse in the dry leaves, slide downhill, kick twice, and then all was quiet. The cast HP had entered exactly where I had intended, raked the lungs and exited through the point of the far shoulder, after penetrating 30+" of mule deer. Based on the forensic evidence gleaned from the internal characteristics of the wound channel, the 33889 HP had expanded to approximately .45 caliber as it passed through her lungs. By the time it reached the far shoulder, most of its energy had been expended, as the exit wound was only about the size of a dime. She died seconds after impact and covered about 50 yards. There was very little blood-shot meat on the carcass. After the fact, I found out that this load was only generating about 1250 fps (which explains the lack of bloodshot meat), but even at this modest velocity, the 33889 HP had clearly expanded in a slow and controlled fashion. Encouraged by this level of performance at such modest velocity, I returned to the drawing board to work up faster, more accurate loads for this bullet, as well as other cast bullet designs (the results of that load development were summarized above).

I got the chance to exercise the fruits of this research a little while later. It was early March, and I spent a couple of days hunting hogs with some friends at Clover Creek Ranch in central Oregon. The night before our hunt, a storm moved in, the temperatures dropped and it started snowing. We only got a light dusting that night, but it started snowing harder the next morning. We went up to a high meadow with a creek running through it (right next to a broken down bulldozer), where we had seen lots of animals on our last visit, but there was no sign of any animal activity whatsoever. We continued up to the big pasture on top. The pond was full, and frozen over, but there were no tracks in the snow, nor any evidence of any critters trying to break through the ice to get a drink. We headed back downhill to the shelter of a large bowl-shaped basin that was protected from the wind, and found animal sign right away. We found an old, fat spotted sow, who easily weighed 600 lbs (or more). We were able to sneak up to within about 20 yards of her, but eventually we all chose to pass her by (we were looking for meat hogs in the 200-300 lb range). My hunting partners found a

small group of Russian hogs that they followed, but were never able to get a shot. I moved down towards the water hole at the bottom of the bowl and found a nice 250 lb black boar rooting in the mud (the snow was melting, and based on the amount of upturned soil, the mud must have smelled really good... well, to a pig anyway). I snuck up on him, using a line of junipers as cover, and then got down on my hands and knees and crawled up to the last couple of trees and laid down in the snow. I was shooting from the roll-over prone position (the only way I could get a clear shot past the low-hanging juniper branches). The black boar was about 40 yards away, but the presentation was not good, so I laid there in the snow while he rooted around, and waited for him to give me a better presentation. After about 10 minutes, he did, and I shot him through both lungs using the Lyman 33889 HP/H4831 load. He gave no visible reaction to the shot, he just turned and trotted directly away from me for about 15 feet, then staggered for a step or two, fell over, and rolled back downhill, towards me. There was a large geyser of pink frothy blood coming out of his right (i.e. exit) side, so I knew that he was lung shot, and that the cast HP had expanded well and exited, even before I got up out of the snow. The entrance wound was a .338 caliber hole and only had a small circle of bloodshot meat around it (about the size of a nickel). Both lungs had a hole through them about the size of a quarter, with about 6" of severely bloodshot lung tissue around the hole. The far side of the ribcage had an irregularly shaped hole through it, roughly the size of a half dollar, and the exit hole through that tough pigskin was about the size of a quarter. While there was some bloodshot meat in the far side ribcage (5-6“, the expanded bullet hit two ribs on the way out), there was notably less than I’m used to seeing with higher velocity jacketed loads. The Lyman 33889 HP at 1600 fps had done everything that could possibly be asked of it. I guess that's why I like cast HP's so much.

Expansion of the Lyman 33889 HP at 1600 was excellent, and killed this hog quickly.

It was satisfying to learn that my pet wildcat was such a good home for cast bullets. Cast bullets provide a great deal of versatility for the handgun hunter. The cast HP can be counted on to provide rapid expansion at 1600 fps, which can be very useful when hunting medium game. Traditional solid cast bullets can provide controlled expansion when cast to intermediate hardness (BHN of 9 or 10) and launched at velocities of 1600-1700 fps. When cast a little harder (e.g. BHN = 13), these same bullets can deliver limited expansion and very deep penetration. Thus, the bullet caster has the freedom to tailor the bullet’s expansion properties to fit his exact hunting needs and his own specific tastes. This is particularly valuable when a bullet manufacturer re-formulates or discontinues a shooter's favorite bullet design. This ability to tailor a cast bullet's expansion properties isn’t something that just holds true for Contender-based wildcats, but is a general truth for all cast bullet hunting loads, handgun or rifle. You might consider working up some cast bullet loads for your favorite Contender round. Taking game using bullets that one has tailored specifically for the cartridge and the quarry can be a very rewarding facet of handgun hunting.

- Glen E. Fryxell

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Glen E. Fryxell Article Index

Cast bullet loading data for the .338 GEF

Cases:	Fire-formed W-W .356 Winchester cases
Primers:	WLR, unless otherwise noted
Bullets:	BHN 13, sized .340"
Lube:	Homemade Moly lube (50/50 by weight beeswax and automotive Moly grease)
Gas Check:	Hornady crimp-on

RCBS 33-200 GC-FP - 210 Grains

Powder	Charge	Velocity	Comments:
H4831	50.0	1770 fps	Poor
IMR 4350	46.5	About 1750?	2" @ 50 yds.
H414	49.0	1766 fps	Decent accuracy
H380	46.0	1850 fps	Wild - 6" @ 50 yds.

Mountain Molds GC-FP - 232 Grains

Powder	Charge	Velocity	Comments:
H4831	46.7	1622 fps	Accurate - 1” @ 50 yds.
IMR 4350	44.5	1712 fps	Very accurate - 3/4" @ 50 yds.
IMR 4350	46.0	1760 fps	Poor - 2-3" @ 50 yds.
H414	46.0	1612 fps	1 1/4" @ 50 yds.

Lyman 33889 GC-HP - 246 Grains

Powder	Charge	Velocity	Comments:
H4831	45.0	1556 fps	Marginal - 2" @ 50 yds.
H4831	46.5	1595 fps	VERY accurate! 4 into 1/2". Called flyer opened group to 1"
IMR 4350	44.5	1655 fps	4 into 1" with an un-called flyer
H414	46.0	1702 fps	Poor

Lyman 33889 GC-FP - 258 Grains

Powder	Charge	Velocity	Comments:
H4831	46.7	1595 fps	1 1/4” @ 50 yds.
IMR 4350	44.0	1663 fps	Poor - 3" @ 50 yds.
H414	46.0	1675 fps	So-So accuracy, very clean