How to cast bullets and other tidbits …

I know, so much has been written about casting bullets that there is nothing new to even try putting on paper. I do not believe this. Every session is a learning experience. I have a friend that will set up two twenty-pound furnaces; four or five moulds and cast for seven straight hours. He will make maxi-balls, round balls and Minie balls by the thousands. I can close my eyes and pick any ball or bullet from his piles for inspection. There is not a single one that I would waste powder shooting. My friend considers it unimportant that his bullets are not perfect, as he does not think cast projectiles are accurate even if they are perfect. I have heard this for years; many of my friends call them grease balls.

To set the record straight, throughout history, lead bullets and balls have proven as good or better then jacketed bullets. The penetration, killing power and accuracy can be awesome. I do not understand the move to sabots and light pistol bullets in muzzle- loaders. The guns are for close range hunting such as our forefathers had to endure. Why stretch the killing distance during a primitive season, when there are so many modern rifle seasons to go for the long- range shots? Of course there are many hunters that shoot whitetails in the woods at the astounding distance of forty yards with .300 magnums. My god, are those deer tough. Along this line of thought, I guess these hunters need magnum muzzleloaders with 150 grains of powder and light, fast pistol bullets. I only wonder what is wrong with a big hunk of lead. I have killed large deer at 50 yards with a big round ball from my .54 cal. Hawken that showed as much tissue damage as any .300 magnum.

How much accuracy can we expect from a cast bullet? From the above-mentioned Hawken, I can shoot five shots into a cloverleaf with all holes touching at 50 yards. With the proper sight setting, I have hit very small targets at 200 yards. Years ago, I owned an 1892 marlin in .25-20 cal and a model 71 Winchester .348 that with cast bullets would shoot one inch or smaller groups at 100 yards, with open sights. Now I hunt with two Ruger .44 magnums. A Super Redhawk and a Super Blackhawks. With these I use the 320-grain LBT wide long nose gas check bullets. Shooting from sandbags at 50 yards, I have shot many five shot, one-inch groups. Several seasons ago I put my .45 Colt Vaquero up against deer, using both the LBT 335 grain and a bullet from Lyman’s mould number 452651, that should weigh 325 grains, but falls from my mould at 347 grains because of my alloy. Believe it or not, I shot one inch groups at fifty yards from this Vaquero with both bullets and even had several this size at 75 yd’s. The LBT landing one and one-half inches left of center and the Lyman one and one- half inches right of center. I shot these groups Creedmoor with the barrel against the side of my leg. I shot a large doe at 40 yards with the Lyman bullet with excellent results. I also shot a doe with the LBT bullet at 32 yards that only went 20 yards. The best was a 100 yard off hand shot that dropped a large doe in her tracks. All the above bullets from these three guns are shot using 21.5 grains of WW 296 powder and Federal 210 standard primers. Want to open groups to three inches? Use magnum primers. I have since expanded my revolver collection to include the BFR 45-70 and .475. Both of these have shot groups under one inch at 50 and 100 yd’s with cast bullets. Many deer have fallen from them.

I know, you will think I spend hours weighing each bullet to a tenth of a grain, inspecting each under a magnifying glass and handling each so they do not touch each other. Let’s get real. I just cast and hand lubed 30 pounds of bullets, do you think I am going to sit and put each one on the scale? I glance at each as I lube it to make sure the base is filled out and there are no chunks of slag on the sides, that’s it! Look at it this way; imagine sitting by a fire while casting enough bullets to shoot buffalo out to 1000 yards the next day. Moving into your tent or shelter to load bullets by an oil lamp or candle, would you weigh each of these bullets on a scale? Casting skill is what counts.

All inspecting of bullets is done as I open the mould. If the base is not filled, I drop that bullet into the sprue can and correct the problem so the rest of the bullets fill out. If I notice wrinkles, this bullet will also be re-melted. After the bullets go on the casting pad, my reject rate will range from zero when using the Rapine mould, to two or three using the Hoch or other cast iron mould. Now that I have gone to the mold furnace, I can get the first perfect. I flux often and keep the ladle and pot as clean as possible. The spout on the ladle has to be kept open and free of slag. Never stir the lead with the ladle. Use a spoon with a long wood handle riveted on. Keep the nose of the ladle out of the lead.

I start with the basics. I use Rapine Mould Prep on my moulds. I have also had good results with a dry moly or graphite lubricant spray. Smoking the mold will work but does not last as long. Keep the mould clean all during the casting session. It should not have any lead splatters on the outside, lead hanging over the sides and most important, no splatters between the blocks. Every now and then, touch some beeswax or paraffin to the sprue cutter screw and handle hinge pin.
What is the secret to getting perfect bullets all the time, every time, for the entire casting session?

**Temperature and the speed used during casting!** Yes, it is that easy. Each alloy needs a different temperature. As we approach pure lead, such as a 1-10 tin to lead mix, up to pure for muzzle- loaders, the lead must be hotter. Between 800 and 900 degrees allows the lead to flow into the mould and fill it to perfection. The more alloy added, such as antimony and tin, the less heat is needed. I judge this by a frosted appearance on the bullet. This requires that I turn down the heat. This is not real critical, but in all cases, hotter is better. This is where the biggest problem that you will encounter can show it’s ugly face, furnaces that do not reach the temperature your alloy requires. My Lyman pot is 45 years old and still works but I had to short out the thermostat and use a voltage control to maintain temperature. I bought a new Lee 20 pound pot and it works great. It has a remote thermostat that is not subject to full pot heat. That is where my friend had trouble. None of his pots would get hot enough.

Plug in the pot and lay the mould on the edge to absorb heat while the lead melts. I made a little mold furnace that sits on a hot plate to bring the temperature to 500 degrees and it works better to get the first bullet perfect. Let the melt come all the way to the set temperature before trying the first bullet. If the first one is not filled out, the mould is still too cold. Remember that propane torch? Turn it on and gently play the flame all around the mould. Do not heat it in one place, but keep the flame moving to all sides. Hold it for a second to let the heat stabilize and try another bullet. Not hot enough? Heat it a little more until the bullet is perfect. This is where the little furnace works better so the first bullet is good. Pre heating the mold has allowed me to empty the pot without a single reject. Now the thing to do is to cast at a rate so the mould does not get cold.

How fast is that? It is much slower then you think. The ladle was put in the lead right after fluxing to bring it to temperature. Fill the ladle with as much as it will hold without spilling when tipped with the mould. With the mould on its side, place the spout of the ladle against the sprue plate and slowly rotate to the upright position. Now hold it there! For a large or long bullet, it has to be held long enough to allow the cooling, shrinking lead in the mould to make room for more lead to flow from the ladle. Large, heavy bullets need more hold time. You do not want the bullet to pull from the sprue, only from the molten lead in the ladle. Tilt off the ladle to allow a good puddle to form on the top of the mould. Now wait at least six more seconds after the puddle on top of the mould solidifies before cutting the sprue. If the sprue shrinks with a depression in it, you did not hold the ladle on long enough and the bullet is pulling from the sprue. Now is the time to inspect the bullet. As soon as the sprue plate swings away, look at the base of the bullet. If there is a pit, you cut too soon and tore the lead out. If there is smeared lead, you cut way too soon. The spire should be cut with light taps, not one hard cut. If all is well, drop the bullet on the pad or in cold water to cool. If the base is not filled, adjust the heat of the mould or the lead temperature for a perfect bullet. Once your rhythm meets the requirements of maintaining the temperature and also filling the mould, no more will need be done with your bullets except to apply lube and load.

Some touch the sprue plate or the bottom of the mold to a cold, wet rag to speed casting. I don’t like to take the chance of warping any part of the mold to get an extra bullet. To cool my mold to the right cutting point, I do something many laugh at. I swing the mold four to five swings and cut the spire. I don’t have to count or watch anything because the swings are my timing. I never try to speed things up so I can get twice as many bullets cast and then have to weigh and inspect all of them only to toss half back in the pot. The added work will more then double the time spent making the bullets. I don’t like to stop and clean lead from the underside of the sprue plate or the top of the blocks either. Any advantage with numbers by working fast is wasted somewhere.

I have tried many, many times to fill my moulds from the bottom pour spout on my furnace. Every setting and technique was tried to no avail. I never, ever cast a good bullet from the bottom spout. Much more time can be wasted trying to keep slag cleaned out of the bottom pour spout. Perhaps some of you can and get acceptable bullets. I can’t, so I removed the parts and plugged the bottom hole. I now have more room for the ladle.

The only place for speed is when fluxing. Fill the mould with a bullet and set it on a block of hardwood or across something to keep it off of metal that would suck off heat. Take out the ladle and drop in some wax. Stir it around to full depth of the pot and clean the surface with the spoon. Drop the bullet from the mould and start again. I still get a perfect bullet with the next pour because the bullet left in the mold keeps it hot for the few seconds it takes to clean the pot and ladle.

A caution to protect the mold is never over tighten the screws that hold the handle to the blocks. Just snug them a little. I have seen molds bent by applying force to the screws. There is not much metal in that area considering the slot for the handle and the cavity.
About moulds

I have a bunch of moulds from every maker and a bunch that I have made. The problem with the ones from large companies such as Lyman, RCBS and Lee is that they do not always fit the bore size of certain guns. They are only offered in set sizes. Very seldom do these moulds really cast bullets to the size listed, due to the fact that as the cherries dull and are re-sharpened, the bullet will be smaller then the first bullets cut from this cherry. If your bore or throat is a standard diameter, all of the above are wonderful moulds. To fit a bullet to the bore or revolver cylinder throat that is out of limits calls for a custom mould. Rapine and Dave Farmer from Colorado Shooter’s Supply will fit a bullet to any gun made. There are others that make great moulds, to be sure, but I am not familiar with them.

You can increase the bullet size a little by casting hotter. The mold expands more. By using a harder alloy, bullets will expand with time also.

Both of my Ruger .44 magnums have .430 bores measured groove to groove. The cylinder throats measure .432. They shoot great with .430 diameter bullets. The most accurate in these particular guns are Hornady’s 240 and 300 grain XTP’s with 24 and 20.5 grains of WW 296 respectively and the LBT 320 grain wide long nose gas check bullets with 21.5 grains of 296. The Lee 310 gr. bullet is accurate at .431” with the same load. Even though it is better to use throat size bullets, it has not been detrimental in this gun so you have to try what you have first before buying another mold.

My Vaquero in .45 Long Colt was another story. XTP’s gave me three to five inch groups at 25 yards. Cast bullets were worse. I measured the throats to find they were .003” smaller then the .452 bore size. When I purchased my Lyman mould for the 325 grain bullet, I found that I could not get a loaded round into the cylinder. I lapped out the throats so that these bullets would just fit through them. The results were tremendous. As I said before, I shot one-inch groups at 50 yards and farther. I had occasion to measure several other Ruger .45 Colts and found each one had throats smaller then the bore. Why do they do this for this one caliber and make the rest okay is beyond my comprehension. More then once I have watched a .45 Ruger shooter spray the entire backstop at the range. Let me repeat here that the use of magnum primers has doubled or tripled the group sizes in these two calibers, the .44 and .45, every time. I know why, but that’s another story for a future article.

My Browning .45-70 also gave me fits. A friend sold me several moulds that cast .458 bullets. Three to five inch groups were the best I could do. I could not figure out why it would not do better. I then pushed a .458 bullet through only to find that there were no marks from the bottom of the grooves on the bullet. I made a chamber cast and a muzzle cast, using Cerro safe. After letting the casts stabilize, I got weird measurements so I never use the stuff anymore. I found the bore was really .4593” groove to groove and .450 land to land by expanding a slug in the bore. After switching to .461 bullets with a .450 nose diameter, they did better. Now I am playing with a .464” bullet. I am fitting the bullet to the chamber instead of the throat.

Muzzleloaders need tight balls for the best accuracy also. The best is to fit the ball to the bore size. .540 for the .54, .450 for the .45, .500 for the .50 and so on. .010-patch material is the right thickness for these. If the ball sizes are reduced to .535, .445 and .495 respectively, .020” patches must be used. This size is hard to find, so .015 patches will be good enough for hunting. This size is also easier to get in the muzzle. I find that the patch must engrave the ball .005” on each side of the ball from the grooves. Thompson Center recommended smaller balls and thin patches for easy loading. I did not find these sizes accurate in my TC Hawken or any other round ball rifle. After these smaller ball moulds were being purchased, Lyman and other companies dropped the bore size balls for lack of sales. This is very sad for the majority of us black powder shooters who still think that accuracy is paramount. The only way to get the proper moulds for round balls in most cases is to buy custom moulds.

It is a proven fact that an undersize bullet or ball will be bumped up to fit the bore when black powder is loaded behind it. This is due to the quick pressure rise of black powder. However, in no case has this proven to be accurate in any gun. Not even the rifles that use Minie balls, which were designed to expand to fill the bore. Using Minie balls that are a press fit in the muzzle will dramatically reduce groups. I have no explanation for this. My thoughts are that the quick pressure spike will push one side of the projectile ahead of the other side, or bend the bullet in some way to destroy accuracy.

I have never found “bump up” to be accurate in any gun, whether black powder or smokeless.

Final puzzle

From the early days of my experience with muzzle- loaders, I measured my powder with the standard volumetric measure. One day after purchasing my Pact chronograph, I set out to shoot black powder loads measured
to less then one tenth of a grain. These must shoot better then just dumping powder into a tube! Boy did this open my
eyes. The groups were horrible. Velocity spread, standard deviation and average velocity readings were out of sight.
Switching back to the powder measure shrunk everything back to normal. What is even more confusing is that the
black powder cartridge rifle demands powder charges weighed on a scale. This is a total mystery and the best reason
to experiment and try everything before forming an ironclad opinion. I can only attribute this to needing even
compression.

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