

The 45 ACP is one of the most widely used pistol cartridges. It rules NRA 2700 target competitions, is still shooting in all the practical pistol leagues and clears a pin table with authority. For some competitions it is the only choice and for others it is a good choice. Naturally it is also one of the most reloaded pistol cartridges. With 100 years of development, the big, low pressure 45 ACP is easy to load and friendly to cast bullets. However loading high quality match ammunition with cast bullets takes extra effort.

Jacketed bullets provide a useful accuracy standard

The standard factory target load is a 185 grain short nose jacketed open base wadcutter at ~800 fps. It is a good load but perhaps not the best.

I shot beside the US Marine Corps team in civilian matches after I was discharged from the Marines. The USMC pistol team did extensive testing in the 1970's to determine the best match 45 load possible. They determined best accuracy was obtained with a hollow point bullet instead of the standard open base wadcutter.

The USMC match load was:

New primed Winchester cases checked for length, trimmed if needed.

Cases full length sized, mouth expanded to just accept the bullet.

Nosler 185 grain hollow point

4.1 grains Vihtavuori N310 powder

Seated to 1.200 OAL and taper crimped.

This load gives 770 to 830 fps. In tight match barrels with minimum chamber dimensions.

Groups were under 2" at 50 yards in all the team guns. The only adjustment was the recoil spring weight to give perfect functioning in each gun.

The Nosler bullet is superb, you can buy this bullet in Nosler ammunition. Nosler loads it to 980 fps which will make major power factor. Today more ammo is consumed in run and gun competitions which require major power than in bullseye shooting. Custom ammunition makers are supplying the USMC match load.

Enough about jacketed bullets, I could not afford to shoot them all the time. They are useful to me as an accuracy standard when load testing or pistol testing.

Check your pistol:

Before you load cast bullets you need to check your pistol. Fire factory match loads off a rest with an optical sight or on a machine rest. A good 45 match pistol should shoot in the 2s with no groups over 3" at 50 yards in no wind conditions. A pistol and ammo combo which shoots in the 1's is to be prized, however maintaining this level of accuracy is difficult, as a pistol is shot it will wear and groups will increase. In a regular production 45 you can expect to equal the grouping of jacketed bullets with carefully loaded cast bullets.

Barrel groove diameter:

Match 45 barrels should be 0.4510 – 0.4515 groove diameter. I have found cast bullets 0.001 over groove diameter work best, so I size bullets 0.452. This is not definite, other shooters use

0.451 bullets in 0.451 barrels and get good results. The only thing you must NOT do is have the bullet under groove diameter.

Many shooters use jacketed bullets and very few will use a Ransom Rest. Run and gun matches do not require the accuracy of bullseye shooting, so some manufacturers have gotten sloppy and barrels 0.452 and even 0.453 groove diameter are sold. With some combinations of case wall thickness and chamber dimensions, cast bullets larger than 0.452 will make the rounds too large to chamber. Barrel replacement may be required.

Headspace:

Consistent minimum headspace was one of the secrets of the phenomenal accuracy of the USMC team pistols. Minimum length match chambers were complemented by brass trimmed to a length to minimize headspace. You can easily measure the headspace in your pistol. Put an empty case in the chamber and measure the distance between the breech face and the cartridge base, the sum of the case length and the feeler gage is the headspace. A good match barrel installation should be close to minimum headspace.

Headspace is not inconsequential! Cast bullets are more sensitive to headspace than jacketed bullets. In my tests using cast bullets in match loads, headspace over 0.005 gave larger groups and headspace over 0.010 could add 50% to the group size. SAMMI 45 ACP case dimensions are 0.888 min – 0.898 max and chamber specs are 0.898 min and 0.920 max, so a maximum cartridge will fit in a minimum chamber. Maximum headspace in 45 ACP is 0.022, which is very detrimental to cast bullet accuracy and does not help jacketed bullets.

Recoil Spring:

The recoil spring must match the load used. Do not cut the factory spring to do this! Recoil springs are inexpensive and available in consecutive powers. A correct spring gives maximum reliability, minimum gun wear and is most comfortable to shoot. You should be using a recoil buffer on the spring guide. Buffers are cheap, frames are expensive!

Clean the barrel

If your pistol has fired jacketed bullets, clean the barrel with a good copper removal solvent like Sweet's 7.62.

Magazines!!

I should not have to say this, but I have observed shooters with expensive match grade guns using WWII surplus magazines. Magazines affect reliability and accuracy. Improper feed angle caused by the magazine can damage cast bullets. Wadcutter bullets require good magazines.

Ok, your pistol is ready, now we need ammunition.

Brass:

Should be single maker, single lot.

I have tried Winchester, Remington and Starline, all are OK. I avoid military brass and cheap commercial brass. Cannelures lead to early case failures. I use good quality brass cases with no

cannelure. Some shooters use military match brass, it is good stuff if you can get enough of a single lot to make it worthwhile.

It would be nice to be able to sort out maximum length cases for use in match ammo. Measuring case length will be an eye opener. Do not measure fired cases, they are shorter! Measure sized cases. Case lengths may be variable and usually well short of maximum. You may even find some under minimum length, I have never found one over maximum. Taper crimping is tolerant of small case length variations, so good commercial cases of single lot can usually be used without trimming for cast loads.

Keep your case lots separate, cases should be fired the same number of times. Once the first case mouth crack appears, the entire lot should be scrapped. Case mouths which crack on firing cause severe fliers.

Do not chamfer the case mouth! This is a carryover from the poor practice of seating and crimping at the same time. Chamfering will decrease bullet setback resistance and causes early mouth cracking. The case mouth should be belled to accept 1/32 inch (0.8 mm) of the bullet.

Primers should be seated by feel, below flush. Primers seated to "just flush" can add 30% to the group size over properly seated primers. Some progressive loaders do a poor job of primer seating. Most primer seating systems do not hold the case straight, by rotating the case 180 degrees and reapplying seating pressure, a good job of primer seating can be done with most tools.

Cast bullet types:

45 ACP cast bullet designs come in two types: head spacing and non-head spacing. A non-head spacing design headspaces on the case mouth, just like commercial cast ammo and jacketed bullets. Head spacing designs have a full diameter step or full diameter front band which can allow the cartridge to headspace on the bullet.

Lyman #452324 is a cast copy of a jacketed bullet, as is the Lee 452-288-1R both are non-headspacing. The ogive will give variable sized length with the slight variations in cast diameter, this cannot be tolerated in zero headspace seating.

RCBS 45-230-RN has a headspace shoulder it is a 0.010 step to the ogive. The RCBS bullet can be seated out to headspace on the bullet shoulder. Semi-wadcutter target bullets can headspace on the front band.



LEE 45 and RCBS 45

There are two popular semi-wadcutter designs for the 45. One is the long nose 200 grain Hensley and Gibbs # 68 and the other is the 185 grain Hensley and Gibbs 130. These basic designs are offered by most mold makers and commercial casters because of their popularity. The designs by different makers may have slightly different dimensions and groove configurations but the basic designs are similar.



H&G 68, H&G 130 and jacketed copies, and Nosler 185 HP

The #68 type has the advantage of being able to feed in most stock pistols without modification. It also cuts the cleanest hole in the target. Disadvantages are the heavier weight and limited headspace length.

The #130 type has the advantage of slightly less weight which gives less recoil. The short nose provides a wider range for headspace seating in pistols with long chamber throats. Disadvantages are the ragged target hole and the need for a smooth, wide feed ramp for 100% feeding.

The ragged holes vs clean holes argument has been with us ever since we started shooting at paper. The magnifying plugs used at matches are very good for evaluating ragged holes. The Marines gave up on clean holes because a 0.1 inch decrease in average group size is worth more points than clean holes. Nevertheless, it is hard to convince a shooter when he/she sees a 9 that a "bigger" hole might have made a 10, that clean holes are not of paramount importance.

Molds:

Excessive sizing destroys accuracy and diameter variation also destroys accuracy. It would be nice to be able to cast bullets to the exact diameter needed with zero diameter variation. However this is the real world and variation exists. We need consistent bullet diameter, so sizing is needed. I want a mold to cast 0.001 over the sizing diameter and not over 0.002. This requires a custom mold and the maker needs to know which alloy you will use.

Alloy:

The 45 ACP is a low pressure round and target ammunition is at the low end of the pressure range. The low pressure permits the use of BHN 8-10 alloy, however feeding in pistols is better

with harder bullets, I have found BHN 18 alloy to work well. Some shooters use linotype alloy, which casts excellently, but is expensive.

Bullet lube:

The 45 ACP does not place great demands on the bullet lube. I have tried at least two dozen. All the commercial lubes I tested were OK. Alox 50/50, LBT Blue, Lyman Orange Magic work fine. The unknown lube on commercial cast bullets was OK. Several homemade lubes were OK, but many were poor. Stick with a commercial lube unless you enjoy experimenting.

I have tried Orange Magic as a melt-on lube, thin coating the entire bullet and also filling the lube groove. Accuracy was good either way.

Liquid Alox was OK, but starting with a clean barrel, Liquid Alox took 10 rounds to settle down. This is an important consideration as the 50 yard line is the first stage in a match.

With any lube coating the entire bullet, you need to clean the noses of the loaded rounds with a rag and mineral spirits or it will gunk up your gun and magazine. You are going to have to size the bullets, so I lube in a lub-sizer.

Quality bullets:

You can buy quality cast bullets. I know several Expert Class shooters and some Masters who load commercial cast bullets. I have run the commercial bullets they use through my quality control and they are very good. If you buy commercial cast bullets you **MUST** do quality control and visually inspect each bullet. Lots can differ, check the diameter and weigh a few to check consistency. Commercial cast bullets are usually BHN 18 which I have found is ideal for 45 ACP in pistols. Commercial cast bullets are a good way to test bullet designs before you spend money on molds.

You can cast better quality cast bullets yourself. However this requires excellent casting and dedicated quality control. There is plenty of information elsewhere on how to do this on this, way too much for this article.

The Load:

The load should give ~ 800 fps. About 4.2 grains Bullseye or 4.8 grains 231 will do this. Many shooters think a particular powder is important. I have not seen this, in my experience velocity variation and average load velocity are the most important factors. You want velocity variation (standard deviation) to be as low as possible. In my limited experience, match guns can have a velocity preference. If 825 fps gives best accuracy with Bullseye, adjusting 231 to give 825 fps will also shoot well. Different lots of powder can give ± 50 fps and a chronograph can be a big help in adjusting quickly to best accuracy.

Many shooters load lighter loads for the 25 yard line, some shoot 600-700 fps loads the entire match to limit recoil. I have used 3 grains of Bullseye and 185 grain bullets to get absolute minimum recoil. Some clubs do not have a 50 yard range and use the reduced B-18 target for slow fire at 25 yards. Light loads can work well at 25 yards, however 50 yards requires more

velocity for best accuracy.

One solution is to use one load for 50 yards and a lighter load for 25, some shooters even use different bullets. Using light loads at 25 yards and heavy loads at 50 yards requires a recoil spring correct for the light load. I was using a new recoil buffer every match. Light loads give greater velocity variation, and do not burn clean. The pistol may fail to function as it gets dirty late in a match.

Increased ignition time and longer barrel time are factors which do not show up in Ransom Rest or bench rest testing. I think the longer time for bullet exit makes low velocity loads much harder to shoot than people realize.

Seating cast bullets:

This is where maximum accuracy is realized with cast bullets in pistols. Headspace on the bullet means the ammunition is **pistol specific** as the overall length and position of the step or front band is set for an individual pistol.

The carbide sizer should minimally size the brass, this is important to brass life, not accuracy. The expansion die should be 0.451 for 0.452 bullets and as long as the bullet seating depth. The former decreases the chance of bullet base damage and the latter increases the resistance to bullet set back. The seating die should allow the case to enter full length, just touching the mouth bell. The bell must not be closed in the seating die! The seating stem should match the bullet, for RCBS dies you can send the stem and sample bullets and they will machine a perfect match in the stem.



. H&G 68 and custom seater punch

The crimp die should have minimum dimensions. The LEE factory crimp die will taper crimp, I already had an excellent crimp die so I have not tested the LEE die against it.

Seat dummies with no powder deeper until headspace is zero on slow, by-hand chambering with no recoil spring in the pistol.

Adjust the separate taper crimp die to remove the bell and close the case mouth to 0.003 to 0.005 under the loaded case diameter. This will vary with bullet size and case wall thickness.

Check to see if the rounds will eject.

Check to see if they will fit in the magazine and feed.

Check for bullet set back, apply 50 pounds pressure for 30 seconds, bullets must not move. In the final station, use a LEE factory crimp die with the crimp collar removed. Any rounds excessively sized by the LEE die have thick case walls and are rejected, used for plinking and thrown away.

Load 100 and check function, velocity and accuracy.

Now you can load 4000 for the match season and practice.

Things which I have found of little importance.

There is lots of room for argument here, some of these procedures are dear to many shooters. With 2" fifty yard groups, some things important to sub 1" 100 yard rifle groups simply do not matter. I have not found any negative effects except for time and effort wasted. If I cannot show a statistical difference in group size when comparing 10 x 10 shot groups, I am not going to spend time on it.

Trimming cases:

I would rather sort cases for length, or select a lot with small length variation than spend the time trimming. Even with 0.010 case length variation I was unable to detect accuracy differences if the rounds headspaced on the bullet.

Match quality dies:

Some manufacturers add a micrometer to their dies and call them "match" dies. Adding a micrometer to the seating die is useless unless the dimensions of the dies are correct. The micrometer is nice if you frequently change die settings, which I seldom do.

Roll crimping:

In order to roll crimp the cases must all be exactly the same length. Excessive roll crimp enlarged groups, insufficient crimp did not prevent bullet set back. Variation in roll crimp was difficult to avoid. When extreme care was taken to avoid variation, roll crimping provided no advantage.

Measuring case wall thickness:

Because of the manufacturing process, some case wall variation is always present. Even in a lot of otherwise excellent quality, some thick wall cases may exist. I depend on the Lee factory crimp die to detect these.

Gaging loaded rounds

I used to run all my match ammunition thru a chamber gauge by hand. The Lee factory crimp die has eliminated this time consuming step.

Polishing cases

Highly polished cases are supposed to give less friction and feed better. I am talking about liquid polishing processes which give brass cases a mirror finish. I have not seen any feeding deficits using brass tumble cleaned in dry media.

Cleaning primer pockets

My case cleaning removes some of the residue in the primer pocket. Residue does not increase with subsequent loadings.

Primer pocket uniforming, reaming flash holes:

I have a very nice carbide primer pocket uniformer. It has not been used in years. Primer pocket uniforming and reaming flash holes is a waste of time if brass quality is good. If you need to uniform the primer pockets, or ream flash holes, perhaps you need to buy better brass.

Brand of primer

Any regular primer is OK. Magnum types increased dispersion, this appeared to be because of increased velocity. Reducing the charge to give the same velocity gave equivalent accuracy to the standard primer. Magnum primers might help with light 600-700 fps loads, but I have not tested this.

Weighing each bullet

A waste of time if casting is correct, uniform, and visual inspection is careful. Yes, one bullet in thousands may have a hidden internal void. Is it worth the time? Only you can answer that question. Some shooters weigh bullets for slow fire.

Nose first sizing

If the alignment in your lube sizer is OK use it. If not, size the bullets nose first, then lubricate them base first in a die 0.001 larger.

Powder type:

Use any fast, fine grain powder to give the desired velocity and precise measurement. Bullseye and 231 are used by ~90% of shooters. The other 10% use ten other powders and swear by them, if you want to try low velocity loads, Whitavouri 310 burns clean in light charges and gave low velocity spreads.

Weighing powder charges

Your measure should be made specifically for small charges and capable of less than ± 0.05 grain precision. If so weighing changes is not needed.

Precision pistol shooting is a mind game, confidence in your pistol and ammunition is important. If some of my "of little importance" factors are necessary to give you confidence in your ammunition, then they are important!

Steve Hurst