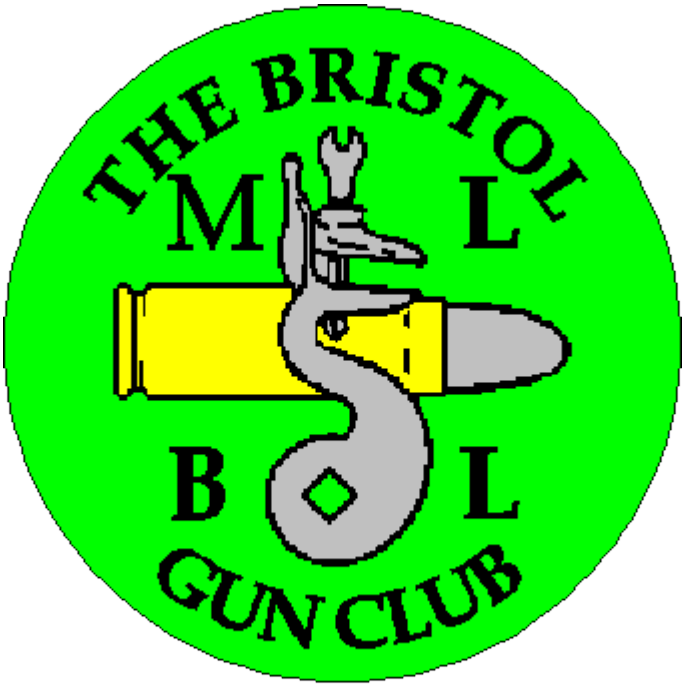


BRISTOL MUZZLE AND BREACH LOADING GUN CLUB

HANDLOADING COURSE

Home loading your own ammunition is a rewarding part of shooting and will extend your knowledge of the sport. If carried out correctly it can give you better and more consistent results then shop brought ammunition as it can be tailored for your own firearm. If carried out incorrectly it can be dangerous not only to yourself but fellow shooters close to you, it can also damage a firearm beyond repair

This course is designed to teach you the basics of hand loading **safely** having mastered the basics you can then move on to producing ammunition tailored for you own firearms

So why handload, as explained above one reason is to produce ammunition suited to your individual firearm another is cost after the initial outlay ammunition can often be produced cheaper then shop brought ammunition, but not always, another reason is availability of ammunition some less popular calibres can be hard to source and hand loading ammunition may be the best or only option.

Before deciding on what to buy take a few minutes to consider the location of your reloading area and reloading bench and what you are going to use as a re loading bench

safety

choose a location you will not be disturbed while working do not reload if tired or ill

Get into a set routine when reloading to avoid mistakes

Always keep a record of the powder, powder weight, bullets and primes used place a label on the box

When primming ware safety glasses

store powder in a locked wooden box, keep out only as mush powder as you need

Dispose of spilt power around the roses on a wet day

Kill primers with oil

Always start low when selecting a starting load

Never use powder or primers if you have lost there identification

It goes without saying no smoking are naked flames when reloading

The location should ideally be somewhere quite you will need to concentrate and load by yourself with no distractions such as other people talking to you or a television in the background, drawing your attention away from the task at hand. It needs to be well lit and as free from drafts as possible, your loading bench needs to be sturdy and strong as you resize rifle cases you will put a lot of pressure through the press onto the bench.

You should ideally have a floor covering that can be swept clean and not vacuumed so avoid carpet

For this course we will concentrate mainly on loading high power rifle ammunition but will also touch on pistol ammunition.

So, what equipment do you need, do you buy new or second hand do you buy an off the shelf reloading kit the answer to these questions will depend on the depth of your pocket and availability.

The first bit of equipment you will need is a reloading press, there are a large number of presses available, but they basically fall into two categories, a single stage press or a multistage press. A single stage press is as the name suggests a press that does each stage of the process one stage at a time and you change dies for each step of the process most people will opt for a single stage press due to cost. A multistage press will accommodate all the dies on the press and as you pull the handle the rifle or pistol case will move around the press to the next stage multistage presses are generally more expensive and take up more room.

We will concentrate on a single stage press for this course

A single stage press mounted on a sturdy bench

reloading dies for the calibre you are going to reload will be next on the list, rifle dies normally come two per set, pistol dies three per set and should contain a shell holder included with the set more on dies will be covered later

Next is a powder measure either a balance scale an electric scale or better still and electronic power dispenser with built in scales. Powder dispensers **without** built in memory have come down in price recently and are a great investment if you are a target shooter, if you are only loading a small quantity of ammunition a basic set of powder scales will do fine if a bit slow.

Three RCBS scales top left is a chargemaster with memory, right is a chargemaster light without memory. Both chargemasters will dispense powder and weigh it. The small scale in the middle is an

RCBC electronic scale behind the scales is a Lee powder dispenser powder can be dropped into the cup and weighed on the scales

Case priming most reloading presses will have a mechanism for priming the case on the ram but a hand primer is a better option

A good reloading book is a must the internet is a great place for information and powder manufacturers and bullet manufacturers all have their own web sites but you can't beat a good reloading manual they will normally contain information on the reloading procedures and additional information such as case length overall cartridge length and a lot more. As I write this course, I have a speer reloading manual Infront of me, it is 30 years old but still as relevant today as it was the day, I brought it

The above covers the big-ticket items but there are a number of smaller items you will need

Safety glasses reloading is safe if carried out properly but you are advised to ware safety glasses when priming cases, primers can go off if you are careless, so, please ware safety glasses when priming cases.

If you are loading rifle cases or any bottle neck case you will need a case lube for your cases before you resize them.

Case lube

Neck lubing brush you should aways lube the inside of the case mouth

Having weighed your powder, you will need to transfer the powder the into the case with a powder funnel

A loading block is handy or at least a storage case for the calibre you are loading

A loading block

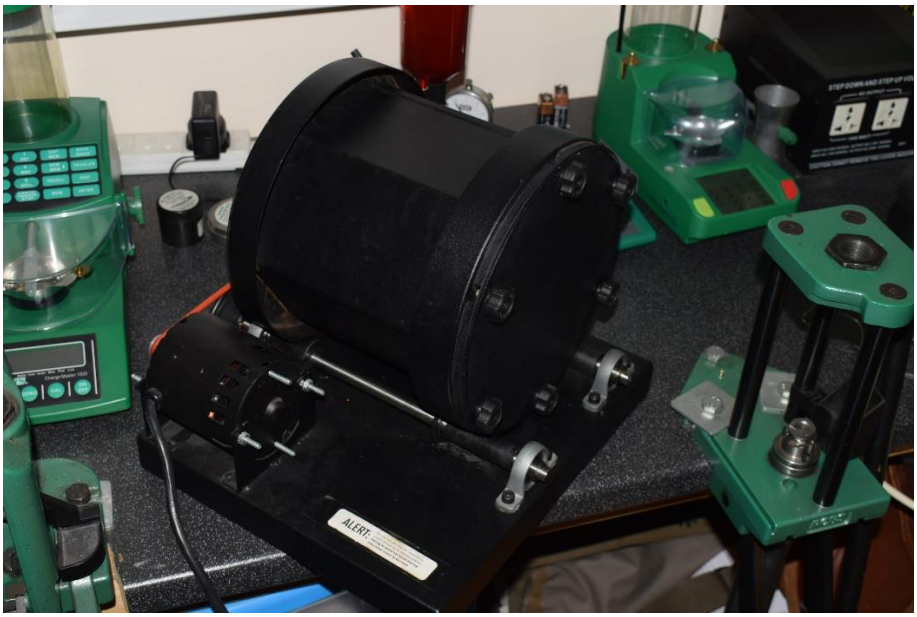
We will cover more items you will need to accumulate as you progress such as something to deconstruct a round when you make a mistake, and you will.

Case Cleaning

You will need to clean your cases after firing and before you re size them, the one thing to NEVER use is a metal polish. Cases should be cleaned or washed by using a dry media tumbler, a wet tumbler that uses steal pins or a cheap option is an ultrasonic cleaner often used by jewellers. A dry tumbler uses corn or nut husks some are fine and some are course, the course media will sometimes get stuck in the flash hole, a wet tumbler uses steel pins to clean the cases and is the quickest method but after cleaning they will have to be dried, a cheap food hydrator off eBay is good for drying cases wet tumblers are more expensive then the dry tumblers, ultrasonic cleaners are ok for small quantities and you can use washing up liquid in them, they also need drying after cleaning

A dry media tumbler

ultrasonic cleaner



Wet Tumbler

Steel pins in the wet tumbler

<u>Cases, Powder, primers and bullets</u>

Cases
Cases can be brought new or you can buy or acquire fired cases, pistol cases can be reloaded a lot more then rifle cases sometimes up to 30 firing and more, rifle cases less so some good quality rifle cases can last up to 10 firings before they fail cheaper cases a lot less, avoid picking up spent brass you find on the range you don't know what it's been through, why has it been binned is the question you should ask yourself.

We will cover case preparation at the end in more detail

Powder
Powder is often a matter of availability rather than choice and that's where a good reloading manual or the internet will come into play. You cannot afford to use the wrong powder for the cartridge you are loading. Manufactures make a lot of different powder but they are not all suitable for every calibre. It's always good to ask other people what powers they use for a given calibre and bullet weight. Good reloading manual should explain the different types of powder available. The types of powder and there uses is beyond the scope of this course except to say reloading date is readably available from all powder manufacturers. Read a manual and understand the difference between single and double base powers and when and why to use either type.

Never jump in and load the maximum charge for the calibre you are loading, start low and work up maximum loads are rarely the most accurate but can be the most dangerous.

Powder trickle above an electronic scale

Primers
Primers come in several sizes and power factors some common ones are listed below
Small pistol
Large pistol
Small rifle
Large rifle
magnum rifle
Bench rest

3 boxes of primers all look the same and are the same size left large pistol primers centre large rifle primers right large rifle Magnum

Primers should not be stored in bulk and should be stored in their factory containers, if you are unsure about a primer is should not be used but killed by soaking in oil, primers should be returned to their containers for storage if used in a hand primer.

Primers also come in two types Boxer and Berdan you will be hard pressed to find Berdan primers and modern cartridges cases are all boxer cases some older military cases are Berdan primed.

Berdan primers are beyond the scope of this course.

Again, a good reloading manual will guide you to the correct primer but for the majority of rifle cases they will generally use large rifle primers although small rifle primers are now making more of an appearance in some calibres just look at the primer pocket the size will be obvious, you won't get a large rifle primer into a 223 case but you may find 6.5 and some 308 cases use small rifle primers instead of large rifle primers. Large rifle calibres such as 338 LM will need to large magnum rifle primer, they are the same size as a large rifle primer but more powerful.

When priming cases always ware safety glasses primers are very safe but they can go off if you are careless and the shrapnel can take out an eye, please don't take the risk.

Primer mechanism fitted to the single stage press

Hand Priming tool

Priming tool that fit on top of a single stage press

Bullets
There are more types and shapes of bullets then there are stars in the sky. Again, you might be driven by availability ask others what they use, there is no point in spending a lot of money on extreme low drag bullets if you are shooting 100 and 200 meters when a plinking bullet will do you at half the cost.

A heavier bullet will be driven slower than a lighter bullet but will generally have less wind effect on it then a lighter bullet, a lighter bullet can be driven faster will have less drop over distance then a heavy bullet but will be more effected by wind.

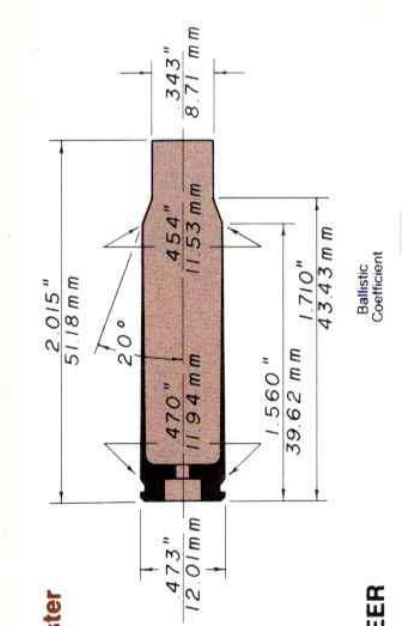
The important thing is to match your bullet to the correct powder the correct weight of powder and the correct primer.

Setting up and loading your first round

For this course we will concentrate on loading a rifle round but will cover pistol as well in parts

So, you have your press mounted dies in the box powder primers and bullets ready to go

We will load to SAMMI specification, SAMMI stands for The Small Arms and Ammunition Manufacturing institute and is the standard of ammunition that you would buy in a shop that means that whoever made the ammunition it will fit into any rifle that is made to SAMMI specifications.



A 308 Winchester case above giving the dimensions of the case

The first step is to set up the rifle die into the press the shell plate fits onto the ram and the die is screwed onto the top of the press.

Lower the handle to rase the ram with the shell plate in situ screw the sizing die into the press the sizing die has the recapping pin in it.

Screw the die down until it touches the shell plate then lower the ram and screw the die in about one tenth of a turn and lock it in place with the locking ring bring the ram back up it should touch the shell plate the travel a little further under pressure this is known as cam over it just wants to be a small amount it's a matter of feel and my take a bit of learning, ensure the locking ring is tight. This process is the same for rifle and pistol cases

Before sizing all cases must be inspected for damage and splits

When a round is fired, the case expands then contracts to allow extraction but it does not contract back to its original size so it will need re sizing, as we are loading to SAMMI specifications we need to full length size the case.

Pistol cases can be nickel plated or copper and do not need lubricating before you size them

Rifle cases are generally bottle neck cases and have to be lubricated before you size them.

Not all pistol cases are straight walled, 44x40 cases look straight but are bottle necked

The two cases on the left are bottle necked the next two are straight walled cases the far right is a bottle neck case but looks straight walled and will need lube before sizing

There are a number of case lubes on the market from spray cans to lee lube and imperial lube that looks a bit like petroleum jelly but is not.

Whatever lube you decide to use you must follow the instructions if you get it wrong you will end up with a case stuck in the die. If you use to much lube, you will dent the case, the only part of the case to lube is from the bottom of the shoulder to the bottom of the case using a cotton bud or a small brush apply a small amount of lube inside the case mouth this will help re sizing the case mouth

You can buy a lube tray that you can role the cases on, and lube a number of cases at a time, there is also a dry neck lube that you can dip the case mouth in

If you apply to much lubrication to the case or you lube the shoulder you will dent the case

Lube tray

Cases with two much lubrication on them then pushed through the sizing die, this can happen if you use a dirty die or a dirty case as well.

Removing a stuck case can be difficult and is not something you will want to do so be careful

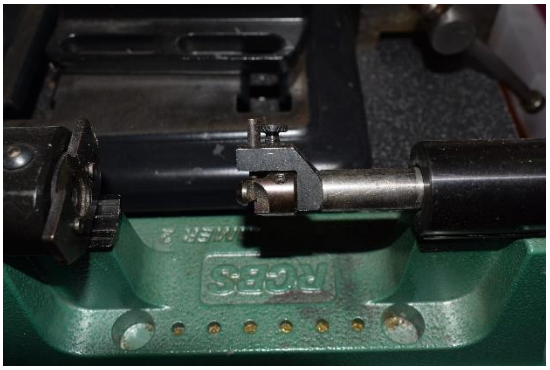
Sizing dies should be cleaned regularly

Having lubed the case place the case into the shell holder lower the handle and insert the case into the die slowly as you push the case into the die the de capping pin will push out the spent primer. Push the handle all the way down until you feel the cam over then remove the case from the die, you are ready for the next case. When you have sized all your cases wipe of any remaining lube from the case

In time cases will need trimming you can buy a die that you file off the brass that protrudes out the top

There are a number of other case trimmers.

Hand case trimmers from Lyman



RCBS case trimmer with de burring tool

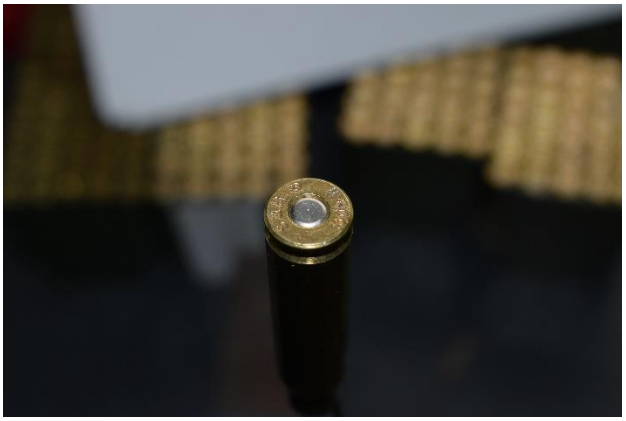
Electric case trimmer with de burring tool

Hand held de burring tool after trimming a case both the inside and outside of the case will need to de burred.

Primming the case

Priming the case can be done as part of the sizing process or after sizing using a hand primer

If you are priming as part of the sizing process when you have sized the case and bring the case out of the die flip the priming arm forward insert a primer and as you push the press handle up the primer will seat in the case



Hand primers are quicker and give better control but either work well

The primer should be seated just below the case bottom run your finger over the primer and you will feel if the primer is seated low if you seat the primer too deep you will flatten the primer it must not protrude out the bottom of the case.

Remember when priming to were safety glasses

Oil will destroy primers so ensure your working are is clean and free form any oil, if you need to dispose of live primers put them in a bag and poor a little oil over them

Powder

Having sized and primed all your cases it's time to load powder into the case

By now you will have: -

cleaned your case
inspected your case

lubed and sized your case
wiped the lube of your sized case after sizing
and primed your case

powder is sometimes a matter of availability it's always good to ask others who home load what powder they are using; however what others use may not be the correct powder for you

deciding on the correct power is dependent on calibre and the bullet shape and the weight of bullet you are using

This is where a good reloading manual comes in or visit the powder manufactures web site for guidance

Look up the bullet type against the calibre you are loading and you will be given a number of powers suitable for use in that calibre.

Having chosen the powder, you are going to use than start light, start at the minimum suggested load. Load a few rounds moving up a few tenths of a grain or so at a time. when you fire the rounds look for signs of pressure flattened primers or an extractor leaving a mark on the base of the round are classic signs of over pressure as is difficulty extracting the round. If in doubt ask someone to look at a fires case and give advice.

Maximum loads are not necessary the best for accuracy look for a slower muzzle velocity that will give you the best group. People are sometimes obsessed with high muzzle velocity so as to have a flatter trajectory, better to have an accurate load and know your bullet drop then a fast muzzle velocity that gives poor accuracy.

Powder can be thrown by volume of weight.

Pistol rounds where traditionally thrown by volume as small amounts for powder are used in pistol cases, and it was quicker to load a few hundred rounds in a multi stage press and not worry about weight being a bit either side of your selected load

In practical shooting today when the accuracy of a round is less important than speed on the range shooters use multi stage presses that throw powder by volume as well.

For the most accurate round the powder should be weighed. The room you use needs to be free from drafts scales do not like drafts, electronic powder thrower's often have a cover to keep out the drafts when you are weighing the powder.

A balance scale can be used, they are accurate but slow, if you can't stretch to an electrical powder thrower then an electric scale is the second-best choice you can throw powder by volume close to the weight you want than top it up.

Be very careful loading pistol ammunition, a double load can be a disaster to you and the pistol. Pistol loads use very little powder in a large case and double loading is a real possibility if you do not pay attention.

Bullets, Bullet seating and crimping

Remember we are loading to SAMMI specifications

The type, weight and shape of bullets is endless and again may be driven by availability.

Trial and error are often the only way to find out what works best in your own individual rifle.

For target shooting at distance a boat tail bullet will generally give the best accuracy

A reloading manual will often give you the maximum overall length for a given bullet, however ammunition manufacturers will assume you are loading into a magazine, there's no point producing a round that people cannot fit into a rifle magazine.

When Bullet seating that will normally be your starting point if you have a magazine fed rifle if not you will have to consult a bullet manufactures web site or loading Manual.

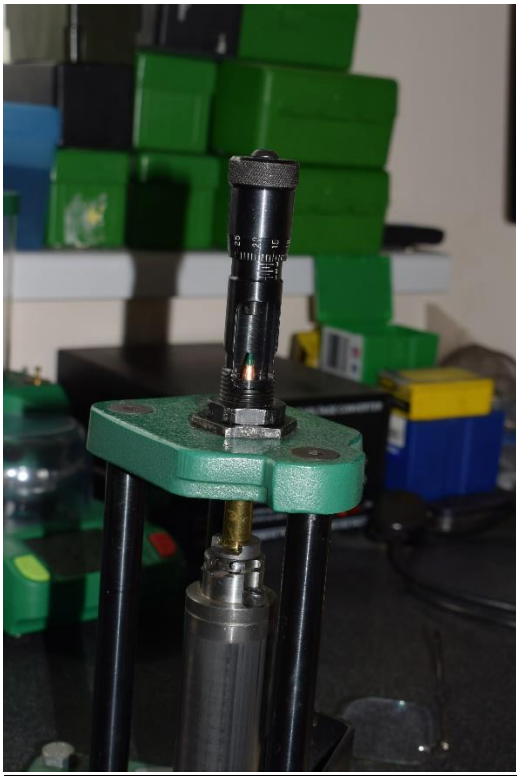
Some bullets will have a seating cannular to guide you to the best depth to seat into, the 4 bullets on the left below all have a seating cannular the 2 on the right have been pulled from a live round and you can see the crimping groove left by the crimping die

If you are loading single rounds into the rifle, you have far greater control over seating depth however that is beyond the scope of basic reloading.

If you are loading for a tube fed magazine such as a Winchester under leaver you will need to use a flat headed bullet, a bullet with a sharp point risk igniting the primer of the bullet in front of it during loading or by the recoil when firing

A selection of bullets some with a crimping grove

Bullet seating tool with modified cases this tool is used to work out the optimum bullet seating depth for a given bullet shape. Its for use in single loading not magazine fed rifles



Bullet seating with a competition die

Crimping a bullet

If loading rounds individually there is no real need to crimp a bullet as long as the bullet is a friction fit in the case and will not fall out or drop into the case. Bench rest shooter quite often don't crimp rounds

If loading rounds into a magazine they will need to be crimped.

Seating dies can normally crimp as well as seat the bullet, you can also buy dedicated crimping dies

It's well worth making a dummy round for each calibre and bullet type you reload it makes setting up the dies quicker and easier each time you reload.

To work out the crimp on a seating die, back the die out a quarter, and with the die backed out seat a bullet to the correct depth. Then back the seater part of the die out and then screw the die back down don't let the seater touch the bullet head the die will make contact with the case mouth drop the ram and screw in the die a tenth of a turn bring the ram back up and the die will role crimp the round don't apply to much pressure if needed back the die out or screw it in a bit until you have The desired crimp. When you have the desired crimp tighten the locking ring and bring the seating head down in contact with the bullet and you're ready to seat and crimp the next round.

If you make a dummy round first setting up will be quicker next time

You now have a loaded round

You have

cleaned your case
inspected your case
lubed and sized your case
wiped the lube of your sized case after sizing
Primed your case
selected the appropriate powder
weighted the powder, starting low
selected a suitable bullet in conjunction with the powder load
seated the bullet to the correct depth
crimped the bullet

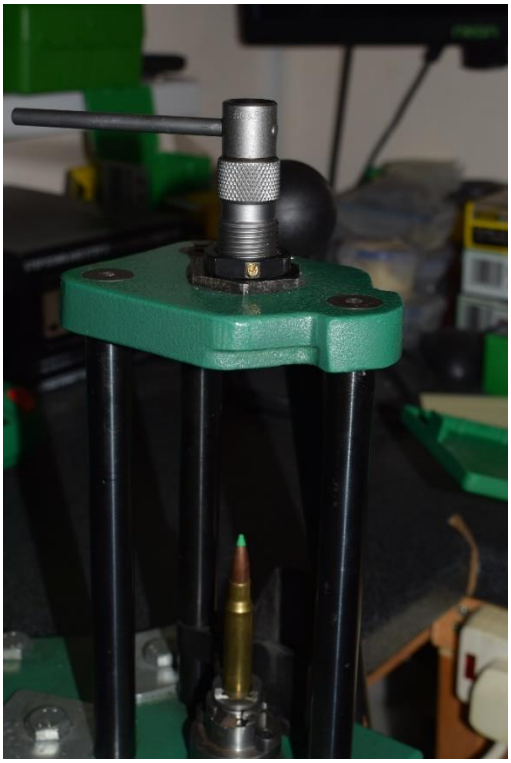
Pulling a live round

During your time reloading it's only a matter of time before you make a mistake and have to pull a live round. It happens. There two ways to pull a live round a dedicated bullet pulling die, or a kinetic bullet puller

Kinetic bullet puller

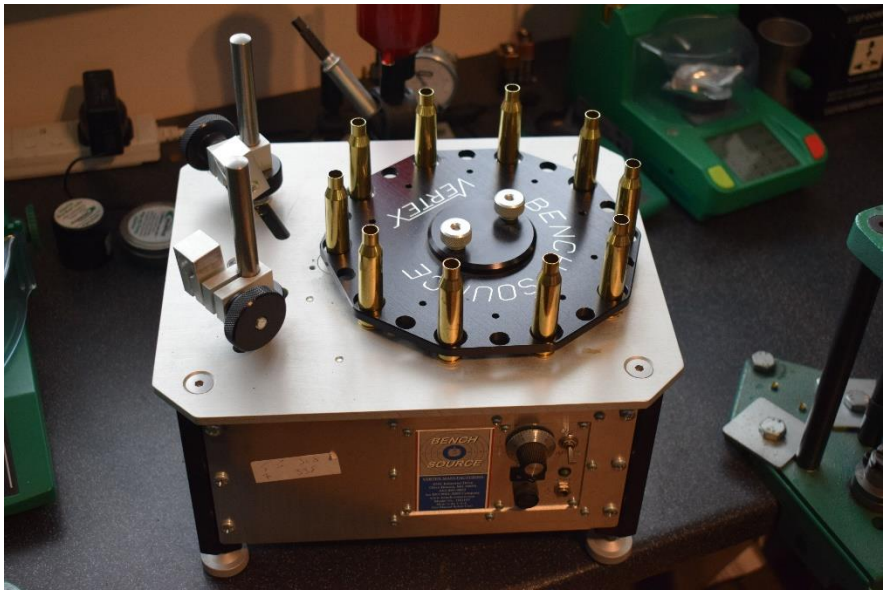
With the kinetic puller you unscrew a top of the hammer inset the round to be pulled screw it up tight and strike it against a hard surface the bullet will come out of the case along with the powder and be caught inside the hammer

With the die, it goes into the press the bullet is inserted into the die and tightened and the ram is lowered and the bullet is withdrawn from the case.



This course has been designed to give you the basics to get you started SAFELY. Over time you may want to anneal your cases learn how to get the best bullet seating depth and how to prep your cases to give you the best consistency. Below are some tools you may wish to acquire as time goes on but are not required to get you started

<u>Case preparation in a little more detail</u>



An electric annealing machine without the gas torches attached

The better quality your rifle case the better results you can expect. Case preparation in its simplest form just requires cleaning inspection trimming if necessary and re sizing either full length or neck sizing then its ready to re load.

However, you can do a lot more to gain the best out of your cases and prolong their life

Sizing

The dies you select can make a difference, competition dies or standard dies, competition dies will be made to a higher specification.

If you are only loading for one rifle in a specific calibre you can get away with neck sizing only, you can invest in bushing dies that will size the neck to your specific bullet.

Neck sizing will prolong the life of a case but you will need to full length every so often depending on your rifle. For expensive or hard to get cases it makes sense to neck size.

Having cleaned and de primmed your brass there is a lot you can do to the brass

Primer pockets can be reamed to flatten the base of the pocket this will ensure the primmer fits square in the pocket, and will give more assured ignition by keeping the anvil inside the primer even

When cases are formed the flash hole is punched through the bottom of the case, this leaves a ragged hole and a burr inside the case, a flash hole uniform tool will remove the burr and uniform the flash hole to a consistent size

Top is a primmer pocket uniform tool below is a flash hole uniform tool both can be fitted to an electric drill

Some cases notably military cases, the primers are crimped and glued in place having removed the primer you will need to remove the crimp

Primer pocket de burring de crimping tool

Primer pocket cleaning tool, soot will build up in the primer pocket and should be removed, one end is large primer pockets the other small primmer pockets.

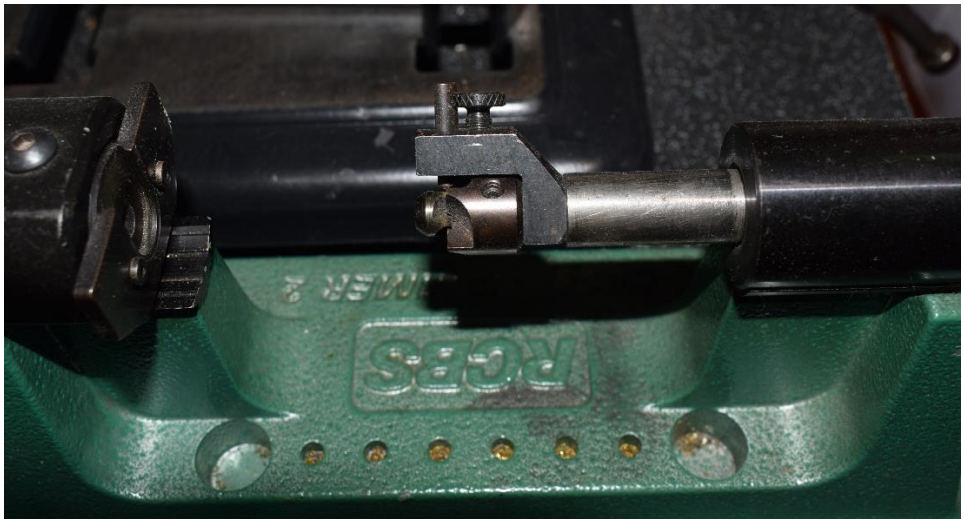
Case length is important, at the very least they need to be the same length if not when you crimp a case the amount of crimp will be different for each case and give different pressers when fired also a long case may not load in the chamber of the rifle. All case will expand over time some calibres more than others.

The SAMMI length for a cartridge can me found in a re loading manual and on powder manufacturers web sites. A good set of digital callipers is a must

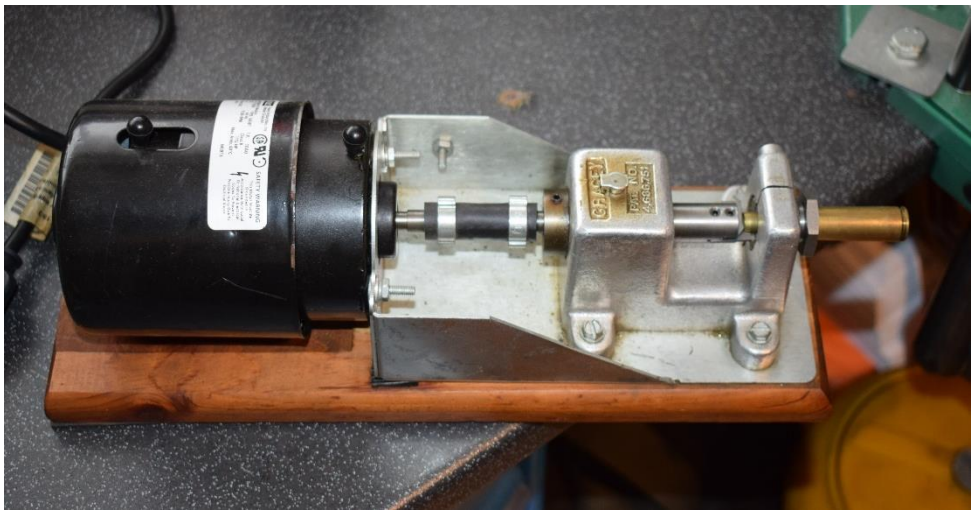
Having trimmed the case to length both the inside and outside of the case mouth must be du burred using a de burring tool

A de burring tool

Case trimmers can be manual or electric. you can also buy a case trimming die that you file the exposed brass off the top. Some trimmers will also de bur the case at the same time.



An RCBS case trimmer that will de burr at the same time as trimming



A Gracey electronic case trimmer that also de burrs the case

Hand trimmers by Lyman

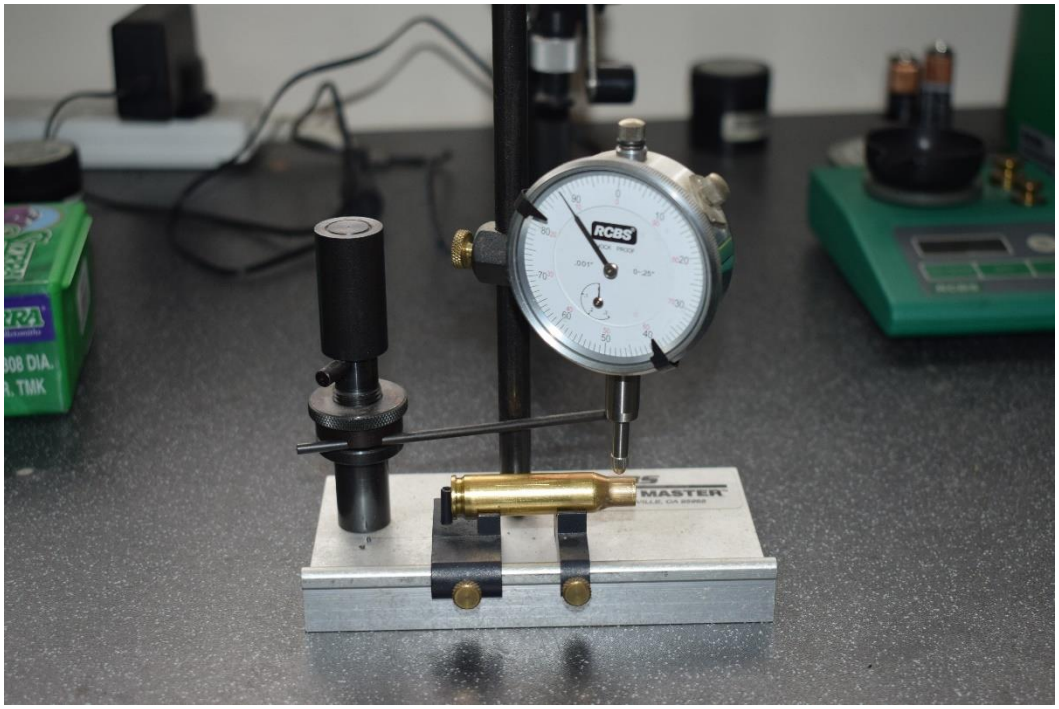
Having worked on your primer pocket and flash hole, then trimmed your case it now time to uniform the case neck

To uniform the case neck requires removing brass from the outside of the case neck and ensuring the case is concentric in the past both the inside and outside of the case would be turned, but nowadays only the outside is turned.

The case mouth is lubed and pushed into a mandril to ensure the cases are all the same size internally then the outside of the case is turned using a hand cutter.

Neck turning tool

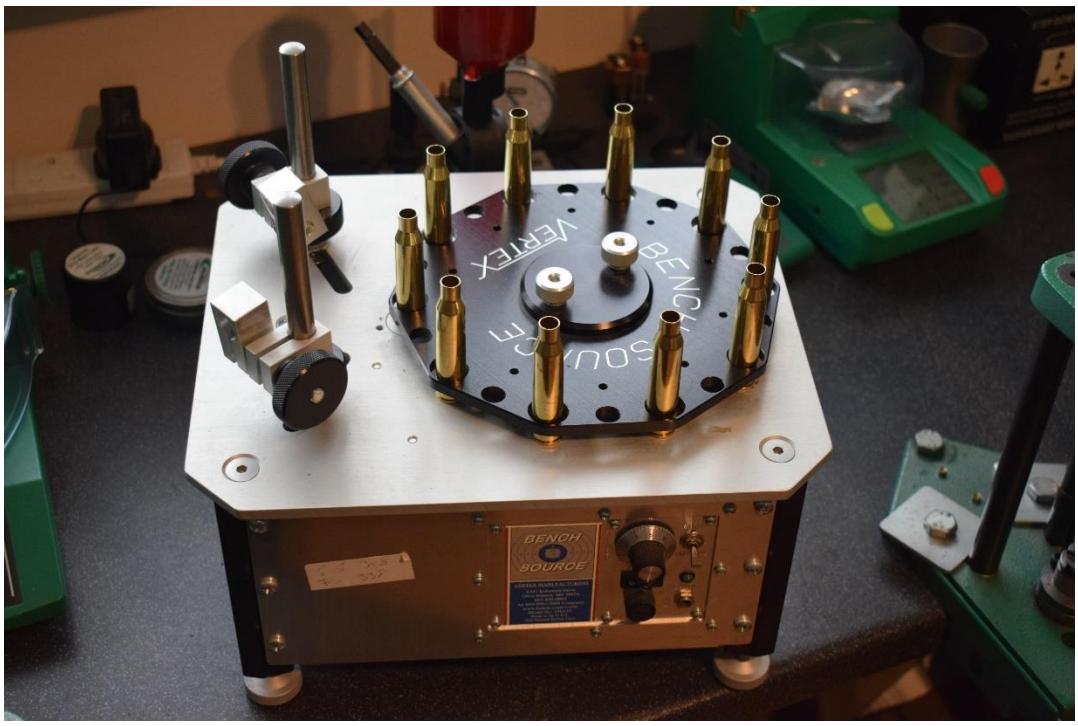
Cases can be checked for concentricity using an RCBS gauge



The gauge can be used to test case concentricity and bullet run out, case and neck thickness and case length.

Annealing cases.

cases harden over time the process of firing and sizing harden the case and eventually they will split annealing will prolong the life of a case, if a case in expensive or hard come by annealing may well be something you consider



That’s the cases prepared the last task is to weigh and batch your cases and load them in batches for the best consistency

What you decide to do or not do is up to you, most case preparation only needs doing once in the life of the case such as the primer pocket and flash hole and neck turning. Some small gains may not be worthwhile against the cost and effort involved.

Please see the declaration on the next page.

The NRA/MOD have introduced a requirement that any shooter using home loaded ammunition on MOD ranges must have completed a course in home loading ammunition.

Club members who wish to shoot home loaded ammunition on MOD ranges will need to have it entered onto their Safe Shooters Certificate.

You will need to inform the club that you wish to have home loaded ammunition added to your Safe Shooter Certificate, you will also need to produce the signed declaration below before it can be added to your Safe Shooters Certificate.

Declaration

I confirm I have read and understand the reloading course and I can handload ammunition to safe standards for the calibres and firearms I shoot.

All ammunition I produce will be loaded to within safe limits for the firearm I am using

Delete one or two of the following

I have been reloading my ammunition for approximately …… years

I am new to reloading, but I have read and understood the course and I am able to reload ammunition to safe SAMMI standards.

I have attended a reloading course with another club or instructor. Name of club or

instructor……..

Name ……

Date ……