



SURVIVAL AMMUNITION

How To

**Make Your Own Ammunition
When Store Shelves Are Empty**

TG. CAL. 50
LOOSE
UNKNOWN

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How to Make Your Own Ammunition When Store Shelves are Empty

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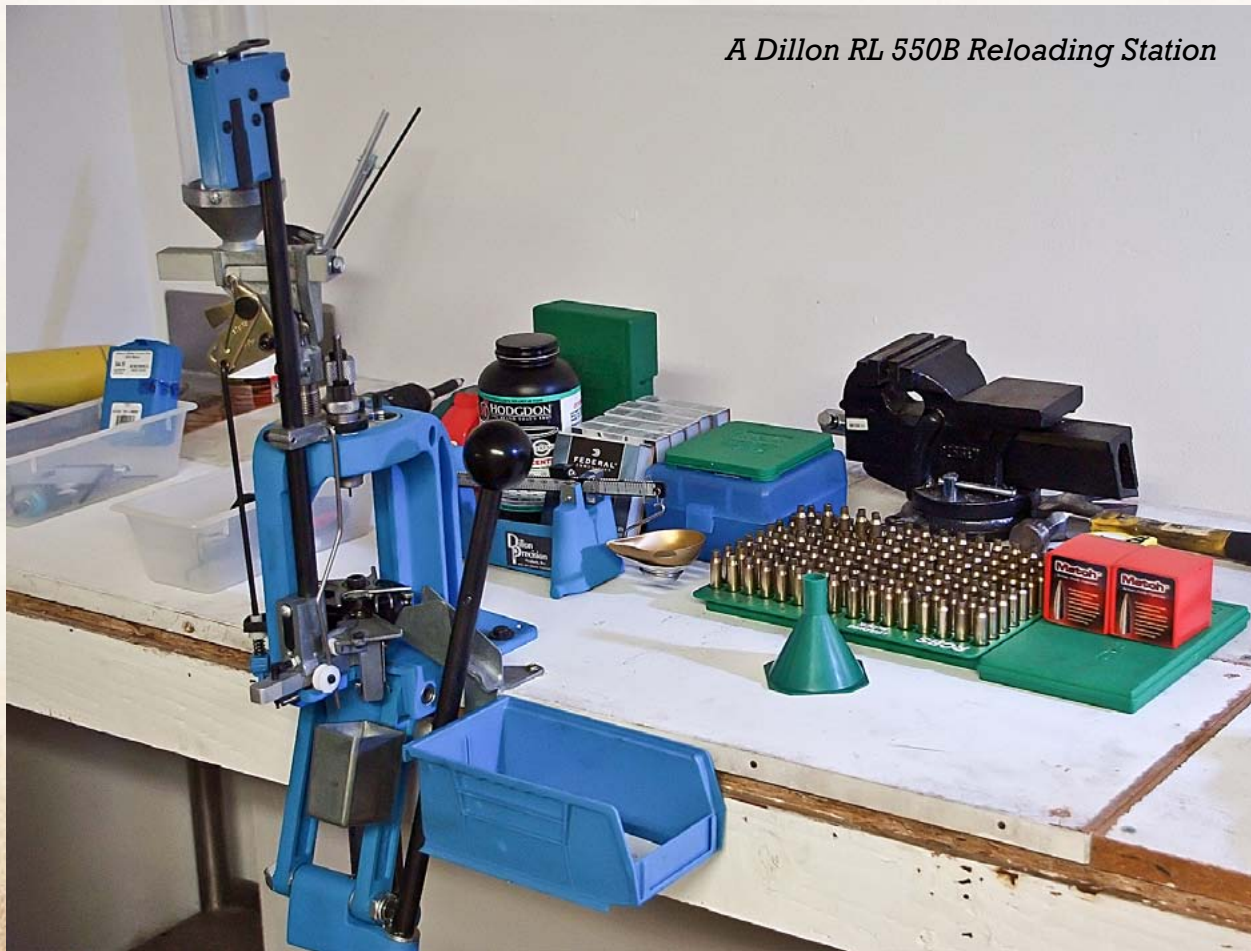
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Making your own ammunition is a fun, rewarding hobby and might become a necessity one day, depending on the availability of commercially available ammo and the political climate that exists. To those in the know, making your own ammunition is known as *reloading*, or *handloading*, since what is being done in essence is to manufacture ammunition rounds by purchasing the individual components of ammunition, namely powder, primers, cases, and bullets, then assembling them. "Reloading" is still the term used even when every single component of the ammo you are making is brand new; many shooters will decline to use spent cases to make new ammo with. Whichever way you choose, reloading is an excellent skill for a prepper to have, and one that could create an interesting side business in troubled times.



A Dillon RL 550B Reloading Station



WHY RELOAD?

There are a number of compelling reasons to take up reloading as a hobby:

- **Cost:** Far and away the biggest reason historically that people have started reloading is cost. Your average round of reloaded ammo costs quite a bit less than store-bought ammo, once the cost of the equipment is factored in. At the outset, reloading represents a significant outlay of cash in the form of reloading equipment, but as the reloader manufactures more ammo, the cost per round plunges. Once the reloader begins using pre-fired brass to reload, the cost per round becomes a fraction of the price of new rounds and stays low as the reloader continues to reuse spent cases. You won't see an immediate cost difference, but after several hundred to several thousand rounds (depending on what you shoot), you will see a noticeable decrease in your ammunition costs.
- **More practice:** As a corollary to the above point, the cheaper your ammo is, the more likely you are to shoot more. Shooting is a significant investment. First you must buy the firearm, and then you must feed it constantly. The base metals which make up your typical ammunition have increased by an order of magnitude in recent years. Copper, a primary ingredient in the manufacture of brass cases, has gone through the roof, jacking up the price of ammo. More expensive ammo means that shooters shoot less, and as a consequence, lose some of their edge and shooting skill. Reloading levels the playing field some, allowing a shooter who otherwise could not afford store-bought ammo to shoot more often, and thus retain or regain his proficiency.
- **Government interference:** After decades of making great strides in the areas of concealed carry issuance and gun rights in general, a series of disastrous school shootings has once again emboldened the gun grabbing left and has called them to action. Realizing that because of the Second Amendment the total ban of all guns is unlikely; politicians have turned to ammo as a target since they realize that all firearms need ammunition to fire.

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As of the date of this writing, nationwide federal and state proposals are being introduced to tax ammunition, require a license to purchase ammunition, set limits on the quantity of ammunition a person may buy or own, require a background check to purchase ammunition, and other such draconian measures. It's no secret that the federal government and many state governments want to control guns by controlling the ammunition citizens need in order to shoot. They wish to make the purchase of ammunition so onerous that people won't buy it, or so expensive that no one can afford to keep any significant quantity of it on hand.

In this realm, the reloader has gone more or less unnoticed as reloading is not a mainstream activity, and the individual components of reloading such as the brass, powder, and bullets are not really individually regulated. Reloading essentially allows the common man to make ammunition without actually having to jump through the hoops required to buy store-bought ammunition.

- **Accuracy:** Due to the stringent tolerances that most reloaders keep, reloaded ammunition is generally of higher quality and therefore better accuracy than most store-bought ammo. This is because the average reloader purchases high quality components that are carefully measured to produce what amounts to near match-grade ammunition. Match-grade ammunition is ammunition that is manufactured to a higher degree of precision with a minimum range of tolerances. It is not something that is produced through high-speed manufacturing. The same term is used for high precision individual components as well.

THE BASICS OF A CARTRIDGE

The uninitiated will often refer to cartridges as “bullets” or “shells,” but these are incorrect terms. In order to speak the same language as we teach you the process of reloading, we must first ensure we are clear on what each term means. These terms apply to both rifle and pistol ammunition:

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Bullet: The pure lead or copper-jacketed lead slug that is seated into the case mouth. The bullet is the part that actually shoots out of the firearm and strikes the target. There are a myriad of bullet designs out there, from wad cutters, hollow points, full-metal jacket, and ball, to name but a few.



Cast Lead Bullets



Copper Jacketed Bullets

Case: Sometimes referred to as “brass,” the case is what holds the powder and also accepts the seated bullet. Cases are most often made of brass, but can sometimes be made of aluminum, or steel, which is inappropriate for



Empty Brass Cases

reloading. It is important to note that the case is the only thing that can be reused in the reloading process. It should be noted that only cases with a single flash hole (Boxer Primed) can be reloaded. Cases with two flash holes (Berdan Primed) cannot be reloaded because they cannot be de-primed. Rimfire ammunition cannot be reloaded either, but it is very economical to buy so that is not a big issue.



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Powder: The powder is more correctly termed *smokeless powder*, which differentiates it from the black powder of muzzleloaders. Smokeless powder is not classified as an explosive; it is classified as a *propellant*. Smokeless powder is flammable, but not explosive. Black powder, on the other hand, is explosive, and therefore more dangerous to handle and store.

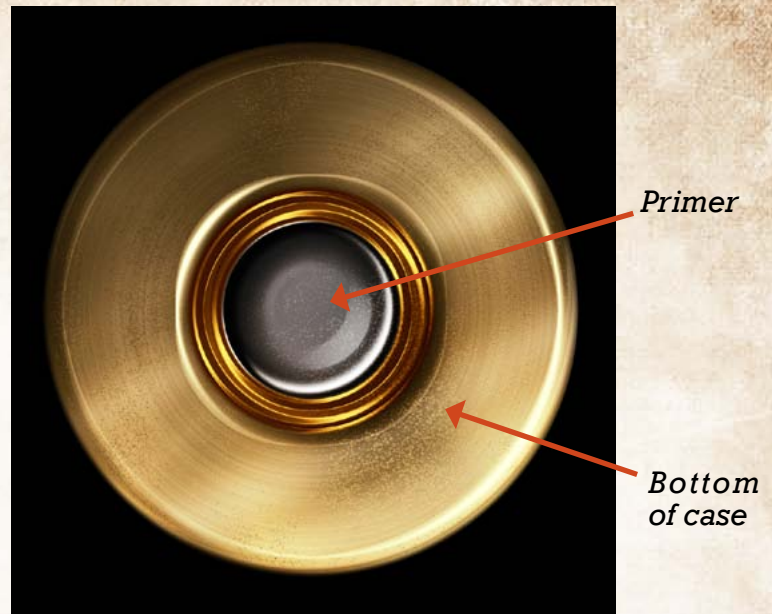
Primer: If you take a round of ammunition and turn it over, you will notice a steel colored disk inset into the bottom of the case. This is the primer. It contains a little bit of high explosive which, when struck by the gun's firing pin, ignites the powder.

Putting all the pieces together, you get what is called a *cartridge*—a fully loaded round of ammunition that can be chambered in a weapon and fired. The term *shell* is not used with rifle or pistol ammo and is generally reserved for shotgun shells.

HOW A CARTRIDGE WORKS

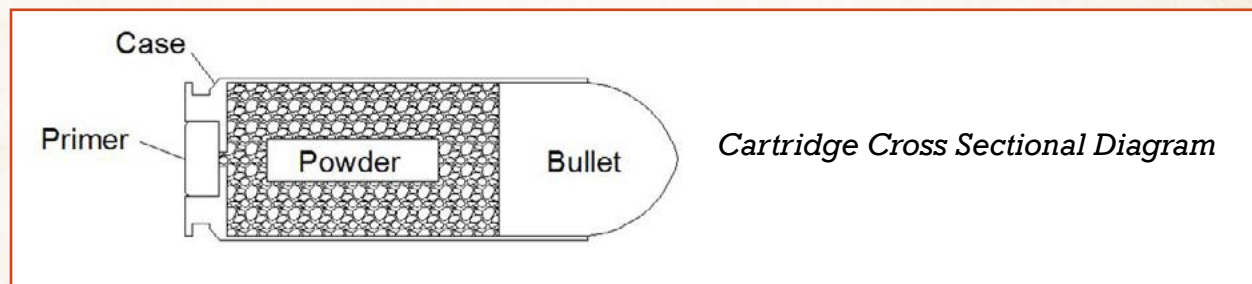
When you load a live cartridge into your gun and fire it, the following events occur:

1. The firing pin strikes the primer, which is a high explosive. The primer ignites, sending its energy through a hole in the bottom of the case called the *primer hole* or *flash hole*.
2. This energy ignites the powder charge within the case, causing a massive gas buildup within the case.



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3. This gas buildup forces the bullet forward, into the barrel of the weapon, and then onto the target.
4. The firearm then ejects the case. Note that the primer is ignited and then spent. The powder is completely consumed as it lights off within the case, and the bullet is sent to the target. ***All you have left is the case, which forms the basis of all reloading activities.***



Okay, so now we understand how a cartridge works, but where do we begin our journey in reloading? First, we must define some basic expectations of what we hope to achieve. It is thoroughly possible for a reloader to manufacture thousands of rounds of ammunition per week with the right setup, but the equipment required to do this will be expensive. A reasonable goal would be to initially start with the equipment necessary to be able to reload common rifle and pistol calibers, and be able to reload somewhere on the order of a hundred rounds or so of pistol or rifle ammo per week. This volume of ammunition usually matches most people's shooting habits and can easily be accomplished with a simple *single stage press*, which we will talk about shortly. You can always expand your reloading activities, but as a reloading novice, you should start with the basics of reloading and teach yourself first to make small quantities of well made and safe ammunition before venturing off into anything that resembles mass production.

RELOADING SAFETY CONSIDERATIONS

Don't gloss over this section because you think that it doesn't apply to you. When properly done, reloading is a safe and enjoyable process. When improperly done, reloading can be extremely dangerous. Here are the dangers, in black and white:



When properly done, reloading is a safe and enjoyable process. When improperly done, reloading can be an extremely dangerous activity. Follow ALL safety precautions and procedures.

Powder: Smokeless powder is obviously flammable. You should never smoke while reloading or reload near sources of excessive heat or open flame. Store gunpowder in the same manner as you would store any other flammable item such as propane or lighter fluid—away from sources of combustion. Smokeless powder is about as combustible as gasoline and should be stored and handled similarly.



This is why you must handle primers very carefully and wear safety glasses.

Primers: Primers are highly explosive and should not be struck, smashed, or stabbed intentionally or accidentally, or they will go off. ***Primers should always be stored in their original package.***



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They should never be stored loose in a box, glass bottle, metal can, or any container that can become shards of shrapnel if the primers should explode. Additionally, they should be stored in the same manner that powder is stored—safely, and away from sources of combustion. Always wear safety glasses when handling primers!

Reloading in general: Pay attention to what you are doing. Improperly measuring your powder—either putting too little powder in a case or too much powder—can cause the ammunition to *rupture explosively* rather than fire. The cartridge doesn't actually explode, but the rapid expansion of the heated gases rupture the cartridge case with enough force to damage/or destroy both the gun and the shooter. That means the result can be destruction of the gun and/or the *death of the shooter, or even a bystander.* Complacency kills when reloading. Avoid reloading while distracted, intoxicated, or tired. Pay attention to what you are doing!

GETTING STARTED

While most reloading guides start you off with a list of equipment to purchase, we thought it would be best to explain the process of reloading first, since you might not understand terms like *primer pocket deburring tool, single stage press* or *shell holder* before you know what they are actually used for. We'll give you a full equipment list (promise!), but first, let's get started on how the steps of reloading actually go and then the equipment list will make a lot more sense.

Reloading with new components

Technically, it's not reloading since we are working with brand new components. It's *handloading*, but you get the idea. Basically what we are doing is assembling brand new cartridges from brand new components. Many reloaders use this method exclusively since they don't need to deal with the case preparation that is required with reloading previously fired brass. Additionally, reloading with new components is the easiest, quickest,

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and safest method of reloading, although you will never enjoy quite the savings of reloading that you would see from using recycled brass.

The steps we're about to show you apply to both rifle and pistol, generally speaking. We're also going to assume that you have the necessary equipment, but won't talk much about equipment until later in the guide. *The process is more important than the equipment used!*

The process is more important than the equipment used!

Step 1 – Select a Caliber: The first stage of your reloading process will be to select the caliber of ammunition (either rifle or pistol) that you wish to reload. Just as your gun only shoots one caliber, the reloading equipment (specifically, *dies*) you need are for a *single caliber*. If you want to reload multiple calibers, you will need multiple sets of dies for your press. The sky's the limit here. Buy the dies you need to reload the calibers you want—you can reload a single caliber or every caliber out there, depending on your budget. While you will only typically have the one press, you will have several sets of dies, each one corresponding to a specific caliber.

Step 2 – Select the brass: The same manufacturers that make ammunition also make brass cases. These are brands like Winchester and Federal, to name but a few. In addition, for precision rifle shooting, there are manufacturers that make match-grade brass such as Norma and Lapua. The reason we draw your attention to selecting the brass first before any other component such as powder or bullets is that the brass is the one item that you will reuse. It pays to buy quality brass the first time, since you can get many reloadings out of it.

Cheap brass will usually get you three or four reloads out of a single case. What this means is that you can buy the brand new brass, load it, and fire it out of your gun. Then, you can prep that case, reload it, and fire it again, up to three or four times before the case starts exhibiting signs of wear (explained later).

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Good quality brass, however, can last eight to twelve reloadings or more. Some shooters have even gotten fifteen or more reloads out of their brass, which makes it very economical to shoot. ***If you are new to reloading, buy only brand new brass for the first time you reload.*** You don't want to reload brass that someone claims is "once fired," but is really four or five times fired. Pick quality brass with the idea that it's not really an expendable part of the equation. Sure, you will ultimately have to throw the brass away after multiple reloads, but think of buying brass like buying tires for your car. Tires are also expendable, technically, but not as expendable as gasoline.

Another option, which is a good way to start, is to buy high quality store-bought ammo, shoot that, and save the brass to reload. However, if you go this route, you will need to prep this brass (refer to the following section for that process).

Step 3 – Select the powder: There are a multitude of powders out there for different uses—something like 150 or more choices of powder. Some powders are only used for large bore magnum rifle rounds, while others



are for pistol. Some, like Hodgdon Varget, for example, can be used in both. Buying powder is a very subjective choice. Some shooters prefer a certain brand over another, and each powder has its own distinctive characteristics which makes it applicable to the type of round it is used to reload. For the novice reloader, the easiest way to select a powder is to purchase a *reloading guide*. A reloading guide is a printed book which lists various formulas for powder loads based on the caliber and the weight of the bullets. The following volumes are a great start:

The Lyman "Reloading Handbook" is probably the best book for novice reloaders.

- Lyman "*Reloading Handbook*": now in its 49th edition (probably the best book for novice reloaders) (extensive load data and reloading instructions in an easily understood format)
- Lee "*Modern Reloading 2nd Edition, Revised*" Reloading Manual: shows reloading tables for 167 different cartridges
- *Sierra 5th Edition Rifle Handgun Reloading Manual*
- Hornady "*Handbook of Cartridge Reloading: 9th Edition*" Reloading Manual

These Lyman and Lee guides tell you *how* to reload cartridges, as well as *what powder* to use in *what quantity* for a given caliber and bullet weight. So if you shoot .308 Winchester, for example, you can turn to that page and see a list of powders that are appropriate for that caliber, as well as how much powder to use depending on the bullet weight (explained later).



This Photo Shows a Large Rifle and Small Rifle Primer.

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Note that, if you only want to start reloading with a single caliber, it's often not necessary to purchase a reloading guide since your die set will often come with a listing of powders appropriate for that caliber.

Step 4 – Select the primers: Primers mainly come in the following sizes:

- Small pistol
- Small pistol magnum
- Large pistol
- Large pistol magnum
- Small rifle
- Small rifle magnum
- Large rifle
- Large rifle magnum

How do you know which one your caliber takes? Look it up in your reloading guide. For example, 9mm Luger takes small pistol primers, and regardless of the brand of primer you purchase, they will make a size that corresponds to a “small pistol primer” size. Note that the only item that is interchangeable between calibers is the primer. Some primers work with multiple calibers—for example, the previously mentioned small pistol primer will work on 9mm Luger, .38 Super, .38 Special, .357 Magnum, and .32 Special, among others.

Also, for precision rifle shooting, you can purchase *match-grade primers*. These are generally more expensive than non-match-grade primers, and are more precisely tuned for match-grade uses. Unless you are shooting a precision rifle that can take advantage of these, there's no need to buy match grade.

Step 5 – Select the bullets: The type of bullet you want to shoot depends on the type of shooting you are planning on doing. If you are trying to make up a bunch of practice rounds for your pistol, you might buy cast lead wadcutter bullets because they're inexpensive (called ‘wadcutter’ because they are designed to punch nice round holes through paper targets). If your particular pistol cannot properly feed wadcutters from the magazine then you would use a cast lead round nose bullet (ball ammo). If you want home defense rounds, you would purchase hollow points instead for maximum expansion and less penetration. Basically, if you can

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get a certain bullet type in commercial ammo, you can get the same bullet to reload yourself. Discussing each bullet type is outside the scope of this guide, as there are hundreds upon thousands of variations of bullets for rifles and pistols, from everything to hunting, target shooting, and self defense. Buy what works for you and your gun.

Step 6 – Work up a load: A *load* is the term used for the combination of the bullet, the case, the primer, the assembled cartridge dimensions, and powder you are using. Think of the load as a Rubik’s Cube sort of equation—changing one face of the cube also changes the other face of it. Altering the amount of powder and/or the bullet weight changes the load. The performance of the ammunition is tied to the weight of the bullet, the type of bullet, the seating depth of the bullet, the primer used, the type of powder, and the amount of powder within the case. If any one component, or measurement, changes, so will the performance of the ammo.

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First, realize that the weight of the powder used within the case is measured in grains. Second, realize that while the weight is always measured in grains, the *volume* of powder used may vary depending on the brand of powder used, even though the weight in grains remains identical. This may sound confusing, but consider that one pound of feathers will have a huge volume; probably filling up a small sack, yet one pound of lead will have a much smaller volume. They both weigh the same one pound, however. *This is why you should forget about volume right now.* Powder is measured in grains, period. End of discussion. Bullets are also measured in grains. The weight of the bullet is expressed in grains of weight.

Do NOT adjust powder weight/bullet weight formulations!

Here are some handy rules to keep in mind:

1. Powder weights are NOT INTERCHANGEABLE between brands. Since each brand of powder has different characteristics, you CANNOT SUBSTITUTE one brand of powder for another while keeping the grains the same. For example, let's say that your reloading guide tells you that one possible load for your .308 Winchester rifle is to use 43 grains of Hodgdon Varget powder in each case. You don't have any of this powder, but you do have Reloader 15, a different brand of powder. At this point, STOP! Don't proceed further! The 43 grains of Hodgdon Varget is not the same as the 43 grains of Reloader 15! NEVER SUBSTITUTE POWDER without checking a reloading manual, as you could cause a disastrous accident.

To even further simplify this example, your car has a tank capacity of twenty gallons of gasoline. Just because someone

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offers you twenty gallons of diesel, doesn't mean you can use it in your car! *The weight of the fuel in gallons is identical, but the formulation is totally different!*

2. Bullet weights are up for grabs within a particular caliber. For example, if you shoot .308 Winchester, you can pick a bullet weight between approximately 100 grains and 200 grains, with something like fifty choices in between. There are tons of choices for a myriad of applications. Powder rate/bullet rate formulations have been meticulously time-tested to precision. They cannot be arbitrarily changed.
3. If your formula calls for 43 grains of a particular powder, this is based on a particular bullet weight! What this means is that if the formula calls for 43 grains of powder based on a 175 grain bullet, you **CANNOT** change the bullet weight without changing the powder as well. Do **NOT** adjust formulations!

To sum it up, your load is intricately dependent upon an **EXACT** bullet weight used with an **EXACT** amount of an **EXACT** type of powder. Unlike cooking recipes, there is no substitution of ingredients! As we mentioned earlier, however, some powders (in varying quantities, of course) will work with a range of pistol and rifle cartridges, so you really can purchase a single powder to reload a handful of calibers with, although this may not always make the most sense purely from a performance standpoint.

Step 7 – Think about Starting Charge and Maximum Charge: Once you have decided on the type of powder you want to use, plus the bullet type and weight you have in mind, its time to start thinking about the *starting charge* and *maximum*

Never charge a case with less powder than the starting load!

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Too much or too little powder in a cartridge can cause catastrophic accidents such as this!



charge (sometimes expressed as *starting load* and *maximum load*). What most novices don't understand is that the load is something you develop at first, for what works in your gun. Here is what you need to know:

Starting Charge or Load: This is the minimum amount of powder of a certain brand that can be used within the cartridge. Wait – minimum? Why would there be a minimum? This is because using *too little* powder causes a dangerous condition when you fire the round. Have you ever heard how a gasoline tank that is mostly empty of gas (but full of fumes) represents more of an explosion hazard than a full tank of gas? It's the same with a cartridge that has too little powder in it. What could occur here is that the gun could blow up rather than sending the bullet downrange! The starting load will be given in every single data book,

Never exceed the maximum charge load expressed in the manual.

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and varies by powder manufacturer, caliber, and bullet weight used. NEVER CHARGE A CASE WITH LESS POWDER THAN THE STARTING LOAD! This can result in a bullet stuck in the barrel and/or a catastrophic rupture of the cartridge which may injure/destroy the gun and/or injure, or even kill, the shooter or bystanders.

Maximum Charge or Load: Means just what it says. Never exceed the maximum charge load expressed in the manual. If the maximum charge is stated as 40 grains of a certain type of powder, for example, that means 40 grains on the nose, not 40.1 or 40.2 grains! NEVER EXCEED THE MAXIMUM CHARGE!

Often, there will be a range of acceptable loads between the starting load and the maximum load. For example, on a .308 Winchester using a 175 grain Sierra Match King bullet and Hodgdon Varget powder, the starting load is 42 grains while the maximum load is 45 grains. Any powder combination between 42 and 45 grains works in the gun safely. What exact load you put in there depends on what your gun “likes” best, which we will discuss later. On pistol ammo, since the cases are smaller, the range between starting load and maximum load can be as little as a single grain (not very much at all), which means you have to be quite a bit more vigilant and precise as to your powder loadings.

Step 8 – Starting a Batch: Thus far we have been speaking of reloading individual cartridges, but in reality reloading or handloading is a batch operation job. Usually, you start with a tray of fifty brass cases, and reload all fifty before moving on to the next batch. It’s not a true batch operation, however. You will prime all fifty cases at once, but not charge each case with powder at the same time because that could lead to spillage. Still, working with batch sizes of fifty keeps everything manageable. Most ammunition trays are made to hold fifty cartridges at a time, by the way.

Step 9 – Priming the Cases: Wearing a pair of safety glasses, begin by priming each case. Assuming you are working with new brass, what

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Using a Hand Priming Tool

you are essentially doing is pressing one primer into the primer pocket of each case, one case at a time, until all fifty cases are primed. Priming the cases can be accomplished with a number of tools, which we will discuss later. The key here is to make sure the primer is pressed into the primer pocket and sits either flush or slightly under the bottom of the case. Most priming tools accomplish this automatically, but in the event you have a

case where the primer is standing proud from the bottom of the case, you should (safely) de-prime the case or discard it.

Step 10 – Charge one case at a time: *Charging* the case is the act of putting a precise amount of gunpowder in that case. Usually, this step will be broken down into two sub-steps:

- 1) You will measure the powder precisely using any number of tools ranging from a digital scale, electronic powder measure, or powder throwing device. Without getting wrapped around the axle over equipment, the goal here is to measure out the exact amount powder your reloading guide requests. If it says each case should have 9 grains of powder in it, then you need to measure precisely 9 grains of powder.
- 2) You will place this precise amount of powder within a primed case. Usually, this is accomplished with a special funnel that fits over the mouth of the case. Simply pour the measured powder into the funnel and it will make its way into the case.

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ONLY CHARGE ONE CASE BEFORE SEATING A BULLET. A word about powder volumes is in order here—don't worry about what the powder looks like in the case from a volume perspective. Some powder charges will fill the whole case, others less than half. What is important is putting the precise amount of powder in the case that the reloading manual says. ***Nothing about powder measuring is done by eye!***

Step 11 – Seat a bullet: You want to seat a bullet on the case you just charged. Wait; why not just charge fifty cases, and then seat fifty bullets? There are good reasons for this. First of all, if you accidentally knock the cartridge tray and spill some powder, you won't know which case has less powder in it unless you re-measure all fifty cases. Also, if you have to walk

away from the operation because of a phone call or other emergency, you don't want to come back to cases which you had previously charged. What if someone else knocked them over while you were gone? The exact measurement of powder grains is important enough that you want to do it one at a time, then seat the bullet to seal it all in.



Seating bullets is accomplished by using a reloading press. What happens here is that you place the charged and primed case inside the shell holder of the press. The shell holder is a slotted piece of metal that holds the case so you don't have to. Then, you place a bullet inside the open case mouth. It won't go inside with just



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hand pressure—that's why you need a press. After placing the bullet on the case mouth, you then pull the lever, which actuates the press through one stroke. Using the correct bullet die for the caliber you are using, the press seats the bullet inside the case. When you release the lever, presto! You have a fresh, ready-to-shoot cartridge. It's really that simple.

A word about bullet seating depths is in order. Seating depth is a measure of how deep the bullet is pushed, or *seated*, into the case. The press can push it as far or as minimally as you like, but realize that for the novice, bullet seating depth is not to be fooled with. The seating depth of the bullet is directly related to the pressure within the case. Seating a bullet deep into the case raises the case pressure (possibly dangerously). Also, seating the bullet to a shallow depth can also increase chamber pressure, since the bullet is pressed right up to the lands in the barrel of the gun, and this can also cause a dangerous condition.

The safest thing for a novice to do is to stick with the published cartridge overall length (COL), which can be found in your reloading manual. All store bought, commercially-made cartridges have standard COL numbers. This is so that they can be used in a range of guns. For example, the published COL for .308 Winchester is 2.8" in length. This means that most commercial ammo for .308 Winchester will be 2.8" long from case bottom to bullet tip, measured with a caliper. If you adjust your dies so that your seating depth produces a cartridge with a COL that is exactly that of the published COL for that caliber, you'll be taking the safest, most reliable route. As with powder, Cartridge Overall Length is a precise measurement best done with precision calipers, not a tape measure or a ruler. These measurements must be precise. Usually, once you set your dies, the measurement stays constant.

Only charge one case before seating a bullet.

Step 12 – Continue: From this point, you will continue to charge an empty case, then seat a bullet, so on and so forth, until all fifty are loaded. Even though your die is set to a specific seating depth, you still want to measure every fifth round or so with a set of calipers to make sure that the COL stays constant. Some dies are good at maintaining seating depth; others tend to drift slightly. Check every so often to avoid loading the fiftieth round and then finding the depth way off. When complete, store your newly made ammunition as you would conventional ammunition.

PROCESSING FIRED BRASS

So your first batch of ammo is a success, and you shoot it at the range. Now what? The steps for converting once (or multiple) fired brass into freshly reloaded rounds is similar to starting with new rounds, but with extra steps added in there because you have to get the cases processed back into cases which are suitable for reloading. Here are the steps for making fired brass appropriate to reload:

Step 1 – De-prime the brass: Use a dedicated de-priming die (also called a de-capping die) to remove the spent primer from the case. This die has a thin, hardened steel rod inside which, when you insert a spent casing into the press, pushes the spent primer out of the primer pocket. Going through the case mouth, it simply pops the primer out. This operation is done as a batch job, meaning that you will de-prime all the cases that you cleaned in the first step. It's a relatively quick job; you simply insert a case into the shell holder on the press, pull the lever, and it automatically de-primed the case in a single stroke. The purpose for doing this step first is that the primer pocket will be automatically cleaned when the cases are cleaned in step 2.

NOTE: For once-fired military brass: The primers in military cases are crimped into the primer pocket. If you deprime (or decap) once fired military brass you will need to remove this crimp after removing the primer.

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This accomplished with a small hand tool designed specifically for this operation. The tool is called primer pocket swaging tool.

If you purchase once-fired deprimed military cases you will need to inspect each case to determine if the crimp has been removed before trying to install a new primer.



Brass cases before and after cleaning/polishing

Step 2 – Clean the fired brass: Your brass gets dirty in a number of ways. First off, the powder tends to blacken the cases both inside and out. Also, grease or oil from the chamber of the gun gets on the case and causes further fouling. Lastly, as the round is ejected, it lands on the floor or even in the dirt, gathering up contaminants. Take these cases and clean them using a *case tumbler*, which is nothing more than a motorized bucket that vibrates the cases, using media such as walnut hulls or corn husks to clean the brass as it tumbles. There are many ways of case cleaning, but a tumbler that can handle 250 or so cases at a time is the easiest. The media can also be reused.

Step 3 – Inspect and separate the fired brass: The best time to inspect the cases is after they emerge clean from the tumbler. There are a few things you will need to look for. First off, make sure that no cleaning media is inside the case, as the tumbling process often leaves media inside cases. Any debris or leftover media could potentially be catastrophic if left inside the case. Finally, look for bulges in the case walls or other abnormalities. These could mean that the cases have reached the end of their life spans, or are experiencing *overpressure*. Overpressure is a condition whereby due to the load that is being used, you are exceeding the pressure limits for that chamber. Most often, this occurs when you exceed the maximum powder charge in a case, but not always. Every reloader should be aware of the signs of overpressure:

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- Bulging case walls
- Cracked case walls
- Ejector marks on the bottom of the case. This occurs when the charge is so powerful that it rams the case into the ejector, leaving a characteristic half moon-shaped scar on the case bottom. Note that some ejector marks are due to the design of the weapon and do not necessarily signify overpressure.
- Flattened or dished primers. This happens for the same reason as the ejector marks, the sheer force of being rammed back into the bolt.
- Missing primers. Sometimes the charge is powerful enough to unseat the primer. This also happens when the case is too old and will no longer hold the primer due to the fact that the primer pocket has become enlarged.

Lastly, your cases could become damaged from simply stepping on them at the range by accident. Look at each one to make sure it still makes the grade. Any cases showing any of the defects mentioned here should be discarded and not reused. For safety, discarded cases should have their case mouths smashed shut with a pair of pliers before throwing them away so that they can never be reused.

Step 4 – Resize the Case using a Full-length Die: Full length resizing should be practiced by all novice reloaders until they fully understand the resizing process and the purposes for other resizing methods. Ammunition for use in semi-automatic firearms should always be full-length resized for reliable functioning of the firearm.

To understand full-length sizing, you need to understand what happens to the case when you pull the trigger. As the powder ignites, it causes the case wall to bulge out, instantly forming it to the inside of the chamber of the gun. This creates a case that fits very tightly in your chamber if you attempt to rechamber it without resizing. Unfortunately, this tight fit can

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cause ammo jams and unreliable operation in a semi-automatic firearm. To solve this problem, you need what is called a *full-length sizing die*. What this die does is crush the case back down to new specifications so that it will once again fit in any rifle or pistol of the same caliber.

There are certain situations where full-length resizing may not be the best method of case preparation; however, those situations and methods are best left to very experienced shooters and reloaders. As you gain experience and increased knowledge of reloading and accuracy considerations you will hear/learn about these other methods and may want to experiment with them. For now we will concentrate on the best techniques for novice reloaders.

Step 5 – Measure Case Length and Trim the case if necessary: After firing, some cases might grow too long and be out of spec. The expansion from firing and the compression from resizing work together to cause the case walls to become thinner and the case length to increase. The solution to this is to use a *case trimmer*. There are many simple, and many complex and expensive solutions, to case trimming. The easiest solutions are the ones that incorporate a trimmer and a gauge in one unit. Usually, you take a spent casing and insert the gauge into the mouth, and the trimmer shaves off a bit of the case mouth, bringing it back into spec. It's an exceedingly



*Hand
Cranked
Case Length
Trimmer*



*A Hand-Held Case Mouth
Deburring Tool*

easy operation, and again, a batch operation. You trim all the cases you cleaned and de-primed at once.

Depending on the caliber and type of case, your cases may need to be trimmed every time they are fired. Some cases may only require trimming after several firings. Straight walled revolver cases tend to need infrequent length trimming. Rifle cases with tapered walls and a shoulder will

require frequent trimming and may require trimming every time they are reloaded.

After trimming the case mouth, the edges should be deburred with a case mouth deburring tool. This tool will deburr the inside and outside of the case mouth. One end is for the inside and the other end for the outside of the case mouth. If this step is ignored, the bullet will be difficult to insert into the case and poor accuracy will result from inconsistent drag on the bullet as it exits the case upon firing. Also a burr on the outside of the case mouth can cause cartridge feeding and extraction problems.

Those cases which require frequent trimming will also experience rapid thinning of the case walls in the case neck area. Inspect your case every reloading and toss out any cases showing evidence of excessive thinning of the case walls.

Step 6 – Inspect the primer pocket: After cleaning there could be debris (burnt powder residue or small pieces of cleaning media) in the flash hole which could impede ignition when you reload. To remove the debris push a small brass rod through the flash hole.

Brass rods in appropriate diameters can be purchased at most hardware stores. A steel rod can be used, but it must have the end well rounded so



*Commercially Available Flash
Hole Cleaning Tool*



that it does not scrape or gouge the flash hole enlarging it. If you accidentally enlarge a flash hole, discard that case. The size of the flash hole is crucial in controlling the rate of expansion of the burning powder.

Step 7 – Expand the Case Mouth: After resizing the case, the case mouth internal diameter will be too small for easy insertion of the bullet into the case. Use a case mouth expanding die to slightly flare the mouth of the case so that you can insert the bullet just far enough to start it into the case. When you have your bullet seating die adjusted properly it will remove the flare and crimp the edge of the case mouth into the bullet's cannelure, if it has one.

After doing all of this, your once- or multiple-fired brass is now ready to be reloaded using the first set of steps that we showed you. Prime each case, pour some powder, and seat a bullet per the twelve original steps we illustrated.

LET'S TALK EQUIPMENT

Now that we have seen how simple it is to reload fresh brass, as well as process spent brass, and we have an idea of what steps are involved, we can now talk about all the equipment we need to reload multiple calibers.

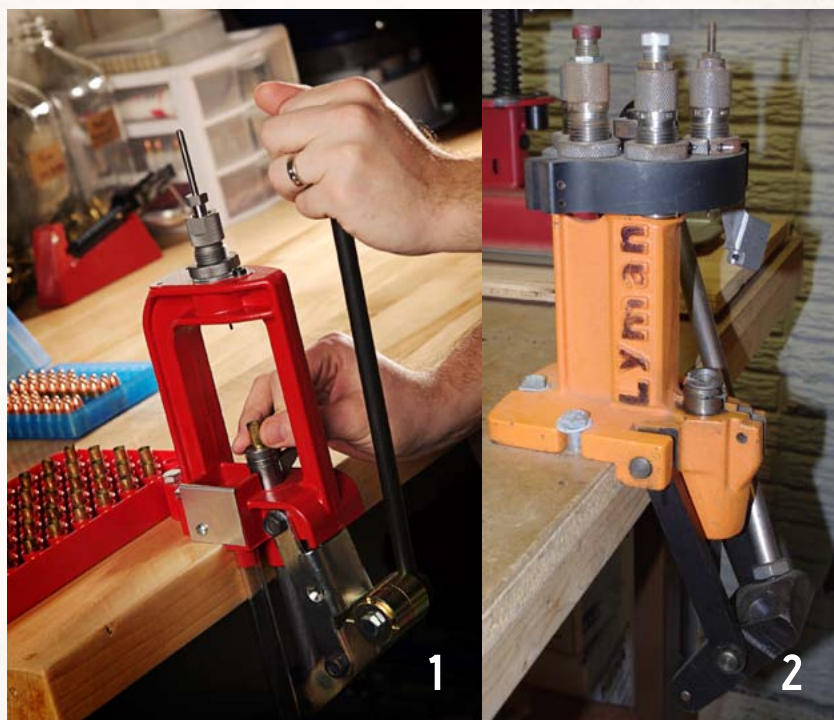
The Press: It all starts with the right press. The best press to purchase for an utter novice is either a *single-stage press* or a *turret press*. Both of these presses do just one thing and one thing only when you pull the lever. What it

Remember, you must purchase one set of dies for each caliber you wish to reload!

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does when you pull the lever is a function of what die you happen to have in the press at the time. Available dies are things like neck sizing dies, full-length sizing dies, bullet seating dies, and de-priming dies. Some presses also have crimping dies for rounds that require them. **Remember, you must purchase one set of dies for each caliber you wish to reload!** Single-stage presses are not the quickest to operate. They require replacement and readjustment of the die for each operation. The turret press differs from the single stage press in that the turret allows you to keep all the dies needed for your caliber mounted and adjusted and just rotate the needed die into position. Otherwise its operations is exactly like a single stage press. Pull the lever once, and you get one seated bullet. It's only that fast. This is okay, however, since the novice can precisely track what is happening at any given time and maintain a high level of quality control.

Multiple-stage presses are a little more complicated to use, and do several things at the same time. They are harder to learn how to use correctly



1. Single Stage Press 2. Turret Press
3. Spare Turrets with Die Sets



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than single-stage presses, cost more, and one pull of the lever can result in a half a dozen screwed up rounds instead of one. Multiple-stage presses are great when reloading lots of pistol rounds, for example. The novice should not invest in a multiple stage press until gaining considerable experience on a single-stage or turret press.

This isn't to say that single-stage presses are solely for novices. Consider that for precision rifle shooting, a single-stage press makes the most sense. Look for brands like the Lee Classic Press, Lyman, Forster, RCBS, Dillon, and other quality manufacturers. Don't try to save money on buying a cheap press. It will be the centerpiece of your reloading operation for years to come, and good presses will last decades.

The Scale: The single most important measurement you can make in reloading is the measure of the weight of the powder. It is so critical as to be a safety hazard if measured incorrectly. On the extreme low end, one can purchase a manual beam-type scale for less than \$20. Such scales come in base level reloading kits and are slow to use, but the better ones can be just accurate as higher end scales.

On the mid range, digital scales can be had for \$25 to \$120 or so, and are stable, accurate, and easy to use. If you purchase a digital scale from other than a manufacturer of reloading equipment make sure that it is capable



A Manual Beam Powder Scale with Pan

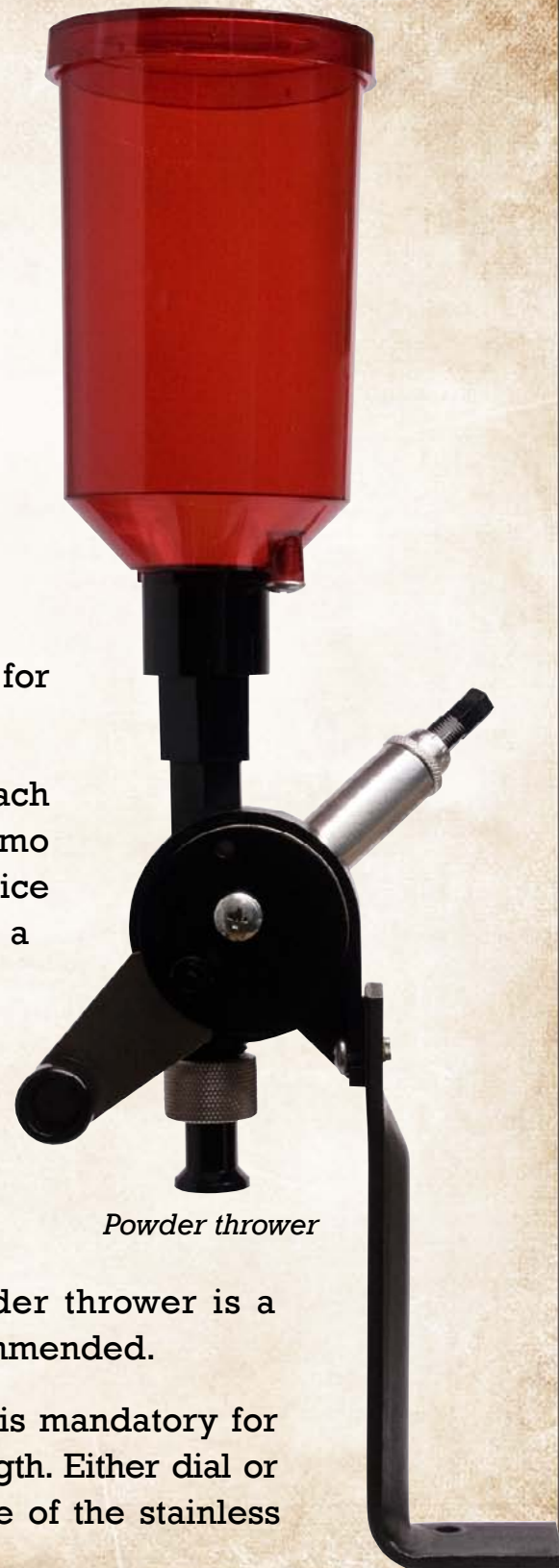
of reading in grains. Most non-dedicated digital scales can be programmed to read in several different units. Some of them can read grains and some cannot. When shopping for such scales be sure that you do not confuse grams (gr) for grains, these are not the same units. The digital scale must be capable of reading weight in grains.

On the high end, for \$375 and up, one can purchase an automated powder-dispensing scale. Basically, you key in the grains of powder you want, and then wait as the unit dispenses it. It's nice to have, but pricey.

Any of the scales discussed here are adequate for the novice reloader.

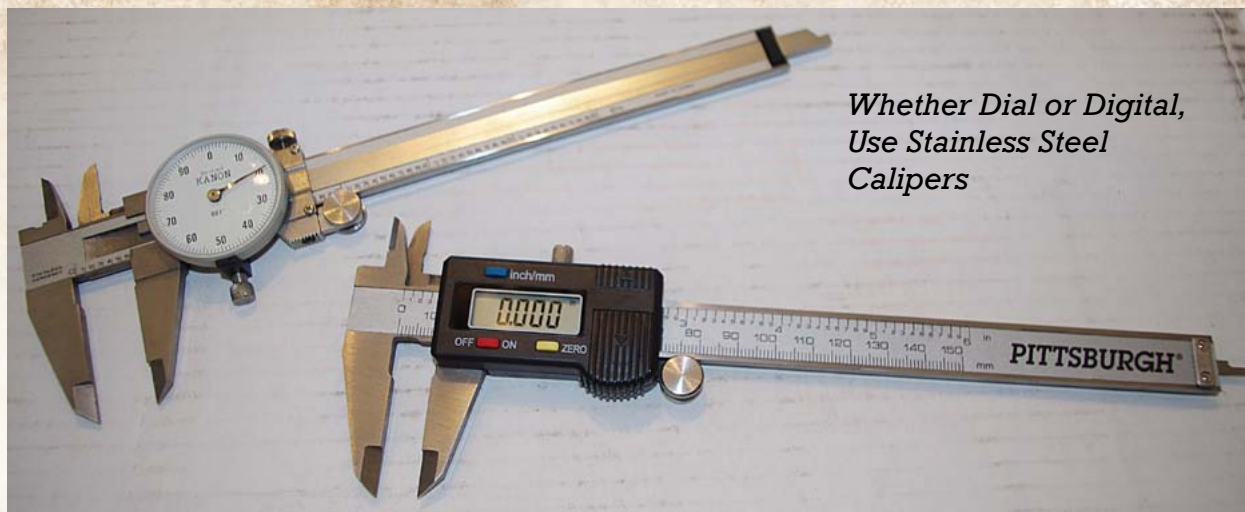
Powder Thrower: An alternative to measuring each charge on high volume jobs such as pistol ammo is to use what's called a *powder thrower*. This device uses a cylinder to hold the powder while using a pre-calibrated chamber to hold a certain amount of powder. The way it works is you pull the lever, and it dispenses a set charge based on volume. It's a good alternative for pistol ammo and speeds up the process to say the least. It's not precise enough to use on long range precision rifles, but it's great for pistols and general usage rifle rounds. A good powder thrower is a relatively inexpensive luxury and is highly recommended.

Calipers: A good set of dial or digital calipers is mandatory for accurately measuring finished ammo's overall length. Either dial or digital types are satisfactory, but they should be of the stainless



Powder thrower

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*Whether Dial or Digital,
Use Stainless Steel
Calipers*

steel type. Avoid using plastic calipers as the measuring surfaces can quickly degrade when placed against the sharp edges of the cases and bullet points.

Funnel: The powder has to make it from the pan of your scale into the case, which is usually a pretty narrow hole. Use a funnel made especially for that purpose.

Hand Priming Tool: There are dies available that will fit on your press and prime cases for you, but this takes a long time to set up. Some prefer a hand priming tool such as the one made by Lee Precision or others. This is essentially a hand-held mini press that has a primer tray attached. You fill the tray with primers, and then load a case on top. With each stroke of the



*Powder Funnel in Use (Notice how the funnel fits
down over the case to prevent spillage)*





Priming tool

hand, the press loads a primer into a case. Using this method, you can hand prime fifty cases in about ten minutes. Additionally, this gives you good tactile feedback on whether the primer is seated correctly. However, once a press mounted priming system is set up it can be as fast as or faster than the hand held tool. The press mounted priming system is a good option when very large batches (hundreds of

rounds) are being processed. Many presses come with a press mounted priming system and choosing to use it can save you the cost of purchasing a hand held tool. Always use safety glasses for this step regardless of the method you choose! Also always wear safety glasses any time you are handling primers!

Case Length Trimmer: The manual version consists of a small rotating blade powered by a hand crank. The trimmer has an adjustable stop you set for the proper case length. Again, there is an (expensive) machine available for this, but a standard hand crank case trimmer that can be purchased for around \$15. The hand crank trimmer is not difficult to use because only a very small amount of brass is removed from the case during the trimming process.

The hand crank trimmer is best for the novice because it is very easy to 'over trim' your cases with a power trimmer.



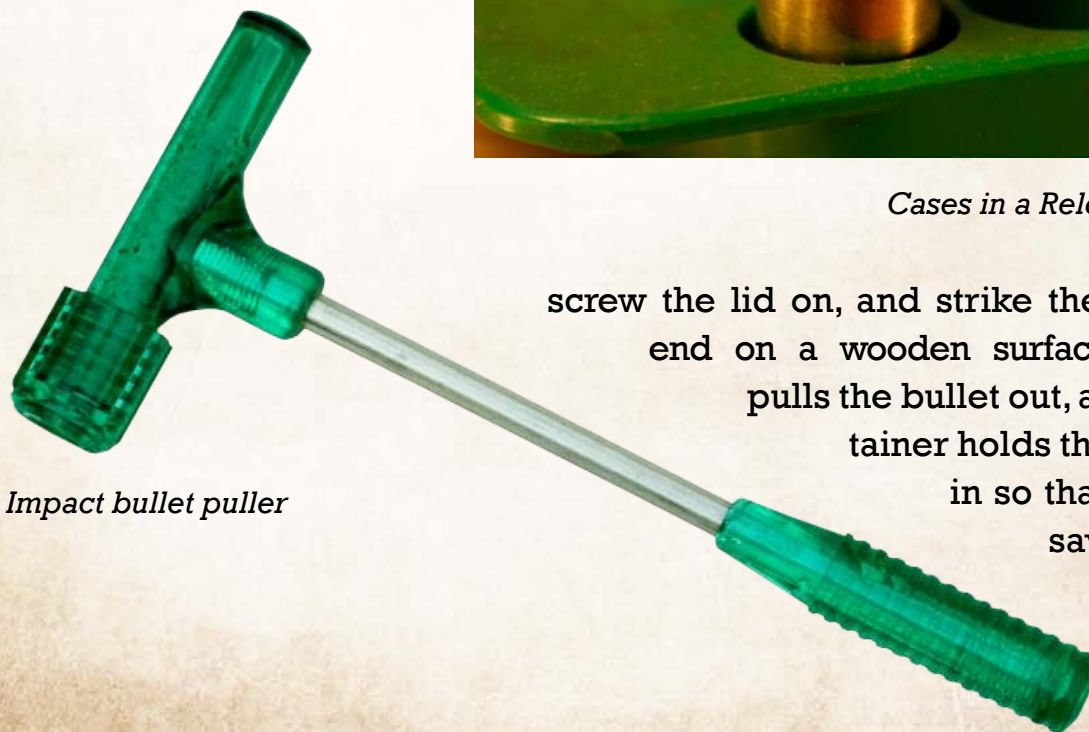
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Ammunition Tray: You don't want loose ammo rolling around while trying to reload. Put the cases in the tray so that they stay upright while you are charging them with powder.

Impact Bullet Puller: Occasionally, you will make a mistake and will need to unseat a bullet for whatever reason. An impact bullet puller looks like a big plastic hammer. You insert the bullet in the hammer's head,



Cases in a Reloading Tray



Impact bullet puller

screw the lid on, and strike the hammer end on a wooden surface. Inertia pulls the bullet out, and a container holds the powder in so that you can save it all.



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*A .45 Caliber Bore Brush Being Used
to Clean Inside a .45 Colt Case*



Bore Brush With Handle: This is nothing more than a cleaning brush that is sized for the caliber you are reloading, with a handle attached so that you can scrub out the inside of the cases. This is usually not necessary if you clean your brass with a tumbler.

Case Tumbler: These go from simple to fancy, but basically they either spin or vibrate the cases with cleaning media so that after two to six hours the cases come out nice and shiny.



Tumblers like these can clean several hundred cases at once.

Media Separator: Another bit of fanciness, albeit a cheap one, the media separator is a spinner you put the cases and the media in after they have been cleaned. You turn the handle and it separates the cases from the media in one fell swoop.

WORKING UP A LOAD

By now you have a good grasp of the basics of reloading and an idea of how it works. Now, you must take the basic concepts of reloading and then use them to work up a load. Recall that in our earlier section we mentioned that there was a starting charge for powder and a maximum charge, but wait... what about all the charges in between? Even if the starting charge was 9 grains, and the maximum charge was 10 grains, there's still one entire grain in there. What about 9.1 grains, or 9.2 grains, or even 9.8 grains? Which one is better?

The one that is best is the one that is the most accurate without exceeding the maximum charge. What you need to do is a load workup ladder, and it goes something like this.



A media separator allows you to quickly separate your cleaned cases from the cleaning/polishing media.

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1. Load five rounds at the starting charge.
2. Load five more rounds in half grain increments for rifles, and tenth of a grain increments for pistols. This means that if your starting charge for a rifle is 42 grains, and your maximum charge is 45 grains, you load five rounds at 42 grains, five rounds at 42.5 grains, five rounds at 43 grains, and so on and so forth until you reach the maximum charge.
3. Take your test rounds and your rifle or pistol to the range. Shoot the rifle from a bench or prone at a fixed distance target (usually 100 yards). For the pistol, consider borrowing a pistol rest or vise such as a Ransom Rest to hold it steady, and shoot at twenty-five yards or less.
4. Fire off one group of charges at a time, all five rounds, as carefully and precisely as you can. Mark where those rounds impact on the target.
5. Fire each subsequent group of five rounds, and as you start to increase the powder, look at the expended casings for signs of overpressure.
6. When you have shot and marked all rounds in each group, examine the target closely.

More powder doesn't necessarily result in a more accurate round.

Here's what you will see—a certain powder charge will result in a tighter group than the other charges. This is because the amount of powder creates a chamber pressure that's favorable to the harmonics of that particular rifle's or pistol's barrel and will result in a more accurate shooter. This blend of pressure and accuracy is referred to as an *accuracy node*, and you will most definitely be able to tell when you have found it just by looking at your target. Note that more powder doesn't necessarily result in a more accurate round.

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Using this method, you can find *precisely* the amount of powder that your pistol or rifle loves to shoot, based on the bullet weight you are using. When you find this number, simply continue to reload that charge with that bullet, knowing that you are shooting the most accurate powder and bullet combination for *your* gun.

IN CONCLUSION

Reloading is a fun hobby that puts the power of making ammunition back in your hands, where it belongs. Not only is it cost-effective, it is also a great way of producing super-accurate and reliable ammunition. Finally, it's a hedge on a despotic government and the effects of new laws that may arise in the future.

