Reloading Steel Shotshells
The Basics

I have put together this information to help those who would like to start loading their own steel loads but are not sure how to start. These steps and tools are the basic ingredients I use to produce my shells. Others may have different ways of doing business but this will get you started.

Safety:

You alone are responsible for the safe production of your shells, be vigilant of data and measurements. Follow data to the letter. I make no claims as to the safety of the activities shown in this document.

Knowledge and Data:

Knowing what you’re after and how to get it is half the battle. Reloading manuals for steel data are inexpensive and are an invaluable source of information. One of the best guides to understanding how and why to load steel is Ballistic Products (BPI) “The Status of Steel” followed by the Lyman 5th Edition “Shotshell Reloading Handbook”. Though both of these books have great explanations and data I primarily use Reloading Specialties Inc (RSI) “Shotshell Reloading Handbook Vol. 8 No 1” and Precision Reloading (PR) “Lightning Steel 2nd Edition” data. Data is also available from Alliant Powder and Hodgdon Powder Co online. The components used to make this guide are available from Precision Reloading and the data is from Lightning Steel 2nd Edition. I recommend you own all of the publications mentioned above.

Tools:

The Loader:

One of the most common shot shell loaders out there is the MEC 600 Jr. It is a great tool for steel loading as it is inexpensive, durable and parts/accessories are readily available. The MEC Sizemaster is much the same but uses a different sizing mechanism, comes with a primer feed system and has a few other minor differences. The MEC Steelmaster is identical to the Sizemaster but comes with steel charge bars, steel shot bottle, and steel drop tube. All of these loaders can produce 2 ¾’ and 3” shells with only minor adjustments. The Steelmaster has a 3 1/2’ model as well. If you are interested in the MEC loaders please consult their website to decide on which model is best suited for your needs. Single stage loaders are preferred by most for making steel loads due to the limitations of the components used (you will see later on). Other loaders will work well, some are arguably better, but I think you’ll find the MEC the most common. Below are links to loader manufacturers. The loader I used for the demonstrations here is a MEC 600 Jr. I think the most versatile MEC loader for all-a-round loading is the Steelmaster in 3 1/2”, with the right accessories it will do everything you would want to do.

Loader websites:

www.mecreloaders.com       www.rcbs.com
www.reloaders.com            www.leeprecision.com
Powder and Shot Handling:

Alliant STEEL powder:

When loading steel you will come to find that Alliant STEEL powder is used in the majority of loads. There are good loads using other powders as well but STEEL is preferred due to its ability to achieve higher velocities at lower pressures with a large variety of payloads in all weather conditions. STEEL is a bulky powder and cannot be “dropped” using a charge bar with any real consistency: therefore, you must “dip” and weigh each powder charge before you load it. If you use other finer powders you will be able to load using a charge bar as done in target loading, but you may give up some performance while doing so.

Scales:

An accurate scale is essential for loading steel. Quality scales are accurate to within 1/10th of a grain. Most of the loading equipment manufactures make good scales that are readily available. There are two types of scales: balance beam scales and digital scales. Both are accurate (providing there quality is equal) and will do the job well. There are fancy powder dispensers that will weigh a charge automatically for you. They are great tools, but to start a good scale is all you need. It’s still all I use.
What I look for and prefer in a scale:

1: Accuracy of 1/10 grain

2: Capable of measuring minimum 700 grains because you will need to verify shot weights too. Scales with less capacity will work but you may have to weigh some things in two parts.

3: Digital scales are faster and easier to use so personally I would pick a good digital scale.

Powder and Shot Dippers:

You can use anything that will give you your required, measured amount of powder or shot. I use LEE powder dippers to measure powder but sometimes they aren’t large enough so I end up using two to give me my powder amount. There are also adjustable dippers available for the task or you can easily make your own dipper out of any spent hull or what ever else you can find. I caution you that even if you use a calibrated dipper (of any type) you need to verify every STEEL powder charge on a scale. You may want to weigh your shot charges as well even if they come from a proven dipper. I recommend that you do. For shot, especially larger shot, you can also use an empty primer tray to count the pellets by taping over the unwanted holes. With quality shot this will give you an accurate measure. Tables with the number of pellets for a given shot size and weight are listed in load data books.
Other Tools:

You will need some basic hand tools for adjusting the loader. A flat tip screw driver, an Allan key and some wrenches. All are common and you are likely to have them around the house.

Another tool that is helpful but not necessary is the all gauge multi tool. It is used to prepare the hull mouth to insert the wad into the hull and seat the wad on top of the powder.

A digital caliper for checking crimp depth is helpful and inexpensive. They are available at most hardware stores.

**Digital Caliper:**

To check crimp depth: Take an average reading in a few places as shown. Use the metal rod that sticks out from the caliper as your feeler gauge and rest the edge of the metal bar on top of the crimp rim. If you look real hard here you can see the metal rod just to the left of center in the yellow circle.

Depth should range between .050” and .070”
Components:

Shot, powder, primers, wads and hulls are the required ingredients, but first things first. What is your load going to be? Pick a load from your chosen load book and get exactly what it lists. For the purposes of this demonstration I am going to load a 2 ¾” shell with 1oz of steel #3s at a published velocity of just over 1600fps from Precision Reloadings “Lightning Steel 2nd Edition. All components should be new and exactly what is listed in the data. The hull is the only “used” component (you can get new hulls too). My advice is use only once or twice fired clean, dry and undamaged hulls. Carefully look them over and discard any with splits in the base wad, crimp fold or base. Using poor hulls for steel hunting loads is counter productive as poor hulls will not yield the same velocity or down range performance as hulls in excellent condition.

Steel shot and Powder:

Steel shot:

Steel shot comes plated or non-plated. I prefer plated only because it offers some protection against rust and corrosion. Ballistically they will perform equally well. Shot can be plated in copper or zinc (left). Shot manufactures include RSI, BPI, and PR. All are quality products.

Powder:

Here are some powders commonly used for reloading steel shells.

All will work well within their limitations.

Follow manufactures instructions when handling powder.

Powder type and quantity is listed in load data.
**Primers:**

All available primers work exceptionally well. There is no need to substitute primers because of quality issues related to an individual brand. Always use the primer listed in your load data, never substitute.

The relationship between primers and powder is complex, especially with regards to loading steel. Each combination reacts differently with each other and will yield different, unpredictable pressures because of this. When you add these unknown variables with still other variables like wads, shot weights, and hull type you run the risk of creating a real monster.

When using European hulls (Cheddite, Fiochhi, etc) with North American primers you may have to resize the hulls primer pocket so that the primer remains snug and does not fall out of the hull. BPI and PR sell this tool. European primers and primer pockets are slightly larger than North American brands.

**Wads/Fillers and Over shot cards (OSC)**

<table>
<thead>
<tr>
<th>Wad/Card/Filler Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felts, cork wads/fillers and OSCs are used to adjust load height in the hull to get a proper crimp. Here are some basic guidelines.</td>
</tr>
<tr>
<td>Felt filler wads can be used under or over shot.</td>
</tr>
<tr>
<td>OSCs are used over shot only, never under shot.</td>
</tr>
<tr>
<td>Cork filler wads (not shown) can be used in place of felts but under shot only.</td>
</tr>
<tr>
<td>20ga filler wads are usually used in 12ga loads.</td>
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</tbody>
</table>

If wads are un-slit and you’re in doubt as to what to do, cut 4 even slits vertically down the wad until about 1/16” from the shot cup base and you will be OK. BPIs steel manual covers this topic.

Cushioned wads usually use less filler wads. Un-cushioned wads usually use filler wads.

Follow load data for the use of wads, fillers and OSCs. When in doubt and you need to fill out a shell use felt spacers (over or under) or cork (under) shot. Felts and cork will not increase pressure in a load when used properly.

<table>
<thead>
<tr>
<th>Tips for wads, fillers and OSCs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limiting the use of any fillers/OSC over the shot eliminates the possibility of fillers interfering in your loads pattern.</td>
</tr>
<tr>
<td>You can usually get tighter crimps using cork wads than felts, resulting in more consistent loads.</td>
</tr>
<tr>
<td>Custom slitting wads can help patterns. All wads must be slit at least 2/3 of the wads length. Minimum 2 slits in the wad.</td>
</tr>
</tbody>
</table>
The Loading Procedure

Remove spent primer:

Please Note:

I recommend removing the wad guide fingers and top portion of the drop tube. The top portion of the drop tube is not required because I do not drop my shot or powder charges via a charge bar. Due to the dimensions of steel wads and the space available, the wad fingers only serve to get in the way, hence the all gauge multi-tool for inserting the wad.

A  Place shell under de-prime station tool and pull lever fully to remove primer and resize brass head

B  Resizing collar should not contact loader base when no shell is in this station.

Collar should slide over brass all of the way but should not be set so that severe force from the tooling is transferred into the loaders base or so that it distorts the hulls brass head.

The smaller 2nd ring is to lock to collar in place once adjusted.
Prime the Hull:

A Set primer in seating cup
Verify that the cup is clear of obstructions.

B Place hull on priming ram and pull down to seat the primer.

C Be sure the primer sits completely flat to the base of the hull and is firmly in place.
1. At this point all you have to do is simply pour your accurately weighed powder charge into the hull. A small funnel may help.

2. Using the all gauge multi tool or equivalent widen the mouth of the hull to accept the wad and push the wad firmly against the powder. All wad petals should sit flat on/against the hull wall. Wad petals should not overlap, if they do push them into place.

3. At this point you could set the wad pressure directly on the wad, but I choose to do it over top of the shot. See Fig: TP for setting wad pressure. Either is a valid method.

4. Pour in your weighed or counted shot charge. Gently tap on the shell to settle the shot. Once it looks like its settled fully put it on the loading press and using the wad pressure gauge apply the desired amount of pressure. See Fig: P1 below.

For steel I usually set wad pressure over the shot as opposed to applying pressure directly to the wad. Either method will work but doing it over shot can help make tight fitting loads fit better in the hull. This in turn can prevent crimping issues. You should have some wad pressure on your loads just to insure proper wad seating. 30 lbs is a good starting point. Try both methods and use the one that works best for you.
Wad pressure is set by loosening the Allen screw A.

Then move the drop tube B up to reduce pressure or down to increase pressure.

Retighten screw A after adjustment and check if your adjustment was successful. Take care not to over tighten the Allen screw.

C Pressure indication is in lbs. Reading is achieved when indicator reads the appropriate value. If you wish you can set the pressure so that your desired reading is reached on the full downward pull of the handle, but it is not necessary.

D There are lines marked to use as a reference on the drop tube.
Crimping stations: Crimp start

Crimp starter should be adjusted so that the opening in the hull is the size/diameter of a standard pencils eraser.

This step has an impact on the final crimp. This is my preferred setting for all my loading.

Fig: S1
Crimp Start

OK. Now the final crimp stage, when set properly this is what you end up with.

In the following pictures I will explain these adjustments using examples. They are the most important adjustments on your loader.
Crimp depth adjustment: Fig: C1

To adjust the crimp depth you must loosen nut B slightly (just enough to make the adjustment), then you can turn screw A as required.

Turn A clockwise to make crimp deeper. Plunger moves down in the die

Turn A counterclockwise to make crimp shallower Plunger moves up in the die.

When adjustment is finished tighten nut B.

Cam/ Taper adjustment: Fig: C2

To adjust the cam X loosen allan screw A slightly.

Rotate X up to loosen the crimp. Take the “swirl” out of a crimp.

Rotate X down to tighten the crimp. Shrink the size of the “hole” in the crimp.

Tighten Allan screw A when done. Do not over tighten or you will strip the cam.

Adjust only small amounts 1/32” -1/16” at a time. This adjustment can change things quickly.
Crimp adjustment Example 1: Adjusting crimp tightness

**Remove swirl or loosen crimp:**

What I did here required only a small adjustment of the cam/taper section. I loosened the Allen screw A from Fig: C2 slightly and then rotated the X cam *up* about 1/16”. A hair more adjustment in the same direction would remove it completely.

![Before and After comparison of crimp removal](image)

**Close a hole or tighten crimp:**

In this case I loosened the Allen screw A from Fig: C2 slightly and then rotated the X cam *down* about 1/16”.

![Before and After comparison of crimp tightening](image)
Crimp adjustment Example 2: Wad Pressure/Height Adj

What I want to show here is that if everything seems pretty much the way you want it but your crimp is still a bit “pushed in” adjusting wad pressure may remedy it. In some cases you may need to add a felt/cork spacer as well.

The reverse is also true. Sometimes in order to get the crimp that extra little push down extra wad pressure will do it. Or the removal of a felt/cork spacer may be necessary.

Cushioned wads react more to wad pressure adjustments, but it still has an impact with non-cushioned wads.

This is usually for small amounts of adjustment. In extreme circumstances when things are really tight it could make or break a load for you.
Crimp Adjustment Example 3: Things have gone terribly wrong…

…and yes I made this mess. It can happen when you change loads often.

Ok gents if your at this point or worse do not panic we will get it sorted. These are the steps to follow when the wheels have come right off.

1. Verify your load data. Be sure your components match those listed exactly. Look at the height of the shot column in the load for fit issues. Recheck all measurements, hull base wad height, wad type, fillers and possibly even shot size. If it all checks out carry on.

2. Set your crimp start as shown in Fig: S1.

3. At this point either crimp depth or cam/taper adjustments can cause this, so the first step is to adjust cam/taper to the most open/loose position. Rotate cam X all the way up. This will eliminate any buckling issues associated with the cam adjustment. See instructions on Fig: C2.

4. Try another load. This time at the final crimp stage go slowly and watch for any buckling of the hull near the brass head/sidewall. If it still buckles or wants to, proceed to the next step. If it no longer buckles go to step 6.

5. At this point if the data is followed correctly it is likely that the plunger is set too deep. Adjust plunger CCW up as shown on Fig: C1. Start with at least one full turn CCW. Continue to do this until the buckling /over pressure stops.
6. Once the buckling has stopped, continue adjusting the plunger Fig: C1 until you get the crimp depth to about .065” (aprx. 1/16”) (Fig: DC) once its there adjust the cam/taper Fig: C2 down as necessary so that you have a tight crimp. Recheck your depth and further adjust until the crimp is flat. (wad pressure or filler wads perhaps?)

7. Once you’ve got the crushing and buckling sorted you may have to go back and forth with the adjustments until you are satisfied with your final crimp quality.

One more thing…

**Crown lines and taper:**

As you adjust for your final crimp keep an eye on how the “crown” of the shell turns out. The shell on the left has ample taper and smooth lines, this to me is ideal. The shell on the right (while not bad) does not have quite as rounded or smooth a crown as it could. At this point you are fine tuning so a touch of adjustment to cam or depth should do the trick. I would shoot either shell. Unfortunately this picture is the best my photography skills would allow me to illustrate, but you get the idea.

![Great lines](image1.png)

Great lines

![OK lines](image2.png)

OK lines

Do not allow the crown to become wider than the hull body.
Websites:

www.bucksrunsports.com (RSI retail)

www.ballisticproducts.com

www.precisionreloading.com

www.lymanproducts.com

www.mtmcaseguard.com

www.alliantpowder.com

www.hodgdon.com

www.wholesalesports.com (Canadian/RSI components)

www.bilozir.net (Canadian BPI/reloading distributor)

Conclusion:

I did not cover changing your loader over to load 3” shells. This is shown well in the loaders manual which you can download free from MEC on their website. With the exception of the addition of de-priming and priming spacers all the crimp adjustments and tuning for 3” shells are the same as shown here for 2 ¾” shells.

I also did not cover the sizing adjustment on the Sizemaster or Steelmaster. This is shown well in the loaders manual. Again it can be downloaded free from MEC on their website. The one question that seems to come from this is; what size should the resizing collet be set to? My advice is to take the time and set it to just fit the chamber of your shotgun. If you have several guns take some empty hulls or a measuring tool and figure out which gun has the tightest chamber and setup for that one. Do not try to over size or you run the risk of damaging the loader.

I hope this information has been useful to you. I have tried to cover the items that bring the most questions for those starting down the steel loading path. Should you have more questions please send me (Rob MacK) a private message from the Duckhuntingchat.com website or post your question on the reloading and chokes forum if you would like more opinions.

Cheers,

Robert MacKillop
“Rob MacK”
Cape Bretons Heavy Metal Redneck since 1972