

Make your own chamber reamers

By *Deth502* 14 January 2010

Me, being the cheap bastard that I am, I always prefer making my own before I'll buy anything. Why should needing a reamer to chamber a bbl be any different??

I've made a few before, but now, in the face of a new project in .38 special, I'm in need of a new chamber reamer in that caliber. So i figured id open a small window into the workings of how the firearms hobby relates to me. The 38 spl is about as straight forward and as easy as you can get as far as making a chamber reamer, so i figured this would be a quick project to post.

It all starts with a shitty, hard to read, chicken scratch drawing of mine containing all of the pertinent numbers needed to complete the project. From there, I grab a length of 1/2" diameter O-1 drill rod from the materials pile, and chuck it up in the lathe.

To start, i turn about 2" of it to the maximum (case rim) diameter.

I don't know if you can tell because of the poor quality of the cell phone pic, but there are 3 rings near the back there. At first, I turned it .003" too small, so i pulled it out a bit further to cut more of the virgin drill rod. I wasn't going to make that mistake again. And I didn't. I only cut it .001" too small the 2nd time !! Oh well, 3rd times the charm.



After that, I turned down the major body diameter for all but the last approx 1/4" of the area i was working with.

The taper in the specs for this cartridge had it at a difference of .001" over the length of the case, 1.10", not enough, IMO, to warrant any fancy machining techniques, just a few swipes with the file to put the ever so slight taper in, and the case portion of the cutter was turned.

Next to cut the throat cutter portion of the reamer.

I put some dykem blue over it, and scribed a line where my prints told me to, as the start of the angle for the throat, and I set my compound to approx the specified 6.5 degrees. My compound is calibrated in 2.5 deg increments, so its pretty much a guessing game.



Then I just guess an appropriate place for the taper to end, doesn't really matter as long as its thinner at the pilot at that point, again, just a guess, and plunge the cutter in some. Keep working it back and forth with the compound and plunging in a bit deeper.

When the cut comes up to meet the scribed line where the case ends, its done.





Now I shorten the excess portion in front of the cutter. I eyeball approx 1.5x the bore diameter for the length of the pilot, and begin to remove the rest.

Once that is done, I turn the pilot to the correct diameter.



Then, a quick chamfer of both edges of the pilot with a file, and some polishing with some sandpaper (the entire reamer was cut to .0005" over the print to accommodate this) and the profile is done.



Loosen the chuck, slide the drill rod out a bit further, and part off.

The next step is of to the mill to cut flutes and a driver surface on the back of it, but i've been in the shop for an hour at this point in sub zero temps, and I'm far too cold to work on anything more today. More to come.

Ok, despite my not wanting to go to the cold shop, I just noticed i was nearly out of heating oil, so i cut the thermostat back to 58 so I don't go dry until it gets delivered, so at this point, its just about as cold in the house!!!

Now the key to doing the fluting quickly and easily are the collet blocks. I needed them for a project, and kept putting them off. I finally just bit the bullet and got a set off ebay for, iirc, \$30-40 shipped. Great investment. Now, if you had a spin indexer or the like, I'm sure that would be just as easy.

First I clamped it up butt end out in the hex block. I don't like the square shanks on reamers, as its harder to find something to drive it if your doing any final sizing with it by hand. To easily cut the hex drive, I set up a clamp to use as a stop block.



Then I did a little math and set the depth to make a 7/16" hex, and made the cuts back and forth, to insure they lined up (the stop block comes into play here)

and in a short time, I had my drive hex cut on it.





Now on to cutting the flutes.

I set the bottom of the cutter to the centerline of the reamer blank. The bottom of the cutter will be making the working surface of the reamer.

One thing to be careful of is the side that you cut the flute on. A little caution here can help keep you from ending up with a handful of "left hand" reamers, like myself. They will still work though, as long as you turn them backwards.

Then, I plunge in the cutter to about 1/3 of the blank diameter. This is another one of those "eyeball" dimensions that really doesn't have to be that accurate. And proceed to cut the flute.



Then a few quick turns of the collet block, repeating the cut, and the flutes are finished.

Next step, hardening.

I've never found the need to temper any of my specialty cutters. This is all that I do.

First, the set up. I chuck the reamer up in the drill press. I do this to spin the reamer, to help assure that its heated evenly to avoid distortion, plus, being that its hanging down, will also resist warping from gravity when its red hot and can "droop" one way or the other slightly. Also, make sure that you have your quench medium ready and able to be used on the reamer. Mines in that cayenne pepper container. I had to lower the drill press table a little before I started or I wouldn't have got it under the reamer when I needed it.



Then just play the torch flame over it until it get to a cherry red. I'm about half way there here:

once its a full cherry red, don't rush, hold it there for a minute or so to let the heat do its work. When your ready, simply remove heat and dunk.

Here's the hardened reamer.



Now to the sharpening.



First I take it to the bench grinder and relieve about half of the remaining .100" cutting surface left from the fluting operation.

Then I simply stone the edges to finish it.

Getting both the outer diameter edge, and the inner flat edge that meet at the cutting point.



One last step (I should have done this before hardening, but I forgot) mark it so I'm not wondering what its for next time I come across it in the tool drawer.

Cant really make it out from the bad pic, but I just stamped

38
SPL
BBL

into the shank with a 1/16" stamping set.

Project finished. Less than 2 hrs time, and some on hand materials, and I saved the \$80 + shipping + waiting over buying a commercial reamer. Not to mention the satisfaction of doing it yourself.

Now to test it.....

I faced off my bbl blank, just to get a square end on it.



I was just going to do this under power, as its damn cold out there, and i wanted to finish quickly!!

Well, there was a problem with it. I chucked the reamer in the drill chuck and just slid the tailstock forward under hand pressure to ream the chamber. Pushed it halfway in, withdrew it to clean the chips, then the second cut down to the rim, clean and re-oil, now the problem. It worked so good, i just put a little pressure on it and it went right in, and cut the chamber too deep!!! Not a problem, this 18" blank will only be around 6" when I'm done, so I have plenty of material to face off another few thousandths from the rear.

Here's the reamed chamber:

you can see how deeply a 38 spl sits in the bbl from my heavy handed reaming.





And for comparison, here's a 357 mag in the chamber, notice how it not only doesn't seat to the depth of the 38, but also sits proud of the face of the bbl. Proof of concept that this 38 chamber will exclude a 357 round, just in case!.

And that's that. I hope I have encouraged others to be less reliant on specialty tooling suppliers. After all, if i can do it, it sure as hell cant be that hard!

Thanks for looking.