

50 Caliber Cross Twist Pen Tutorial

By Les Elm © 2008

Making pens using rifle casing and bullets is nothing new. I have seen photos of cartridge pens and read tutorials on various pen making forums and decided to try making a 50 Caliber Twist Pen using an actual Copper bullet for the Nib with a Cross style refill. The following instructions are what has worked for me. As you make your own pen you may find different ways to make this pen.

The Casing is a once fired 50 Caliber Military Brass with a spent primer which will be left in place. A spent primer will have an dimple in the end of the primer. Usually the neck on a once fired cartridge will be stretched enough so the bullet will turn freely inside the neck.

The bullet used to make the nib is a new Hornady .510 50 CAL 750 GR A-MAX. (Advanced Match Accuracy) with a copper jacket, aluminum tip and a lead core. One of the first jacketed bullets produced for non-military use.

The hardware pen kit required for this Cross style twist pen is 2 - 7mm brass tubes and a 7mm transmission.



Military 50 Caliber Brass Casing



Hornady .510 50 CAL 750 GR A-Max

Preparing the Brass Casing

The cartridge is mounted on the lathe using a Dead Center in the head stock and a Live Center in the tail stock. The casing is mounted between centers with the tip of the live center in the dimple in the primer. **Don't over tighten the casing or the Dead Center will swage out the neck.**

Depending on how heavily the brass is tarnished, clean the brass starting with super fine steel wool and the finish cleaning and polishing with liquid Brasso. At this point clean the brass with lacquer thinner to remove any residue that may interfere with any final coating to be applied to avoid tarnishing. Some prefer no coating and can be cleaned with Brasso as the brass tarnishes.



Polishing and Cleaning Between Centers

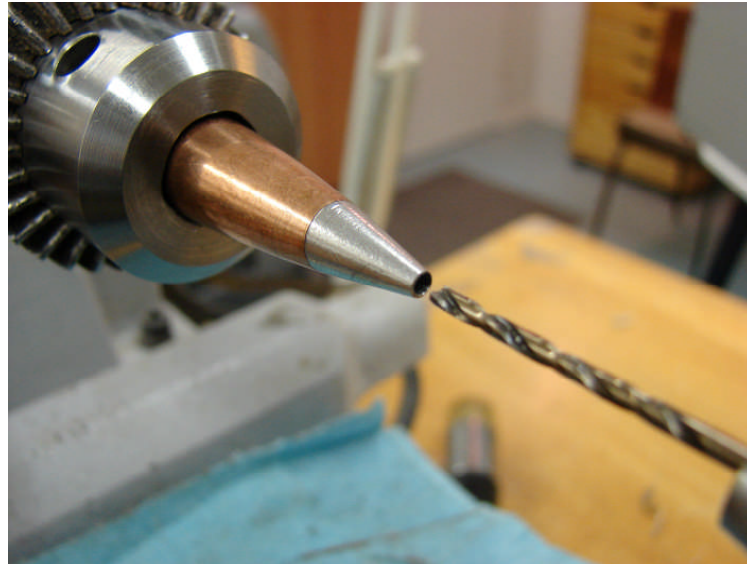
Preparing the Cross Refill Bullet Nib Assembly

Install the bullet into a 5/8 drill chuck with the point facing out, tighten by hand and file 1/8" off of the tip to a square flat surface. **Don't over tighten the chuck or it will mark the copper bullet surface.**



Aluminum Tip Filed Flat

Install a drill chuck in the tailstock with a #46 drill bit and drill hole in the center of the flat bullet tip to a depth of 1/2" drilling slowly using Rapid Tap Drilling Fluid.



Drill to 1/2 Inch With # 46 Bit

Reverse the bullet in the drill chuck and drill a pilot hole to a depth of 1/2" in the center using #46 bit drill. Install a 9/64" bit and using Rapid Tap Drilling Fluid drill to a depth of 2-1/4" to avoid drilling through the sides of the bullet tip. Stop frequently to clean the hole a bit.

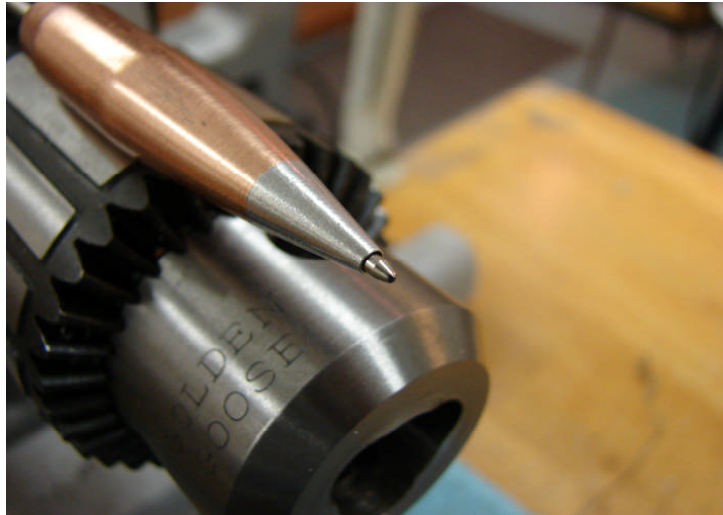


#46 Pilot Hole Drilled to a Depth of 1/2"



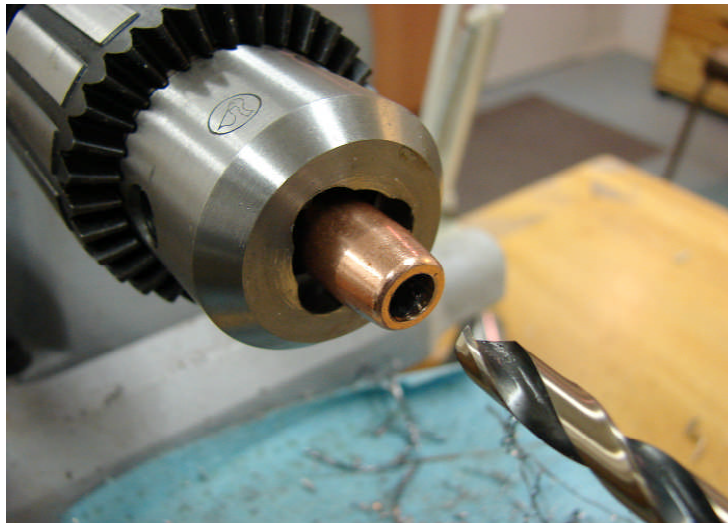
Drilled 9/64 Cross Refill Hole to 2-1/4"

Remove the bullet from the chuck and take a Cross refill, insert through the 9/64" hole and check for the correct amount of refill tip reveal.



Cross Refill Tip Reveal

Reinstall the bullet into the 5/8 drill chuck and drill to a depth of 1-1/2" with a 7mm drill bit being careful not to drill through the tapered side wall of the bullet.



Drilled to 1-1/2 inches With 7mm Bit

Completing The Cross Refill Bullet Tip Assembly

Remove the bullet and clean all the drilling fluid and filings from inside the 7mm hole. Rough up a 2 “ length of 7mm brass tube with 220 grit sand paper. Insert the tube into the 7mm hole and there should be approximately 1/2” of tube extension above the bullet end.

Remove the tube and run a 4-5 drops of Medium CA down and around the inside wall of the bullet through the 7mm hole and at the same time put a small amount of Medium CA around the mid section of the brass tube. Insert the tube through the 7mm hole with a twisting action. **Do all this quickly to avoid CA running into the nib hole. Remove any excess glue from the top of the 7mm hole.** Stand the bullet with the tip facing up and let the Medium CA cure over night.



7mm Tube Installed In Bullet

Insert a Cross refill through the 7mm hole to ensure that the refill tip will come through the bullet nib hole is not plugged with glue. If there should be glue plugging the hole run the #46 bit through the tip and insert the 9/64” bit through the tube and clean out.

Press in the transmission while checking with the refill until the correct refill tip reveal is achieved. Check operation to ensure the refill smoothly extends and retracts through the bullet tip.



Completed Cross Refill Bullet Tip Assembly

Cleaning and polishing the of the Copper and Aluminum is done by removing the refill from the transmission and installing the completed bullet tip assembly into a drill chuck and hand tighten the chuck. **To avoid damage to the tube and transmission do not over tighten.**

With the lathe running clean up with super fine steel wool. Finish cleaning and polishing with liquid Brasso. At this point clean the brass with lacquer thinner to remove any residue that may interfere with any final coating to be applied to avoid tarnishing. Some prefer no coating and can be cleaned with Brasso as the copper tarnishes.



Cleaned and Polished Bullet Nib Assembly

Completing The Cross Refill Dowel Insert

Insert the completed bullet tip assembly into the casing neck to allow a total of 1-5/8" above the neck and mark with a felt tip marker.



Mark the Bullet at the Casing Neck

Insert a piece of 1/2" dowel into the casing as far as it will go to bottom out on the inside casing head. Mark the end of the neck on the dowel and remove. Place the bullet tip assembly beside the dowel with the mark lined up with the mark on the bullet. This is where the tail of the bullet will sit when completed. Place a mark on the dowel to line up with the bottom of the bullet and cut the dowel on this mark.



Cutting the Cross Dowel Insert to Length

Install the dowel in 1/2" collet and drill a 7mm hole through the center of the dowel. Drill a 3/8" recess a 1/4" deep. Slide a 7mm tube over the transmission and slide the dowel onto the 7mm tube and cut so the tube is flush with the bottom of the 3/8" recess. Glue the tube into the dowel insert. Insert a short piece of 3/8" dowel and glue it into the recess to seal the hole and cut the dowel flush with the end of the insert.



Insert With Tube Installed Flush



Insert Recess Plugged

Completing The Casing

Check that the length of the insert is correct by seating the bullet tip assembly into the dowel insert and check that the refill retracts smoothly in and out of the bullet tip.



Dowel Insert Installed on Bullet Tip Assembly

Place the insert and bullet tip assembly into the casing to check for correct length of bullet extension above the casing neck. Remove the insert and bullet tip assembly from the casing.

Next place 15-20 large drops of Medium CA into the bottom of the casing. **Ensure that no CA gets on the casing neck.** Push the insert and bullet tip assembly down to the bottom of the casing into the Medium CA. Push and twist to ensure an even spread of CA around the bottom of the insert. The bullet tip assembly will center the insert in the casing. Stand upright and let cure overnight.



Dowel Insert and Bullet Tip Assembly in Casing

Check the twist action to extend and retract the Cross refill and the Bullet Tip Assembly should rotate smoothly inside the casing neck. If the Bullet Nib Assembly dose not rotate smoothly in the casing neck remove the Bullet Tip Assembly from the dowel insert and sand the inside of the casing neck with some 220 grit sand paper.

You will notice that the dowel insert will be centered the casing just below the casing neck. No extra support around the top of the Dowel Insert should be required with the Dowel Insert securely glued into the bottom of the casing.



Dowel Insert Glued into Casing Bottom

Insert the Bullet Tip Assembly into the Casing and Dowel Insert. To Change the Cross refill twist and pull the bullet to remove the Bullet Tip Assembly from the Dowell Insert. Change the refill and push and twist the Bullet Tip Assembly back into the Dowell Insert and check twist operation.



Bullet Tip Assembly with Cross Style Refill



Completed 50 Caliber Cross Twist