

# How to Swage Bullets Using The **CORBIN**

## RBTO-4-M, -S, or -H Die Set

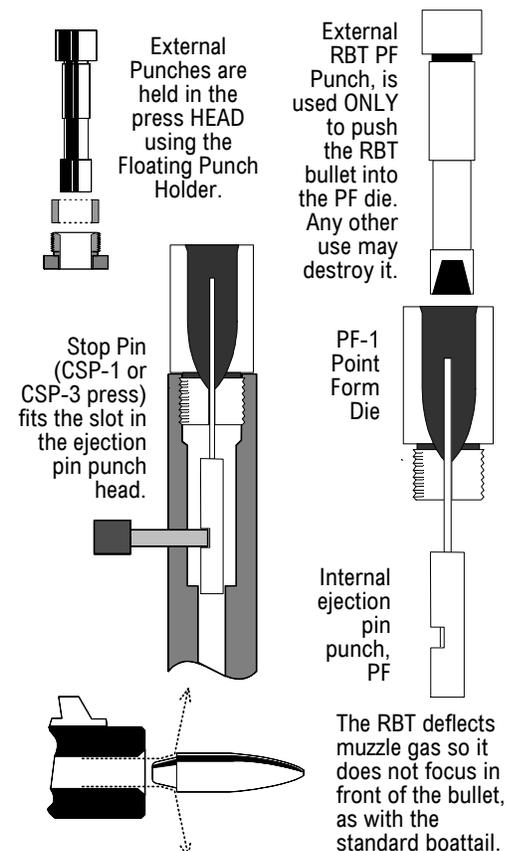
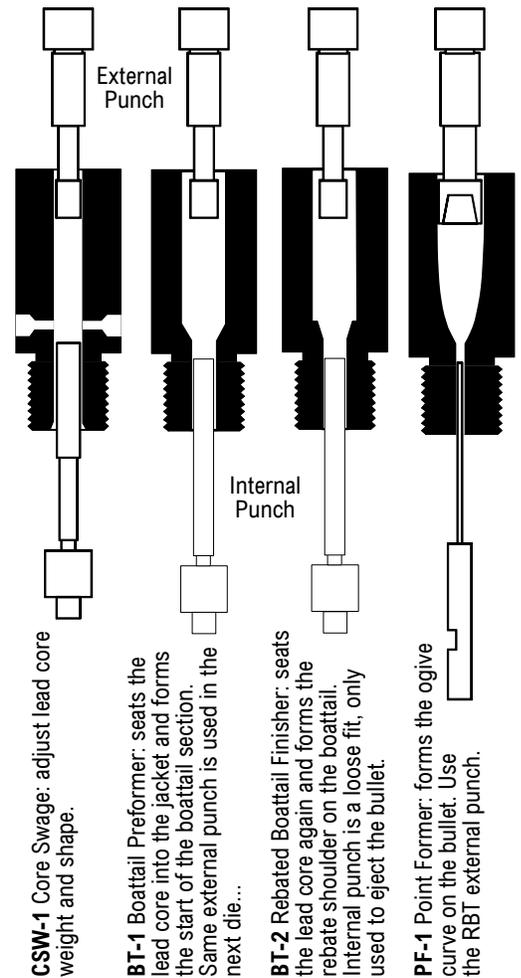
Type -H dies fit into the ram of the Corbin Mega-Mite press (CSP-2), Corbin Hydro, Jr. (CSP-2H) press, and the Corbin Hydro-Press (CHP-1). The type -M dies fit either the horizontal Silver Press (CSP-3) or the vertical Series II Press (CSP-1). The type -S dies fit only the Series II Press (CSP-1). The last letter, -M, -S, or -H, describes the outside diameter, threads, punch lengths, and which presses the die set will fit. If a tool fits both the -S and the -M systems and there would be no difference in it for either of them (such as punch holders or draw dies), then the -M designation is used.

The 4-die set consists of a CORE SWAGE (CSW-1), a BOAT-TAIL PREFORM (BT-1), a REBATED BOATTAIL FINISHER (BT-2), and a POINT FORM (PF-1) die, each with one internal and one external punch, except the two rebated boattail dies share the same external core seating punch.

An EXTERNAL PUNCH is held in the FLOATING PUNCH HOLDER (FPH-1-M or FPH-1-H), which comes with the press and screws down into the top plate of the press. For the -M and -S external punches under 3/8-inch caliber, a threaded bushing and steel ring are removed from the bottom of the punch holder, placed over the external punch, and then screwed back into the bottom of the punch holder to secure the punch. The punch holder screws into the press head, so the punch faces the ram. For -M and -S punches from 3/8-inch up, the bushing and ring are part of the punch assembly. For -H external punches, only a threaded bushing is used, without the steel ring. The external punch is the TOP punch in these systems.

The die screws into the press ram, with its INTERNAL PUNCH inside the ram. Some internal punches require the use of spring powered retraction: for the PF-1-H die, the internal punch is called an EJECTION PIN punch, and it will have a quarter inch diameter hole through the head portion, through which a 1/4-inch diameter retraction pin fits. The pin goes below the large spring around the press ram, and pushes down on the pin, which then pushes the punch down when the ram is raised, making it easier to insert material into the die. For the PF-1-M and PF-1-S dies, a notch is machined into the head of the internal punch, which matches a removable pin with knurled head pushed into the front (CSP-1) or top (CSP-3) of the press. This is the STOP PIN. It presses on the tail all punches except for the ejection pin punch, to cause ejection on the down stroke. Because the PF-1 die would form the bullet around this pin if the pin were allowed to remain in the die cavity during swaging, the stop pin must be put into the notch and used to keep the pin retracted from the cavity during swaging, holding it firmly during the down stroke to cause ejection of the bullet.

In the -H system, a knock-out or ejection bar goes through a slot in the press ram, below the spring and also below the retraction pin (if one is required not all punches have a hole through the head). The knock-out bar supports the head of the internal punch while the component is being swaged, and comes to rest on the press mounting plate on the downward stroke. This stops the movement of the bar while the ram continues down, making the punch stop moving while the die goes down with the ram.



Never try to swage a component that will not go into the die by hand. The swaging operation depends on each component being slightly smaller than the die bore, and increases the bullet diameter a little with every step. The core seating die and point forming die are matched to each other for a given jacket and core material to within 0.0005 to .0010 inches with the core seater being smaller.

**The first die is the CORE SWAGE (CSW-1).** It is used to form a piece of lead to precise diameter, length and weight. There are three bleed holes through the sides of the die, and its punches are very close fits to the die bore. They are the smallest punches in the set and only fit this die properly. Always make sure the punch fits the die by hand before applying pressure to it with the press!

For power presses, set the bottom sensor so the pressure stops (red LED on the sensor goes on) just as the swaged core is ejected (internal punch even with the top of the die). Use a knock-out bar that allows the punch to come just to the die face, if you have more than one height of bar with your press (CSP-2 hand press uses three different heights of bars for various punch and die lengths). Make sure your hand press is in the SHORT STROKE (swaging) position: the CSP-1 and CSP-2 presses have dual stroke pivot holes for the ram/toggle linkage and you cannot swage in the long or reloading stroke (it may break the stop pin to try).

You can use cut lead wire, or a cast lead core. Apply a small amount of Corbin Swage Lube to the cores as you handle them. Set the floating punch holder so the desired amount of lead is left in the die when the press stops moving up (position of the top sensor controls top of stroke on hydraulic presses, physical end of ram travel is fixed on hand press). Always extrude at least 1-2 grains from each core, or else you will not achieve consistent weight control. But do not extrude more than about 10 grains, as this only wastes time and raises the swaging pressure unnecessarily.

After making the desired number of cores, clean them in hot water to remove the swage lube, then let them dry and insert them into bullet jackets (if jackets are used).

**The BT-1 Boattail Preformer is the second die** in a RBT die set. It will accept the jacket for its caliber easily but closely, and has no bleed holes. The BT-2 looks similar, but is marked with the BT-2 designation. The bore size of the BT-1 is slightly smaller than that of the BT-2. The internal punch for the BT-1 die is a loose fit in the die; it serves ONLY to push the bullet out, and plays no part in forming the base.

Select a diameter of external punch that fits the jacket ID at the point where you want the core to be after seating. Thicker jackets, and lighter cores in tapered jackets, both require a larger diameter external punch than thinner jackets or heavier bullets with a tapered commercial jacket. (See Corbin Handbook for discussion of proper core/jacket/punch fitting).

The correct core seating pressure is normally in the 300 to 500 PSI range. This can vary with the particular caliber, jacket thickness, and other features of the bullet, so follow any written instructions provided with the die regard-

ing the suggested pressure. Always start with the pressure in a low setting on the hydraulic presses (300 to 500 psi) and increase slowly until the jacket expands to just under the diameter you get with a swaged pure lead slug in the die. Any greater pressure than this will only stress the die and could bend punches or break dies.

Apply a small amount of swaging lube to the outside of each jacket as you pick it up to insert in the die; the amount that you get by rolling a drop between finger and thumb is sufficient in most cases. Lubricant should not be allowed inside the jacket: that is why the cores were washed clean before insertion into the jackets.

**The third die is the REBATED BOATTAIL FINISHER (BT-2).** *Note that the combination of the BT-1, BT-2, and the external RBT punch for the PF-1 die is also packaged as the RBT-2 ADD-ON SET, for adding the RBT design to existing flat base die sets.* Use the same external punch (core seating) that you used with the previous step. Push the bullet base first into the die, and apply enough pressure so that a shoulder is formed clearly at the junction of the boattail and the bullet shank (full diameter portion). This small shoulder is the "spoiler" that breaks up laminar flow of muzzle gas so it cannot focus itself in front of the bullet, gaining up to 15 percent better accuracy than a conventional boattail with all other factors equal. The shoulder formed in this die must match the cavity of the external point form punch. If it is too long or short, a double shoulder may be created in the final step.

**The fourth die is the POINT FORMER (PF-1-H).** It shapes the ogive curve on the bullet and gives the bullet its final diameter. This die has a bullet-shaped hole. The diameter of the point form die itself is usually NOT the same as the bullet, and is designed to match the core seater, the jacket material and thickness, and the lead hardness. Using materials other than those for which the set was designed can change the bullet diameter and may cause the bullet to stick or become hard to eject.

The external punch has a cavity matching the boattail angle and shoulder depth. Make sure that the bullet is short enough so that the entire punch tip is well within the die cavity before any pressure is created. If the punch walls are not supported fully by the die, the punch will crack when pressure is applied. Making too heavy a bullet for the length of the PF-1 die cavity may break the external punch.

When installing the internal punch, make absolutely sure that the internal ejection pin punch is held by the stop pin (in -M or -S systems) or retraction pin (in -H systems). Otherwise the pin may fall out of the die hole and be collapsed by the end of the die when the ram goes down, rolling it like a pretzel inside the ram. Shape the bullet by carefully raising the ram and pushing the nose end of the bullet down into the die.

Eject, examine, and re-adjust until the tip is formed to the desired amount of closure, but do not try to close it smaller than the size of the ejection pin! Never force jacket material up into the ejection pin hole: doing so will concentrate force in such a small area that it can crack the die. Remember, we are dealing with rifle chamber pressures in these swaging dies, when the press goes "over center".