Reloading Dies - What the heck are they and why do I need them?

Reloading dies size and shape the brass cartridge and are caliber specific so, for example, you cannot reload .45 ACP cartridges with dies made for the .38 Special. This means you need separate dies for each caliber you plan on reloading. In order for a new or used case to be reloaded, it first needs to be sized to certain specifications for the cartridge. These specifications are maintained by Sporting Arms and Ammunition Manufacturers' Institute (SAAMI), the organization that makes sure a specific cartridge fits properly into the specific chamber designed to fire it. An extensive catalog of cartridge specifications are maintained online and it's a great resource.

General Die Setup and Adjustment

Most dies simply screw into the top of the press. Hornady presses use an additional sleeve that locks into the press that makes changing dies a little quicker, but they all work basically the same way.

NOTE: Dies are shipped from the manufacturer with a coating of something as a rust inhibitor which should be removed before they are used the first time. Simply take apart the dies and spray with a cleaning solvent; Ballistol, WD-40, Hoppes 9 - whatever you have handy, and wipe clean (with a cloth!). It’s not a bad idea to keep them very lightly oiled if you are in a high humidity location. Just a light spray is all you need, which can be removed before you use them again with a chamber mop.

To setup a die for the first time, perform the following steps:

- insert appropriate caliber press shell holder into the top of the ram. It just snaps into place.

- without a cartridge in place, lower the handle to raise the press ram to its uppermost position.

- screw the die body into the press, so the bottom of the die just touches, or is very slightly above the top of the shell holder.

- screw the locking ring on the die body down until it rests on the top of the press and tighten the set screw.

- as you begin work, you may find small adjustments are necessary - simply loosen the locking ring, adjust the die, and tighten the ring and set screw.

- sometimes when the locking ring is set it makes the die difficult to remove from the press. A few whacks on the locking ring with a rubber mallet will usually do the trick.

- once properly set, you should not usually need to make additional adjustments. Simply screw in the die until it's stopped by the locking ring. Specific considerations for individual die setup are discussed below.

A properly set die will perform its function at the top of the ram stroke, just as the lever begins to cam over and stop, and without a great amount of force. This is an important point. An improperly set die will return inconsistent results due to the application of variable force, and possibly damage the case. As you gain experience, you will notice many steps are done based on the feel of the amount of force required to complete them. Anytime anything changes, STOP WORKING, and investigate. Each step should be completed smoothly and without a huge effort. If you find yourself needing to use a lot of muscle, then something isn't working right and needs to be corrected.

A good video on die setup is found here: https://www.youtube.com/watch?v=bAFrOPQ16AY" . A couple of points - the guy in the video has various interpretations of the word "cannelure" (can-ne-lure), and also doesn't seem to embrace the use of the die locking ring. Other than that, it's a fairly decent look at the process of setting up the 3 dies in your set. The press he is using is slightly different design, but the die setup instructions all still apply. There are a bazillion videos on reloading, so look around if this guy bugs you. If you find yourself actually doing any of this and have questions, please feel free to email Gun Thread technical support who will be happy to help!

You'll recall last week we talked about the dies and the functions they perform in the reloading process. Let's review them in a little more detail now, including ways the setup differs among the three dies.

Sizing Die

When a cartridge is fired, it expands against the chamber wall to seal the breech, then snaps back a little but not quite all the way. Depending on the chamber, the fired case may be several thousandths of an inch (.00X") larger in diameter than it was before firing. The sizing die simply returns the case to the correct pre-fired diameter. You will notice a pin sticking out beneath the sizing die. That's the decapping pin and it punches out the used primer. In a new or unprimed case the pin is just along for the ride. The screw and smaller locking ring on the very top of the die are used to replace or make adjustments if needed to the decapping pin depth which should be set to just pop out the used primer. To setup a sizing die just follow the steps above.

Expander Die

The second, or expander die is used to very slightly flare the mouth of the case to accept the bullet. Set up the die as described earlier so the bottom of the die is barely touching or just above the shellholder. Next, adjust the expander plug inside the die using the smaller screw and lock ring on the top of the die. When properly adjusted, the expander die will flare the case mouth by a few thousandths of an inch to accept the bullet. It's a barely perceptible amount to the naked eye, but it allows the bullet to begin the seating process without being shaved by the edge of the case mouth. Use caution to avoid oversizing the case which can lead to reduced case life.

Seating and Crimping Die

The third die in the set performs two operations. It seats the bullet to the desired depth and applies a slight crimp to the case mouth to hold the bullet in place. There are two steps to setting up a seating/crimp die. First, back the seating stem screw on the top of the die counter clockwise, or up, most of the way and then screw in the die body in to the press until the bottom is a couple of turns above the shellholder. Next, place a dummy (unprimed and without powder!) sized and expanded case into the shellholder and place a bullet on top. Now cycle the press and advance the seating stem by small increments until the bullet is seated to the desired depth (more on this later) checking the overall length with calipers or using a case gage. Now back out the seating stem several full turns.

Leaving the cartridge on the ram in the full up position, screw in the die until you begin to feel the resistance of the cartridge. Lower the ram and advance the die in small increments, raising the ram after each adjustment and checking until the desired crimp is achieved. Bullets with a cannelure (groove) will require more downward adjustment to achieve a "roll" crimp, where the case mouth is very slightly curved into the cannelure. Cartridges which headspace on the case mouth (.45ACP for example) require less downward adjustment of the die body to achieve a "taper" crimp. Do not roll crimp jacketed bullets without a cannelure as you may damage the jacket, and again, do not roll crimp any cartridge that headspaces on the mouth of the cartridge, taper crimp these instead. Now lower the locking ring and tighten the set screw on the die body.

Finally, you will need to reset the seating stem. With the dummy cartridge on the ram in the full up position, lower the seating stem screw until you feel it stop against the top of the bullet and simply tighten the upper locking ring. The die is now configured to seat and crimp in a single step.

We'll discuss the various measurements as we begin the step-by-step reloading process. For now, we simply want to have the dies configured approximately. We will discuss making small final adjustments later.