

## BALL SWAGE KIT: SPECIAL INSTRUCTIONS

- 1) Swage the ball “core” in the Core Swage die (marked “S”) to a weight that is equal to the weight of the finished ball. In some cases the ball weight is marked on the ball die next to the caliber marking. Approximate finished ball weight can be easily calculated using the following formula:

Ball weight = 1500 x D where D is the diameter (caliber) of the ball.\*

Example: for a 54-caliber ball the equation would read:

$$1500 \times (.54) = 236.2 \text{ grains}$$

This would then require a swaged core of approximately 236 to 236.2 grains.

\*This formula is based upon the geometric volume of a sphere and pure lead. Therefore the actual weight of the ball may differ slightly if something other than pure lead is used. “Hard” lead is not recommended for use in the pure lead core swage die because it is generally too hard to move through extruder holes intended for soft lead. A little experimenting will ultimately determine the ideal core weight.

### IMPORTANT NOTES:

1. Use only slightly more lead (approx. 5 - 10 grains) in the Core Swage die than will be required for the finished ball. This is because the extruder holes are relatively small in order to ensure consistent core size. Too much excess lead will require considerably more time to swage the core due to the necessity to systematically push off a relatively large volume of lead .
  2. Do not over-pressure the Core Swage die in an attempt to reduce the swaging time. The lead needs time to move out through the extruder holes, and too much pressure will simply break the die.
  3. If using the Hydro-Press, use only moderate ram speed. Fast ram speed can cause a hydraulic shock effect, and ultimately result in a broken die. Again, the lead needs adequate time to move, and large diameter swaging dies move a considerable volume of lead over a very short ram stroke. Using barely more lead than necessary, and governing the speed and pressure appropriately, will produce the most consistent and efficient results.
- 2) Install the Ball Swage Die into the press. The die half with the alignment sleeve installs into the press ram. Adjust the top die-half position so that there is moderate contact pressure between the die halves with the press ram fully extended. Heavy pressure is not necessary, and may damage the die. Corbin Mfg. does not warranty damaged dies. Hydro-Press users should back the ram pressure control all the way off, and only increase the pressure if it is found to be necessary.
  - 3) Position a swaged core vertically into the ball swage die unit with the rounded ends facing the two die halves. Do not apply swage lube to the inside of the die cavities as it will create minor voids in the surface of the ball. It may be advantageous to touch one end of the core on a swage lube treated cloth if the swaged balls tend to favor adhering to the upper die half.
  - 4) Close the die and swage the finished ball.
  - 5) Remove the ball from the die unit with a pair of tweezers, preferably flat-faced. Note: Some units have a slip-fit, removable alignment sleeve to facilitate ball removal.

If there is a small amount of flashing around the middle of the ball where excess lead has extruded from between the die halves, then simply wipe it off. This is indicative of a slightly oversize core, and some minor reduction in core weight is necessary. Conversely, an undersize core will fail to fully form around the middle. An oversize ball can sometimes be reswaged to remove the flashing line, but will somewhat tend to stick in one die half. Inspect the ball for imperfections and relative symmetry. Lead balls are somewhat deformed by the ramrod during muzzle loading, and therefore “nit-picking” the symmetry is rather unnecessary. However, with some practice a very nicely formed musket ball can be produced.