

Calibration procedure for ground driven, no-till and press, box style drills

Items necessary for calibration:

- Twine string
- Tape measure
- Tape or bright marking pen
- Seed
- 1 large or multiple small bags to collect seed
- Scale to measure in small increments (ounces or grams, ounces are preferred)

Procedure:

1. Note the amount of seed metering cups the drill contains and the drill seeding width.
2. Determine the circumference of the drill's seed metering drive wheel.
 - a. Make sure the wheel is properly inflated.
 - b. A twine string and tape measure will be helpful tools to determine circumference by wrapping the string around the tire and measuring the string length there the string end meets.
3. Determine how many times to rotate the drive wheel for a fraction of an acre ($1/20^{\text{th}}$ of an acre is frequently recommended) given the drill seeding width.
 - a. $(43,560 \text{ square feet per acre}) / (15 \text{ feet drill seeding width}) = 2,904 \text{ linear feet the drill travels to equal 1 square acre}$
 - i. $(43,560 \text{ ft}^2) / 15 \text{ ft} = 2,904 \text{ ft}$
 - b. $(2,904 \text{ ft}) * (1/20^{\text{th}} \text{ of an acre}) = 145.2 \text{ linear feet the drill's drive wheel must travel to seed } 1/20^{\text{th}} \text{ of an acre}$
 - i. $(2,904 \text{ ft}) / 20 = 145.2 \text{ ft}$
 - c. $(145.2 \text{ linear ft}) / (\text{drive tire circumference in feet}) = \text{number of times to rotate the tire to simulate seeding } 1/20^{\text{th}} \text{ of an acre}$
4. Add seed to a fraction of the drill's seed meters and positioned close to one another. (The more seed meters collected from, the more accurate the calibration, however, the longer the calibration procedure takes.) Collecting from $1/4$ to $1/6$ of the meters is recommended.
 - a. Rotate the drive wheel to fill the seed meters and dispense seed to the seed boot.
 - b. Visibly mark the tire in order to precisely count the number of wheel revolutions.
 - c. Remove the seed tubes from the seed meter desired to collect from. (For example, collecting $1/6$ of 24 total meters requires seed collection from 4 seed meters.)
 - i. Place seed collection bag or bags under the desired seed meters.
 - ii. Weigh the seed collected using a scale. Remember to tare the scale and exclude the weight of the seed collection container.
 - iii. Write down the collected seed weight.

5. Use the collected information specific to the drill and desired seeds to be sown to determine the drill seeding rate.
 - a. (seed weight collected from turning the drive wheel $1/20^{\text{th}}$ of an acre from selected seed meters) X (factor to equal all seed meters) X (factor to equal 1 square acre) = ounces or grams per acre (depending on scale being used)
 - b. (Seed weight collected) X 6 X 20 = Ounces per acre
 - c. Ounces per acre / 16 = pounds per acre

Example Calibration Procedure:

The drill being used is a John Deere 750 no-till drill, and the farmer desires to seed a diverse cover crop mix at the rate of 40 pounds per acre. After looking over the drill, the farmer determines seeding width to be 15 feet and row spacing of 7.5 inches. The number of seed meters dispensing seed is 24. Rain is forecasted, and the farmer is short on time. The goal is to calibrate as fast as possible and commence seeding. Here are the steps needed to set the drill:

1. Set the drill according to average seed size and the seeding rate chart standard with each drill located under the seed box lid or in the operator's manual.
2. Safely lift and securely block the machine so the drive wheel can be rotated by hand safely. Take steps to mitigate the machine falling off the jack and harming those calibrating the machine or even harming the machine itself.
3. Mark the tire with a visible marking pen or piece of tape
4. Determine the circumference of the drive tire by wrapping the string around the tire. (Place string between the tire ribs for more accurate circumference as the tire is deflected into the soil when loaded with seed and drill weight.) Write down the circumference to reference later! The farmer determines tire circumference is 96 in or 8 ft.
5. Determine how many times to rotate the drive wheel to simulate in this case $1/20^{\text{th}}$ of an acre considering the 15 ft seeding width
 - a. $43,560 \text{ ft}^2 / 15 \text{ ft} = 2,904 \text{ ft}$
 - b. $2,904 \text{ ft} \times 1/20 \text{ acre} = 145.2 \text{ linear feet}$ the drill must travel for $1/20^{\text{th}}$ of an acre
 - c. $145.2 \text{ ft} / 8 \text{ ft tire circumference} = 18.15 \text{ tire revolutions}$ to simulate $1/20^{\text{th}}$ of an acre
 - i. To save time for future calibrations for THIS DRILL and EXACT TIRE ONLY, document this number in the operator manual.
6. Remove 4 of the 24 seed tubes below the seed meter
7. Place several pounds of seed into the seed box primarily above and around the seed meters desired to collect from. (Make sure each of the 4 meters are full and have adequate seed to not run empty while calibrating.)
8. Rotate the drive wheel to fill the seed meters. (750 drill seeding units must be lowered to field position for the drive wheel to engage the seed meters.)
9. Place containers under the 4 seed meters to collect dispensed seed. Rotate the drive wheel a little more than 18 revolutions (18.15 revolutions to be exact).
10. Weigh the collected seed and subtract the container weight (7.867 seed and container weight – 3.2 oz container) This farmer's scale measures in ounces.
 - a. $7.867 \text{ oz} - 3.2 \text{ oz} = 4.676 \text{ oz}$ of seed collected

11. Convert weight to pounds per acre:
 - a. $(4.676 \text{ oz}) \times (6 \text{ to equal } 24 \text{ openers}) \times (20 \text{ to equal one acre}) / (16 \text{ to convert oz to lbs}) = 35.07 \text{ lbs/acre}$
 - b. $4.676 \times 6 \times 20 / 16 = 35.07 \text{ lbs/acre}$
12. Adjust seed meter settings and recalibrate, adjusting get close to the target rate of 40 lbs/acre

Additional Tips:

- Remember, the calibration procedure is unique to each machine and tire size. When installing new tires on the drill, recalibration will be necessary.
- After calibrating the drill, place a known amount of seed into the grain box and zero out the acre counter. Seed for an acre or two and check the seed box to verify the estimated rate per acre is visibly close to target.
- When adjusting the seed meter rate lever, open the meters further than the desired setting and then bring back to the desired rate setting. This ensures the metering rolls are aligned consistently across the drill for uniform seeding.
- Physically dig to find seed and measure to ensure adequate seed depth early in the field and monitor across varying soil and field conditions.
- Ensure adequate down pressure settings for the drill to ensure precise seed depth placement. When the drill is operating in field position, gauge wheels should be firmly secured to the ground and should not spin freely when checking by hand. If the down pressure is adjusted to maximum settings, make sure the drive wheel has adequate contact with the ground. If the drive wheel does not have adequate contact, skips across the entire drill width will result. Additional weight may be required to achieve desired seed depth and drive wheel contact.
- Avoid too much down pressure or drill weight to minimize compaction, inhibiting seed growth potential.
- Seed mixtures should be properly mixed before filling the seed box to ensure uniform seed distribution.
- Seed mixtures with varying seed size (large and small seeds) should be filled into the seed box more frequently and less full to minimize seed separation as the machine travels across the field, to achieve the most uniform mixture.

Measurements and Conversions:

1 square acre = 43,560 feet squared
12 inches = 1 foot
16 ounces = 1 pound
453.592 grams = 1 pound



Drill Calibration Video

Scan this QR code with your mobile device to watch a step-by-step instructional video on how to calibrate a no-till drill.

Or visit:

<https://youtu.be/k-bT8m7-eSs>