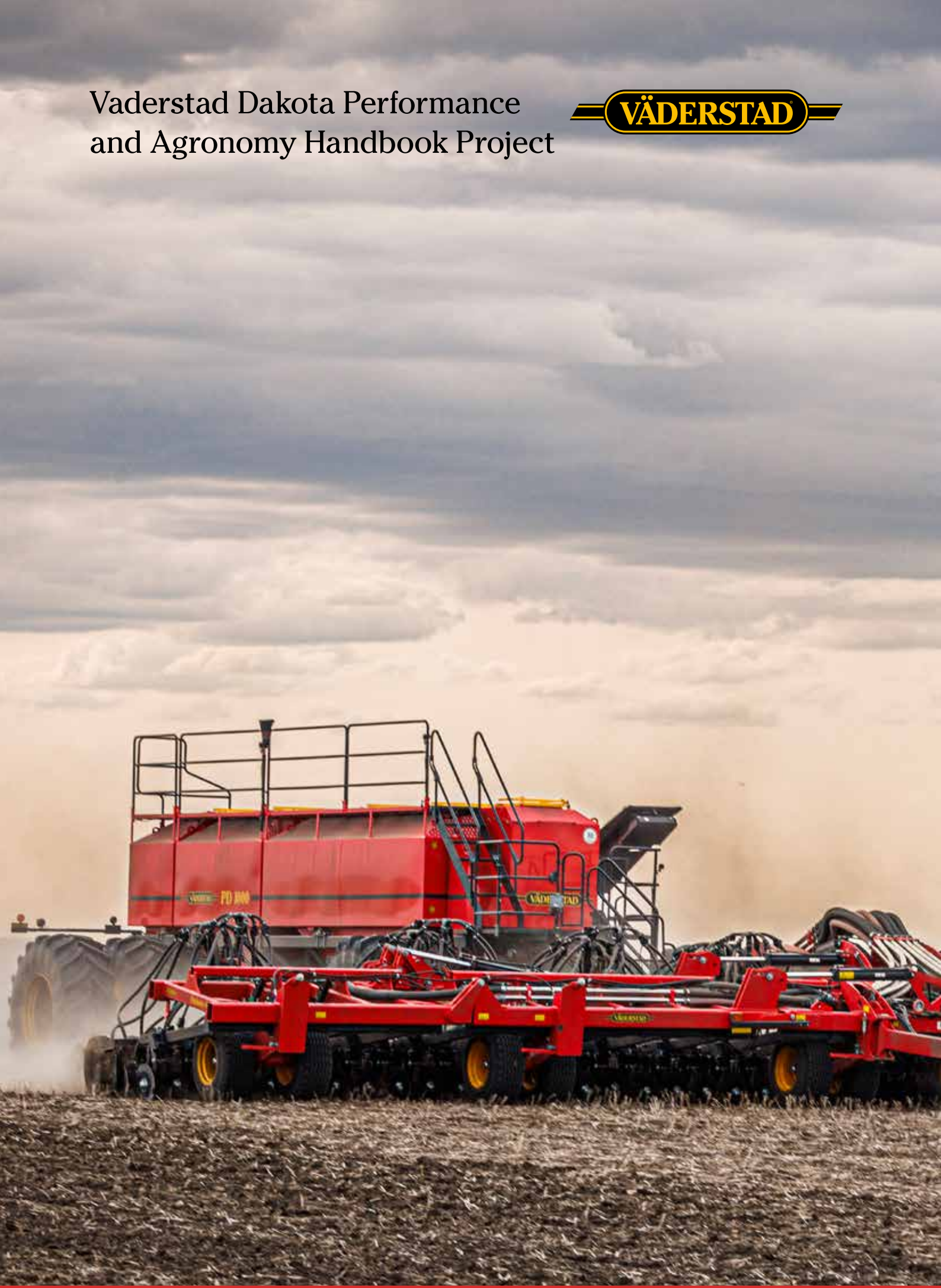
Vaderstad Dakota Performance and Agronomy Handbook Project

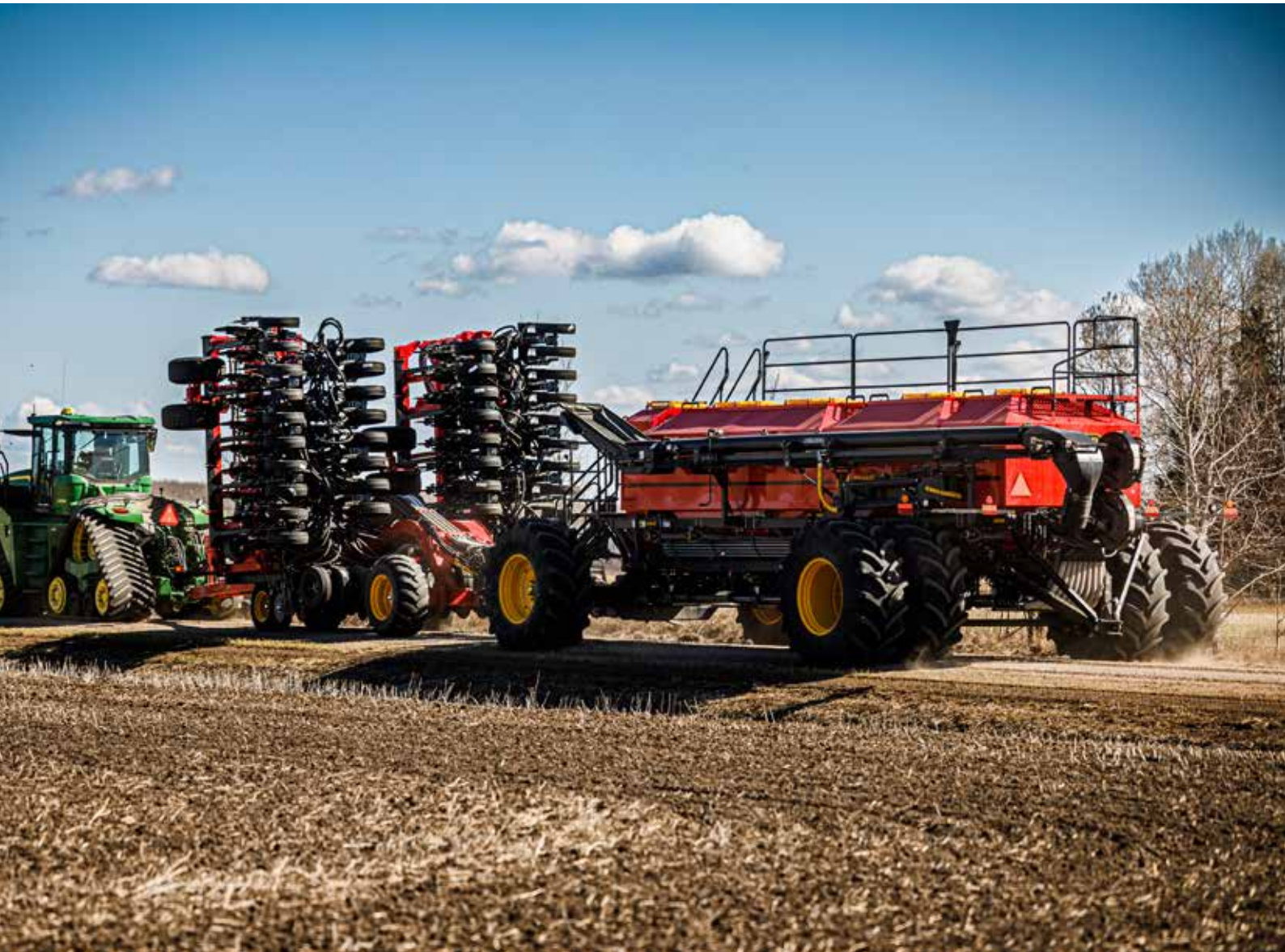


Purpose

The purpose of this handbook is to discuss the optimization of agronomic performance of the Dakota disc drill.

Every planting situation is unique with differences in seed, fertilizer, soil, moisture and previous crop residue to name a few. Optimization of crop performance to reduce risk and increase return on investment therefore requires optimization of machine performance to best adapt to the cropping situation. By delivering precision metering and placement of product to the soil, the crop can maximize its growth potential throughout the entire year and consistently over the course of different growing seasons. The result is more consistent crop yield and quality and greater financial stability to a farming operation.

As agronomic parameters change between every farm, from one growing season to another and within the same year, it is important to note that the discussions in this document are meant to be suggestions only. It is important to consult with a licensed professional agrologist for advice regarding specific decisions relating to agronomic stewardship in a farming operation.

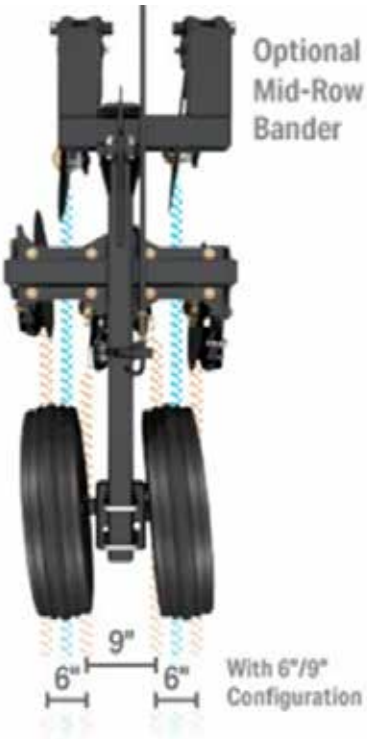


Fertilizer Rates and Placement

Utilization of a nutrient application by the crop, when applied at the time of seeding, requires optimization of the rate and placement of fertilizer.

Nutrients are one of the most critical components of plant growth and optimizing both the rate and type of fertilizer applied specific to the crop and soil conditions is an important step in crop success. To determine how much nutrients are required to achieve desired yield goals, it is important to conduct soil testing to examine nutrient levels present in the soil as well as yield potential. Soil testing typically takes place in cooler weather prior to the growing season. Once the soil test results are known, consult with an agronomist to determine the ideal course of action regarding fertilizer rates, type of fertilizer to use and ideal placement. Soil types, crop to be planted and moisture levels both at seeding time and expected during the season are some of the factors to be considered.

When determining fertilizer rates and placement options, it is important to consider the Seed Bed Utilization (SBU) of the toolbar which is determined by the row spacing of the openers and the width of the opener itself. This determines the amount of fertilizer that can be safely placed with the seed, subject to the crop being grown, soil type and moisture conditions present in the field both at seeding and through the early part of the growing season.

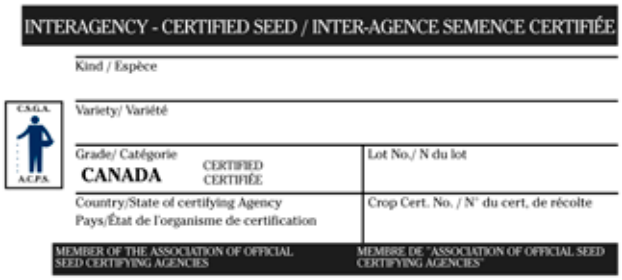


As indicated in the diagram, the seed rows are spaced alternately at 6" and 9" away from each other. With a disc opener spread of 0.75" and the average seed row spacing at 7.5", the SBU of the Dakota disc drill is 10%

Seeding Rates

Along with moisture and nutrients, plant stand is a key component of yield potential.

The first step in producing an ideal plant stand that maximizes use of soil water and fertilizer is determining seeding rate. Ideally, the goal is to produce the number of viable plants required to achieve maximum yield while limiting the amount of competition between plants for resources including sunlight. The desired number of plants will change from year to year based on soil moisture levels; growing seasons with sufficient moisture amounts are able to provide enough water for higher seeding rates while seasons with limited precipitation require a reduced plant stand to reduce plant competition for scarce moisture.


INTERAGENCY - CERTIFIED SEED / INTER-AGENCE SEMENCE CERTIFIÉE

Kind / Espèce

Variety/ Variété

C.S.G.A. A.C.P.S.

Grade/ Catégorie
CANADA CERTIFIED CERTIFIÉE

Lot No./ N du lot

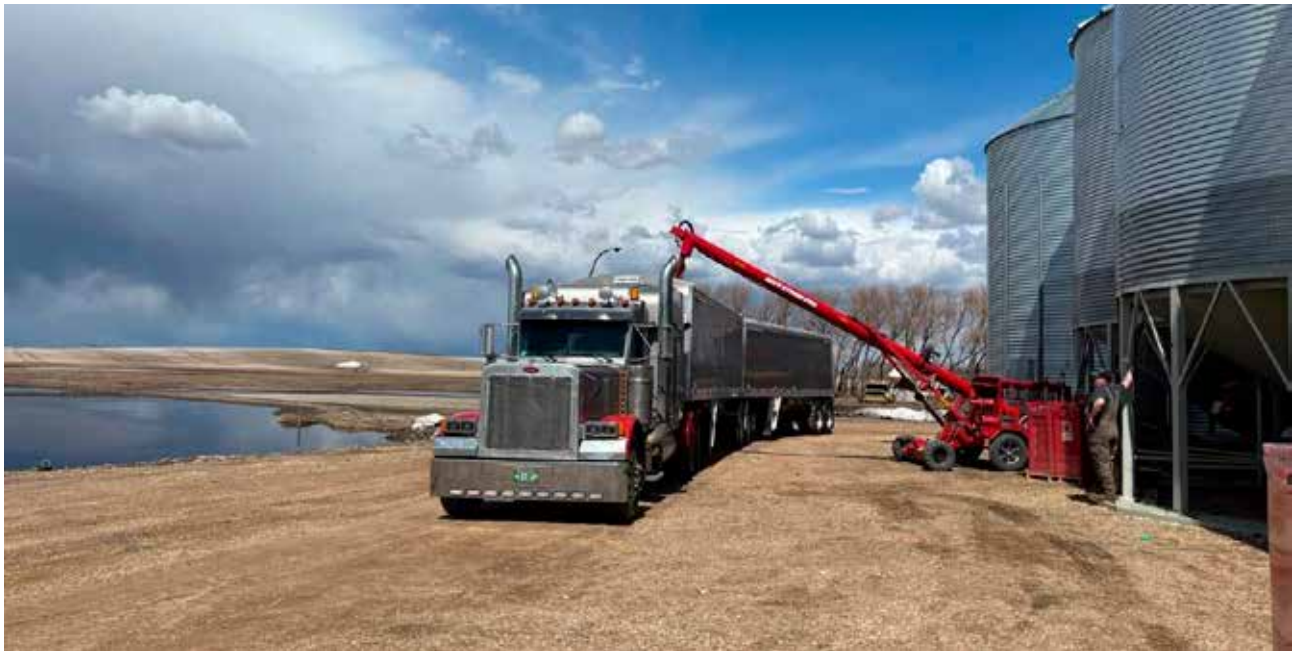
Country/State of certifying Agency
Pays/État de l'organisme de certification

Crop Cert. No. / N° du cert. de récolte

MEMBER OF THE ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

MEMBRE DE "ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES"

Seeding rate with the Dakota disc drill is calibrated in pounds per acre (lbs/ac), however it is important to consider seeding rate in seeds and plants per area which is typically per square foot. When a drill is set to a specific seeding rate in lbs/ac, the actual number of seeds being metered out is determined by the weight of the individual seed lot, typically known as Thousand Kernel Weight (TKW) and expressed in grams (g). Using this number, convert the target seeding rate to pounds per acre. In terms of final seeding rate, seedling survivability is also required as several factors can affect how many seeds germinate and emerge to become viable plants. Consult with an agrologist to determine any factors that may affect seed survivability in a particular field or crop season.



Roller Selection

Seed Hawk offers five different rollers to use with the Fenix III metering system. A chart displaying the different options of rollers and their applications is listed below.

If using a different roller for the same application, be sure to perform a static calibration to ensure the correct rate of product is being delivered. If applying rates of monoammonium phosphate fertilizer higher than 60 lbs/ac, it is advised to use the grey 120cc roller to ensure accurate metering.

Fenix III meter Roller Option					
Color	Blue	Grey	Grey	Black	Yellow
Volume cc	18 cc	60 cc	120 cc	400 cc	500
Roller Output /lbs/ac)	Low (1-12)	Low (3.5-45)	Med (6-60)	High (30-350)	Ultra (40-400)
Product					
Starter Fertilizer		●			
Fertilizer			●	●	●
Inoculants	●	●			
Canola	●				
Barley				●	
Wheat				●	
Oats				●	
Large Bean					●
Flax		●	●		
Peas					●

Machine Startup

When engaging the cart fans at the start of the day, it is important to allow the fans to operate for five minutes to allow any moisture in the product lines to dry. Granular fertilizer may contain a substantial amount of dust (especially sulfur) and this dust can accumulate over time and lead to plugging. Reducing moisture in the primary product lines is one way to help avoid this issue. Prior to seeding, it is also advised to run the hydraulic circuits to allow the oil to warm up so that opener operations perform quickly. This is especially important in sectional control functions to avoid overlap and misses.

Opener Design and Adjustments

Seeded/worked row

Seeds in the row

The Dakota drill is characterized by an 18" diameter single disc opener that is set on a 5 degree vertical axis and a 3 degree horizontal axis in proximity to the toolbar frame. During operation, the angle of the disc produces fracturing of the side wall of the seed trench, resulting in loose soil around the seed and improving seed to soil contact. The intensity of soil fracturing depends on soil type and soil moisture conditions at seeding as well as drill speed. With the narrow seed row spacing, cultural weed control is greatly enhanced as the crop is able to canopy quicker in the spring and shade problematic weeds both between the rows and within the seed row itself.

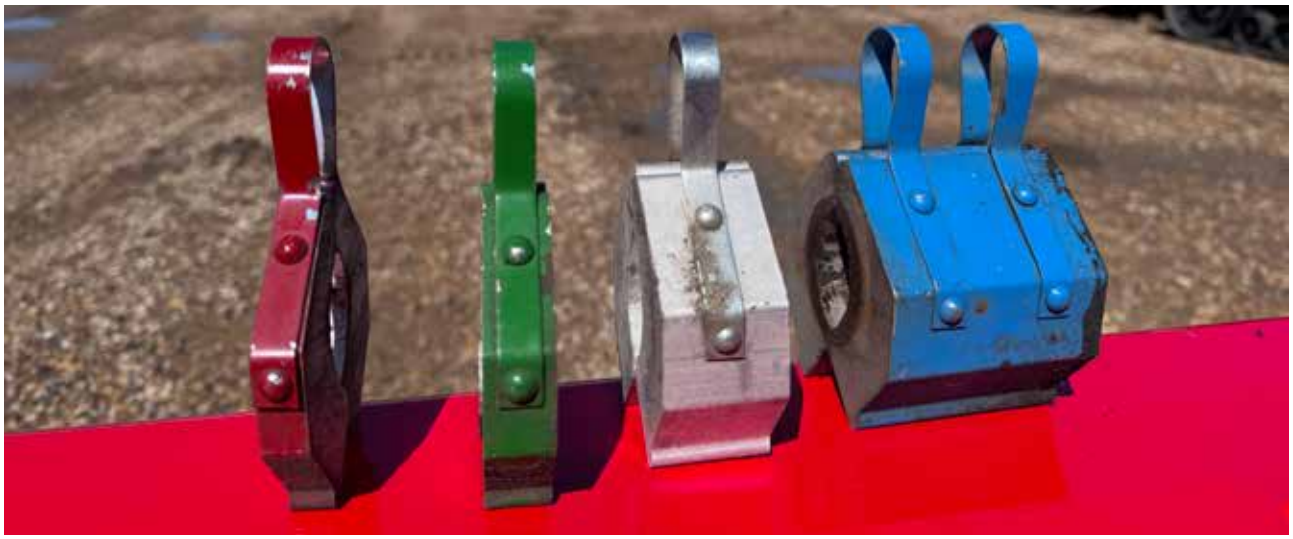
Product depth is adjusted by adding and removing depth collars from the frame adjustment cylinders. It is required that the same collars and sequence of positioning are the same for each cylinder across the toolbar. The following is the colour and width of each depth collar:

Blue: 3.0 inch (7.62 cm)

Silver: 1.5 inch (3.81 cm)

Green: 0.75 inch (1.91 cm)

Red: 0.5 inch (1.27 cm)



Each adjustment of the collar groupings by 1 inch adjusts the product depth by approximately ¼ inch. The following is the recommended sequence of collars for each cylinder to achieve the desired depth. Actual product depth is contingent on other factors such as packing pressure; therefore, it is required that the operator check the product depth in the soil and adjust as necessary.

B	B	B	B	B	B	B	B	B	B	B	B	B	S	S	S	S	S	
S	S	S	S	S	S	S	S	S	S	S	S	S	G	G	G	G	G	
G	G	G	G	G	G	G	G	G	G	R	G	R	G	G	G	G	G	
G	G	G	G	G	G	G	R	G	R	R			G	R	G	R	G	
G	G	R	G	R	G	R	R						R	R	R	R		
R	R	R	R	R									R	R				
R	R	R																
R																		
0.94	1.06	1.13	1.19	1.25	1.31	1.38	1.44	1.50	1.56	1.63	1.69	1.75	1.81	1.88	1.94	2.00	2.06	in.
2.38	2.70	2.86	3.02	3.18	3.33	3.49	3.65	3.81	3.97	4.13	4.29	4.45	4.60	4.76	4.92	5.08	5.24	cm.

S	S	S	S	S	S	S	G	R	G	R	G	R	
G	G	G	G	R	G	R	R	R	R	R			
G	R	G	R	R			R	R					
R	R												
2.1	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.8	2.9	in.
5.4	5.6	5.7	5.9	6.0	6.2	6.4	6.5	6.7	6.8	7.0	7.1	7.3	cm.

The packer tire is set at a 5-degree angle to the seed rows; each packer tire is responsible for packing two 6-inch separated rows. Operating at an angle removes any mud accumulated in wet seeding conditions. The packing tires on the right-hand side of the drill are angled toward the right-hand side of the drill while the packing tires on the left-hand side of the drill are angled toward the left-hand side.

Packing tire pressure must be adjusted depending on soil conditions. When planting conditions are wet, pressure must be lowered to allow the side wall of the tire to flex and shed any accumulated mud. The recommended pressure settings are as follows:
Dry Soil: 10 to 15 psi (69 to 103 kPa)
Wet Soil: As low as 8 psi (55 kPa)

Packing Pressure

Packing pressure is an important component of ensuring proper seed to soil contact which provides essential moisture and nutrient access to the seed. The Dakota drill packing pressure is set with the iPad and ranges from 150 psi to 2500 psi. Ideal packing pressure will change depending on soil types, soil moisture conditions, seed depth settings and ground speed. Soils that are dry may require more packing pressure to seal in the soil to ensure moisture preservation while wet soils may require less to avoid soil overpacking.

Additionally, in fields characteristic of heavier residue, lumpy soil and rocks, packing pressure is necessary to maintain consistency of seed depth which becomes even more important in years where soil moisture conditions are highly variable due to limited rainfall. It is advised to set the drill at 400 psi of packing pressure at the beginning of planting, check the furrow and adjust as necessary.

Depth Selection

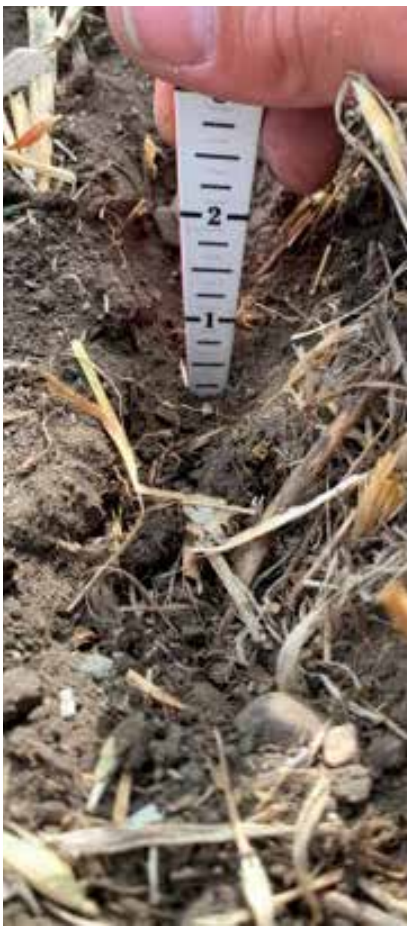
Choosing the ideal seeding depth for a seeding operation varies based on crop, current soil moisture levels and expected future precipitation. To ensure germination, the seed must be placed into sufficient soil moisture. As soil moisture levels in the field can greatly fluctuate even at the same depth due to changing soil conditions, it is important to set the opener at a depth where each seed, to the best judgement, is placed in as similar moisture conditions as possible.

With the relatively high-speed operation of the Dakota disc drill, ensuring consistent seed depth is very important to produce as evenly germinating and emerging crop as possible. Check seed depth frequently during drill operation; adjust the toolbar depth settings and packing pressure as necessary. The opener depth chart is meant to serve as a guide and checking the actual seed depth in the soil is paramount to achieving the desired setting.

The fertilizer coulter depth, in proximity to the seed, can be adjusted as well. Please refer to the drill operator's manual for instructions on how to make this adjustment.

Machine Operation

A successful seeding operation is characterized by precision placement of both seed and fertilizer, in their respective rows, with proper seed-to-soil contact around each product.



Producing consolidated soil around each seed and granule allows the crop to access both moisture and nutrients quickly. The narrow width of the disc opener assembly allows for reduced soil disturbance to retain moisture which becomes very important in years of limited moisture.

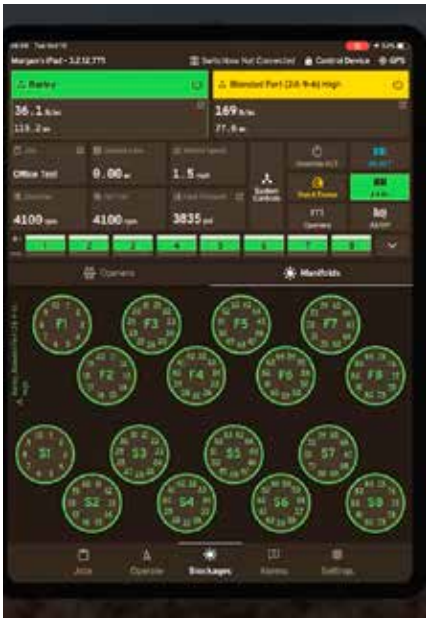
The angle of the disc opener facilitates fracturing of soil along the side wall to allow for improved seed to soil contact and reduced sidewall compaction. Fracturing is also contingent on the machine being operated at a speed typically higher than other drills. An operating speed of 7 miles per hour is recommended in ideal planting conditions. Inspection of the seed and fertilizer trench to check for consistency of product depth and soil tilth is required on a regular basis as conditions may change frequently, even in fields with smooth topography.

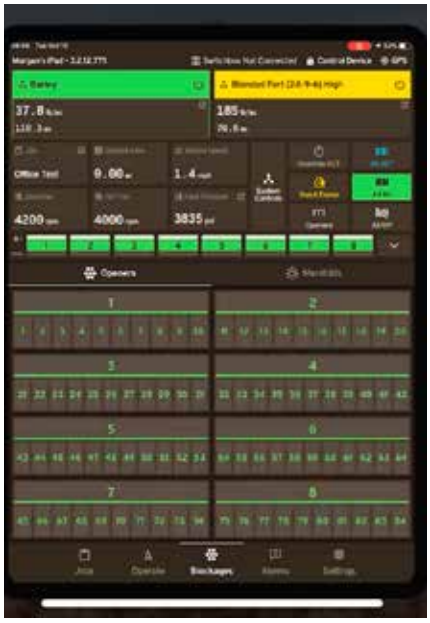
Quick closure of the row through soil fracturing is especially important when considering NH3 fertilizer application. As NH3 is applied as a gas, row closure is important to ensure that the product does not escape into the atmosphere or be directed into the following seed row. This maintains the seed-to-fertilizer separation required for seed safety especially at higher nutrient application rates.

As mentioned previously, it is imperative to continually check seed depth during seeding operations which requires keeping a tape measure, ruler or seed depth-checking tool available at all times. Be sure to check different sections of the toolbar to ensure consistent depth is achieved across the entire width of the implement.

Väderstad iCon – Blockage

During seeding operations where fertilizer is being placed with the seed, due to the blockage sensors being unable to detect the difference between a blocked seed run and fertilizer moving through it, it is important to periodically check that all seed runs are clear. To do this, turn off the seed-placed fertilizer bin during seeding for a minimum of 50 feet and note the product runs on the blockage section of the iCon control.

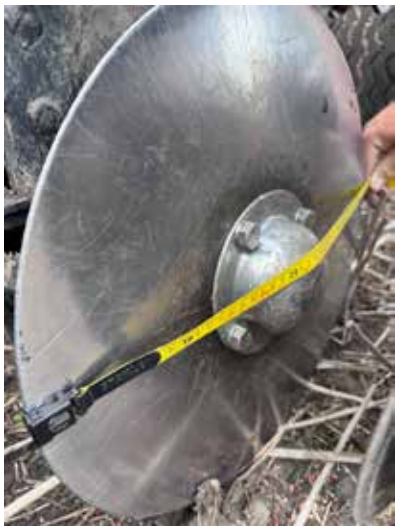


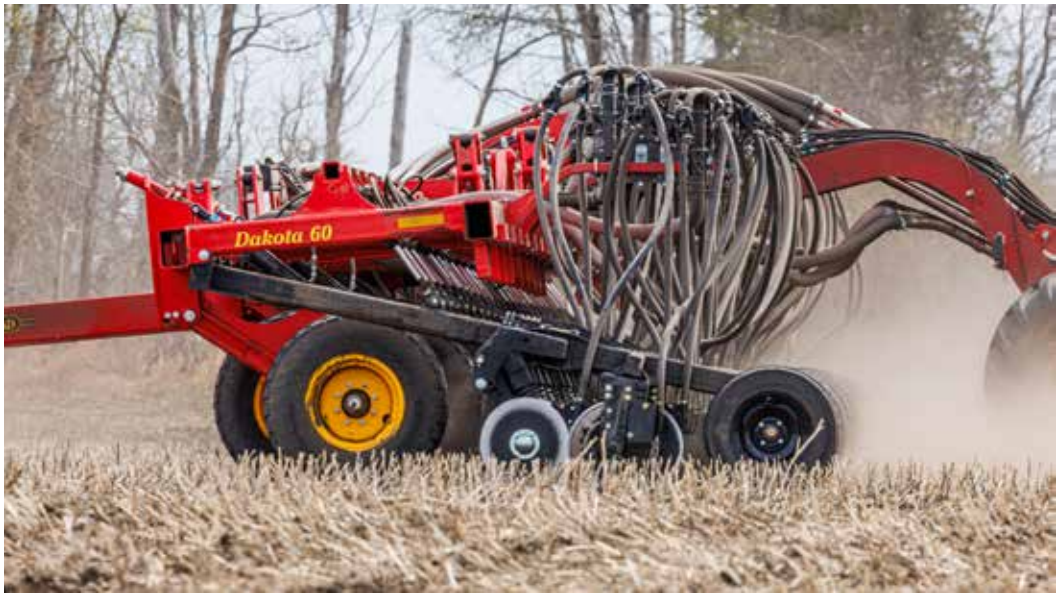


Dakota General Tips and Tricks

How to Assess Discs for Wear and Replacement

The Dakota disc is 18 inches in diameter; it is important to measure discs every year to determine the amount of wear and determine whether replacement is necessary. If disc diameter has been reduced by 1.5 to 2 inches, or if the beveled cutting edge has disappeared, the disc must be replaced. Disc size and integrity is essential for proper product trench creation in the soil, fracturing of the sidewall for seed-to-soil contact and for cutting through previous crop residue to avoid hairpinning.



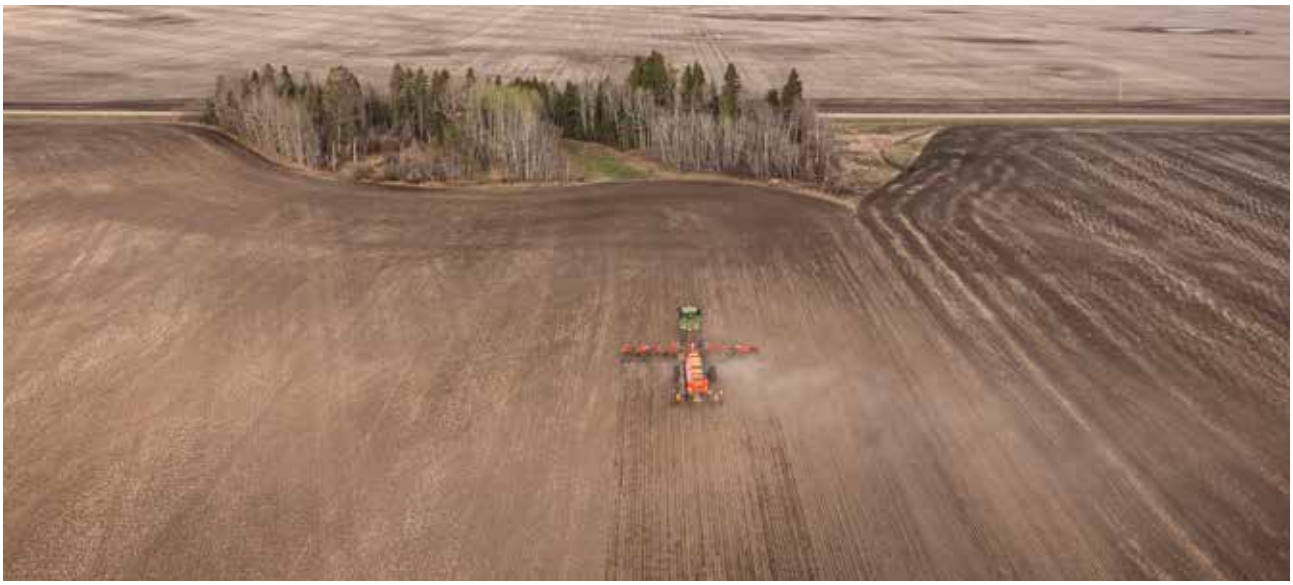


Seeding in Heavy Residue

Standing residue from the previous crop can play a large role in moisture preservation such as catching snow during the winter and restricting soil moisture loss through evaporation. The Dakota drill, with its angled disc opener, cuts through and removes residue from the seed row. Doing so minimizes residue “hairpinning” that disrupts seed to soil contact and subsequent plant growth. However, in conditions featuring high residue levels (especially with lumps) it may be necessary to mechanically manage residue prior to seeding operations. It is encouraged to begin residue management practices during the previous year’s harvest with straw chopping and spreading equipment on combines. During seeding season, it is advised to seed at a slight angle to previous crop rows and, during wet conditions, allowing for residue to dry before beginning seeding operations.

What Product Look Ahead's are and How to Check Them in the Soil

Product Look Ahead's are the Sectional Control Technology (SCT) settings that determine when product rollers begin to meter product at the start of a drill pass and when they turn off at the end of a pass. These numbers are determined during calibration prior to seeding, however it is important to check drill passes at the beginning of the operation and periodically thereafter to ensure that there are no product gaps in the field or excessive overlap. Go to a seeded area of the field where the drill starts and ends a pass at a 90 degree angle to a previous pass, typically a headland, and inspect individual rows to determine if product is being metered into the previous pass or leaving gaps of unseeded soil in the field. Adjust settings in the control system as necessary.



How to Set and Check the Airflow for Best Fertilizer Placement Without Plugging

The test procedure outlined below, and in the PD Tank operator's manual, serves as a guideline for ensuring proper fan speed for effective delivery of product:

1. Remove hose(s) from an outside opener and temporarily attach to the frame of the seeder with the hose looping no more than 12" (300 mm) below the frame.

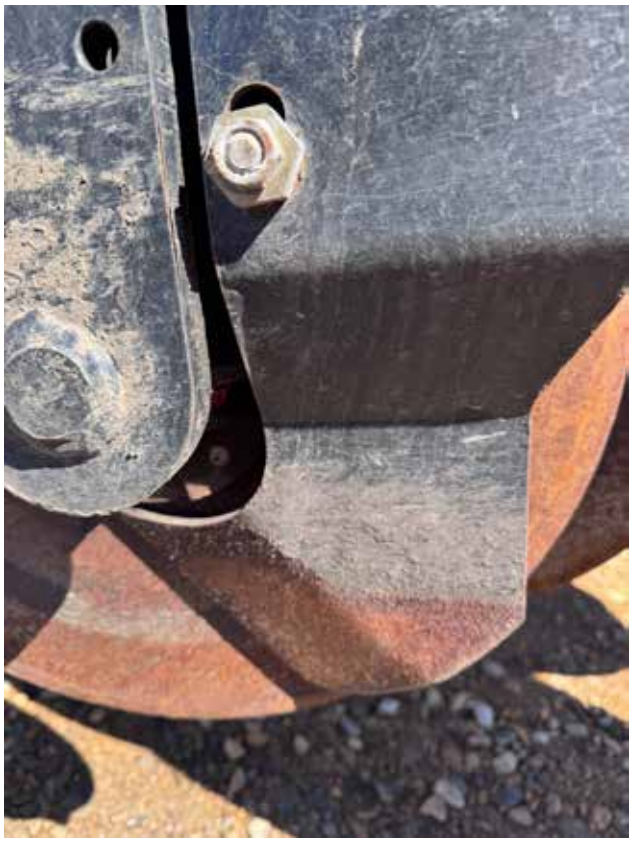
2. Begin seeding at normal field speed(s) and observe distance product discharges from hose(s) attached to the frame. All products should discharge within a range or 12" — 24" (300 — 600 mm).

3. Adjust fan speed, if necessary, to ensure optimum air flow for product discharge.

Additionally, check the furrow to ensure that fertilizer is remaining in its proper location in the fertilizer trench and is not blowing into the seed trench or on the surface of the soil itself.

Levelling the Drill Frame

An evenly germinating and emerging crop is continent on each seed being located at the same depth across the field. While it is important for opener settings to be at the same setting across the toolbar, the toolbar itself is required to be at a level working height across its entire width. Be sure to check the levelness of the toolbar prior to each season. Please reference the operator's manual for instructions on how to level the toolbar.



Opening Disc Scraper Adjustment

When operating the drill in heavy, wet soil conditions, the presence of soil on the opener disc can affect furrow creation and sidewall soil fracturing. It is therefore imperative to ensure that disc scrapers are set to the proper adjustment to facilitate soil removal. The opening disc scraper is adjusted correctly when the full length of the front edge of the disc scraper lightly touches the opening disc. Adjust the opening disc scrapers according to field conditions and the wear of the disc scraper. Please refer to the operator's manual on how to make this adjustment.

Changing Opening Disc Offset

1. Lift the frame of the implement to the highest position.

2. Support the opening disc strut and opening disc.

3. Remove and keep the four bolts, washers, and lock nuts attaching the opening disc strut to the opener mount.

4. Move the opening disc strut to the new position of the opener mount.

5. Attach the opening disc strut to the opener mount with the existing bolts, washers, and lock nuts.

Final Thoughts

Risk management through agronomic stewardship is a key component of long-term success.

Creating an environment to allow for quick germination, emergence and crop canopy allows for enhanced crop performance both in the spring and throughout the entire growing season. The result is maximum yield and quality to deliver consistently greater return on investment on the farm.

Reliable and durable farm machinery

1
Year
Warranty

*Entire machine comes with 12 month or 25,000 acres warranty from Warranty Start Date.**

3
Year
Warranty

*Frame structure comes with 36 month or 25,000 acres warranty from Warranty Start Date.**

** Warranty valid period is whichever limit occurs first.*

VÄDERSTAD

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