7000 SERIES AIR SEEDER

MINIMUM FAN SPEED CHARTS MANUAL

0252-90-10

This manual is intended to be used as a supplement to the 7000 Series Air Seeder Operator's Manual.

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Effective L.N. 40980AS01- DATE
Revision March 2015
0252-90-10

1. FAN SPEED CHARTS

IMPORTANT

THE CHARTS LISTED IN THE FOLLOWING MANUAL WERE CREATED USING A BOURGAULT AIR SEEDER AND BOURGAULT SEEDING UNIT/DISTRIBUTION SYSTEM. THE CHARTS LISTED IN THIS MANUAL ARE ONLY ACCURATE AND VALID WITH A BOURGAULT SEEDING SYSTEM.

CHANGES TO THE BOURGAULT DISTRIBUTION SYSTEM, INSTALLING A BOURGAULT AIR KIT ON A COMPETITOR SEEDING UNIT, OR USING A BOURGAULT TANK WITH A COMPETITIVE DRILL WILL REQUIRE THE END USER TO CALCULATE THEIR OWN MINIMUM FAN SPEEDS NEEDED FOR EACH PRODUCT. THESE CHARTS ARE NOT APPLICABLE FOR THOSE SCENARIOS.

BOURGAULT SHIPS ALL 7000 SERIES CARTS WITH ¾" FAN CIRCUIT HYDRAULIC COUPLERS, AND ALL CROSS TILLAGE HYDRAULIC HOSES WITH ¾" COUPLERS TO SUPPLY THE FAN'S HYDRAULIC REQUIREMENTS. FOR MAXIMUM FAN EFFICIENCY AND RPM THESE COUPLERS SHOULD NOT BE DOWNSIZED FOR ANY REASON.

THE STATIONARY METHOD LISTED IN THE *SECTION 1.2* WAS USED TO CONSTRUCT THE CHARTS LISTED IN THIS MANUAL.

IMPORTANT

ANY SEEDING CONDITION, INCLUDING PRODUCT DENSITY, PRODUCT SIZE, RELATIVE HUMIDITY, AND SEED TREATMENTS, CAN ALL HAVE AN EFFECT ON THE MINIMUM REQUIRED FAN SPEED FOR ANY PRODUCT. THE CHARTS LISTED HEREIN ARE A GUIDE BASED ON OPTIMUM CONDITIONS. OPERATORS SHOULD CALCULATE THE REQUIRED FAN SPEED USING THE METHOD LISTED IN THE *SECTION 1.2* FOR ANY CHANGE TO SEEDING CONDITIONS.

TERMINOLOGY

1. **Cleanout** - This is when the airstream goes from carrying product in the air stream to having only air traveling through the transfer lines.
2. **Loaded Fan Speed** - Stable fan RPM displayed when product is being metered into the distribution system.
3. **Unloaded Fan Speed** - Stable fan RPM displayed when there is no product being metered into the distribution system.
4. **Ports** - Number of manifolds feeding the drill from the Primary Manifold.

1.1 READING FAN CHARTS

The following information will assist in reading the fan charts provided.

1. Verify your model and width.
2. Check your opener spacing. If unsure of the spacing, measure the distance between 2 adjacent openers, this measurement is your unit spacing.
3. Count the number of ports on the primary manifold. This is the manifold being fed by the 6” or 7” pipe from the Air seeder tank, refer to *Figure 1*.
4. Verify the type of fan on your air cart.

   There are 2 methods to distinguish between the High Speed and High capacity fan, refer to *Figure 2*:

   i. The high speed fan has a plastic molded transition between the fan housing and the 7” distribution piping. The High capacity fan has a steel formed transition between the fan housing and the 7” distribution piping.

   ii. The High speed fan has a 3-3/4” wide fan housing. The High capacity fan has a 4-3/4” wide housing.
5. Once you have recorded this information refer to the *Table 1 - Minimum Fan Speed Chart Legend* (page 1.3) the Legend to find the charts specific to your seeding system and applied product.

NOTE

IF YOU ARE APPLYING A BLEND OR THERE IS NO CHART FOR YOUR PRODUCT PLEASE FOLLOW THE INSTRUCTIONS IN *SECTION 1.1.2 - DETERMINING FAN SPEED FOR UNISTED PRODUCTS* TO CALCULATE A MINIMUM FAN SPEED REQUIRED.

***Example**: For a 3320-76 @ 10" spacing with High Capacity fan use Chart 5A - 5F, depening on the used product. Refer to Table 2 - Example - Finding The Chart Specific to Your Seeding System.*

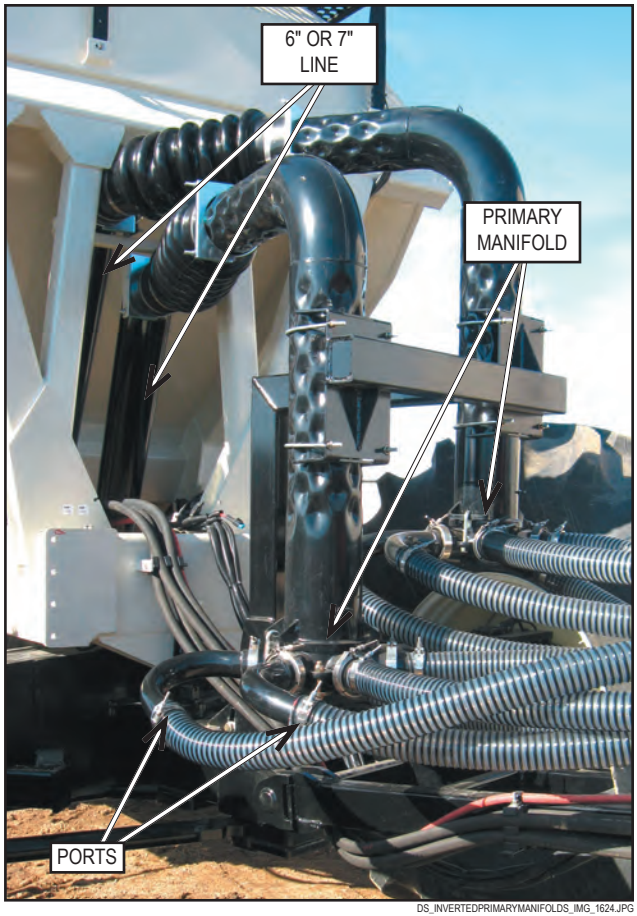

Figure 1 - Primary Line, Manifold and Ports
(Double shoot is shown)

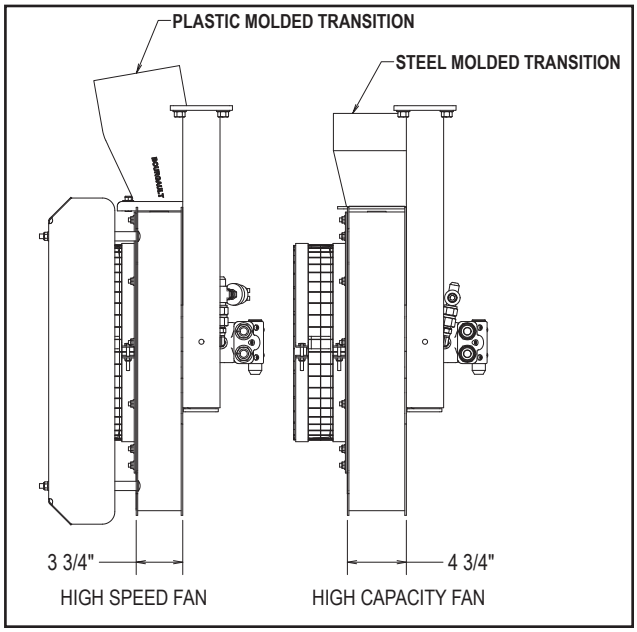

Figure 2 - Fan Identification

1.1.1 MINIMUM FAN SPEED CHART LEGEND

Drill Configuration			Chart Required			
			Section A (Trailing Units)		Section B (Leading Units)	
Model	Spacing	Number of Ports	High Speed Fan	High Cap Fan	High Speed Fan	High Cap Fan
3320-50	10	6	3A ~ 3F		7A ~ 7F	
	12	6	3A ~ 3F		7A ~ 7F	
3320-60	10	6	1A ~ 1F		9A ~ 9F	
	12	6	1A ~ 1F		9A ~ 9F	
3320-66	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	6	1A ~ 1F		9A ~ 9F	
3320-76	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
3320-80	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
3320-86	10	10	4A ~ 4F	6A ~ 6F		
	12	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
3720-50	7.5	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	10	6	3A ~ 3F		7A ~ 7F	
	12	6	3A ~ 3F		7A ~ 7F	
3720-60	7.5	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	10	6	1A ~ 1F		9A ~ 9F	
	12	6	1A ~ 1F		9A ~ 9F	
3720-70	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	6	1A ~ 1F		9A ~ 9F	

Table 1 - Minimum Fan Speed Charts Legend

Drill Configuration			Chart Required			
			Section A (Trailing Units)		Section B (Leading Units)	
Model	Spacing	Number of Ports	High Speed Fan	High Cap Fan	High Speed Fan	High Cap Fan
3320-50	10	6	3A ~ 3F		7A ~ 7F	
	12	6	3A ~ 3F		7A ~ 7F	
3320-60	10	6	1A ~ 1F		9A ~ 9F	
	12	6	1A ~ 1F		9A ~ 9F	
3320-66	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	6	1A ~ 1F		9A ~ 9F	
3320-76	**10**	**8**	2A ~ 2F	**5A ~ 5F**	8A ~ 8F	10A ~ 10F
	12	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
3320-80	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
3320-86	10	10	4A ~ 4F	6A ~ 6F		
	12	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
3720-50	7.5	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	10	6	3A ~ 3F		7A ~ 7F	
	12	6	3A ~ 3F		7A ~ 7F	
3720-60	7.5	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	10	6	1A ~ 1F		9A ~ 9F	
	12	6	1A ~ 1F		9A ~ 9F	
3720-70	10	8	2A ~ 2F	5A ~ 5F	8A ~ 8F	10A ~ 10F
	12	6	1A ~ 1F		9A ~ 9F	

Table 2 - Example - Finding The Chart Specific to Your Seeding System

1.1.2 FAN SPEED INTERPOLATION FOR THE UNLISTED GROUND SPEEDS

For ground speeds not listed on the chart, operators will have to interpolate the fan speed based on the ground speeds listed in the charts. Follow the procedure below for unloaded and loaded minimum fan speeds.

1. From the chart specific to your configuration locate the rate in lb. /acre.
2. Follow where the Loaded/unloaded speed curve that are above and below your intended speed crosses the rate required and record.
3. Calculate the difference from the speed you wish to travel vs the lower speed curve listed. The difference between chart lines is 1mph and your calculated difference is the factor used to calculate the new minimum fan rpm.
4. Subtract the higher ground speed fan rpm from the lower ground speed fan rpm. Multiply this value by the speed difference factor calculated above.
5. Add this value to the lower ground speed fan rpm previously recorded. This is your fan speed.

Example:

Minimum unloaded fan speed required to travel 5.7 mph with a 3320-76' unit, 10" spaced, 8 port and tow behind tank that comes with the high capacity fan applying wheat at 150lb. (Using Chart 5)

1. It is determined that Chart 5a is the chanrt specific for seeding system configuration. On the chart locate the rate - 150 lb.
2. Determine unloaded fan speed:

   Between 5mph and 6mph curves Unloaded Fan speed at 5 mph and 6 mph:

   a) 5mph 150lb unloaded minimum fan speed = 4050 rpm

   b) 6mph 150lb unloaded minimum fan speed = 4275 rpm

3. Calculate the difference between speeds:

   5.7 mph – 5 mph = 0.7 mph

4. Change in fan RPM required:

   (4280-4050) x 0.7 = 161 rpm

5. Calculate your fan speed:

   Estimated unloaded fan speed = 4050 rpm + 161 rpm = 4208 rpm minimum no load fan speed for a ground speed of 5.7 mph

   Set fan to 4200 rpm in the unloaded state (round rpm to nearest 50 rpm +/- 25 rpm).

1.1.3 DETERMINING FAN SPEED FOR UNLISTED PRODUCTS

Listed in *Table 3* are several common products that do not have fan charts, along with the recommended minimum fan chart that can be used as a starting point. If there is no product listed please go to instructions below and follow the procedure to get the minimum fan speed required.

NOTE

THESE ARE RECOMMENDED CHARTS TO FOLLOW. OPERATORS SHOULD GO THROUGH THE PROCEDURE BELOW IF THERE IS ANY CONCERN WITH THE MINIMUM FAN SPEED REQUIRED.

In order to calculate the minimum fan speed for blended products, or products not listed on the charts please use the following formula:

1. Calculate the total amount of product to be applied, (in pounds/acre).
2. For any product in the blend that has a chart listed in the following pages, look at the chart and find the loaded fan speed required for the **Total Product** to be applied and write it down.
3. For all products that do not have a chart listed in this document select a product that is the closest match to what you wish to apply for your unit and do the same as in Step 2.
4. Calculate the percentage of each individual product in the blend and multiply that percentage by the fan speed recorded previously for each product.
5. Add the weighted fan speeds together from each product and the result will be your initial loaded fan speed.
6. Repeat process 1 – 5 to calculate the unloaded minimum fan speed required for the same rate required. This will provide the initial starting point.

Product	Recommended Chart to Follow
Canary Seed	Barley
Faba Beans	Chickpea/Pea
Flax	Barley
Lentils	Chickpea/Pea
11-0-0-50	11-51-00
20-00-00-24	46-0-0

Table 3 - Recommended Chart to Follow for Non Listed Products

Example:

Applying a blend of 150 lbs. wheat and 50 lbs. 11-51-0-0 at 5 mph with a 3320-76 unit with 10" spacing, 8 port, and trailing air seeder tank that comes with High Speed fan.

Using Tables 3 (if required) and Chart 2 to calculate fan speed.

1. Total Product:

   150 lbs. + 50 lbs. = 200 lbs.

2. Loaded fan RPM:

   Wheat @ 200 lbs.: 4600 RPM

   11-51-00 @ 200 lbs.: 5175 RPM

3. Percentage of each product:

   150 lbs. wheat / 200 lbs. total = 75%

   50 lbs. 11-51-0-0 / 200 lbs. total = 25%

4. Estimated loaded fan speed

   (75% x 4600) + (25% x 5175) = 4744 RPM minimum loaded minimum fan speed for this blend.

   Initial loaded fan rpm should be 4750 rpm (round rpm to nearest 50 rpm +/- 25 rpm).

IMPORTANT

DO NOT EXCEED 6000 RPM WITH EITHER THE HIGH SPEED OR THE HIGH CAPACITY FAN.

1.2 TROUBLESHOOTING

If you experience plugging or that the fan cannot achieve the loaded minimum fan RPM required perform one of the following stationary tests.

1.2.1 STATIONARY TEST IF SYSTEM PLUGS

The stationary method should be used any time you experience issues with the air system delivering product.

NOTE

EACH AIRSTREAM MUST BE CHECKED SEPARATELY.

1. Verify that augers for the tanks you are testing are charged and full of product.
2. With the unit stationary and the openers out of the ground, set the fan rpm at your anticipated unloaded RPM required.
3. Engage the metering augers from the tanks you are applying product from, (utilizing the control box on the side of the tank), for that airstream.
4. Meter product until the fan RPM stabilizes at the loaded RPM, approximately 5~10 seconds minimum. If after one minute the fan speed has not stabilized and is still increasing, shut off the metering augers, allow the system to clean out and retest with a higher unloaded fan speed.
5. Shut off the metering augers.
6. Count the number of seconds that elapse until product stops coming out of the seed boots at the mainframe. (This is when the majority of product stops – expect the odd kernel to come out for 5~10 seconds beyond the majority of product stopping).
7. If the interval between shutting off the augers vs product coming out of the seed boots is greater than 4 seconds, the unloaded fan speed must be increased.
8. Repeat the above process until the interval is below 4 seconds. The RPM that has a clean out of less than 4 seconds is your required minimum fan RPM for this product.

NOTE

MEASURE FAN SPEED AGAINST YOUR ACCEPTABLE SEED BOUNCE. BE SURE TO USE ENOUGH FAN RPM TO MEET THE 4 SECOND MINIMUM CLEANOUT.

IMPORTANT

EXCESSIVE FAN SPEED CAN RESULT IN PREMATURE HOSE WEAR, SEED DAMAGE, AND THE POTENTIAL FOR ABNORMALLY HIGHER PERCENTAGE OF SEED BOUNCE.

1.2.2 STATIONARY TEST IF MINIMUM LOADED FAN SPEED UNACHIEVABLE

NOTE

EACH AIRSTREAM MUST BE CHECKED SEPARATELY.

1. Verify that augers for the tanks you are testing are charged and full of product.
2. With the unit stationary and the openers out of the ground, set the fan rpm at the maximum unloaded fan speed available.
3. Engage the metering augers from the tanks you are applying product from, (utilizing the control box on the side of the tank), for that airstream.
4. Meter product until the fan RPM stabilizes at the loaded RPM, (5~10 seconds minimum). If after 1 minute the fan speed has not stabilized and is still increasing, shut off the metering augers, allow the system to clean out and retest with a lower ground speed or with less total product. Continue to next step if the fan speed is stable.
5. Shut off the metering augers.
6. Count the number of seconds that elapse until product stops coming out of the seed boots at the mainframe. (This is when the majority of product stops – expect the odd kernel to some out for 5~10 seconds beyond the majority of product stopping).
7. If the interval between shutting off the augers vs product coming out of the seed boots is greater than 4 seconds, the seeding speed will need to be decreased or the total amount of product being applied will need to be lowered.
8. Repeat the above process until the interval is below 4 seconds. The RPM that has a clean out of less than 4 seconds is your required minimum loaded fan RPM for this product.
9. The stationary method should be used any time you experience issues with the air system delivering product.

Chart 3A

(for rates below 50lb/ac use a minimum fan speed of 3000 RPM)

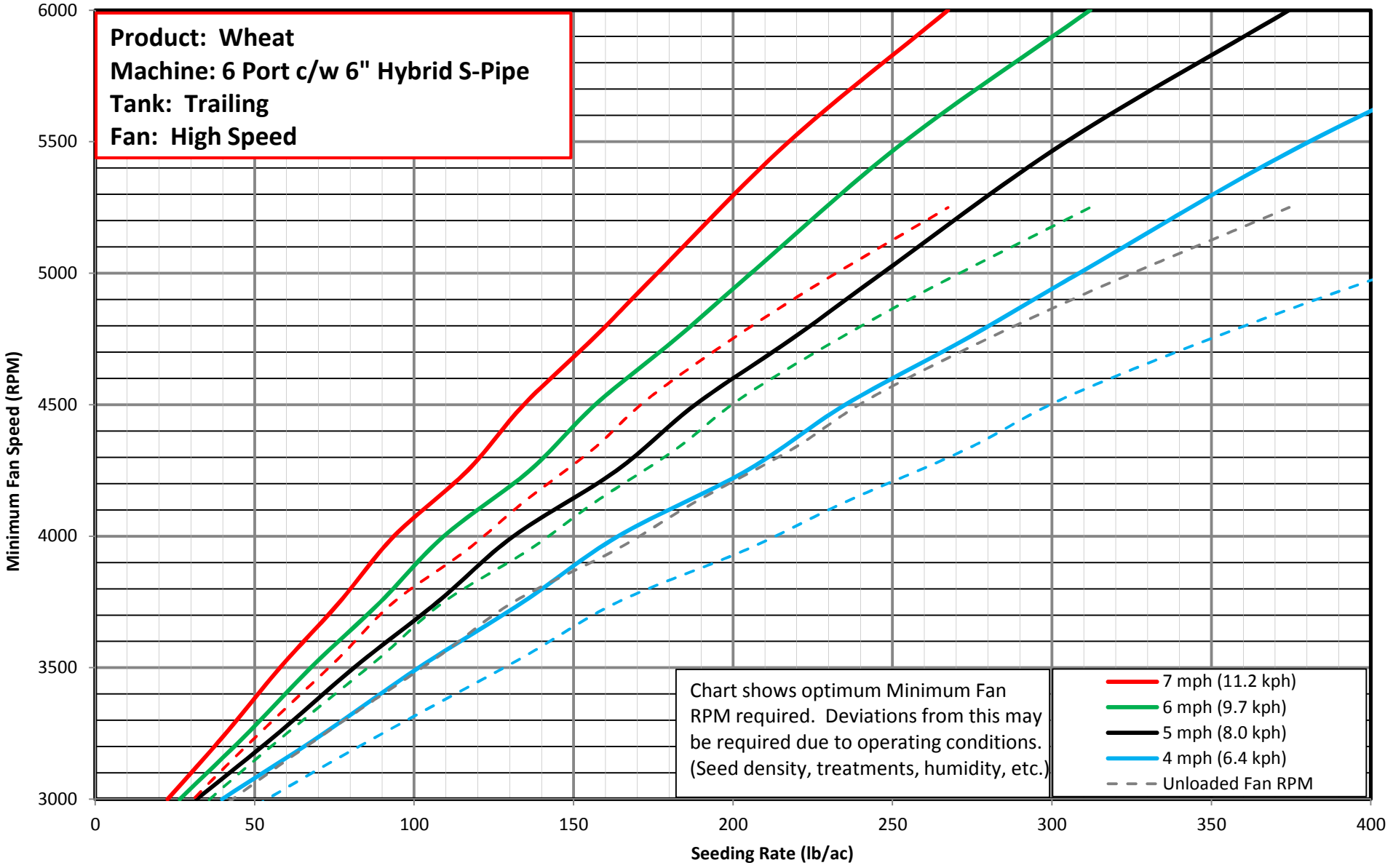

Chart 3B

(for rates below 50lb/ac use a minimum fan speed of 3000 RPM)

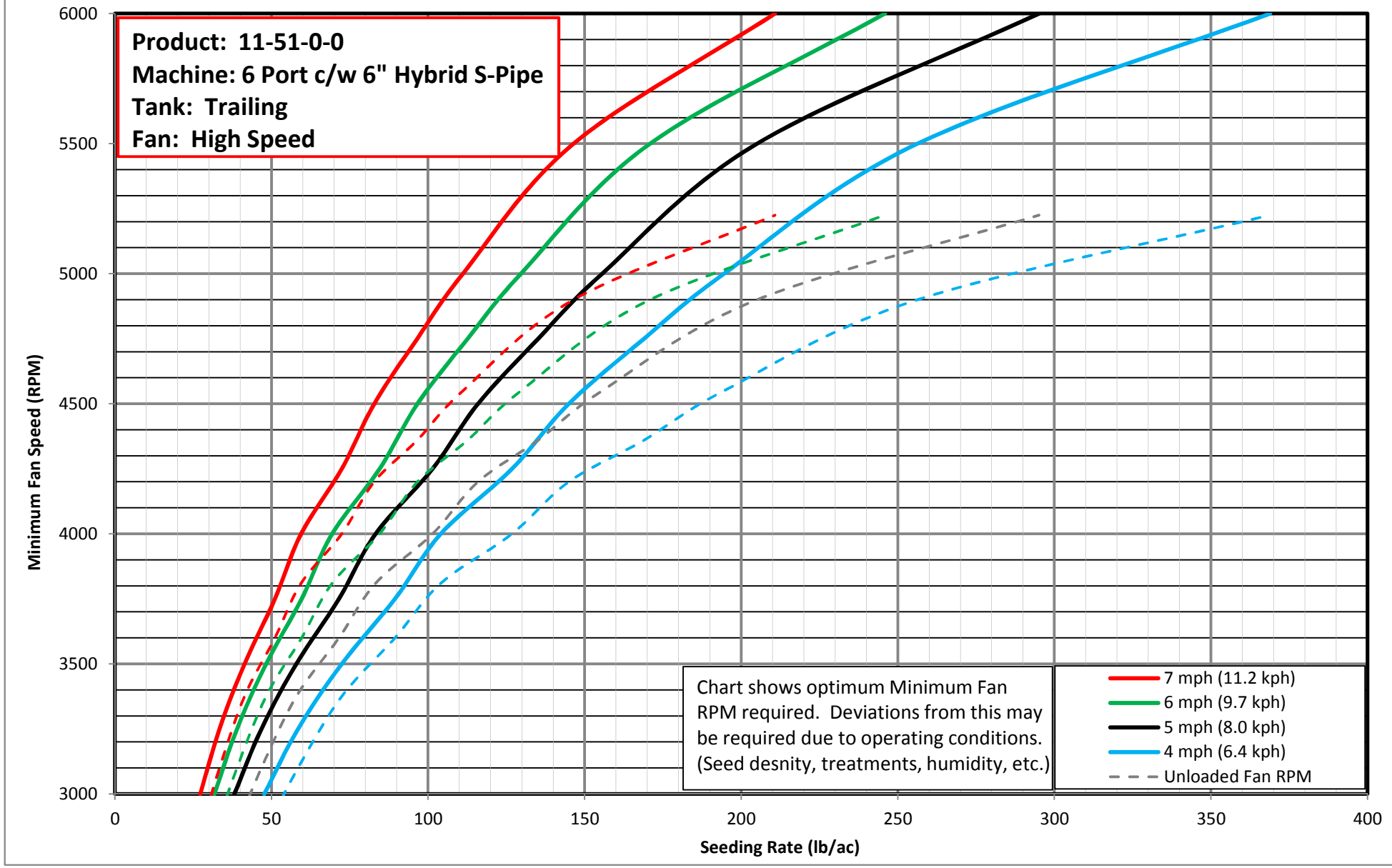

Chart 3C

(for rates below 50lb/ac use a minimum fan speed of 3000 RPM)

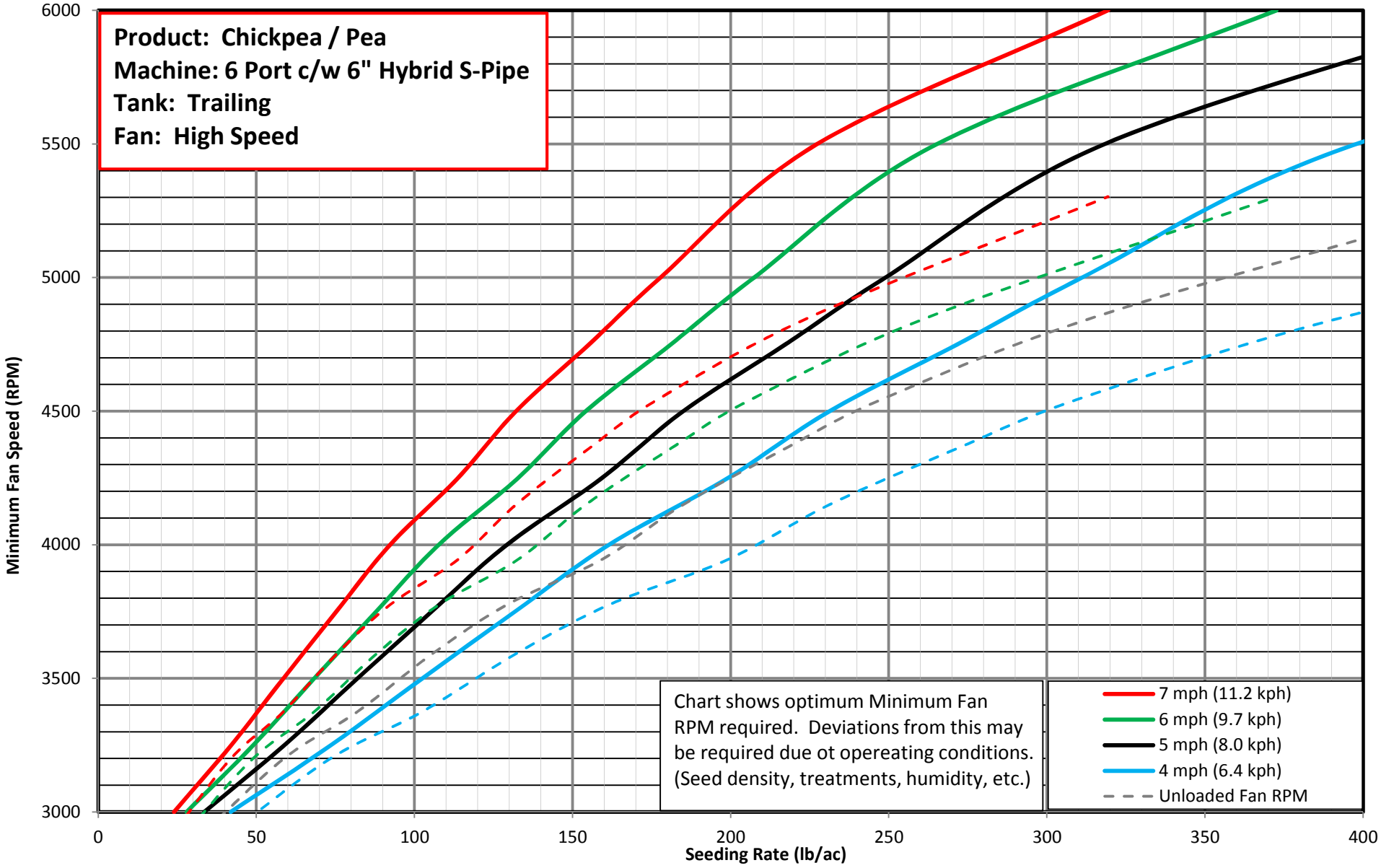

Chart 3D

(for rates below 50lb/ac use a minimum fan speed of 3000 RPM)

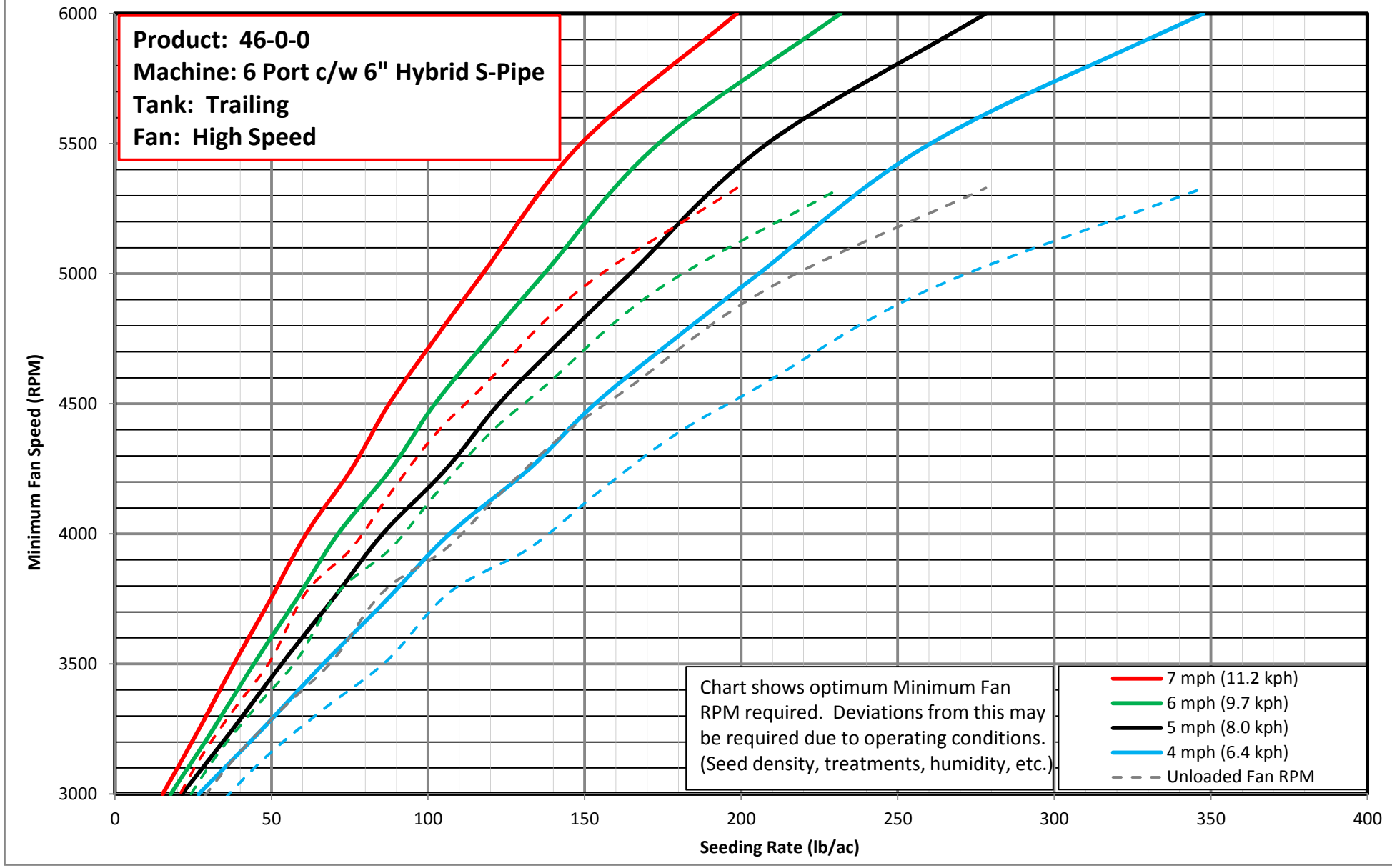

Chart 3E

(for rates below 50lb/ac use a minimum fan speed of 3000 RPM)

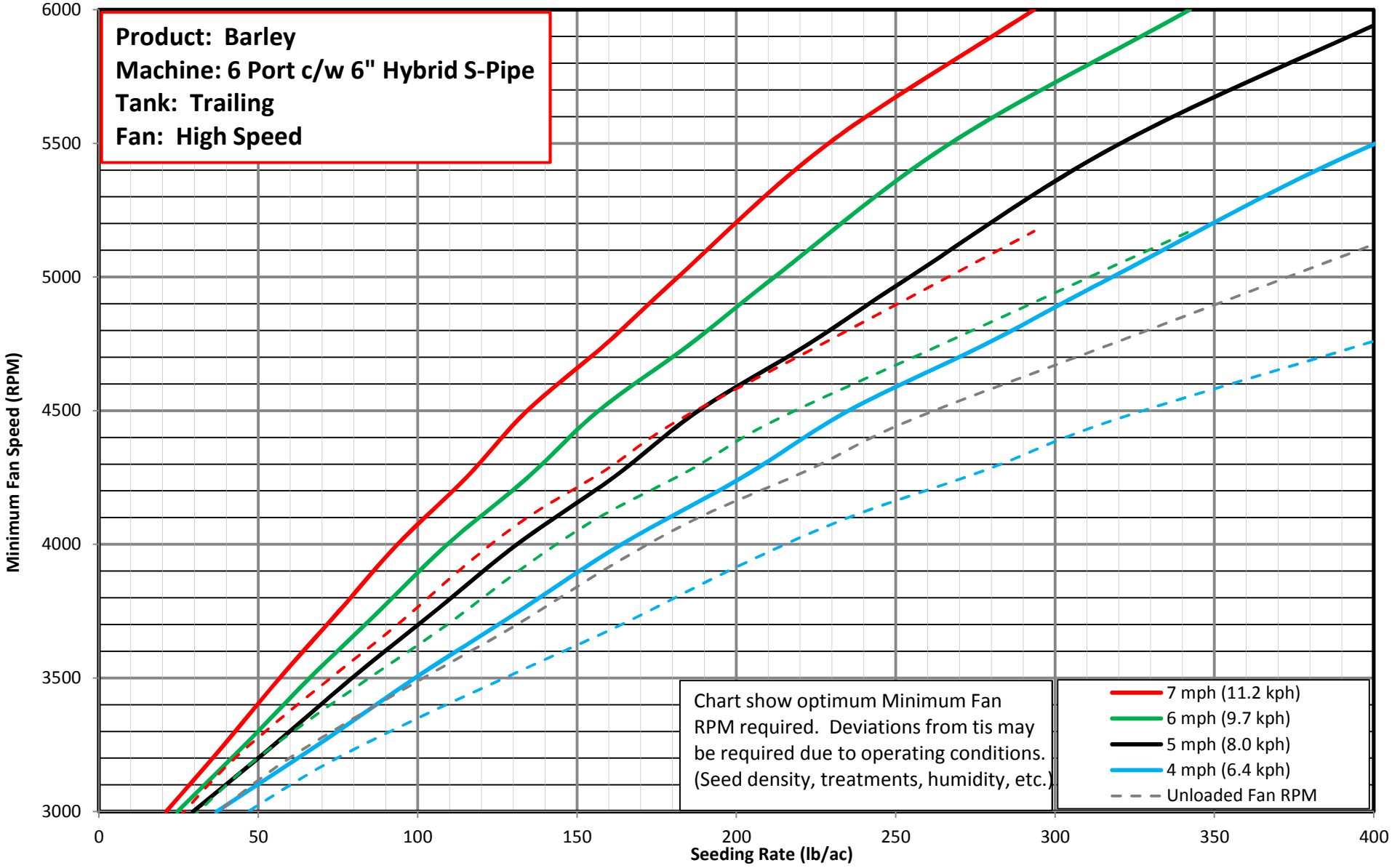

Chart 3F

(for rates below 50lb/ac use a minimum fan speed of 3000 RPM)