Maxi-Cap Series
Gravity Separators

OPERATIONS MANUAL

(Revision 1 – February 2012)

- **Operating Instructions**
  - **Troubleshooting**
    - **Maintenance**
      - **Auxiliary Equipment**
        - **Parts List**

Oliver

Advancing the Science of Separation.

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Maxi-Cap Series Gravity Separator - Operations Manual Revision Table		
Section	**Revision**	**Date**
Operating Instructions (including Appendix)	1	February 2012
Troubleshooting	1	February 2012
Maintenance	1	February 2012
Auxiliary Equipment	1	February 2012
Parts List	1	February 2012

Congratulations!

You have just purchased a well-built machine that will earn substantial profits for you, if you take the time right now to understand how the Maxi-Cap Series Gravity Separator works.

This manual contains new and valuable information that both experienced and inexperienced gravity separator operators need to know and understand. Please allow adequate time to read, understand, and be comfortable with the various Maxi-Cap operations. Taking the time now to learn how the Maxi-Cap works will help eliminate many of the problems frequently encountered.

Keep in mind at all times that the Oliver Gravity Separator is not a "cure-all" for the processor's problems. The gravity separator is a specialized piece of machinery designed to separate particles of similar size that differ in specific density.

Oliver Gravity Separators should not be used as a cleaning machine to remove dust, dirt, sticks and other refuse frequently found in harvested crops. The gravity separator should not be used as a sizing machine. Screening machines can do this more efficiently.

If you ever have any questions about your Maxi-Cap Gravity Separator, don't hesitate to call us during our normal business hours of 7:00am to 5:30pm Mountain Time, Monday through Friday. You can also send us a fax or visit our website anytime.

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Important Safety Precautions for Using the Maxi-Cap Gravity Separator

- Always shut off the "lock-out" power when performing maintenance or service.
- Always insure that the separator and components are electrically grounded.
- Always wear face and eye protection when inspecting or adjusting the separator.
- Never operate the separator with the air filters removed.
- Never operate the separator with the deck removed.
- Never operate the separator with missing or worn parts.
- Never operate the separator with the air chest boot removed.
- Never operate the separator with worn or damaged decks.
- Never use the deck as a table or work station.
- Never stand on the separator.
- Always wear ear protection when operating the separator.
- Always keep separator clean and properly adjusted.
- Periodically inspect the separator for wear and correct operation.

Maxi-Cap Series
Gravity Separators

• Operating Instructions

(Revision 1)

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Important Information about the Operating Instructions

The Maxi-Cap Series of Gravity Separators is comprised of four different models: 2400 (3 fans), 3000 With (3 fans with a wider deck), 3600 (4 fans), and 4800 (5 fans). The length of the deck is proportional to the number of fans.

Unless otherwise noted, the Operating Instructions apply to all four models. These instructions will be updated as required. Updated documentation will be sent to all current owners of a Maxi-Cap Series Gravity Separator.

Maxi-Cap Series Operating Instructions
Table of Contents

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1. Introduction

The Maxi-Cap Gravity Separator is a specialized piece of processing equipment designed to separate particles which are similar in size and shape but differ in weight. For agricultural products this includes sticks, stems, insect damage, shriveled seed, weeds, stones and other reject materials.

Gravity separators are also used in recycling applications, mineral concentration, plastic separation and many other industrial applications. Best results are obtained when the Maxi-Cap is used as an integral part of a processing line after the product has been thoroughly pre-cleaned and sized.

2. Installation

All Maxi-Cap Gravity Separators (hear after referred to as just Maxi-Cap) are operated on test blocks at the factory for a minimum of 50 hours to insure that they are shipped to you in perfect operational condition. During and after the operational period, the drive train and all controls are carefully checked to be sure that they are operating correctly.

Foundation Requirements

A solid level foundation is required for safe and proper operation of the Maxi-Cap. False vibrations from flooring can ruin the separation quality of the machine. A six-inch concrete slab is ideal but not essential. The Maxi-Cap is fully counterbalanced to keep external vibrations to a minimum. However, the accuracy of the counterbalancing system is affected by the weight of the product on the deck and thus is dependent on the capacity and type of product being separated. Therefore we recommend that the Maxi-Cap be firmly attached to the floor. Please contact the factory or your Oliver representative for recommendations. When positioning the Maxi-Cap, be sure that you leave adequate clearance to operate the controls, open the electrical cabinet and remove the deck for changing or cleaning.

Handling

Your new Maxi-Cap Gravity Separator is designed to give years of maintenance-free operation, but it can be damaged during handling and installation. Please take extra care during installation not to cause damage which may result in additional installation costs.

The Maxi-Cap Gravity Separator weighs between 6,000 and 10,000 pounds depending on the model and accessories ordered with it. Be sure that the handling equipment is adequate for the load. While handling the machine take extra care not to damage the separating deck, the air filters or any other parts of the machine.

Protecting the Deck

The deck is the portion of the machine that actually contacts the product during separation. Take extra care not to damage it. During construction and installation, it is very common for contractors to use the surface of the deck as a work space or storage space for items they do not need. **Please discourage this practice!** The deck is designed to support a relatively uniform load of product over its entire surface. Storage of concentrated loads on the deck have resulted in bent or broken deck frames and in damage to the wire overcovers. We recommend that a non-combustible surface such as a sheet of 22-gage steel be placed over the deck to protect it until the Maxi-Cap is ready for to be used. **Do not weld anything to the machine as the sensitive control electronics could be seriously damaged.** If it is necessary to weld or cut above the machine during installation take extra care to prevent damage from falling debris or sparks.

Electrical Requirements

Normally motors will be installed at the factory and will be wired for 60 cycle, 220/440 volt, 3 phase, 1750 RPM unless otherwise specified on your order. The eccentric inverter is voltage specific so make sure it is correct for your voltage.

When your electrician wires the motor, be sure that he connects it so that it will run in the proper direction. The fan shaft, eccentric shaft and blender shaft should turn counterclockwise when viewed from the discharge end of a left hand machine, clockwise on a right hand machine. Proper direction of rotation is very important and at least half of the problems with new gravities can be traced back to incorrect rotation.

	2400/3000	**3600**	**4800**
Circuit Size	208/230V 60 amps	208/230V 70 amps	208/230V 100 amps
	460V 30 amps	460V 35 amps	460V 50 amps

User Supplied Motor Installation and Belt Adjustments

If you supply your own motor(s), be sure that it is large enough to carry the loads for the gravity separator you are using. Please refer to the User Supplied Motor Specifications listed below.

	Model 2400	**Model 3000**	**Model 3600**	**Model 4800**
Motor Specifications (In HP)	Fan - 15	FAN - 15	FAN - 20	FAN - 25
	Deck – 2.0	Deck – 2.0	Deck – 2.0	Deck – 2.0
	Blender - 1	Blender - 1	Blender - 1	Blender - 1
	Pump - 0.5	Pump - 0.5	Pump - 0.5	Pump - 0.5

	Model 2400	**Model 3000**	**Model 3600**	**Model 4800**
Motor Specifications (In KW)	Fan - 11.3	FAN - 15	FAN - 15	FAN - 19.5
	Deck – 1.5	Deck – 1.5	Deck – 1.5	Deck – 1.5
	Blender - .75	Blender - .75	Blender - .75	Blender - .75
	Pump - .37	Pump - .37	Pump - .37	Pump - .37

Motor bases are provided for all motors. The fan motor is located in the base of the machine below the feeder. The eccentric drive motor is located inside the air chest. The blender motor is located directly under the blender. The hydraulic system motor, located in the bottom of the machine fan box, and the eccentric motor are always supplied by the factory.

While the motors are still outside the machine, install the motor shaft sheaves using the bushings provided. Place the motor on the mounting bracket, mount the belts and align the motor so that the DriveR sheave and the DriveN sheave are parallel. Adjust the belts to the proper tension and tighten the motor mounting bolts. After the motor is installed, the belts should be checked for the proper tension. When belts are too tight, excessive strain is placed on the bearings, which will shorten their life. When belts are too loose, they will slip. Slippage will cause the belts and sheaves to overheat, shorten their life and result in poor performance of the machine.

To check for proper belt tension, first turn off the machine and lock out the power supply. Next, apply pressure to the top of the belt midway between the sheaves. The belts should deflect approximately 1/2 inch. After the machine has been run 8 to 10 hours, check the belts again. It is normal for new belts to stretch, so belt tension will probably have to be adjusted.

Clean Air Source

Some customers need to bring in clean outside air rather than drawing dusty plant air through the filters. When doing this we recommend that air be brought into the Maxi-Cap from the bottom or through the filter openings located nearest the feeder.

Ductwork should be tightly connected to the machine and run to a clean air source with as few bends or turns as possible. Do not use duct work that is too small. Refer to the specifications for duct and air requirements. The clean air source should have a pre-filter with an open area not less than the area of the deck surface.

After your Maxi-Cap is installed, take the time to become familiar with the following operating instructions and the theory behind gravity separation.

3. How Does a Gravity Separator Work?

About 250 B.C., Archimedes discovered the law of specific gravity which is "All bodies floating in or submerged in a liquid are buoyed up by a force exactly equal to the weight of the liquid they displace." The specific gravity of a particle is the ratio of its density to some standard substance, the standard usually employed being water with a specific gravity of one (1). In water, particles having a specific gravity of less than 1 will float, and particles with a specific gravity greater than 1 will sink.

The term "Gravity Separator" is a contraction of the proper name "Specific Gravity Separator," which means, a separator of particles differing in their specific gravities. All Gravity Separators use air as a weighing medium rather than water. Since air is lighter than water, the relative

difference between particles of differing weights is effectively increased. For this reason, the

Gravity Separator is a very sensitive machine, and when operated correctly, can produce a very precise separation.

The Process of Stratification

Before a product can be separated by weight the product must be fluidized and then stratified vertically. On Gravity Separators lighter particles are moved upward through the fluidized bed. Heavier particles sink downward. This produces stratified layers with lighter particles in the upper layers and the heavier particles in the lower layers. Air is used as the fluidizing medium for the process of stratification. Stratification occurs by forcing air upward through the particle mixture so that the particles rise or fall by their weight relative to the air flow.

Figure 1 represents a cross section of the Gravity Separator directly over a fan. A particle mixture consisting of heavy and light product has been introduced on top of the screen deck with the fans off. In **Figure 2,** the fan has been turned on and adjusted, so that the heaviest particles sink to the surface of the deck and the lightest particles are lifted to the top of the product completely free of the deck surface. Proper regulation of the air-flow at this time is critical or the result is a situation seen in **Figure 3**, where all particles are lifted free of the deck surface by excess air. This results in a boiling turbulent action and can actually remix the stratified product.

Principals of Stratification

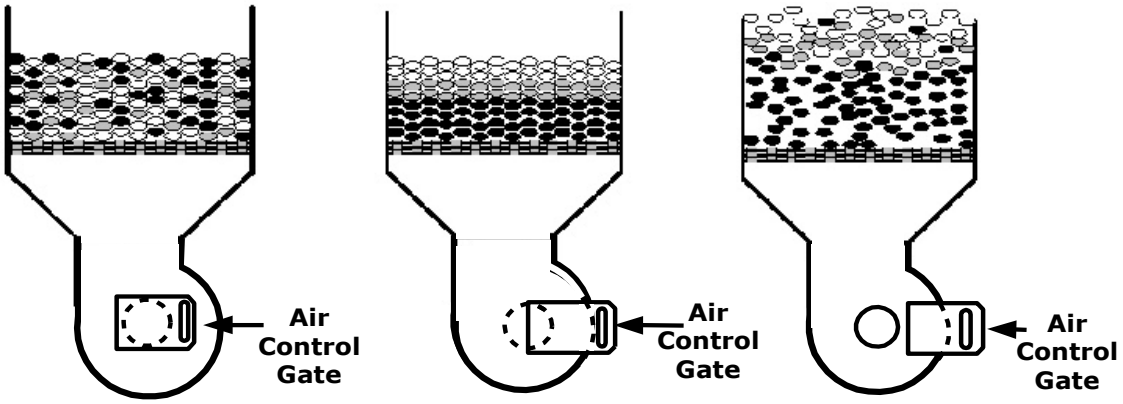


Figure 1 **Figure 2** **Figure 3**

A particle mixture, illustrated in **Figures 1, 2 and 3** falls from the feeder onto the deck. The area immediately around the feeder is called the STRATIFYING AREA. In this area the vibration of the deck and the lifting fluidizing action of the air are combined to stratify the product into layers, with heavier layers on the bottom and lighter layers on the top as shown in **Figure 2**. Separation cannot occur until the product becomes stratified. The size of the stratification area will depend on the difficulty of separation and on the capacity at which the product is being processed. At no time should the stratification area exceed one-third of the deck surface.

The more difficult the separation, the greater is the area that is required to obtain proper stratification. For example: The stratification area is large when separating frosted beans from

saleable beans, because there is relatively little difference in weight. However, the stratification

area is small when removing insect damaged peas from whole peas because there is a large difference in weight. Higher capacities likewise require larger deck areas for stratification.

Once the product is properly stratified, the vibrating action of the deck begins pushing the heavier layers, in contact with the deck surface, toward the high side of the deck. At the same time, the lighter layers, which are at the top of the bed and do not touch the vibrating deck, float downhill toward the low side of the deck. As the product flows laterally from the feed end to the discharge end of the deck, the vibrating action gradually converts the vertically stratified layers to a horizontally graded bed of product.

The lighter product, initially stratified into the upper layers, floats downhill to the light (low) side of the deck, and the heavier product initially stratified into the lower layers is conveyed uphill toward the heavy (high) side of the deck. By the time the product reaches the discharge end of the deck, the separation should be complete. Heavier products will be concentrated along the high side of the deck. Light products will be along the low side of the deck, and intermediate products will be in between.

Maxi-Cap – Correct Flow Pattern

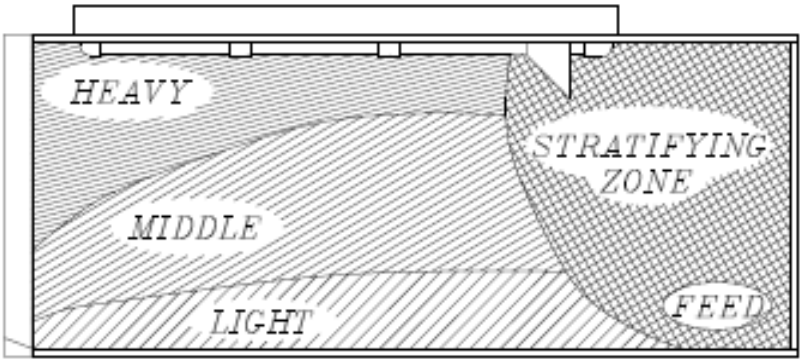


Figure 4

It should be noted that **Figure 4** represents an ideal situation! While ideal situations are nice in theory, they rarely occur in actual practice. Usually the stratification area will not be clearly defined and must be assumed to occupy an area from 5 to 15 square feet around the feeder.

Figure 5 (see Page 6) depicts the interaction between the three Forces of Separation; deck speed, air flow and side tilt. The separation process begins immediately after the product becomes even partially stratified. Therefore, it is important to stratify the product as quickly as possible or the lighter product may be carried to the high side of the deck before the stratification process occurs. The best way to accomplish this is to use more air at the feed end than at the discharge end.

In many separations, the distinction between heavy particles and lighter particles is not visible to the unaided eye. In this case, periodic testing for weight per test volume (weight per bushel or weight per cubic foot) at various points along the discharge would be necessary to determine if the correct separation is being made. The discharge from the gravity separator is a continuously graded product ranging from the heaviest particle on the high side of the deck to the lightest particle along the low side of the deck.

In practice, this continuous grade is normally broken down into three products; (1) a heavy or acceptable product, (2) a light or reject product, (3) a small middling product. In processing where rocks or other heavy trash might be present, a fourth product can be extracted, consisting primarily of dirt, rocks or other heavy rejects.

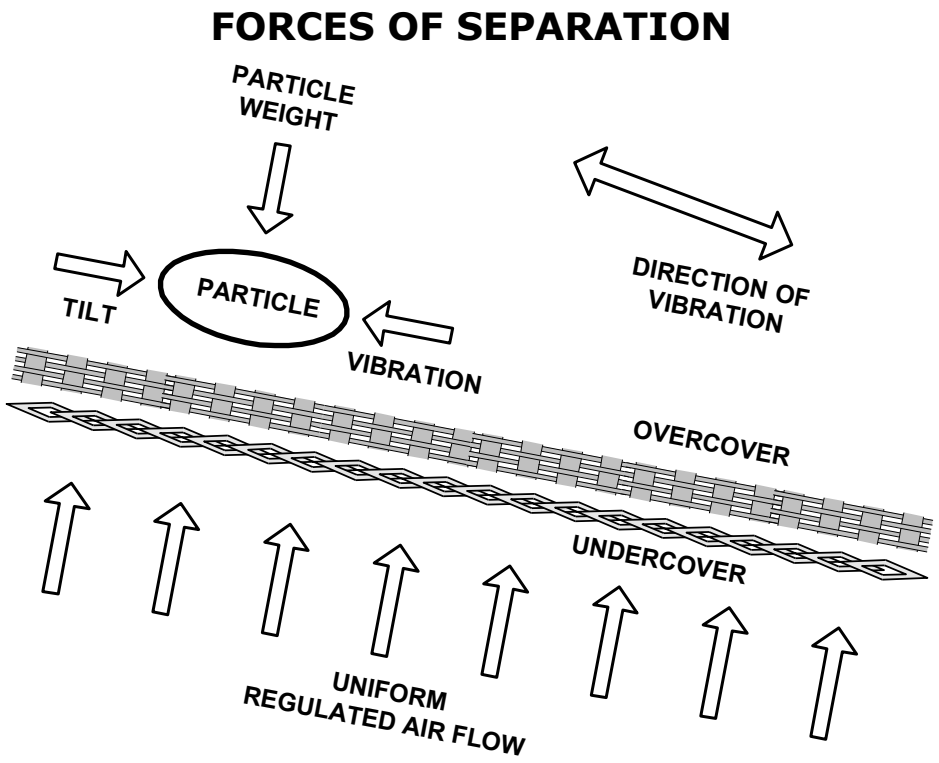


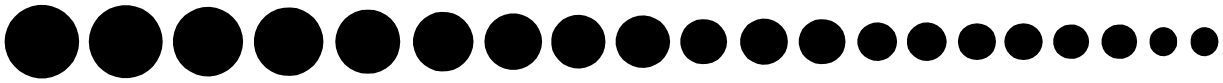
Figure 5

OLIVER STEELE'S GUIDELINES FOR USE OF GRAVITY SEPARATORS. WHAT GRAVITY SEPARATORS CAN AND CANNOT DO.

HEAVY → **LIGHT**

RULE 1 - PARTICLES OF THE SAME SIZE BUT DIFFERING SLIGHTLY IN SPECIFIC GRAVITIES CAN BE SEPARATED.

A common example of this would be the separation of similar size seeds, the lighter of which has been hollowed out by the insect damage or lack of development.



RULE 2 - PARTICLES OF THE SAME SPECIFIC GRAVITIES BUT DIFFERING IN THE SIZE WILL BE GRADED ACCORDING TO THE SIZE OF THE PARTICLES.

A common example of this would be the elimination of shriveled corn kernels from whole kernels of the same density.

RULE 3 - PARTICLES DIFFERING IN SPECIFIC GRAVITIES AND ALSO DIFFERING IN SIZE CANNOT BE EFFICIENTLY SEPARATED.

An example of varying sizes and the densities occurs on every ear of corn. Depending on their location on the ear, corn comes in a variety of sizes; small rounds, medium rounds, small flat, medium flats and large flats. Because of growing conditions seed weight varies within a given size range, Often separation of unsized corn gives less than satisfactory results.

4. Maxi-Cap Controls

Deck

The most important part of any gravity separator is the deck, because it is the main separating surface. The Maxi-Cap's deck consists of a welded aluminum frame, an undercover which develops the air pattern, and a screen or cloth overcover which is the surface on which the product separation takes place. Two **Cutting Fingers** (see Page 19) are mounted on the discharge end of the deck. These are adjustable to channel different fractions of the finished product according to their value. **Cutout Gates** (see Page 17) are located along the heavy product side of the deck. These are used to increase capacity as described later in these instructions. On the same side of the deck as the gates, but closer to the feed end is the **Rock Trap** (see Page 19). It is used to bleed a heavy trash product from the machine to avoid contamination of good heavy product. These features will be discussed further in the instructions, but knowledge of their locations is important, as is understanding the controls that affect the variable adjustments of the Maxi-Cap operation.

Feeder

Feeding is very critical to the operation of a gravity separator. The product should be fed uniformly with as few surges as possible. Surges, or variations of feed, will result in reduced quality. The Feed Control governs the amount of product fed onto the deck, **Figure 6**.

ASPIRATOR FEEDER

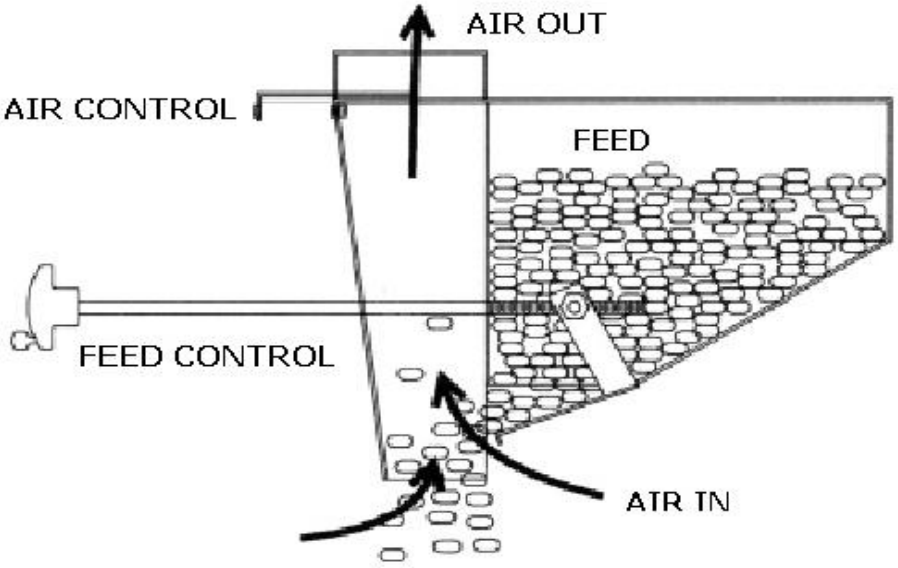


Figure 6

Generally, the average feed rate is determined by the average capacity of the processing line of equipment. For optimum separation the feed rate should be as low as possible without falling below the minimum feed rate at which the deck can be kept completely covered.

Maximum feed rate is the maximum rate at which product can be fed onto the deck and still obtain the necessary separation. When starting your gravity separator, always start at a low feed rate. Adjust the gravity separator for best separation. Then increase the capacity to the desired rate.

Aspirator Feeder

Unless it has a Dust Hood (optional), the Maxi-Cap comes equipped with an Aspirator Feeder as shown in **Figure 6** (see Page 8). The Aspirator Feeder is designed to pre-clean dust, dirt and fines from the product. As the product falls from the feeder to the deck, surface air is drawn through the product lifting the fine dust and trash. Air flow is controlled by opening and closing the damper located on top of the feeder. The feeder should be set to pull as much air as possible without removing good product. Please refer to the specifications in the Maintenance Section for air exhaust requirements.

The feeder on the Maxi-Cap is located in the uppermost corner of the machine. This is designed to give the best separation and operation at high capacity for most cereal grains and large seed. However, when operating at lower capacities on large sized product or when working with small sized product it may be desirable to change the location slightly.

The feeder can be moved across the entire width of the deck by removing the mounting bolts that attach the feeder to the feeder brackets and sliding the feeder over to the desired location. Drill new 7/32" holes at the desired locations and bolt the feeder in place using the self tapping screws which held the feeder in its original location. Feed rate control and air control rods must be shortened to obtain proper adjustment.

Operational Controls

A Maxi-Cap has four major operational controls; End Raise (Slope), Side Tilt, Deck Speed (Eccentric Speed) and Air Flow. End Raise (Slope), Side Tilt, and Air Flow are controlled by hydraulic valves located in a control console at the discharge end of the gravity separator, **Figure 7** (see Page 10). The control levers that operate the hydraulic valves are all “set-up” to increase the control function as you push on the lever and to decrease the control function as you pull on the lever. The Deck Speed is controlled by an electronic touch pad also located on the control console.

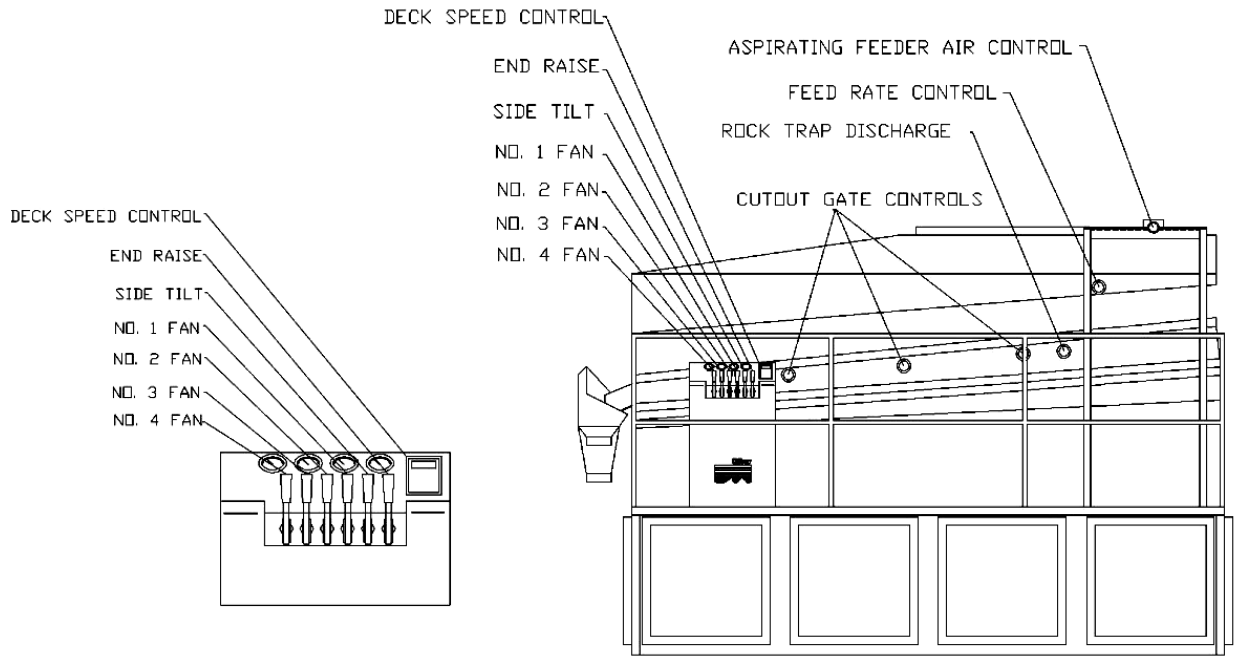


Figure 7

End Raise (Slope)

End Raise is the slope from the feed end of the deck to the discharge end. The slope determines the rate of flow from the feed end to the discharge end of the deck and is directly related to the capacity. Greater End Raise means a greater rate of flow and less exposure time for the product. Less End Raise means a slower rate of flow and more exposure time for the product. Quality of separation is directly related to exposure time for the product. In general, the longer a product mass is exposed to a separating action, the better the separation becomes.

End Raise and feed rate are closely related controls, **Figure 8** (see page 11). As the feed rate is increased, End Raise must also be increased so that the depth of product on the deck will not become too thick. As feed rate is decreased, the End Raise must also be decreased so that the depth of product will not become too thin and the deck will remain completely covered. The End Raise control is the lever located closest to the feed end of the machine, **Figure 7**. To increase the End Raise, push on the lever. To decrease the End Raise, pull on the lever.

END RAISE

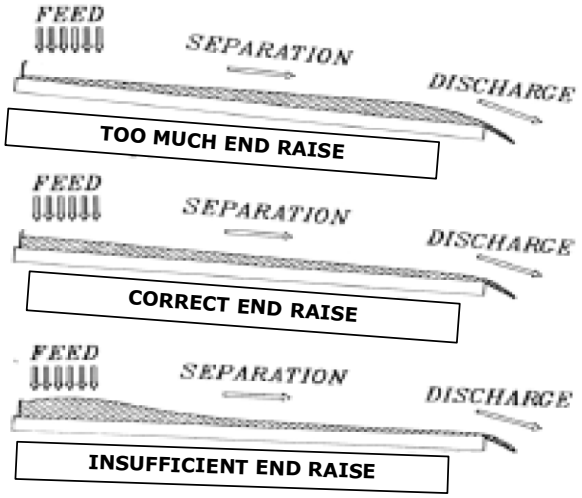


Figure 8

SIDE TILT

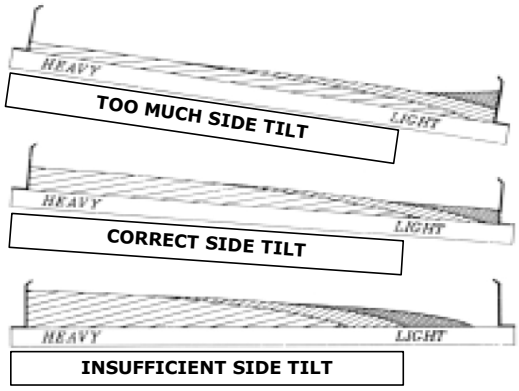


Figure 9

Side Tilt

Side Tilt is the difference in elevation between the high side of the deck and the low side of the deck. Increasing the Side Tilt will cause the product to shift toward the low side of the deck. Decreasing the Side Tilt will cause the product to shift toward the high side of the deck, **Figure 9**. Normally, the best separations are obtained when the Side Tilt is set at or near the *maximum steepness*. However, care should be taken not to set the Side Tilt too steep. Side Tilt is too steep when the product cannot be made to flow toward the high side of the deck by increasing the Deck Speed. Too little Side Tilt occurs when the product moves toward the heavy side of the deck despite a low Deck Speed.

The Side Tilt control is the second lever from the feed end of the machine, **Figure 7** (see Page 10). To increase the Side Tilt, push on the lever. To decrease the Side Tilt, pull on the lever.

Deck Speed (Eccentric Speed)

Deck Speed and Side Tilt are closely related. Increasing Deck Speed will cause the product to be shifted toward the high side of the deck. Decreasing Deck Speed will cause the product to be shifted toward the low side of the deck, **Figure 10** (see Page 12). Generally, by increasing Deck Speed, which shifts the product toward the high side, and increasing the Side Tilt, which shifts lighter product back toward the low side, a more precise separation can be obtained. Too much Deck Speed can be observed when the product shifts to the high side of the deck despite maximum Side Tilt being used. Deck Speed is controlled by using the up and down buttons on the touchpad situated on the control console. The rpm's of the eccentric shaft can be read on the touchpad. Normal operating range is 400 to 560 rpm.

DECK SPEED

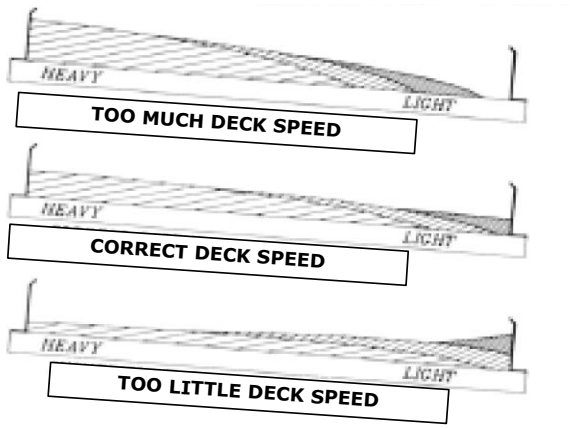


Figure 10

AIR FLOW

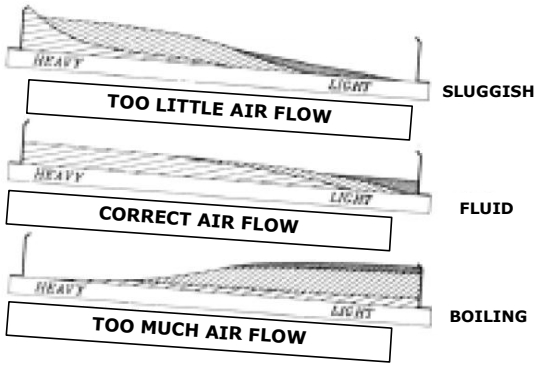


Figure 11

Air Flow

Air Flow control is one of the most important adjustments to be made on a gravity separator. The most common mistake in air flow control is using too much air. Separation is not made by "blowing" the light product from the heavy product, but by controlling the air flow to create the stratified layers that are then separated by the Deck Speed. Too much air will cause a boiling or bubbling action, lifting the heavier particles from the deck and mixing them with the lighter top layers, **Figure 11**. Too little air will cause the product to appear sluggish and to pile up at the high side of the deck.

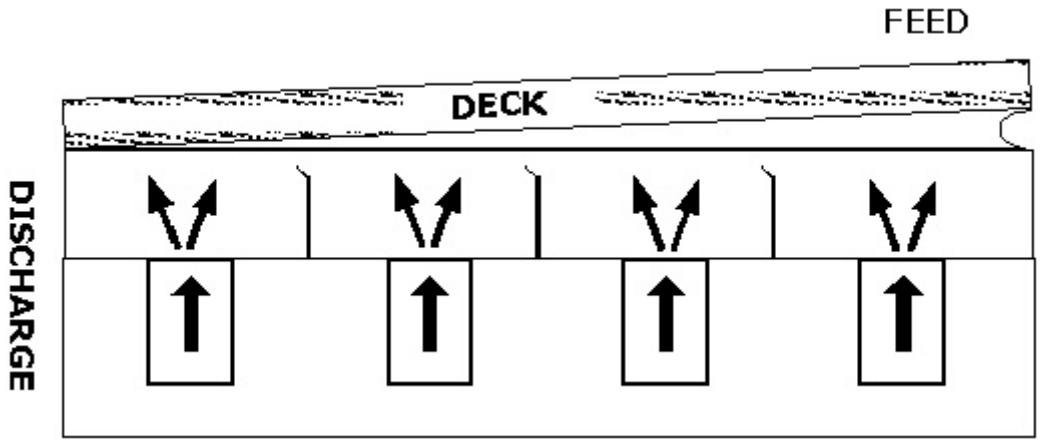
With proper air flow control, the bed of product will almost appear to be fluid. The product on the surface should be agitated and free flowing, with the exception of the stratifying zone under the feeder. Bubbling should be kept to a minimum, allowing the vibrating deck to make the separation. It was discovered through experience that the air pattern under the deck must be varied when working with different products and sometimes even with different lots of the same product.

To enable these corrections to be made quickly and accurately in the field, each fan is individually adjustable, **Figure 12** (see Page 13). This enables the processor to adjust the air pattern and air volume as necessary to make an optimum separation. With single fan systems, machines vacuum systems, the air patterns are preset at the factory and very little range of adjustment is available to the processor. On multiple fan machines, air is regulated by moving the air levers. For more air (open the air gate), push on the lever. For less air (close the air gate), pull on the lever.

The #1 fan is located closest to the feeder. As product flows down the deck toward the discharge end, it passes over each succeeding fan. Air flow must be adjusted in the area above each fan for best separation within that area. All the controls on a gravity separator serve a purpose and

must be balanced with the other controls to obtain optimum separation. With this understanding, you are now ready to begin making an actual separation.

MULTIPLE FANS (Independently Adjustable)



Note: Model 3600 shown. Models 2400 and 3000 have 3 fans and Model 4800 has 5 fans.

Figure 12

5. Startup and Operation

All Maxi-Cap operations (except for the Feeder Control [see Page 7], Cutout Gates [see Page 17] and Rock Trap [see Page 19]) are controlled by either levers or the electronic touch pad located on the Control Console. Therefore, power must always be supplied to Maxi-Cap.

Startup Procedures

Most of the initial adjustments must be made soon after product is fed on the deck. Therefore, it is a good idea to operate the separator empty for a few minutes prior to attempting to make a separation. During this period listen to the machine to become familiar with the way it sounds during operation.

- Using the electronic touch pad, change the Deck Speed to make the deck oscillate faster or slower.

- Locate the Side Tilt control (the second lever from the feed end of the machine). To increase the Side Tilt, push on the lever. To decrease the Side Tilt, pull on the lever. Remember that Side Tile and Deck Speed must be balanced against each other to create a smooth, uniform bed of material across the deck.

- Check the feeding mechanism to insure that the Feed Rate can be controlled. Turn the feed gate control clockwise to increase feed rate and counterclockwise to decrease feed rate.

- Locate the End Raise control (the closest lever to the feed end of the machine). To increase the End Raise, push on the lever. To decrease the End Raise, pull on the lever. Remember that

End Raise and Feed Rate must be balanced against each other another to insure a uniform flow rate of material from the feed end of the deck to the discharge.

- Open and close the air gate for each fan. Pushing the lever opens the gate and pulling the lever closes the gate. Although this does not produce a visible effect on an empty deck, changes in air flow may be noted by holding your hand over the deck as the speed of each fan is changed. The air flow settings are an important part of successful gravity separation.

Before turning off the separator, make one final check to be sure that the fan shaft is turning in the right direction. When viewed from the discharge end of the machine, all shafts should rotate counterclockwise for LEFT HAND machine and clockwise for RIGHT HAND.

Separation Procedures

Setup

After becoming familiar with the operating characteristics of the Maxi-Cap, separation can begin. Preset the adjustments shown in **Table 1**. Close all **Cutout Gates** and the **Rock Trap Gate** on the high side of the deck. These are used to increase capacity and will be discussed later.

Model	Deck Mesh	Deck Slope	Side Tilt	Deck Speed	#1*	#2*	#3*	#4*	#5*
2400	10Ms	1/2	3/4	500	Full	1/2	0		
2400	16Ms	1/2	3/4	480	3/4	1/2	0		
2400	30Ms	1/4	1/2	460	1/2	1/4	0		
3000	10Ms	1/2	3/4	500	Full	1/2	1/4		
3000	16Ms	1/2	3/4	480	3/4	1/2	0		
3000	30Ms	1/4	1/2	460	1/2	1/4	0		
3600	10Ms	1/2	3/4	500	Full	3/4	1/2	1/4	
3600	16Ms	1/2	3/4	480	3/4	1/2	1/4	0	
3600	30Ms	1/4	1/2	460	1/2	1/4	1/4	0	
4800	10Ms	1/2	3/4	500	Full	Full	3/4	1/2	1/4
4800	16Ms	1/2	3/4	480	3/4	3/4	1/2	1/4	0
4800	30Ms	1/4	1/2	460	1/2	1/2	1/4	1/4	0
***#1 fan is under feeder going down the deck to #5 fan at discharge end.									

Table 1 – Preset Adjustments

Starting the Maxi-Cap

Start the machine and make the initial adjustments. Open the feeder slightly and allow a thin stream of product to flow onto the deck. After there is a small amount of product on the deck, adjust the deck speed so that product begins to flow toward the high side of the deck, **Figures 13A and 13B** (see Page 15).

OPENING FEEDER

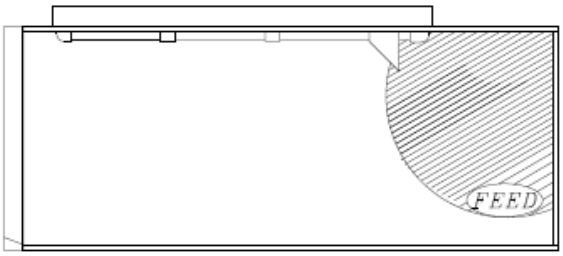


Figure 13A

FILLING THE DECK

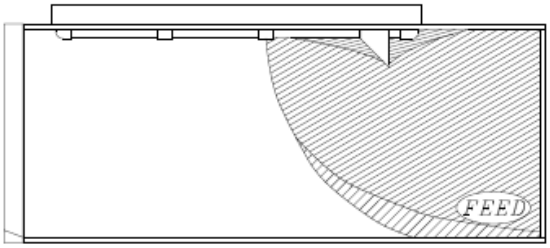


Figure 13B

Adjusting the Air Flow

As soon as feed is flowing onto the deck, open the air gates for the #1 and #2 fans completely to allow maximum air at the feed end of the deck. This will create a bubbling, boiling action and will cause the material to flow away from the feeder toward the light side of the deck, **Figure 13C**. As the deck fills reduce the air flow on the first two fans to the Preset Adjustments listed **Table 1** (see Page 14). Once the deck is completely covered, begin adjusting the remaining fans to balance the air flow.

EARLY SEPARATION

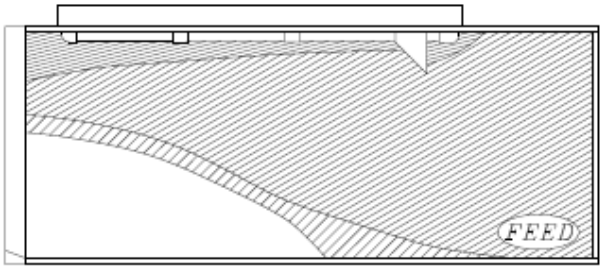


Figure 13C

CORRECT FLOW PATTERN

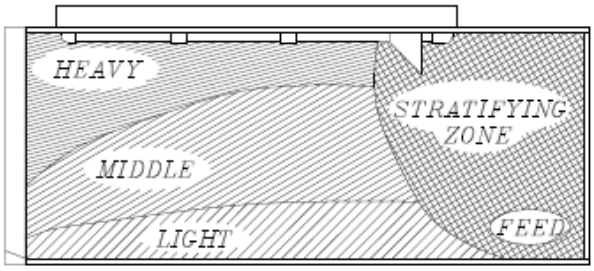


Figure 13D

Beginning with the fan at the *discharge end of the deck*, increase the air flow until you see a definite boiling, bubbling action. Now reduce the air flow until the bubbling almost stops leaving the product bed in a fluid condition in the zone over the fan. Move on to the next towards the feeder. Increase the air flow until you see a definite boiling action over the fan. Then reduce the air flow until the product is fluid but not boiling. Continue this procedure with the remaining fans. After final adjustment of the fan closest to the feed end of the deck, repeat the process. Begin with the fan closest to the discharge end and work toward the feeder, one fan at a time.

Generally by the time you have balanced the air flow twice you will have a good pattern, **Figure 13D**. As you become more familiar with the machine and the way the product flows adjust the air flow in each zone as necessary, **Figures 14A and 14B** (see Page 16).

TOO MUCH AIR

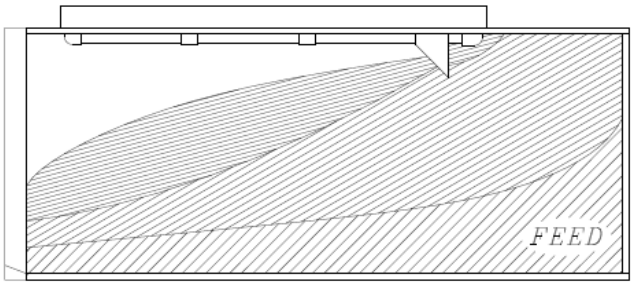


Figure 14A

TOO LITTLE AIR

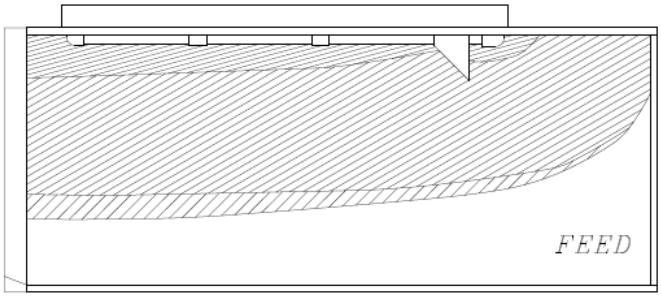


Figure 14B

Adjusting the Side Tilt

After a good air pattern has been obtained, observe the depth of the product across the discharge end of the deck. The surface of the product should be smooth and uniform. The depth of product on the high side of the deck should be 1 to 3 times as deep as on the low side (closest to the operator). If the product depth is too deep on the high side, increase the Side Tilt. If the product depth is too thin on the high side then reduce the Side Tilt, **Figures 14C and 14D**

TOO MUCH SIDE TILT

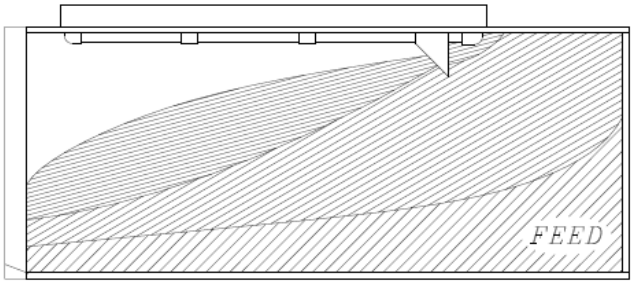


Figure 14C

TOO LITTLE SIDE TILT

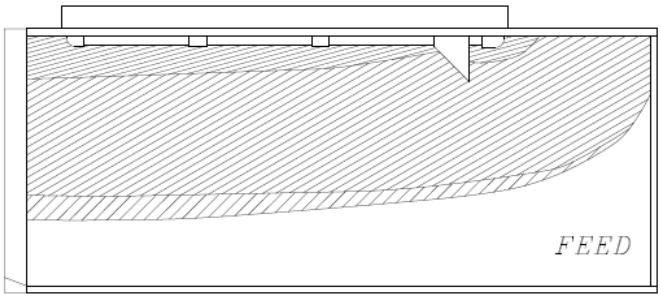


Figure 14D

Adjusting the Deck Speed

Deck Speed serves two purposes in the correct operation of a gravity separator. First, it serves to agitate the product so that it can be fluidized more completely by the air flow. If the Deck Speed is too slow, the product will not be properly fluidized and no separation will result. If the Deck Speed is too fast the product will be put into a turbulent flow condition. This results in too much agitation, and will tend to re-mix the product producing poor separations

Second, Deck Speed is used as the separating factor for converting the vertically stratified product into a horizontally graded product. When operating within the range required for proper fluidization, increasing the Deck Speed moves product toward the high side of the deck and decreasing the Deck Speed moves the product toward the light side of the deck, **Figures 15A and 15B** (see Page 17).

TOO MUCH DECK SPEED

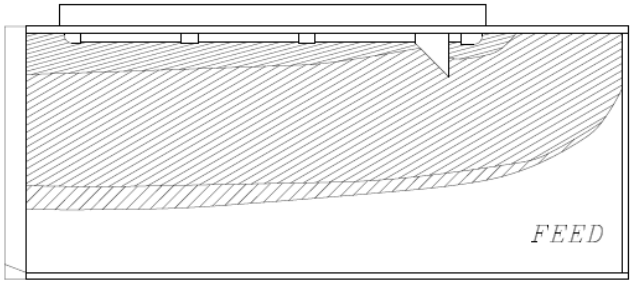


Figure 15A

TOO LITTLE DECK SPEED

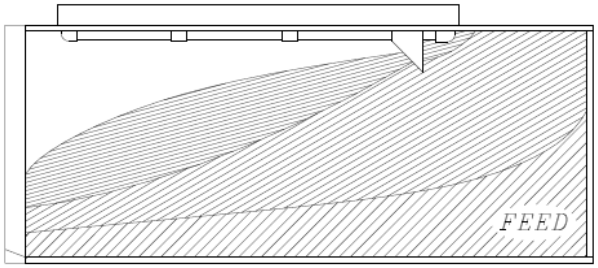


Figure 15B

Adjusting the End Raise

Check the End Raise of the Maxi-Cap. If it is correctly adjusted, the depth of product at the feed end should be 1 to 3 times greater than that at the discharge end.

If the bed of material is too deep, the End Raise will have to be increased by pushing the End Raise lever to cause the material to flow away from the feed end faster. If the bed of material is too thin, decrease the End Raise by pulling on the End Raise lever to retain material at the feed end longer, **Figures 16A and 16B**.

TOO MUCH END RAISE

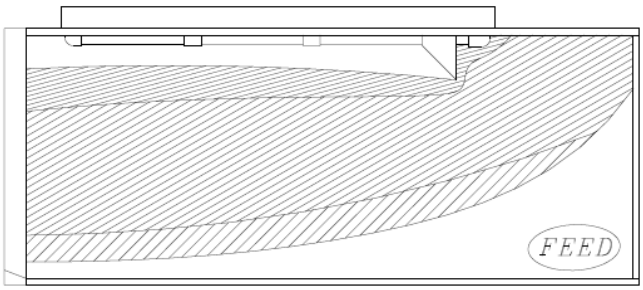


Figure 16A

TOO LITTLE END RAISE

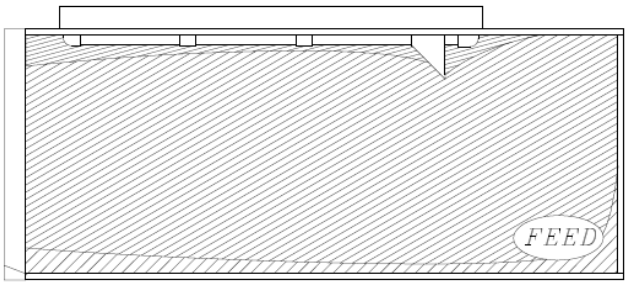


Figure 16B

Increasing Capacity

Once the desired separation quality has been obtained, begin increasing the capacity. Open the feed gate slightly. This increases the feed-rate so the bed depth will increase.

Observe the change in the product on the deck. Then increase the End Raise (see the previous section) to compensate for the increased feed-rate. Continue increasing the feed-rate and End Raise until the maximum feed-rate, where the Maxi-Cap can maintain the required separation, has been reached. The air flow may have to be increased slightly to compensate for the thicker bed of product. It is possible to increase capacity even more by opening the **Cutout Gates** (see Page 18) along the high side of the deck.

Begin by opening the cutout gate closest to the discharge end of the Maxi-Cap. Turn the cutout gate knob clockwise and open the cutout gate until a small amount of product begins to discharge into the blender trough. As you allow product to discharge into the blender trough you can increase the feed-rate by a corresponding amount.

Normally as you begin releasing more and more product from the deck into the blender you will notice a change in the air flow pattern on the deck. After making adjustments to the cutout gates go through the air flow balancing procedure periodically. The number of cutout gates that may be opened should be determined by the difficulty of separation and the end results required. The easier the separation, the more cutout gates can be opened and the higher capacity can be obtained.

Always remember that capacity and quality off-set one another. Therefore, if the separation quality does not meet the required standards, lower the capacity of the Maxi-Cap. Conversely, if the end product is better than it needs to be, increase your operating capacity, **Figure 17A**.

TOO MUCH CAPACITY

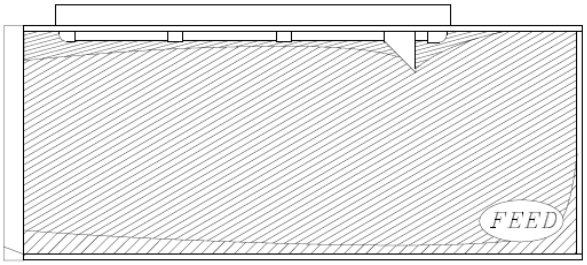


Figure 17A

Another feature of the cutout gates is that of shifting the bed back and forth to accomplish different separations. By opening the cutout gates wider at a given capacity you remove some of the heavier product from the deck. This allows the lighter middle and light fractions to thin out and allows gravity to work more directly on the most difficult part of the separation, **Figures 17B and 17C**.

CUTOUT GATES OPEN TOO WIDE

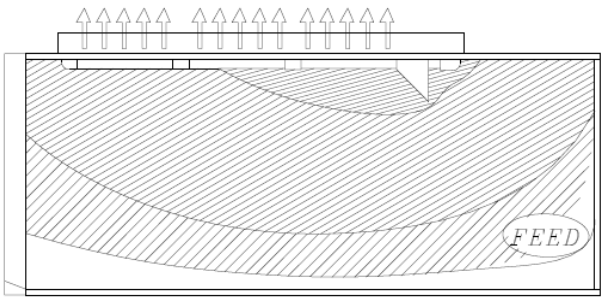


Figure 17B

CUTOUT GATES OPEN TOO LITTLE

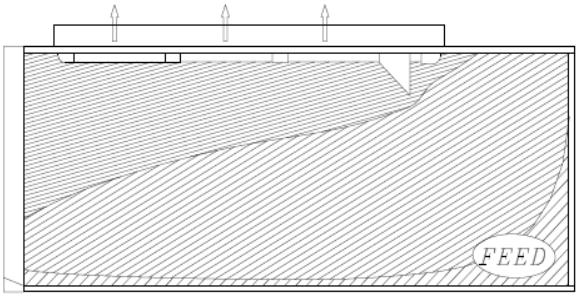


Figure 17C

If the reject percentage is relatively small (less than 5%), then the cutout gates should be opened fairly wide, moving 20% to 50% of the product out the high side of the deck and into the blender trough. If the percentage reject is relatively high (greater than 5%), then the cutout gates should be almost closed, forcing the light product over to the low side of the deck more forcibly.

Removal of Heavy Foreign Material

The **Rock Trap** is located on the high side of the deck between the feeder and the first cutout gate. The primary purpose of the rock trap is for removal of a small percentage of heavy contaminant. Initially the rock trap was designed to remove dirt and stones from edible dry beans, hence the name rock trap. However, the rock trap has proven to be effective in many products and is included as standard on all decks. Almost any heavy contaminant may be removed at the rock trap. The greater the density difference between the heavy contaminant and the good product, the easier the separation.

For best results, the rock trap should be operated to maintain a continuous discharge. If the concentration of heavy foreign product is low then adjust the rock trap gate at the minimum discharge rate you can maintain without bridging and stopping the discharge completely. If the percentage of heavy foreign product is high then adjust the rock trap gate for greater discharge.

Product Separation

At the discharge end of the deck are two **Cutting Fingers**. The purpose of the cutting fingers is to divide the product into the respective fractions. You make the decision where to divide your product since you know what you are trying to produce. The Cutting Fingers are pre-set to produce a heavy fraction, a middle fraction and a light fraction however the cutting fingers can be easily changed to handle any number of product fractions.

In a typical operation the heavy fraction is the good product. The light fraction is a reject product and the middle fraction is a middle quality product. However, in a many operations the middle or the light fraction is the desired product. Regardless of which fraction you wish to save you make the decision what to save and what to reject. Adjust the cutting fingers to produce a quality product that meets your standards. Check the results on a periodic basis to insure that you are producing the desired quality product.

Separation Results

Many customers ask us how to determine when they are getting the most from their Gravity Separator. This is an extremely difficult question to answer because not all people want to accomplish the same thing. We manufacture Gravity Separators to make a separation based on specific density. To do this, it is first necessary that the product be cleaned and properly sized. Size, shape and weight of the product directly affect the separation. It is imperative that the product be classified according to size and shape, before attempting to make a separation on the basis of weight.

In an agricultural application, the fastest method of testing to determine the effectiveness of a Gravity Separation is through the use of a U.S. Standard Weight per Bushel Tester. Most industrial applications use weight per cubic foot as a standard. Determine the difference in weight between the heavy and light product. The Gravity Separator should be set to obtain the maximum weight difference between the light and heavy products.

The test weight of the heavy, middle and light fractions should be recorded along with the machine settings necessary to obtain this, **Figure 18**. For seed applications, germination and vigor testing should be done on these fractions and the results recorded with the test weights. This gives a written record, for future reference, of the operation of the Gravity Separator and the settings necessary to obtain a separation of that particular product. Included is a sample form for recording the necessary information.

Form for Multi-Cap Settings

Product _____ ID Number _____

Test Weight #/BU _____ Germination _____

% Moisture _____ Size Range: Max _____ Min _____

MACHINE SETTINGS:

1. End Raise _____ 2. Side Tilt _____

3. Eccentric Speed _____ 4. Capacity _____

5. Fan Speed #1 _____ #2 _____ #3 _____ #4 _____ #5 _____

PROCESSING RESULTS:

	Test Weight	% Yield	Germination
(1) Heavy	_____	_____	_____
(2) Middle	_____	_____	_____
(3) Light	_____	_____	_____

Date_____ Tested By _____

Figure 18

This concludes the Operating Instructions for the Maxi-Cap Series Gravity Separators.

Maxi-Cap Series
Gravity Separators

- **Troubleshooting**

(Revision 1)

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Important Information about Troubleshooting

The Maxi-Cap Series of Gravity Separators is comprised of four different models: 2400 (3 fans), 3000 With (3 fans with a wider deck), 3600 (4 fans), and 4800 (5 fans). The length of the deck is proportional to the number of fans.

Unless otherwise noted, this Troubleshooting information applies to all four models. These instructions will be updated as required. Updated documentation will be sent to all current owners of a Maxi-Cap Series Gravity Separator.

Maxi-Cap Series Troubleshooting
Table of Contents

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1. Introduction

Most operators of gravity separators can get acceptable separations after working with the machine for a few minutes. However, in some cases, even experienced operators run into problems that they cannot solve. Many operators expect results too soon from their gravity separators. When an adjustment is made, wait at least five minutes before deciding whether it has made any improvement. A certain amount of time is required for the entire deck surface to adjust to the new conditions.

Do not attempt to operate the Maxi-Cap Gravity Separator without an understanding of how and why it works. Your gravity separator makes a separation based on a particles weight and its resistance to air flow. Proper adjustment of all the controls is necessary to obtain the best separation. Remember that the Maxi-Cap has four major adjustments: End Raise, Side Tilt, Deck Speed and Air Flow.

2. Common Operating Problems

Operational adjustments are discussed below for reference purposes. For a more complete discussion refer to Section 4 of the Operating Instructions.

End Raise

End Raise determines the rate at which the product flows from the feed end of the deck toward the discharge end. High feed rates require a high End Raise setting, and lower feed rates require lower End Raise settings. End Raise also determines the length of time a product is exposed to the separating action. Therefore, End Raise has a direct effect on the quality of separation. Usually decreasing the end raise increases the quality of separation, **Figure 1**.

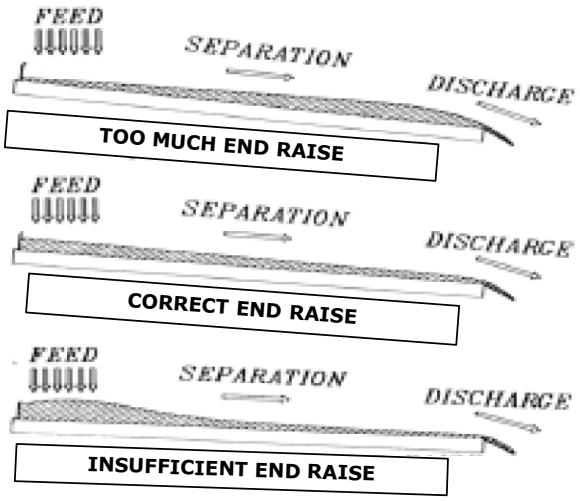


Figure 1

Side Tilt

Side Tilt is the difference in elevation between the high side of the deck and the low side of the deck. Normally, Side Tilt should be set at the maximum height where an acceptable pattern across the deck can be maintained. Too much Side Tilt is present when the product cannot be made to climb to the high side of the deck. Too little Side Tilt is present when the product will not float to the low side of the deck, **Figure 2**.

SIDE TILT

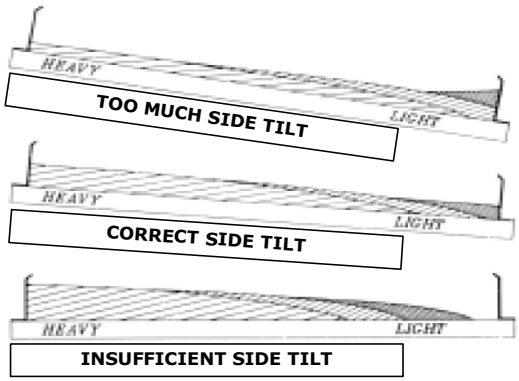


Figure 2

Deck Speed

Deck Speed is the rate of vibration of the deck. The vibrating action provides agitation so that product can be stratified. Stratification separates the heavier lower layers of product from the lighter upper layers of product. Deck Speed and Side Tilt must be combined to get the best separation action. Too much Deck Speed will cause product to flow to the high side of the deck and spill over the banking rail. Too little Deck Speed will not agitate the product sufficiently to be properly stratified. Usually, with too little Deck Speed, the product will lay on the deck without moving and the deck will quickly become overloaded, **Figure 3.**

DECK SPEED

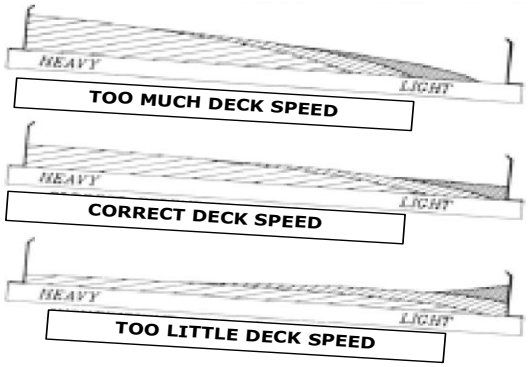


Figure 3

Air Flow

Air is used as the stratifying medium. Unless the product is properly stratified initially, a good separation cannot be obtained. Too much Air Flow will cause a bubbling/boiling action that re-mixes the product as fast as it is stratified. Too little Air Flow will not stratify the product properly. Generally, higher Air Flow is required in the feed area to obtain good stratification. As product moves from the feed end to the discharge end, progressively less Air Flow is required to maintain proper stratification, **Figure 4.**

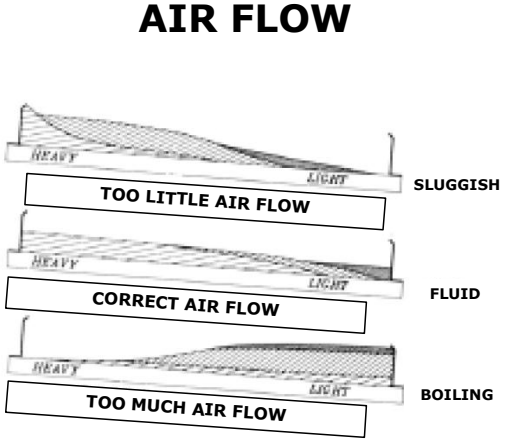


Figure 4

Feed Rate

Feed Rate determines the capacity of the machine. Minimum feed rate is the lowest rate of feed at which an adequate cover can be maintained over the entire deck. Maximum feed is highest rate of feed at which an acceptable separation can be obtained. Between these limits, quality of separation generally goes down as capacity is increased, and up as capacity is decreased.

3. Most Common Problems

From conversation with customers over a period of years, we have compiled a list of problems most generally encountered when setting up a new machine.

Blinded Decks

If there is insufficient air and the fans are running correctly, clean the deck. The deck can be cleaned best by blowing the dirt and chaff out from the top downward, while the gravity separator is running.

Dirty Air Filters

The air filters on the side of the Maxi-Cap are designed to screen dirt out of the air before it enters the machine. If they become plugged, the fans cannot pull enough air through them to provide proper separation. The air filters can be cleaned by removing them from the machine and gently tapping them on the floor. A more effective cleaning may be obtained by removing the filters and using compressed air to blow out the dirt. If you must clean filters while the machine is running use an industrial vacuum cleaner and vacuum the dirt from the filter surface.

Inadequate Foundations

Although the Maxi-Cap is counterbalanced, it must be attached to a secure foundation. If any vibration can be felt in the floor while the machine is running, the foundation is probably too weak. Weak foundations lower the quality of separation because the foundation absorbs some of the oscillating action intended for separation. Call the factory if you feel that you have an installation problem.

Operating at Too Much Capacity

Often merely lowering the operating capacity slightly will greatly improve the separation. Care should be taken not to decrease capacity too much. The machine's deck should be completely covered. Capacity is usually dependent on the standards to be met and the quality of the product. Quality and capacity are inversely related. That is, increasing capacity usually lowers quality while decreasing capacity usually improves quality.

Improper Dust Hood Arrangement

Dust Hoods reduce dust and dirt emissions into the plant and also reduce noise levels in the plant. The dust hood and exhaust system must be designed to exhaust at least 5% more air than the machine uses for separation. Also, adequate make-up air must be available. Dust Hoods and the associated air exhaust system design require expert knowledge to provide an economical and efficient system. If your machine is equipped with a dust hood and you feel that you are not getting proper separations we suggest you contact the factory.

Using the Wrong Deck Cover

The Deck Cover is the portion of machine that actually makes the separation. Without friction between the deck cover and the product to be separated, no separation will result. Therefore, a cover must be selected that will perform well with a specific product. Using the wrong cover will cause poor quality separation, and very low capacity. Sometimes, an improper cover will cause sufficient damage to the deck that it must be rebuilt. Generally, the cover should have a rough surface texture and the openings should be as large as possible without allowing product to fall through. Oliver offers four standard decks: cloth for small grasses; 30-mesh wire for seeds the size of alfalfa and clovers; 16-mesh wire for seeds the size of wheat and oats; and a 10-mesh wire for large seeds, such as beans. A variety of special decks to meet particular needs are available. Contact the factory for further information.

Belt Slipping

Belts commonly slip on new machinery. New belts have a tendency to stretch slightly and should be checked frequently during the first couple of weeks of operation. To check a belt, turn off the machine and lock out the power supply. Then apply pressure to the back of the belt midway between the two pulleys. The belt should deflect approximately 1/2 inch.

Wrong Adjustments

This is commonly a problem with new, inexperienced operators. The solution is usually gaining more experience.

Do not be afraid to adjust the machine. Make an adjustment. Wait a couple of minutes to determine the effect and decide if it is good. Then try something else for further improvement. If the effect is bad, return to the original setting. Finally, remember to make all adjustments in small increments. It is better to approach the final setting through several small steps than to make one adjustment that might be too large.

The final pattern on the deck may vary depending on the product being processed. Depending on the size of the product, we suggest the following:

Product Size	Average Depth
Smaller than 1/32 inch in diameter.	Less than 1/4 inch.
1/32 to 3/32 inches in diameter.	1/4 to 1/2 inch.
1/16 to 3/16 inches in diameter.	1/2 to 1 inch.
1/8 to 3/8 inches in diameter.	1 to 2 inches.

As a general rule, the product depth along the high side of the machine should be from 1 to 3 times the depth along the low side. The average depth of product at the feed end of the machine should be from 2 to 4 times the average depth at the discharge end. These patterns will not be correct for all products. However, approximation of these conditions on the deck surface will provide an initial set-up. From this point, make the necessary adjustments to obtain optimum separation. As an additional aid in making your adjustments, a chart is provided that shows many situations that can occur, and lists adjustments that will help correct the pattern, **Figure 5** (see Page 6).

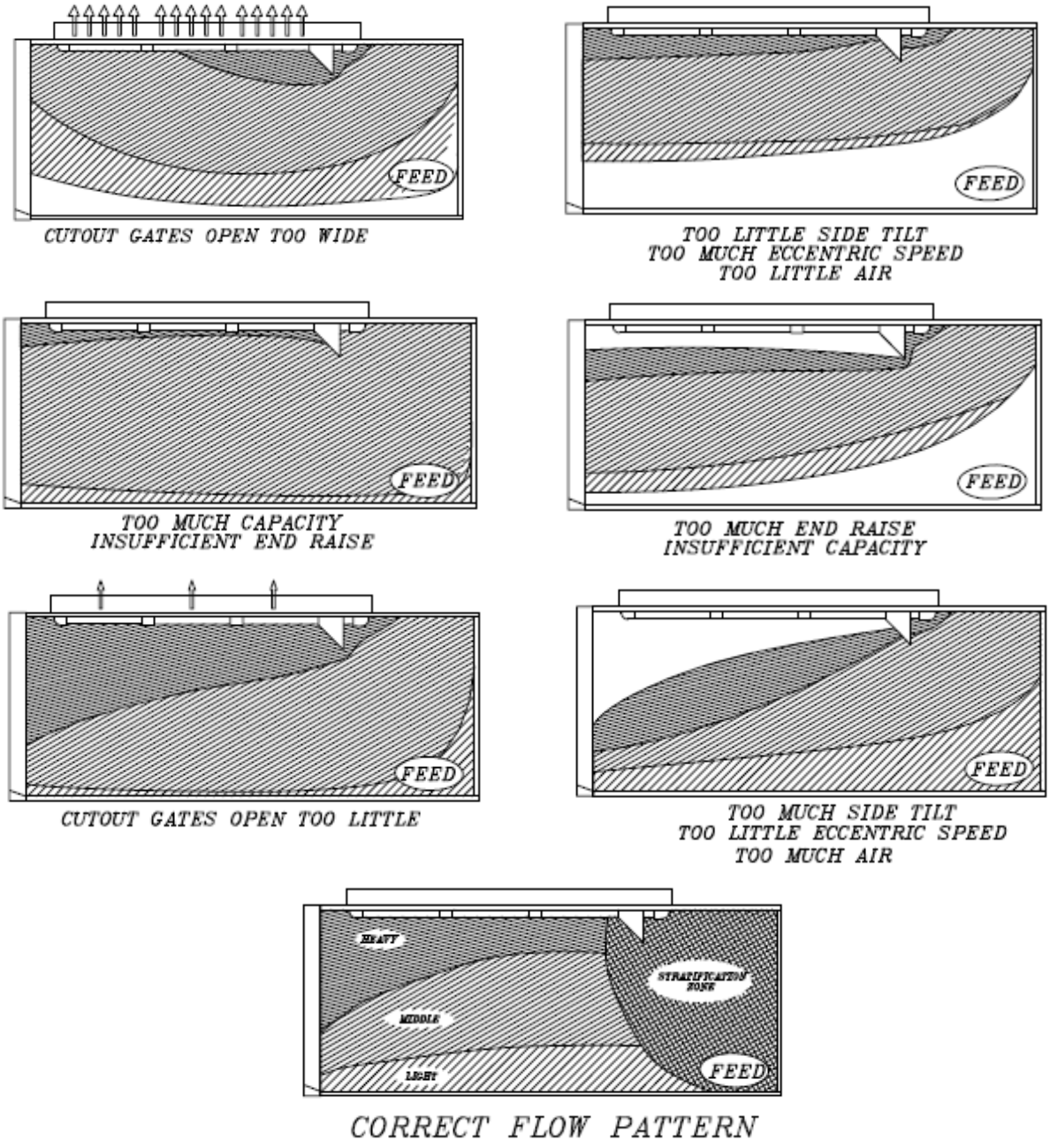
Finally, if you cannot get the separation you want, please call the factory (719-254-7814). If you have specific problems or questions, let us know. We will be glad to share our thoughts on the subject with you. We offer on-site factory assistance for a nominal fee, or take advantage of our free operator school held at the factory. For the convenience of our customers, we maintain a free laboratory service where we can process your sample. If you have a sample you would like to have tested, call us. We will discuss your problem and determine how much of a sample is needed for testing. If you like, we can set the test dates so you can be present. We respectfully ask that you pay all freight costs.

4. Separation Problems

Attempting to Separate Products Unsuitable For Separation

This is a very rare problem, because normally a gravity separator will make some improvement in any free flowing product. However, a gravity separator is a specialized machine designed to separate particles of varying density and similar sizes. If the product does not fall into that classification, then it probably cannot be separated on a gravity separator.

TYPICAL PROBLEMS AND HOW TO SOLVE THEM



LEGEND

HEAVY **MIDDLE** **LIGHT** **STRATIFICATION ZONE**

Figure 5

Maxi-Cap Series
Gravity Separators

• Maintenance

(Revision 1)

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Important Information about Maintenance

The Maxi-Cap Series of Gravity Separators is comprised of four different models: 2400 (3 fans), 3000 With (3 fans with a wider deck), 3600 (4 fans), and 4800 (5 fans). The length of the deck is proportional to the number of fans.

Unless otherwise noted, this Maintenance information applies to all four models. These instructions will be updated as required. Updated documentation will be sent to all current owners of a Maxi-Cap Series Gravity Separator.

Maxi-Cap Series Maintenance
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1. Introduction

Maxi-Cap Series Gravity Separator's are designed to give years of trouble-free service. However, as with all machinery, periodic maintenance is required to keep it in top condition. The following is a list of some areas that can be problems, if not periodically checked.

2. Maintenance Items

Deck

The deck is the portion of the machine that actually contacts the product and makes the separation. To maintain optimum separation, the deck should be checked frequently and cleaned or repaired as needed. Even in very clean atmospheres, dust and dirt will build up on the underside of the deck. This causes a restriction of air flow through the deck and will eventually plug the deck completely (blinded deck)**, Figure 1.**

BLINDED DECK

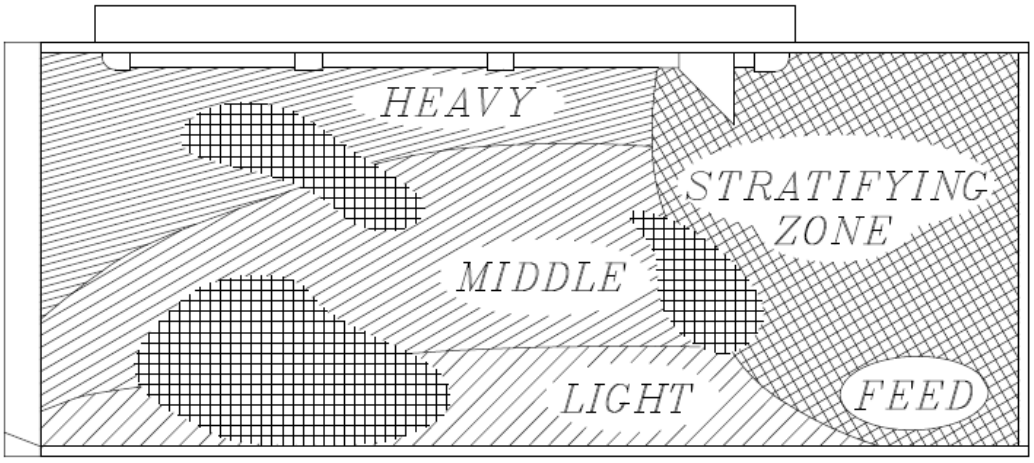

Figure 1

When the deck becomes plugged, it will be necessary to remove it from the machine and thoroughly clean it. A deck that is only partially cleaned will become plugged sooner. To check if a deck is clean, place a light on a drop cord under the deck. If the deck is clean, you should be able to see light through every opening of the deck cover. Dirty areas will show up as dark spots and should be cleaned more thoroughly. Decks can also be cleaned with the machine running. The advantage of this is that it is not necessary to remove or handle the deck. Disadvantages are that the deck is not cleaned as thoroughly as when removed, and they must be cleaned more often.

With the fans running, the dust is pushed back up through the deck by the operational air, and does not settle inside the machine. For this purpose we suggest a blow gun with an extended nozzle at least 48" in length. Air from the extended nozzle should be blown downward. With an extended nozzle you can clean the entire deck surface without leaning on the deck. We caution that you retain the OSHA blowing tip, and install it on the modified cleaning wand

Because decks are in direct contact with the product being separated, they are subjected to abrasive wear. Inspect your deck frequently for wear. As a deck wears out, the surface becomes

smoother and it becomes more and more difficult to move the heavier product out from under the lighter layers. Normally, when the wires of the deck overcover are worn halfway through, it is time to repair the deck. If the deck cover is worn completely through, there is danger of ruining the undercover, which develops the air pattern, **Figure 2.**

NEW DECK vs WORN DECK COMPARISON

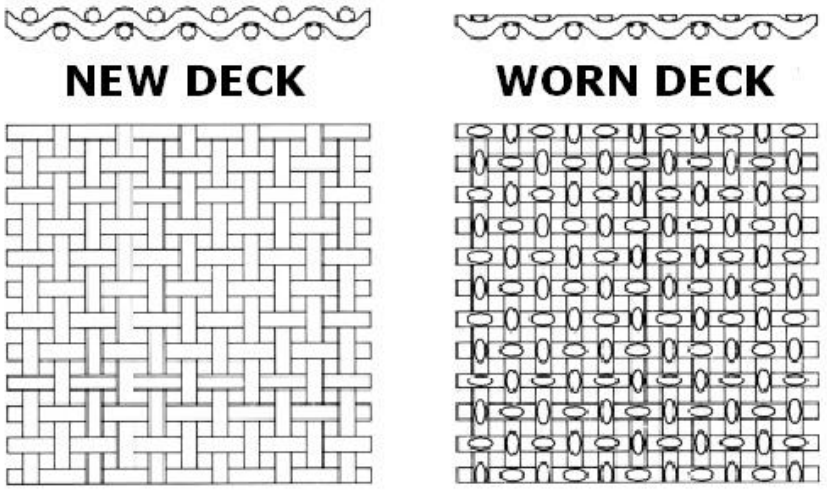

Figure 2

All decks with wire overcovers are built with a perforated metal undercover, which develops the air pattern, and a woven wire overcover, which actually make the separation. As long as the undercover is not damaged, it is not necessary to replace it. When rebuilding a deck, always inspect the deck thoroughly. Look at the underside of the deck and inspect each rib for cracks, dents, bends or other problems. If the ribs are damaged, it will be necessary to tear down the deck completely to repair or replace them. The deck frame is made of high quality aluminum. Any repairs must be made by someone experienced in working with aluminum. Factory repair is available at a reasonable cost.

When installing an overcover or undercover, it is best to place the deck on two sawhorses with a light underneath. By looking through the screen toward the light, you will easily be able to locate the ribs for fastening purposes. Always stretch the screen tightly. Tight screens give better separation results than loose ones.

Finally, inspect the deck trim, aprons, rails, and riffles; and replace what is needed. The horizontal metal pieces running across the top surface of the deck are called riffles. Riffles assist heavy particles in working uphill by trapping them behind the riffle and allowing light products to flow over. Riffles are riveted to the top of the wire overcover. The rivets should extend down into the deck ribs. If your deck is supplied with riffles, a riffle should be attached over each of the aluminum ribs exactly like the pattern supplied on the new machine.

Hydraulic System (Side Tilt and End Raise only)

The deck position adjustments on the Voyager are made using a hydraulic system. This system enables you to stand in one convenient place and quickly adjust the machine. All adjustments may be made while the machine is operating. To operate correctly the fluid level must be properly maintained, and the proper fluid must be used. The oil reservoir is located on the hydraulic motor pump assembly in the fan chest of the machine. The reservoir should be maintained at the full level at all times. If the reservoir requires frequent filling, this indicates a leak. Leaks will allow air to get into the system and will result in erratic or poor operation of the Gravity Separator. All leaks must be located and repaired as soon as they are suspected to insure proper operation.

Oil and Filters

Periodically check the oil reservoir to be sure that it is maintained at the "full" level. If the reservoir requires frequent filling, check for leaks. The Maxi-Cap Series is designed to operate efficiently for 24 months without the need to replace the hydraulic oil filter. When a new filter is required, it can be ordered directly from Oliver Manufacturing.

Oil Viscosity Recommendations

Any major brand of anti-wear, non-detergent hydraulic oil may be used. It should meet the following viscosity requirements:

	SAE Viscosity
-10 to 130 F	SW, 5W-20, 5W-30
0 F to 210 F	10W-30, 10W-40
	ISO Viscosity
-10 to 130 F	22
0 F to 210 F	46

Purging Air from the System

Air in the hydraulic system will result in erratic operation of the hydraulics. If you suspect air in your system you must purge the system. To purge the system, operate each hydraulic control through its entire range of operation for at least 5 full cycles. If you are unable to purge the system by these methods, please call the factory. It is recommended that you cycle each control periodically to insure that air does not build up in the system.

Bearings

To prolong bearing life, each bearing should be greased with 1 to 2 shots of grease at the start of each season. *Sealed bearings are installed at the factory, and will give much better service if they are not over-greased*. A bad bearing will normally be detected by a rumbling noise in the machine, or by feeling an unusual vibration. To determine if a bearing is actually defective, run the machine for at least 30 minutes. Then, turn off the machine and lock out the power supply. Touch the bearing surface. If the bearing is excessively hot, it is probably bad and must be replaced.

3. Specifications

Physical

Model	2400	3000	3600	4800
Length (inches)	135″	135″	159″	194″
Width (inches)	93″	108″	109″	124″
Height (inches)	95″	96″	98″	102″
Weight (lbs.)	5000 lbs.	5400 lbs.	5800 lbs.	7600 lbs.
	Deck Size (square feet)			
	40	50	60	90
	Motors, HP (frame size)			
Blower	15(254T)	15(254T)	20(256T)	25(284T)
Deck Speed	1(143T)	1.5(145T)	1.5(145T)	1.5(145T)
Blender	1(143T)	1(143T)	1(143T)	1(143T)
Hydraulics	0.5(56C)	0.5(56C)	0.5(56C)	0.5(56C)

Air Requirements

Note: Air requirements vary with product size and density. Those listed below are typical airflows for the decks listed. For more specific information about your product please call the factory.

Model	2400	3000	3600	4800
10-Mesh Deck:				
Air Supply	17,000	18,000	25,000	30,000
Min. Dia.	36	36	42	
Exhaust Air	17,000	18,000	25,000	30,000
Min. Dia.	30	30	36	40
16-Mesh Deck:				
Air Supply	12,000	14,000	17,000	20,000
Min. Dia.	30	30	36	38
Exhaust Air	12,000	14,000	17,000	20,000
Min. Dia.	26	26	30	32
30-Mesh Deck:				
Air Supply	8,200	9,000	12,000	15,000
Min. Dia.	24	24	30	34
Exhaust Air	8,200	9,000	12,000	15,000
Min. Dia.	20	20	26	28

Air Requirements (Cont'd)

Model	2400	3000	3600	4800
Linen Deck:				
Air Supply	5,000	6,000	7,000	8,000
Min. Dia.	20	20	22	24
Exhaust Air	5,000	6,000	7,000	8,000
Min. Dia.	16	16	20	22

Aspirating Feeder

Model	2400	3000	3600	4800
All Decks:				
Exhaust Air	1,500	1,500	1,500	1,500
Min. Dia.	6	6	6	6

Maxi-Cap Series
Gravity Separators

• Auxiliary Equipment

(Revision 1)

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Important Information about Auxiliary Equipment

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Unless otherwise noted, this Auxiliary Equipment information applies to all four models. These instructions will be updated as required. Updated documentation will be sent to all current owners of a Maxi-Cap Series Gravity Separator.

Maxi-Cap Series Auxiliary Equipment
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1. Middling Products

Many processors ask us what can be done to reduce or reprocess the middling product produced by the Oliver Gravity Separator. By definition the middling fraction is neither good or bad, but a middle grade product, which is too good to throw away. Saving the maximum amount of this middling product can mean substantial profits. Middle products can consist of a variety of particles. These include: 1-larger, lightweight material, 2-smaller, heavy-weight material and 3-middle quality material.

In most well run processing plants the over-sized and undersized material is removed by screening. This removes most of the larger lightweight material and the smaller heavyweight material. After processing over a large sized gravity, the product in the middle fraction is just that, a middle quality product. From the characteristics on which the gravity separator separates, recycling will only produce a limited effect. Successive recycling results in progressively less improvement in the fraction. You can overload the deck with middle quality product, to the extent that a good separation cannot be maintained at any capacity.

No Gravity should be forced to handle more than 10-15% of the flow as a middle return. Running excessive amounts of middle return reduces overall capacity and lowers output quality. Make periodic tests of all three fractions, heavy, middle and light. By making periodic tests and maintaining records many customers have found that the middle fraction can be completely eliminated or reduced to a very small fraction.

The simplest method of reducing the middle cut is to run the machine at lower capacity. Capacity and quality are inversely related. Generally, the quality of separation will improve when capacity of operation is decreased. Many processing facilities cannot reduce capacity because of production demands. When adequate storage is available, these plants place the middle and light fractions in a holding bin, and reprocess them when time is available. The advantage of this system is it allows a higher initial capacity during the processing season. During the offseason period, extra time is available to process the middle fractions more slowly. The disadvantage of this system is storage space required to contain the middle grade product until it can be processed. Also, when this method is used, it is often found that no amount of processing will produce results which are as good as the results which were produced in the initial processing stages.

An alternative solution, which eliminates the need to store the middle fraction, is to run the middle fraction back into the processing line, and clean it during the regular separation process. Some operators merely connect an elevator from the middle discharge spout of the gravity and run the material back to the gravities' feeder. For this reason the feeder on your Maxi-Cap is divided into two sections. The first, closest to the feed end, is the primary feeder and is intended to feed the incoming product at the desired rate. The second is located approximately 3" closer to the discharge end of the machine, and is used to feed the middle product. Using the re-run chamber will place the middle product on the deck in the best area for proper separation. **(See Figure 1 on Page 2)**.

3600 Maxi-Cap Gravity Separator

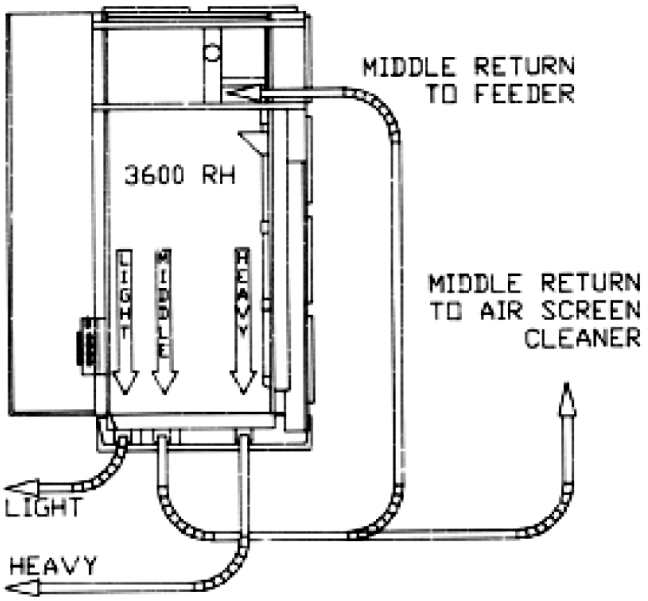

Figure 1

An even better way of handling the middle fraction with the initial processing run is to return the material to the feeder of the screen air machine. The screening action of the screen air machine will improve the condition of the middle fraction, before it is fed onto the gravity, by removing the larger light particles and the smaller heavy particles. The major advantage of this system is that all the material is cleaned in one processing operation, and no bin space is required for the middle product. The disadvantage is that the overall production of the plant is reduced by the amount that is fed back into the processing line.

A final alternative is to use a successive line to clean the middle product during the regular processing action. This should consist of a small screen machine to size the middling product and a Gravity Separator to finish the separation. This is probably the best solution for large processing plants. It allows for a high capacity primary processing line and a slower more precise secondary line to clean the middle fractions. It also eliminates the need for bin space to store the middle product for later operation. The primary drawback of this system is the initial cost. However, the cost will be paid many times over in improved production and quality.

2. Destoners

Although Gravity Separators will remove stones and heavy material, they will not always do a complete job. The Destoner will produce a clean product that is free of heavy contaminants. Destoners work on the same general principles as do Gravity Separators. However, they are designed to do a specific job, removing a small fraction of heavy material from a large fraction of light. Normally, Destoners cannot be used to grade material as on a Gravity Separator. Oliver Manufacturing offers a variety of Destoner sizes to meet specific needs.

Normally, two approaches are taken toward destoning: First is the use of a Destoner before material is fed onto a Gravity Separator. By using this method, all of the material is fed onto the Destoner; and heavy contaminants are removed ahead of the Gravity Separator. In this approach, the Gravity Separator is used only to remove light material, producing a very good separation with minimum middle product, **Figure 2**.

1205 Maxi-Cap Destoner feeding two 4800 Maxi-Cap Gravity Separators

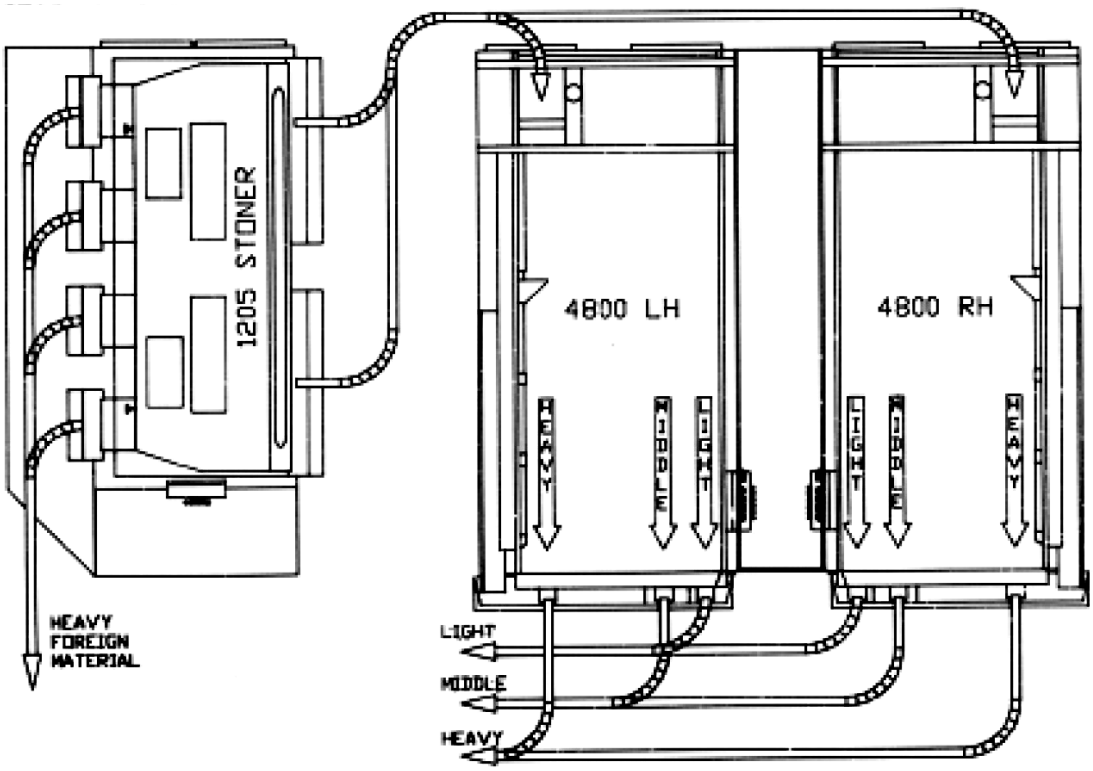

Figure 2

The second method is to send the product through the Destoner after the Gravity Separator. In this approach, all the material is fed onto the Gravity Separator before it is destoned. Then a small portion, 5% to 10% of the flow, is removed from the Gravity Separator at the rock trap and fed onto the Destoner **(See Figure 3 on Page 4)**.

The major advantage in using the Stoner after the Gravity Separator is that less space is required for a smaller Stoner.

A big disadvantage is that the Gravity Separator may not catch all the heavy contaminant at the rock trap. If the heavy trash misses the rock trap and the Destoner, it will not be removed and will be in the final product.

If you have stone, glass, metal or other heavy contaminants in your product, please contact us. We can discuss problems and arrange to have a test sample processed.

3600Maxi-Cap Gravity Separator with Rock Trap feeding a 305 Destoner

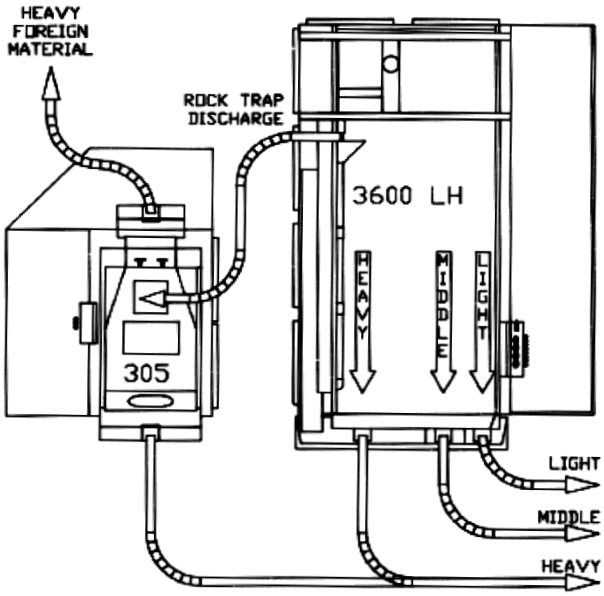

Figure 3

3. Dust Control Accessories

The Gravity Separator is not intended to be a cleaning machine. With some commodities, dust is still present on the particles when they are introduced on the Gravity Separator. This can be both annoying and illegal. Oliver has three systems to combat dust and get it away from the machine. These are the Aspirating Feeder, supplied standard with your Maxi-Cap, an Oliver Half-Hood or an Oliver Full-Hood.

Please see specifications section for air recommendations and requirements.

The Aspirating Feeder is ideal for controlling small amounts of dust generated in processing a product that is normally fairly clean. The Aspirating Feeder is designed to draw air through a curtain of feed as it falls onto the gravity deck. This will remove 70-90% of the fines, and other light trash which is present during the feeding operation. If the dust problem is severe then a partial Half-Hood or a complete Full-Hood is required.

All Maxi-Cap Dust Hoods feature a built-in feeder for proper feed regulations and a built-in blast gate so that the exhaust air can be adjusted for optimum operation. For easier operation they are constructed with large windows of strong LEXAN polycarbonate, and an explosion proof Class II, group G light Fixture so that you can see the product you are separating.

Half-Hoods cover approximately 40-50% of the deck area. These are designed to remove the dust and fines from the areas around the feeder and along the light side of the deck. This is where most of the dust is concentrated. Half-Hoods will typically remove over 90% of the dust generated by the separating process.

Full-Hoods provide the most complete form of dust control. These hoods cover the entire deck surface and exhaust 100% of the air used for separation. Figure 4.

We recommend Full-Hoods for all severe dust problems, or where the dust and fines material constitute a safety hazard.

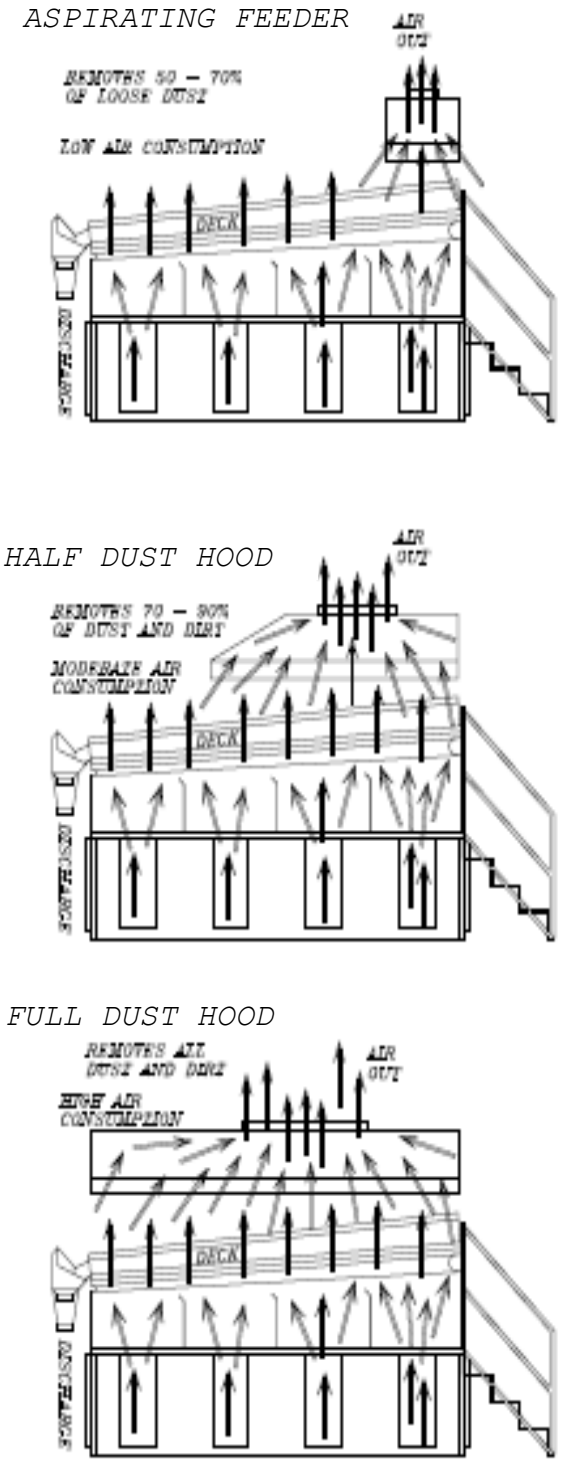

Figure 4