

# JAY•LOR<sup>®</sup>

BECAUSE  
NUTRITION  
MATTERS.<sup>®</sup>

# OWNER MANUAL



5750HD  
5850HD  
51000HD

## California Proposition 65 Warnings

 **WARNING:** Battery posts, terminals and related accessories contain Lead and Lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling. For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

 **WARNING:** This product can expose you to chemicals including Lead and Nickel, which are known to the State of California to cause cancer and/or reproductive harm. For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

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## 1. INTRODUCTION

Congratulations on your choice of a Jaylor mixer to complement your operation. At Jaylor we want our customers to have access to leading nutritionists and information. You can visit the Nutrition Section of our website for articles, advice and upcoming events, or just browse our Social Media sites to see what other farmers are saying.

[www.facebook.com/jaylor](http://www.facebook.com/jaylor) **OR** [www.twitter.com/myjaylor](http://www.twitter.com/myjaylor)

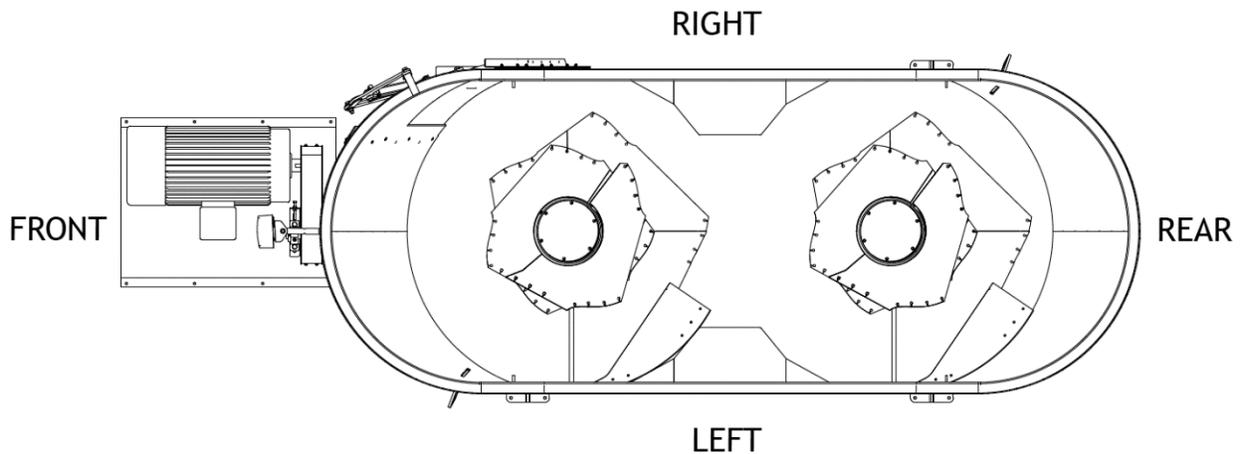
Our team of nutritionists are also available by phone to answer any questions or concerns you might have.

Safe, efficient and trouble-free operation of your mixer requires that you and anyone else who will be operating or maintaining the machine reads and understands the safety, operating, maintenance and troubleshooting information contained within this manual.

This manual covers the 5000 Series twin auger stationary models manufactured by Jaylor. Keep this manual readily available for reference and be sure to pass it on to new operators or owners. Contact your nearest Jaylor dealer or distributor if you need assistance or information.

This equipment has been designed and manufactured for efficient cutting, mixing and feeding of ingredients destined exclusively for animal consumption.

**OPERATOR ORIENTATION** - The directions left, right, front, and rear, as mentioned throughout this manual, are as illustrated below.



**Figure 1 - Operator Orientation**

## 2. POLICY STATEMENT

It is the policy of Jaylor to improve its products where it is possible and practical to do so. Jaylor reserves the right to make changes or improvements in design and construction at any time, without incurring the obligation to make these changes on previously manufactured units.

## 3. OWNER/OPERATOR'S RESPONSIBILITY

It is the Owner/Operator's responsibility to read the **Owner Manual**, to operate, lubricate, maintain, and store the product in accordance with all instructions and safety procedures. Failure of the Owner/Operator to read the **Owner Manual** is a misuse of this equipment.

Like all mechanical products, Jaylor products will require cleaning and upkeep. It is the Owner/Operator's responsibility to inspect the product and to have any part(s) and/or assemblies repaired or replaced when continued operation would cause damage or excessive wear to other components or cause a safety hazard.

It is the Owner/Operator's responsibility to deliver the product to the authorized Jaylor Dealer or Distributor, from whom it was purchased, for service or replacement of defective parts which are covered by warranty. Repairs to be submitted for warranty consideration must be made within thirty (30) days of the failure. It is the Owner/Operator's responsibility to cover any cost incurred by the Dealer for traveling to the site or hauling the product for the purpose of performing a warranty obligation or inspection.

#### 4. LIMITED WARRANTY

Jaylor (the Seller) warrants the articles and units sold to be free from defects in material and workmanship and to conform to applicable specifications. These express warranties are the sole warranties of the Seller, and any other warranties, express, implied in law or implied in fact, are hereby specifically excluded. Refer to the **Owner Manual** content for any applicable warranties expressed otherwise.

The Seller's sole obligation under its warranties will be, at its option, to repair or replace any article or part thereof which is proved to be other than warranted. Obligation under this warranty will be limited to replacement or repair of parts found, upon Seller's inspection, to be defective. All warranties shall expire **12 (twelve) months** from the date the unit or article is placed in service, or **12 (twelve) months** from the date the article or unit is delivered by the Seller, whichever expires first.

**NO ALLOWANCES WILL BE MADE TO THE BUYER FOR ANY TRANSPORTATION, LABOUR CHARGES, PARTS ADJUSTMENTS OR REPAIRS, OR ANY OTHER WORK, UNLESS THESE CHARGES ARE AUTHORIZED IN ADVANCE BY THE SELLER.**

The Seller shall in no event be liable for special or consequential damages. If an article is claimed to be defective in material or workmanship, or does not conform to specifications, the Seller, upon notice promptly given, will either examine the article or unit at its site, or issue shipping instructions to return to the Seller. The warranties shall not extend to any articles, units, or parts thereof which have been installed, used, or serviced, otherwise than in conformance with the Seller's applicable instructions, manuals, service bulletins, or, if none, which shall have been articles, units, parts thereof furnished by the Buyer or acquired from others at the Buyer's request and/or Buyer's specifications.

The warranties are not applicable for expenses, either direct or consequential, that may arise from the use or inability to use the articles and units sold by the Seller. The Seller shall in no event be responsible for and will not be held liable for losses, injury, or damage caused to persons or property by reason of operation of Seller's products or their failure.

**No warranty is extended to regular wear items such as fluid, paint, tires, knives, PTOs, crosses and the like.**

The engine and scale system are covered by separate warranties by their respective manufacturers which can be found in this manual.

This warranty pertains to components manufactured or installed by Jaylor only. This hereby excludes any warranties offered separately such as those offered by the truck manufacturer. In this event, please refer to the appropriate Warranty Statements offered by the separate manufacturer.

All claims for warranty must be directed to your dealer or distributor.

**WARRANTY VOID IF NOT REGISTERED**

## 5. CONTACT INFORMATION

Contact Jaylor at:

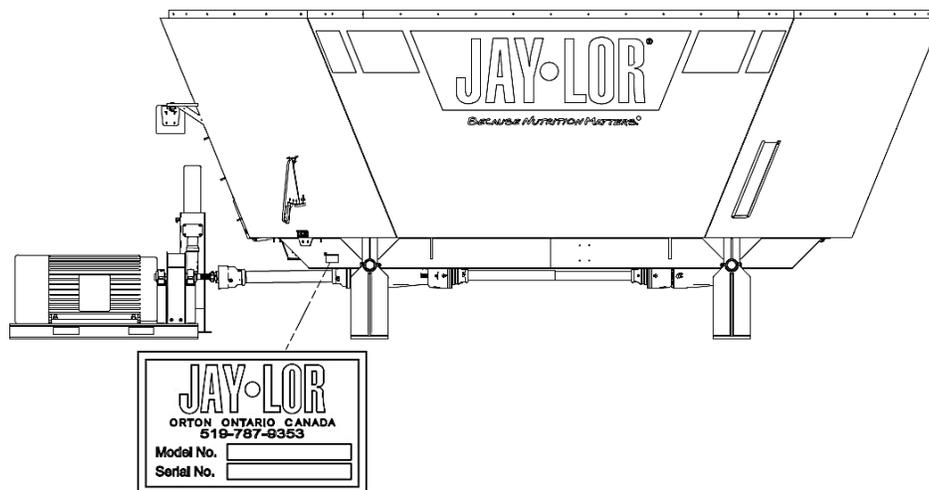


071213 10<sup>th</sup> Line  
 East Garafraxa, ON  
 Canada  
 L9W 6Z9

**Phone:** (519) 787-9353  
**Fax:** (519) 787-7053  
**E-mail:** [jaylor@jaylor.com](mailto:jaylor@jaylor.com)  
**On the web:** [www.jaylor.com](http://www.jaylor.com)

## 6. SERIAL NUMBER LOCATION

Always give your dealer the Model Number and Serial Number of your Jaylor when ordering parts or requesting service or other information. Depending on the type of service, the Serial Numbers of individual components and/or assemblies will be required. The Serial Number location required for servicing your Jaylor Product is shown in **Figure 2**. For easy reference, please write this information in **Section 7**.



**Figure 2 - Serial Number Location**

## 7. CUSTOMER REFERENCE INFORMATION

Jaylor Model Number: \_\_\_\_\_

Jaylor Serial Number: \_\_\_\_\_

Date Purchased: \_\_\_\_\_

Dealer Name: \_\_\_\_\_

Dealer Phone: \_\_\_\_\_

Scale Indicator Model Number: \_\_\_\_\_

Scale Indicator Serial Number: \_\_\_\_\_

Other Main Components:  
(e.g. Gearboxes, Motors, etc.)

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## 8. SAFETY

All implements with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes the potential hazards and follows reasonable safety practices. The manufacturer has designed the implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

BEFORE YOU START!

**Read the safety messages on the implement and shown in your manual.  
Observe the rules of safety and common sense!**

### 8.1 Safety Alert Symbol

This Safety Alert Symbol means:

- **ATTENTION!**
- **BECOME ALERT!**
- **YOUR SAFETY IS INVOLVED!**



The Safety Alert Symbol identifies important safety messages on your Jaylor mixer and in this manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

### 8.2 Understand Signal Words

Note the use of the signal words **DANGER**, **WARNING**, and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guidelines:

- **DANGER** – Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.
- **WARNING** – Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.
- **CAUTION** – Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or manufacturer directly.

### 8.3 Safety Guidelines

**YOU** are responsible for the **SAFE** operation and maintenance of your Jaylor mixer. **YOU** must ensure that **YOU** and **ANYONE** else, who are going to operate, maintain, or work around the Jaylor mixer be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alert you to safety practices that should be adhered to while operating the machine.

Remember, **YOU** are the key to **SAFETY**. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. All accidents can be avoided. Do not risk injury or death by ignoring good safety practices.

- Vertical mixer owners **MUST** give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter.

- The most important safety device on this equipment is a **SAFE OPERATOR**. It is the operator's responsibility to read and understand **ALL** safety and operating instructions in this manual and to **FOLLOW THEM**.
- Jaylor feels that a person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function, safety, and life of the equipment as well as possibly voiding the warranty.

**Think SAFETY! Work SAFELY!**

#### **8.4 General Safety**



Read and understand this manual and all safety signs before operating, servicing, maintaining or adjusting the vertical mixer.



Only trained competent persons shall operate the vertical mixer. An untrained operator is not qualified to operate the machine.



Have a first-aid kit available for use should the need arise and know how to use it.



Provide a fire extinguisher for use in case of a fire. Store in a highly visible place.



Do not climb on the vertical mixer during operation.



Wear protective gear such as hearing protection, footwear with slip resistant soles, and the like.



Stop electric drive motor, wait for all moving parts to stop and disconnect drive shaft between chain belt reduction and planetary gearbox before servicing, adjusting, repairing, or unclogging.



Do not operate this machinery under the influence of any alcohol, drugs or medication.



Review safety related items annually with all personnel who will be operating or maintaining the vertical mixer.

#### **8.5 Operating Safety**



Read and understand this manual and all safety signs before using the vertical mixer.



Stop electric drive motor, wait for all moving parts to stop and disconnect drive shaft between chain belt reduction and planetary gearbox before servicing, adjusting, repairing, or unclogging.



Stay away from unloading door and conveyor discharge when unloading or moving.



Do not operate when any guards are damaged or removed. Install and secure guards before starting.



Keep hands, feet, clothing and hair away from all moving and/or rotating parts.



Do not climb on the vertical mixer during operation.

-  Clear the area of bystanders, especially small children, before starting.
-  Stay out of the mixing chamber and away from the auger when engine is running. Keep others away.
-  Before applying pressure to the hydraulic system, make sure all components are tight and that hoses and couplings are in good condition.
-  Review safety instructions with all personnel annually.

## 8.6 Maintenance and Repair Safety

-  Follow ALL the operating, maintenance, and safety information in the manual.
-  Only properly trained personnel should maintain and repair this equipment.
-  Follow good shop practices:
  - Keep service areas clean and dry.
  - Be sure electrical outlets and tools are properly grounded.
  - Use adequate lighting for the job at hand.
-  Use only tools, lifting equipment, and safety stands of sufficient capacity for the job.
-  Stop electric drive motor, wait for all moving parts to stop and disconnect drive shaft between chain belt reduction and planetary gearbox before servicing, adjusting, repairing, or unclogging.
-  Make sure all guards are in place and properly secured when maintenance work is completed.
-  Before applying pressure to a hydraulic system, make sure all lines, fittings, and couplers are tight and in good condition.
-  Keep hands, feet, hair, and clothing away from all moving and/or rotating parts.
-  Maintain fasteners in running gear systems at their specified torque at all times.
-  Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments.
-  Do not allow grease or oil to build up on the machine.

## 8.7 Hydraulic Safety

-  Make sure that all components in the hydraulic system are kept in good condition and are clean.
-  Replace any worn, cut, abraded or flattened hoses or metal lines immediately.
-  Relieve pressure before working on hydraulic systems.
-  Do not attempt any makeshift repairs to the hydraulic fittings or hoses. The hydraulic system operates under extremely high pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.
-  Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.
-  If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.
-  Before applying pressure to the system, make sure all components are tight and that lines, hoses, and couplings are not damaged.

## 8.8 Safety Signs

-  Keep safety signs clean and legible at all times.
-  Replace safety signs that are missing or have become illegible.
-  Safety signs are available from your dealer, distributor, or the factory.

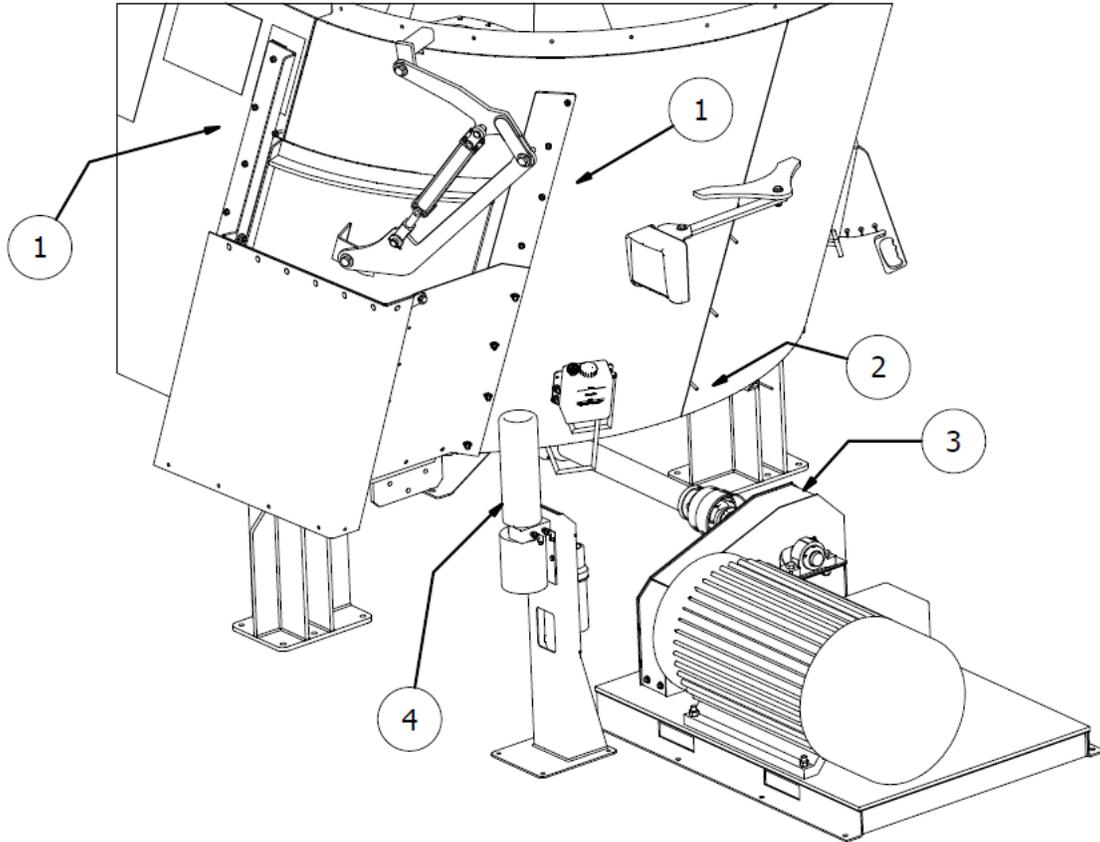


## 10. SAFETY SIGN LOCATIONS

The types of safety signs and typical locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area of particular function related to that area which requires your **SAFETY AWARENESS**.

**Think SAFETY! Work SAFELY!**

### 10.1 Safety Sign Decal Locations



**Figure 3 - Twin Auger Stationary Safety Sign Locations**

1. 'Danger' Rotating Auger Hazard and Pinch Point (see Figure 4)\*
2. 'Danger' Rotating Driveline Hazard (see Figure 5)
3. 'Warning' Rotating Part Hazard (see Figure 6)
4. 'Warning' High Pressure Fluid Hazard (see Figure 7)

\*This decal will be located near unloading door on all door configurations.

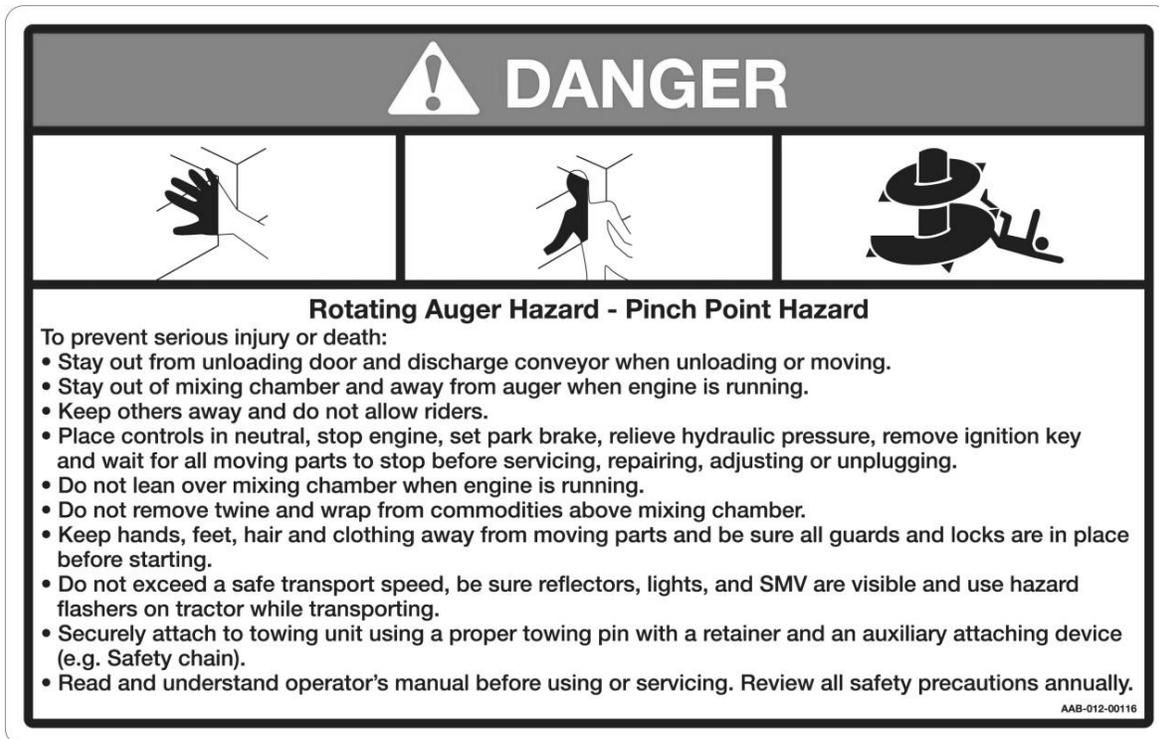


Figure 4 - 'Danger' Rotating Auger Hazard and Pinch Point



Figure 5 - 'Danger' Rotating Driveline Hazard



Figure 6 - 'Warning' Rotating Part Hazard



Figure 7 - 'Warning' High Pressure Fluid Hazard

**REMEMBER** – If Safety Signs have been damaged, removed, become illegible, or parts were replaced without signs, new signs must be applied. New signs are available from your authorized dealer or distributor.

### 10.2 How to Install Safety Signs

- Be sure that the installation area is clean, dry and is above 10°C (50°F).
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and press the small sticky portion in place.
- Peel back the remaining paper and smooth the remaining portion of the sign in place.

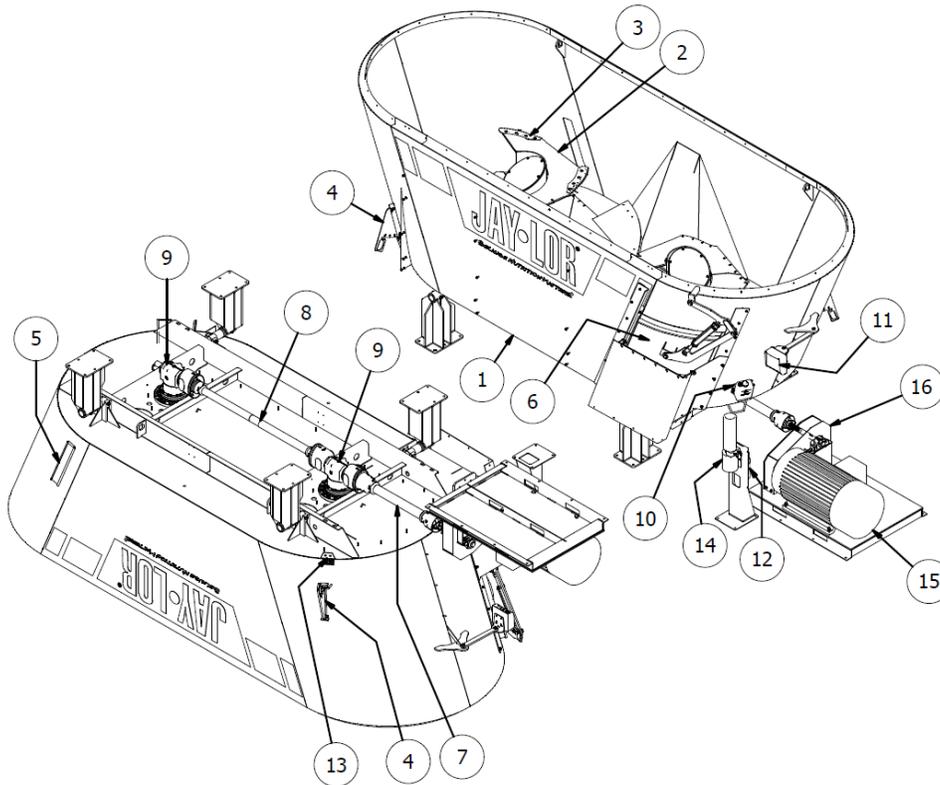
## 11. OPERATION OVERVIEW

The Jaylor mixer is specifically designed to cut and mix feed ingredients into a total mixed ration (TMR). Many of the features incorporated into this machine are the result of suggestions made by customers like you. We greatly appreciate any input you may have and would like to thank you in advance for any you may give.

Read this manual carefully to learn how to operate the machine safely and how to adjust it to provide maximum efficiency. Following the operating instructions with a proper maintenance program will extend the life of your machinery.

## 12. MACHINE COMPONENTS

The main machine components for 5000 Series twin auger stationary models are shown below:



**Figure 8 - 5000 Series Twin Auger Stationary Mixer Components**

1. **Mixer Drum** – Contains the feed while it is cut and mixed by the vertical auger.
2. **Vertical Auger** – Mixes the feed within the mixer drum and discharges the feed through the unloading door.
3. **Auger Knives** – Cuts the feed material as the auger rotates.
4. **Restrictor Blades** – Adjustable blades can be moved inward to increase cutting speed and outward to decrease cutting speed.
5. **Viewing Window** – Allows safe viewing of cutting and mixing action inside the drum.
6. **Unloading Door** – Opens hydraulically to allow feed discharge.
7. **Front Driveshaft** – Couples chain belt reduction to front planetary reducer gearbox.
8. **Rear Driveshaft** – Couples between both planetary reducer gearboxes.
9. **Planetary Reducer Gearboxes** – Couples the Driveshaft to the Vertical Auger.
10. **Planetary Gearbox Oil Reservoir** – Remove the cap to add oil. Markings indicate proper oil level range.
11. **Electronic Scale Indicator** – Displays the weight inside the drum.
12. **Onboard Owner Manual Holder** – a convenient place to store the owner manual and spare PTO shear bolts.
13. **Central Grease Location** – a centralized location to grease auger bearings.
14. **Hydraulic Power Pack** – Controls up/down motion of unloading door(s).
15. **Electric Drive Motor** – Provides power to run vertical mixing augers. In most cases, motor is supplied by customer.
16. **Chain Belt Reduction** – Couples electric drive motor to front driveshaft and provides a rotational speed reduction.

### 13. PRE-OPERATION CHECKLIST

Efficient and safe operation of your Jaylor mixer requires that each operator reads and understands all operating procedures and related safety precautions. A pre-operation checklist is provided for the operator. Photocopy and use this checklist before every use of your Jaylor mixer. It is important that this checklist is followed for personal safety and maintaining good mechanical condition of the machine.

#### **Before operating the machine:**

- Lubricate the machine as outlined in **Section 23.5. Fluids and Lubricants**.
- Check oil level and condition in the planetary gearboxes. Be sure there are no leaks. Stop leaks before continuing.
- Inspect all hydraulic lines, hoses, fittings, and couplers for tightness.
- Check that augers rotate freely. Remove all string, twine, or other entangled material.
- Check that driveshaft couplings are securely locked to shafts on planetary gearboxes and chain belt reduction output.
- Close and secure all guards and safety devices.
- Check that machine is clean and free of debris.
- Check that mixer feet and power supply platform are securely mounted to concrete floor.
- Check that hydraulic power pack motor is connected to an AC power source with adequate amperage output.



**Danger:** *Take care not to come in contact with knives. Contact with a knife could result in deep laceration and severe hemorrhaging.*

## 14. BREAKING-IN

Although there are no operational restrictions for the machine when used for the first time, it is recommended to check the following items prior to first use:

### 14.1 Before Starting:

- Check oil level and condition of the planetary gearbox.
- Cycle the unloading door(s) several times to fully charge hydraulic system with oil (once this is done top up hydraulic power pack reservoir with oil).
- Disconnect front driveline and turn augers by hand. Be sure that they turn freely.
- Check for debris and/or any other items that could block or affect machine operation.
- Check that no hoses are pinched, rubbing, or being crimped. Re-align as required.
- Check that chain belt reduction is aligned properly.

### 14.2 After Operating for ½ hour:

- Check that all bolts and fasteners are tightened properly as indicated in **Section 23.4**.
- Check the augers. Remove all string, twine, or other entangled material.
- Check that no hoses are pinched, rubbing, or being crimped. Re-align as required.
- Check for oil leaks. Stop leaks before continuing.
- Lubricate all grease fittings.
- Check that chain belt reduction is aligned properly.

### 14.3 After operating for 5 hours and 10 hours:

- Re-torque all fasteners and hardware.
- Check that augers turn freely.
- Check the augers. Remove all string, twine, or other entangled material.
- Proceed with normal servicing and maintenance schedule as defined in **Section 23**.



**Danger:** *Take care not to come in contact with knives. Contact with a knife could result in a deep laceration and severe hemorrhaging.*

## 15. CONTROLS

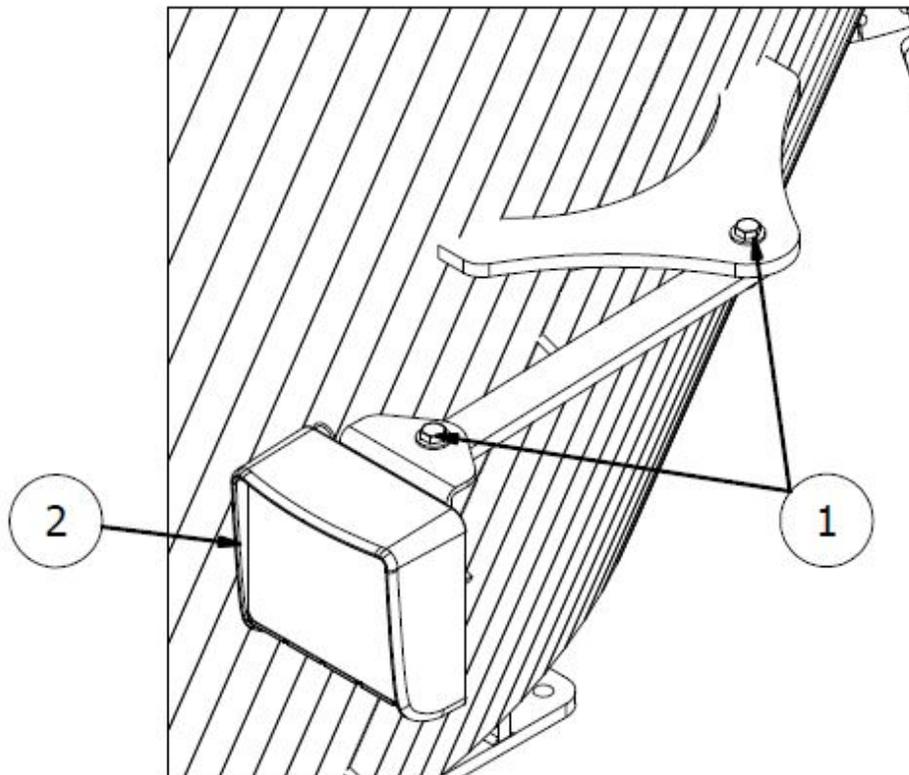
### 15.1 Weighing

#### 15.1.1 Scale System Overview

- The scale system on all twin auger stationary models includes four weigh-bars which are mounted between the drum underframe and feet. The weigh-bars electronically measure the amount of ration inside the mixing chamber. The indicator is mounted at the front of the mixer, in a position high enough to be seen clearly from the loader cab.

#### 15.1.2 Indicator Mounting and Adjustment

- There are various scale indicators available for use on your Jaylor, however the mounting assembly for most scale indicators is the same. When attaching the indicator to the machine, be sure that it is securely fastened. Typically, the indicator slides down into the mounting bracket, and a wire or plastic fastener secures the indicator to the mounting bracket.
- To adjust the direction that the indicator faces, see **Figure 9**:



**Figure 9 - Scale Indicator Adjustment**

1. **Swivel Joints** – Swivel joint lock nuts should be tight enough to hold the indicator in position while allowing it to be re-positioned by hand. The indicator can be rotated to face any direction.
2. **Scale Indicator**

### **15.1.3 Indicator Connections**

- There are four outlets on the bottom of the indicator for attaching the four weigh-bar cords. These outlets should not be confused with the power supply, which will not attach in the same outlet. The weigh-bar cords are pushed in, and then the tightening ring threaded into place. Make sure that the plugs are free of moisture or other contaminants, as this will affect the performance of the weighing system.
- On standard models, the power cord is connected to the 90VAC-305VAC to 12VDC voltage rectifier. Voltage rectifier will need to be connected to a VAC power source within this range to run the scale system.

### **15.1.4 Remote Indicator (Optional)**

- Remote indicators are usually positioned to allow viewing from the loading equipment. In most cases the remote indicator does not allow full access to weigh system parameters. These parameters are controlled from the main indicator. The remote indicator attaches to the main indicator via a cable or wirelessly, depending on model. Make sure plugs are free from moisture and other contaminants as this will affect performance of the weighing system.

**Note:**

- *The scale is programmed to display weight in either kilograms (kg) or pounds (lbs.). If your scale is not programmed to your preferred units of measurement, or for any other settings, please see the scale system manual which has been provided by the scale system manufacturer.*

## 15.2 Restrictor Blades

- Located at the front-left and rear-right corners of the mixing chamber the restrictor blades can be locked "IN" to increase cutting aggressiveness or "OUT" to reduce it. Proper blade position is determined by the operator's preference.

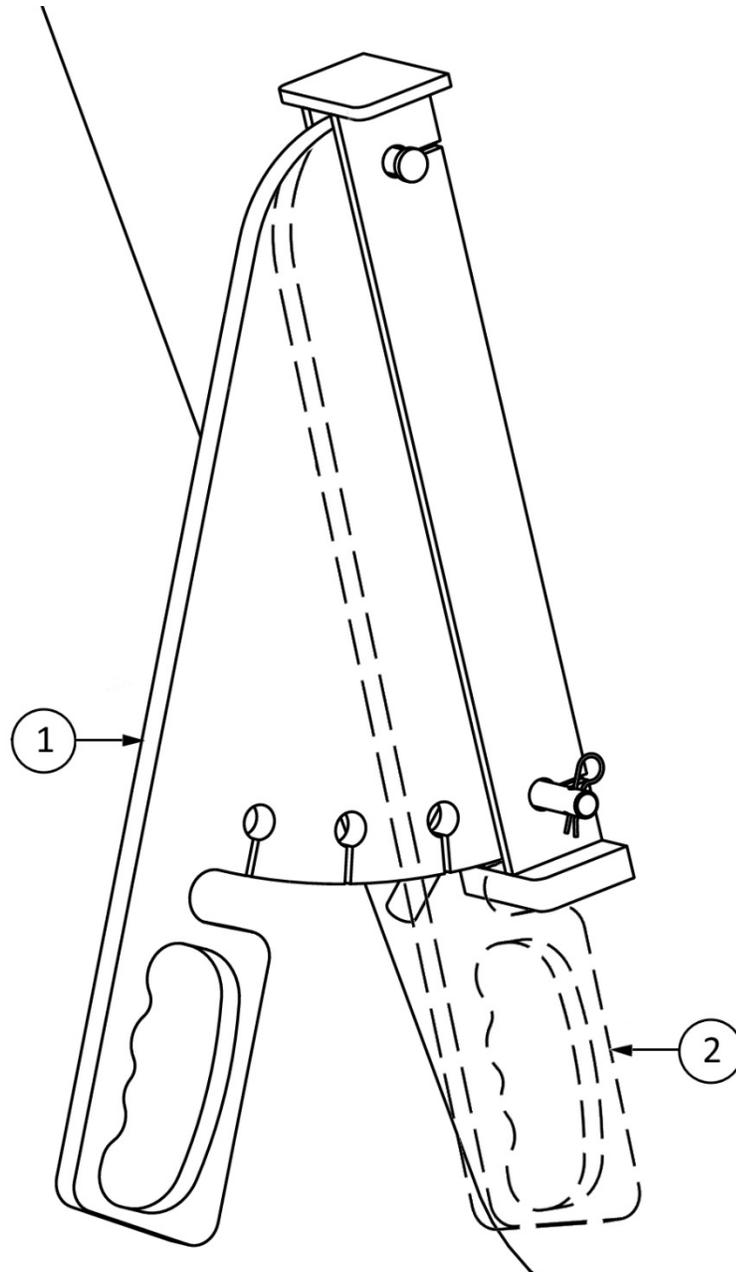
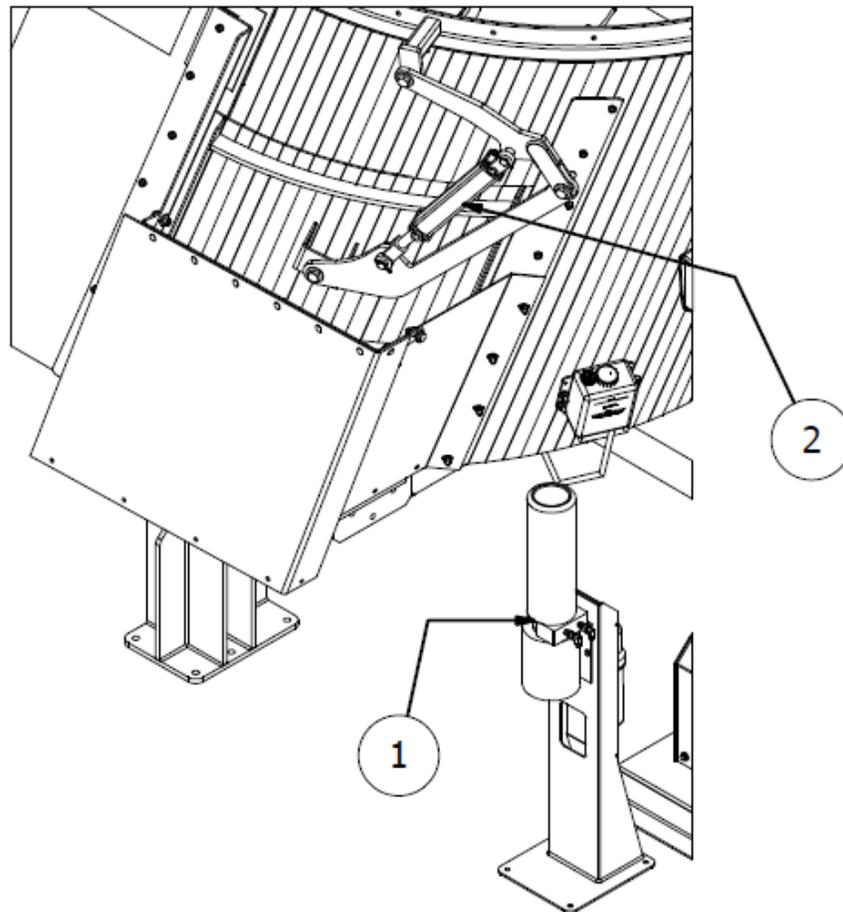


Figure 10 - Restrictor Blades

1. "OUT" Position
2. "IN" Position

### 15.3 Door Position

- The door position for all models is controlled by a hydraulic power pack (see **Figure 11**). The power pack must be connected to an AC electrical power source to operate. The power pack comes equipped with a momentary lever which controls upward and downward motion of the door. On models with two doors, the power pack is equipped with two levers, one to operate each door.



**Figure 11 - Door Position Control**

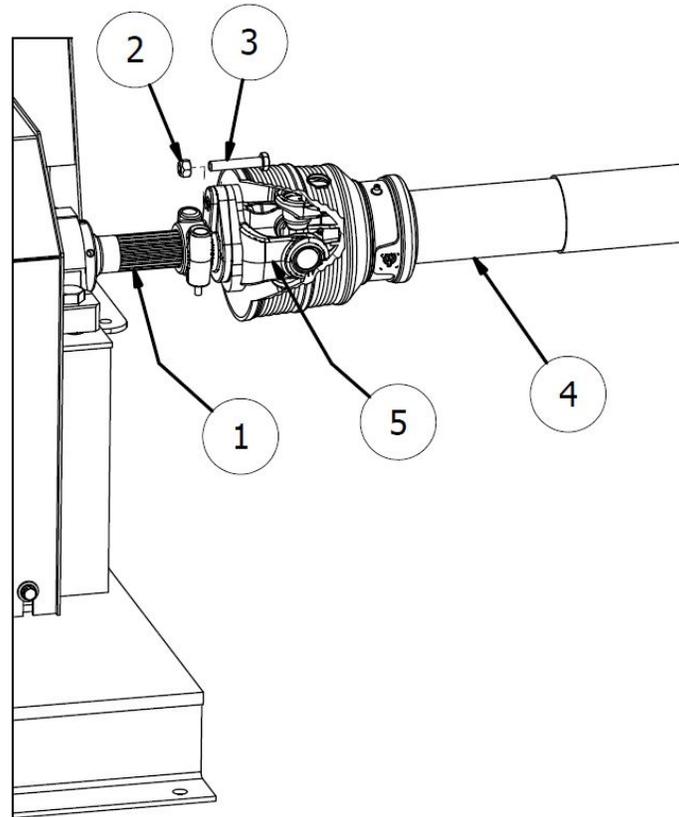
- 1. Hydraulic Power Pack**
- 2. Hydraulic Door Cylinder**

### 15.4 Auger Rotation

Auger rotation is controlled by running the electric drive motor. The motor will run at a single speed therefore auger speed will be constant. The electric drive motor is controlled by a motor starter, which has on/off capabilities. In most cases, the customer provides the motor and starter.

## 16. SHEAR BOLT PROTECTED DRIVELINE

Should excessive loads be placed on the driveline, the shear bolt will fail. This is a safety feature, but should not be depended on as a maximum load indicator. The shear bolt is located on the chain belt reduction end of the driveshaft supplied with the machine (see **Figure 12**).



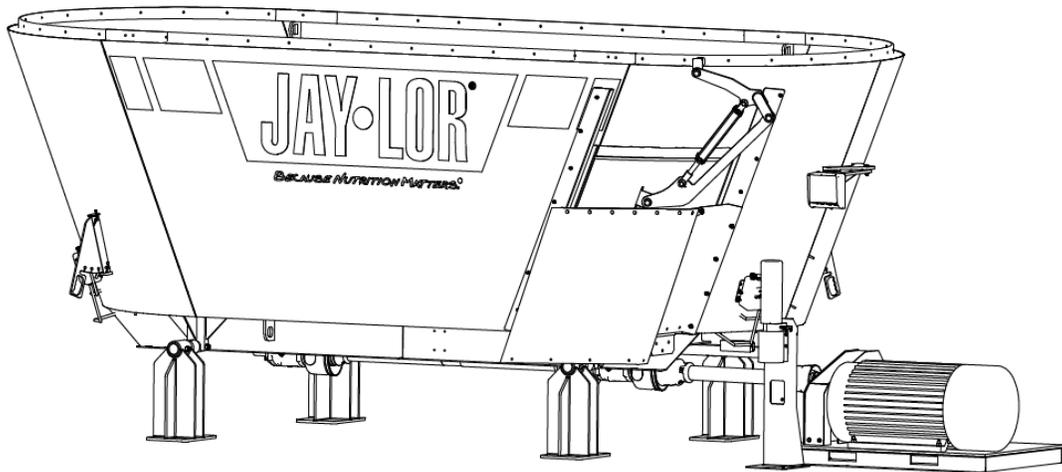
**Figure 12 - Shear Bolt Location**

1. Chain Belt Reduction Output Shaft
2. Hex Nut
3. Shear Bolt
4. Front Driveshaft (shielding shown)
5. Shear Bolt Yoke Assembly

If the shear bolt breaks, it must be replaced with the correct bolts specified by the manufacturer (see **Section 23.7**). For convenience, spare shear bolts are supplied with the machine and are stored in the cap of the manual holder.

## 17. DOOR CONFIGURATIONS

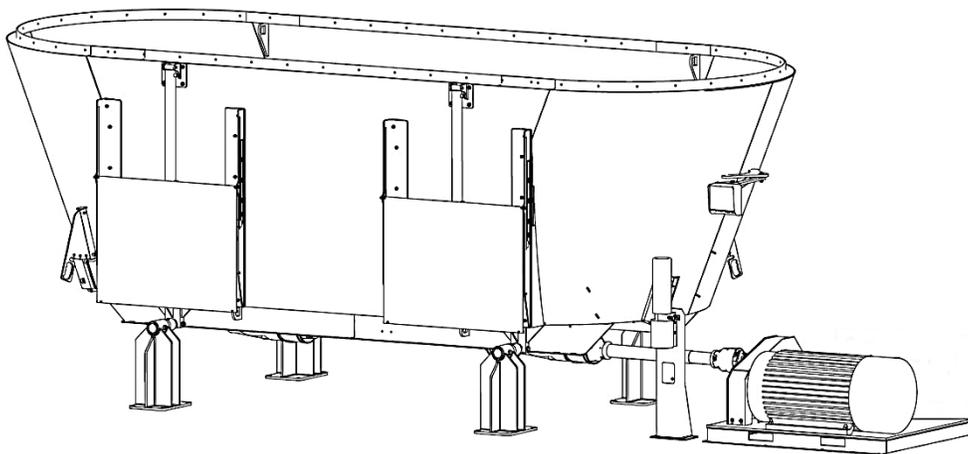
### 17.1 Corner Door Discharge



**Figure 13 - Front Right Corner Door Configuration**

The corner discharge door is controlled hydraulically from the power pack. When the door is opened, feed will discharge from the machine. The door can be raised to any position up to a maximum of 28 inches (71 cm) in height.

### 17.2 Centre Side (C-Side) Door Discharge



**Figure 14 - Dual Right Centre Side Door Configuration**

The centre side discharge door is controlled hydraulically from the power pack. When the door is opened, feed will discharge from the machine. The door can be raised to any position up to a maximum of 28 inches (71 cm) in height. Mixers are available with one or two center side doors.

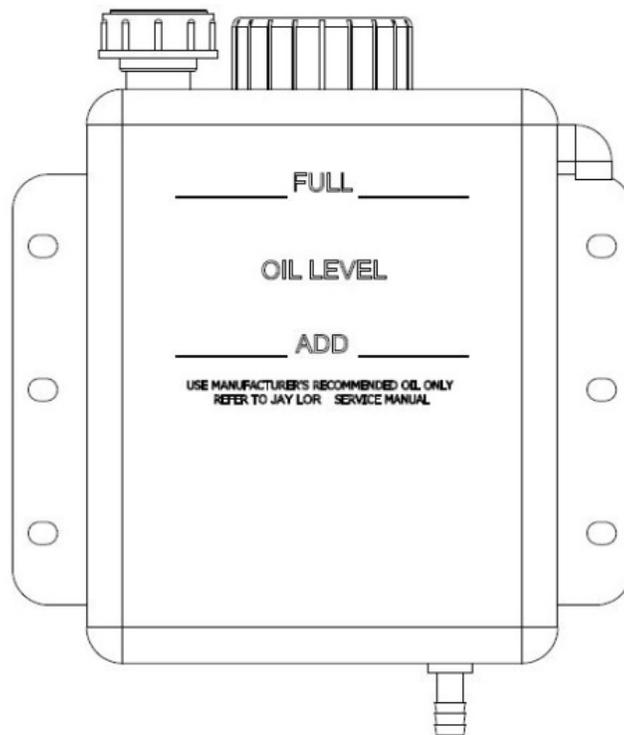
## 18. GEARBOX LUBRICATION

The gearboxes on Jaylor machines use either gear oil (if machine is NOT equipped with oil coolers) or hydraulic oil (if machine IS equipped with oil coolers) as their lubricant. The oil reservoirs on the side of the mixer drum contain lubricant for the gearboxes. See **Section 23.5.1** for lubricant specifications for your Jaylor.

Every Jaylor is equipped with an oil reservoir for each gearbox. The polyethylene body is a very durable material, which is able to withstand severe impact. If a reservoir is damaged it must be replaced with an approved reservoir or components recommended by the manufacturer. If a reservoir sustains any damage, call your Jaylor dealer or distributor immediately.

The polyethylene reservoir has decals indicating the maximum and minimum oil level range under normal operating conditions. At no time is the fluid level to be lower than the minimum recommended level, as damage to the gearbox may occur. If the fluid level is higher than the maximum level, the oil may overflow either at the reservoir or underneath the machine at the gearbox. Check the fluid level in the reservoir daily.

Each oil reservoir has a filter/breather located on the top, which must be attached to the reservoir at all times. This breather is removable, to allow filling of the reservoir. If the filter/breather becomes contaminated, remove the breather and clean it. Follow the instructions described in **Section 23.5.1**.



**Figure 15 - Gearbox Oil Reservoir Assembly**

## 19. FIELD OPERATION

### 19.1 General

The operation of the Jaylor mixer will differ greatly with the various feeds and climatic conditions. In most instances, “trial and error” is the best method of setting the machine up for a particular commodity to obtain maximum performance. As a general rule the bulkiest and lightest commodities should be added first. To prevent over-cutting of feed, we suggest starting with the restrictor blades in the out position, and then adjusting to obtain the desired coarseness of mix.

It is recommended that commodities are added to the mixing chamber while the augers are turning for maximum mix efficiency. Starting the augers from a standstill with a full load in the mixing chamber places additional stress on the machine. Even though it is designed to handle this stress, repetitive startups under load may affect the service life of the machine. If however, circumstances dictate that it is required to restart the machine while loaded, retract the restrictor blades to the ‘out’ position in order to decrease starting torque as much as possible.

The type of mix required varies from one operation to another. Therefore, mixing times and procedures will vary as well. When adding ingredients, watch the numbers on the scale indicator to monitor the weight of each ingredient as it is added. We highly recommend the use of a feed nutritionist when planning rations as well as the regular use of a particle separator to ensure accuracy of mix. To purchase a Jaylor Particle Separator, based on the Penn State Particle Separator, contact your Jaylor dealer. Upon completion the ideal mix will be light, fluffy and uniform. Hays/straws will be cut cleanly at short lengths and no clumping of feed will be visible.



**Danger:** *Never enter the mixing chamber unless the electric drive motor is stopped, all moving parts have stopped, and drive shaft between chain belt reduction and planetary gearbox has been disconnected before servicing, adjusting, repairing, or unclogging. Failure to follow these safety precautions can result in serious injury or death.*



**Danger:** *Never stand on the mixer platform while the drum is being loaded. Stay out of reach of the loading equipment.*



**Danger:** *Never install the mixer in a location where you or any person could fall into the mixing chamber as severe injury or death could result.*



**Warning:** *While loading the machine, be certain that no bucket or loading device comes into contact with the rotating auger inside the mixing chamber. This may cause injury or death to the operator and serious damage to the mixer and/or loader.*

**Caution:** *It is recommended that commodities are added to the mixing chamber while the auger is turning for maximum mix efficiency. Starting the augers from a standstill with a full load in the mixing chamber places additional stress on the machine and may decrease mix quality.*

**Caution:** *Never load anything into the mixing chamber that could cause damage to the machine (i.e. lumber, branches, stones, tires, etc.). **Before mixing any materials other than suitable animal feed stuffs, written permission must be obtained from the manufacturer!***

## 19.2 Cutting and Mixing Procedure

Follow these procedures when using the machine:

1. Review the Pre-Operation checklist, as described in **Section 13**.
2. Review the location and function of all controls, as described in **Section 15**.
3. Start electric drive motor.
4. Loading Feed Rations:
  - a. Remove all twine, string, and wrapping material from the bales and/or other commodities.
  - b. Begin adding ingredients to the mixing chamber.
  - c. When adding ingredients, watch the numbers on the scale indicator to monitor the weight of each ingredient as it is added.
  - d. Mixing times may vary depending on the ingredients being mixed. Typically, a total mixed ration is achieved in 3 to 5 minutes beginning after the last ingredient is added.



**Danger:** *Never enter the mixing chamber unless the electric drive motor is stopped, all moving parts have stopped, and drive shaft between chain belt reduction and planetary gearbox has been disconnected before servicing, adjusting, repairing, or unclogging. Failure to follow these safety precautions can result in serious injury or death.*

**Important:** *Always remove twine, string, and wrapping material from bales and/or other commodities from the ground before loading into the mixing chamber. Failure to follow these requirements can cause damage to the machine.*

**Important:** *It is recommended to add light and fluffy ingredients into the mixing chamber first. The heavier and denser material will force the lighter ingredients into the mixture.*

## 19.3 Unloading Procedure

Follow these guidelines when unloading the machine:

1. If not already done, engage the PTO to start auger rotation.
2. Open unloading door slowly until desired height is reached.
3. Monitor scale indicator readings to evaluate ration distribution.
4. Continue unloading until mixing chamber is empty or desired amount of mixed ration has been unloaded.

## 19.4 Mixing Tips

- Place light, fluffy, least dense ingredients into the machine first. In that way, the heavier and denser material added later will push the light material into the augers. Always place hay (round, square, or loose) into the machine first.
- Shake the bucket on the loader to control the amount of material being added to the machine. Watch the weight indicator to know exactly how much of each ingredient you are adding.
- Operate the augers for 3 to 5 minutes after the last ingredient has been added before unloading to ensure a uniform mixture. Mixing times will vary depending on the type of ingredients being mixed. Visually monitor the mixture to ensure that mixing is complete.
- Consult with a feed nutritionist to determine the best combination of ingredients for your requirements. Following their recommendations will ensure the best results with your total mixed ration (TMR). This translates into maximum efficiency of your Jaylor investment.

## 19.5 General Mixing Issues

The following are some problems that the operator may be faced with at some point during cutting and mixing. Remember when doing any work on the mixer always stop the electric drive motor(s), wait for all moving parts to stop and disconnect drive shaft between chain belt reduction and planetary gearbox.

### Think SAFETY! Work SAFELY!

#### 19.5.1 Feed Clogging

The most common place feed may clog is in the unloading door. To unclog the unloading door, open the door as wide as possible, secure the door in an open position with a pair of locking pliers locked just below the door to the drum wall, and proceed with manual clean out.



**Danger:** Take care not to come in contact with knives. Contact with a knife could result in a deep laceration and severe hemorrhaging.

#### 19.5.2 Entangled Material:

Twine, string, and wrapping material that is not removed from bales can get tangled on the auger or under the auger. If this material is not removed from the auger, it can cause damage to mixer components as well as decreased mixing and cutting ability. Due to the severe consequences that having entangled material can cause, action to remedy this should be taken as soon as it is noticed. To remove the material the door must be secured in an open position with a pair of locking pliers locked just below the door to the drum wall. Once the mixer door is secured in the open position the drum can be entered to remove the material.



**Danger:** Never enter the mixing chamber or go on the conveyor unless all controls are in neutral, engine stopped, park brake set, ignition key removed and all moving parts have stopped. Failure to follow these safety precautions can result in serious injury or death.



**Danger:** Take care not to come in contact with knives. Contact with a knife could result in a deep laceration and severe hemorrhaging.

## 20. STORAGE

Should the machine be stored for an extended period of time, it should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time the next time the machine is to be used.

Recommended procedure:

1. Wash the entire machine thoroughly using a water hose or pressure washer to remove all dirt, mud, debris, or residue.
2. Inspect all drives and moving parts. Remove any string, twine, or other material that has become entangled in the auger knives, shafts, and belts. Be sure the components are clean and move freely.
3. Inspect all hydraulic hoses, fittings, lines, and valves. Tighten any loose fittings. Replace any hose that is cut, nicked, abraded, or separating from the crimped fitting.
4. Inspect auger and knives for damaged or broken components. Repair or replace components as required.
5. Lubricate all grease points. Make sure all grease cavities have been filled with grease to remove any water residue left from washing.
6. Apply grease to the exposed cylinder rams.
7. Touch up all paint nicks and scratches to prevent rusting.
8. If the machine is not to be used for an extended period, consider removing the scale indicator from the machine and place in a clean and dry environment. Use the original packaging if available. Place all weigh bars and power cords so that they will not be exposed to weathering and/or damage.



**Danger:** Before entering the drum, always stop the electric drive motor, wait for all moving parts to stop, and disconnect the drive shaft between the chain belt reduction and planetary gearbox. Failure to follow these safety precautions can result in serious injury or death.



**Danger:** Take care not to come in contact with knives. Contact with a knife could result in a deep laceration and severe hemorrhaging.

**Important:** When spraying water to clean the mixer, protect the breather and reservoir to avoid contamination.

## 21. TROUBLESHOOTING

Your Jaylor mixer is designed to receive a variety of feed material in its mixing chamber to cut and mix prior to unloading. It is a simple and reliable system that requires minimal maintenance.

The following section lists possible problems, causes, and solutions to the problems you may encounter with your Jaylor mixer. Should any maintenance and service be required as a result of troubleshooting, see **Section 23 - Maintenance and Service Information** for assistance.

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please call your dealer or distributor. Before you call, have this manual and the serial number from your machine ready.

PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
- Material wraps around knives.	- Knives dull or worn out.	- Check auger, remove entangled material. - Check knife condition. Replace any worn, bent, and/or damaged knives.
- 'Dead Spot' during mixing.	- Material will not mix in certain locations inside the mixing chamber, commonly the front and back areas of the mixing chamber.	- Make sure the machine is level when mixing. - Check condition of all knives. Replace accordingly.
- Auger stops rotating during mixing.	- Auger jammed.	- Clear packed material and resume mixing.
	- Leading edge of auger digging into drum floor.	- Adjust auger height.
	- Shear Bolt Failure.	- Replace Shear Bolt
- Visible deformation, wear or failure of driveline or PTO components	- Extreme load - Contaminants (sand, etc.) - Turning at too great an angle	- Replace damaged components with Jaylor recommended parts

## 22. STANDARD MODEL SPECIFICATIONS

## 22.1 5750HD Stationary Mixer

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	740 cu.ft. (21.0 m <sup>3</sup> )
<b>Auger Assembly</b>	Features	Complete w/ 9 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Drivetrain</b>	Driveshafts	#8 - 1000 RPM maximum operating speed, 1-3/4" diameter 20-spline female both ends.
	Auger Rotational Speed	41 RPM
	Power Supply	200 HP (149 kW) minimum, 1200 RPM, NEMA 449T electric drive motor.
<b>Hydraulics</b>	Power Pack Specifications	2 HP (1.49 kW) electric motor, 0.91 GPM (3.44 LPM) oil flow, 2850 PSI (19.65 MPa) relief pressure.
<b>Weight</b>	13000 lbs. (5900 kg)	Dependent on equipped options.

\* - Due to continual product development, specifications are subject to change without notice.

## 22.2 5850HD Stationary Mixer

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	800 cu.ft. (22.7 m <sup>3</sup> )
<b>Auger Assembly</b>	Features	Complete w/ 9 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Drivetrain</b>	Driveshafts	#8 - 1000 RPM maximum operating speed, 1-3/4" diameter 20-spline female both ends.
	Auger Rotational Speed	41 RPM
	Power Supply	200 HP (149 kW) minimum, 1200 RPM, NEMA 449T electric drive motor.
<b>Hydraulics</b>	Power Pack Specifications	2 HP (1.49 kW) electric motor, 0.91 GPM (3.44 LPM) oil flow, 2850 PSI (19.65 MPa) relief pressure.
<b>Weight</b>	17600 lbs. (8000 kg)	Dependent on equipped options.

\* - Due to continual product development, specifications are subject to change without notice.

**22.3 5100HD Stationary Mixer**

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	925 cu.ft. (26.2 m <sup>3</sup> )
<b>Auger Assembly</b>	Features	Complete w/ 11 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Drivetrain</b>	Driveshafts	#8 - 1000 RPM maximum operating speed, 1-3/4" diameter 20-spline female both ends.
	Auger Rotational Speed	41 RPM
	Horsepower Requirement	250 HP (186 kW) minimum, 1200 RPM, NEMA 449T electric drive motor.
<b>Hydraulics</b>	Power Pack Specifications	2 HP (1.49 kW) electric motor, 0.91 GPM (3.44 LPM) oil flow, 2850 PSI (19.65 MPa) relief pressure.
<b>Weight</b>	19800 lbs. (9000 kg)	Dependent on equipped options.

\* - Due to continual product development, specifications are subject to change without notice.

## 23. MAINTENANCE AND SERVICE INFORMATION

This section covers the maintenance required for your Jaylor mixer. It is essential that your Jaylor receives this maintenance to retain the safety, dependability, and performance originally built into your Jaylor product. By following a careful service and maintenance program, you should enjoy many years of trouble-free service.

In some cases, the maintenance required for your Jaylor may necessitate the assistance of qualified service personnel. Please consult with your dealer or distributor for assistance with such services.

Always keep this manual, and leave it with the machine when sold. The maintenance record, plus maintenance receipts, may be needed for warranty repairs. It is suggested that receipts be kept with this section. A convenient log for recording maintenance performed is provided at the end of the maintenance section.

### 23.1 Maintenance Safety



#### SAFETY FIRST:

1. Follow ALL the operating, maintenance and safety information in the manual.
2. Follow good shop practices.
3. Use only tools, jacks and hoists of sufficient capacity for the job.
4. Stop the electric drive motor, wait for all moving parts to stop, and disconnect the drive shaft between chain belt reduction and planetary gearbox before servicing, adjusting, repairing, or unclogging. Be sure to let the hydraulic system cool to a safe temperature before servicing, adjusting or repairing any of these components.
5. Make sure all guards are in place and properly secured when maintenance work is completed.
6. Before applying pressure to a hydraulic system, make sure all lines, fittings, and couplers are tight and in good condition.
7. Keep hands, feet, hair, and clothing away from all moving and/or rotating parts.
8. Clear area of bystanders (especially small children), when carrying out any maintenance, repairs, adjustments or testing.

### 23.2 Model and Serial Number

Always give your dealer/distributor the model number and serial number of your Jaylor mixer when ordering parts or requesting service or other information. See **Section 6** for where to find the serial number. Depending on the type of service, the serial numbers of individual components and/or assemblies will be required.

### 23.3 Following an Effective Maintenance Schedule

It is the owner/operator's responsibility to operate, lubricate, maintain, and store the machine in accordance with all instructions and safety procedures.

Remember, the guidelines established in this manual are general. Maintenance and service work is **NOT** limited to these guidelines. If you have any questions or concerns, please contact your Jaylor Dealer or Distributor.

### 23.4 Bolt Torque

The tables shown below give correct torque values for various bolts and cap screws. Tighten all bolts to the torque specified in the chart unless otherwise noted. Check tightness of bolts periodically, using the bolt torque chart as a guide. Replace hardware with the same strength bolt.

Bolt Diameter "A"	Bolt Torque*					
	SAE 2		SAE 5		SAE 8	
	(N.m)	(lb-ft)	(N.m)	(lb-ft)	(N.m)	(lb-ft)
1/4"	8	6	12	9	17	12
5/16"	13	10	25	19	36	27
3/8"	27	20	45	33	63	45
7/16"	41	30	72	53	100	75
1/2"	61	45	110	80	155	115
9/16"	95	60	155	115	220	165
5/8"	128	95	215	160	305	220
3/4"	225	165	390	290	540	400
7/8"	230	170	570	420	880	650
1"	345	225	850	630	1320	970

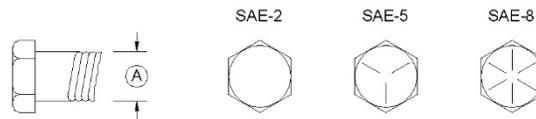


Figure 16 - Imperial Bolt Specifications

Bolt Diameter "A"	Bolt Torque*			
	8.8		10.9	
	(N.m)	(lb-ft)	(N.m)	(lb-ft)
M3	0.5	0.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710

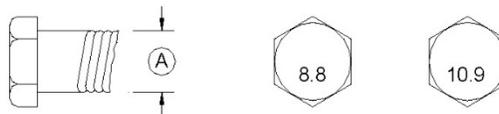


Figure 17 - Metric Bolt Specifications

Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

\* Torque value for bolts and cap screws are identified by their head markings.

## 23.5 Fluids and Lubricants

For information listed below it is to be noted that oils are categorized under the AGMA (American Gear Manufacturers Association) standard. An ISO 150 is equivalent to an AGMA 4.

EP additives = AGMA 4EP. Synthetic Oil = AGMA 4(S) EP or AGMA 4EP (Synthetic)

### 23.5.1 Planetary Gearbox Oil

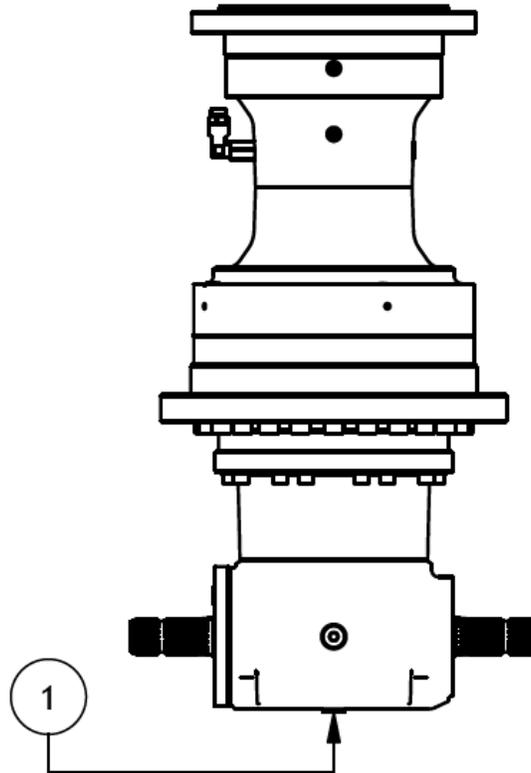


Figure 18 - Planetary Gearbox

#### 1. Oil Drain Plug

All models equipped with a standard planetary gearbox require **synthetic industrial gear oil with extreme pressure characteristics**. The following is a list of equivalent brand name oils that are suitable for use in the planetary gearbox on your Jaylor:

#### ISO 150 EP Synthetic Industrial Gear Oil

Esso Terrestic SHP 150

Mobil SHC 629

Enduratex XL Synthetic Blend 150 - (Petro-Can)

To maintain the gearbox, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Stop the electric drive motor, wait for all moving parts to stop, and disconnect the drive shaft between chain belt reduction and planetary gearbox before servicing, adjusting, repairing, or unclogging.
3. **Checking Oil Level:**  
Each gearbox is equipped with a special oil reservoir and breather mounted on the drum to eliminate maintenance on the gearbox itself. The oil level must be checked daily when the gearbox is cold and machine is level. Add oil through the vented cap as required to maintain the oil level between the minimum and maximum oil level lines.
4. **Checking the Magnetic Plug:**  
If equipped, the gearbox may have a magnetic plug designed to collect and trap metallic contaminants from the lubricating oil. The magnetic plug is usually the oil drain plug. It is recommended that the plug be removed 25 hours after new and then every 100 hours or twice annually and cleaned to remove contaminants from the system. To clean the plug, follow this procedure:
  - a. Have a rubber plug available that will act as a stopper in the drain hole when the magnetic plug is removed.
  - b. Place a pan under the plug to collect any spilled oil.
  - c. Remove the magnetic plug.
  - d. Quickly install the rubber plug to minimize loss of oil.
  - e. Examine the material collected on the magnet. There should be only a small clump of material sticking on the magnet. A small clump will indicate the system is functioning well. If there are large pieces of cuttings or chips on the magnet, change the oil in the gearbox immediately to remove contaminants. Refill with clean oil. Contact your dealer or distributor for assistance in troubleshooting, repairing, or replacing the gearbox.
  - f. Clean the plug.
  - g. Remove rubber plug, install magnetic plug and tighten to its specified torque.
  - h. Dispose of the used oil in an environmentally friendly manner.
5. **Refilling Planetary Gearbox and Reservoir:**

The oil in the gearbox should be changed at least **annually**. However, if there is a leak, so much oil may be lost that the system may have to be virtually refilled. If metal contaminants are found on the magnetic plug, the system should be drained and refilled with clean oil. When refilling or changing oil, follow this procedure:

- a. Place a pan or pail of at least 15L (3.96 US gallons) capacity under the drain plug.
- b. Remove drain plug and allow sufficient time for the system to drain.
- c. Dispose of used oil in an environmentally friendly manner.
- d. Clean the drain plug (or magnetic plug) and reinstall. Tighten plug to its specified torque.
- e. Clean around the breather cap on the reservoir. Remove the breather cap.
- f. Pump **15L (3.96 US gallons)** of previously specified oil directly into the gearbox through the lower fill hose if possible. If not possible, fill through the reservoir.
- g. Using a funnel, top up the reservoir.
- h. Continue to refill the reservoir until the oil level stabilizes.
- i. Clean the breather cap, reinstall and tighten to its specified torque.

**Note:**

- *Drain the oil while it is warm (not hot) to avoid sludge deposits.*
- *For an effective oil change, flush the system with liquid detergent recommended by the lubricant supplier before refilling the system.*
- *If you are unable to pump oil it may all be added through the reservoir; however, this can take up to 24 hours. The reservoir will slowly feed oil into the gearbox through the connecting hose. The gearbox fills slowly so the reservoir will need to be refilled several times.*

**Important:** Monitor the oil level closely during the first few hours of use. Refill the reservoir as required maintaining the proper level.

6. **Breather/Filter Assembly:**

Each planetary gearbox oil reservoir is designed with a breather/filter assembly on the top to vent the internal system pressure to atmosphere. It must be kept clean and free of contaminants and debris to function properly. **Remove and clean every 200 hours of operation, twice annually, or if the gearbox lubrication system develops a leak.** To maintain the breather, follow this procedure:

- a. **Visually check the reservoir breather every day.** Remove any material that falls on top of the breather and polyethylene oil reservoir. Keep clean and clear to allow for free flow of air for venting the internal system pressure to atmosphere.
- b. **Cleaning Breather:** Clean the breather every 200 hours of operation, twice annually, or whenever the lubrication system develops a leak.
  - i. Clean the top of the oil reservoir.
  - ii. Remove breather and bushing.
  - iii. Disassemble breather.
  - iv. Remove any buildup in the breather passages and clean the foam using a mild detergent.
  - v. Reassemble and install in reservoir. Tighten to its specified torque.

**Important:** When spraying water to clean the mixer, protect the breather and reservoir to avoid contamination.

**Important:** If it is necessary to add oil frequently to maintain the required oil level, there is a leak in the system. Determine the source of the leak and correct before continuing to operate the machine. Contact your Jaylor dealer or distributor should you require assistance.

### 23.5.2 Hydraulic Power Pack Oil

The hydraulic power pack on this Jaylor mixer will require oil having the following specifications:

- **ISO 46 AW Hydraulic Oil** - For continuous ambient temperatures above 0 °C (32 °F)
- **22 AW R&O** - For all other applications

The oil in the power pack reservoir should be replaced at least **annually**. The oil level can be monitored by checking the level in the reservoir which is mounted to the end of the power pack. Check oil level daily. If it is necessary to replace or top up the oil, clean around the fill breather cap, remove cap, and add oil directly into the reservoir.

### 23.5.3 Greasing

Use **Section 25** to keep a record of all scheduled servicing. Components should receive one pump of grease after every **16 loads or 50 hours** unless specified otherwise. Use SAE multi-purpose high temperature grease with extreme pressure (EP) characteristics on all areas requiring grease lubrication. See **Figure 19** and **Figure 20** for typical grease locations.

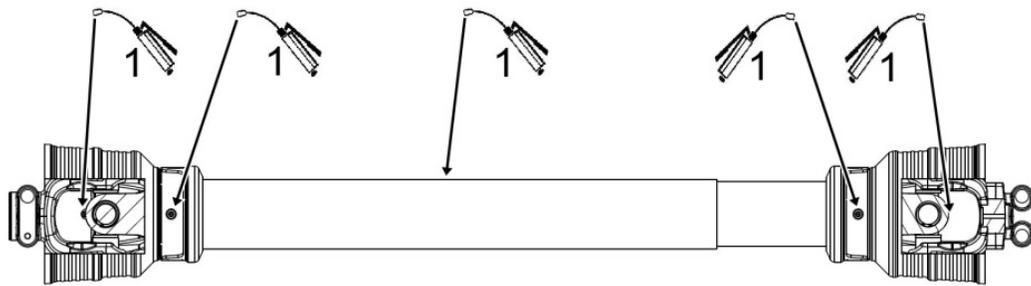
1. Wipe grease fitting clean before greasing, to avoid injecting dirt and grit.
2. Replace and repair broken fittings immediately.
3. If fittings will not take grease, replace immediately.

When creating a maintenance schedule please keep in mind:

- When greasing the gearbox through the grease line mounted underneath the mixing chamber, be sure to inspect the integrity of the line. If it is split, cracked and/or disconnected replace the line immediately.

**Important:** The service intervals shown are typical. Always follow the instructions supplied with the PTO Shaft for full service information.

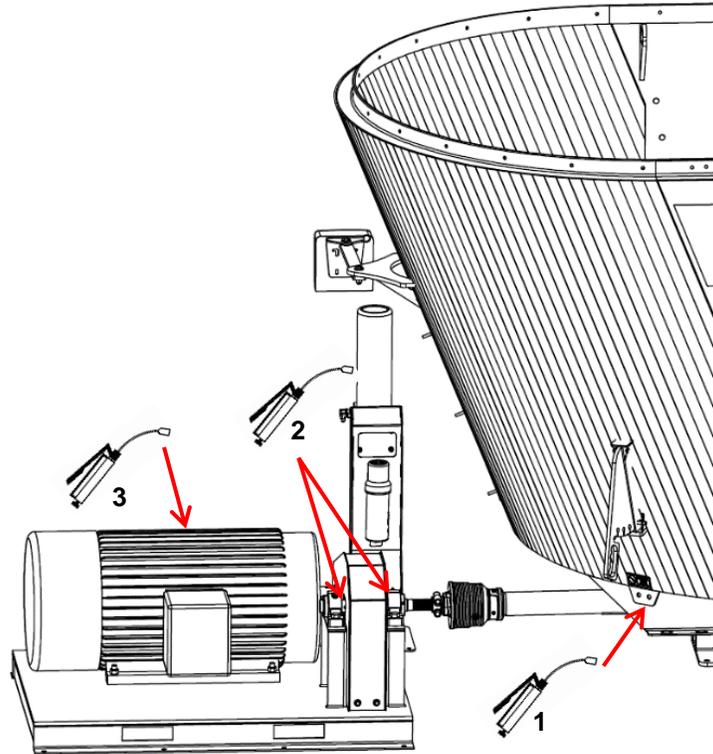
**Important:** When greasing the crosses on the driveshaft, always inspect the condition of the yoke assemblies. Apply grease to contact areas if required, check connections, and check condition of the shear bolt if applicable.



**Figure 19 - Driveshaft Grease Locations**



Grease one pump after every 16 hours or 50 loads (both driveshafts).



**Figure 20 - Grease Points on Twin Auger Stationary Mixer**



Apply one (1) pump of grease every 8 hours or 25 loads to both grease points on the central grease plate. Each grease point applies grease to one of the planetary gearbox's upper bearings.



Apply one (1) pump of grease every 16 hours or 50 loads to each pillow block bearing on the output side of the chain belt reduction.



Refer to electric drive motor manufacturer's manual for motor specific grease schedule.

## 23.6 Auger Maintenance

### 23.6.1 Timing

To minimize rocking during operation, the vertical augers must be aligned. Auger alignment must be checked before connecting the driveshaft between the two auger gearboxes. The figures below illustrate optimal alignment for different auger types.

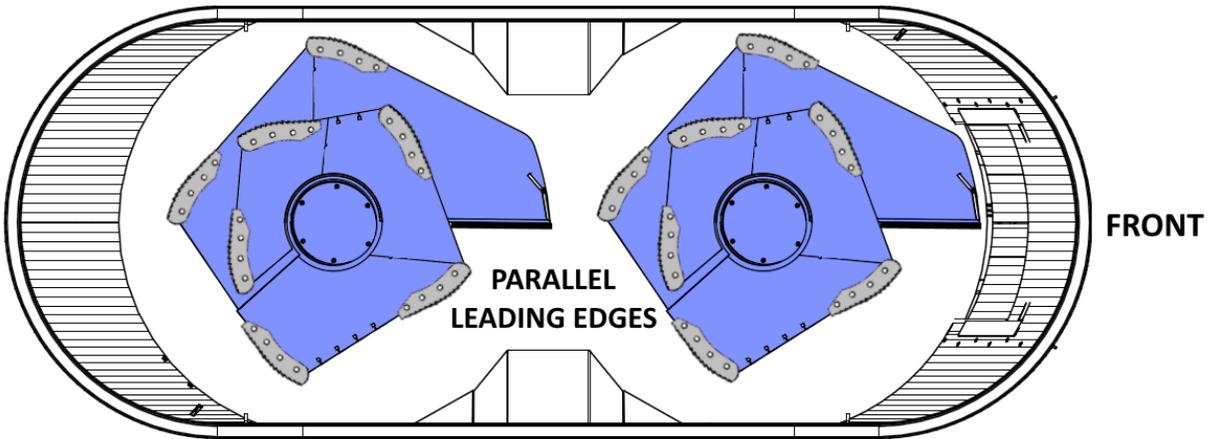


Figure 21 - Angling Blade Auger Alignment

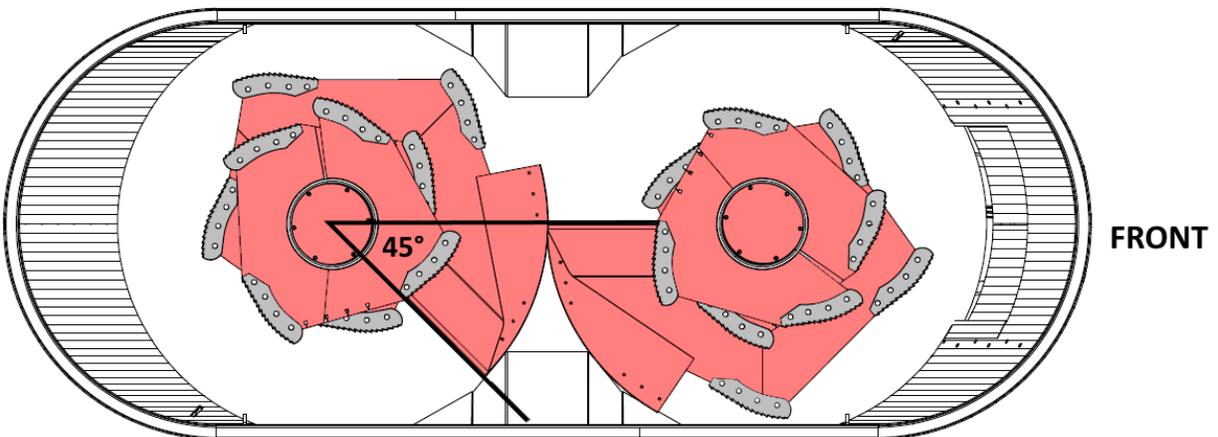
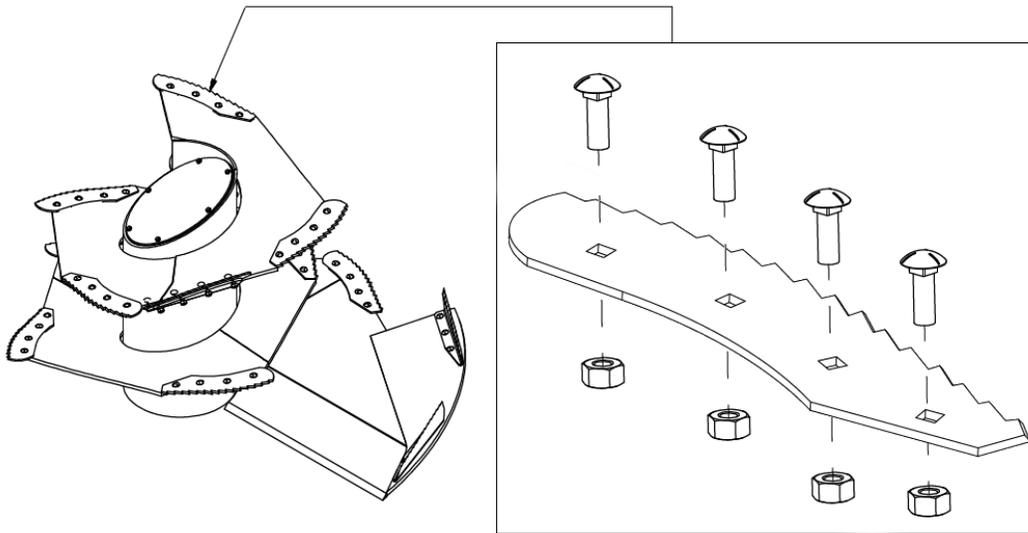


Figure 22 - Slide Plate Auger Alignment

### 23.6.2 Knives

The vertical augers are equipped with knives for cutting feed material. To maintain knives, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine, set park brake, relieve hydraulic pressure, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing, or unplugging.
3. Install new knives and tighten mounting bolts to their specified torque.
4. Keep knives in good condition. Replace if chipped, dull, or damaged in any way.
5. Knife sharpening is not recommended. Each knife has hardened surfaces on the upper side that keeps it sharp.



**Figure 23 - Auger and Knife Assembly**

Knife wear is greater on the knives located near the bottom of the auger. To extend the service life of knives, rotate the lower knives with the upper knives. This way all knives will wear evenly to a point where they will all need replacement.



**Danger:** Take care not to come in contact with knives. Contact with a knife could result in a deep laceration and severe hemorrhaging.

**Important:** Ensure no extra hardware and/or tools are left inside the mixing chamber after servicing.

### 23.7 Shear Bolt Specifications

All Jaylor mixers equipped with a mechanical driveline include shear bolt protection. The shear bolt size standard for most Jaylor machines is **M10 x 60 mm, GRD 8.8**.

**Note:**

- For some applications, shear bolt sizes may differ from the standard option. Make sure to order the same size shear bolts that came with your new Jaylor.

**Important:** Replace shear bolts with the correct size and capacity specified. Failure to follow these guidelines can cause damage to the drive train of the machine as well as void the machine warranty.

### 23.8 Electric Drive Motor Platform

The electric drive motor platform will require daily maintenance to help ensure all components mounted to the platform run properly with as much longevity as possible. It is important to keep the electric drive motor housing clean at all times otherwise, overheating of the system could occur.

Rotational speed reduction between the electric drive motor and planetary gearboxes is accomplished with a chain belt reduction. The toothed belt is capable of transmitting high horsepower loads with little maintenance.

The belt must remain properly tightened at all times for optimal life span. Use both adjuster bolts to tighten the belt properly.

To ensure both adjuster bolts are applying the same amount of tension, free-wheel the motor. The belt will track to one side if the tension is unequal. If this is the case, make adjustments to equal tension.

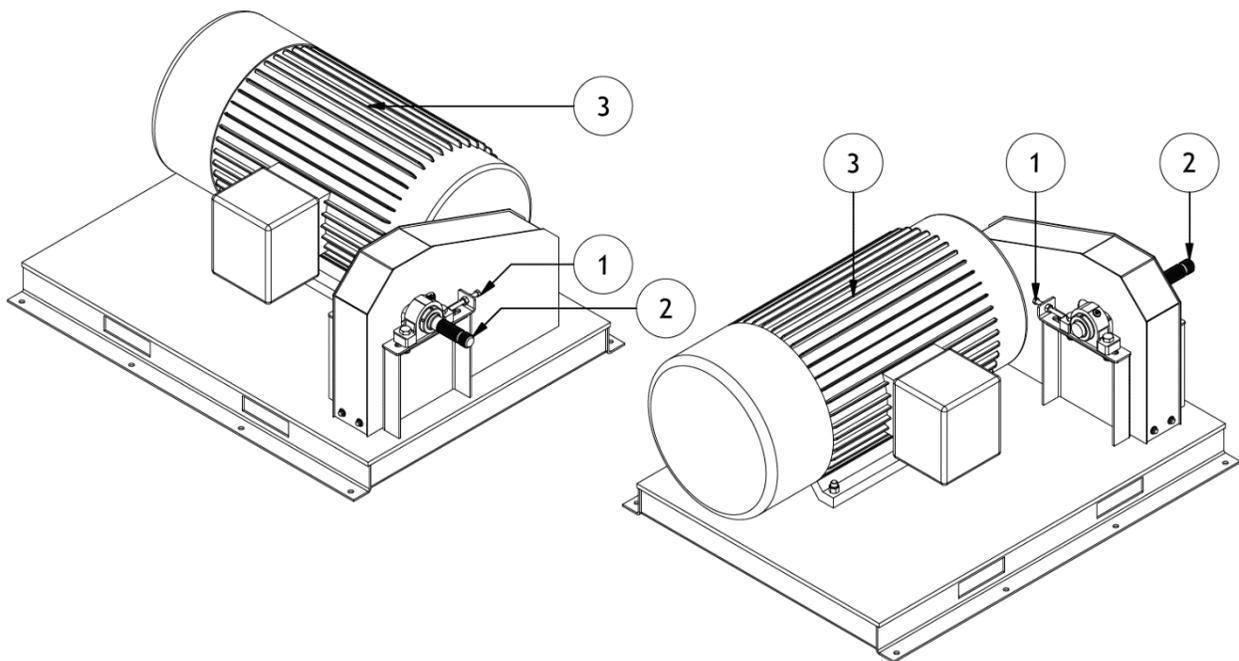


Figure 24 - Electric Drive Motor Platform

1. Belt Tension Adjustment Bolt
2. Output Driveshaft
3. Electric Drive Motor

## 24. PERIODIC MAINTENANCE CHART

A list of common maintenance items and their intervals is supplied below. Remember, these maintenance items and intervals are general. Depending on the application, additional maintenance items may be necessary and/or intervals may be shortened. It is the responsibility of the operator to properly maintain the equipment based on the specific application.

(Note: See maintenance sections preceding this chart for specific procedures)

Item	Interval
Check reservoir oil level	Every 1 day
Check drive platform belt tension	Every 1 day
Grease PTO crosses & U-joints	Every 8 hours or 25 loads
Grease auger bushings	Every 8 hours or 25 loads
Grease PTO shafts	Every 16 hours or 50 loads
Grease driveshaft bearing	Every 16 hours or 50 loads
Check hydraulic fittings and hoses for leaks	Every 1 week
Inspect auger knife condition	Every 1 week
Check hardware for tightness	Every 1 month
Check / clean gearbox magnetic plug	After first 25 hours Every 100 hours or 6 months
Clean oil reservoir breather	Every 200 hours or 6 months
Change gearbox oil	After first 100 hours Every 2000 hours or 1 year
Maintain electric motor	Refer to motor manufacturer's guidelines



## 26. SAFETY SIGN



# The Safe Operation of a Jaylor Vertical Mixer is a **Must!**

- #1 **ALL TWINE MUST BE REMOVED** from bales while the bale is on the ground and before the bale is placed into the mixer.
- #2 The **OPERATOR VIEWING STAND IS NOT** to be used in any way for the removal of twine.
- #3 **POST THIS NOTICE** in a prominent location and advise all mixer operators accordingly.

# PUT SAFETY FIRST!

27. PARTICLE SEPARATOR

CONGRATULATIONS

# ON BUYING A JAYLOR TMR MIXER

To ensure your mixer provides an optimal mix at all times, we are proud to present you with your own

## JAYLOR PARTICLE SEPARATOR

*The Jaylor Particle Separator is based on the modified (3 sieve) Penn-State Particle Separator described by Kononoff, P.J et al. (2003) in the Journal of Dairy Science, Vol. 86: pp 1858-1863.*

### **It is intended to be used as described in:**

Evaluating particle size of forages and TMRs using the New Penn State Forage Particle Separator

***As available at:***

<http://www.das.psu.edu/research-extension/dairy/nutrition/pdf/evaluating-particle-size-of-forages.pdf> (***See Attached Copy***)



# Evaluating particle size of forages and TMRs using the Penn State Particle Size Separator

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## Topics Include:

- Introduction
- Guidelines on particle size
- Particle size separator instructions
- Particle size effects on the dairy cow
- Recommended fiber intakes

# INTRODUCTION

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Having the proper particle size distribution of forages is an important part of a total ration formulation program. Until recently this has been difficult to measure on farms. Many dairy nutritionists have put subjective measures on this aspect of the diet and most have been quite effective in making ration changes in respect to this measure.

The new Penn State Forage Particle Size Separator is currently available to quantitatively determine the forage particle size of various components. The concept of forage particle size analysis and having a standard method for this is not new. The American Society of Agricultural Engineers' standard for particle size analysis and distribution has been available for many years. The objective in developing the easy to handle Penn State separator was to mimic the cumbersome laboratory method for measuring forage and total mixed ration (TMR) particle sizes.

Forage particle size analysis begins with harvesting forages at the proper stage of maturity. Chopping the crop at the proper length allows the forages that can be

combined in a total ration to achieve the desired ration particle length.

Measuring the particle length of individual forages is only one part of the solution. In fact, measuring single forages for particle size is similar to analyzing that forage for crude protein. There are recommended ranges for individual forages, but the real use of the measurement is in combining forages to achieve the proper particle size in the total ration, much like combining feeds to achieve the proper protein level in the ration.

The main goal in analyzing the particle size of the total ration is to measure the distribution of feed and forage particles that the cow actually consumes. Examine not only the particles greater than a particular size, but also the overall distribution of feed particles being consumed by the dairy cow. It is recommended that a TMR be measured from fresh samples taken from the feed bunk before the cows eat or sort the feed. Mixing and distribution equipment can reduce particle size of feeds and forages and needs to be accounted for when evaluating the diet.

## GUIDELINES ON PARTICLE SIZE

---

Achieving adequate ration particle size requires using recommended guidelines for forages and TMRs (Table 1). Particle size guidelines have been obtained from field data consisting of a large number of farms and samples studied over several months. The results of forage and TMR particle size distribution can be a tool in formulating rations, especially for forage neutral detergent fiber (NDF) intake, total NDF intake, and forage dry matter intake.

### *Corn silage*

Corn silage can be quite variable and depends largely on the amount fed in the diet. If corn silage is the sole forage, then some longer particle size is suggested. At least 5 to 10 percent of the particles should be in the upper sieve of the separator (> 0.75 inches). When corn silage is not the sole forage, then 2 to 4 percent of the particles in the top sieve may be adequate.

## GUIDELINES ON PARTICLE SIZE (CONTINUED)

---

It is more critical to chop corn silage so that a good fermentation can occur yet not be pulverized. This means that about 40 to 50 percent of the silage material measured is in both the middle (<0.75 and >0.31 inches) and bottom (<0.31 inches) pans of the separator. As corn silage makes up a greater proportion of the ration, the more that should be in the middle sieve and less in the bottom pan.

The newer systems of harvesting corn silage that includes chopping and rolling in one process can create a silage with 10 percent or more of the forage material having long particles without large pieces of whole cobs or stalks. This forage can still be excellent quality because adequate fermentation can occur in the silo due to packing characteristics.

More conventional choppers that are operated to create such long particle size in corn silage would create a forage material that would be predisposed to mold formation due to poor silo compaction. The material usually has large pieces of cob, dry stalks and leaves that have poor palatability and may often be refused by high producing cows.

### ***Haylage***

There is a lot of variability with haylage due to the type and use of machinery, sward type and density, and most of all, the dry matter of the crop harvested. Ten to 25 percent of the crop should be in the top sieve of the particle separator. This means that 10 to 25 percent of the forage particle size is greater than 0.75 inches. If the distribution of forage particles is determined, then the

amount of forage particles greater than 1 inch can be approximated.

The type of silo structure may require altering the particle size distribution recommended. Forages stored in upright sealed silos would likely fall at the lower end of the range (10 to 15 percent). Bunker silos can have appreciably longer material ranging from 15 to 25 percent. The middle pan should contain 30 to 40 percent of the material and the bottom pan 40 to 50 percent.

### ***TMR***

Field investigations conducted at Penn State have found that there is a high degree of variability in overall rations. Feeding management plays an important role in the particle length needs of the cow. Ideally 10 percent or more of the material should be greater than 0.75 inches (top sieve). It was observed that many rations have only 3 to 8 percent of the TMR particles in the top sieve (> 0.75 inches). This extrapolates to many rations having less than 1 percent of the particles as being greater than 1.5 inches. While this goes against many old thumb rules, there are many farms feeding these types of rations with obvious success.

Feeding management, balanced rations, and attention to total ration NDF and forage NDF levels are likely a large part of their success. Some generally preferred guidelines to follow for TMRs are 6 to 10 percent of the particles in the top sieve, 30 to 50 percent in the middle sieve, and 40 to 60 percent in the bottom pan in rations for high producing dairy cows.

## GUIDELINES ON PARTICLE SIZE (CONTINUED)

**Table 1. Recommended forage and TMR particle sizes for the Penn State Separator.**

	Corn silage	Haylage	TMR
Upper sieve <sup>1</sup> (> 0.75 ")	2-4% if not sole forage	10-15% in sealed silo	6-10% or more
	10-15% if chopped and rolled	15-25% bunker silo, wetter mixture	3-6% focus on TNDF & FNDF
Middle sieve <sup>1</sup> (0.75 - 0.31")	40-50%	30-40%	30-50%
Bottom pan <sup>1</sup> { < .31")	40-50%	40-50%	40-60%

<sup>1</sup> Portion remaining on the screen

## PARTICLE SIZE SEPARATOR INSTRUCTIONS

The Penn State Particle Size Separator is currently available from Nasco. For their free phone order service dial 1-800-558-9595. The data sheet and Weibull paper to use with the particle size separator are attached to the back of this publication. An accurate scale is also needed for weighing the samples and the boxes.

### *Using the separator*

Stack the three plastic separator boxes on top of each other in the following order: sieves with the large holes (upper sieve) on top, the smaller holes (middle sieve) in the center and the pan on the bottom. Place approximately 3 pints of forage or TMR in the upper sieve.

On a flat surface, shake the sieves in one direction 5 times. There should be no vertical motion during shaking. This process should be repeated 7 times for a total of 8 sets or 40 shakes with the sieves rotated 1/4 turn after each set of 5 shakes. See sieve shaking pattern shown in Figure 1.

Weigh the material on the sieves and on the bottom pan. Note that the material above the upper sieve is greater than 0.75 inches long, the material on the middle sieve is between 0.31 and 0.75 inches, and the material on the bottom pan is less than 0.31 inches. See Table 2 for data entry and how to compute percentages under each sieve.

## PARTICLE SIZE SEPARATOR INSTRUCTIONS (CONTINUED)

### *Using Weibull paper*

Weibull paper is used to graph the distribution of forage and TMR particles of the sample using the three weighed fractions from the sieves. The number of forage and TMR particles in a sample do not follow a normal distribution population, however they can be plotted as a straight-line distribution using the unique Weibull graphing paper.

Plotting the sample allows one to extrapolate beyond the measured points (.75 and .31 inches). It should be noted that the accuracy of these values decrease as the line is extended beyond these two points. Therefore the line should not be drawn beyond .2 and 1.5 inches.

Referring to Table 2, value [e] refers to 0.75 inches and value [f] to 0.31 inches. These percentages are plotted on Weibull paper and an appropriate line drawn between the two points (Figure 2).

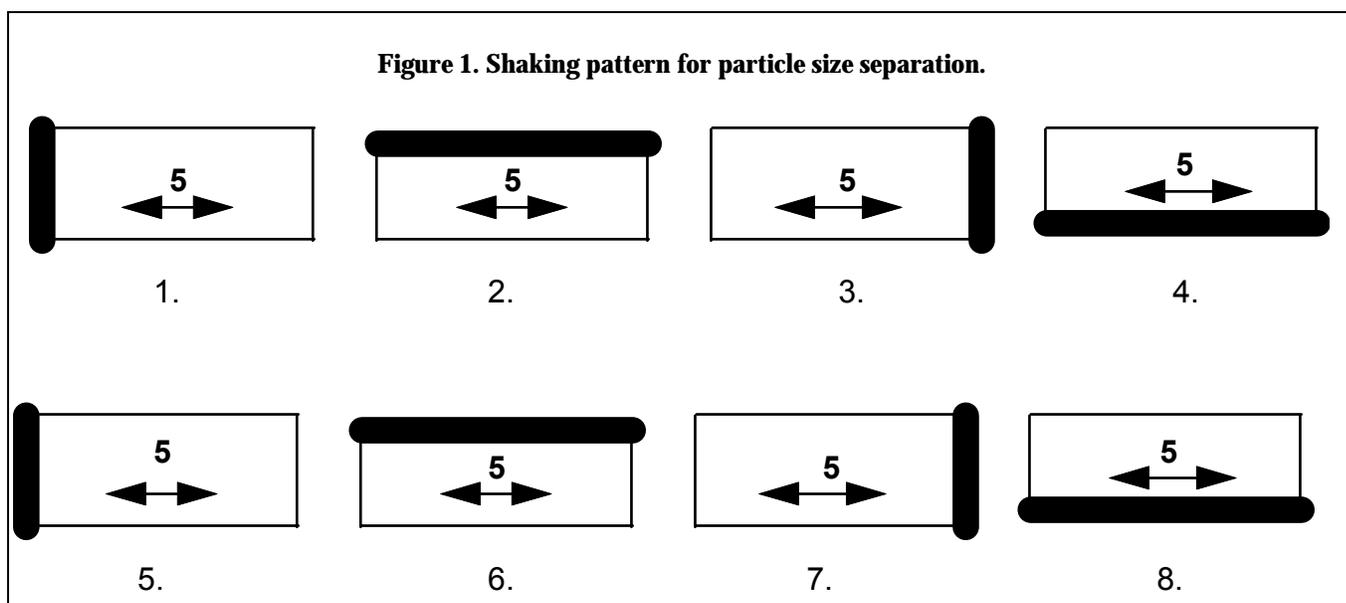
On Weibull paper, the horizontal axis is for particle size and the vertical axis is for cumulative percent undersized. The axes are not linear. For the example given in Table 2, the following deductions or statements can be made:

- approximately 8% of the feed is > 0.75 inches
- approximately 30% of the feed falls between 0.31 and 0.75 inches
- approximately 62% of the feed are < 0.31 inches

Another interpretation could be:

- approximately 97% of the feed are < 1.0 inch
- approximately 80% of the feed are < 0.50 inches
- approximately 48% of the feed are < 0.22 inches

This example would indicate a typical, well cut corn silage. This material can be used as a component of a forage-feeding program where another longer forage material is also used.



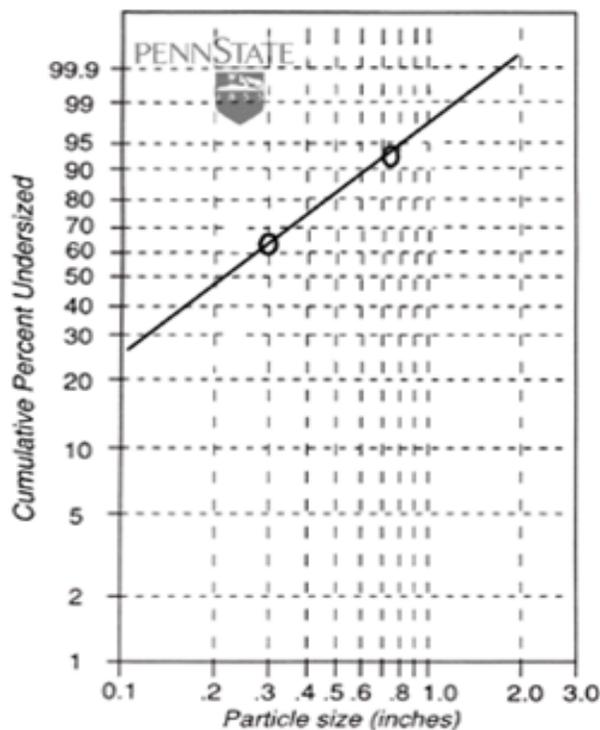
# PARTICLE SIZE SEPARATOR INSTRUCTIONS (CONTINUED)

**Table 2. Example on computing the total weight and percentages under each sieve.**

<u>Record data</u>			
Sample	Corn silage		
Upper sieve	20 grams	[a]	
Middle sieve	75 grams	[b]	
Bottom pan	155 grams	[c]	
<u>Compute total weight and percentages</u>		or	<u>Proportion remaining on each pan</u>
Total	250 grams	$[d = a + b + c]$	upper sieve 8%
% under upper sieve	92%	$[e = 100 \times (b + c)/d]$	middle sieve 30%
% under middle sieve	62%	$[f = (100 \times c)/d]$	bottom pan 62%

<sup>1</sup>The percentages are cumulative percent undersized. For example, on average, 92% of feed is smaller than 0.75 inches and 62% of feed is smaller than 0.31 inches.

**Figure 2. Weibull paper**



# PARTICLE SIZE EFFECTS ON THE DAIRY COW

---

The dairy cow's need for increasingly higher levels of energy have led to diets relatively high in concentrates. All silage diets have replaced diets high in long hay in today's larger herds and more mechanized farms. However, cows still require adequate fiber in the ration to function properly. When the minimum fiber levels are not met, cows often show one or more of the following metabolic disorders: reduced total dry matter digestibility, reduced milk fat percentage, displaced abomasum, and an increase in the incidence of rumen parakeratosis, laminitis, acidosis, and fat cow syndrome. Cows consuming sufficient NDF with finely chopped forage can also exhibit the same metabolic disorders as a diet deficient in fiber.

Adequate forage particle length is necessary for proper rumen function. Reduced forage particle size has been shown to decrease the time spent chewing and cause a trend toward decreased rumen pH. When cows spend less time chewing, there is a decrease in the volume of saliva produced needed to buffer the rumen.

It has been shown that insufficient particle size will decrease the rumen acetate to propionate ratio and pH, which will lower milk fat percent. When rumen pH falls below 6.0, the growth of the cellulolytic organisms are depressed, allowing for an increase in the propionate producing microbes decreasing the acetate to propionate ratio.

Reduced forage particle size increases dry matter intake, decreases digestibility, and results in less rumen solid retention time. Diets that have a smaller forage particle size enter the rumen at a smaller size after initial chewing and swallowing, and therefore leave the rumen at a faster rate. The result is an increase in the rumen turn over rate allowing for an increase in dry matter intake. Smaller forage particles spend less time in the rumen for microbial digestion, thereby reducing digestibility, particularly fiber digestion.

If rations or forages are too fine in particle size a small amount of long hay or balage can make improvements in achieving some long particles in the ration. Farms feeding 5 or more pounds of long hay per cow daily would not likely have problems with overall particle size. Many farms, however, do not have long hay as an option. In these situations, the distribution of the total ration particle size is likely more important than particles greater than a certain length.

Particle size analysis is not the end all for ration problems. It does give a way to measure this variable and to improve upon the overall nutrition of the dairy cow. Feeding a ration containing extremely fine particle size length with a small amount being greater than 0.75 inches is not recommended. Diets containing very fine particle size can predispose cows to rumen acidosis and other associated problems.

## RECOMMENDED FIBER INTAKES

---

Adequate NDF intake by the dairy cow is necessary for normal rumen function, production, and health. A majority of the NDF in the ration must be in the form of forage NDF along with sufficient ration

particle size to maintain a healthy rumen environment.

Under conditions where particle size is marginal, special attention must be paid to maintaining adequate levels of total NDF and forage NDF intakes (Table 3 and 4).

## RECOMMENDED FIBER INTAKES (CONTINUED)

Suggested ranges for total NDF should be at least 1.10 to 1.20 percent of body weight. Forage NDF intake can range from .75 to 1.10 percent of body weight.

However, if the forage or TMR particle length is too fine, then a higher minimum (> 0.85 percent of body weight) should be used in the ration.

**Table 3. Guidelines for forage NDF intake.**

Forage NDF as % of body weight <sup>1</sup>	Intake level
.75% <sup>2</sup>	Minimum if ration provides 1.30-1.40% total NDF by use of byproduct feeds.
.85% <sup>2</sup>	Minimum if ration provides 1.00-1.20% total NDF by use of grains or starchy feeds.
.90%	Moderately low
.95%	Average
1.00 %	Moderately low
1.10%	Maximum

<sup>1</sup>Forage dry matter intake should range between 1.40% to 2.40% of body weight regardless of forage NDF intake parameters.

<sup>2</sup>Higher minimum may be necessary if forage is chopped too fine.

**Table 4. Guidelines for total NDF and forage NDF intakes as a percent of the total ration dry matter when using low NDF concentrates.**

<u>Milk production</u>	<u>Total NDF intake</u>	<u>Forage NDF intake</u>
High (> 80 pounds)	28-32%	21-27%
Medium (60-80 pounds)	33-37%	25-32%
Low (< 60 pounds)	38-42%	29-36%

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# Penn State **Extension**

August 26, 2013

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## Penn State Particle Separator 2-Sieve Model (19 mm and 8 mm)

first available in 1996

### Recommended distribution of particle size (percent remaining on each screen) for corn silage, haylage, and TMR samples

Screen	Pore Size (inches)	Particle Size (inches)	Corn Silage	Haylage	TMR
Upper Sieve (19 mm)	0.75	> 0.75	2 to 4% if not sole forage 10 to 15% if chopped and rolled	10 to 20% in sealed silo 15 to 25% in bunker silo, wetter	6 to 10% or more 3 to 6%, focus on total NDF and forage NDF
Middle Sieve (8 mm)	0.31	0.31 to 0.75	40 to 50%	30 to 40%	30 to 50%
Bottom Pan		< 0.31	40 to 50%	40 to 50%	30 to 40%

Note: The recommendations for the percent remaining on the upper sieve vary depending on the conditions described in this table. Graphs on the following pages show boxes that indicate both recommendations. Users should consider their conditions and compare their results to the most appropriate “target” range.

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## Data Sheet For Forage and TMR Particle Size Analysis

Sample ID \_\_\_\_\_

### Weight of material retained on each sieve

Upper (a) \_\_\_\_\_

Middle (b) \_\_\_\_\_

Bottom Pan (c) \_\_\_\_\_

Sum of Weights  
[d = a+b+c] \_\_\_\_\_

### Calculations for percentage retained on each sieve

Upper [= a/d \*100] \_\_\_\_\_

Middle [= b/d \*100] \_\_\_\_\_

Bottom Pan [= c/d \*100] \_\_\_\_\_

### Calculations for percentage under each sieve

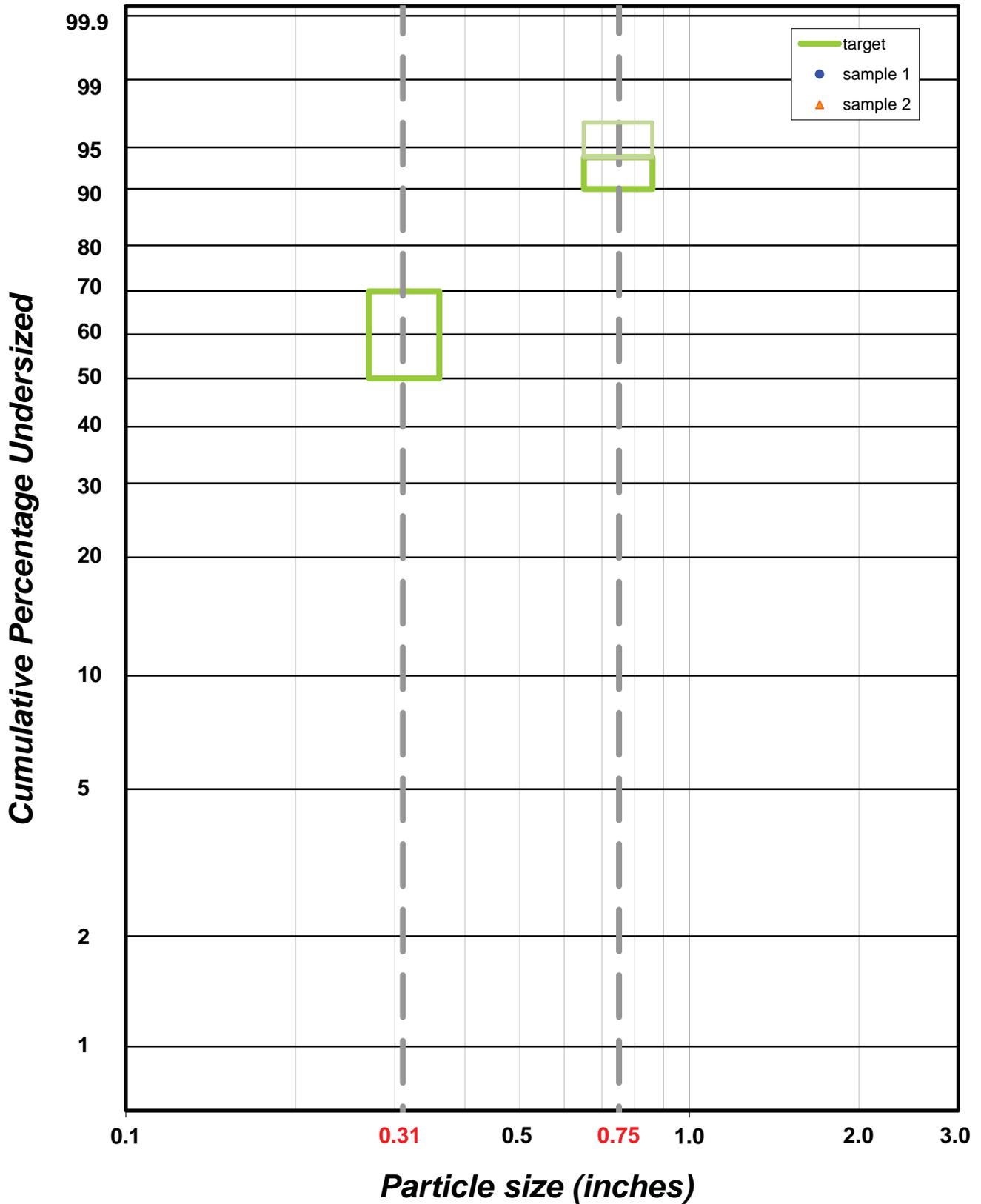
Upper Sieve  
[e = 100 - (a/d\*100)] \_\_\_\_\_

Middle Sieve  
[f = e - (b/d\*100)] \_\_\_\_\_



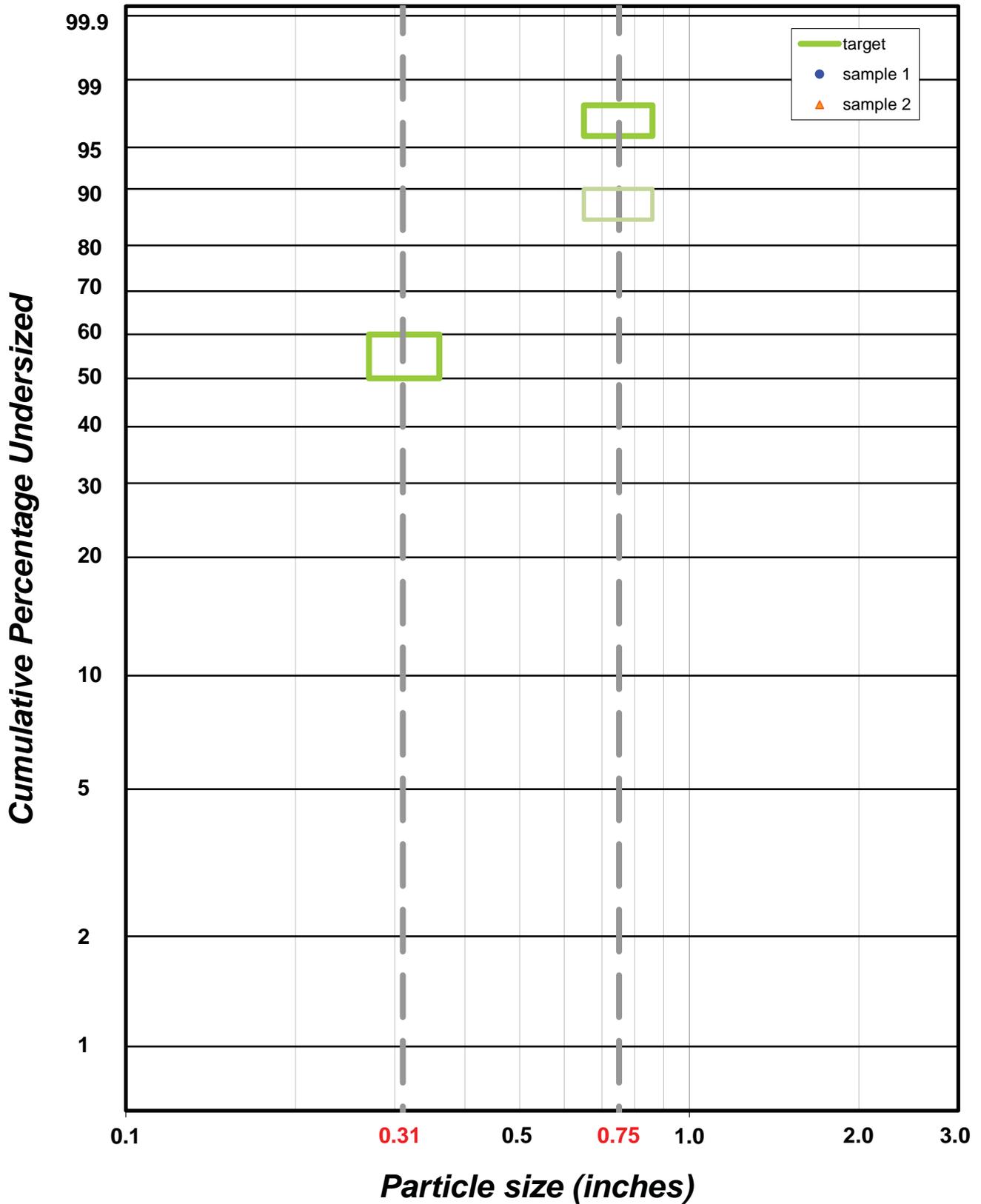
# TMR Particle Size Analysis

Penn State **Extension**



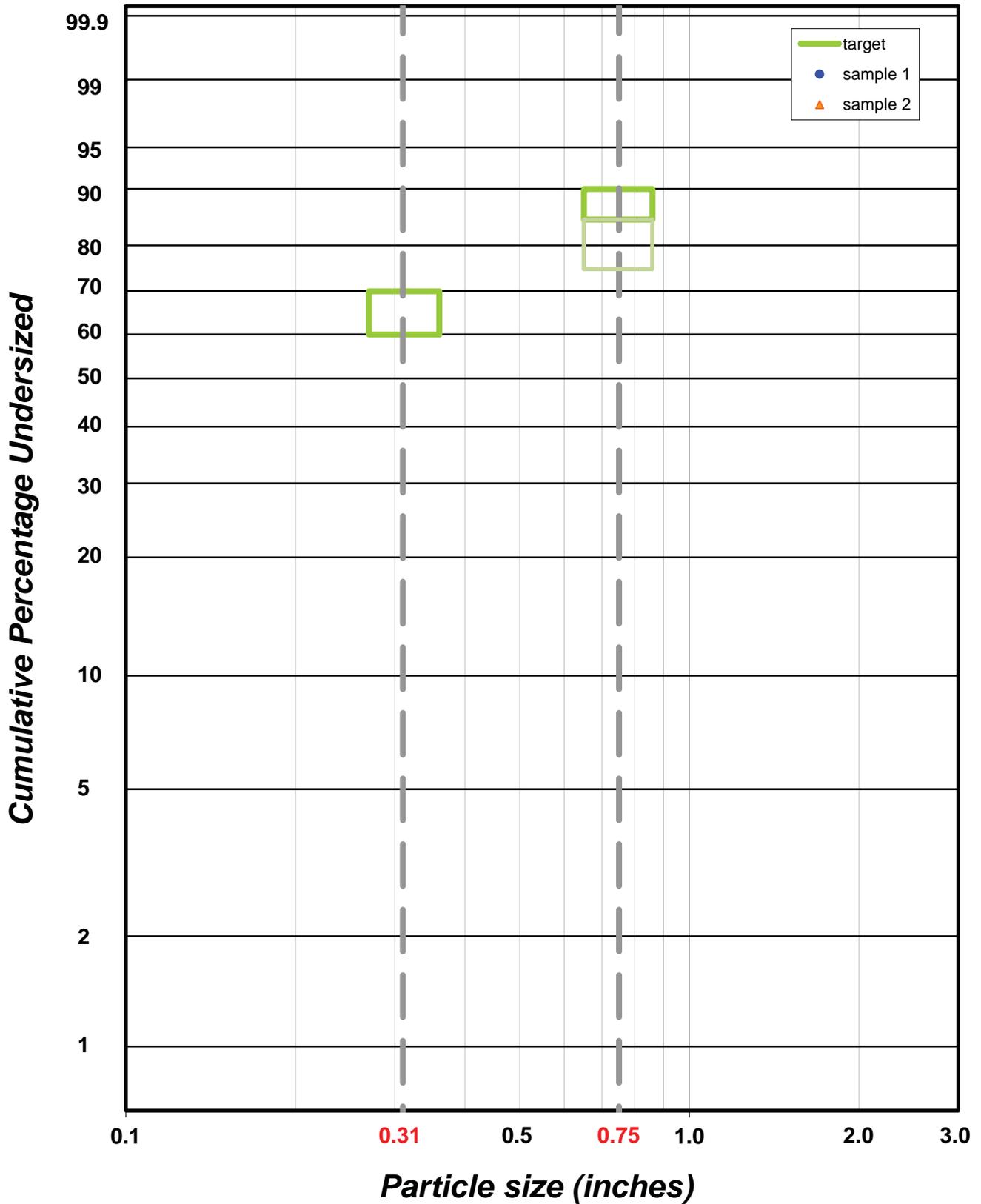
# Corn Silage Particle Size Analysis

Penn State **Extension**



# Haylage Particle Size Analysis

Penn State **Extension**



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