

# JAY•LOR<sup>®</sup> BECAUSE NUTRITION MATTERS.<sup>®</sup>

## OWNER MANUAL



5425TM  
5575TM  
5650TM  
5750TM  
5850TM  
51000TM  
51250TM

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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 Truck Mount 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 the manual, are as seen from the driver's seat and facing forward.

## 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 (**see section 4 for full warranty information**). 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 transporting 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.

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 for your Jaylor Product is shown in **Figure 1**. For easy reference, please write this information in **Section 7**.

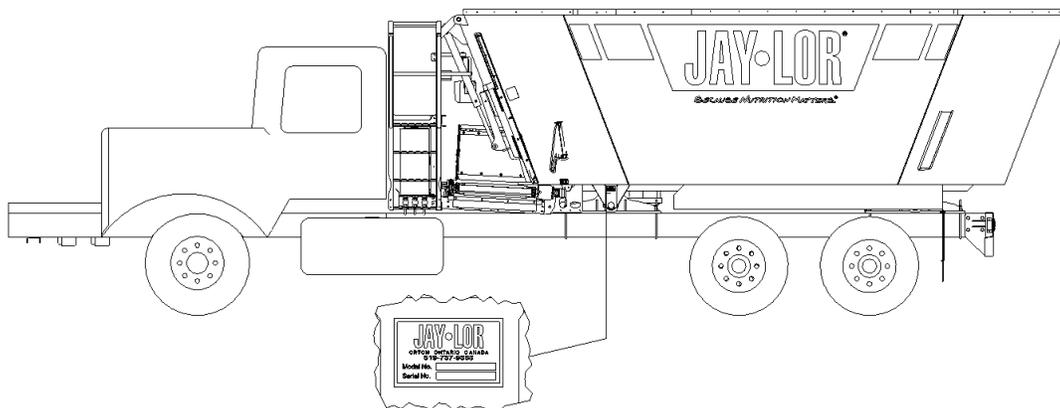


Figure 1 - Serial Number Location

**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, Hydraulic Motors, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 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, 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 is 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 fire. Store in a highly visible place.



Do not allow riders on the vertical mixer.



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



Place controls in neutral, stop engine, disengage power source, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing, or unplugging.



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.



Place controls in neutral, stop engine, disengage power source, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing, or unplugging.

-  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 allow riders on the machine during operation or transporting.
-  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.
-  Stay away from overhead power lines when loading. Electrocution can occur without contact.
-  Clean reflectors, lights and SMV signs, before transporting.
-  Follow all local laws and regulations when transporting the machine on public roads and highways.
-  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.
-  Support the machine with blocks or safety stands when changing tires or working beneath.
-  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.
-  Place controls in neutral, stop engine, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing, or unplugging.
-  Relieve pressure from the hydraulic circuit before servicing.
-  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 Tire Safety

-  Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion, which may result in serious injury or death.
-  Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.
-  Have a qualified tire dealer or repair service perform required tire maintenance.

## 8.9 Transport Safety



Make sure you are in compliance with all local regulations regarding transporting equipment on public roads and highways.



Make sure all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.



Do not allow anyone to ride on the machine. Any passenger must be safely secured with a working seat belt inside the cab.



Drive carefully and defensively at all times and especially when negotiating uneven or hilly terrain.



Watch for overhead obstructions. Stay away from power lines and low tree branches.

## 8.10 Storage Safety



Store unit in an area away from human activity.



Do not permit children to play on or around the stored machine.



Store the unit in a dry, level area. Support the machine with planks if required.

## 8.11 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

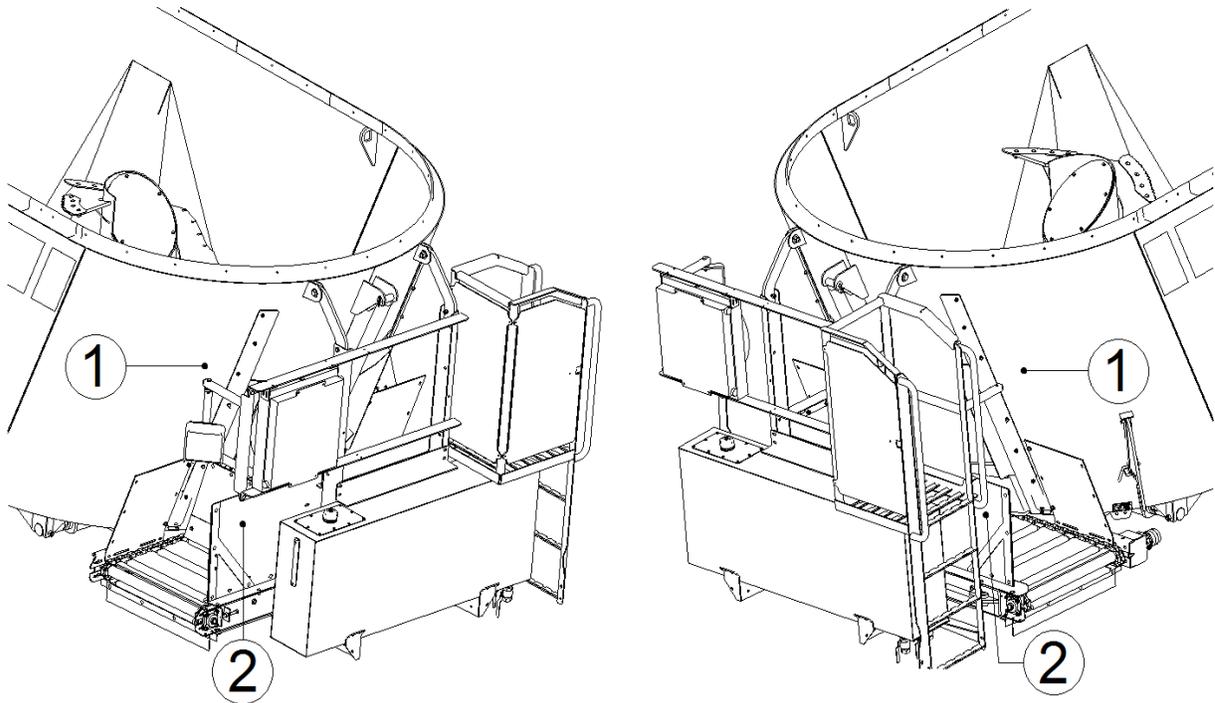


Figure 2 - Standard Safety Sign Locations

1. 'Danger' Rotating Auger Hazard and Pinch Point (Figure 3)\*
2. i. 'Warning' Rotating Part Hazard (Figure 4)
- ii. 'Warning' High Pressure Fluid Hazard (Figure 5)\*\*

\*This decal will always be located near every unloading door on the machine no matter the configuration

\*\*Also located on both sides of truck near the pump assembly



**Figure 3 - 'Danger' Rotating Auger Hazard and Pinch Point**



**Figure 4 - 'Warning' Rotating Part Hazard**



Figure 5 - '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 Truck Mount models are shown below:

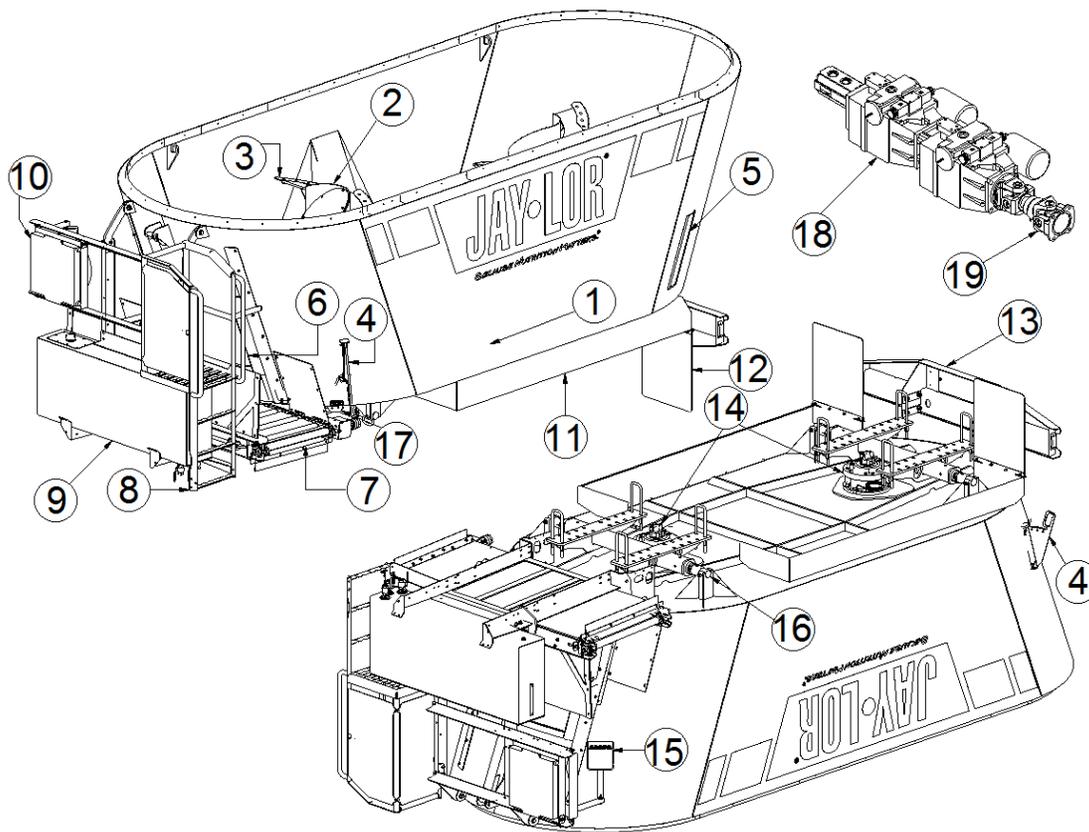


Figure 6 - Truck Mount Mixer Components

1. **Mixer Drum** – Contains the feed while it is cut and mixed by the vertical auger(s).
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 operators to safely view cutting and mixing action inside the drum.
6. **Unloading Door** – Opens hydraulically to allow feed discharge.
7. **Discharge Conveyor** – Depending on option chosen, the conveyor can be controlled hydraulically to discharge feed from one or both sides of the machine. Conveyor chain speed can be controlled on your control console located in the cab.
8. **Ladder** – Safe, elevated viewing platform to see into the drum.
9. **Hydraulic Oil Reservoir** – Holds excess hydraulic oil used to run pumps and auxiliary components such as the conveyor.
10. **Hydraulic Oil Cooler** – Keeps hydraulic oil at a suitable temperature for operation.
11. **Galvanized Fender** – Keeps mixer clean and helps protect internal components from road debris.

- 12. Mud Flaps** – Protects following traffic from dirt and debris off mixer tires.
- 13. Galvanized Bumper** – Houses lights to keep truck compliant with local traffic laws.
- 14. Hydraulic Motor and Gearbox Assembly** – Converts hydraulic pressure to turn augers at an optimal speed for mixing.
- 15. Electronic Scale Indicator** – Displays the feed weight inside the drum.
- 16. Weigh Bar** – Supports mixer drum and transmits weight reading to scale indicator.
- 17. Central Grease Location**
- 18. Proportional Hydraulic Pump** – Pressurizes hydraulic oil to power mixer components at a user-controlled speed.
- 19. Driveshaft** – Transmits power from engine to hydraulic pumps.

### 13. PRE-OPERATION CHECKLIST

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

#### Before operating the machine:

- Lubricate the machine as outlined in **Section 24.5**.
- Check the hydraulic system. Be sure that the hydraulic reservoir is filled to the required specifications.
- Ensure that the machine is properly attached to the truck chassis.
- Check that the valves at the oil tank outlets are fully open. Be sure there are no leaks in the system including the tank, fittings, couplers, valves or lines. Properly correct all leaks before continuing.
- Inspect all hydraulic lines, hoses, fittings, and couplers for tightness.
- Check the tires to be sure that they are inflated to the specified pressure. Check that wheel nuts are tight.
- Check that the auger rotates freely. Remove all string, twine, or other entangled material.
- Close and secure all guards and safety devices.
- Check that the machine is clean and free of debris.

## 14. BREAKING-IN

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

### 14.1 Before Starting:

- Check oil level and that the tank outlet valves are fully open.
- Ensure that the condition of the hydraulic oil is within the normal operation limits.
- Cycle the unloading door and conveyor several times to fully charge the hydraulic system with oil.
- 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.
- Follow any break-in guidelines as recommended by the truck manufacturer.

### 14.2 After Operating for ½ hour:

- Park mixer\*
- Check that all bolts and fasteners are all tightened properly as indicated in **Section 24.4**.
- Check the auger. 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.

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

- Park mixer\*
- Re-torque all fasteners and hardware.
- Check that auger turns freely.
- Check the auger. Remove all string, twine, or other entangled material.
- Proceed with normal servicing and maintenance schedule as defined in **Section 24**.



**IMPORTANT:** Check the torque of clamping assemblies daily during the break-in period. See **Section 24.14** for more information.



**\*IMPORTANT:** When parking the mixer, place on a flat, level surface, put controls in neutral, apply parking brake, stop engine, remove ignition key, and wait for all moving parts to stop. Be sure to let engine and hydraulic system cool to a safe temperature before servicing, adjusting or repairing any of these components.

## 15. CONTROLS

### 15.1 Weighing

#### 15.1.1 Scale System Overview

- The scale system on all models includes 4 weigh-bars. The weigh-bars electronically measure the amount of ration inside the mixing chamber.

#### 15.1.2 Indicator Mounting and Adjustment

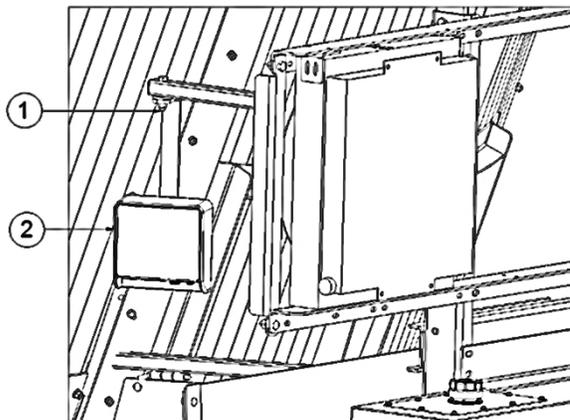
- There are various scale indicators available for use on your Jaylor however the mounting assembly for most scale indicators is the same. When attaching the indicator to the machine, be sure that it is securely fastened. Typically, the indicator slides down into the mounting bracket and a wire or plastic fastener is used to secure the indicator to the mounting bracket.
- To adjust the direction of the indicator display face, see **Figure 7**.

#### 15.1.3 Indicator Connections

- On the bottom of the indicator are outlets for attaching the weigh-bar cords. These 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 is 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.
- Typically, the mixer weigh-bars are plugged into a junction bar and then a single line is run into the scale head in the cab. The power cord is run to a power connection in the cab from the vehicle's electrical system. This should be a 12-volt negative grounded power supply.

#### 15.1.4 Remote Indicator (Optional)

- This indicator is usually placed such that it can be viewed 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 as described earlier. The remote indicator attaches to the main indicator via a cable or wirelessly. Like all of the other connections, ensure the plugs are free from moisture and other contaminants as this will affect the performance of the weighing system.



1. **Swivel Joint** – Swivel joint lock nut should be snug enough to hold the indicator in position but not too tight to be turned by hand. The indicator can then be rotated to face any direction.
2. **Scale Indicator**

**Figure 7 - Scale Indicator Adjustment**

**Note:**

- *The scale will be 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 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 cutting aggressiveness. Proper blade position is determined by the operator's preference.

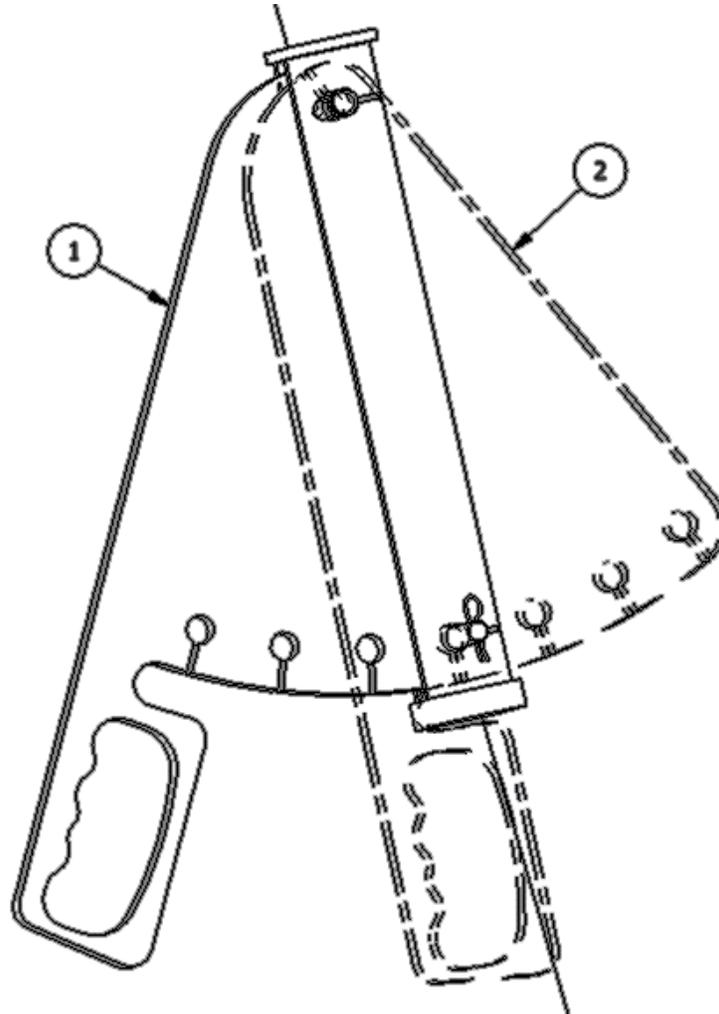


Figure 8 - Restrictor Blades

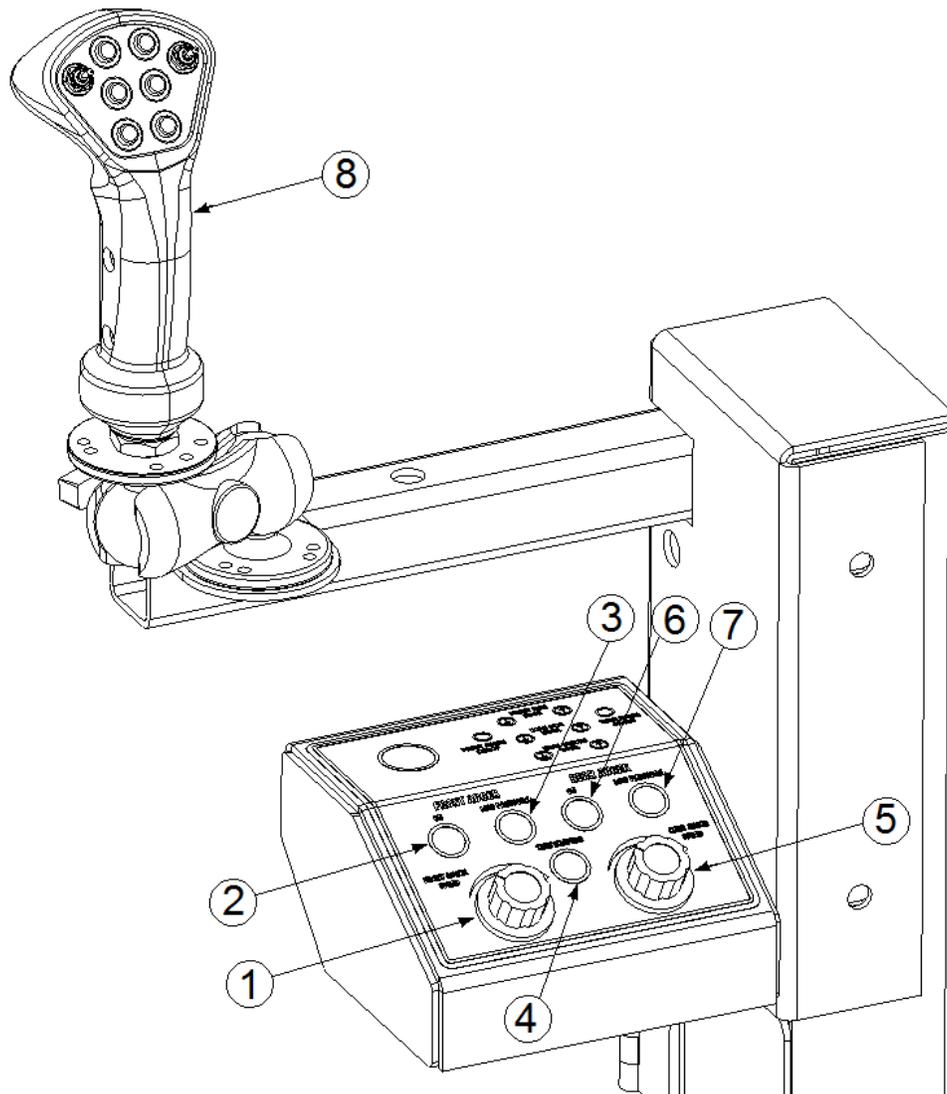
1. "OUT" Position
2. "IN" Position



**IMPORTANT:** Position the Restrictor Blades in the 'IN' (retracted) position during transportation of the machine to reduce overall width.

### 15.3 Control Console and Joystick

The control console for the mixer is located inside the truck cab. The joystick is where the augers can be independently switched on and off and where all doors are raised and lowered. The control console consists of temperature and pressure warning lights as well as independent speed controls for the augers. **Figure 9** depicts the layout of the console for proper operation of the mixer.



**Figure 9 - Standard Control Console**

1. Front Auger Speed Control
2. Front Auger ON Indicator Light
3. Front Auger Low Pressure Warning Light
4. System Overheating Warning Light
5. Rear Auger Speed Control
6. Rear Auger ON Indicator Light
7. Rear Auger Low Pressure Warning Light
8. Joystick Control (on applicable configurations)

## 16. DOOR CONFIGURATIONS

### 16.1 Front Center Discharge

The front discharge door is controlled hydraulically from the control console in the truck cab. The door is opened to allow feed out of the mixing chamber onto the conveyor. The door, on all models, excluding low-profile, can be raised up to a maximum of 32 inches (81 cm) in height.

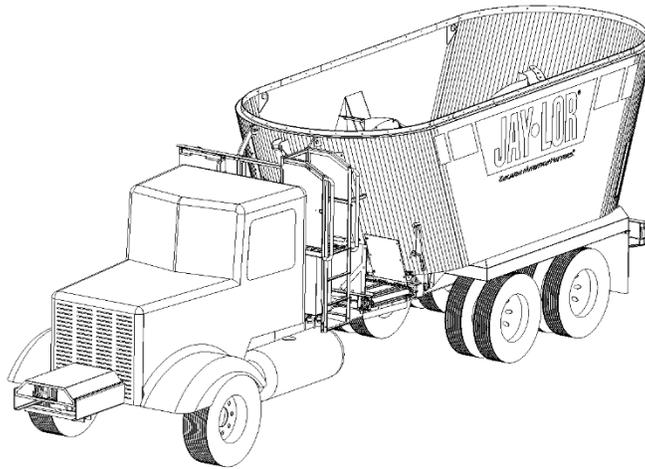


Figure 10 - Front Door Configuration

### 16.2 Rear Door Discharge

The rear discharge door is controlled hydraulically from the control console in the truck cab. On most units, the rear door option is equipped in addition to the front discharge door option. The door, on all models, excluding low-profile, can be raised up to a maximum of 32 inches (81 cm) in height.

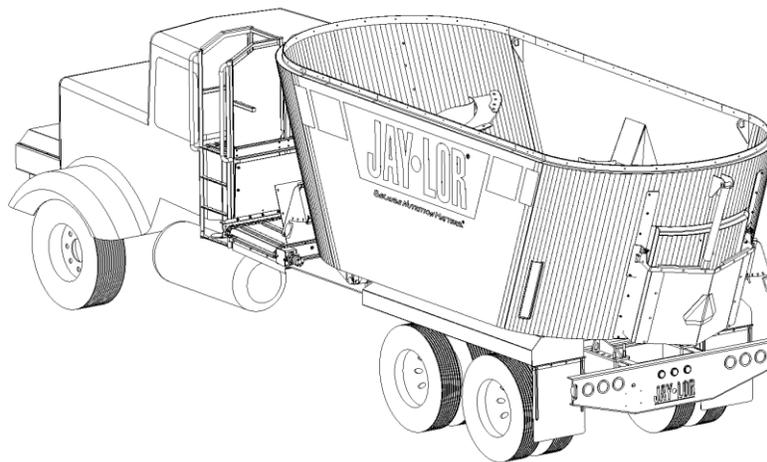
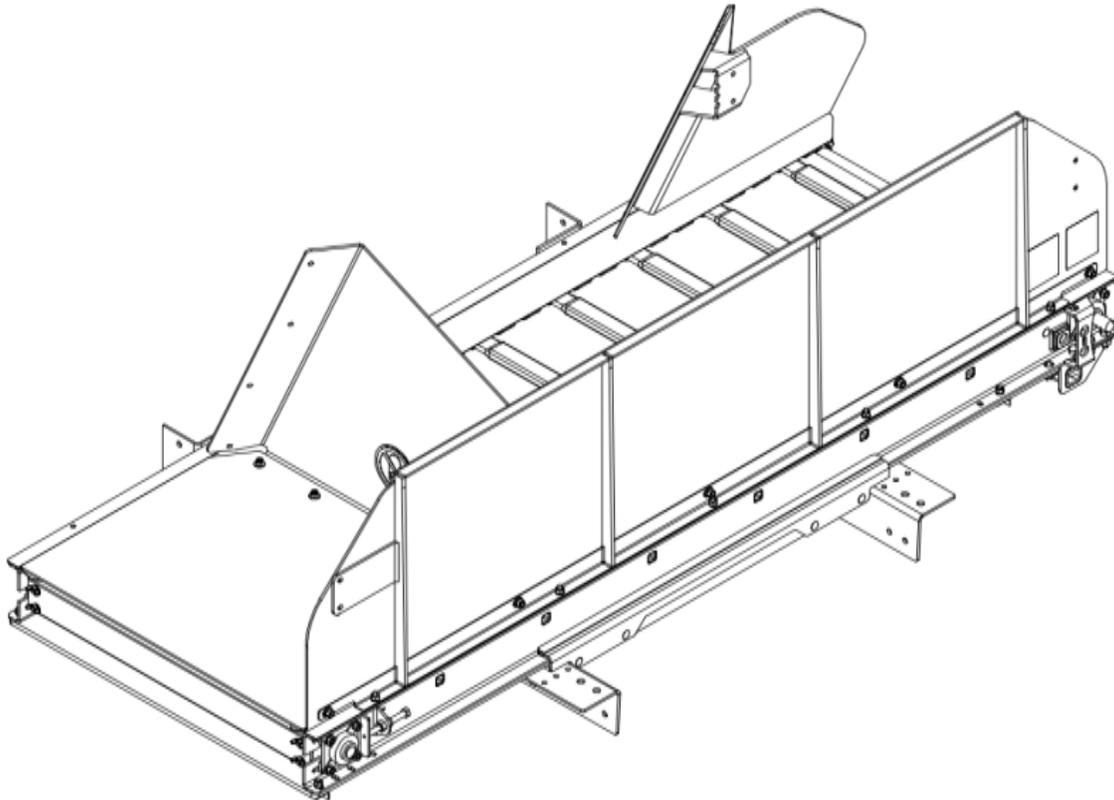


Figure 11 - Rear Door Configuration

## 17. CONVEYOR

A front discharge mixer will come with an 8ft 6in telescopic conveyor for feed discharge. The conveyor is available with right, left or dual discharge options. On machines equipped with dual side unloading, the conveyor will unload on either side of the machine. The conveyor is operated by using the controls on the console in the truck cab. The conveyor will reverse from its direction of discharge, when the remote is moved to the opposite position.



**Figure 12 - 8ft 6in Slide Single Discharge**

## 18. HYDRAULIC SYSTEM

### 18.1 Hydraulic Pumps

The augers are powered by hydrostatic pumps which are attached together and powered by a single driveshaft from the engine. The pumps can be set for either CCW (counter clock wise) or CW (clock wise) rotation. Typically, a CCW pump is installed if the pumps are mounted in front of the engine (FEPTO) and a CW pump is used if the pumps are installed behind the engine (REPTO).

Each hydrostatic pump is actuated by an electric solenoid valve which is switched from the in-cab console.

Each hydrostatic pump is equipped with a spin-on filter. See **Section** □ for filter replacement type and general maintenance schedule.

### 18.2 Auxiliary Pump

Located on the end of the hydrostatic pump is a double auxiliary hydraulic gear pump. This pump is powered by the main driveline for the machine which ensures hydraulic power is available at all times, provided that the truck engine is running.

The auxiliary pump provides hydraulic fluid power to components such as the unloading door, discharge conveyor and oil cooler fan.

The auxiliary pump is designed for minimal maintenance and service. See **Section** □ for maintenance information.

### 18.3 Hydraulic Reservoir

A hydraulic oil reservoir is located at the front of the machine behind the truck cab. Always keep the reservoir at least  $\frac{3}{4}$  full of hydraulic oil. At no time is the fluid level to be lower than the minimum level on the tank indicator as damage to the hydraulic system will occur. If the fluid level is higher than the maximum level, fluid may overflow the reservoir and cause fluid loss. Check the fluid level in the reservoir daily and replace with recommended oil as needed. The reservoir has a breather cap located on the top of the unit, which must be attached to the reservoir at all times during operation. The breather is removable, to allow filling of the reservoir. Replace the breather **every 6 months** or earlier if the replacement indicator LED is blinking. See **Section 24.11** for replacement instructions.

The reservoir outlet lines are equipped with external shutoff valves. This is a service feature and can be closed or shut-off so that items such as filters can be serviced without draining the hydraulic system oil.

### 18.4 Electric Solenoid Hydraulic Valve Controls

Depending on the machine, located either under the conveyor or underneath the front of the drum, usually on the driver's side, are the electric solenoid valve controls. Depending on options equipped with the machine, there may be 3 or 4 electric solenoid hydraulic valves banked onto an aluminum block manifold. Hydraulic fluid power supplied by the auxiliary pump enters the aluminum block manifold. The hydraulic flow is divided to the different circuits found on the machine (e.g. discharge door, conveyor). The valves are controlled electrically from the control console located in the truck cab.

## 19. FIELD OPERATION

### 19.1 General

Mixer operation will differ greatly with the various feeds and climatic conditions. In most instances “trial and error” is the best method of setting up the machine 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. Starting the augers from a standstill with a full load in the mixing chamber places additional stress on the machine which may affect the service life of the mixer. If 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 augers should not mix at a speed greater than 41rpm.

The type of mix required varies from one operation to another therefore mixing time and procedure 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 the rations as well as the regular use of a particle separator to ensure accuracy of mix. For your convenience, a Jaylor Particle Separator, based on the Penn State Particle Separator, is provided with your machine. Included at the back of this manual is an article which describes how to use the separator and interpret your results. 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 mixer is parked on a flat, level surface, all controls are in neutral, parking brake is applied if equipped, engine is stopped, ignition key is removed, and all moving parts have stopped. 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 park or load 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 this procedure 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. Transport the machine to the feed storage area.
4. Always follow this procedure when **starting** the machine to minimize high startup loads:
  - a. Start the engine and run at low speed.
  - b. Engage the hydraulic pumps to start the auger.
  - c. Increase engine speed until the desired RPM is reached.
  - d. Proceed with loading of the ration.
5. Loading Feed Rations:
  - a. Position the mixer where the loading machine has clear and easy access.
  - b. Begin adding ingredients to the mixing chamber in order to cut and mix a uniform feed ration.
  - c. When adding ingredients, watch the numbers on the scale indicator to monitor the weight of each ingredient as they are added.
  - d. Mixing time 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.
6. Stopping:
  - a. Stop forward motion.
  - b. Close unloading door.
  - c. Stop conveyor when commodity is off.
  - d. Slow engine to low idle.
  - e. Disengage hydraulic pumps.
  - f. Stop engine if required.



**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.*



**IMPORTANT:** *If an emergency should arise, turn hydraulics off, stop forward motion and stop engine immediately.*



**IMPORTANT:** *Rapid engagement under a heavy load can cause damage. Engage slowly for the best results.*



**IMPORTANT:** *Always remove twine, string, and wrapping material from bales and/or other commodities from the ground that will be loaded into the mixing chamber. Failure to follow these requirements can cause damage to the machine.*



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

### 19.3 Mixing Tips

- Place the light, fluffy and least dense ingredients into the machine first. In that way, the heavier and denser material added later will push the light material into the auger. 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 auger for 3 to 5 minutes after the last ingredient has been added and 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.

## 19.4 Unloading Procedure

Follow these guidelines when unloading the machine:

1. Transport the machine to the feeding area.
2. If not already done, engage the hydraulic pumps to start auger rotation.
3.
  - a. For models equipped with front discharge use a combination of the opening of the unloading door, speed of the conveyor, and ground speed to distribute the feed mixture to the desired areas. Follow this order:
    - i. Start the conveyor
    - ii. Raise the unloading door
    - iii. Start the auger if not already turning
    - iv. Drive along feeding bunk/area to unload the feed mixture
  - b. For models equipped with center side or corner door discharge use a combination of the opening of the unloading door and ground speed to distribute the feed mixture to the desired areas. Follow this order:
    - i. Raise the unloading door
    - ii. Start the auger (if not already moving)
    - iii. Begin driving along feeding area to unload the feed mixture
4. Monitor scale indicator readings to evaluate ration distribution to unloading areas.
5. Continue unloading until mixing chamber is empty or desired amount of mixed ration has been unloaded.



**IMPORTANT:** *It may be necessary, in order to completely empty the mixer of all commodities, to turn the auger at the fastest speed possible. This will propel the feed that is resting on the auger off its flights, and allow the auger to unload this.*

## 19.5 General Mixing Issues

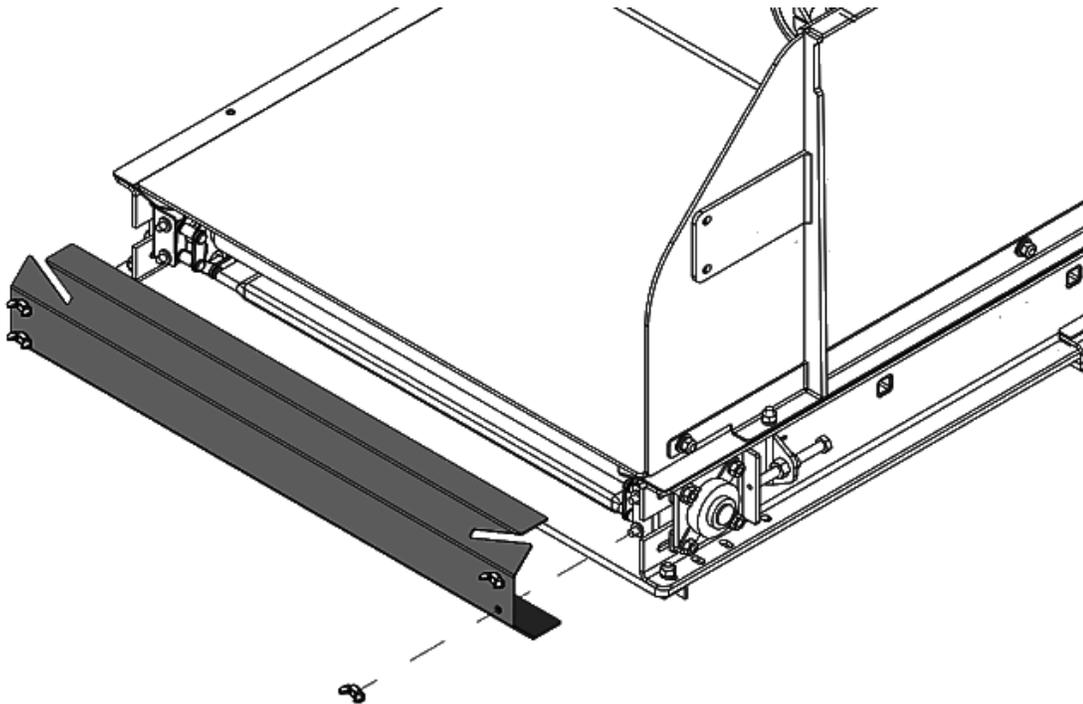
The following are some problems which the operator may be faced with at some point during cutting and mixing. Remember, when performing any work on the mixer always park it on a flat, level surface, put controls in neutral, apply the parking brake, stop the engine, remove the ignition key, and wait for all moving parts to stop. Once it has completely stopped follow the below recommendations given to remedy the problem.

**Think SAFETY! Work SAFELY!**

### 19.5.1 Feed Clogging

There are two common places that the feed will tend to clog. They are listed below along with guidelines for unclogging:

1. The unloading door
  - Open the door wider if possible and proceed with manual clean out
2. In the boot of the conveyor (only on left or right discharge options)
  - **Figure 13** shows where to open the conveyor to clean it out



**Figure 13 - Conveyor Boot**

### ***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 and the auger is fully stopped with the truck off and parked the mixer 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.*



***CAUTION:*** *When in the mixing chamber take care not to come in contact with knives. Contact with a knife could result in a deep laceration and severe hemorrhaging.*

## 20. TRANSPORTING

The machine is designed to be easily and conveniently moved from one location to another. The following outlines the procedure for securing and transporting these models:

**Think SAFETY! Work SAFELY!**

1. Always comply with the rules and regulations governing the transporting of agricultural equipment on highways.
2. Make sure all bystanders are clear of the machine and that there are no riders on the machine.
3. Make sure all the lights and reflectors that are required by the local highway and transport authorities are in place, clean, and visible by all overtaking and oncoming traffic.
4. Retract the conveyor so that it is centered on the chassis.
5. It is not recommended that the unit be transported for long distances when the mixing chamber is fully loaded. Transporting will compact the mixture and can make startup difficult.
6. Never transport faster than the road or terrain conditions will allow you to do safely.
7. **Do not allow riders on the machine.**

## 21. 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, axles, hubs, or shafts. 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. This includes the discharge door cylinder and the conveyor slide cylinder.
7. Touch up all paint nicks and scratches to prevent rusting.
8. Move the machine to its storage position.
  - Select an area that is dry, level, and free of debris.
9. Block the wheels on the machine.
10. 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 removing material, always place controls in neutral, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before removing material. Failure to follow these safety precautions can result in serious injury or death.

## 22. 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 24** 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, please have this manual and the serial number from your machine ready.

<b>PROBLEM</b>	<b>POSSIBLE CAUSES</b>	<b>POSSIBLE SOLUTIONS</b>
Material wraps around knives	<ul style="list-style-type: none"> <li>- Knives dull or worn out</li> </ul>	<ul style="list-style-type: none"> <li>- Check auger, remove entangled material</li> <li>- Check knife condition. Replace any worn, bent, and/or damaged knives</li> </ul>
Conveyor doesn't move	<ul style="list-style-type: none"> <li>- Insufficient oil flow</li> </ul>	<ul style="list-style-type: none"> <li>- Increase oil flow at the control console</li> <li>- Check oil level in hydraulic oil reservoir. Add as required</li> </ul>
	<ul style="list-style-type: none"> <li>- Cold temperatures</li> <li>- Conveyor slats frozen down</li> </ul>	<ul style="list-style-type: none"> <li>- Warm machine before operating</li> </ul>
	<ul style="list-style-type: none"> <li>- Conveyor jammed</li> </ul>	<ul style="list-style-type: none"> <li>- Clear material out of slat pathway underneath the conveyor assembly</li> </ul>
'Dead Spot' during mixing.	<ul style="list-style-type: none"> <li>- Material will not mix in certain locations inside the mixing chamber, commonly the front and back areas of the mixing chamber</li> </ul>	<ul style="list-style-type: none"> <li>- Make sure the machine is level when mixing.</li> <li>- Check condition of all knives. Replace accordingly</li> </ul>
Auger stops rotating during mixing	<ul style="list-style-type: none"> <li>- Auger jammed</li> </ul>	<ul style="list-style-type: none"> <li>- Clear packed material and resume mixing</li> </ul>
	<ul style="list-style-type: none"> <li>- Leading edge of auger digging into drum floor</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust auger height</li> </ul>
Visible deformation, wear or failure of driveline	<ul style="list-style-type: none"> <li>- Extreme load</li> <li>- Contaminants (sand, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Replace damaged components with Jaylor recommended parts</li> </ul>

## 23. STANDARD MODEL SPECIFICATIONS

### 23.1 5425 Truck Mount Mixer

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	450cu.ft. (12.7 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>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	250+ HP

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

### 23.2 5575 Truck Mount Mixer

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	475 cu.ft. (12.7 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>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	250+ HP

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

**23.3 5650 Truck Mount Mixer**

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	650 cu.ft. (18.4 m <sup>3</sup> )
<b>Auger Assembly</b>	Features	Complete w/ 18 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	300+ HP

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

**23.4 5750 Truck Mount Mixer**

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	740 cu ft. (21 m <sup>3</sup> ) (w/ Standard 12" Ext.)
<b>Auger Assembly</b>	Features	Complete w/ 18 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	300+ HP

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

**23.5 5850 Truck Mount 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/ 18 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	335+ HP

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

**23.6 51000 Truck Mount 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/ 22 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	410+ HP

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

**23.7 51250 Truck Mount Mixer**

<b>Main Component</b>	<b>Detail</b>	<b>Specification</b>
<b>Mixing Chamber</b>	Capacity	1125 cu.ft. (31.9 m <sup>3</sup> )
<b>Auger Assembly</b>	Features	Complete w/ 22 Tungsten Carbide Cutter Blades per Auger
<b>Frame</b>	Features	Heavy duty, with provision for 4-point weigh scale system.
<b>Conveyor Assembly</b>	Width and Type	36" (91 cm) wide, chain/slat discharge, 8' 6" length dual, left or right discharge options
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
<b>Drivetrain</b>	Driveshaft	1410 driveshaft
	Working range	1500 to 1600 RPM
	Horsepower Requirement	410+ HP

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

## 24. 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 the product. By following a careful service and maintenance program for your machine you will enjoy many years of trouble-free service. In some cases, the maintenance required 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 in **Section 25**.

### Note:

- *All information provided in this section is for maintenance and service of your Jaylor mixer. Maintenance on the truck should be accounted for when creating your maintenance schedule. Consult the manual provided by your truck manufacturer.*

### 24.1 Maintenance Safety



#### SAFETY FIRST:

1. Follow ALL the operating, maintenance and safety information in the manual.
2. Support the machine with blocks or safety stands when changing tires or working beneath.
3. Follow good shop practices.
4. Use only tools, jacks and hoists of sufficient capacity for the job.
5. When parking mixer, place on a flat, level surface, put controls in neutral, apply parking brake, stop engine, remove ignition key, and wait for all moving parts to stop. Be sure to let engine and hydraulic system cool to a safe temperature before servicing, adjusting or repairing any of these components.
6. Make sure all guards are in place and properly secured when maintenance work is completed.
7. Before applying pressure to a hydraulic system, make sure all lines, fittings, and couplers are tight and in good condition.
8. Keep hands, feet, hair, and clothing away from all moving and/or rotating parts.
9. Clear area of bystanders (especially small children), when carrying out any maintenance, repairs, adjustments or testing.

### 24.2 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.

### 24.3 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 to incorporate truck maintenance into the schedule. Please refer to the maintenance and service manual provided by the truck manufacture for direction when creating the schedule.

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

## 24.4 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

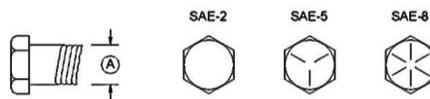


Figure 14 - Imperial Bolt Specifications

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 15 - Metric Bolt Specifications

The 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.

## 24.5 Fluids and Lubricants

### 24.5.1 Oil

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)

Hydrostatic Pump Drive System and Auxiliary Pump System

The hydrostatic system on the Jaylor Truck Mount will require hydraulic oil having this specification:

#### ISO 46W HYDRAULIC OIL

The type of hydraulic oil specified is recommended for all heavy-duty hydraulic applications requiring excellent wear protection. This oil has excellent thermal stability and oxidation life, which extends drain intervals and protects against corrosion and varnish.



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



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



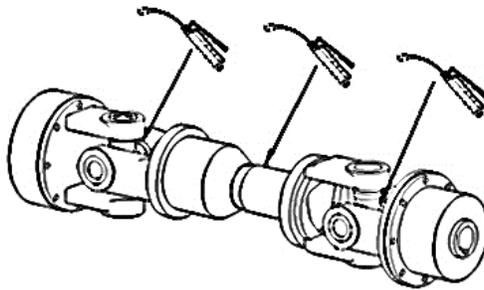
**IMPORTANT:** If it is necessary to add oil frequently to maintain the required oil level, this indicates a leak in the system. Determine the source of the leak and correct before continuing to operate the machine. Contact your Jaylor dealer or distributor should you require assistance.

### 24.5.2 Greasing

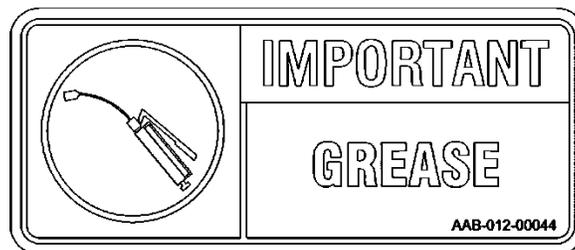
Use **Section 25** to keep a record of all scheduled servicing. Unless specified otherwise, components should have one pump of grease after every 16 loads or 50 hours. Use SAE multi-purpose high temperature grease with extreme pressure (EP) characteristics on all areas requiring grease lubrication.

All Jaylor Truck Mount models are equipped with a driveshaft assembly that transmits power from the truck engine to the hydrostatic pump drive system. Depending on the model and options specified, grease locations will vary. Grease is required at each cross or 'u'-joint found on the driveshaft. Grease is also required on the telescopic tube assembly. Crosses and telescopic tube assemblies will require **1 pump every 16 hours and/or 50 loads**. Refer to the diagrams that follow 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.

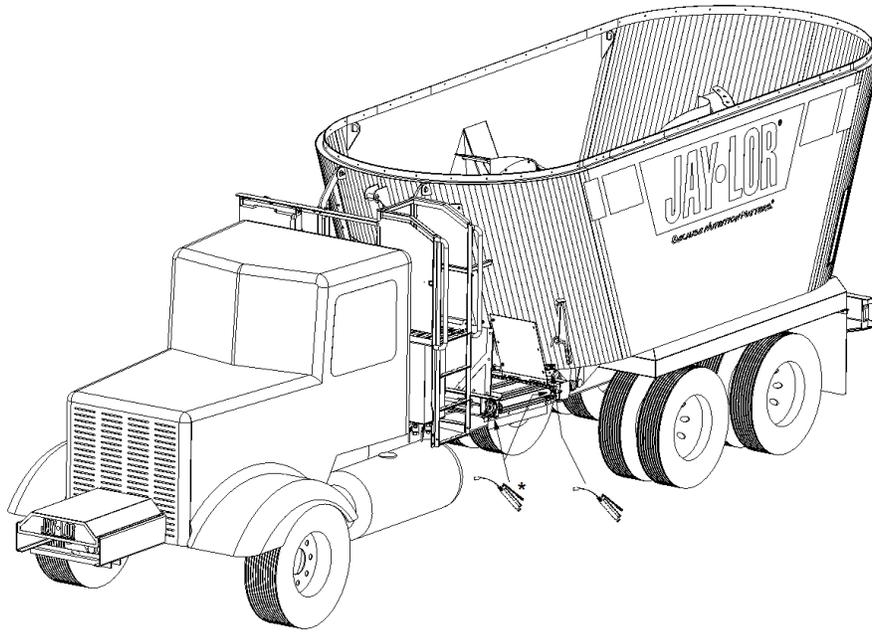


**Figure 16 - Grease Location on Driveshaft**



**Figure 17 - Central Grease Decal for Tower Gearbox Lubrication  
(Location Labeled in Figure 18)**

\* - Gearbox should be greased 1 pump every 8 hours or 25 loads



**Figure 18 - Grease Points on Truck Mount Mixer**

*\* there are two bearings opposite the two in view for a total of four bearings*

When creating a maintenance schedule please keep in mind:

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

## 24.6 Unloading Conveyor

Jaylor mixers with a front center discharge are equipped with a hydraulically powered chain slat conveyor for unloading and distributing the mixed rations to the feeding area.

### 24.6.1 Conveyor Chain Tension

To adjust the conveyor chain tension, follow this procedure:

1. Ensure the area is clear of bystanders.
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. Proper Chain Tension:
  - a. The chain is set at the proper tension when it runs without jumping the drive sprockets.
  - b. Pull up at the center of a span; the chain should come up approximately 1-1/2 inches (38 mm) when the chain tension is properly set.
4. Adjusting Chain Tension: **(Figure 19)**
  - a. Loosen jam nuts on adjusting bolt.
  - b. Loosen bearing housing anchor bolts.
  - c. Slide or tap housing to the required position. Use adjusting bolt to move housing if required.
  - d. Repeat with other housing (on opposite side of conveyor).
  - e. Tighten bearing housings anchor bolts to their specified torque.
  - f. Tighten adjusting bolt jam nuts to their specified torque.

**REMEMBER:** Always move both ends of shaft the same amount to keep it parallel to the chain slats.

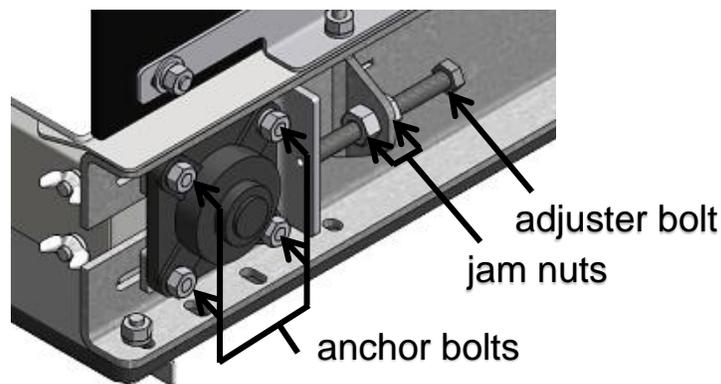
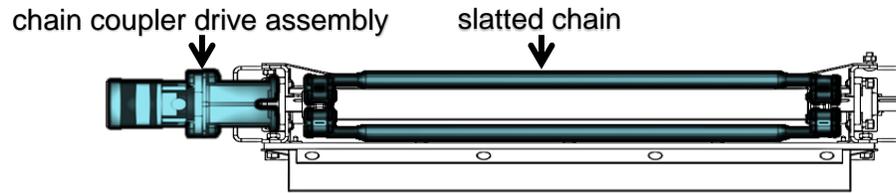


Figure 19 - Chain Tension Adjustment

### 24.6.1 Chain Coupler Assembly

All unloading conveyors are equipped with a chain coupler drive assembly, which connects the output shaft of the hydraulic motor to the driveshaft assembly on the conveyor. Periodically inspect the condition of the chain coupler and components. Apply a light coating of grease to the chain coupler assembly to keep rust and other contaminants from deteriorating them.

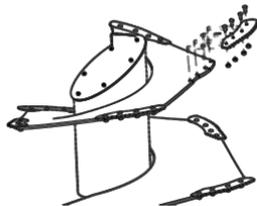


**Figure 20 - Conveyor Chain Coupler**

## 24.7 Knives

Every Jaylor is designed with a vertical auger that is equipped with knives for cutting 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 keep it sharp.



**Figure 21 - Auger and Knife Assembly**

Knife wear is greater on the knives located near the bottom of the auger than those found near the top of the auger. To extend the service life of the knives, rotate the lower knives with the upper knives. This way all knives will have a chance to wear evenly to a point where they will all need to be replaced.



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

## 24.8 Filtration

The hydrostatic drive system on your Jaylor requires proper filtration and regular service to sustain the duty life of the system. **Use only the correct replacement hydraulic filters** when servicing.

### 24.8.1 Filter Replacement Instructions

1. Make sure that the filter housing and filter are clean and free of any debris and/or contaminants.
2. Make sure that the replacement filter is the correct type for the application.
3. Place a large drain pan or pail underneath the filter housing.
4. Using a filter wrench, remove the filter by turning the filter body counterclockwise until it is free from the housing.
5. Allow sufficient time for any oil in the surrounding hoses to drain into the pan or pail. Allow oil to drain out of the filter itself.
6. Visually inspect the condition of the filter. Determine if any further servicing of the hydraulic system is required.
7. Dispose of the used oil in an environmentally safe manner.
8. Lubricate the top O-ring seal of the replacement filter with oil to ensure a smooth and tight seal upon contact with the filter housing.
9. To assist in preventing air locks in the hydraulic system, fill the filter with hydraulic oil, prior to attaching to the housing. This will also lubricate the filtering media inside the filter.
10. Turn the filter body onto the housing clockwise until it is hand-tight on the housing.
11. Top up the hydraulic oil reservoir with oil if necessary.
12. Follow all instructions outlined in the operator's manual and startup the hydraulic system and run. Check for and repair any leaks that may arise.



**IMPORTANT:** When replacing, inspect the filter for excessive contamination. Often, a severely contaminated filter is indicative of required servicing of the hydraulic system.

### 24.8.2 Charge Pump Pressure Filters

The Sauer Danfoss 90 Series Tandem Pumps each include an integrated pressure filter incorporated into the charge pump filter assembly. The filter is a 'spin-on' type of filter that will need replacement. **Replace this filter element after 50 hours of break-in use and every 250 hours thereafter.**

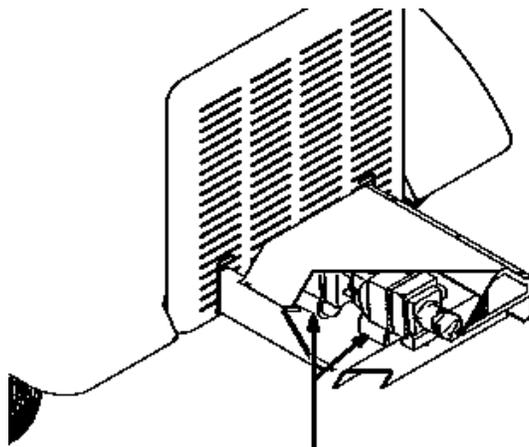


Figure 22 - Charge Pump Filter Location on FEPTO Truck Mount

**Filter Specification (Charge Pump Pressure Filter)**

The replacement charge pump pressure filter for the hydraulic system is as follows:

**Arlon® Brand – Code #CG46-CC16**

This part can be ordered using Jaylor Part Number #AAB-009-00362

<b>Cross-reference Chart for Equivalent Replacement Charge Pump Pressure Filters</b>	
<b>Brand:</b>	<b>Part Number:</b>
Baldwin	BT-748
Baldwin	BT-8840-MPG
Donaldson	P16-4375
Donaldson	P17-5910
Fleetguard	HF6552
MP Filtri	CSD 50-D05
Parker-Arlon	CG46-CC16
Sauer Danfoss	9700810
Western Filters	51455
Separation Technologies	HF6552



**IMPORTANT:** *There are (2) Charge Pump Pressure Filter Assemblies on the Hydrostatic Pumps. Remember to inspect and replace both of them when servicing.*

**24.8.3 Auxiliary Circuit Filter**

Located on the return line near the solenoid valve assembly is a hydraulic oil filter. The filter is a 'spin-on' type of filter that will need replacement. **Replace this filter element after 50 hours of break-in use and every 500 hours thereafter.**

**Filter Specification (Auxiliary Circuit Filter)**

The replacement auxiliary circuit filter for the hydraulic system is as follows:

**Donaldson 079089**

This part can be ordered using JAY•LOR® Part Number # AAB-008-00070

<b>Cross-reference Chart for Equivalent Replacement Auxiliary Circuit Filters</b>	
<b>Brand:</b>	<b>Part Number:</b>
Zinga	ZAE-10L
Hydac	0080MA010BN
LHA	SPE15-BTA-12



**IMPORTANT:** *When replacing, inspect the filter for excessive contamination. Often, a severely contaminated filter is indicative of required servicing of the hydraulic system.*

## 24.9 Hydrostatic oil reservoir

### 24.9.1 System Hydraulic Oil – Change Interval Information

The hydraulic oil used in the hydraulic systems on your Jaylor truck mount was selected for its heavy-duty operating properties. This minimizes frequent hydraulic oil changes and extends the life of the hydraulic system components.

It is recommended to change the hydraulic oil every **5000 hours** of regular use, or when oil properties degrade. If the fluid becomes black, this is a sign of overheating. If the fluid appears milky, this is a sign of water contamination.

If in doubt as to the condition of your hydraulic oil, contact your authorized Jaylor dealer and/or distributor or your local hydraulic service center. A sample of the hydraulic oil can be tested with the correct testing equipment. Good condition hydraulic oil must meet the following minimum requirements:

1. Water Content in Hydraulic Oil < 100 Parts/Million
2. Viscosity of Hydraulic Oil  $\pm$  10% of Original Specification
3. ISO Oil Cleanliness Standard of 18/13

### 24.9.2 Changing Hydraulic Oil and Reservoir Maintenance

The following steps should be followed to change the hydraulic fluid and clean the reservoir: use **Figure 23** for reference.

1. Position a large capacity catch container under the reservoir below the drain plug. The volume of the hydraulic reservoir is large; make sure the selected container is suitable for this service.

Model:	Approx. Reservoir Capacity:
5425 & 5575	226 L (60 US gal.)
5650, 5750, 5850	340 L (90 US gal.)
51000, 51250	340 L (90 US gal.)

2. Open the supply line shutoff valves.
3. Remove the drain plug and allow oil to drain.
4. Dispose of the used oil in an environmentally safe manner.
5. Remove and inspect the reservoir supply strainers:
  - a. Disconnect the hoses from the supply line shutoff valves.
  - b. Un-fasten fittings and shutoff valves if necessary, to access to the supply line strainers.
  - c. Remove the strainers by turning the large hexagonal flange on the bottom of the unit counterclockwise until it is free from the reservoir.
  - d. Thoroughly inspect the strainers for foreign matter and/or damage.
  - e. If the strainers are undamaged, clean them with a degreasing solution and a brush. If there are any signs of damage, replace with a new unit. See **Section 0** for replacement information.
  - f. Re-install the strainers, valves, fittings and hoses. Use pipe thread sealant on all threaded connections.
6. Re-install the drain plug. Use pipe thread sealant on the threads of the drain plug.
7. Remove and inspect the oil reservoir breather cap. See **Section 24.11** for further instruction.
8. Add new, filtered hydraulic oil of the appropriate specification through the breather port. Add oil slowly and carefully to avoid spillage. Continue filling the reservoir until the oil level gauge on the side of the reservoir indicates that it is full.
9. Close the supply line shutoff valves.
10. Place oil catch containers under the connections between supply line hoses and pumps.
11. Loosen the supply line hose fittings at the pump-ends.
12. Have an assistant open and close the supply line shutoff valves to control the flow of hydraulic oil. Flush old oil out of the hoses.
13. Tighten the supply line hose fittings at the pump-ends.
14. Make sure the supply line shutoff valves are fully open.

15. Add additional hydraulic oil to the reservoir through the breather port until the oil level gauge on the side of the reservoir indicates that it is full.
16. Re-install the breather cap.
17. Start the truck engine and allow the pumps to operate in neutral for 5 minutes to allow the system to fill with oil and purge any air.
18. Engage the pumps after 5 minutes. Check for hydraulic leaks and verify proper operation of the machine.

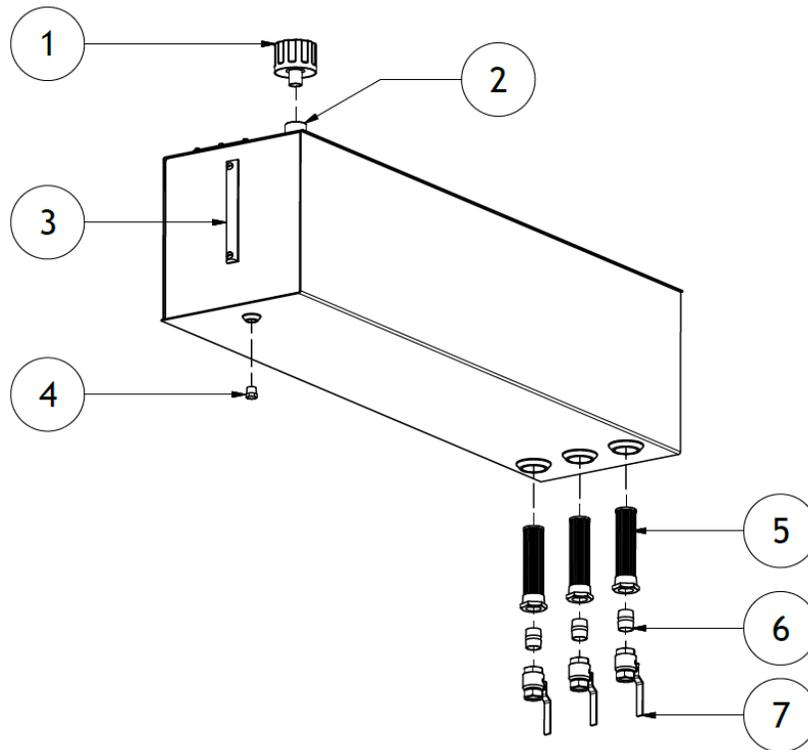


Figure 23 - Hydraulic Oil Reservoir

1. Breather Cap
2. Breather / Fill Port
3. Oil Level and Oil Thermometer
4. Drain Plug
5. Supply Line Strainers
6. Supply Line Fittings
7. Supply Line Valves



**IMPORTANT:** Presence of debris or contaminants in the reservoir indicates a potential failure or deterioration of a system component, contact your Jaylor dealer or distributor immediately.



**IMPORTANT:** Excessive amounts of air in the hydraulic system can cause instability and cavitation of the hydraulic system.

## 24.10 Reservoir Strainer Specification

The replacement strainer for the hydraulic system is as follows:

### LHA Brand – TM-50-100-RV5

This part can be ordered using Jaylor Part Number # AAB-008-00064

## 24.11 Reservoir Breather Cap

Each hydrostatic oil reservoir is designed with a breather assembly at the fill location of the reservoir, to vent internal system pressure to atmosphere. It must be kept clean and free of contaminants to function properly. Remove any debris that falls on the to ensure proper functioning. Replace the breather **every 6 months** or earlier if the replacement indicator LED is blinking.

To activate a new breather, follow this procedure:

1. Remove the breather from the box and turn it upside down – with neck and thread up.
2. Insert your finger into the neck and press on the plastic screen until the LED begins to flash. The light will flash three times with a short-flash followed by a long-flash and then another short-flash.
3. Release pressure from the plastic screen immediately after the light begins flashing.
4. Thread the breather into the fitting on top of the hydraulic tank.

Replacement breather caps can be ordered using Jaylor Part Number #AAB-209-00785



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



**IMPORTANT:** *Hydraulic oil is added to the hydraulic system through the breather port. Always clean around the breather prior to removing it and adding oil.*

## 24.12 Hydrostatic Oil Cooling System

The Hydrostatic Oil Cooling System is located on the front of the viewing platform, behind the cab of the truck. The cooling system uses an oil cooler with a hydraulically powered fan for maximum cooling efficiency. Note the hydraulic oil flow directions in and out of the cooling system. It is important to maintain this flow configuration should any of the circuits be disconnected for service.

Care must be taken to reduce or eliminate dirt and debris from blocking the cooling surfaces as overheating can result. Clean the cooling radiators daily. Use compressed air with a blow gun attachment to clean out accumulated dirt, dust, and other debris from the cooling fins on the radiator. Inspect the cooling fan used on the cooler and make sure that it turns freely.

### 24.13 Hydraulic Hose and Electrical Wiring – Repair and Service

Hydraulic hose assemblies and electrical wiring, like other products, have a finite service life. The actual service life of a given hose assembly is dependent on many variable factors such as operating pressures, temperatures, and conditions.

Your dealer will be able to provide specifications on the construction of the hydraulic and electrical circuits. Your dealer will also be able to provide instructions on how to replace these components and inform of any safety precautions.



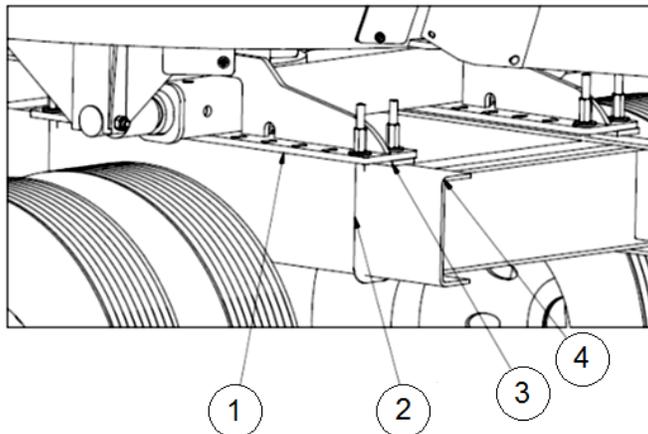
**IMPORTANT:** *Hose assemblies in service should be inspected frequently for leakage, kinking, corrosion, abrasion, or any other signs of wear or damage. Hose assemblies that are worn or damaged should be removed from service and replaced immediately!*

### 24.14 Machine Mounts

It is important to ensure that the machine and its components are securely attached to the truck platform. The machine and its components are attached to the truck chassis through a series of U-bolts. The hardware used in the clamping assemblies should be tightened to and maintain a torque of 100 ft-lbs. for safe operation of the machine.

**Note:**

- *Check the torque on the clamping assemblies daily during the break-in period of the machine. Afterwards check the torque monthly.*



**Figure 24 - Mixer Mounting**

1. Mixer Mounting Foot
2. 3/4" U-Bolt
3. Hardwood Spacer
4. Truck Frame



**IMPORTANT:** *Ensure that the machine is securely attached to the truck platform. Variables such as machine operation, machine break-in, flex of the truck chassis, and operating conditions can loosen the machine mounts.*



## 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. THE PARTICLE SEPERATOR****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).

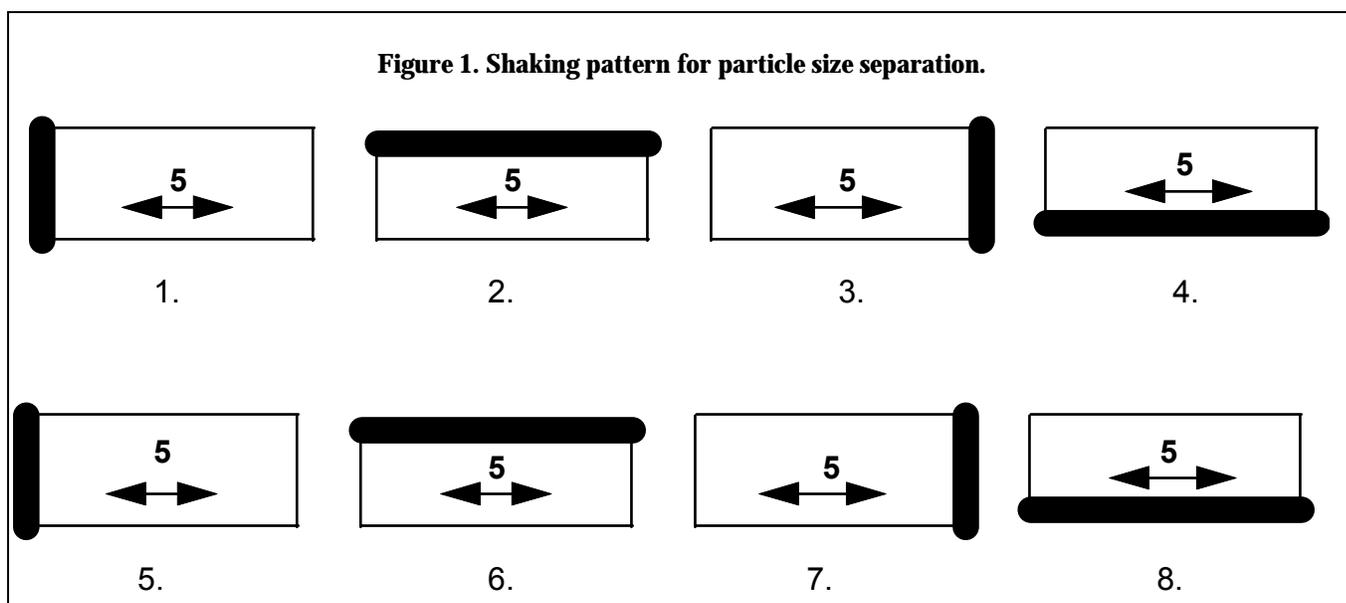
On Weibull paper, the horizontal axis is for particle size and the vertical axis is for cumulative percent undersized. The axes are not linear. For the example given in Table 2, the following deductions or statements can be made:

- 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.



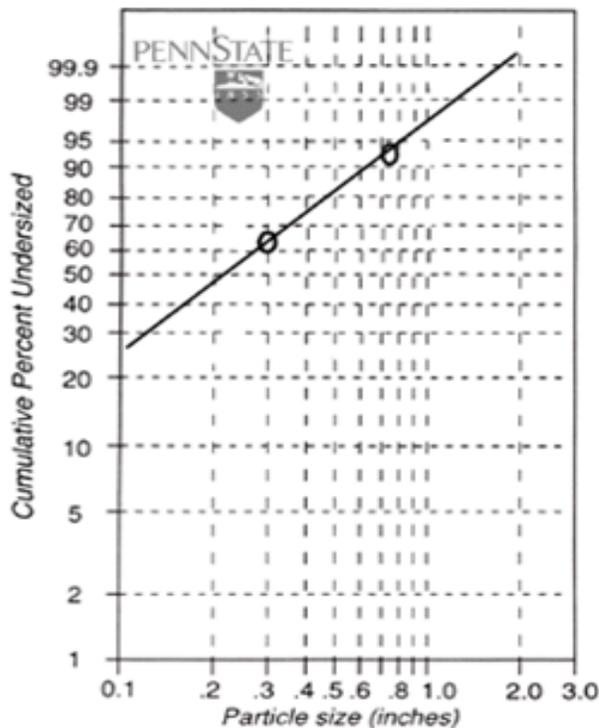
# PARTICLE SIZE SEPARATOR INSTRUCTIONS (CONTINUED)

**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

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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

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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

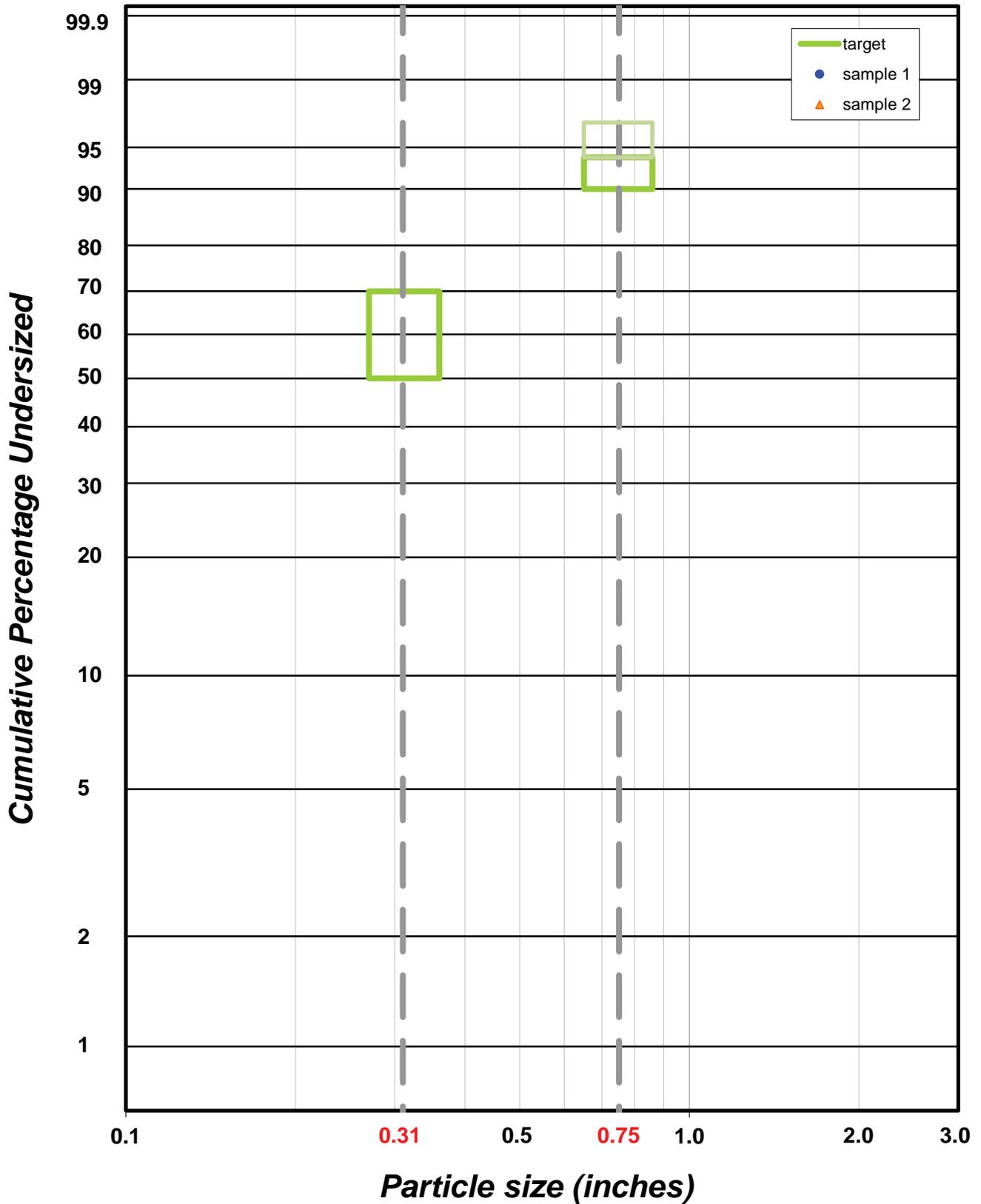
Upper Sieve  
[e = 100 - (a/d\*100)] \_\_\_\_\_

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



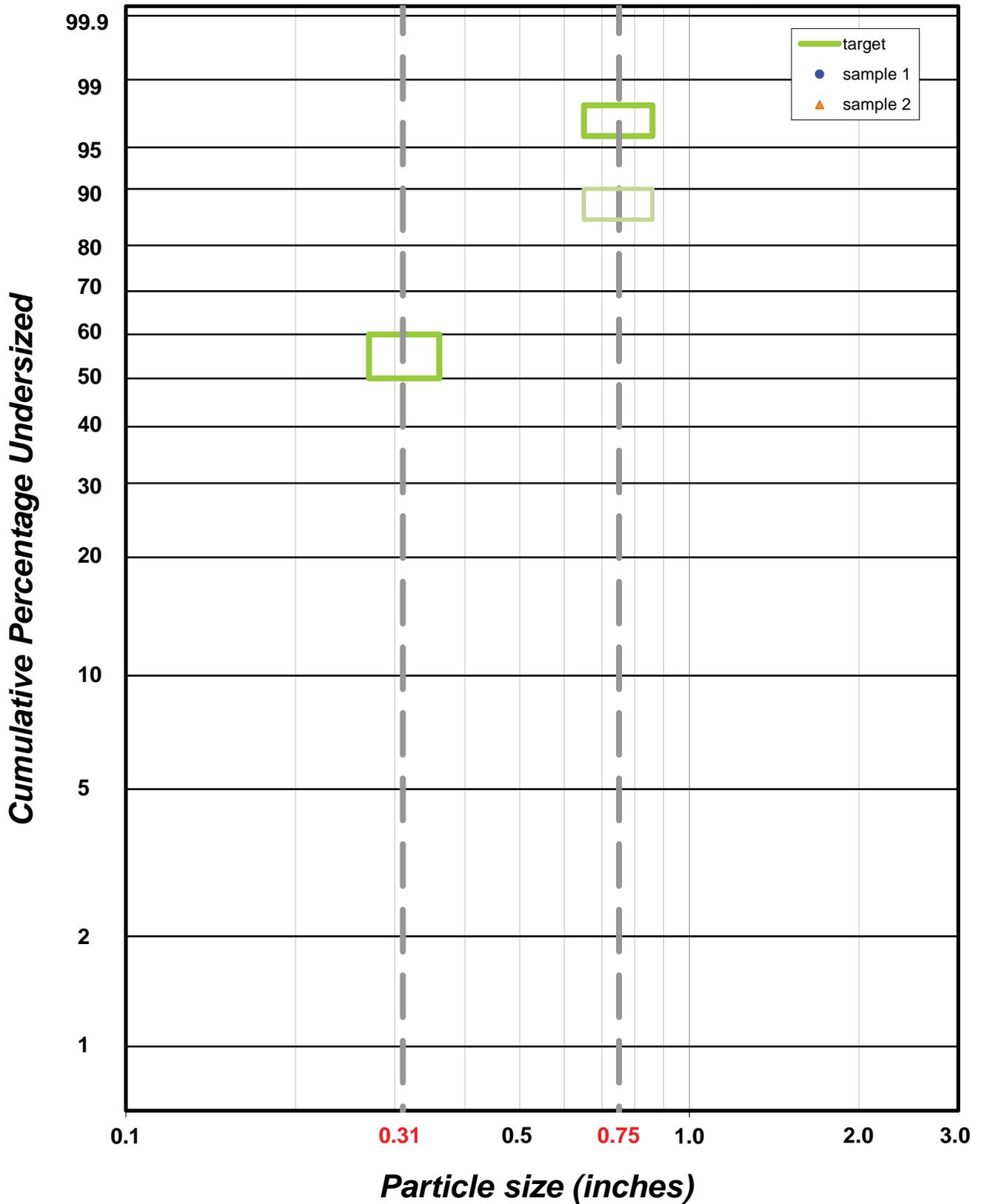
# TMR Particle Size Analysis

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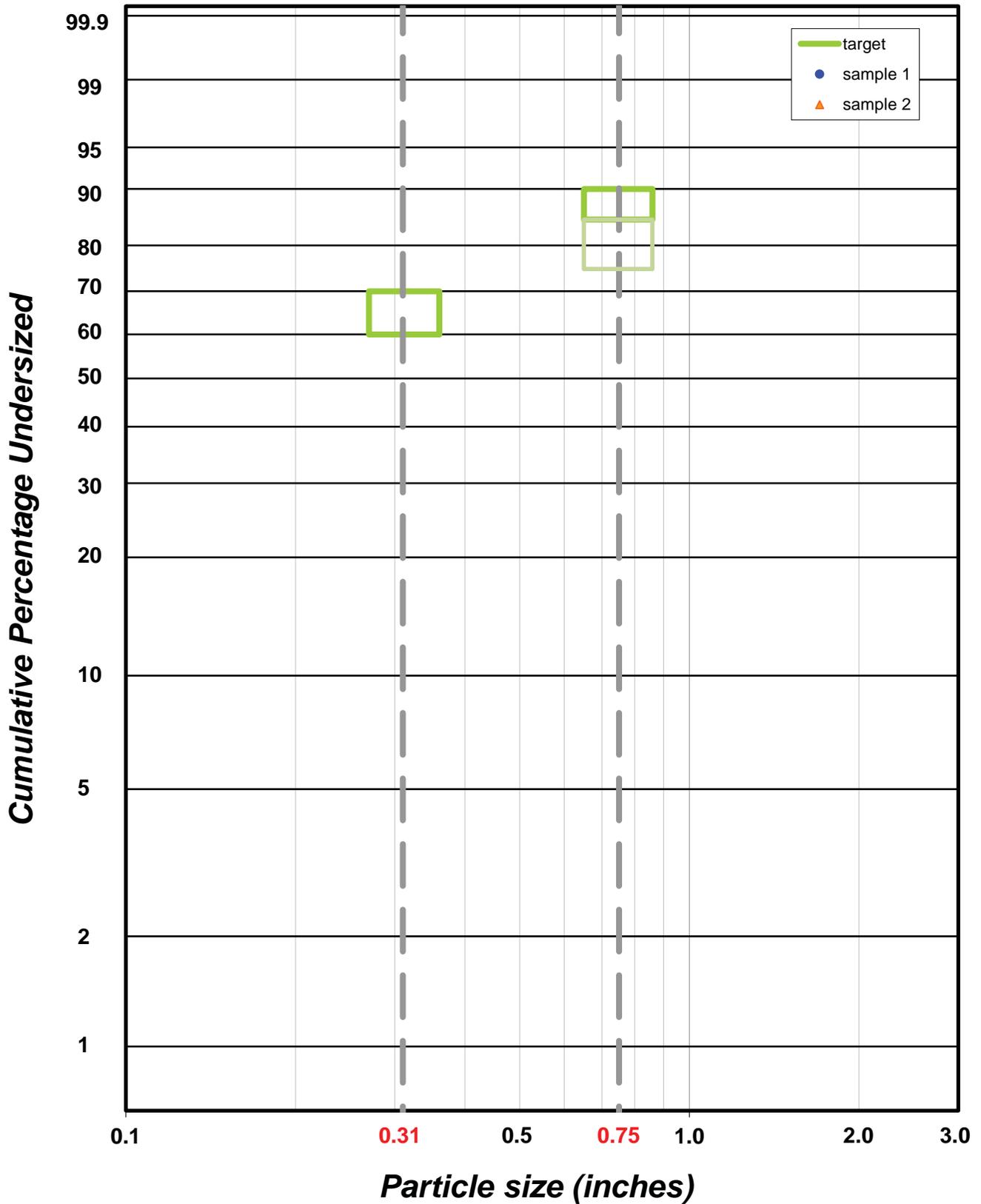
# Corn Silage Particle Size Analysis

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# Haylage Particle Size Analysis

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