

JAY•LOR[®]

BECAUSE
NUTRITION
MATTERS.[®]

OWNER MANUAL



5150

5350

5400

5425

5575

California Proposition 65 Warnings



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



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

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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 **OR** 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 single auger 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 tractor driver's seat and facing forward.

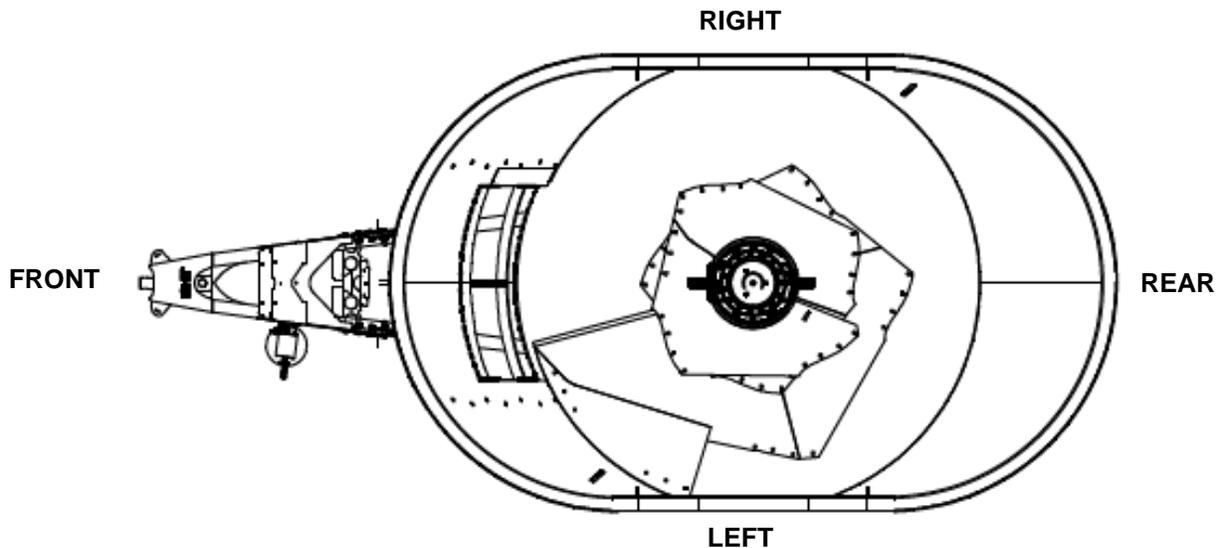


Figure 1 - Operator Orientation

2. POLICY STATEMENT

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

3. OWNER/OPERATOR'S RESPONSIBILITY

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

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

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

4. LIMITED WARRANTY

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

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

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

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

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

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

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

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

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

WARRANTY VOID IF NOT REGISTERED

5. CONTACT INFORMATION

Contact Jaylor at:



071213 10th Line

East Garafraxa, ON

Canada

L9W 6Z9

Phone: (519) 787-9353

Fax: (519) 787-7053

E-mail: jaylor@jaylor.com

On the web: www.jaylor.com

6. SERIAL NUMBER LOCATION

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

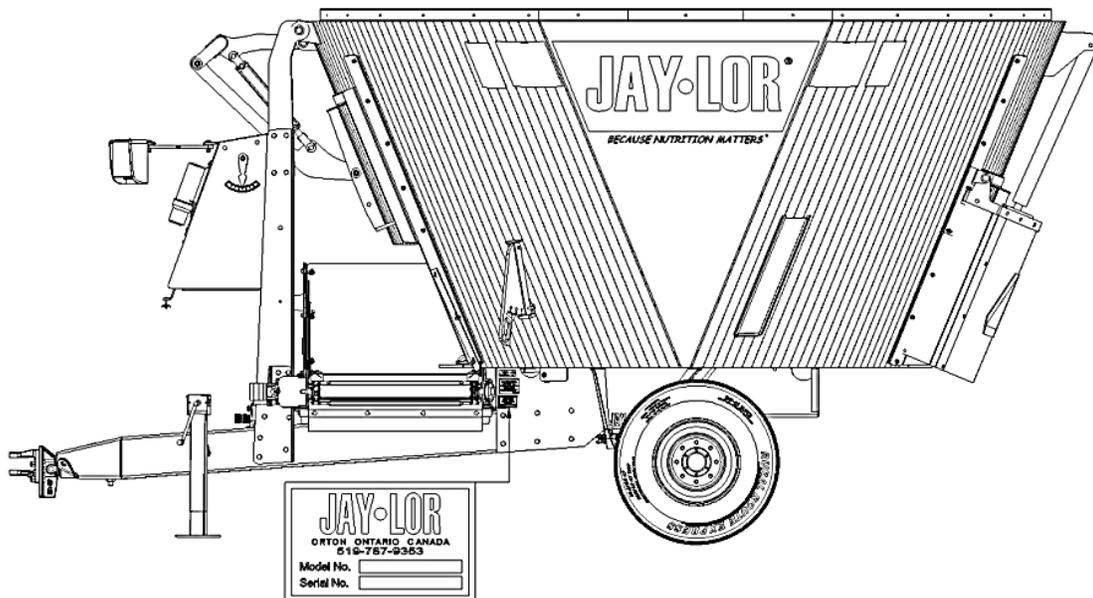


Figure 2 - Serial Number Location

7. CUSTOMER REFERENCE INFORMATION

Jaylor Model Number:

Jaylor Serial Number:

Date Purchased:

Dealer Name:

Dealer Phone:

Scale Indicator Model Number:

Scale Indicator Serial Number:

Other Main Components:

(e.g. Gearboxes, 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 or require additional copies or the manual is damaged, please contact your dealer or manufacturer directly.

8.3 Safety Guidelines

YOU are responsible for the **SAFE** operation and maintenance of your Jaylor mixer. **YOU** must ensure that **YOU** and **ANYONE** else who 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 a 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.
-  Attach securely to the tractor using a retainer on the drawbar pin and a safety chain.
-  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, SMV signs, before transporting.
-  Use hazard flashers on tractor when 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 or disconnecting from the tractor.
-  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 the SMV (Slow Moving Vehicle) emblem and 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.
-  Attach securely to the tractor using a retainer on the drawbar pin and a safety chain.
-  Do not allow anyone to ride on the machine or tractor during transport.
-  Do not exceed 10 mph (15 km/h). Reduce speed on rough roads and surfaces.
-  Always use hazard warning flashers on tractor when transporting unless prohibited by law.
-  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.
-  Use only a tractor with adequate brakes to stop the tractor coupled with the machine and payload.

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.
-  Make sure the implement jack is properly pinned to the mounting bracket.

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

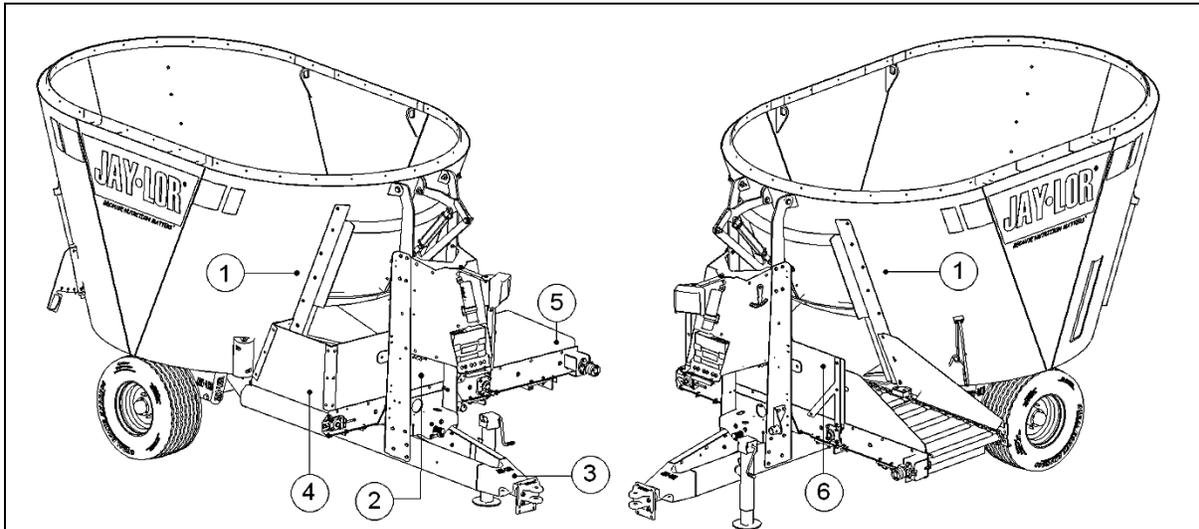


Figure 3 - Single Auger Standard Safety Sign Locations

1. 'Danger' Rotating Auger Hazard and Pinch Point (Figure 5)*
2. 'Danger' Rotating Driveline Hazard (Figure 6)
3. 'Caution' Not for Highway Travel (Figure 4)
4. 'Warning' Rotating Part Hazard (Figure 7)
5. i. 'Warning' Rotating Part Hazard (Figure 7)
ii. 'Warning' High Pressure Fluid Hazard (Figure 8)
6. 'Caution' Secure Conveyor Discharge (Figure 9)

*This decal will be located near every unloading door on the machine



Figure 4 - 'Caution' Not for Highway Travel

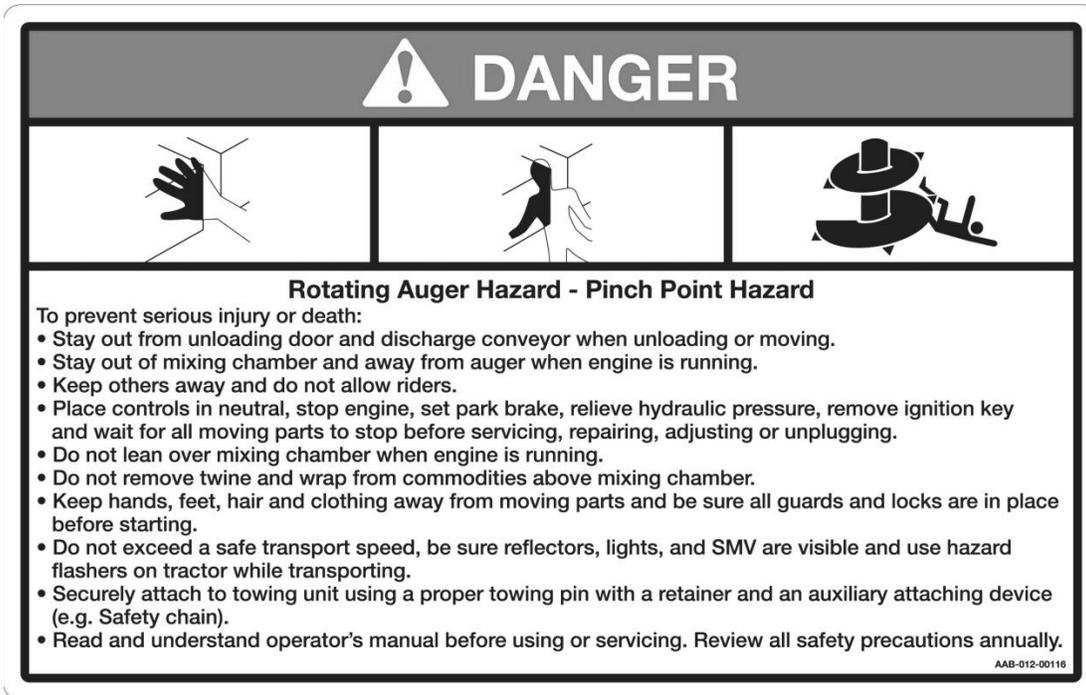


Figure 5 - 'Danger' Rotating Auger Hazard and Pinch Point



Figure 6 - 'Danger' Rotating Driveline Hazard



Figure 7 - 'Warning' Rotating Part Hazard



Figure 8 - 'Warning' High Pressure Fluid Hazard



Figure 9 - 'Caution' Secure Conveyor Discharge



Figure 10 - 'Warning' Do Not Step*

*Not pictured in **Figure 3**. Located near the ladder of low profile mixers

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 single auger models are shown below.

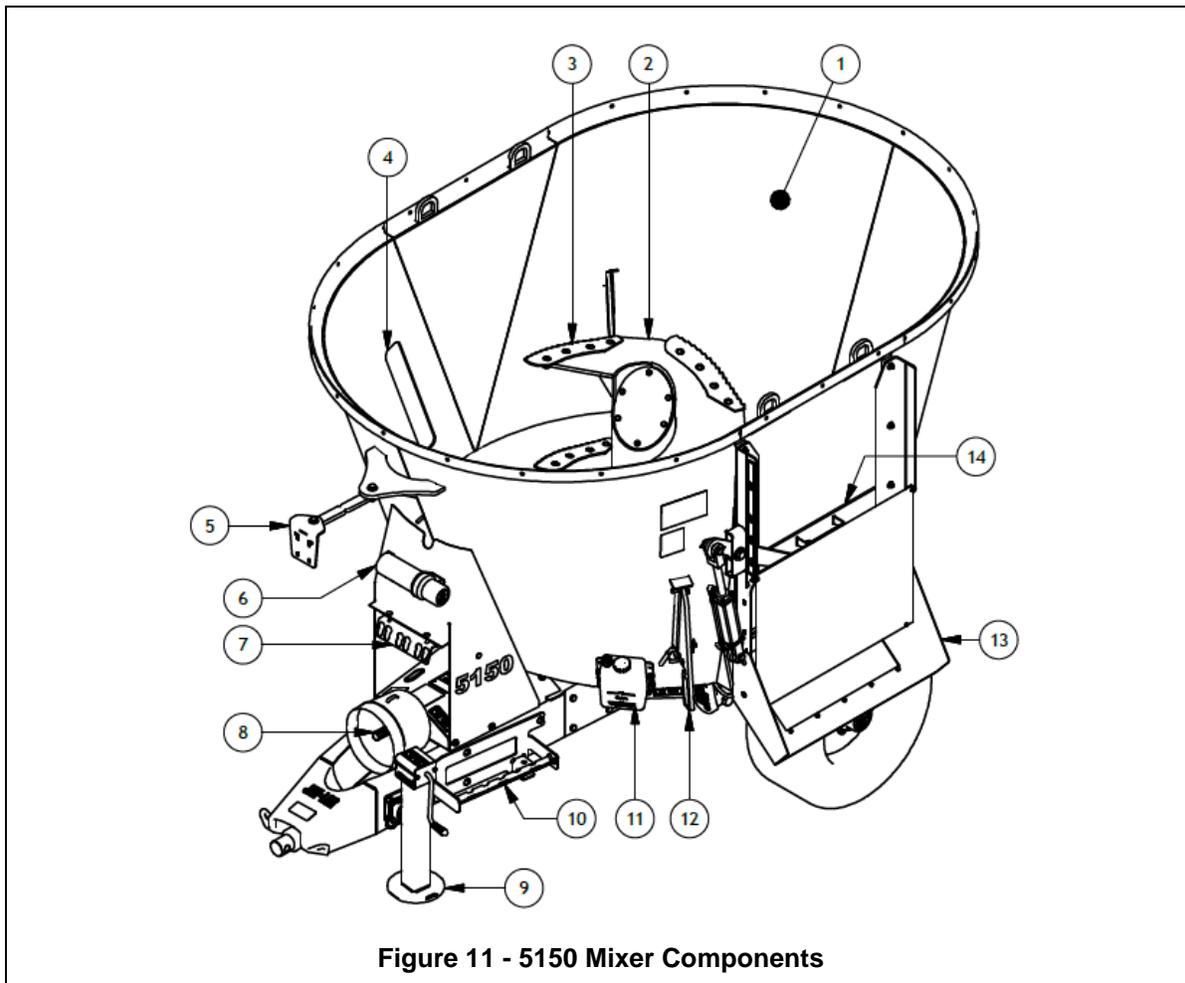


Figure 11 - 5150 Mixer Components

1. **Mixer Drum** – Contains the feed while it is cut and mixed by the vertical auger.
2. **Vertical Auger** – Mixes the feed within the mixer drum and discharges the feed through the unloading door.
3. **Auger Knives** – Cuts the feed material as the auger rotates.
4. **Viewing Window** – Allows safe viewing of cutting and mixing action inside the drum.
5. **Scale Indicator Bracket** – Adjusts to allow easy viewing of the scale indicator
6. **Onboard Owner Manual Holder** – a convenient place to store the owner manual and spare PTO shear bolts.
7. **Hose Clamp** – Conveniently organizes hydraulic hoses.
8. **PTO Shaft** – Couples between the tractor power take-off and the planetary gearbox.
9. **Trailer Jack** – Raises and lowers the height of the trailer tongue and coupler.
10. **Step / Jack Holder** – Conveniently stores the trailer jack when not in use and acts as a step for viewing the mixer contents.
11. **Planetary Gearbox Oil Reservoir** – Remove cap to add oil. Markings indicate proper oil level range.
12. **Restrictor Blades** – Adjustable blades can be moved inward to increase cutting speed and outward to decrease cutting speed.
13. **Discharge Chute** – directs feed discharge with optional magnet plate.
14. **Unloading Door** – Opens hydraulically to allow feed discharge.

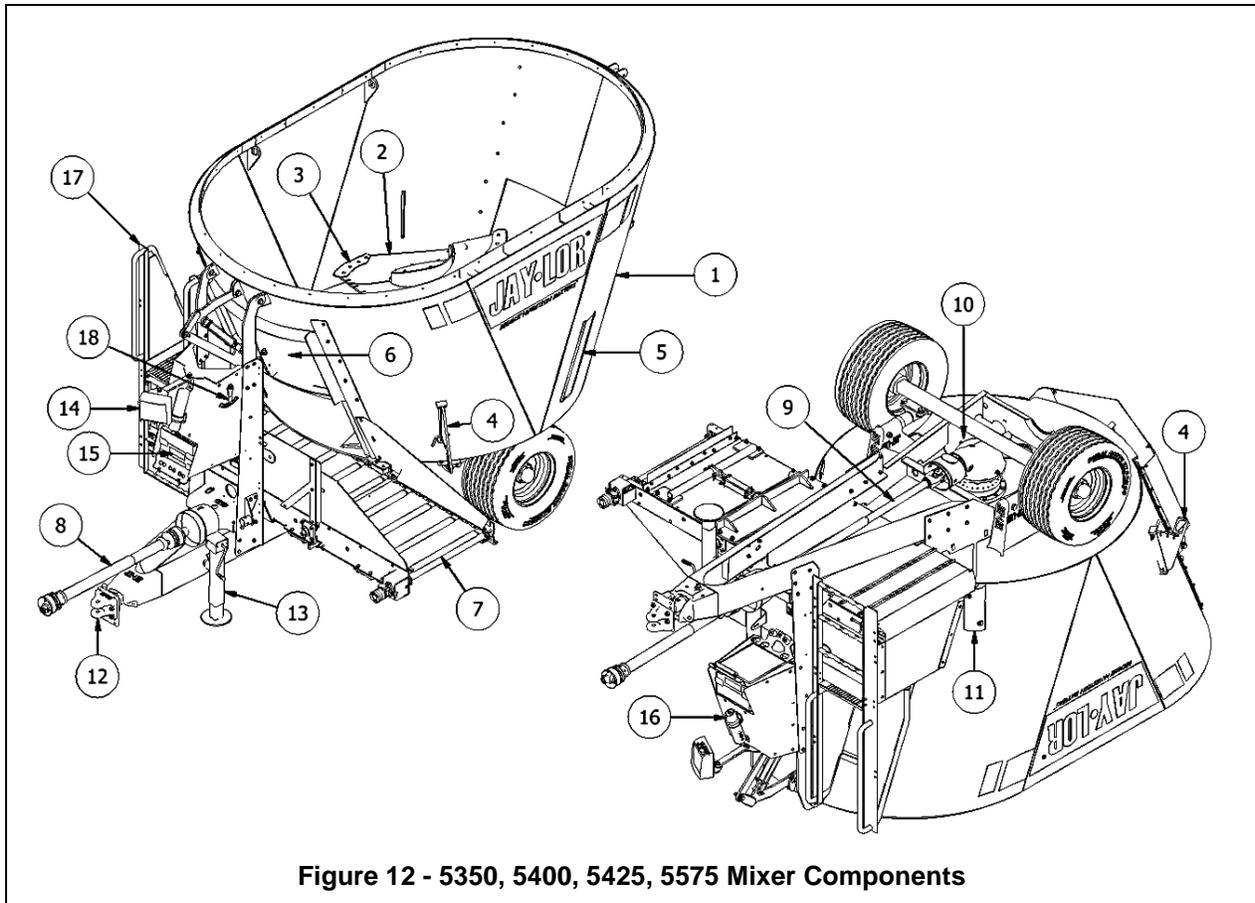


Figure 12 - 5350, 5400, 5425, 5575 Mixer Components

1. **Mixer Drum** – Contains the feed while it is cut and mixed by the vertical auger.
2. **Vertical Auger** – Mixes the feed within the mixer drum and discharges the feed through the unloading door.
3. **Auger Knives** – Cuts the feed material as the auger rotates.
4. **Restrictor Blades** – Adjustable blades can be moved inward to increase cutting speed and outward to decrease cutting speed.
5. **Viewing Window** – Allows safe viewing of cutting and mixing action inside the drum.
6. **Unloading Door** – Opens hydraulically to allow feed discharge.
7. **Discharge Conveyor** – Depending on option chosen, the conveyor can be controlled hydraulically to discharge feed at different heights, speeds and directions. Conveyors are standard on front door configurations and optional on front corner door configurations.
8. **PTO Shaft** – Couples between the tractor power take-off and the driveshaft.
9. **Driveshaft** – Couples between PTO shaft and the Planetary Reducer Gearbox.
10. **Planetary Reducer Gearbox** – Couples the Driveshaft to the Vertical Auger.
11. **Planetary Gearbox Oil Reservoir/Cap** – Remove this cap to add oil. Markings indicate proper oil level range.
12. **Adjustable Clevis Trailer Coupler** – Will couple to standard tractor drawbars.
13. **Trailer Jack** – Raises and lowers the height of the trailer tongue and coupler.
14. **Electronic Scale Indicator** – Displays the weight inside the drum.

15. **Onboard Shaker Box Kit** – Allows operator to test mix uniformity at any time.
16. **Onboard Owner Manual Holder** – a convenient place to store the owner manual and spare PTO shear bolts.
17. **Ladder** – Safe elevated viewing platform to see into the mixer drum.
18. **Mixer Level Indicator** – indicates when mixer is on level ground.
19. **2-Speed Transmission** (Not pictured) – Provides additional reduction. Couples the PTO Shaft and the Driveshaft.

13. PRE-OPERATION CHECKLIST

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

Before operating the machine:

- Lubricate the machine as outlined in **Section 27.5 - Fluids and Lubricants**.
- Use a tractor of adequate power and capacity to operate the machine.
- Ensure machine is properly attached to the tractor. Be sure retainer is installed in drawbar pin and the safety chains are attached.
- Check that PTO driveline is locked to the tractor shaft and the guard is chained to the frame.
- Check that hydraulic reservoir on the tractor is filled to required specifications.
- Check oil level and condition in the planetary gearbox. Be sure there are no leaks. Stop leaks before continuing.
- Inspect all hydraulic lines, hoses, fittings, and couplers for tightness. Use a clean cloth to wipe dirt from couplers before connecting to the tractor.
- Check that tires 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 machine is clean and free of debris.



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

14. BREAKING-IN

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

14.1 Before Starting:

- Check oil level and condition of the planetary gearbox.
- Cycle unloading door and conveyor several times to fully charge hydraulic system with oil.
- Disconnect PTO driveline and turn auger by hand. Be sure it turns freely.
- Check for debris and/or any other items that could block or affect machine operation.
- Top up tractor hydraulic oil reservoir if required.
- Check that no hoses are pinched, rubbing, or being crimped. Re-align as required.

14.2 After Operating for ½ hour:

- Check that all bolts and fasteners are all tightened properly as indicated in **Section 27.4**.
- 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:

- Re-torque all wheel nuts, 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 27**.



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

15. EQUIPMENT MATCHING SPECIFICATIONS

The machine is designed to be used with agricultural tractors. To ensure good performance, the following list of specifications must be met:

15.1 Horsepower:

- The minimum horsepower required for your Jaylor is listed below:

Model	HP
5150	35 HP
5350	60 HP
5400	70 HP
5425	70 HP
5575	80 HP

15.2 Drawbar Dimensions:

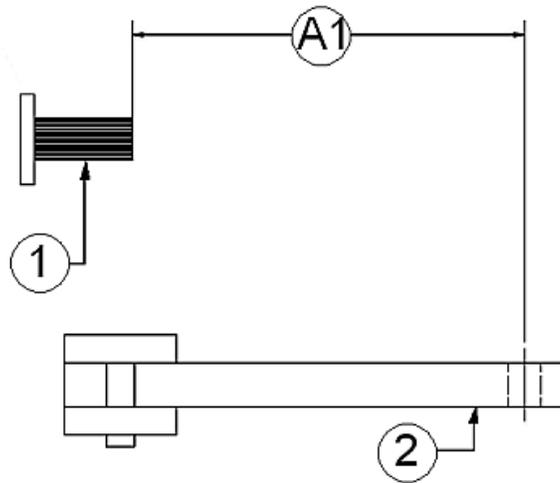


Figure 13 - Drawbar Setting

1. Tractor PTO
2. Tractor Drawbar
- A1. Refer to charts below for proper dimension

Set the drawbar distance from the PTO shaft using the charts below.

1. For Standard double yoke PTO's:

PTO	Spline	Drawbar Position (A1)
Type 1	540 rpm - 1 3/8" / 1 3/4" (35mm / 45mm)	14.0" (356mm)
Type 2	1000rpm - 1 3/8" (35mm)	16.0" (400mm)
Type 3	1000rpm - 1 3/4" (45mm)	20.0" (500mm)

2. For Optional Constant Velocity (CV) PTO's:

PTO	Spline	Drawbar Position (A1)
Type 1	540 rpm - 1 3/8" / 1 3/4" (35mm / 45mm)	9.75" (250mm)
Type 2	1000rpm - 1 3/8" (35mm)	9.75" (250mm)
Type 3	1000rpm - 1 3/4" (45mm)	9.75" (250mm)

16. CONTROLS

16.1 Weighing

16.1.1 Scale System Overview

- The scale system on all models includes three weigh-bars. The axle system incorporates two weigh-bars while the tongue and hitch system incorporates the third. The weigh-bars electronically measure the amount of ration inside the mixing chamber. The indicator is mounted at the front of the mixer, in a position high enough to be seen clearly from the tractor cab.

16.1.2 Indicator Mounting and Adjustment

- There are various scale indicators available for use on your Jaylor, however the mounting assembly for most scale indicators is the same. When attaching the indicator to the machine, be sure that it is securely fastened. Typically, the indicator slides down into the mounting bracket and a wire or plastic fastener secures the indicator to the mounting bracket.
- To adjust the direction of the indicator display, refer to **Figure 15**:

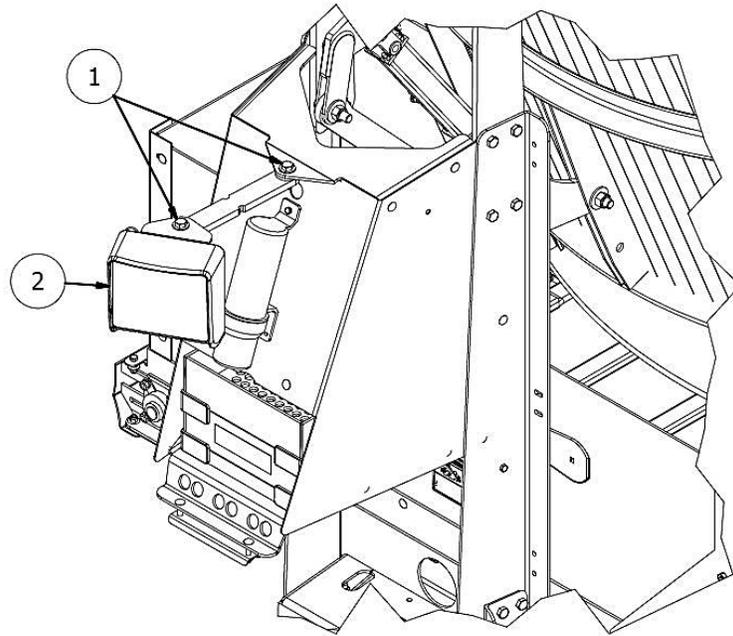


Figure 15 - Scale Indicator Adjustment

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

16.1.3 Indicator Connections

- On the bottom of the indicator are four outlets for attaching the three weigh-bar cords, and the fourth outlet is capped. 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 threaded into place. Make sure that the plugs are free of moisture or other contaminants, as this will affect the performance of the weighing system.
- On standard models, the power cord is plugged into the tractor female receptacle, getting its power supply from the tractor's electrical system. This should be a 12-volt negative ground power supply. For machines using a self-contained battery (optional), the female receptacle is connected directly to the battery.



Warning: *To avoid injury or death, always follow all safety and operational instructions and constraints pertaining to the battery.*

16.1.4 Remote Indicator (Optional)

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

Note:

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

16.2 Restrictor Blades

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

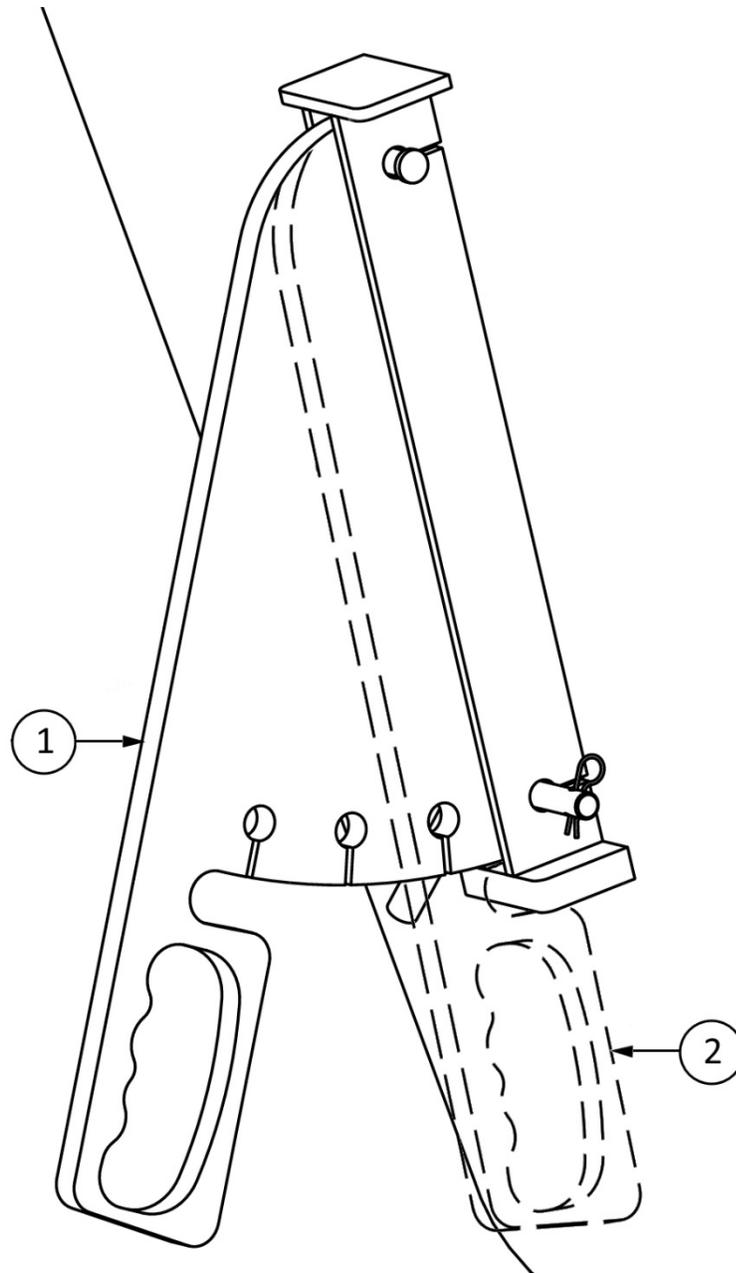


Figure 16 - Restrictor Blades

1. “OUT” Position
2. “IN” Position

Important: Position the Restrictor Blades in the ‘IN’ (retracted) position during transportation to reduce overall machine width.

17. SHEAR BOLT PROTECTED DRIVELINE

Should excessive loads be placed on the driveline, the shear bolt will rupture. This is a safety feature, but should not be depended on as a maximum load indicator. The shear bolt is located on the machine end of the driveshaft supplied with the machine.

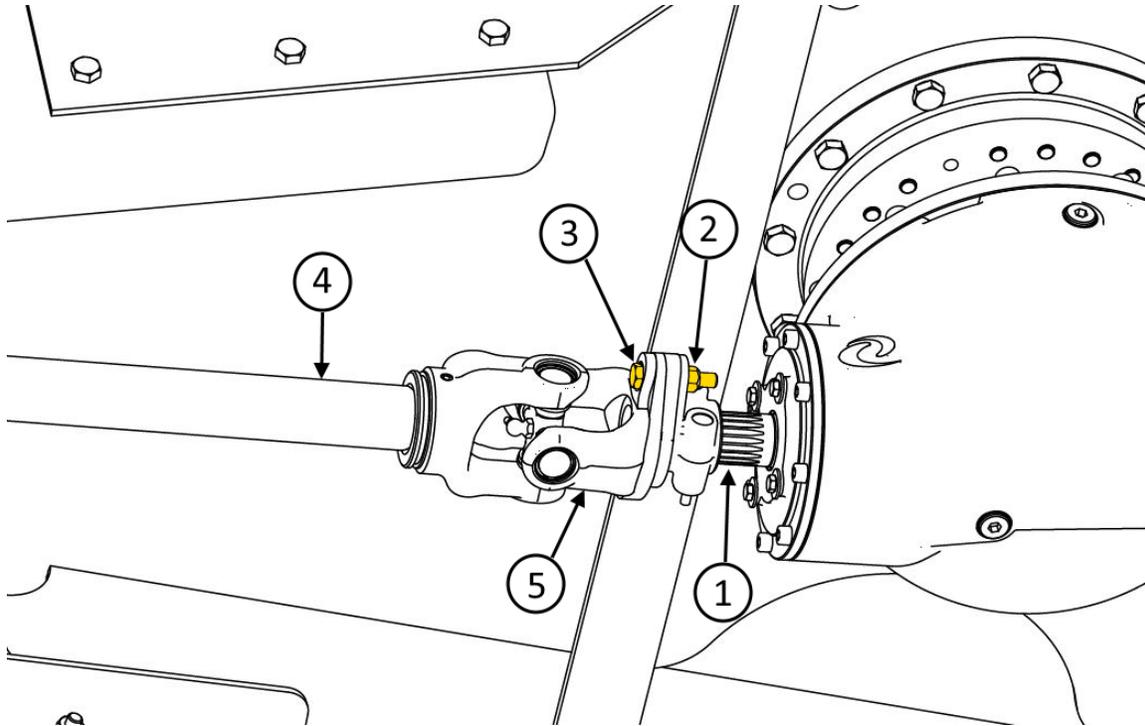


Figure 17 - Shear Bolt Location

1. Gearbox Input Shaft
2. Nut
3. Shear Bolt
4. Front Drive Shaft
5. Shear Bolt Yoke Assembly

If the shear bolt breaks, it must be replaced with the correct bolts specified by the manufacturer. See **Section 27.8** for specifications. For convenience, spare shear bolts are supplied with the machine and are stored in the cap of the manual holder.

18. DOOR CONFIGURATIONS

18.1 Front Center Discharge

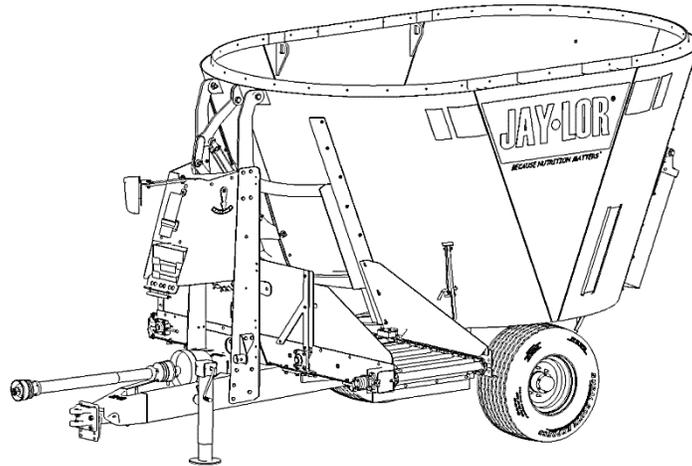


Figure 18 - Front Door Configuration with 6ft 41in Left Discharge Conveyor

The front discharge door is controlled hydraulically from the tractor. The door is opened to allow feed out of the mixing chamber onto the conveyor.

The door, on all models excluding the low profile, can be raised up to a maximum of 32 inches (81 cm) in height. The low-profile door opens to a maximum height of 27 inches (68 cm). Use the door guide markings to determine the door opening height.

18.2 Rear Center Discharge

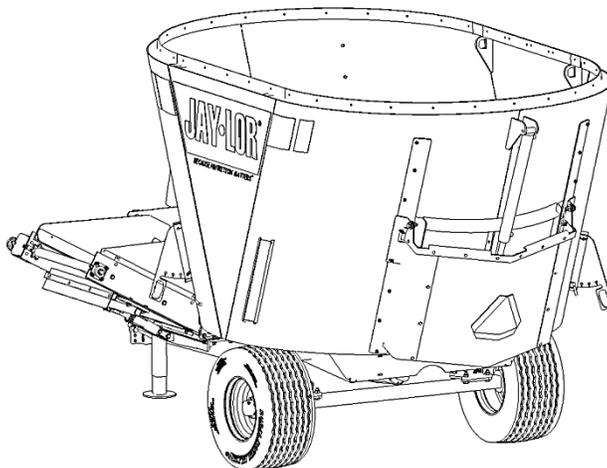


Figure 19 - Rear Door Configuration

The rear discharge door is controlled hydraulically from the tractor. When the door is opened, feed will discharge from the machine onto the ground. On most units, the rear door is equipped in addition to the front door.

The door can be raised up to a maximum of 32 inches (81 cm) in height (27 inches (68 cm) on low profile models). Use the door guide markings to determine the door opening height.

18.3 Corner Door Discharge

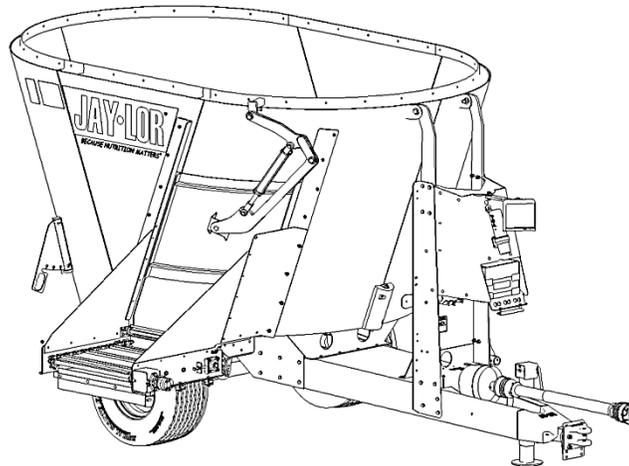


Figure 20 - Front Right Corner Door Configuration with 3ft Conveyor

The corner discharge door is controlled hydraulically from the tractor. When the door is opened, feed will discharge from the machine onto the ground.

The door can be raised to any position up to a maximum of 28 inches (71 cm) in height. Depending on the configuration equipped on the machine, the door is located either in the rear left or the front right corner of the machine.

The optional chute assembly can be removed for transporting or storage purposes.

18.4 Center Side (C-Side) Door Discharge

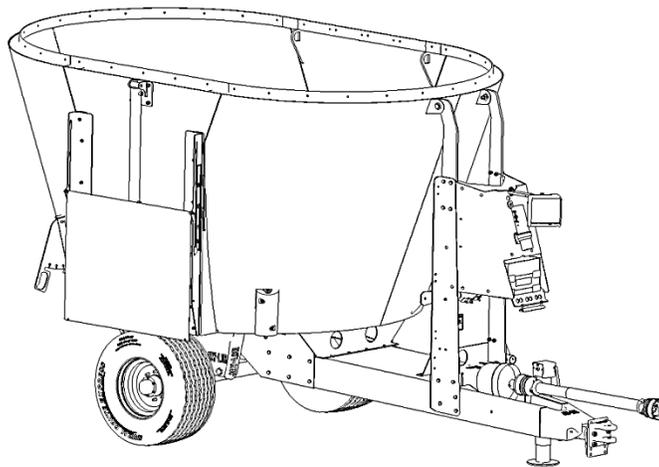


Figure 21 - Right Center Side Door Configuration

The center side discharge door is controlled hydraulically from the tractor. When the door is opened, feed will discharge from the machine onto the ground.

The door can be raised to any position up to a maximum of 28 inches (71 cm) in height. Centre side doors can be located on the left and/or right side of the machine.

The optional chute assembly can be removed for transporting or storage purposes.

18.5 Multiple Door Configuration

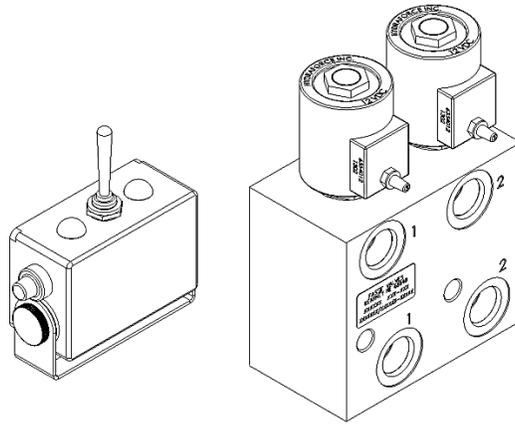


Figure 22 - Remote Switch Box (Left) and Selector Valve Block (Right)

If the machine is configured with multiple doors an optional electronic diverter valve kit can be purchased. This is for tractors that do not have a sufficient number of hydraulic ports to operate the mixer properly. The kit includes the selector valve block, a remote switch box and all wires, fuses and fittings required for installation. A detailed installation and operation guide is provided with purchase of kit.

19. CONVEYOR OPTIONS

A Diverter Valve System (optional) may be necessary to run the conveyor if the tractor running the mixer lacks a sufficient number of hydraulic inputs, see **Figure 22**.

19.1 Flat Conveyors

Flat conveyors are available in right, left and dual discharge options and can be placed on any front discharge door. Dual discharge conveyors can unload to either side of the machine. The conveyor is operated by using the controls on the tractor.

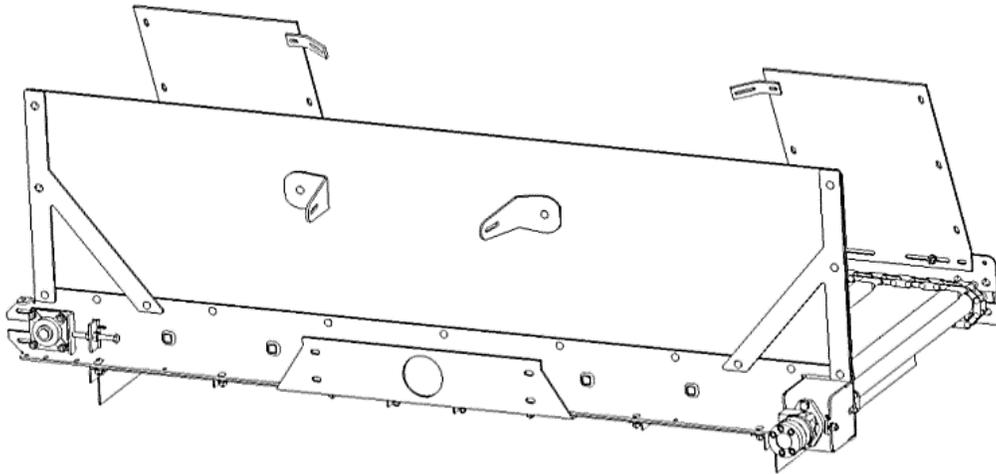


Figure 23 - 8ft Flat Dual Discharge Conveyor

19.2 Winged Conveyors

Winged conveyors are available in right and left discharge options and can be placed on any front center discharge door. The extension portion of the conveyor can be hydraulically raised and lowered to adjust discharge height.

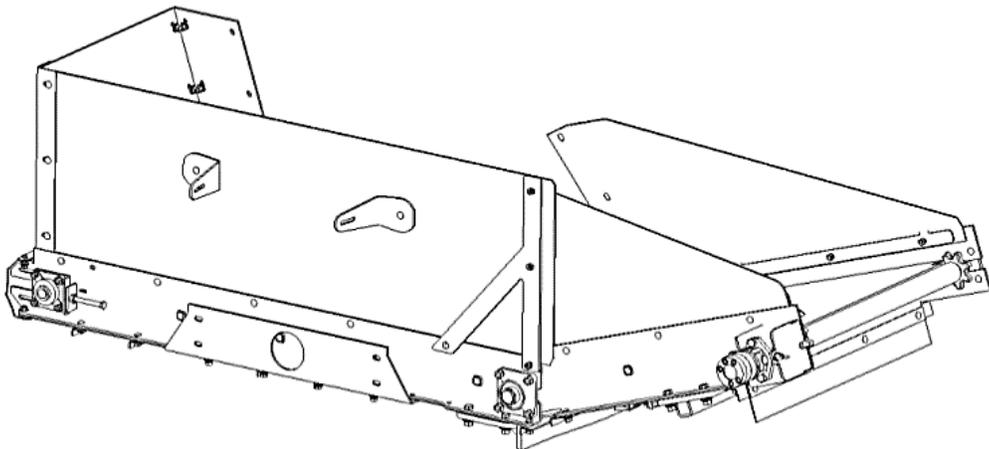


Figure 24 - 6ft Left Discharge Conveyor with 41in Extension

To maintain a consistent discharge height between mixes lock collars have been provided with the machine. Each lock collar set comes with 4 different sized collars that slip onto the cylinder rod to set the discharge height of the wing.

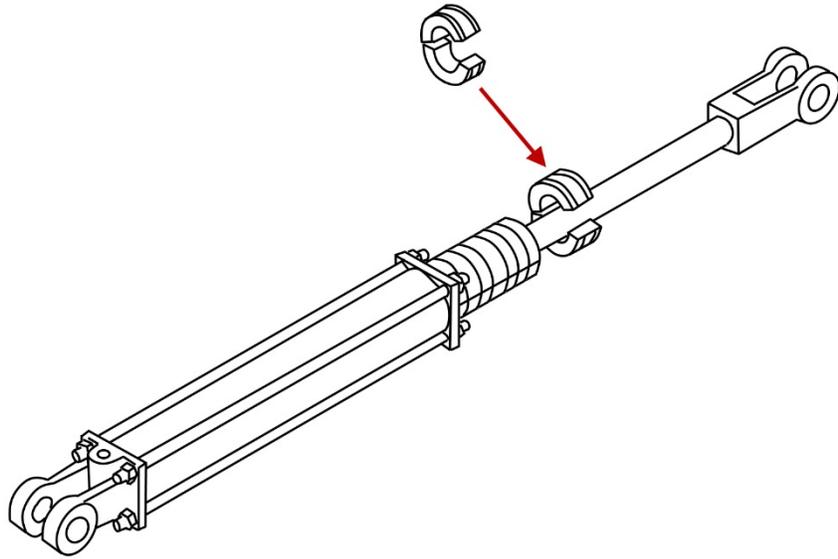


Figure 25 - Lock Collars

19.3 3ft Chain Conveyor

3ft chain conveyors are available for any front right corner door. Much like the extension on winged conveyors the discharge height can be adjusted through the use of hydraulics and lock collars.

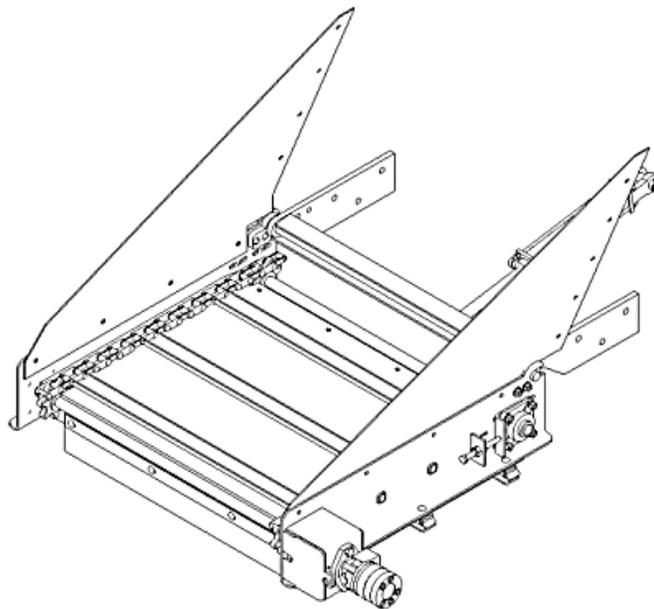


Figure 26 - 3ft Chain Conveyor

19.4 3ft Belt Conveyor

3ft belt conveyors are available for c-side doors on 5150 models only. The discharge height of the conveyor can be adjusted through the use of hydraulics and lock collars.

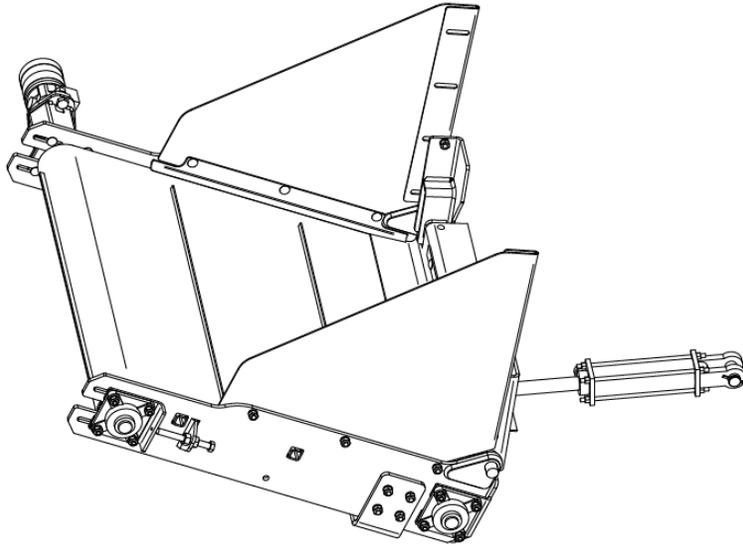


Figure 27 - 3ft Belt Conveyor

20. GEARBOX LUBRICATION

The oil reservoir, on the right side of the mixer drum, contains the lubricant for the gearbox. See **Section 27** for lubricant specifications for your Jaylor.

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

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

The oil reservoir has a filter/breather located on the top, which must be attached to the reservoir at all times. This breather is removable, to allow filling of the reservoir. If the filter/breather becomes contaminated, remove the breather, and clean it. Follow the instructions described in **Section 27**

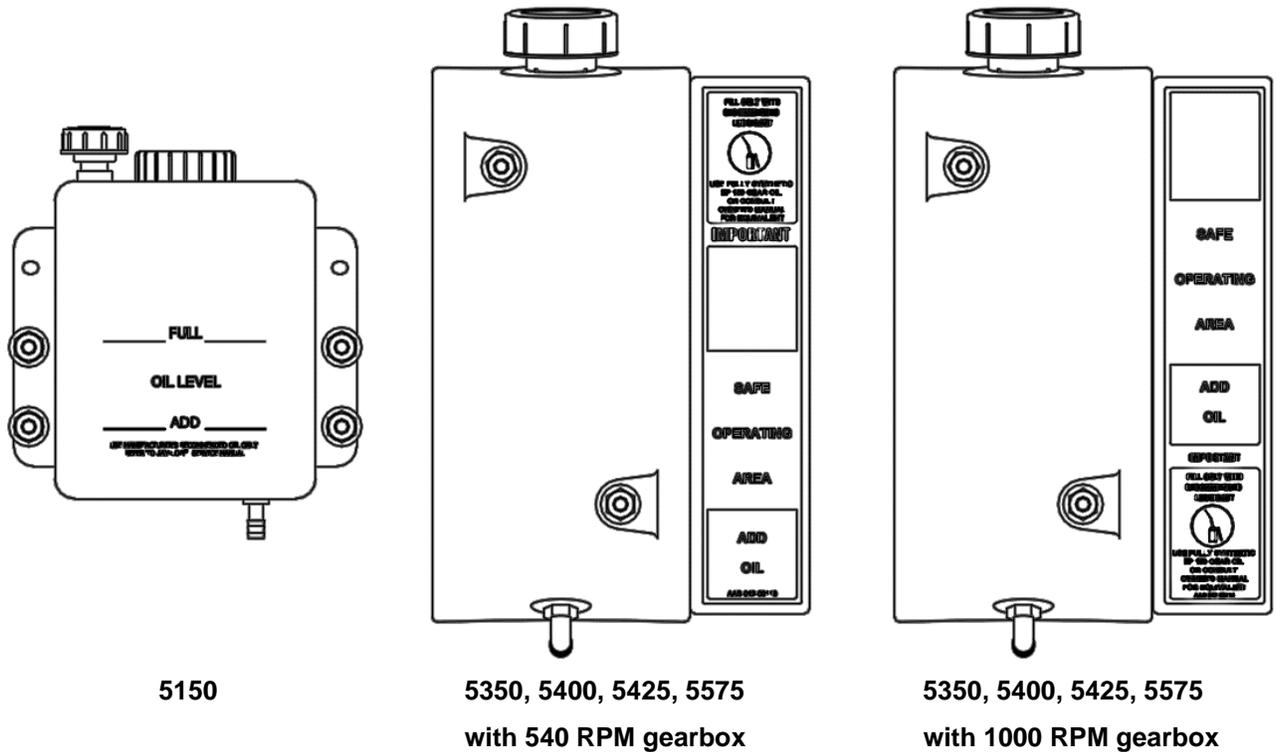


Figure 28 - Gearbox Lubricant Reservoir Assembly

21. ATTACHING/UNHOOKING

The machine should always be parked on a level, dry area that is free of debris and foreign objects.

Follow this procedure when **attaching**:

1. Clear the area of bystanders and remove foreign objects from the machine and working area.
2. Make sure there is enough room to back the tractor up to the hitch point.
3. Start the tractor and slowly back it up to the hitch point.
4. Stop the tractor engine, place all controls in neutral, set park brake, and remove ignition key before dismounting.
5. Adjust the length of the drawbar to give the appropriate dimension (see **Figure 13**) between the PTO shaft and drawbar pin hole (Refer to the Tractor Operator's Manual).
6. Use the clevis on the hitch to level the machine.
7. Use the jack to raise or lower the hitch pole to align with the drawbar.
8. Install the drawbar pin with provisions for a mechanical retainer such as a 'Klik' pin. Install the retainer.
9. Attach safety chains between the machine and the tractor drawbar cage.
10. Connect the PTO shaft:
 - Check that the PTO driveline telescopes easily and the shield rotates freely.
 - Attach the driveline to the tractor by retracting the locking pin, slide the yoke over the shaft and push on the yoke until the lock pin clicks into position. Pull on the yoke to be sure the driveline is locked on the shaft.
11. Connect the hydraulics:
 - Use a clean cloth or paper towel to clean the hose couplers. Also clean the tractor couplers.
 - Attach the hose couplers to the remote hydraulic ports on the tractor.
 - Be sure that each hydraulic circuit on the machine matches up with the correct set of ports on the tractor. Be sure to match the system with the desired control lever in the tractor.
12. Connect the wiring harness and scale indicator power cord.
13. Route the hoses and wiring harness along the hitch and secure in position to prevent entanglement with moving parts.
14. Raise the implement jack, remove and mount on the storage bracket.

When **unhooking** from the tractor, reverse the above procedure.

22. FIELD OPERATION

22.1 General

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

It is recommended that commodities are added to the mixing chamber while the augers are turning for maximum mix efficiency. If your driveline operates at 540 RPM the auger will turn at a speed of 41 RPM. If your driveline operates at 1000 RPM the auger will turn at a speed of 38 RPM. Starting the augers from a standstill with a full load in the mixing chamber places additional stress on the machine. Even though it is designed to handle this stress, repetitive startups under load may affect the service life of the machine. If circumstances dictate that it is required to restart the machine while loaded, retract the restrictor blades to the 'out' position to decrease starting torque as much as possible.

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



Danger: *Never enter the mixing chamber unless the mixer is parked on a flat, level surface, all controls are in neutral, parking brake is applied if equipped (if not, block wheels), 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. Contact may cause injury or death to the operator and serious damage to the mixer and/or loader.*



Warning: *Never load an unhitched machine. The machine is designed to be loaded only when properly hitched. Improper loading can cause loss of control, severe injury, or death.*

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!***

22.2 Cutting and Mixing Procedure

Follow these procedures when using the machine:

1. Attach the machine to the tractor, as described in **Section 21**.
2. Review the Pre-Operation checklist, as described in **Section 13**.
3. Review the location and function of all controls, as described in the **Section 16**.
4. Transport the machine to the feed storage area.
5. Always follow this procedure when **starting** the machine to minimize high startup loads and breaking of shear bolts:
 - a. Start the tractor engine and run at low speed.
 - b. Engage the PTO clutch to start auger.
 - c. Increase engine speed until the desired RPM is reached.
 - d. Proceed with loading of the ration.
6. Loading Feed Rations:
 - a. Remove all twine, string, and wrapping material from the bales and/or other commodities
 - b. Position the mixer where the loading machine has clear and easy access.
 - c. Begin adding ingredients to the mixing chamber.
 - d. When adding ingredients, watch the numbers on the scale indicator to monitor the weight of each ingredient as they are added.
 - e. Mixing times may vary depending on the ingredients being mixed. Typically, a total mixed ration is achieved in 3 to 5 minutes beginning after the last ingredient is added.
7. Stopping:
 - a. Stop forward motion.
 - b. Close unloading door.
 - c. Stop conveyor when commodity is off.
 - d. Slow engine to low idle.
 - e. Disengage PTO clutch.
 - 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, disengage PTO, turn hydraulics off, stop forward motion and stop engine immediately.*

Important: *Rapid engagement under a heavy load can break the shear bolt. Engage slowly for 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 light and fluffy ingredients into the mixing chamber first. The heavier and denser material will force the lighter ingredients into the mixture.*

22.3 Unloading Procedure

Follow these guidelines when unloading the machine:

1. Transport the machine to the feeding area.
2. If not already done, engage the PTO to start auger rotation.
3.
 - a. For models equipped with front discharge use a combination of unloading door height, conveyor speed and ground speed to distribute the feed mixture. 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 unloading door height and ground speed to distribute the feed mixture. Follow this order:
 - i. Raise the unloading door
 - ii. Start the auger (if not already turning)
 - 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, 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 flighting.*

22.4 Mixing Tips

- Place light, fluffy, least dense ingredients into the machine first. In that way, the heavier and denser material added later will push the light material into the 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 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.

22.5 General Mixing Issues

The following are some problems that the operator may be faced with at some point during cutting and mixing. Remember when doing any work on the mixer always 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!

22.5.1 Feed Clogging

There are two common places feed may 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



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

2. In the boot of the conveyor
 - **Figure 29** shows where to open the conveyor up to clean out

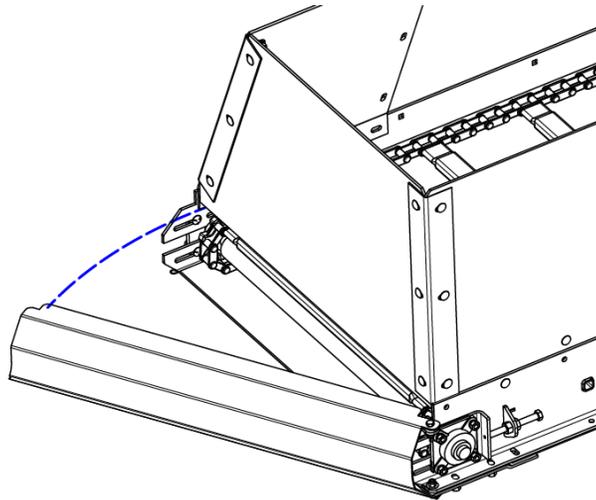


Figure 29 - Conveyor Boot

22.5.2 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 tractor 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.



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

23. 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 transporting of agricultural equipment on highways before starting.
2. Make sure all bystanders are clear of the machine and there are no riders on the machine.
3. Be sure the unit is hitched to the towing vehicle (See **Section 21** for details).
4. Make sure the SMV (Slow Moving Vehicle) emblem and all lights and reflectors required by local highway and transport authorities are in place, clean, and visible by all overtaking and oncoming traffic.
5. Raise the conveyor and install the transport lock bracket.
6. Transporting the machine for long distances when the mixing chamber is fully loaded is not recommended. Doing so will compact the mixture and can make startup difficult.
7. Always use hazard flashers on the tractor when transporting unless prohibited by law.
8. Do not transport the machine faster than **15 km/hr. (10 mph)**.
9. Never transport faster than the road or terrain conditions will allow you to do safely.
- 10. Do not allow riders on the machine.**

24. STORAGE

Should the machine be stored for an extended period of time, it must be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent 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. Raise the conveyor to its maximum height and install the lock channel.
7. Apply grease to the exposed cylinder rams. This includes the discharge door cylinder and the conveyor lift cylinder, if equipped.
8. Touch up all paint nicks and scratches to prevent rusting.
9. Move the machine to its storage position.
 - Select an area that is dry, level, and free of debris.
10. Place planks under the jack for added support if required.
11. Unhook the machine from the tractor.
12. Block the wheels on the machine.
13. 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.



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

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

25. 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, refer to **Section 27 - Maintenance and Service Information** for assistance.

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

PROBLEM	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
- Material wraps around knives.	- Knives dull or worn out.	- Check auger, remove entangled material. - Check knife condition. Replace any worn, bent, and/or damaged knives.
- Conveyor doesn't move.	- Insufficient oil flow. - Cold temperatures - Conveyor slats frozen down. - Conveyor jammed.	- Increase oil flow at tractor or flow divider. - Warm machine before operating. - Check oil level in tractor reservoir. Add as required. - Clear material out of slat pathway underneath the conveyor assembly.
- 'Dead Spot' during mixing.	- Material will not mix in certain locations inside the mixing chamber, commonly the front and back areas of the mixing chamber.	- Make sure the machine is level when mixing. - Check condition of all knives. Replace accordingly.
- Auger stops rotating during mixing.	- Auger jammed.	- Clear packed material and resume mixing.
	- Leading edge of auger digging into drum floor.	- Adjust auger height.
	- Shear Bolt Failure	- Replace Shear Bolt
- Visible deformation, wear or failure of driveline or PTO components	- Extreme load - Contaminants (sand, etc.) - Turning at too great an angle	- Replace damaged components with Jaylor recommended parts

26. STANDARD MODEL SPECIFICATIONS

26.1 5150 Trailer Cutter Mixer Feeder

Component	Detail	Specification
Mixing Chamber	Capacity	155 cu ft. (4.4 m ³)
Auger Assembly	Features	Complete w/ 8 Tungsten Carbide Cutter Blades.
Frame	Features	Heavy duty, with provision for 3-point weigh scale system.
Wheel Assembly	(2) Tire and Wheel Assemblies	10.0 / 75 – 15.3 18 Ply tires on 9 x 15.3, 6-Bolt rims
Conveyor Assembly	Width and Type	n/a
	Conveyor Drive Assembly	n/a
Drivetrain	PTO Shaft	#6, 1-3/8" dia., 6-spline hookup to tractor.
	Maximum Operating Speed	540 revolutions per minute (RPM)
	Horsepower Requirement	35 HP Minimum; depends on commodities mixed.
Hydraulics	Tractor Hydraulic System Requirements	Minimum 2 sets of Remote Hydraulic Outlets. 5 gpm (19 L/min) at 2000 psi (13,750 kPa)
Weight	3500 lbs. (1590 kg)	Dependent on equipped options.

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

26.2 5350 Trailer Cutter-Mixer-Feeder

Component	Detail	Specification
Mixing Chamber	Capacity	350 cu ft. (9.9 m ³)
Auger Assembly	Features	Complete w/ 9 Tungsten Carbide Cutter Blades.
Frame	Features	Heavy duty, with provision for 3-point weigh scale system.
Wheel Assembly	(2) Tire and Wheel Assemblies	12.5 x 15 – L.R. "F" on 15 x 10, 8-Bolt 6000 lb. Rim with Valve Guard.
Conveyor Assembly	Width and Type	36" (91 cm) wide, chain/slat discharge, various option packages available.
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
Drivetrain	PTO Shaft	#6, 1-3/8" 6-spline w/ shear bolt protection (540 RPM) #8, 1-3/8" 21-spline w/ shear bolt protection (1000 RPM)
	Max Operating Speed	540 RPM (standard) / 1000 RPM (optional)
	Horsepower Requirement	60 HP Minimum; depends on commodities mixed.
Hydraulics	Tractor Hydraulic System Requirements	Minimum 2 sets of Remote Hydraulic Outlets. 5 gpm (19 L/min) at 2000 psi (13,750 kPa)
Weight	7300 lbs. (3300 kg)	Dependent on equipped options.

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

26.3 5400 Trailer Cutter-Mixer-Feeder

Component	Detail	Specification
Mixing Chamber	Capacity	375 cu ft. (11.5 m ³)
Auger Assembly	Features	Complete w/ 8 Tungsten Carbide Cutter Blades
Frame	Features	Heavy duty, with provision for 3-point weigh scale system
Wheel Assembly	(2) Tire and Wheel Assemblies	15.0 x 17 - 26 Ply Rural Route Tire on 17 x 13, 8-Bolt 9500 lb. Rim with Valve Guard
Conveyor Assembly	Width and Type	36" (91 cm) wide, chain/slat discharge, various option packages available
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
Drivetrain	PTO Shaft	#6, 1-3/8" 6-spline w/ shear bolt protection (540 RPM) #8, 1-3/8" 21-spline w/ shear bolt protection (1000 RPM)
	Max Operating Speed	540 RPM (standard) / 1000 RPM (optional)
	Horsepower Requirement	70 HP Minimum; depends on commodities mixed.
Hydraulics	Tractor Hydraulic System Requirements	Minimum 2 sets of Remote Hydraulic Outlets. 5 gpm (19 L/min) at 2000 psi (13,750 kPa)
Weight	7900 lbs. (3600 kg)	Dependent on equipped options.

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

26.4 5425 Trailer Cutter-Mixer-Feeder

Component	Detail	Specification
Mixing Chamber	Capacity	450 cu ft. (12.0 m ³)
Auger Assembly	Features	Complete w/ 9 Tungsten Carbide Cutter Blades
Frame	Features	Heavy duty, with provision for 3-point weigh scale system
Wheel Assembly	(2) Tire and Wheel Assemblies	15.0 x 17 - 26 Ply Rural Route Tire on 17 x 13, 8-Bolt 9500 lb. Rim with Valve Guard
Conveyor Assembly	Width and Type	36" (91 cm) wide, chain/slat discharge, various option packages available
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
Drivetrain	PTO Shaft	#6, 1-3/8" 6-spline w/ shear bolt protection (540 RPM) #8, 1-3/8" 21-spline w/ shear bolt protection (1000 RPM)
	Max Operating Speed	540 RPM (standard) / 1000 RPM (optional)
	Horsepower Requirement	70 HP Minimum; depends on commodities mixed.
Hydraulics	Tractor Hydraulic System Requirements	Minimum 2 sets of Remote Hydraulic Outlets. 5 gpm (19 L/min) at 2000 psi (13,750 kPa)
Weight	7500 lbs. (3400 kg)	Dependent on equipped options.

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

26.5 5575 Trailer Cutter-Mixer-Feeder

Component	Detail	Specification
Mixing Chamber	Capacity	475 cu ft. (16.3 m ³)
Auger Assembly	Features	Complete w/ 11 Tungsten Carbide Cutter Blades
Frame	Features	Heavy duty, with provision for 3-point weigh scale system
Wheel Assembly	(2) Tire and Wheel Assemblies	15.0 x 17 - 26 Ply Rural Route Tire on 17 x 13, 8-Bolt 9500 lb. Rim with Valve Guard
Conveyor Assembly	Width and Type	36" (91 cm) wide, chain/slat discharge, various option packages available
	Conveyor Drive Assembly	Hydraulic Orbit Motor, 9.75 cu.in/rev. (160cc/rev)
Drivetrain	PTO Shaft	#8, 1-3/8" 6-spline w/ shear bolt protection (540 RPM) #8, 1-3/8" 21-spline w/ shear bolt protection (1000 RPM)
	Max Operating Speed	540 RPM (standard) / 1000 RPM (optional)
	Horsepower Requirement	80 HP Minimum; depends on commodities mixed.
Hydraulics	Tractor Hydraulic System Requirements	Minimum 2 sets of Remote Hydraulic Outlets. 5 gpm (19 L/min) at 2000 psi (13,750 kPa)
Weight	9,400 lbs. (4300 kg)	Dependent on equipped options.

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

27. MAINTENANCE AND SERVICE INFORMATION

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

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

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

27.1 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 if equipped (if not, block wheels), 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. Disconnect the spark plug lead and ground it to ensure the engine does not start unexpectedly.
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.

27.2 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.

27.3 Following an Effective Maintenance Schedule

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

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

27.4 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

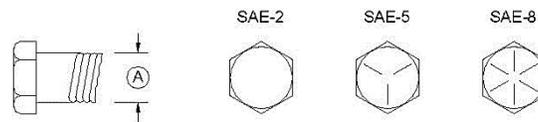


Figure 30 - Imperial Bolt Specifications

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

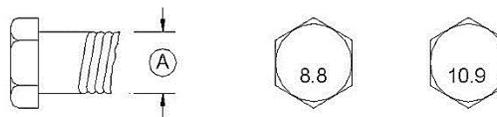


Figure 31 - Metric Bolt Specifications

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

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

27.5 Fluids and Lubricants

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

27.5.1 Planetary Gearbox Oil

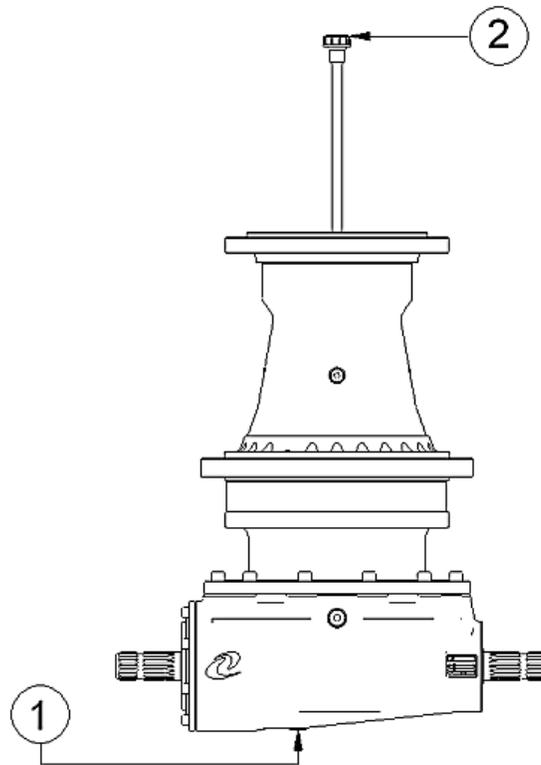


Figure 32 - Planetary Gearbox

1. Oil Drain Plug
2. Breather Cap

All models equipped with the standard planetary gearbox will require **fully synthetic industrial gear oil**. Prior to adding oil to your reservoir or gearbox ensure the oil is PAO (polyalphaolefin) based and **NOT** PAG (polyalkylene) based. Mixing fully synthetic oils is acceptable as long as both oils are PAO based. The following is a list of equivalent brand name oils that are suitable for use in the planetary gearbox on your Jaylor.

Enduratex Synthetic EP 150 Gear Oil

Exxon Spartan Synthetic Ep 150 (*Mobile*)
 Shell Omala S4 GX 150 (*Shell*)
 Mobil SHC Gear 150 (*Mobile*)

To maintain the gearbox, 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. **Checking Oil Level:**
Each gearbox is equipped with a special oil reservoir and breather mounted on the drum to eliminate maintenance on the gearbox itself. The oil level must be checked daily when the gearbox is cold and machine is level. Add oil through the vented cap as required to maintain the oil level between the lines as identified by decal beside the reservoir.
4. **Checking the Magnetic Plug:**
If equipped, the gearbox may have a magnetic plug designed to collect and trap metallic contaminants from the lubricating oil. The magnetic plug is usually the oil drain plug. It is recommended that the plug be removed **25 hours** after new and then every **100 hours or twice annually** and cleaned to remove contaminants from the system. To clean the plug, follow this procedure:
 - a. Have a rubber plug available that will fit into and act as a stopper in the plug hole when the plug is removed.
 - b. Place a pan under the plug to collect any spilled oil.
 - c. Remove the magnetic plug.
 - d. Quickly install the rubber plug to minimize loss of oil.
 - e. Examine the material collected on the magnet. There should be only a small clump of material sticking on the magnet. A small clump will indicate the system is functioning well. If there are large pieces of cuttings or chips on the magnet, change the oil in the gearbox immediately to remove contaminants. Refill with clean oil. Contact your dealer or distributor for assistance in troubleshooting, repairing, or replacing the gearbox.
 - f. Clean the plug.
 - g. Remove rubber plug, install magnetic plug and tighten to its specified torque.
 - h. Dispose of the oil in an environmentally friendly manner.
5. **Refilling Planetary Gearbox and Reservoir:**
The oil in the gearbox should be changed **at least annually**. However, if there is a leak, so much oil may be lost that the system may have to be refilled. If metal contaminants are found on the magnetic plug, the system should be drained and refilled with clean oil. When refilling or changing oil, follow this procedure:
 - a. Place a large pan or pail under the drain plug. The pan or pail must be large enough to hold the oil volume specified in the table below.
 - b. Remove the plug and allow sufficient time for the system to drain.
 - c. Dispose of the used oil in an environmentally friendly manner.
 - d. Clean the plug and reinstall. Tighten plug to its specified torque.
 - e. Clean around the breather on the reservoir. Remove the breather and its mounting bushing.
 - f. Pump oil directly into the gearbox. Use the table below to find the oil volume for your mixer.
 - g. Reassemble the reservoir and breather assembly.
 - h. Using a funnel, fill the reservoir.
 - i. Refill the reservoir until the oil level stabilizes.
 - j. Clean the breather, reinstall and tighten to its specified torque.

Model	Oil Volume
5150	5L (1.3 US gallons)
5350, 5400, 5425, 5575 with 540 RPM gearbox	20L (5.2 US gallons)
5350, 5400, 5425, 5575 with 1000 RPM gearbox	21L (5.8 US gallons)

Note:

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

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

6. Breather/Filter Assembly:

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

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

Note:

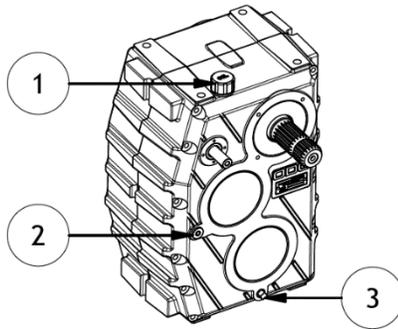
- There is a second breather located within the auger tube sticking out the top of the gearbox. This breather should also be inspected and cleaned periodically.

Important: Oil is added to the lubrication system through the breather hole. Always clean around the breather prior to removing it and adding oil.

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

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

27.5.2 2-Speed Transmission Oil



1. Breather Plug/Oil Fill
2. Oil Level Sight Glass / Sight Plug
3. Oil Drain Plug

Figure 33 - 2 Speed Transmission Assembly

Suitable oil for use in the 2-speed transmission is as follows:

Enduratex EP 220 Gear Oil

Esso Spartan Ep 220 (*Mobile*)
 Shell Omala Oil 220 (*Shell*)
 Mobilgear 600 Xp 220 (*Mobile*)
 Sunep 1070 (*Sunoco*)

To maintain the gearbox, 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. Checking Oil Level:
 Each 2-speed transmission is equipped with either a sight glass or sight plug on the front for checking the oil level. **Check daily** when the gearbox is cold and the machine is level. Oil should reach the sight plug or be visible through the sight glass, if equipped. Add oil through the breather plug to maintain the oil level.
4. Refilling
 - a. Place a large pan or pail under the drain.
 - b. Remove plug and allow sufficient time for the system to drain.
 - c. Dispose of the used oil in an environmentally safe manner.
 - d. Clean the plug and reinstall.
 - e. Clean around the breather/fill plug. Remove and inspect the breather to ensure that it is functioning properly.
 - f. Using a funnel, fill the transmission to the level of the sight glass. The sight glass is the correct oil level for the transmission. The 2-speed transmission will hold approximately **10.22 liters (2.7 US gallons)**.

Important: Oil is added to the lubrication system through the breather hole. Always clean around the breather prior to removing it and adding oil.

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

27.5.3 Greasing

Use **Section 28** 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.

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

When creating a maintenance schedule please keep in mind:

- Wheel hubs should be greased periodically and repacked yearly. If the mixer is running through muddy, sandy, dusty or wet conditions often greasing intervals should be increased.
- When greasing through the central grease lines be sure to inspect the integrity of the line. If a line is split, cracked and/or disconnected replace the line immediately.
- Jaylor mixers are equipped with one driveshaft assembly. Depending on the options specified, grease locations will vary. Grease is required at each cross or 'u'-joint found on the driveshaft. Crosses will require **1 pump every 8 hours or 25 loads**. Refer to **Figure 34**, **Figure 35** and **Figure 36** for typical grease locations

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

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

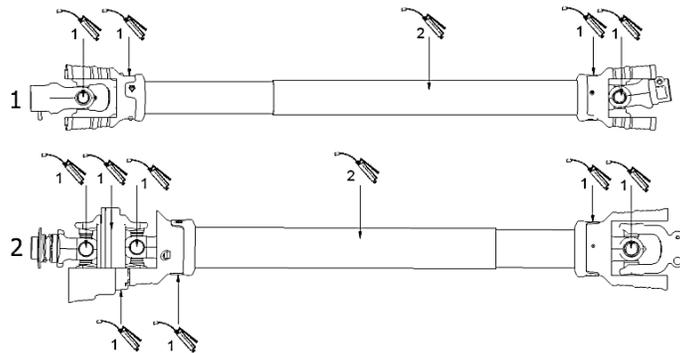


Figure 34 - PTO Shaft Grease Locations

1. **Standard PTO Shaft**
2. **Constant Velocity Joint PTO Shaft**

- 1 Grease one pump after every 8 hours or 25 loads
- 2 Grease one pump after every 16 hours or 50 loads

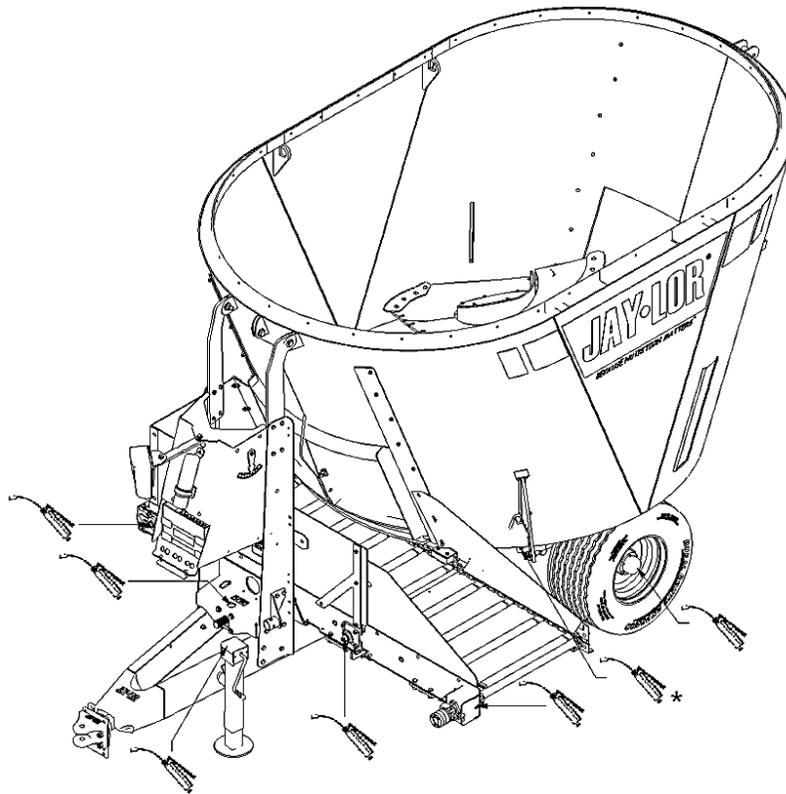


Figure 35 - Grease Points on Single Auger Mixer

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

Note – There are a total of 6 bearings on the conveyor that need to be greased. The 3 not labeled are directly opposite the ones that are

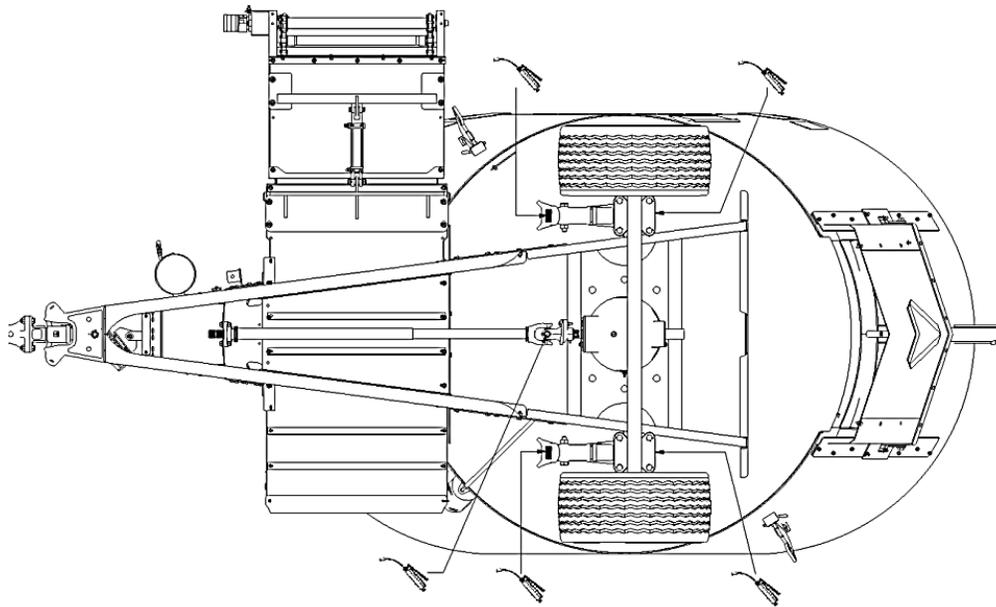


Figure 36 - Grease Points Underneath a Single Auger Mixer

27.6 Unloading Conveyor

Jaylor mixers can be equipped with a hydraulically powered chain slat conveyor or belt conveyor for unloading and distributing mixed rations to the feeding area. While there are several unloading conveyor options available, service for each assembly is essentially the same.

27.6.1 Conveyor Tension

To adjust the conveyor 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. Tension:
 - a. The chain or belt is set at the proper tension when it runs without jumping the drive sprockets.
 - b. Pull up at the center of a span.
 - c. The chain or belt should come up approximately 1-1/2 inches (38 mm) when the tension is correct.
4. Setting:
 - 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.
 - e. Tighten bearing housings anchor bolts to their specified torque.
 - f. Tighten adjusting bolt jam nuts to their specified torque.

Important: Always move both ends of the shaft the same amount to keep the shaft square to the chain.

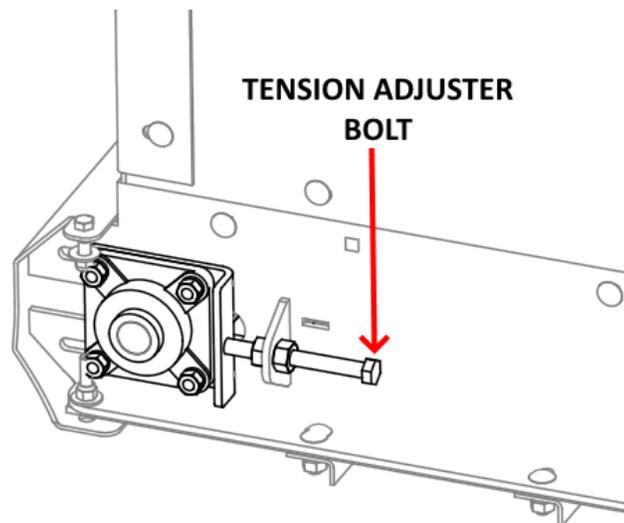


Figure 37 - Tension Adjuster Bolt

27.6.2 Chain Guide Wear Blocks

Machines equipped with a winged conveyor have wear blocks to keep the conveyor chain travelling close to the conveyor floor when the wing is tilted up (see **Figure 38**). The blocks are consumable items and should be checked periodically to ensure proper conveyor chain operation and performance. The wear blocks are designed such that they can be unbolted and turned so that a new wear face is exposed, thus extending the life of the blocks. However, if the blocks are worn to a point where they can no longer be used, replace with new wear blocks, available from your Jaylor dealer or distributor.

Important: Operating the adjustable wing conveyor tilted at maximum height places additional stress and wear on the chain guide wear blocks.

27.6.3 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.

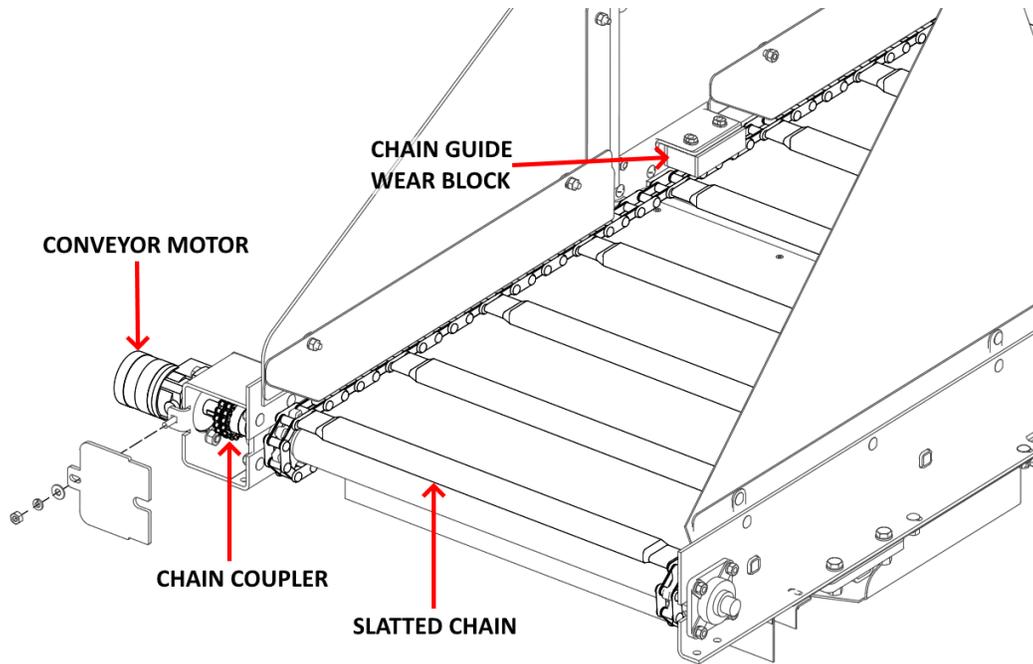


Figure 38 - Conveyor Chain Coupler

27.7 Auger 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 keeps it sharp.

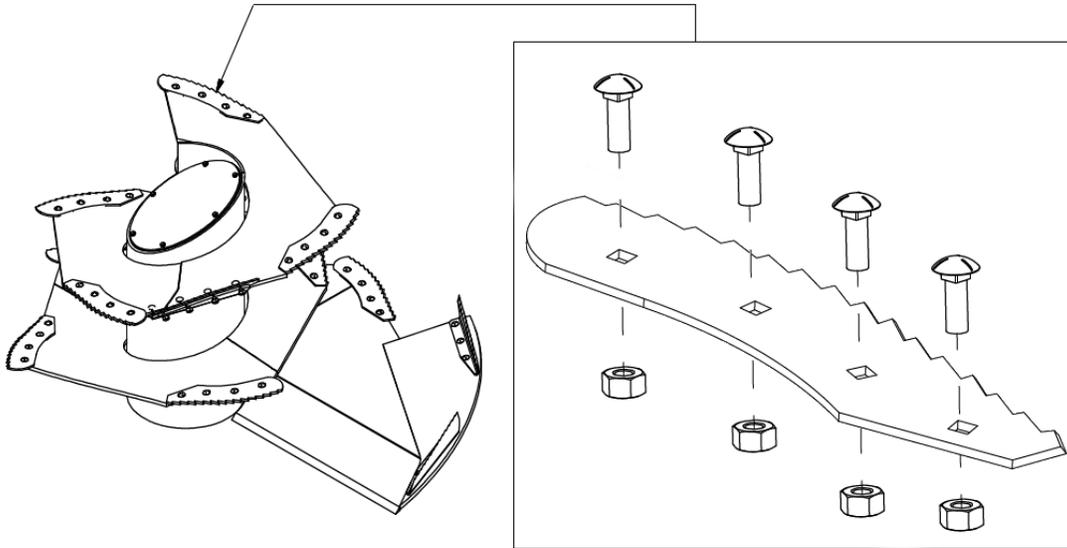


Figure 39 - Auger and Knife Assembly

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



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

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

27.8 Shear Bolt Specifications

All Jaylor mixers equipped with a mechanical driveline include shear bolt protection. The standard shear bolt size for all Jaylor machines is **M12x65mm GRD 8.8**.

Note:

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

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

27.9 Wheel Maintenance

Inflate tires on all Jaylor Models to the tire manufacturer's recommended pressure. The inflation pressure will be on the tire and/or in the chart below. Ensure all tires are at the recommended pressure. Allowable load capacity and maximum tire pressures for conventional and wide base tires are based on TRA Standards. Inflation values are based on cold pressures.

10.0/75-15.3

Load Rating: 5070lbs (2300kg) at 15mph (25KM/H)
Max Pressure: psi 104 bar 7.15 kPa 715

15.0/55-17

Load Rating: 9500lbs (4300kg) at 15mph (25KM/H)
Max Pressure: psi 87 bar 6 kPa 600

12.5L x 15F1

Load Rating: 5600lbs (2540kg) at 30mph (48KM/H)
Max Pressure: psi 90 bar 6.20 kPa 620

245/70R19.5 (Per Tire in Dual Configuration)

Load Rating: 5800lbs (2628kg) at 25mph (40KM/H)
Max Pressure: psi 130 bar 8.96 kPa 896

435/50R19.5

Load Rating: 9920lbs (4500kg) at 62mph (100KM/H)
Max Pressure: psi 130 bar 8.96 kPa 896



Warning: Never over inflate tires and keep a safe distance while inflating. Over inflation can result in the tire exploding which could result in serious injury or death.

Wheel condition should be visually inspected before every use along with more thorough checks often.

Wheel nuts need to be retightened routinely after:

1. First use
2. The first laden journey
3. The first 1,000 km
4. Every six months or 25,000 km

The wheel nuts should be torqued according to the specs below in a star pattern. Power tools should only be used if they can be precisely and accurately set to the correct torque.

<u>Bolt Pattern</u>	<u>Size</u>	<u>Torque</u>
6-bolt	M18	200-213 lb. ft. (270-290 N.m.)
8-bolt	M16	145-160 lb. ft. (200-220 N.m.)
10-bolt	M22	330-375 lb. ft. (450-510 N.m.)

27.10 Periodic Maintenance Chart

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

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

Item	Interval
Check reservoir oil level	Every 1 day
Check 2-speed gearbox oil level	Every 1 day
Check conveyor chain tension	Every 1 day
Check tire pressure	Every 1 day
Grease PTO crosses & U-joints	Every 8 hours or 25 loads
Grease auger bushings	Every 8 hours or 25 loads
Grease PTO shafts	Every 16 hours or 50 loads
Grease conveyor bearings	Every 16 hours or 50 loads
Grease driveshaft bearing	Every 16 hours or 50 loads
Grease axle weigh bars	Every 16 hours or 50 loads
Check hydraulic fittings and hoses for leaks	Every 1 week
Grease conveyor chain coupler	Every 1 week
Inspect conveyor chain condition	Every 1 week
Inspect auger knife condition	Every 1 week
Check hardware for tightness	Every 1 month
Check tire condition	Every 1 month
Check / clean gearbox magnetic plug	After first 25 hours Every 100 hours or 6 months
Clean oil reservoir breather	Every 200 hours or 6 months
Grease wheel hubs	Every 6 months
Change gearbox oil	After first 100 hours Every 2000 hours or 1 year



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!

30. PARTICLE SEPARATOR

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JAYLOR PARTICLE SEPARATOR

The Jaylor Particle Separator is based on the modified (2 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

Jud Heinrichs



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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

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 ¹ (> 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 ¹ (0.75 - 0.31")	40-50%	30-40%	30-50%
Bottom pan ¹ { < .31")	40-50%	40-50%	40-60%

¹ 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).

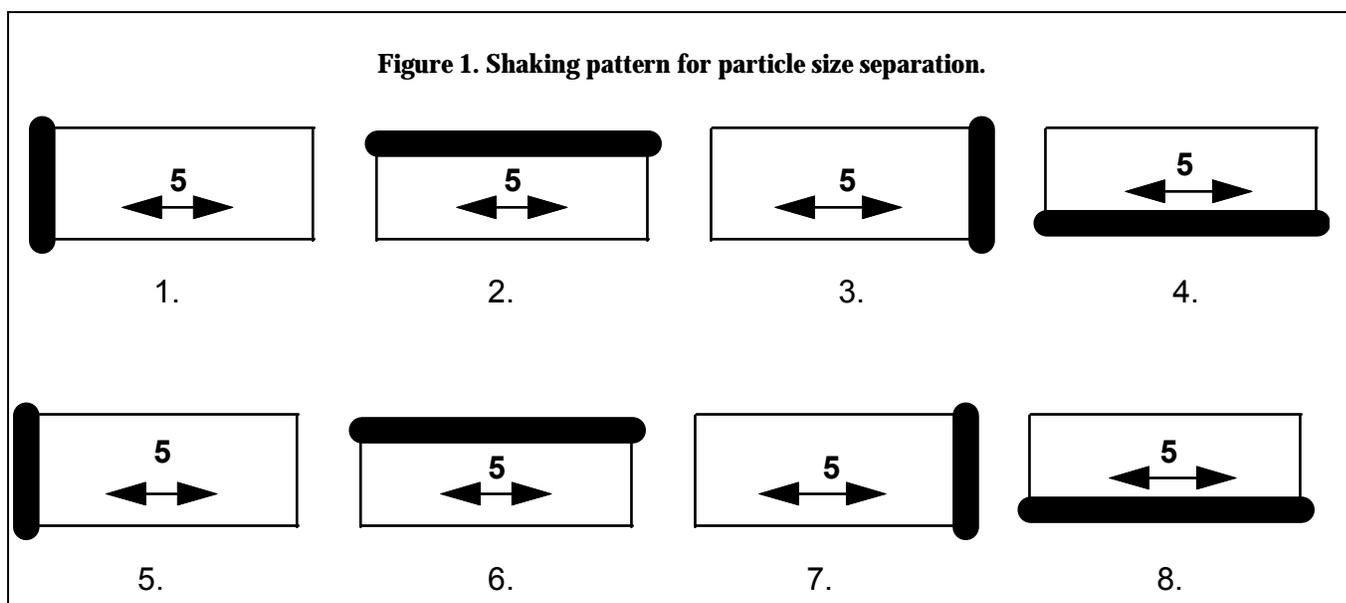
On Weibull paper, the horizontal axis is for particle size and the vertical axis is for cumulative percent undersized. The axes are not linear. For the example given in Table 2, the following deductions or statements can be made:

- 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.



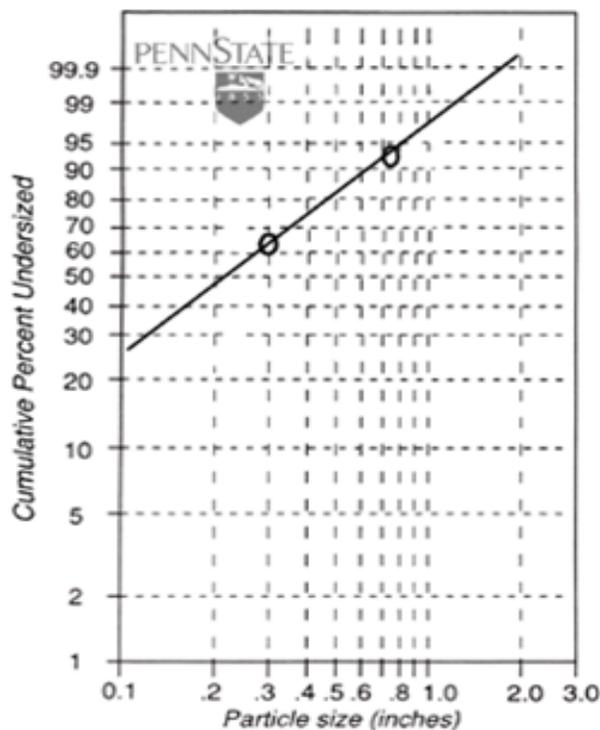
PARTICLE SIZE SEPARATOR INSTRUCTIONS (CONTINUED)

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 x (b + c)/d]	middle sieve	30%
% under middle sieve		62%	[f = (100 x c/d)]	bottom pan	62%

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

Figure 2. Weibull paper



PARTICLE SIZE EFFECTS ON THE DAIRY COW

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

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

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

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

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

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

RECOMMENDED FIBER INTAKES

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

particle size to maintain a healthy rumen environment.

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

RECOMMENDED FIBER INTAKES (CONTINUED)

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

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

Table 3. Guidelines for forage NDF intake.

Forage NDF as % of body weight ¹	Intake level
.75% ²	Minimum if ration provides 1.30-1.40% total NDF by use of byproduct feeds.
.85% ²	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

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

²Higher 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

extension.psu.edu

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

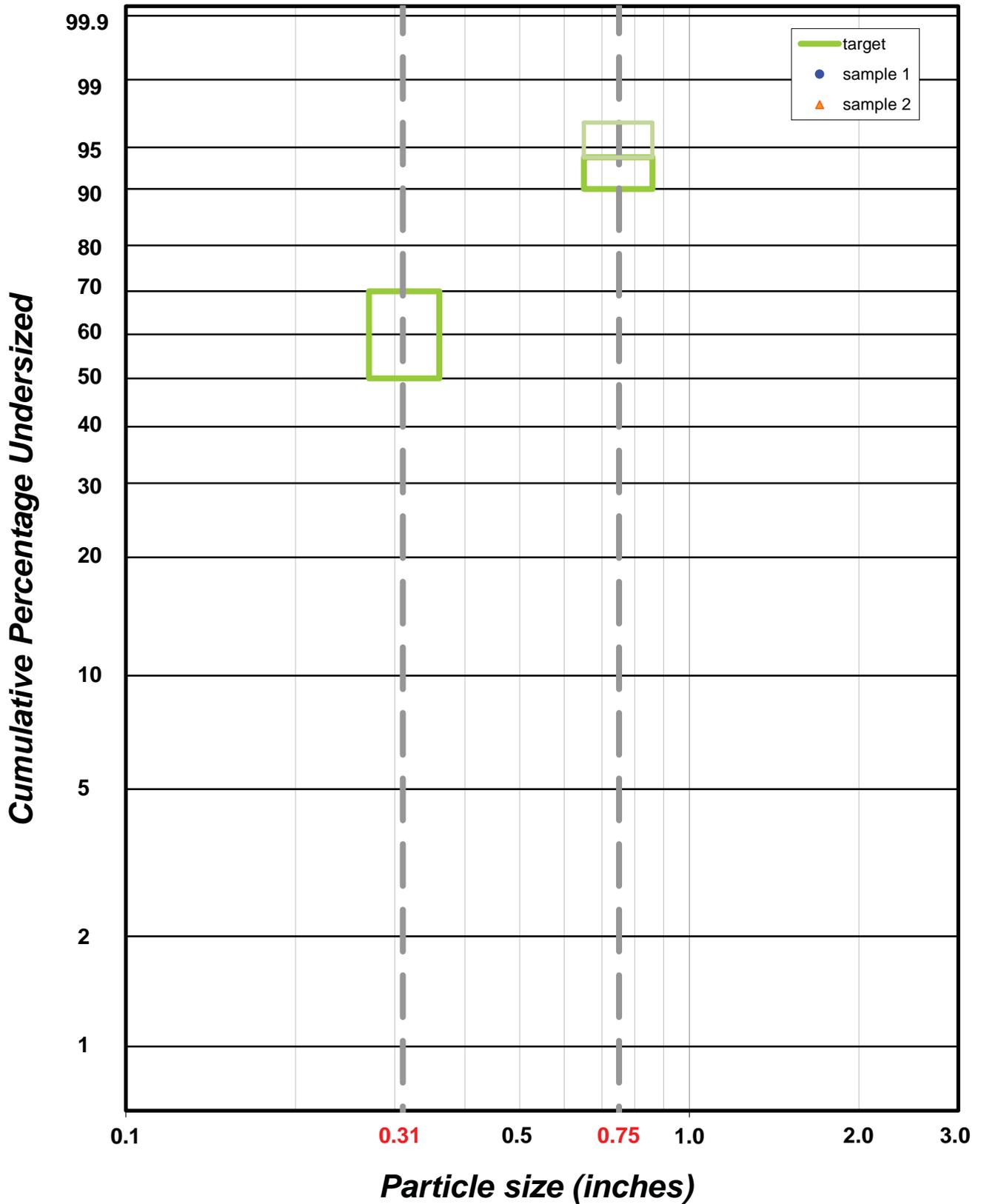
Upper Sieve
[e = 100 - (a/d*100)] _____

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



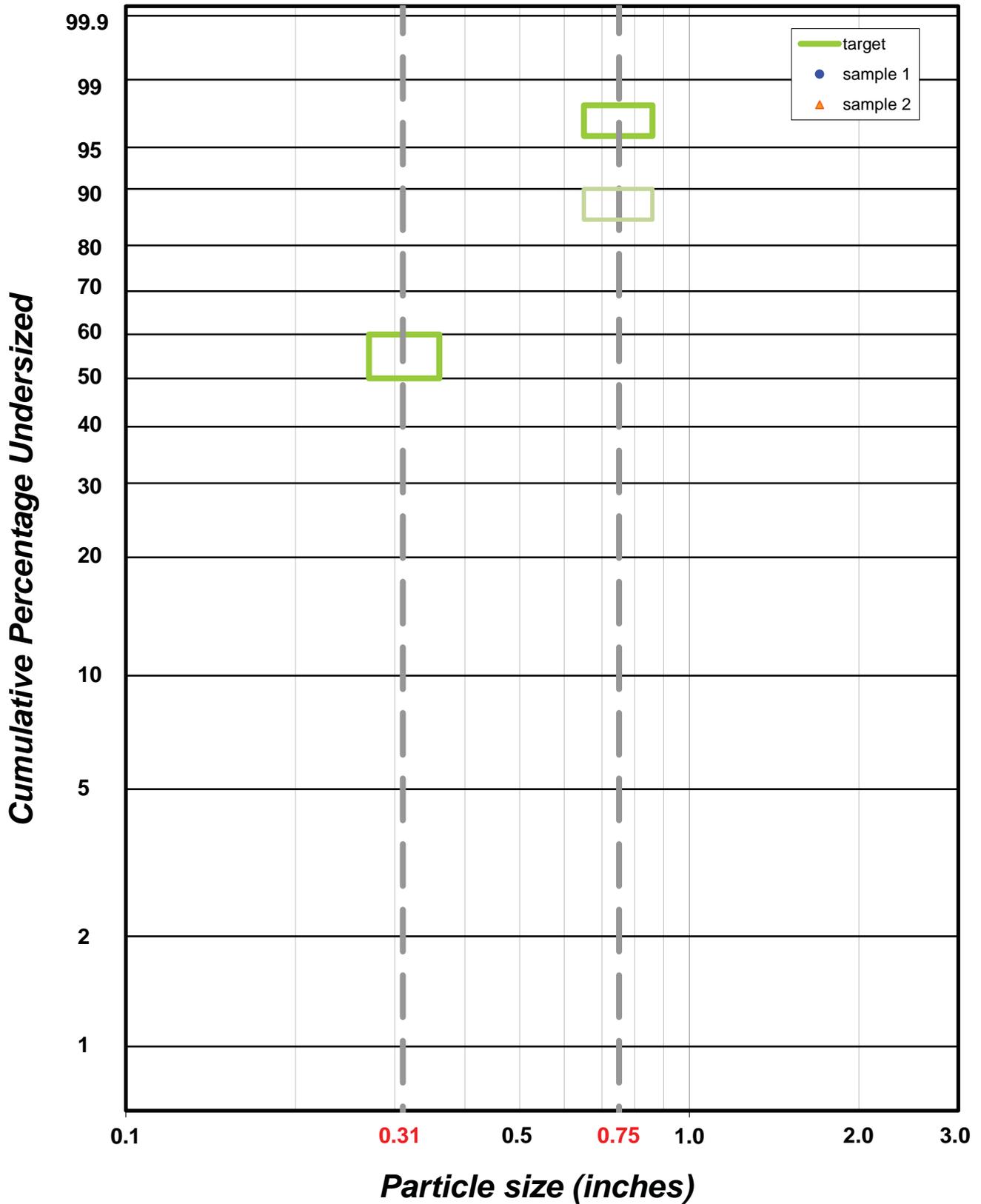
TMR Particle Size Analysis

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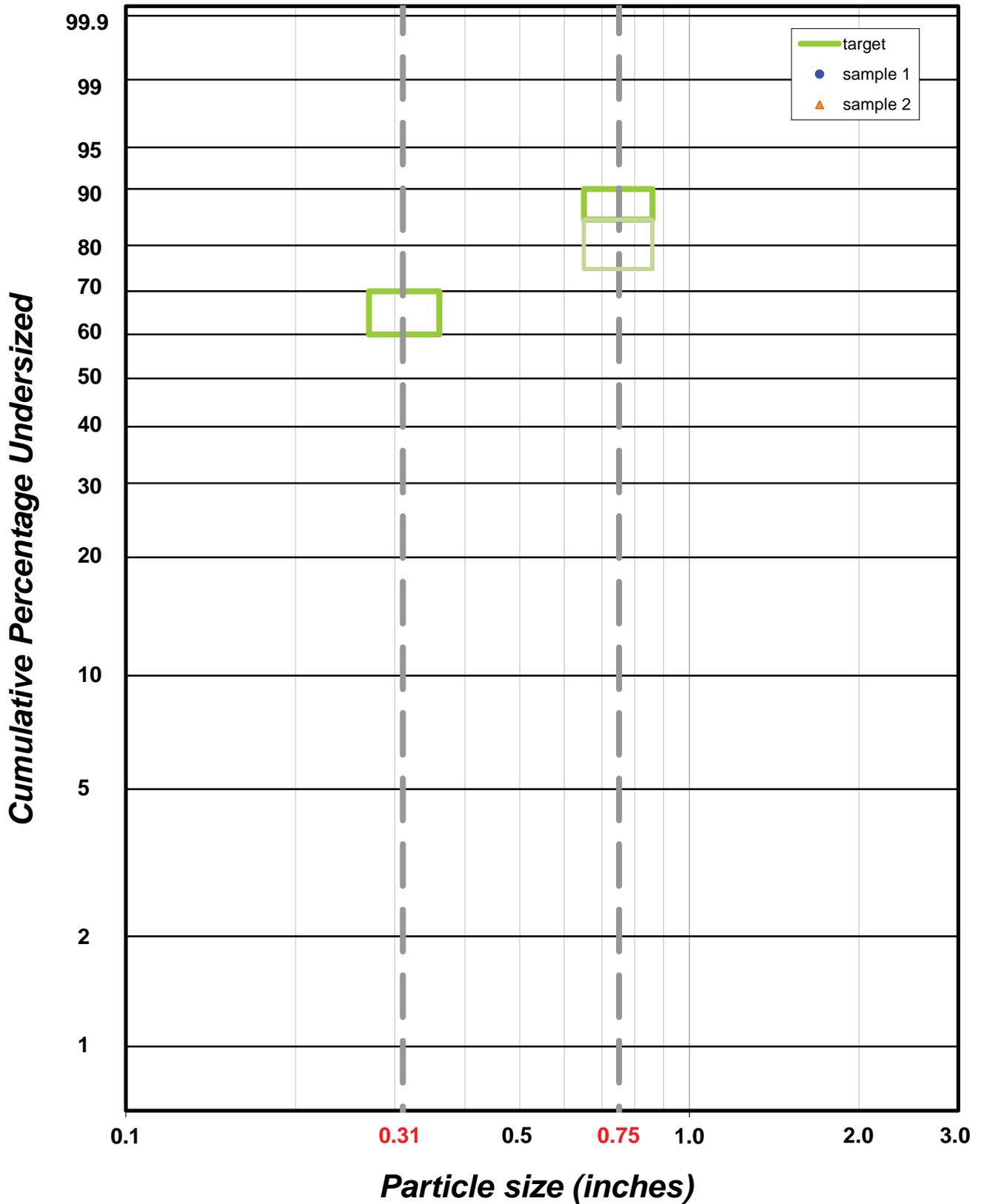
Corn Silage Particle Size Analysis

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Haylage Particle Size Analysis

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