HUSKY VACUUM SPREADER

OPERATOR'S MANUAL

GUARANTEE

All Husky Farm Equipment manufactured by Husky Farm Equipment Limited is guaranteed. Guarantee covers all the replacement cost or repair of all parts said to be defective from manufacture. Guarantee also covers labour installing said parts, if installed at Husky's Manufacturing plant. Time and use is the essence of the guarantee. If equipment is used on a private property for an individual's use, guarantee will be in effect for twelve months from date of invoice. If equipment is used for commercial use to do custom work for money then guarantee will be in effect for three months only from date of invoice.

EXEMPTIONS FROM GUARANTEE

Cost of transportation of equipment to or from Husky Farm Equipment Limited either by customer or by Husky's service staff or cost of mail or of public transportation is not covered. Tires and electric or hydraulic motors are covered by manufacturer's warranty and although Husky may assist to get warranty, Husky will not be responsible other than that allowed by manufacture's warranty. Items subject to normal wear from use not covered by guarantee if faulty part is simply worn.

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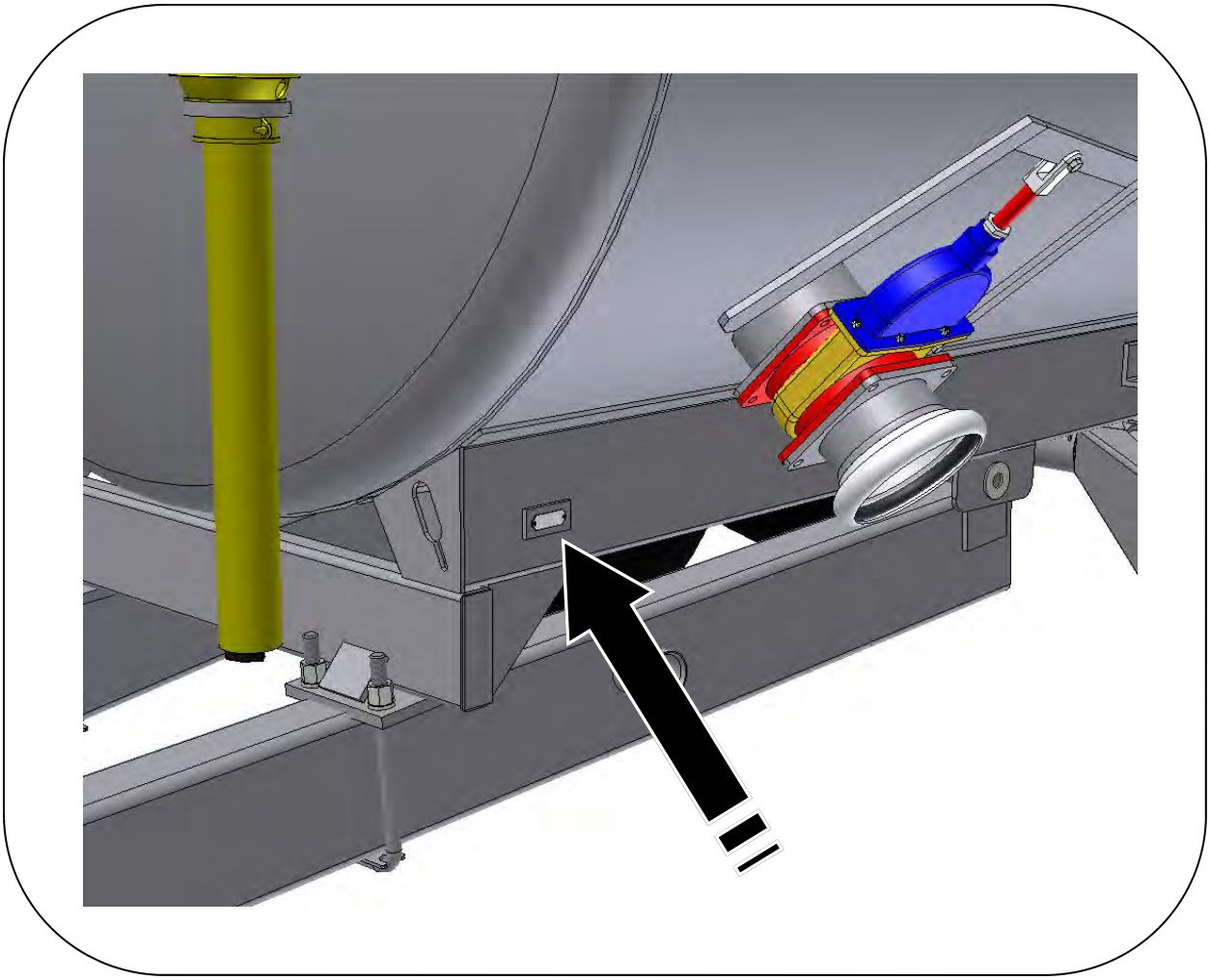
SERIAL NUMBER LOCATION

Always give your dealer the serial number of your Husky Vacuum Spreader when ordering parts or requesting service or other information.

The serial number plate(s) is located where indicated. Please mark the number in the space provided for easy reference.



SERIAL NUMBER LOCATION

Model Type_____

Serial Number_____

Production Year_____

1 INTRODUCTION

Congratulations on your choice of a Husky Vacuum Spreader to compliment your farming operation. This equipment has been designed and manufactured to meet the need of most discerning operators. The highest quality components are used throughout, and each step of Husky manufacturing is inspected under strict quality control.

Safe, efficient and trouble-free operation of your Husky Vacuum Spreader requires that you and everyone else who will be operating or maintaining the machine read and understand all of the safety, operation, maintenance and trouble shooting information contained within this Operator's Manual.

Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Husky Dealer if you need assistance, information or additional copies of the manuals.

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 in the direction of travel.

2 SAFETY

SAFETY ALERT SYMBOL

This Safety Alert Symbol Means
ATTENTION! BECOME ALERT
YOUR SAFETY IS INVOLVED

The Safety Alert symbol identifies important safety messages on the Husky Vacuum Spreader 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.

Why is SAFETY important to you?

3 Big Reasons

Accidents Disable and Kill
Accidents Cost
Accidents Can Be Avoided

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 - An immediate and specific hazard which WILL result in severe personal injury or death if the proper precautions are not taken.

WARNING - A specific hazard or unsafe practice which COULD result in severe personal injury or death if the proper precautions are not taken.

CAUTION - Unsafe practices which COULD result in personal injury if the proper practices are not taken, or as a reminder of good safety practices.

SAFETY

YOU are responsible for the SAFE operation and maintenance of your Husky Vacuum Spreader. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Vacuum Spreader 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 alerts you to all good safety practices that should be adhered to while operating this equipment.

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. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

Spreader owners must give operating instructions to operators or employees before allowing them to operate the Husky Vacuum Spreader and at least annually thereafter per OSHA regulation 1928.57.

Husky Vacuum Spreader owners must follow safety practices as recommended by the Agriculture Safety Associations across Canada .

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 the manual and to follow these. All accidents can be avoided.

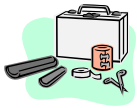
A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes themselves and bystanders to possible serious injury or death.

Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.

Think SAFETY! Work SAFELY!

2.01 GENERAL SAFETY

1. Read and understand the Operator's Manual and safety signs before operating, maintaining, adjusting or unplugging the Vacuum Spreader.



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

3. Have a fire extinguisher available for use should the need arise and know how to use it.

4. Install and properly secure all shields and guards before operating.

5. Do not allow riders on the machine or tractor.

6. Stop tractor engine, disengage PTO clutch, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

7. Never enter manure storage facility without appropriate respiratory equipment and an independent oxygen supply.

8. Review safety related items with all operators annually

2.02 OPERATING SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, servicing, adjusting or unplugging.

2. Do not allow riders on the Husky Vacuum Spreader or the tractor during operation, transport or filling.

3. Do not operate a PTO driven system unless the required shields are in place and secured.

4. Never wear loose fitting clothing, keep hands, feet, hair and clothing away from all moving and/or rotating parts, while working with machinery, use personal protective clothing and eye and ear protection as needed.

5. Stop tractor engine, disengage PTO clutch, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

6. Before applying hydraulic pressure to the system, make sure everyone is clear and that all connections are tight and all components are in good repair.

7. Never enter manure tank or manure storage facility without wearing appropriate breathing gear that carries an independent supply of oxygen.

8. Always use a tractor of sufficient size and weight to maintain vehicle stability during transport and during use.

9. Clean or install reflectors and SMV emblem before transporting and add extra lights for transporting during times of limited visibility.

10. Install the optional brakes if Vacuum Spreader is to be used on hilly terrain.

11. Review all safety instructions annually.

Think SAFETY! Work SAFELY!

2.03 MAINTENANCE SAFETY

1. Read and understand all the information contained in the Operator's Manual regarding maintenance, adjusting and operating Husky Vacuum Spreader.

2. Block the frame up securely and firmly if adjustments and maintenance to the Vacuum Spreader require raising the wheel and tire assemblies off the ground.

3. Exercise extreme caution when working around or with high-pressure hydraulic systems. Depressurize the system when connecting or disconnecting the hose couplers.

4. Wear heavy gloves and eye protection when searching for suspected hydraulic leaks. A high-pressure concentrated stream of hydraulic fluid can pierce the skin. If such an event happens, seek immediate medical attention as infection and toxic reaction could develop.

5. Do not attempt any adjustment or maintenance to any system of the Husky Vacuum Spreader when the implement is in motion.

6. Be very careful and exercise extreme caution when working around or near a rotating PTO shaft.

7. Do not operate PTO system unless the rotating shield and all other guards are in place.

8. Never wear ill-fitting, baggy or frayed clothing and never have unkempt long hair when working around or on any of the drive system components.

9. Stop the engine, place all controls in neutral, remove the ignition key, set the park brake and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging any system or component.

10. Never enter tank or manure storage facility without wearing appropriate breathing gear that carries an independent supply of oxygen. The buddy system is also a recommended procedure.

11. Do not use the jack stand to support the hitch when the tank is full.

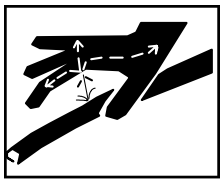
2.04 HYDRAULIC SAFETY

1. Make sure that all components in the hydraulic system are kept in good condition and are clean.

2. Replace any worn, cut, abraded, flattened or crimped hoses and metal lines.

3. Do not attempt any makeshift repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure; 1600 to 2300 pounds per square inch. Such repairs will fail suddenly and create a hazardous and unsafe condition.

4. 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.



5. 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.

6. Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged and kept in good repair.

7. Make sure all hydraulic hoses are not snagged on anything

VAC - PRESSURE SAFETY

1. Although the Husky Vacuum Spreader is equipped with a safety pressure valve, never try to remove air hoses while tank is under vacuum or pressure

2. Never open moisture trap lip, muffler base, or tank manhole lid while under vacuum or pressure.

3. Do not adjust or remove safety pressure valve as increased pressure or vacuum may damage tank.

4. Do not install any other pressure or vacuum type pump on tank than that which is recommended by Husky Farm Equipment Ltd.

2.05 TRANSPORT SAFETY

1. Make sure you are in compliance with all local regulations regarding transporting agricultural equipment on public roads and highways. Consult your local law enforcement agency for further information.

2. Ensure that the SMV (Slow Moving Vehicle) emblem and all reflectors and lights required by the local highways and transport authorities are in place and are clean and visible by overtaking and oncoming traffic.

3. Do not allow anyone to ride on the Spreader or tractor during transport.

4. Ensure that the Husky Vaccum Spreader is hitched positively and safely to the tractor drawbar. Use proper safety chain to secure a safe hitch hookup when transporting.

5. Transport according to local regulations covering maximum width, weight and length.

6. Do not exceed 32 km/hr (20 mph). Reduce speed on rough roads and surfaces.

7. Always use a tractor of sufficient size and weight to maintain vehicle stability during transport.

8. Always shift tractor down into a lower gear when going down hills with a full tank to use the engine retarding force and to maintain vehicle stability.

9. Install the optional hydraulic brake package if used on hilly terrain.

10. Always use hazard warning flashers on tractor when transporting unless prohibited by law.

Think SAFETY! Work SAFELY!

2.06 MANURE STORAGE FACILITY SAFETY

1. Never enter tank or manure storage facility without wearing appropriate breathing gear that carries an independent supply of oxygen .

2. Keep others, especially children, out of these structures.

3. Use special care when opening storage facilities to prevent yourself or others from falling in.

4. Stored manure gives off hydrogen sulfide gas. One breath can kill. Keep away. Keep others away.

5. Do not enter storage facility without oxygen supplying equipment. The surface always crusts and looks solid. It is not. Stay away.

6. Set and adjust agitator before placing in pit. Never enter pit to unplug. Remove first.

7. Always have a ladder in storage tank as a means of getting out should you inadvertently fall in.

2.07 STORAGE SAFETY

1. Store the Husky Vacuum Spreader on a firm, level surface.

2. Store away from areas of human activity. Do not permit children to play on or around the stored Vacuum Spreader.

3. Make sure the unit is sitting, or blocked up firmly and solid and will not tip or sink into a soft area.

2.08 TIRE SAFETY

1. 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.

2. Do not attempt to mount a tire unless you have the proper equipment and experience to do the job.

3. Have a qualified tire dealer or repair service perform required tire maintenance.

4. Check wheel bolt torque daily.

2.09 SAFETY DECALS

1. Keep safety decals and signs clean and legible at all times.

2. Replace safety decals if destroyed, missing, painted over or unreadable.

3. If a section of the Spreader is replaced that carries a safety decal, apply a new decal immediately.

4. Safety decals or signs are available from your Dealers Parts Department.

HOW TO INSTALL SAFETY DECALS:

P Be sure that the installation area is clean and dry.

P Decide on the exact position before you remove the backing paper.

P Remove the smallest portion of the split backing paper.

P Wash area with soapy water and install decal while still soapy, then it can be smoothed out easily.

P Place the sign in position and slowly peel back the remaining paper, smoothing the sign as it is applied.

2.10 SIGN-OFF FORM

Husky Farm Equipment follows the general standards specified by the American Society of Agriculture Engineers (ASAE), the Occupational Safety and Health Administration (OSHA) and safety practices as recommended by the Agriculture Safety Associations across Canada. Anyone who will be operating and/or maintaining the Husky Vacuum Spreader must read and clearly understand ALL Safety, Operating and Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until such information has been reviewed. Annually review this information before the season start-up.

Make these periodic reviews of SAFETY and OPERATION a standard practice for all of your equipment. We feel that an untrained operator is unqualified to operate this machine.

A sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the Operator's Manual and have been instructed in the operation of the equipment.

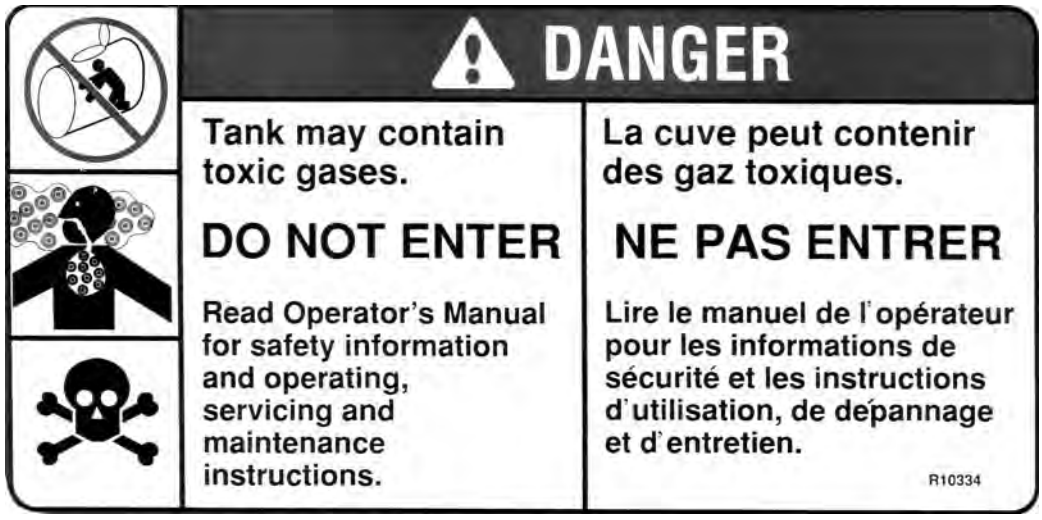
EMPLOYEE SIGN-OFF FORM

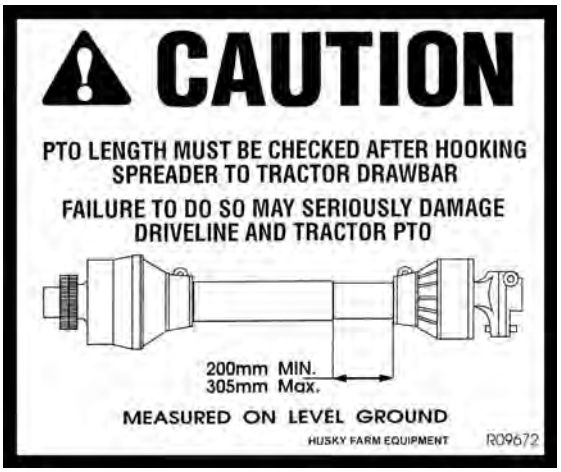
DATE	EMPLOYEES SIGNATURE	EMPLOYERS SIGNATURE

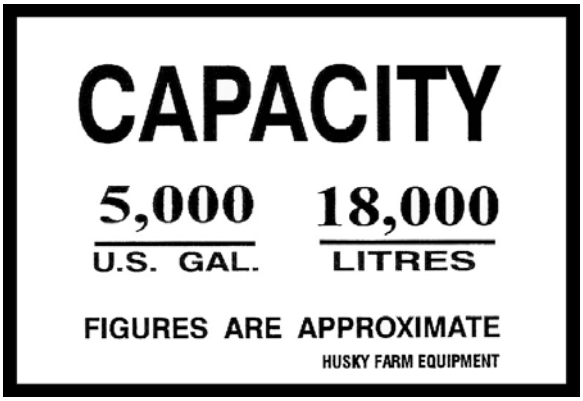
3 SAFETY DECAL LOCATION

The types of decals on the equipment are shown in the illustration below. Good safety requires that you familiarize yourself with the various Safety Decals, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

Think SAFETY! Work SAFELY!







REMEMBER - If safety decals have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer.

4 OPERATION

4.01 TO THE NEW OPERATOR OR OWNER

Husky Farm Equipment's Vacuum Spreaders are designed to efficiently transport liquid manure from the storage facility to the field where it is spread. Many of the features incorporated into this machine are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum efficiency. The manual will take you step-by-step through your working day. By following the operating instructions in conjunction with a good maintenance program, your Husky Vacuum Spreader will provide many years of trouble-free service.

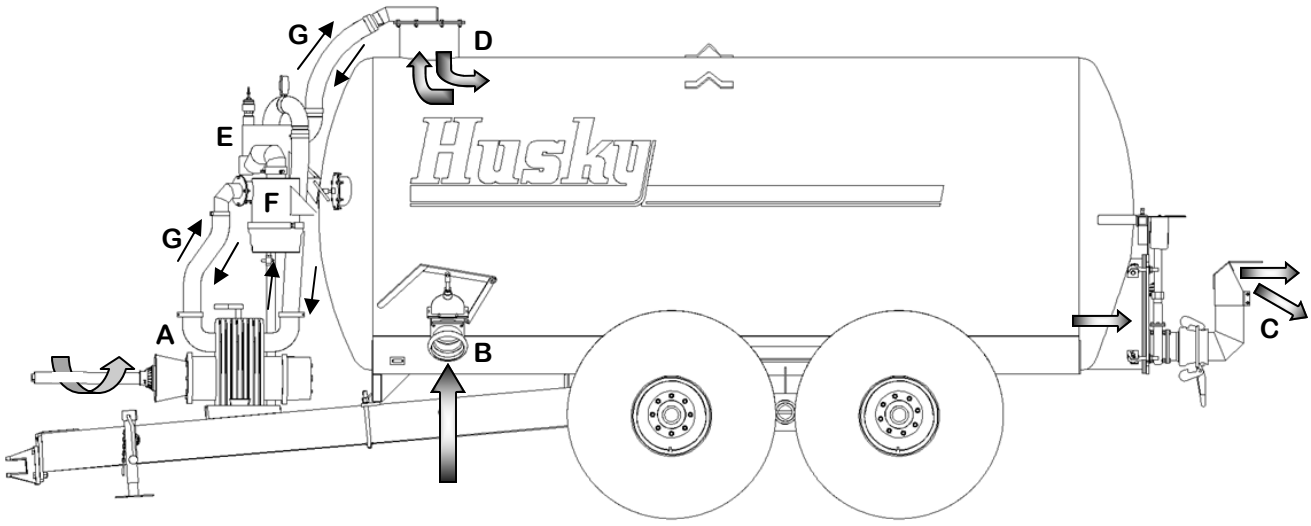
4.02 HOW THE MACHINE WORKS

The Husky Liquid Vacuum Spreader is a large steel tank with domed ends and one or more internal baffles. To load the tanker, the vacuum pump is used to suck out the air from the tank creating a vacuum. When there is enough air removed from the tank, the liquid is sucked in through the hose until the tank is full and automatically closes the air intake. For unloading, the air-flow is reversed and the load is blown off.

Never run the vacuum pump faster than the recommended RPM's

OPTIONAL EQUIPMENT:

- Hydraulic Brakes
- Hydraulic Driven Vacuum Pump
- Hydraulic Hatch
- Electro-Hydraulic Controls
- In Tank Agitation
- Injectors
- Bionic Arm
- Custom Designs



A - Vacuum/Pressure Pump
B - Intake hose - for filling
C - Discharge Port - for unloading
D - Primary Shut off Valve
E - Secondary Shut off Valve & Moisture Trap
F - Muffler
G - Suction & Exhaust Hoses

FIG. 1 PRINCIPLES OF OPERATION

4.03 PRINCIPLES OF VACUUM

ATMOSPHERE

Atmosphere is the name given to the air surrounding the earth. The air is drawn toward the earth by the force of gravity. This causes an atmospheric pressure around the earth, which is much higher at sea level than at high altitudes. Therefore, a Vac pump will perform quite differently at different altitudes.

VACUUM

Vacuum is a space which all matter (air) has been removed; however, total vacuum is unattainable, because matter is capable of diffusion or stretching over unlimited distances.

VACUUM PUMP

Is a machine used to extract the air from an enclosed tank until the atmospheric pressure is reduced to the required level.

VACUUM MEASUREMENT

Vacuum is measured in inches of mercury and not in pounds per sq inch. The method of measuring vacuum is to use a glass tube in the same fashion you would a sucking straw. If drawing mercury up the tube 10" then your vacuum would be recorded as 10" of mercury. It should be noted that mercury is 13.6 times heavier than water. So 10 inches of mercury would lift water 136". Or 20" of mercury would lift water 272". It should be noted that the absolute vacuum attainable would be approx 30" mercury at sea level, or the maximum attainable at a 10,000ft altitude would be 20.5' of mercury.

AIR EXPANSION

Air under vacuum stretches or expands; therefore, to remove enough air from a tank it will require removing several times the volume of the tank. At 10" of mercury, air will expand 1.5 times. At 20" of mercury, the air will expand 3 times. At 29" of mercury, the air will expand 30 times.

PUMP SIZE

The maximum vacuum capability of a vacuum pump is of much more importance than the cubic ft. per minute rating. If you were lifting liquid 15 ft, it would require 20" of mercury just to lift the liquid to the bottom of the tank. To actually fill the tank, it would require approximately 27" of mercury. If your pump only produced 25" of mercury, then the tank would never fill even though the actual size of the pump might be quite large.

LOADING TIME

Many sludges are heavier than water. Loading time and vacuum required will be reflected as to the weight of the material being loaded.

A 2000 US Gal Tank with a 200 CFM vacuum pump should be evacuated, ready for loading in approx. 1 1/2 minutes at 20"of mercury.

HP REQUIREMENTS

A rotary vacuum pump will produce approximately 10 CFM per tractor HP in the 15" of mercury range. So a 200 CFM pump will require approx. 20 tractor HP.

OVER HEATING

Vacuum pumps will overheat when operated continuously. With a vacuum pump, much of the energy input is transformed into heat and must be expelled through the pump exterior. If it is required that a pump must be run for long periods, always purchase a pump designed for continuous duty. Some continuous duty pumps are air cooled and some are liquid cooled with a separate radiator. In high temperature areas and continuous work, a liquid cooled pump should be considered.

FOAMING

Certain types of manure or sewage are subject to foaming while loading. This will cause the ball valve to close prematurely and the tank will not be full. It will also allow foam to pass the primary moisture trap into the secondary moisture trap.

Foam is caused usually by the different feed ration fed to livestock and also made worse by the loading method.

There are several methods to eliminate foam successfully. Adding a small quantity of diesel fuel in the tank will work. However, this may be considered an environmental hazard and may not be recommended.

Foam is much worse at higher vacuum levels and at very high levels the liquid become weightless in the tank and breaks into the foam. Lower vacuum will reduce the incident of foaming and even though it takes longer to load, getting the tank completely full might be worth the extra time. Once the vacuum pump has removed enough air to start the flow of liquid into the tank, the pump can be throttled down as there is very little more air to be removed. The pump then can be maintained at the speed level to simply maintain the proper inches of mercury for loading.

MAINTENANCE

Rotary Vacuum pumps require oil to lubricate the vanes. Most vacuum pumps have an oil reservoir for this purpose and oil is metered out through a glass droplet tube. It is very important to always keep oil in this tank so the pump will not run dry.

Occasionally with a large volume vacuum pump, if the vacuum is high before the valve is opened, it is possible that the primary moisture trap ball will close when the intake valve is opened. If this happens the tank cannot fill properly and the vacuum pump will overheat. If your tank does not fill in a few minutes this could be the problem.

All vacuum pumps must have clean air environment to operate for long periods. If your work is in dusty or dirty conditions a proper air filter must be installed - check with your dealer.

Always operate vacuum pump close to level position, if it is on an angle the vanes will get end wear prematurely.

Always clean air vents on vacuum pumps, if so equipped. Failure to do so will cause overheating of vacuum pump.

4.04 BREAK-IN

Although there are no operational restrictions on the Spreader when it is new, there are some mechanical checks that must be done to insure long term integrity of the unit. When using the Spreader for the first time, follow this procedure:

A. Before Using

1. Lubricate all grease points.

2. Re-torque wheel bolts to the values listed in Maintenance section.

B. After 5 miles on the road or 15 minutes in the field:

1. Re-torque wheel bolts to the specified values listed in Maintenance section.

2. Check all hardware. Tighten as required.

C. After 40 and 100 miles on the road or 2 hours and 5 hours of use

1. Re-torque wheel bolts to the specified values.
2. Check all hardware. Tighten as required.
3. Lubricate all grease points.
4. Then go to the service schedule as outlined in the maintenance schedule.

IMPORTANT

It is very important that the wheel bolts be torqued per section 7.03 when the machine is new. Paint that was applied during the manufacturing process will come out of the joint between the nut and the hub and reduce the torque level. Nuts must be re-torqued to the specified value to insure machine integrity. Failure to maintain wheel bolt torque may void axle warranty.

4.05 PRE-OPERATION CHECKLIST

Efficient and safe operation of the Husky Vacuum Spreader requires that each operator reads and understands the operating procedures and all related safety precautions outlined in this section. A pre-operation checklist is provided for the operator. It is important for both personal safety and maintaining the good mechanical condition of the Spreader that this checklist be followed.

1. Lubricate the machine per the schedule outlined in the "Maintenance Section".

2. Use only a tractor of adequate power and weight to operate the Spreader.

3. Ensure that the machine is properly attached to the tractor using a drawbar pin and a retainer such as a pin made for draw bolts is installed.

4. Ensure that the PTO driveline is securely attached on both ends, that there is proper overlap in length so that the PTO won't come apart or jam up when turning.

5. Check that PTO shields are in place and that it can rotate freely and telescope freely. Secure the PTO shield safety chain (if supplied) to the PTO guards. If a chain is not supplied, one should be purchased from your local equipment dealer. A PTO should not be run until all shields are in place and secure.

A. Inspect all hydraulic lines, hoses, fittings and connectors. Tighten any loose fittings and replace any damaged components.

B. Use a clean cloth to wipe any accumulated dirt from the couplers before connecting to the tractor's hydraulic system.

C. Be sure the hydraulic reservoir in the tractor is filled to the required specification.

D. Be sure the tractor hydraulic system specifications match the requirements of the motors & cylinders

6. Check the tires and ensure that they are inflated to the specified pressure (See Specifications Section). Check the wheel bolt torques. Be sure to re-torque as required to the specified level.

7. Be sure that any lights, reflectors or SMV signs if installed are clean.

4.06 EQUIPMENT MATCHING

Special attention must be given to selecting a tractor with sufficient power to safely maneuver and run the Spreader. A machine of this type is substantially heavier when loaded as compared to when it is empty. The tractor size and weight must be matched to the weight of the spreader when it is loaded.

As a general guideline, Table 1 lists the minimum horsepower requirements for the tractor when the unit is being used on level terrain.

APPROX GALLONS (US)	APPROX. LITRES (L)	RECOMMENDED TRACTOR HORSEPOWER CLASS
1200	4500	60 HP
1800	7000	75 HP
2400	9000	90 HP
3000	12000	100 HP
3600	14000	130 HP
4000	15000	140 HP
5000	18000	160 HP
6000	23000	200 HP
7400	28000	200+ HP

TABLE 1 TRACTOR HORSEPOWER REQUIREMENTS

When the Spreader is being used on hilly terrain, it is recommended that the tractor size be increased by 2 classes and the optional hydraulic brakes be installed.

The standard vacuum pump on the tanker requires an input speed of 1000 RPM. If running 540 RPM a speed up gear box must be installed on the pump to get the correct speed.

To insure there is sufficient space to allow the PTO shaft to telescope during turns and when going over rough terrain, the dimension between the end of the tractor shaft and the end of the yoke on the compressed driveline must be 14 inches (355mm)

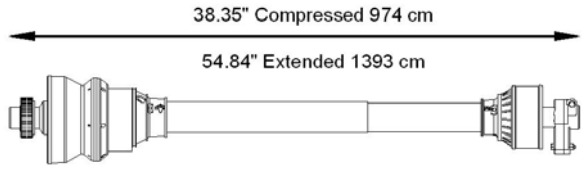


FIG. 2 DRIVELINE DIMENSION

If the dimension varies by more than 3 inches (76 mm) adjust the tractor drawbar. (Refer to tractor manual for details.)

Hydraulic system:

If using a vacuum pump that is powered by the tractors hydraulic system, make sure that the system is set to supply the specified volume and pressure for the pump. If you have any questions about the type of hydraulic system in the tractor or it's output, consult the tractor Operators Manual. The pump motor requires 20 gpm (75 L/minute) flow at 2000 psi pressure.

4.07 ATTACHMENT TO TRACTOR

The Spreader 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 work areas.

2. Make sure there is sufficient room to back the tractor up to the hitch point.

3. Start the tractor and slowly back it up to the hitch.

4. Stop the tractor engine, place all controls in neutral, set park brake and remove ignition key before dismounting.

5. Use the jack to raise or lower the hitch to the desired height.

IMPORTANT

Use a hardened drawbar pin with a minimum diameter of 1 inch (25mm). Larger pins should be used with the larger models to insure adequate shearing strength when subjected to the dynamic loads seen in the field and during transport.

6. Install a drawbar pin that has provisions for a mechanical retainer such as a Lynch Pin.

7. Attach a safety chain with a minimum of 10,000 lbs (4500 kg) strength. Be sure it is routed to prevent binding when making turns.

8. Before connecting the PTO driveline, make sure that it telescopes easily and the the shield rotates freely.

9. Install the PTO driveline by pulling back on the collar and sliding the yoke over the shaft. Release collar as soon as the splines engage. Slide the yoke over the shaft until the pin locks into position. Pull on the yoke to make sure the pin is firmly seated in it's groove to prevent unexpected separation.

10. If the fan is powered by a hydraulic motor, connect the hydraulics by following this procedure:

a. Use a clean rag to wipe away any accumulated dirt on the couplers and on the tractor.

b. Push the male end into the tractor coupling.

c. Be sure the coupler is secured in position.

d. Route the hoses along the hitch to prevent binding, dragging or tangling

11. Lower the jack and transfer the weight of the hitch to the drawbar.

12. Check the angle of the hitch with the weight resting on the drawbar. Husky Spreaders unload from the rear of the tank. The hitch and frame should be sloped toward the rear to assure easy unloading. The hitch plate can be adjusted to provide the required angle.

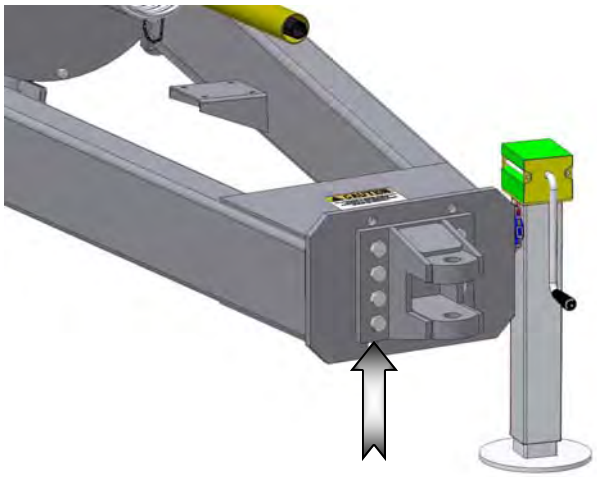


FIG. 3 HITCH ADJUSTMENT

13. Raise the jack base up so jack is fully retracted. Remove jack from mounting sleeve and place in the secondary mounting sleeve, located further up the tongue. Rotate the jack 90° and install mounting pin.

14. Review and follow the items listed in the Pre-Operation checklist before using.

NOTE:

Rotate hitch when it becomes worn

4.08 FILLING THE SPREADER

The Spreader is filled with liquid by attaching the suction hose to the side inlet. When loading follow this procedure:

1. Clear the area of bystanders, especially small children, and be sure the loading area is free of foreign objects.

2. Make sure there is sufficient room to back the unit into the loading position.

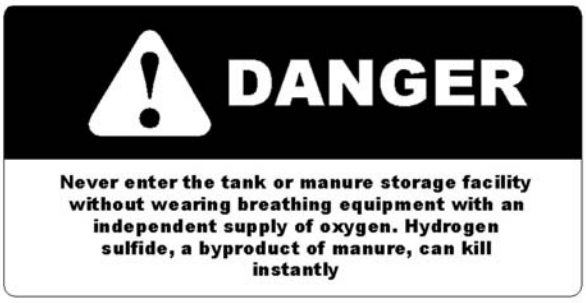
3. Review and follow the Pre-Operation checklist before using.

4. Make sure all valves are closed, and pump is in vacuum mode.

5. Attach suction hose to side inlet, and place hose in the liquid being removed.

6. Start tractor, and turn on PTO with throttle of tractor as low as it will go. After PTO is fully engaged, slowly increase tractors RPM.

7. Ensure the tractor is in Park, then exit from the tractor. Go around to the side inlet with the manual valve. Once the spreader has reached the required amount of vacuum, then open the valve, allowing the liquid to enter the tank



8. The time it takes to load a Vacuum Spreader is dependent on the size of the spreader, the size of the pump, the inlet hose size, and the viscosity of the liquid being loaded.

9. Watching the sight gauge, shut the valve off when the gauge reads FULL. The primary shutoff valve will shut off the flow of air once the tank is full, but it is good practice to stop filling slightly before the liquid has reached that point. This will help keep moisture from entering into the system.

10. Enter back into the tractor, and disengage the PTO.

11. Remove inlet suction hose from spreader.

4.09 TRANSPORTING

Use this procedure when transporting:

1. Clear the area of bystanders, especially small children, before starting.

2. Be sure that the wheel bolts are torqued to the specified level and that the tire pressure is to the specifications in section 7.02.

3. Be sure a drawbar pin and retainer are used.

4. Be sure a safety chain is installed and secured at both ends.

5. Clean the SMV sign and all lights and reflectors.

6. If spreader is equipped with lights ensure they are in working order. Lights are recommended to be used at all times.

7. Do not allow riders on the Spreader or tractor at any time.

8. Start the loaded Spreader slowly to reduce the load on the drive train.

9. If your machine is equipped with hydraulic brakes, the brakes will not release unless the hydraulic lever is held momentarily in the opposite direction. This will relieve the system pressure and the brakes will release. (Note: The above does not apply if the spreader is equipped with Knott Hydraulic Braking System)

10. Always maintain a safe travel speed on rough roads or

terrain and when going down hills or making turns.

11. Never tow the loaded machine faster than 32 km/h (20 mph). The ratio of tractor weight to spreader weight plays an important role in defining acceptable travel speed.

Table 2 Speed vs Weight Ratio

Road Speed	Weight of fully equipped or loaded implement(s) relative to weight of towing machine
Up to 32 km/h (20 mph)	1 to 1, or less
Up to 16 km/h (10 mph)	2 to 1, or less
Do not tow	More than 2 to 1

Refer back to Table 1 to determine the minimum horse-power requirements recommended for level land. Increase tractor size 2 class for operation on hilly terrain.

Table 2 summarizes the weight ratio to travel speed.

12. Always shift to a lower gear when going down hills to use the engine as a retarding force.

13. Apply the tractor brakes carefully to prevent jackknifing.

14. Never disengage tractor drive train and coast down hills. Always keep tractor in gear.

15. Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder if permitted by law.

4.10 UNLOADING THE SPREADER

When unloading, follow this procedure:

1. Turn leaver on pump to pressure mode.

2. If using the vacuum spreader to spread manure on the field, then make sure splash plate is attached to rear discharge.

3. Start tractor and slowly engage tractors PTO. Wait until pump reaches desired pressure. Open rear hydraulic valve.

4. It is recommended that a moldboard plow or disc harrow be used to cover the manure as soon as possible.

5. Since manure smells, it can make unfriendly neighbours. Covering it quickly can reduce the emission of odors. In a residential area, it is recommended that the customer use an injector to bury the smell.

6. Never unhook the tractor from a loaded Spreader. The hitch jack has not been designed to support the heavy load.

4.11 CLEAN-UP

At the end of each working day, follow this procedure to clean the machine:

1. Wash the outside of the Husky Vacuum Spreader with a hose or pressure washer.

2. Inside of the tank can be rinsed by loading a part of a load of clean water and flushing.

3. Drain secondary moisture trap, and Muffler.

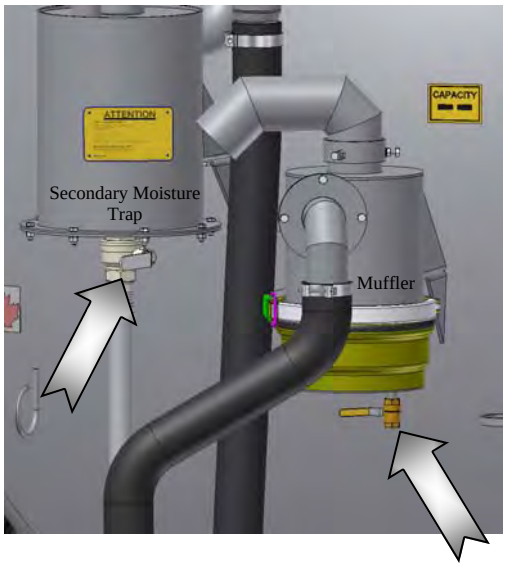


FIG. 4 DRAIN VALVE

4. If the temperatures are below freezing, be sure the water has a chance to drain.

5. It is important to wash the machine after use to prevent acids from the manure from working on the Spreader. A clean machine lasts much longer.

6. When cleaning at the end of the season, a more thorough cleaning and inspection is required (Refer to Section 4.12)

4.12 STORAGE

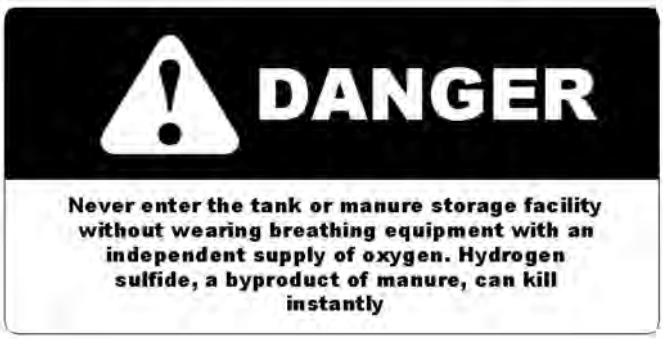
4.12.1 PLACING IN STORAGE

After the season's use, inspect all systems of the Husky Vacuum Spreader. Repair or replace any worn or damaged components to prevent any down time at the beginning of the next season. Since the machine works with manure, it is necessary to thoroughly wash the unit to prevent manure acids from working on the components while in storage. All manure, debris and residue should be removed.

1. Leave back valve open so Spreader can drain.

2. Be sure the spreader is on level ground, with the hitch raised up higher to allow the residue to drain out the rear of the tank.

2. Use a high pressure washer to remove all mud, manure, debris and residue from the outside of the Spreader.



3. Inspect all hydraulic hoses, lines, couplers and fittings. Tighten any loose fittings. Replace any hose that is badly cut, nicked, abraded, or is separating from the crimped end of the fitting.

4. Lubricate all grease fittings (see Maintenance Section). Make sure that all grease cavities have been filled with grease to remove any water residue accumulated from washing.

5. Touch up all paint nicks and scratches to prevent rusting.

6. Remove the wheels and grease the bearings using a HD wheel bearing grease. Mount the wheels back on the axle.

4.12.2 REMOVING FROM STORAGE

Before starting to use the machine, the customer should do a thorough inspection and servicing. Follow this procedure:

1. Lubricate all grease fittings to remove any condensation that accumulated during the storage period.

2. Torque all wheel bolts to the specified values.

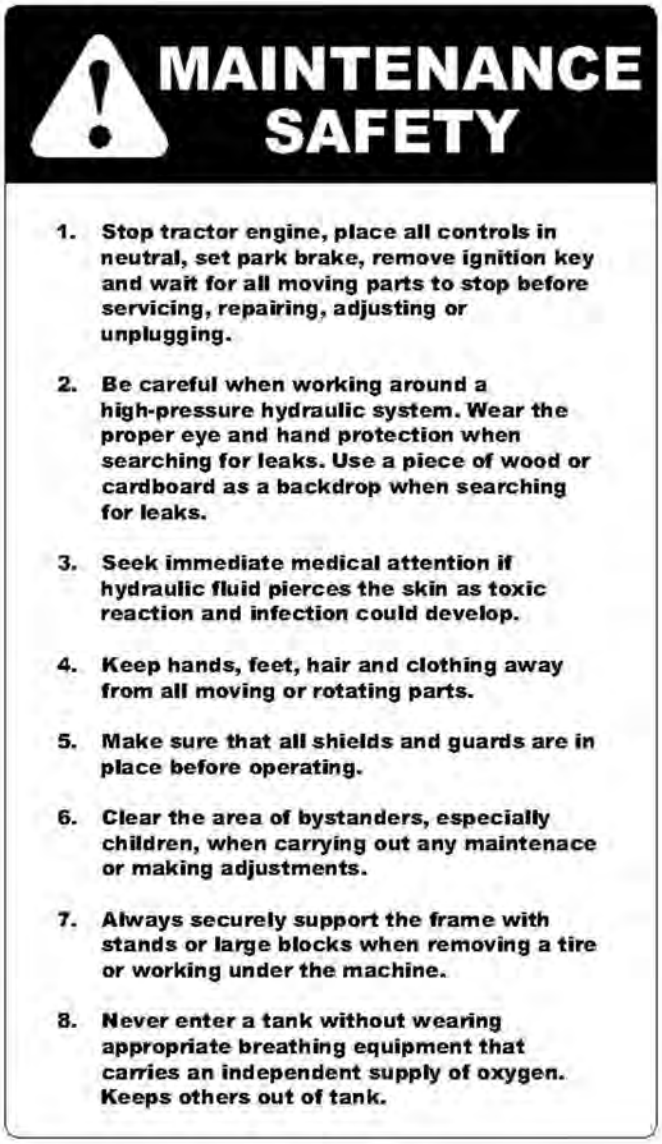
3. Check the tire pressure. Add as required to bring to the specified level.

4. Ensure rear manhole has been securely tightened closed. Close all valves, making sure that all moisture has drained from muffler and secondary moisture trap.

5. Attach to the tractor by following Section 4.07

6. Review and follow all items on the Pre-Operation Check-list (section 4.05) before using.

5 SERVICE & MAINTENANCE



5.01 SERVICE

5.01.1 FLUIDS AND LUBRICANTS

1. **Grease**

Use an SAE multi-purpose high temperature grease with extreme pressure (EP) performance and containing at least 1.5% molybdenum disulfide. Also acceptable is an SAE multi-purpose lithium base grease.

2. **Wheel Bearing Grease**

Use a Heavy Duty wheel bearing grease at all times.

3. **Storing Lubricants**

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

5.01.2 GREASING

Refer to section 5.01.1 for recommended grease. Use the Maintenance Checklist provided to keep a record of all scheduled maintenance.

1. Use only a hand-held grease gun for all greasing. Air powered greasing systems can damage the seals on bearings and lead to early bearing failure.

2. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.

3. Replace and repair broken fittings immediately.

4. If fittings will not take grease, remove and clean thoroughly. Also clean the lubricant passageway. Replace with a new fitting if necessary.

5.01.3 SERVICE INTERVALS

8 Hours or Daily:

1. Grease PTO Knuckles.

2. Grease PTO Shield

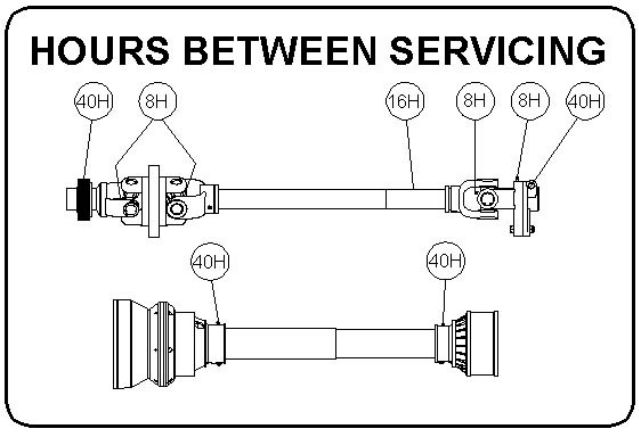


FIG. 5 PTO DRIVELINE SERVICING

3. Depending on the type of Vacuum Pump installed on the machine, it may have a gearbox mounted on the front of the pump, or be a direct drive. Direct drive units will have a grease fitting for the front bearing, and should be greased daily. If pump is equipped with a gearbox, the front bearing will be lubricated in a oil bath. Check oil level daily.

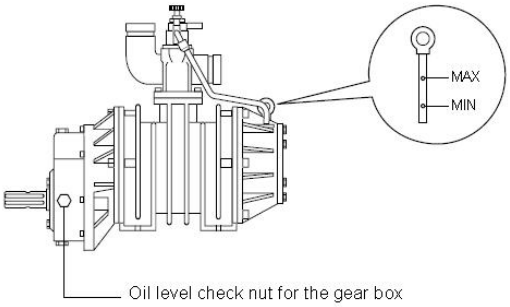


FIG. 6 VACUUM PUMP LUBRICATION

4. Rotary Vane Vacuum pumps are equipped with a drip oiler. Always fill daily with the following oil …….SAE10 - Winter…….……. ……...…..... SAE30 - Summer……

5. Check wheel bolt torque.

Annually:

1. Pull PTO apart. (a) Grease telescope (b) Grease PTO Shield

2. Check Vacuum Pump vanes for excessive wear, and replace if worn past recommend amount. See Vacuum Pump manual for instructions.

3. Repack wheel bearings with grease.

4. Check wheel bolt torque.

5.01.4 SERVICING RECORD

See Lubrication and Maintenance sections for details of service. Copy this page to continue record.

ACTION CODE: ☑ CHECK C CHANGE CL CLEAN
L LUBRICATE R REPLACE

MAINTENANCE / HOURS / SERVICED BY																	
8 HOURS																	
L PTO Driveline																	
L Vacuum Pump																	
☑ Tire Pressure																	
☑ Wheel Bolt Torque																	
20 HOURS																	
L PTO Driveline																	
☑ Tire Pressure																	
☑ Wheel Bolt Torque																	
40 HOURS																	
L PTO Driveline																	
☑ Tire Pressure																	
☑ Wheel Bolt Torque																	
100 HOURS OR ANNUALLY																	
L Wheel Bearings																	
CL Machine																	
☑ Tire Pressure																	
☑ Wheel Bolt Torque																	

5.02 MAINTENANCE

The efficient and safe operation of your Husky Vacuum Spreader will depend to a great degree on your diligence in following the maintenance and adjustment procedures outlined in this section. If you follow these recommendations, your Spreader should work to its maximum potential.

5.02.1 PTO SAFETY SHIELD MAINTENANCE

It is important that the shield components rotate freely over the PTO shaft. Lubricating both the shield bearings and also periodic cleaning will ensure safe operation of the rotating shield. To disassemble, clean and lubricate the shield, follow this procedure:

A. Press down the collar bearing catches with a screw driver to release the cone. Pull the cone towards the tube to remove it.

B. Spread the collar bearing and remove from the tube. Clean collar and the yoke bearing groove. After cleaning thoroughly, apply a good coat of grease to the bearing groove.

C. Fit the collar bearing into the groove and the tube ensuring that the collar catches are centered over the matching holes. The tube and bearing must rotate freely in the bearing groove.

D. Fasten the cone by lining up the cone grease fitting over the grease filling hole on the collar bearing. Make sure that all catches are fastened and that the shield turns freely over the shaft.

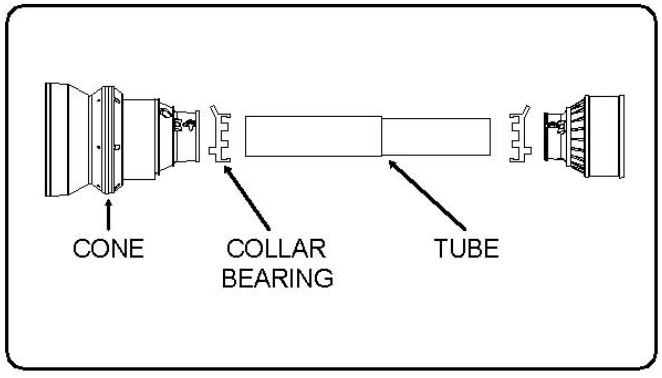


FIG. 7 DRIVELINE SHIELD

5.02.2 PTO DRIVELINE SHEAR PIN

The PTO driveline is equipped with a shear pin to prevent damage to the mechanical drive should an object jam in the pump.

Follow this procedure when replacing the shear pin:

1. Stop tractor engine, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop before dismounting.

2. Remove the ends of the shear bolt from each part of the yoke. It may be necessary to tap out the bolts with a punch if the end is distorted.

3. *What to check for on the brass bearing and thrust washer type of shear flange assembly:* Check that the brass bearing is not worn. Check that the thrust washer is in place and not worn or missing. Check the snap ring that it is correctly seated in the groove.

4. *What to check for on the ball bearing shear flange assembly:* Check that all the balls are in the cavity. Ensure that the grease fitting is in place and tight to hold all the balls in the proper location. If the shear flange was allowed to rotate several times, then the ball grooves on the inner and outer parts should be checked for wear or fracture.

5. Line up the bolt hole and install the shear bolt recommended by the manufacturer.

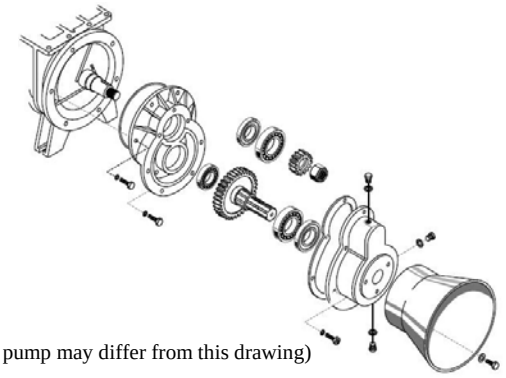
6. Tighten the shear bolt securely in position.

7. Determine the cause of the bolt shearing. Remove the cause before using the machine again.

5.02.3 VACUUM PUMP MAINTENANCE

During the life of the vacuum pump, the vanes may become worn and need replacing. To gain access to these components, proceed in this manner: (For a more detailed procedure, refer to pumps service manual.)

1. Stop tractor engine, place all controls in neutral, set park brake, remove ignition key and wait for all moving parts to stop before adjusting or repairing the machine.



(Your pump may differ from this drawing)

FIGURE 8 PUMP BREAKDOWN

2. Remove end plates and pull out rotor

3. Inspect inside housing for wearing, which will show up in a wash board effect.

4. If casting is worn or damaged, take to a machine shop to have it machined.

5. Replace parts as required.

6. Reassemble

7. Install the PTO driveline.

8. Make sure all shields are secured in position.

5.02.4 GREASING WHEEL BEARINGS

Follow this procedure when greasing the wheel bearings:

1. Be sure the tank is empty.

2. Jack up the axle assembly and place stands or blocks under the frame.

3. Remove the hub to expose the bearings.

4. Add more grease to the bearings.

5. If the grease appears to be dirty and contaminated, wash the bearings, axle and cavity using a good solvent.

6. Liberally apply grease to all the components.

7. Install the hub back on the shaft and secure in position.

8. Remove the blocks & lower to the ground.

6 TROUBLESHOOTING

The Husky Farm Equipment Vacuum Spreader is a simple transportable tank that is used to move slurry from the holding tank to the field, where it is evenly distributed. It is a reliable system that requires minimal maintenance.

In the following troubleshooting section, we have listed many of the problems, causes and solutions to the problems which you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please call your local Husky dealer or the factory. Before you call, please have this Operator's Manual and the serial number from your Spreader ready.

PROBLEM	CAUSE	SOLUTION
Spreader does not track behind tractor	Loose wheel bolts Low tire pressure	Torque wheel bolts to specified level Increase tire pressure
Vacuum pump doesn't run	Broken shear bolt	Replace shear pin. Check for cause of failure. Remove cause
Vacuum pump doesn't create vacuum	Pump dry of oil Vanes won't pop out Lining of hose has collapsed & shut off air	Flush with oil Flush with oil Replace hose
Slurry won't load	Slurry too thick Lifting liquid to far Vacuum not high enough Hose plugged	Add water and agitate Park tank at lower level Wait on pump to build up more vacuum Reverse pressure and dislodge clog
Slurry won't spread	Pressure not up Slurry to thick	Wait on pump to build up more pressure Add water and agitate
Primary moisture trap keeps closing	Air flow surge due to intake valve opening under vacuum	Open valve before tank has vacuum
Vacuum pump is overheating	R Series vacuum pumps are designed with air filter vents. Occasionally the filter will get plugged Pump has been run constantly	Clean air filter Don't run pump on a constant basis - let cool

7 SPECIFICATIONS

7.01 MECHANICAL

LITRES	5800	7000	9000	12000	14000	15000	18000
Gallons (US)	1500	1800	2400	3000	3600	4000	5000
Tank Length	3.65m 12’	4.75m 15’6”	4.36m 14’3”	4.6m 15’	5.46m 18’	5.79m 19’	6.17m 20’3”
Tank Diameter	1.83m 54”	1.83m 54”	1.67m 66”	1.83m 72”	1.83m 72”	1.83m 72”	1.98m 78”
Approx Ht. Overall	2.15m 85”	2.54m 100”	2.85m 112”	3m 122”	3m 122”	3m 122”	3.41m 131”
Tire Size	16.5 L x 16.1	16.5 L x 16.1 18 x 22.5 21.5 x 16.1	16.5 L x 16.1 21.5 L x 16.1 28 L x 26	18 x 22.5 21.5 x 16.1 18.4 L x 26 700/50-26.5 28 L x 26	18 x 22.5 21.5 x 16.1 18.4 L x 26 700/50-26.5 28 L x 26	18 x 22.5 21.5 x 16.1 18.4 L x 26 700/50-26.5 28 L x 26	18.4 L x 26 28 L x 26 30.5 L x 32
Drive	PTO/HYD	PTO/HYD	PTO/HYD	PTO/HYD	PTO/HYD	PTO/HYD	PTO/HYD
Approx. Wt of Spreader	1900 kg 4200 lbs	3175 kg 7000 lbs	3400 kg 7500 lbs	4762 kg 10500 lbs	4989 kg 11000 lbs	5216 kg 11500 lbs	6350 kg 14000 lbs
Approx. Wt of Loaded Spreader	7700 kg 19675 lbs	10175 kg 22432 lbs	12400 kg 27377 lbs	16762 kg 36954 lbs	18990 kg 41865 lbs	20216 kg 44568 lbs	24350 kg 53682 lbs
Tractor Size Suggested	75 hp	75 hp	90 hp	100 hp	125 hp	140 hp	150 hp
Axle Type	Single	Tandem	Tandem	Tandem	Tandem	Tandem	Tandem
Brakes	optional	optional	optional	optional	optional	optional	optional

7.02 TIRE OPTIONS

TIRE SIZE	TIRE TYPE	P.S.I.	KPA
16.5L x 16.1 21.5L x 16.1	Implement Tires	35 35	241 241
18 x 22.5	Truck Tires	65	448
23.1 x 26 28L x 26 30.5 x 32 35.5 x 32	Turf Tires	24 24 24 32	166 166 166 220

7.03 WHEEL BOLT TORQUE

WHEEL BOLT SIZE	TORQUE FT. LBS		KG - METER	
	DRY	OILED	DRY	OILED
9/16 - 18 NF	120.00	90.00	16.50	12.44
5/8 - 18 NF	240.00	180.00	33.18	24.89
3/4 -18 NF	420.00	310.00	58.07	42.86

8 INDEX

9 PARTS BOOK

The Parts Book with a list of all the parts on your spreader is enclosed with this manual at the time you purchase the spreader new.

Contact your local dealer or the factory if you need a copy of the parts book or you need a new copy of this operator's manual

At the time of printing there is no charge for these books to an owner of Husky Liquid Manure Equipment.

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