

Cusco Turbovac Series



REVISED JUNE 6, 2014.
SEE LAST SLIDE FOR CHANGE LOG.

Product Overview

- Cusco's Turbovac Series 2427 and 3627 are premier site remediation systems and are ideal for the pick-up and removal of liquids, slurries and bulk solids.
- Positive displacement blowers:
 - 2427 Series: 2600 CFM, 27" Hg maximum vacuum.
 - 3627 Series: 2600 CFM to 5300 CFM, 27" Hg maximum vacuum.
- Heavy duty hydraulic vibrator.
- DOT 407/412 and TC 407//412 configuration available.
- Blower pressure off-loading system.

**SAFETY
PROVISIONS**

COMPONENTS

**OPERATING
INSTRUCTIONS**

MAINTENANCE

SAFETY PROVISIONS



Static Line



Fire Extinguisher



REAR DOOR STAND



TANK STAND

NOTICE: PLEASE REFER TO INFORMATION BULLETIN DATED JUNE 6, 2014. IT CONTAINS INFORMATION REGARDING THE SAFE USE OF THE TANK STAND AND THE REAR DOOR STAND. YOU CAN FIND THE BULLETIN ON PAGE 11, AND YOU CAN FIND IT ON THE CUSCO WEBSITE.

Static Line

- Electrostatic discharge (ESD).
- Static lines are used when combustible materials are transferred between carriers.
- They are ideally used when a discharge of static (ESD) could cause a spark and subsequent explosion.



Fire Extinguisher

- **A-Rated** extinguishers are used on ordinary combustible materials e.g. wood, paper, cloth, rubber and many plastics.
- **B-Rated** extinguishers are used on flammable liquids and gases e.g. motor oil, paint thinner, gasoline, propane and natural gas.
- **C-Rated** extinguishers are used when live electrical is involved.



REAR DOOR STAND

- Make sure the PTO is disengaged before lowering the rear door onto the prop.
- Do not use the door stand on its own at any time, especially while personnel are performing work inside the tank, or around the rear door. **Always use rear door stand in conjunction with the rear door hydraulic cylinder.**

Note: Prior to each use, the condition and operation of the stand and hydraulic cylinders should be inspected to ensure they are in proper working condition.



DANGER: FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN HAZARDOUS WORKING CONDITIONS WHICH COULD INCREASE THE RISK OF PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH. IMPORTANT: REFER TO INFORMATION BULLETIN DATED JUNE 6, 2014 FOR INFORMATION. SEE PAGE 11.

TANK STAND

- The tank must be emptied before it can be lowered onto the safety stand.
- Do not use the tank stand on its own at any time, especially while personnel are performing work under or around the tank. **Always use the tank stand in conjunction with its respective hydraulic cylinders.**

Note: Prior to each use, the condition and operation of the stand and hydraulic cylinders should be inspected to ensure they are in proper working condition.



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DANGER

**DO NOT ENTER VESSEL WITHOUT
PROPER BREATHING APPARATUS**

**RELEASE PRESSURE OR VACUUM
FROM VESSEL BEFORE OPENING
INLETS AND OUTLETS**

! DANGER

! PELIGRO

**NEVER GET
UNDER THIS
TRUCK IF
THE ENGINE
IS RUNNING!**



***You may be
hurt or killed.***

**¡NUNCA SE
META DEBAJO
DEL CAMIÓN
CUANDA EL
MOTOR ESTÉ
EN MARCHA!**

Part No. 36M35644 (Rev. 9-06)
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DANGER

HIGH VELOCITY AIR INTAKE

**KEEP CLEAR OF NOZZLES
DURING OPERATION**



INFORMATION BULLETIN

Date: June 6, 2014

From: Cusco Fabricators LLC.

To: All Customers of Cusco Fabricators LLC. and all users of Cusco trucks

Subject: This bulletin is intended to provide you with information regarding the safe use of the tank stand and the rear door stand on all Cusco trucks (except for low profile trucks). The door stand and tank stand are depicted pictorially in figure 1 below.

The tank stand is designed to assist in positioning the tank in the elevated position and the door stand is designed to assist in positioning the rear door in the open position. These stands are designed and constructed to be used in conjunction with the other mechanisms on the tanks, in particular the hydraulic cylinders.

Always use the tank stand and rear door stand in conjunction with their respective hydraulic cylinders, see figure 2 (items 1 and 2).

Do not use the tank stand on its own at any time, especially while personnel are performing work under or around the tank.

Do not use the door stand on its own at any time, especially while personnel are performing work inside the tank, or around the rear door.

Prior to each use, the condition and operation of the stands and hydraulic cylinders should be inspected to ensure they are in proper working condition.

DANGER: Failure to follow these instructions may result in hazardous working conditions which could increase the risk of property damage, serious personal injury or death.



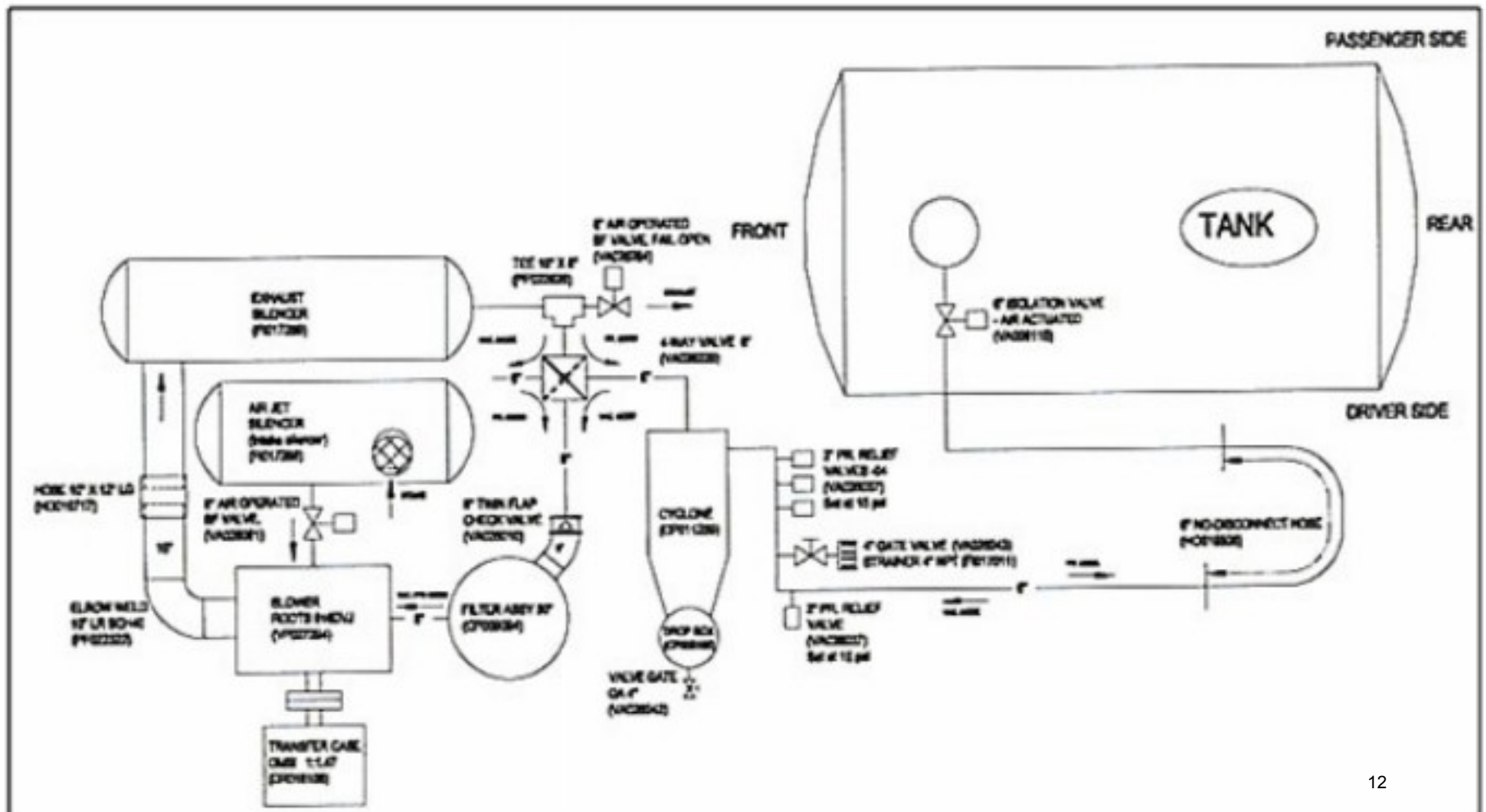
Figure 1



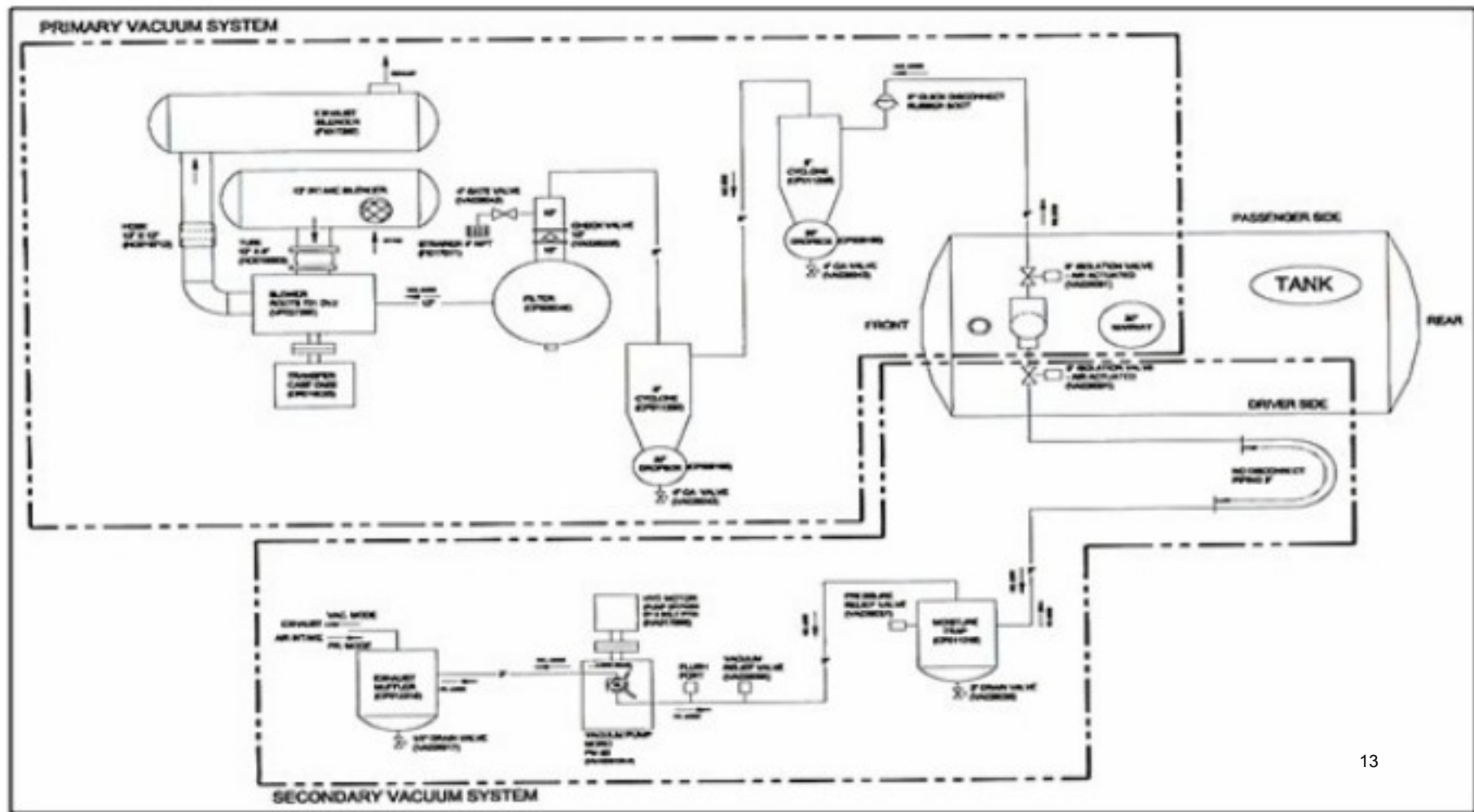
Figure 2

THIS BULLETIN CAN ALSO BE FOUND IN THE CUSCO WEBSITE UNDER BULLETINS

2427 Series Vacuum System Airflow



3627 Series Vacuum System Airflow



Rear Door Valves

- The valves are “air-opened” and “spring-closed”.
- The valves are operated from the air switch, located at each valve.
- The master emergency switch is located on the driver’s side and at the front of the hose tray.
- The 4” valves are used for loading product.
- The 6” valve is used for discharge.



Sand Pipe

- The sand pipe is located on the load nozzle, found on the inside of the rear door.
- It is designed to carry solids that are being loaded and direct them to the front of the tank.
- The sand pipe has a deflector plate at the end of the pipe.
- *Note: The deflector plate and the pipe must be inspected for holes and signs of wear. Failure to do so may cause damage to the top of the tank.*



Primary Internal Shut-Off

- The internal shut-off is located at the top of the vacuum tank and is responsible for preventing fluids from entering the vacuum pump.
- The internal shut-off consists of a 6" stainless steel float ball and a 4" rubber seat.
- The float ball, rubber seat and cage should be checked periodically.
- Check the ball for dents or holes, the rubber seat for sludge buildup and nicks, as well as the cage for signs of wear and loose fasteners.



Rotary Float Gauge



- The rotary float gage is located on the rear door.
- To adjust the packing, tighten the top and bottom packing gland adjuster nuts with a $\frac{1}{4}$ of a turn, alternating from top to bottom to top, until the leak has stopped.
- *Note: If the leak will not stop, the graphite packing can be replaced by removing the packing gland and installing new packing.*

Isolation Valve

- An 8" isolation valve is located at the front, top half of the tank between the primary and secondary shut-off.
- This valve will open when the PTO shifter is engaged and will close when disengaged.
- It will isolate the tank when traveling on the highway.



Tank Pressure Relief Valve

- The pressure relief valve is located on the front, top half of the waste tank.
- This valve is pre-set and cannot be changed.
- The pressure is set to 25 psi.

CAUTION

- The vent is spring loaded. Consult your vacuum truck Owner's Manual before servicing.



Hydraulic Vibrator

- The vibrator system on your unit is operated hydraulically. This hydraulic system incorporates a relief valve set at 2500 psi and a fixed flow control valve. The vibrator is usually located at the front of the unit, on the belly of the vacuum tank and bolted to a mounting channel/reinforcing pad assembly.
- *Note: The vibrator is driven by a hydraulic motor which has been engineered to operate intermittently up to pressures of 2500 psi and with an oil flow of 0.2 – 2.5 gpm.*



Cyclone

- This high capacity cyclone assembly is equipped with a 20" diameter drop box, with a bottom mounted door and a 4" brass gate valve for the drain.
- The cyclone is designed to remove heavy material from the airflow that is passing through the piping to the final filter.
- *Note: Cyclones should be drained and cleaned. Failure to do so will flood the blower and clog the filter.*



System Pressure Relief Valve

- This is a direct operated poppet and spring type valve. Where the spring constantly opposes the pressure inlet port from the outlet port, at the valve seat.
- The desired set pressure or relief is achieved by turning the adjustment shaft in for more pressure and out for less pressure.
- *Note: The maximum pressure for this system is 15 psi.*



Vacuum Relief Valve

- The vacuum relief valve can be found on the inlet pipe going to the vacuum pump, located after the exterior moisture trap.
- On air cooled systems, the function of the vacuum relief valve is to allow cooling air into the vacuum pump.
- This valve works opposite to the pressure relief valve, where the spring continuously opposes the vacuum inlet port from the outlet port, at the valve seat.
- *Note: The maximum vacuum for this system is 24" Hg.*



Vacuum Relief Valve and 10" Check Valve Assembly

- The vacuum relief valve is used to release vacuum from the system on startup and shutdown of the blower.
- The 10" check is in the system to stop the blower from rotating backwards when the system is shut down, before releasing the vacuum.



Hydraulic Control Valve

- The hydraulic control valve is located on the driver's side.
- The standard control has three valve spools (one spool is a double acting spool):
 1. Vacuum pump/vibrator
 2. Rear door
 3. Dump cylinder
- The pressure relief valve is located in the inlet section of the valve body.
- The pressure relief is set to 2500 psi.



2427 Series Roots/Hibon Blowers

Blower specifications:

- Roots blower - 2427 CFM.

Drive:

- Driven from air-shift transfer case.

Silencers:

- 10" intake and exhaust silencers.



3627 Series Roots/Hibon Blowers

Blower specifications:

- Hibon and Roots blowers –
3600 CFM & 5300 CFM.

Drive:

- Driven from air-shift transfer case.

Silencers:

- 12" intake and exhaust silencers.



3627 Series Air Cooled Vacuum Pumps

- Air cooled vacuum pumps are convection air cooling.
- They have a built-in lubricating pump, check valve and changeover valve.
- These pumps are asbestos free and have spark proof vanes.
- Flow rates from 350 CFM to 460 CFM.



3627 Series Exterior Moisture Trap



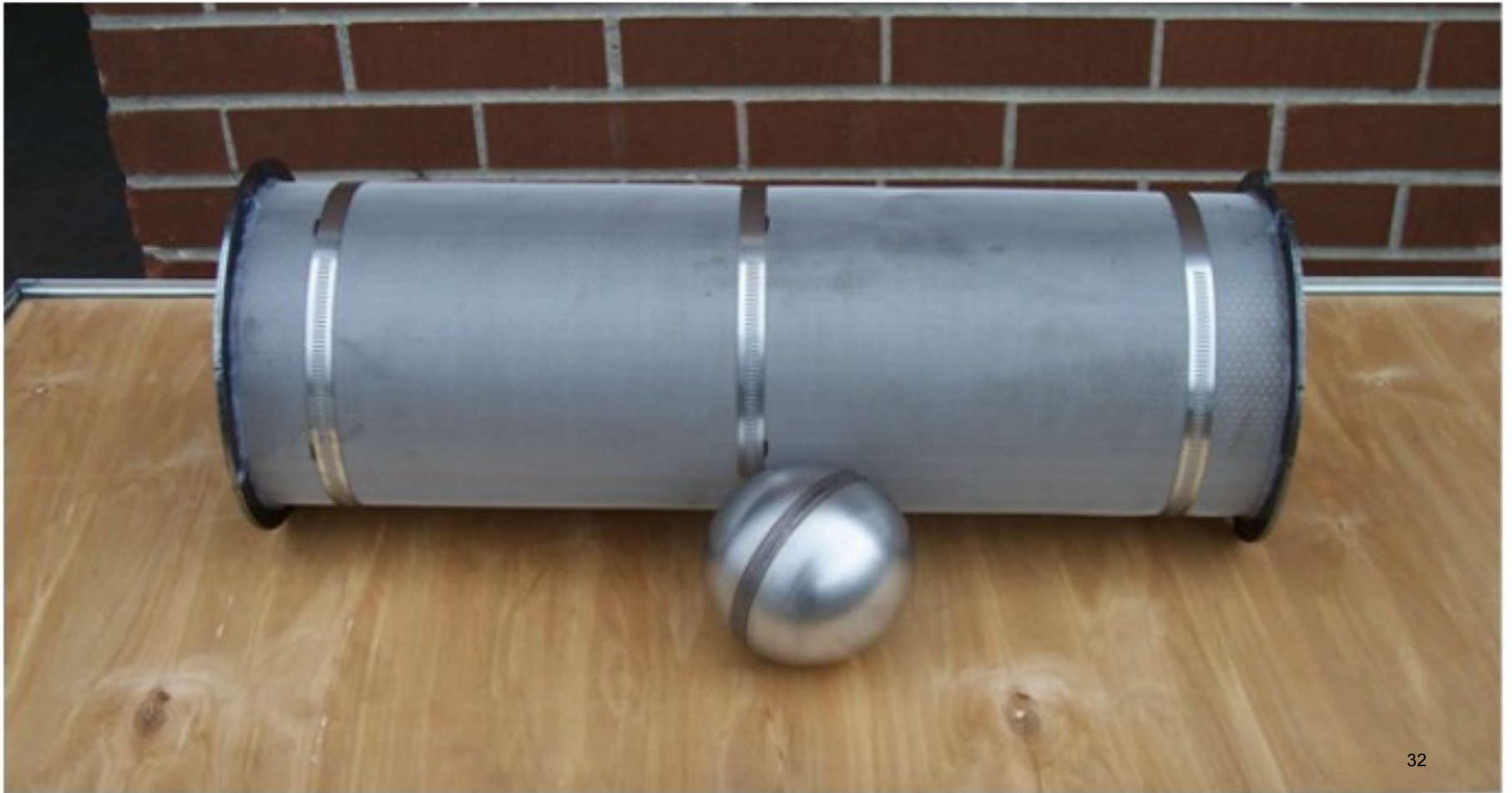
3627 Series Exterior Moisture Trap

- The exterior moisture trap is used between the vacuum pump and the primary shut-off. It acts as a secondary check valve in case the primary shut-off fails.
- The exterior moisture trap also acts as a centrifugal scrubber, cleaning the air that enters the vacuum pump.
- Depending on the products being loaded, the check ball, rubber seat and sight glass should be checked periodically. Inspect the check ball for holes or dents, the rubber seat for sludge buildup and nicks, as well as the sight glass for cracks.
- The housing and filter screen should be inspected and cleaned at the end of each day of operation.
- All liquids accumulated in the exterior moisture traps should be drained after loading, particularly when freezing conditions occur.

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- The housing and filter screen should be inspected and cleaned at the end of each day of operation.
- All liquids accumulated in the exterior moisture traps should be drained after loading, particularly when freezing conditions occur.
- *Note: To prevent damaging the vacuum pump, it is important to maintain the exterior moisture trap and keep it in proper working condition.*

3627 Series Exterior Filter & Float Ball



3627 Series Oil Trap Muffler



3627 Series Oil Trap Muffler

- It is recommended that your vacuum pump system be equipped with a muffler/oil trap assembly to reduce exhaust noise and to collect used vacuum pump oil.
- The filter media in the muffler is used to trap oil that is in the airflow, coming from the vacuum pump.
- The muffler must be drained on a regular bases.
- It is normal for the muffler to smoke when in continuous operation and at high vacuum. To stop it from smoking, open the vent valve on the bottom of the exterior filter. This will allow more cooling air to the vacuum pump.

Control Panel

- The control panel is located on the driver's side of the unit and will control the following:
 - Tachometer and speed control
 - Blower temperature gage
 - Product tank gage
 - Before and after filter gages



Vacuum System Check

Vacuum system check prior to operation:

1. Ensure the vacuum pump oil reservoir is full of oil (refer to the vacuum pump manufacturer's manual for oil specifications).
2. Before starting the vacuum pump, drain and clean the exterior moisture trap and muffler oil trap (refer to the primary/secondary shut-off section of this manual).
3. Make sure that the outside of the finned pump body remains free of dirt and heavy grease buildup. Select the vacuum pressure mode by rotating the 4-way valve selector handle (found on top of the vacuum pump) to vacuum - "V" or pressure - "P".

Power Take-Off



Mechanical Transmissions:

- The Power Take-Off is an integral part of the main transmission.
- Before shifting the Power Take-Off into or out of gear, disengage the clutch and wait for the transmission or PTO gears to stop rotating.

Vacuum Loading

To vacuum load using a blower system:

1. Enter the truck cab and start the engine.
 - *Note: The blower runs at a maximum of 3000 rpm and should not run below 2200 rpm at full vacuum. The truck engine rpm is factory set and is established based on the transmission configurations. The engine rpm setting is shown on the truck dash or transfer case switch-mounting bracket.*
2. Open the blower vent valve on the 6" piping.
3. Depress the clutch pedal and select the proper gear in your transmission, then allow the transmission gears to stop rotating before engaging the transfer case. Wait until the indicator light comes on and all air venting sounds have ceased. Slowly release the clutch pedal.
 - *Note: Releasing the clutch pedal too quickly can damage the blower drive system.*

Vacuum Loading

(continued)

4. Turn both the cruise control and speed control on in the cab.
 - *Note: Do not increase the engine speed before engaging the blower.*
5. Bring the engine rpm to required speed.
6. Proceed to the rear of the vehicle, open the product loading valve and load product as required.

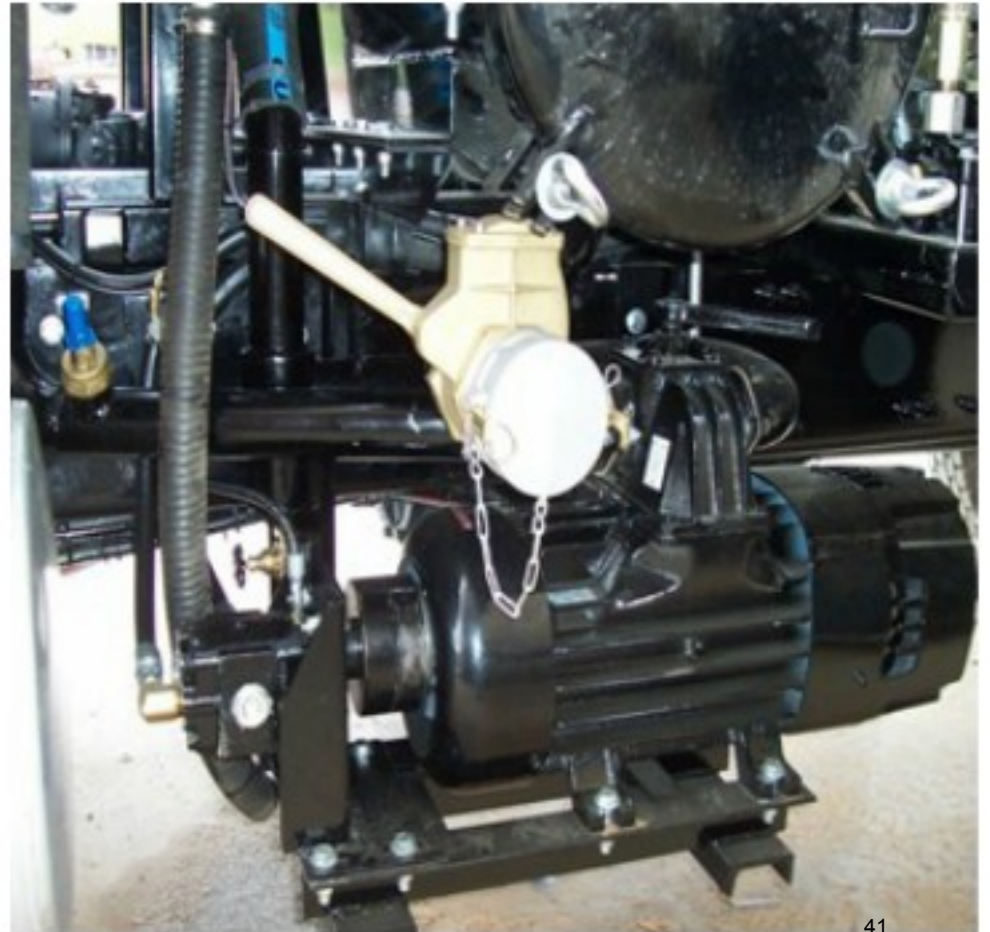
Vacuum Loading

To vacuum load using the secondary vane pump:

1. Select "V" for vacuum operation, found on top of the vacuum pump.
 2. Enter the cab, put it into neutral and engage the PTO (refer to the PTO operating instructions, located on the sun visor).
 3. To begin vacuum operation, allow the vacuum in the tank to rise to 20" Hg (refer to the vacuum and pressure gauge, mounted on the exterior filter).
 4. Open the rear valve emergency switch, located on the driver's side and at the front of the side box.
 5. Proceed to the rear of the vehicle, open the 4" inlet valve on the rear head of the tank and begin loading.
- *Note: When the tank is full, the primary shut-off float ball (located inside the front of the waste tank) will close and stop suction operation.*

Pressure Unloading System

- Moro PM 80 pump.
- Can load and pressure unload.

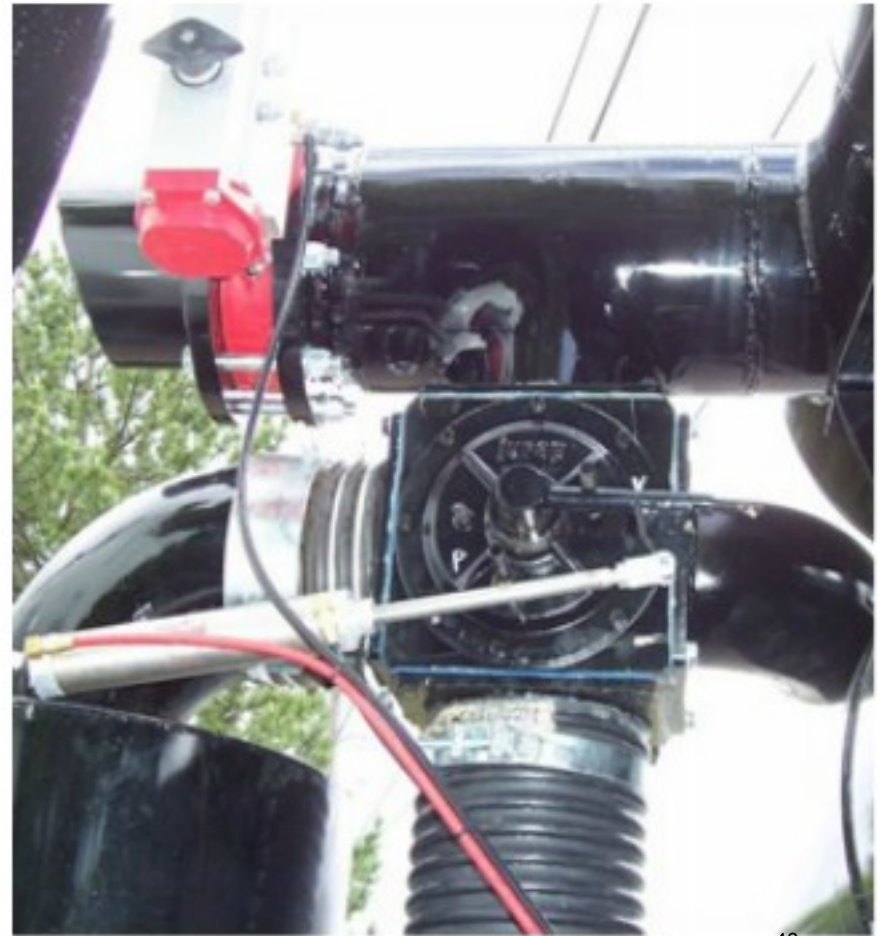
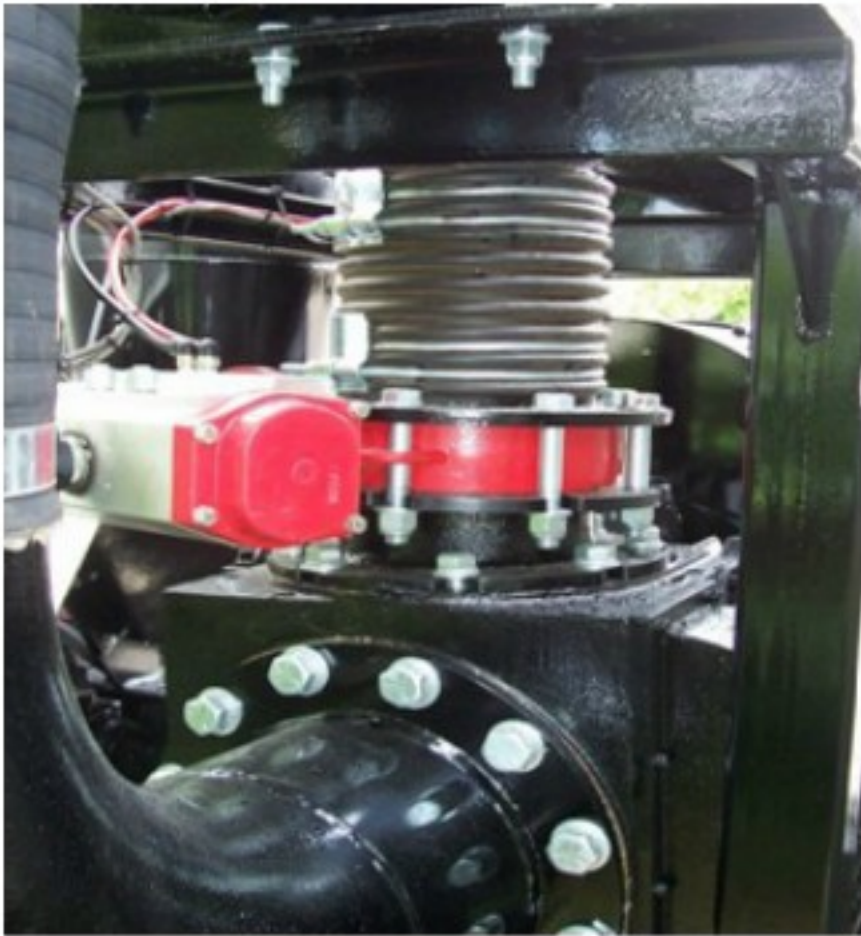


Pressure Unloading

To pressure unload using the secondary vane pump:

1. To empty the tank, move the top handle found on the vacuum pump from vacuum - "V" to pressure - "P". This should be done with the pump at idle speed.
 2. Slowly bring the vacuum pump selector handle to the center/neutral position until all vacuum is vented from the tank.
 3. Select the pressure mode - "P". The throttle control may then be turned on, if required.
 4. Open the outlet valve to allow product to drain. Once the tank has completely emptied, close the outlet valve.
- *Note: To empty the tank with gravity alone, put the vacuum pump handle in the center/neutral position and open the outlet valve. This will allow the product to drain. Once the tank has completely emptied, close the outlet valve.*

2427 Series Pressure Unloading



Blower System Shut-Down

To shut down the blower system after loading:

1. Close the product-loading valve.
2. Open the 4" vent valve to remove excess vacuum from the tank. Run the blower at "0" vacuum for one minute, to allow the blower to cool down.
 - *Note: Failure to do so may cause the blower to run backwards at high speeds and may damage the blower and driveline. The blower is equipped with a check valve to minimize this occurrence.*
3. Reduce engine speed to engine idle and disengage the cruise control from the dash.
4. Disengage the blower using the hydraulic control switch labeled "Blower".
5. Enter the truck cab and switch the blower PTO to the disengage position. Wait until the red indicator light goes out and all air venting sounds have ceased. Slowly release the clutch pedal.

Vent/Pumping Control Valve

Operation of the vacuum vent/pumping control valve:

1. If at any time the blower is left running with the loading valves closed, open the manual vacuum relief valve, located near the filter housing. Venting allows extra cooling air to flow to the blower and reduces blower heat from building up, which would otherwise reduce the required horsepower level.
2. To resume pumping at maximum vacuum, simply close the 4" vent valve.

Hydraulic Dump System



Hydraulic Dump System

- The dump system on your unit has a rated lifting capacity of 20 tons, but should never be used for lifting when the tank is fully loaded. All liquids must be drained prior to lifting the tank.
- To lift the tank proceed as follows:
 1. Drain all liquid products from the tank.
 2. Position the truck or trailer on level and firm ground. Failure to do so will create excessive stress on the dump pivot points, hydraulic reservoir and hydraulic dump cylinder brackets. It can also cause the truck to tip over.
- *Note: Never lift the tank when a strong wind is present, as this may cause the truck to tip over.*

Hydraulic Dump System

(continued)

3. Make sure all the load and discharge connection hoses have been disconnected and the rear area of the truck or trailer is clear of all personnel and obstructions.
4. Unscrew all the wing nuts on the rear door.
5. **Slowly** pull the rear door hydraulic valve body handle. Do not open it too quickly, as this will cause damage to the rear door cylinder and cause structural damage to the brackets.
6. Operate the lever marked “dump” and slowly raise the tank. If the tank is raised with the rear door closed, make sure the bottom wing clamps are positioned so as not to interfere with the rear frame. Full extension of the dump cylinder with the door closed, may not be possible.

Hydraulic Dump System

(continued)

7. After product has been dumped from the tank, lower the tank slowly. Never allow it to drop quickly, as this will damage the dump cylinder sleeves.
 8. When the dump cylinder has a spongy consistency or operates in a jerking motion, it is an indication that there is trapped air. To remove the air, raise the cylinder 12" and using the bleeder screw (located at the top of the cylinder), bleed off air pressure until a solid stream of oil flows out.
- *Note: You must grease the rear dump pivots and hydraulic dump cylinder pivot points every week.*

Rear Door

- When closing the rear door, all areas must be clear from personnel and obstructions.
- The door gasket and mating surface must be clean, or damage could occur to the gasket.
- Go to the hydraulic control and slowly push in the lever. This will power the rear door down. Never push the lever quickly as this will power the door down too rapidly and cause injury to the operator(s).



Rear Door

(continued)

- Engage both side wing bolts and begin tightening the rear door.
- For ease of closing, the vacuum system can be run to help pull the door in. The remaining clamps can now be tightened. Grease and lubricate the swivel hubs periodically.
- *Note: If work is to be done under the door or on the inside of the tank, the rear door must first be extended and then lowered onto the safety prop.*

Regular Maintenance Check

Daily:

- Check the float ball in the tank to ensure the ball has not been punctured or dented, as this will prevent it from working properly.
- Check the float cage for proper operation and ensure the rubber seat is clean.
- Check the cyclone drop box. To prevent liquids from entering the blower, the cyclone drop box must be cleaned and drained of all liquids after each operation.
- Open the filter housing door and check the stainless steel filter canister for excessive debris or damage. Clean or replace it, if required.

Regular Maintenance Check

(continued)

Weekly:

- If dirt buildup exists, completely remove the stainless steel filter canister and clean out the body (refer to the Filter Care and Cleaning Instructions section of this manual). Failure to completely remove the stainless steel filter canister once a week will result in the buildup of deposits in the bottom of the body and make it difficult to remove the filter canister.
- Using the sight glass, located at the bottom of the housing, check the oil levels in the ends of the blower. The oil level is correct when it reaches the top of the red point in the sight glass. The oil level can only be checked once the machine has stopped and the oil has settled. Do not overfill. Oil should be clear in color. If the oil is white or murky, contamination has occurred and the oil should be changed immediately.

Hydraulic System Oil Change Intervals

- The maintenance operations shall be limited to routine inspections of the oil level and periodical oil changes. The drain and filling plugs must be cleaned and sealed using Teflon tape or similar, at every oil change.
- The first oil change must be performed after 200 hours of operation.
- Further oil changes should be conducted every 2000 hours of operation or every six months, when the truck is operated intermittently.

Hydraulic System

- The 140 micron suction strainer is located under the oil tank filler tube. This should be checked on a yearly basis. Especially during cold weather, or if oil starvation to the hydraulic pump is evident.
- To check the suction strainer for cleanliness, first remove the 6" pipe cap/hydraulic fill assembly and reach inside the reservoir to access the suction strainer. Then unscrew the filter counter- clockwise.
- *Note: The filter is reusable and may be cleaned. To remove hydraulic oil, clean the filter with compressed air from the inside, out. Then wash the filter in cleaning solvent.*
- The return line filter is located on top of the hydraulic oil tank. The filter should be changed after the first 10 hours and every 2000 hours, thereafter.
- *Note: Replacement filters can be purchase from Cusco.*

Hydraulic System

(continued)

- The pressure relief for the hydraulic system is an integral part of the valve body. The settings are factory set and should therefore not be tampered with to gain higher pressures.
- This type of system requires the hydraulic oil to be changed every 2000 hours.
- There is a sight gauge located on the reservoir to indicate the hydraulic oil level. When refilling or when the hydraulic oil needs topping up, use an AW32 weight oil or equivalent.

Hydraulic Dump System

- The following items must be checked every week:
 - Rear dump pivots – Check for signs of wear on the pin/bushing and cracks in the pivot bracket.
 - Lower dump cylinder bracket – Check for signs of wear on the pin/bushing and cracks in the bracket.
 - Upper dump cylinder brackets – Check for signs of wear on the pin/bushing, cracks in the mounting bracket and loose fastenings.
- *Note: Never drive the truck with the tank in a raised position. When working underneath a raised tank, ensure the safety brace is engaged to prevent injury. Do not rely on the hydraulic cylinder to hold up the tank.*

Power Take-Off

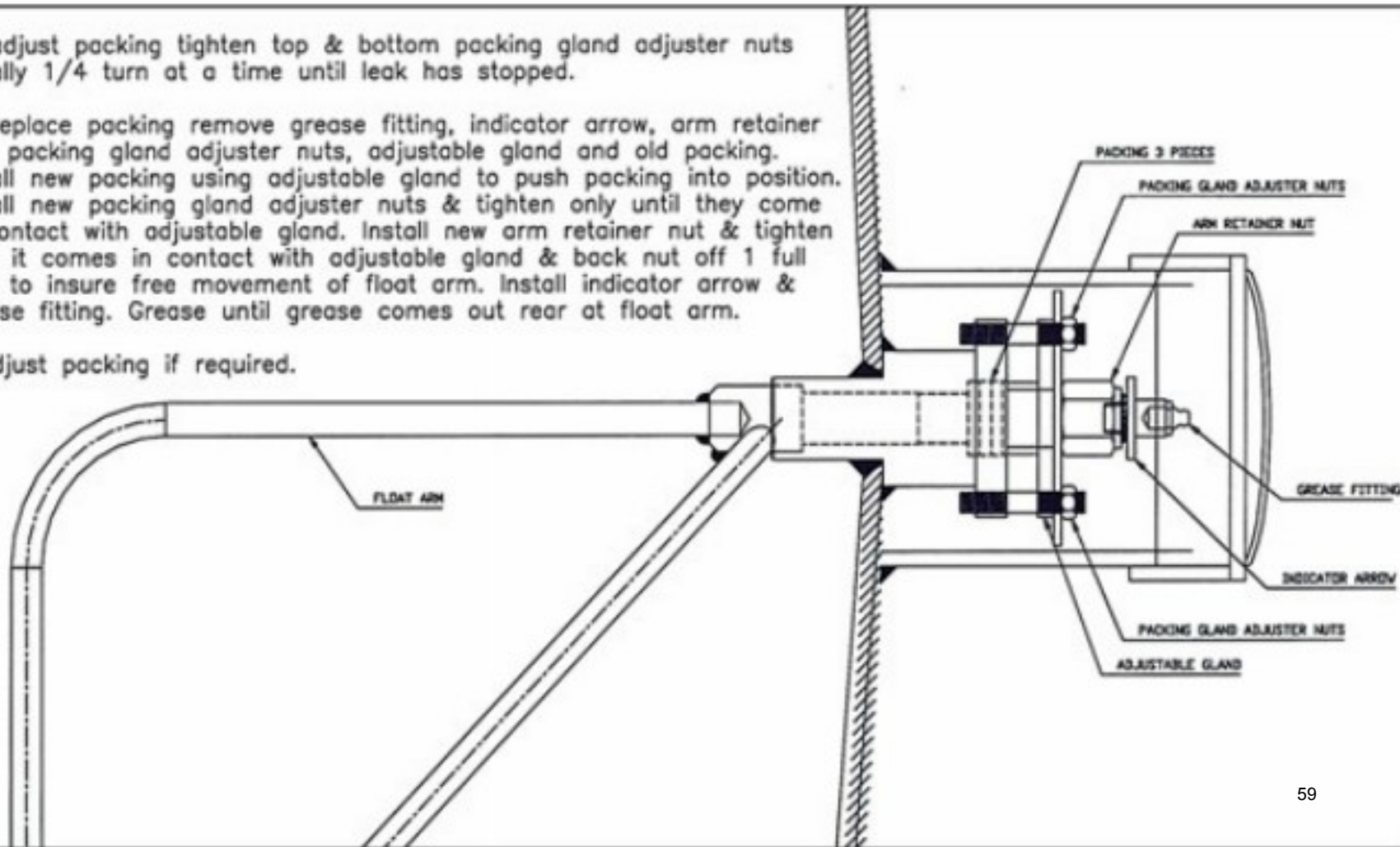
- The power take-off, being an integral part of the transmission, should follow the same service schedule as the transmission. Transmission fluid changes should follow the manufacture specifications. It is very important to check the PTO for leaks and to ensure the transmission oil is at the proper level.
- If the PTO system includes the activation of control parts (such as drive shafts, belts, or hydraulic pump), the system will require periodic checks and service every time the chassis is lubricated or a mechanic is under the vehicle.

Rotary Float Gauge

To adjust packing tighten top & bottom packing gland adjuster nuts equally 1/4 turn at a time until leak has stopped.

To replace packing remove grease fitting, indicator arrow, arm retainer nut, packing gland adjuster nuts, adjustable gland and old packing. Install new packing using adjustable gland to push packing into position. Install new packing gland adjuster nuts & tighten only until they come in contact with adjustable gland. Install new arm retainer nut & tighten until it comes in contact with adjustable gland & back nut off 1 full turn to insure free movement of float arm. Install indicator arrow & grease fitting. Grease until grease comes out rear at float arm.

Readjust packing if required.



Valve Adjustment

- When a valve or the air pot needs to be changed, the valve clevis must be adjusted to ensure the valve is not damaged.
- When the air pot is fully extended, the knife gate (found inside the valve) must be adjusted until the gate is fully opened. This will stop damage from occurring when the product enters through the valve.
- The clevis must also be adjusted to ensure the valve does not leak.



Vacuum Pump

- Maintenance on your new vacuum pump generally begins after the first 40 to 50 hours of running time. However, during this time you must periodically check for loose fittings, bolts, etc. These pumps are fitted with an automatic oiler. Only use oil that is listed in the vacuum pump manual (refer to the vacuum pump manufacturer's manual for recommended oil flow/consumption).
- To change the pump from vacuum to pressure, move the top pump handle to the opposite stop. This should be done while the pump is at idle speed. After reaching the desired position, the pump speed may be increased as needed.
- *Note: The waste tank must be free of vacuum or pressure prior to change over.*
- If dry or gritty materials are accidentally pulled through the vacuum pump, immediately flush it with diesel fuel. Otherwise, dry or dusty material will damage the vacuum pump.

Vacuum Pump

(continued)

➤ To flush the vacuum pump follow these steps:

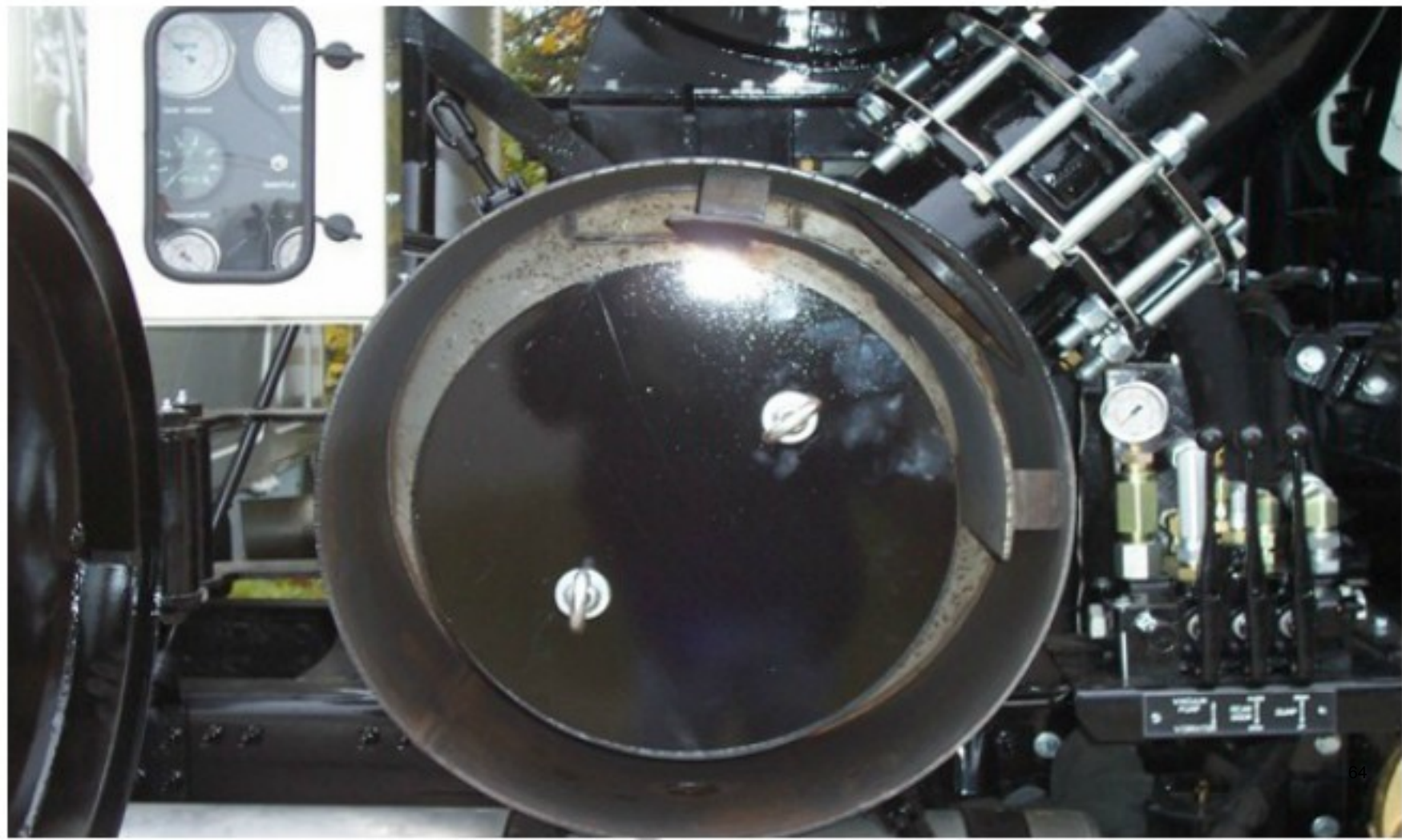
1. Remove the vacuum pump flush port, located on the vacuum pump intake pipe.
2. With the pump running in vacuum - "V" mode and the engine running at idle speed, open the 1-½ inch Kamlok flush port (found above the vacuum pump) and slowly pour one cup of diesel fuel into the intake port. This will clean the pump and remove any harmful sand, grit, etc.
3. Always add at least one cup of oil into the flush port after flushing it with diesel fuel.
4. Make sure the outside of the vacuum pump body remains free from dirt or heavy grease buildup. This will prevent high temperatures on the pump walls and vane tips.
5. Every vacuum pump is required to have an internal shut-off (primary) and external moisture trap (secondary) system to prevent foreign material from entering the vacuum pump. Failure to do so will void the warranty.

Vacuum Pump

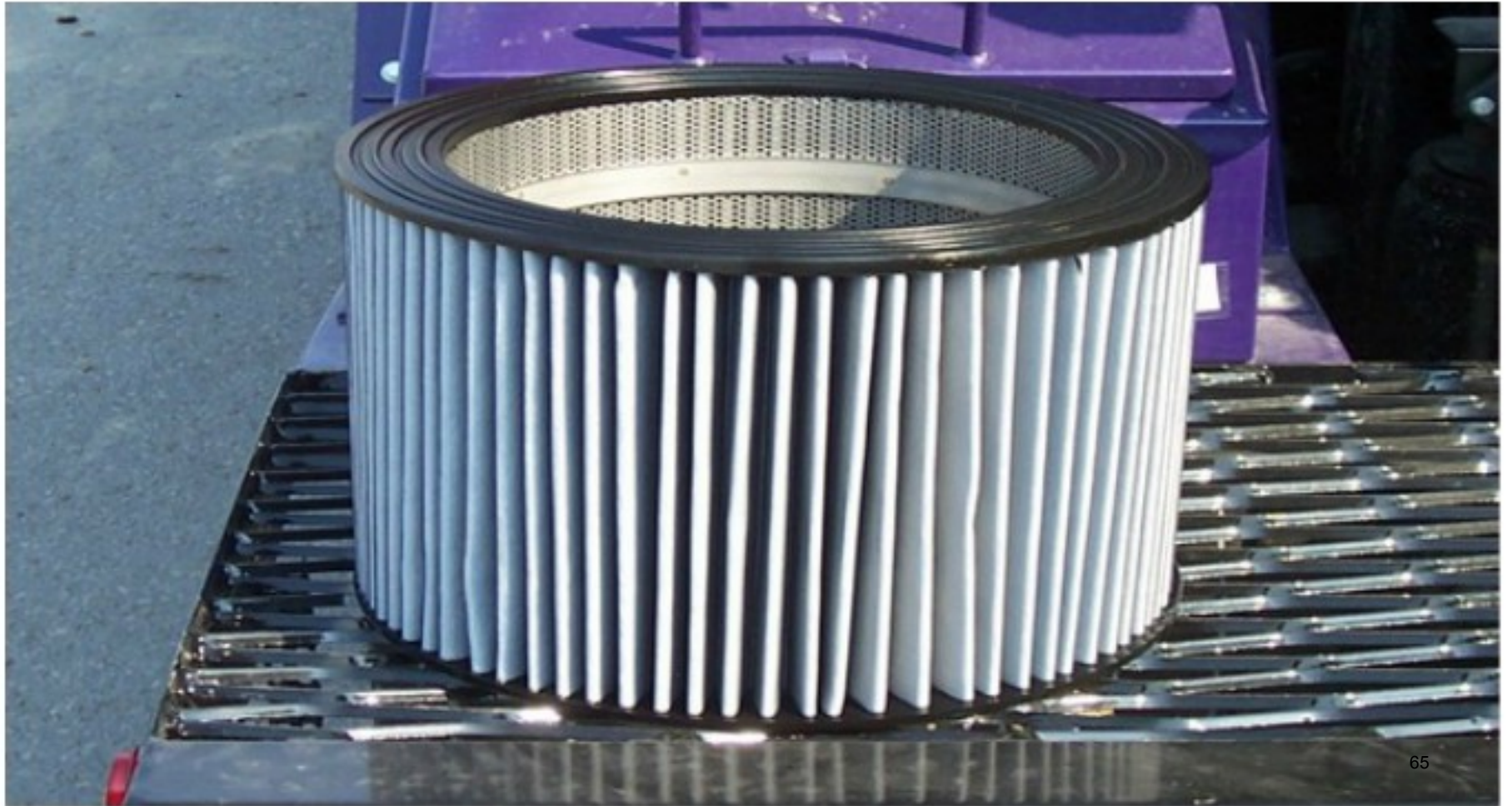
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6. It is recommended that your vacuum pump system is equipped with a muffler/oil trap assembly to reduce exhaust noise and collect used vacuum pump oil.
 7. Never operate the pump when it is full of liquid or ice. Special care must be taken to ensure that water does not freeze inside the pump. If freezing is suspected, completely thaw out the pump prior to operation.
 8. When not in use, always vent the tank and vacuum system to release all of the vacuum or pressure. To do this, turn the top handle of the vacuum pump to the center/neutral position (between "V" and "P").
- *Note: During cold weather of 32 degrees Celsius or lower, allow the vacuum pump to run at a reduced speed for the first five minutes of operation. This allows the oil to circulate and minimizes scuffing or scoring of the walls, rotor, etc. If a pump is running at excessively high speeds, it will damage its internal parts and will void the warranty.*

Blower Filter Housing



Blower Filter



Filter Care and Cleaning

- You may wish to clean an element and return it to service several times before replacing it.
- Filters can usually be cleaned by soaking and then agitating them in a bath of neutral detergent mixed in hot water (100 degrees Fahrenheit -160 degrees Fahrenheit). Carpet shampoo may be used and is widely available in supermarkets or retail stores.
- Rinse with clean water and immediately air dry the element in a warm place. Customers have reported excellent success with industry spray wand cleaners. However, if the spray is directed outward from inside the filter and is at a 90 degree angle, the force of the spray may push the filter media away from the deck wire underneath. Spray directed inward from outside of the filter, tends to drive some dirt into the media. A spray directed at a downward angle, from the outside is usually best. Compressed air can also work well. However, while using the air gun you must be careful not to blow apart the fragile fibers (i.e. filters made of felts).

Filter Care and Cleaning

(continued)

- Filter elements have a short service life and must be replaced once signs of wear are visible.
- Always keep a spare element on hand. To avoid downtime, you can temporarily use the spare element while cleaning the original filter element.

Lubrication Recommendations

➤ Blower Oil:

When the ambient temperature is lower than 0 degrees Celsius, use Mobil Gear SHC 630.

➤ Shell Omala 220.

➤ ISO 150 EP SYN EP.

➤ Texaco Meropa ISO 220.

➤ Castrol Alpha SP 220.

➤ AW 32 Hydraulic oil.

➤ All purpose grease.

Lubrication Recommendations

Moro vacuum pumps:

- During the summer months, use SAE 40 oil.
- During the winter months, use SAE 30 oil.
- Use SAE 50 oil for temperatures above 40 degrees Celsius/104 degrees Fahrenheit.
- Use SAE 20/W40 oil for temperatures below 5 degrees Celsius/41 degrees Fahrenheit.
- *Note: Use only AW32 hydraulic oil.*

June 6, 2014 Revisions:

This manual has been updated with the following changes:

1. Content update in “Product Overview” slide: “Safety Provisions” was “Safety Instruction”
2. Slide renamed: “Safety Provisions” was “Safety components”
3. Slide renamed: New “Rear Door Stand” was “Rear Door Safety Stand”
4. Slide renamed: New “Tank Stand” was “Tank Safety Stand”
5. June 6, 2014 Bulletin added as a slide