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Vacuum Tank Maintenance and Operations Manual

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Vacuum Tank Operations

Normal Operating Conditions

- The tank draws in when the valve is in the VACUUM or SUCTION position.
- The tank discharges when the valve is in the PUMP or PRESSURE position.
- The tank does nothing when the valve is in the NEUTRAL or MIDDLE position.

Loading

- 1- Check the following components in the truck:
 - a. Transmission
 - b. oil o Engine oil
 - c. Fuel
 - d. Tires
- 2- Check the following components on the vacuum pump system
 - a. Vacuum oil o Oil catch muffler (should be drained)
 - b. Primary shutoff filter
 - c. Moisture trap/scrubber (secondary trap)
 - d. Hoses and connections
- 3- Try turning the pump by hand before start-up to ensure that it is not frozen (in winter)
- 4- Start the truck, and allow it to warm up (the unit is warmed up when the valve heating jackets are warm to the touch if applicable)
- 5- Position the truck, put the parking brake on and put the transmission in neutral.
- 6- Close the valves at the back of the pumper tank.
- 7- Remove the dust caps from the suction and discharge valves.
- 8- Position the pump handle to the NEUTRAL or MIDDLE position.
- 9- Engage the PTO. Always with engine at idle
- 10- The engine RPM is automatically set at a recommended RPM setting by the pump manufacturer – as recommended for maximum vacuum. Use cruise control on other trucks. Increase RPM with cruise control. Some smaller trucks will have to have their parking brake on.
- 11- Connect the suction/discharge hose to the suction Camlock fitting at the back of the tank and insert the other end of the hose into the septic tank.
- 12- Move the pump handle into the VACUUM position.
- 13- Wait until the pressure on the gauge reads negative 18" - 22 inches mercury.

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- 14- Open the suction valve at the back of the tank.
- 15- When sewage rises to the lowest sight glass, slowly close the main valve.
- 16- Put the pump handle into the MIDDLE or NEUTRAL position.
- 17- Disconnect the hose from the suction fitting and connect the hose to the discharge fitting. An alternative is to use two lengths of hoses, one each connected to the suction fitting and the discharge fitting.
- 18- Push the other end of the hose as far into the septic tank as you can.
- 19- Move the pump handle into the PRESSURE position.
- 20- Wait until the pressure on the gauge reads positive 5 psi.
- 21- Slowly open the discharge valve. This will swirl the contents of the tank around and create a slurry that you can pump out.
- 22- Slowly close the discharge valve when it seems the tank is nearly empty.
- 23- Put the pump handle into the MIDDLE or NEUTRAL position.
- 24- Disconnect the hose from the discharge fitting and re-connect the hose to the suction fitting. (If you are using two lengths of hose, one attached to each fitting, this is unnecessary).
- 25- Pull the hose up into the middle of the septic tank liquid.
- 26- Move the pump handle into the VACUUM position.
- 27- Wait until the pressure on the gauge reads negative 18-22 inches mercury.
- 28- Slowly open the suction valve.
- 29- Close the suction valve at the back of the tank when the tank is getting full (The sewage will be visible at the highest sight glass).
- 30- Idle the engine by pressing the brake or turning off the cruise control.
- 31- Disengage the PTO.
- 32- Put the pump handle into the MIDDLE or NEUTRAL position.
- 33- Disconnect the hose.

Unloading

- 1- Drive the sludge pumper to the designated area for septic tank sludge.
- 2- Position the truck; put the parking brake on and the transmission in neutral.
- 3- Position the pump handle to the NEUTRAL or MIDDLE position.
- 4- Remove the caps from the suction and discharge valves.
- 5- Connect the suction/discharge hose to the discharge Camlock fitting at the back of the tank, and place the other end of the hose in the place where you are discharging the sewage.

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- 6- Open the discharge valve and let sewage start flowing.
- 7- Engage the PTO.
- 8- Increase the engine RPM as necessary. Pressuring the tank is normally not needed for discharge, but do not exceed 1250 RPM if needed. Press the PTO engage button to engage the PTO. Increase RPM as necessary. Pressuring the tank is normally not needed, but will help speed up the unloading, especially with heavy sludge.
- 9- The sludge in the pumper may flow out without being pumped. If you don't need the pump to unload the tank, go to Step 16 of the Loading Section.
- 10- Move the pump handle toward the PRESSURE position.
- 11- Close the discharge valve at the back of the pumper tank when it is empty.
- 12- Idle the engine by pressing the brake or turning off the cruise control
- 13- Disengage the PTO.
- 14- Move the pump handle into the MIDDLE or NEUTRAL position.
- 15- Disconnect and drain the suction/discharge hose.

Clean-Up

When the hose is uncoupled from the pumper tank fitting, a bucket should be placed under it to catch dripping sewage. Elevate the end of the hose and its entire length to drain the sewage back into the septic tank before laying the hose down. Be sure to keep children and animals away from the work site. Record the amount of waste pumped into the landfill site. Keep this record on file.

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Routine Maintenance and Inspection

This maintenance schedule assumes an operating season in the summer months. See the manufacturer's literature (Operator's Manuals) in the truck for more specific information on the truck's engine, chassis, and transmission maintenance. See the manufacturer's literature (Owner's Manuals) for more specific information on each component of the vacuum system. Listed below are the most basic routine maintenance tasks, with the vacuum equipment emphasized.

Daily

- Drain air brake pressure tanks.

Before Each Use

- The diesel engine requires good quality diesel fuel. Use fresh fuel, not old "flat" fuel.
- Check the pump system oil. See manual for recommended oil.
- Check the air filter on the truck and replace if necessary.
- Check the transmission oil in the truck.
- Check the tires for proper air pressure and check the wheel bearings and lug nut tightness.
- Check the hoses and connections for wear and tightness and replace if necessary. Check the suction and discharge valves on the rear of the tank. Check the vacuum/pressure gauge, safety relief valve, and sight glasses.

During Operation

- Make sure oil is flowing to the vacuum pump (watch for small bubbles in the clear lines from the vacuum pump oiler pump to verify the oil is being injected).
- Make sure the vacuum gauge is operating properly.
- Check that the relief valve on the secondary trap/scrubber is working. You should be able to press it down or feel air around it at negative 24 inches mercury.
- Check the main valves and the hoses for air leakage.

After Each Use

- Drain the secondary trap/scrubber only if primary failed
- Drain the oil catch muffler at end of day
- Clean the pre-filter periodically

After Every 5 Operating Hours

- Wash the air filter in diesel fuel inlet pre-filter, only periodically
- Check the secondary trap/scrubber ball filter and seat. (See the manufacturer's literature).

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Monthly

- Clean the pre-filter.
- Clean the oil tank.
- Grease the jack-shaft spline and universal joints. (Or every 10 hours of operations)
- Check the PTO coupling for wear.
- Flush the vacuum pump (see the manufacturer's literature). Make sure the pump is flushed thoroughly before winter storage.
- Grease the vacuum pump.
- Clean and lubricate the shafts of all valves with a lightweight machine oil. Tighten packing around the valve handles.
- Grease all points of unit, vacuum pump, boom swivel, and vacuum pump drive line.
- Check all bolts on unit and tighten as required, especially the bolts mounting the vacuum pump and the vacuum tank.
- Check the fittings on the loading hoses. Make sure all gaskets are in place.
- The truck should be started monthly, even outside of operating season.
- Check and tighten tank tie-down system once every 30 days. Torque rating to be 100 ft. lbs. excluding spring mounted front tie-downs, a 1/8" space to be left between springs coils at all times. Failure to perform this may cause many problems with the vessel, which may or may not be covered under the manufacturer's warranty.

Annually

- Use only recommended oil as per pump manual. Keep container clean.
- On older pumps where oil tank is attached to the pump, it can collect condensation. It needs to be drained on a regular basis, especially in cold weather climate.
- Change the air filter.

Every 5 Years

- Change the vanes. (Overhaul the Vacuum Pump).

Washing

- Wash your vehicle often with warm or cold water to remove dirt and preserve the original luster of the paint. Never was the vehicle in direct rays of the sun nor when sheet metal is hot to touch, as this may cause streaks on the finish. Do not use hot water, strong soaps, detergents or wipe off dirt when the surface is dry as this will scratch the paint. Check with factory on recommendations for the proper soap to use. DO NOT use an automatic car wash.

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Lubrication and Equipment Maintenance

- It's extremely important to have the unit properly lubricated at regular intervals. Many areas of maintenance on the tank equipment are covered in their respective manuals. Normal use of the tank truck causes metal-to-metal movement at certain points in the cab and body. Noise, wear and improper operation at these points will result when a protective film of lubricant is not provided.

For exposed surfaces, such as door, lock bolts, striker plates, etc please apply a thin film of engine oil.

Body Mounts

- Check and tighten tank tie-down system once every 30 days. Torque rating to be 100 ft. lbs. excluding spring mounted front tie-downs, a 1/8" space to be left between spring coils at all times.

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Common Operational Problems

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Pump runs but no pressure change (no intake or discharge)	Air filter is clogged	Clean or replace the filter
Delivery of pump is decreasing over time	Hose is clogged or leaking	Clear the hose or repair leaks
Oil is leaking around the shaft	Lip seals on the shaft are damaged or worn	Replace the oil seal and possibly the shaft sleeve
Excess heat and noise	Clogged filters, valves or plumbing	Clear or change filters
	Pressure or vacuum reliefs are improperly installed or set	Re-adjust or replace the relief valves
	Incorrect oil flow rate or type of lubricant	Drain the oil tank and re-fill with proper lubricant
	Oil pump is failing	Replace the oil pump
	Water jacket is contaminated	Dismantle and clean the jacket
Rattling noise	Foreign object in the pump or a vane is damaged	Remove the object and/or check the vane condition
Unsmooth running of vacuum pump	Improper clearance between rotor and cylinder	Dismantle and adjust the clearance
	Bearings are worn	Replace the bearing, oil seals and spacers as required
Pump spins back when disengaged	Non-return valve is damaged or stuck	Repair or replace the non-return valve