Servicing a Frozen Direct Drive Truckmount

The information below can be used on Cleanco 45/47 as well as ANY direct drive truckmount that has been frozen.

Things to keep in mind when dealing with frozen units

Diagnosing and fixing a frozen truckmount is a SLOW and methodical process that should not be rushed. Every aspect of the unit needs to be tested before you can give the "all clear" and hand it back over to the customer. If you take any short cuts, you could leave the customer stranded in the middle of a job because a hose blew off, or a leak sprung somewhere that you didn't check, and they lose all pressure in the system. So, when you book in a frozen truckmount, make sure that you leave yourself adequate time to get through all areas of the truckmount to be tested. Finding leaks in fittings and hoses is just one small part to making sure that a truckmount is functional after it has been frozen. But don't get frustrated or discouraged if the customer comes back in multiple times for leaks after freezing their unit. Keep in mind, that just because a component isn't leaking or seem damaged at the time of your testing and repairing does not mean that it made it through freezing unscathed. Micro fractures of brass fittings, stretching of metal and plastic may not show its damage initially, but could and will show up later on. Heating and cooling of the unit will expose over time areas that stretch and became too thin to handle the pressure or have a micro fracture somewhere that was undetectable. But if you take your time going through and testing each component/area, you lessen the chance of this happening.

How Freezing damages a truckmount

When water freezes, it expands one and half times its size. Being that the water is in a confined space, hoses, brass fittings and components (Pump, heat exchanger coils, etc..) take the brunt of this expansion. This as you know causes stretching, cracking, and popping of fittings and damage. Any area where there is inadequate space for the water to expand will break regardless of how thick the material is.

Can The customer claim warranty on anything?

Since this is not a manufacturers defect, warranty cannot be claimed. Freezing the truckmount CAN and WILL void warranty on almost ALL components of the truckmount. The Cleanco warranty booklet (see warranty for all Cleanco/Esteam Equipment) states that freezing your truckmount will void the warranty.

If you do repairs to a Cleanco truckmount that still has a warranty remining, please call or email Cleanco with the information of that unit including serial number and company name so that we can log this information into our system. This is why it is so important to remind the customer multiple times when handing over a new truckmount to them that keeping the van in a warm place over night or when the weather is cold is the utmost important thing. Temperatures as low at 0 degrees can start and cause freezing damage.

Where to start with a frozen truckmount

Before starting to track down leaks and breaks, make sure that the truckmount is warm. Nothing worse than working on a cold piece of equipment and ensures that any ice still in the system has melted and

allows water to flow. Open all vehicle the doors to allow as much room temperature air to get into the van as possible. A space heater put in the back of the van will also help to speed this process up. If the metal and components are ice cold to the touch, it's not warm enough. Depending on the severity of the freezing, this can take a day of sitting in room temperature to thaw out the unit. DO NOT start the unit and try to use the truckmount heat to warm up the truck. This will cause more damage than it will do good.

Start with what caused the damage

Once the truckmount has warmed up and we know all of the ice has melted in the system, we need to get water into the unit to find where all of the damage is. Disconnect either the hose from the freshwater tank at the base of the tank or the large female quick connect located behind the passenger's seat connecting the fresh water to the inlet manifold for the pump. At either one of these spots, you are going to hook up a garden hose. (Preferably with a shut off valve to turn off water quickly) Also, you are going to want to hook up a primer hose/open-ended hose with a shut off valve to one of the quick connects on the front panel. This will allow you to get water fully through the system and remove all the air that may have gotten into the system due to the freezing.

DO NOT START THE UNIT

Open your valve on the primer hose and then start the water flow from the garden hose. Allow water to flow for a short bit through the hose to make sure that there is no air left in the system. Do not forget to turn the knob for the hot and cold to allow water to get to ALL components of the unit. If you notice any leaks at this point, stop the water flow and address the issues.

It's a waiting game

If you do not see any leaks as the water flows, turn off the valve on the primer hose but allow the water from the garden hose to continue flowing. This will pressurize the system with city water pressure (approx. 80psi) This pressure is usually enough to cause any areas that may have been damaged due to freezing to start showing. At this time, you are going to check EVERY area of the unit for leaks. Make sure to use a flashlight to check:

- ALL hose connections on the panel
- ALL brass fittings on the panel
- Pressure regulator (pulsar unloader) for leaks
- Chemical feed on Panel (this is made of acrylic, and cracks VERY easily when frozen. Look for air bubbles forming in the clear tube in the chemical metering valve. Also look for leaks where it attaches to the panel)
- Inlet water manifold (Inline filter (cap usually cracks), all brass connections)
- Cat pump (look for water dripping below the pump head (Silver in color), leaking from front and top valve caps)
- PTI (if equipped) (Look at the high-pressure fittings fitted to each post from the PTI, look for water coming out of the exhaust of the unit (water coming out the unit exhaust indicates that the

internals of the PTI are crack. This is NOT serviceable and a new PTI is required), look at all brass fittings and hoses)

- Heat exchanger (All compression fittings on the top of the exchanger. Check hoses leading from exchanger to panel and PTI)

Let this sit for a time (15 to 30 min) under pressure. This will allow water to seep into micro cracks and hopefully cause them to leak.

The overflow

While the unit is sitting under garden hose pressure, open the hood of the van and look at the overflow container. Use a black marker and mark the level at which the coolant is currently sitting at. This will help you to keep an accurate level of where the coolant is.

Why do we need to know what the coolant level is at? One of the most widely damaged areas when a truckmount is frozen is the heat exchanger. Mainly the copper coils in the exchanger canisters and pressure fittings linking the copper coils to the outside connections of the heat exchanger. Even though these coils have a rating of 9000psi busting pressure, being that the orifice is so narrow in these tubes, freezing can happens very quickly. These coils cycle water, take the heat from the coolant and disperses that heat into the water when the unit is running. If there is a hole or crack in the coils, when you pressurize the system with garden hose, this will cause any crack or hole to leak water into the vans coolant, causing it to fill up the coolant system of the van and fill up the overflow container. With a mark on the container to indicate the starting level of the coolant, we can monitor it for an increase in liquid to determine of there may be more that needs to be disassembled and examined closer in regard to the heat exchange component.

Recovery tank

The recovery tank may seem like a very unlikely place to find issue when a truckmount is frozen but cracking can occur if the recovery tank was full or near full when it was frozen. Remove the cover for the blower filters behind the driver's seat and remove one or both filters in the recovery tank and check the float switch for damage. If water had frozen at this level, damage to the float switch is very likely as the ice could damage the housing to the switch.

Remove the lid for the vac hose port and pull out the lint basket. Inside the recovery tank is a silicon hose that is part of the by-pass system. Make sure that this hose is not leaking and is attached correctly the clamps are secure. Look for any water pouring into the recovery tank from the relief ports from the panel and PTI. At this point, no water should be making its way into the recovery tank.

Fill up the recovery tank with water and look for leaks. Be sure NOT to over fill the tank past the float switch. This is to check to make sure that there are no cracks in the tank and that the dump valve was not damaged. If no leaks are found, empty the tank before further testing.

I have water pouring into the recovery tank

If you have any water that is making its way into the recovery tank, replace check valve located on the PTI and inlet water manifold. Both are listed in the Compact 47 manual. (Inlet water manifold check

valve part# 551-070 (Page 42 in Cleanco Manual Reference number 52) and Pressure limiter valve Part#-551-005 (Page 52 in Cleanco manual Reference number 6).

It may just be good practice to replace these 2 parts regardless along with 550-040 (Page 42 in Cleanco Manual Reference number 51) as freezing these parts can cause issues with diagnosing and water flow.

Still no Leaks or I have fixed all the visible leaks

Sometimes garden hose pressure is not enough to expose all micro cracks or leaks that may form from freezing. If you have taken care of all leaks or find no leaks, now you are going to want to run the unit.

Freshwater tank

If the freshwater tank had water that was frozen, now is a good time to check it for damage. FILL the tank to full. This will allow the pressure from a full tank of water to expose any leaks or issues with the dump valve or possible crack that may have formed due to expansion of the water.

Checking for leaks under pressure

With the garden hose still attached as the water supply for the unit, start the unit and make sure that you still have a primer hose attached to the front panel. Allow the unit to build pressure and flow water. Set your pressure to 500 psi and allow to flow as you again check all areas for the unit as you did under garden hose pressure. Make sure to turn the unit to both hot and cold to allow water to flow into ALL areas of the unit to expose any leaks.

If you cannot find any leaks, close off the valve on the primer hose and allow the unit to build pressure to 500 psi. Watch for steady pressure. If you have fluctuation, allow more water to flow through the primer hose again for a short bit to work out the air in the system. If fluctuation is continuously happening, this may indicate a leak, seeping air into the system, or pump related issues. Time to start looking for the cause.

If you have no fluctuation and no leaks, check all areas of the system for possible leaks by leaving the unit under pressure this way for a period of time (couple of minutes) and continually check for leaks in all areas. If you do not find any, relieve the pressure, allow flow of water again and then repeat this at 1000 PSI. Again, checking both on HOT and COLD settings and checking for leaks. Doing this will build pressure in the system and expose any minor cracks or hoses that maybe damaged or loose.

If no leaks are found, allow the unit to run with water flowing at around 450psi using the primer hose and allow the unit to heat up to operating temperature. Continually look for leaks as it is running in all areas.

Once the unit has heated up to operating temperature, repeat the pressure test by turning off the valve on the primer hose and checking for leaks at both 500 and 1000 psi.

CONTINUALLY check the overflow container on the van for any coolant movement. As the van heats up, coolant levels will change. Either it will increase in the overflow or decrease depending on coolant levels and temperature of the van. So some movement is to be expected. You are looking for the excessive movement or filling up of coolant in the overflow container. Re-mark the levels multiple times to determine if it is standard movement with the van running or excessive and filling up because of an introduction of water to the system.

I can’t build any pressure

If you find that you have no leaks but are still unable to build pressure there MAY be an issue with the seals on the pump. A good indication of issues with wet side pump seals is dripping of water under the pump. Garden hose pressure is capable of exposing these issues but not always. I would spend some more time going over ALL of the other areas of the unit looking for leaks, cracks and loose fittings and hoses before tackling the pump. If you are 100% sure that there are no leaks or other issues, the pump is the only remaining area that is left.

Checking the valves for damage or particles is a good first step.

Remove the caps (6 in total. 3 on the front, 3 on the top) and remove each valve and check for damage. Make sure that they open and spring back into place.

If all the valves are in good condition, removing the pump head and checking plungers for cracks and damage and seals for wear is your next step.

It is also a good idea to remove the oil cap from the pump and shine a flashlight into the body of the pump and check the oil for any water or “milky” fluid. This would indicate that the oil seals have been damaged and is leaking water into the crack cavity of the pump. Oil seals are replaceable but requires a bit of work to replace.

Last and Final Step

By this time, hopefully you manage to find all the leaks and issues and the unit is running great! Might be a good time to check the wands and tools that where in the frozen van as well. There’s a good chance that if the truckmount was frozen, the tools and wands in the van where frozen as well. Checking these is a nice step to take for the customer so that the next time they go to use their unit, they aren’t scrambling to find a wand or tool that isn’t leaking or damaged due to the freezing.

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