



MN-PV-CIS-027

Sewer Flusher Competency Manual

MN-PV-CIS-027 – Sewer Flusher Competency Manual
Rev 2

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Training Expectation Letter

It is required that this document is completed prior to the Employee starting training on a P&V Sewer Flusher Truck. This document will serve as formal record that all parties have reviewed and understand the expectations for training on the Sewer Flusher.

Trainee Name:

Date of Discussion:

Expectations of Supervisor/Leader

- Ensuring trainee has scheduled time for training.
- Ensure trainee has reviewed and understand the technical documentation
- Ensure trainee has been provided a demonstration on equipment operation
- Verify field competency sign offs once completed
- Ensure trainee is working with a competent mentor until they are competent themselves
- Provide support for the assessor, mentor, trainer and trainee whenever possible.
- Ensure training documentation is sent to CEDA Training Department

Expectations of Trainer, Mentor, assessor

- Must be qualified in the position for which he/she is training.
- Educate and support trainee with technical review package.
- Ensure trainee has been provided a demonstration on equipment operation
- Review trainee's technical knowledge and verify acceptable understanding
- Educate and support trainee with field tasks identified in the competency check sheet
- Verify trainee has the ability to perform tasks identified in the competency check sheet
- Communicate to Supervisor that the technical review and field competency is complete

Expectations of Trainee

- Complete all prerequisites outlined within the training program.
- Understand the training process outlined in this document.
- Understanding systems and spending time in the field.
- Ensure all lessons and tasks are signed off by the appropriate personnel as indicated on the training documents.
- Inform Supervisor/Leader on progress of training through face to face meetings.
- Will utilize all the materials provided to ensure a comprehensive training program is followed.
- Provide feedback on the training process and any updates that are required to the training material.
- Inform Supervisor/Leader of any training barriers that may exist during the training process.

Training Expectation Acceptance Agreement

I, _____ understand the expectations of me as a trainee as outlined in this document

(Operator Name)

Operator\Trainee

Name

Signature

Date (MM\DD\YY)

Supervisor/Leader

Name

Signature

Date (MM\DD\YY)

Acknowledgement



This manual has been developed using information and knowledge obtained from manufacturer's documentation and input from experienced Operators. Additionally, this manual has been validated by numerous Subject Matter Experts at CEDA. We welcome any comments or suggestions pertaining to this manual and its contents.

Many thanks to those who have demonstrated a clear dedication to CEDA and our values by participating in the creation of this program.

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Objective

Welcome to CEDA Sewer Flusher Training

This program is designed to provide you with the training necessary to carry out your job in a manner that safeguards yourself, those around you and our environment. Upon Completion of this Module you will be able to:

- Review Sewer Flusher Operations
- Operate Sewer Flusher Unit
- Maintain/ Care for Sewer Flusher Unit

Employee(s) will demonstrate knowledge & skill in the proper application of equipment through practical application.

Instructions

All material must be completed in the order presented to ensure that prerequisites are met.

Employees will demonstrate knowledge and skill in the proper application of equipment through practical demonstration and application.

NOTE: All forms and procedures included are those required by CEDA. Work must be performed in accordance with these standards. On Client work sites, there may be additional standards and modified work procedures that will also have to be met.

Description: This is a knowledge and practical skill that requires written material to be reviewed along with the completion of an on-the-job demonstration prior to the test being written.

Whenever possible, the on-the-job demonstration should be completed at a job site or the shop under controlled conditions.

Arrange a time with your Mentor/Supervisor/Trainer to complete the On-the-Job Demonstration, where you will observe the proper operation of the Wet Vacuum unit and its components.

Assessment of Competency: Successful completion of this competency requires:

- A score of 100% on the written examination.
- A successful demonstration by trainee requiring a sign-off from Trainer.



Prerequisites

- CEDA Orientation
- CEDA Introduction to High Pressure Water Blasting
- Specific work location Orientation

Below is a list of the learning resources that are included and others you must obtain the most recent version from your Supervisor.

- Critical High pressure Water Blasting Authorization
- Sewer Flusher Operations Procedure
- Vactor Jet Rodder Operation Parts and Service Manual
- Auxiliary Diesel Engine Operator Manual
- CEDA Pre-Trip Inspection (Vehicle Inspection Report)
- Site specific documentation
- Job Hazard Analysis for the work
- CEDA FLHA
- Other CEDA procedures and practices that pertain to the job being completed

NOTE: All forms and procedures included are those required by CEDA. Work must be performed in accordance with these standards and can be found in CEDA Health, Safety and Environment Management System (HSEMS) or be requested from your Leader. On Client work sites, there may be additional standards and modified work procedures that will also have to be met.



General Overview

Federal & Provincial Legislation

All work must be completed in accordance with applicable Municipal, Provincial, & Federal Acts & Regulations, including but not limited to:

Transportation of Dangerous Goods (TDG)

- Vehicle must be DOT Approved and be equipped with appropriate safety devices
- DOT approved vehicles will have sticker on side of unit
- Operator must place appropriate placards on side of vehicle
- Operator must prepare bill of lading prior to transporting materials

The Workplaces Hazardous Materials Information System (WHMIS)

- All CEDA field employees working with or around equipment will have WHMIS and TDG training prior to starting work.

Occupational Health & Safety (OH&S)

Seat Belts

Anytime a vehicle (CEDA owned or personal) is being operated during business hours for business use, or on CEDA property, the occupants must be wearing seatbelts.



Personal Protective Equipment (PPE)

To operate the Sewer Flusher unit, employees must have and utilize the following personal protective equipment (PPE):

- CSA Certified Hard Hat
- CSA Certified Safety Boots (Boot Grips when required)
- Fire Retardant Coveralls
- Hearing Protection (plugs or muffs)
- Approved Gloves for the Site/Task
- Safety Glasses with Side Shields.
- Rain Gear as Required

For hot materials, the following additional personal protective equipment may also be required:

- 
- Rubber gloves
 - Steel-toed rubber boots
 - Face shield

Workplace Organization

CEDA's goal is to reduce waste (time, energy and materials) by maintaining an orderly and clean workplace, including our trucks and equipment. We ask that you take pride in the equipment you operate; treat it as if it were your own. A clean and organized vehicle/workspace is a safer vehicle/workspace. There are many ways to eliminate waste:

Allocation & Utilization of Resources: Have the right people and equipment in the right place, at the right time. Use equipment and resources on tasks and activities that are required and add value to our business.

Improve Productivity: Eliminate redundant or unnecessary steps/tasks without negative impact to the safety or quality of our products and services.

Use of Materials: Ensure equipment is stocked with required supplies (filter bags, duct tape etc.) before leaving for jobsite – replace the materials you have used during the shift to ensure that the next crew is adequately stocked. Use the correct materials in the quantities required to do the job safely & correctly.

Preventative Maintenance: Tools and equipment should be assessed as per the performance maintenance schedule to ensure safe operation. Regular maintenance will reduce costly breakdowns in the field.

There are steps we can take to improve our current state and move towards a more productive, organized and safe work environment. Improving workplace organization will reduce costs, improve morale and create a safer work environment. The following steps outline how best to achieve an organized workplace:

Sort, organize and eliminate unnecessary items from the workplace to eliminate clutter. Keep only essential items.

- Tools and equipment that are not utilized for day-to-day operations should be re-purposed within the organization or discarded.
- Garbage or loose items should be removed or properly stored.

Prioritize tools, parts and materials based on usage and keep them in easily-accessible places.

- A place for everything and everything in its place.

Create storage areas that are easy to access and clearly laid out:

- Tools and equipment should be stored clean and ready for use.
- Storage areas and stored items should be properly identified using signage, labels or a visual outline.

Set clear standards for workplace organization:



- Hold yourself and others accountable for keeping the work areas clean and safe. Make workplace organization a standard work rule in your area.
- Clean general work areas and equipment after each shift.
- Put clean tools away in the proper place.
- Note any spills, leaks or other messes – clean and report if equipment requires maintenance
- Inspect the area(s) regularly and immediately record and correct any infractions. Handle deviations from work rules in a timely manner.
- Review processes and procedures regularly and adjust as required.

Equipment Overview

Sewer Flusher

The sewer flusher cleans blocked lines/ pipes while flushing out debris. It uses a pressurized water system to break-up and flush the debris in 4" pipes and sewer drains. This operation is performed by a laborer and an operator for line preventative maintenance.

The sewer flusher is equipped with a stainless steel tank that can hold up to 1,700 gallons of water. A water truck is used to fill the tank this takes approximately 1.5 hours and should be done on site. This is performed by the water truck operator and not the sewer flusher operator. The tank can be set at a variety of flow speeds, the maximum being 60 gpm at 2000 psi.

CEDA uses sewer flusher units provided by different vendors and each unit may make use of controls that are slightly different than those found on other units. CEDA exercises every caution to ensure that controls are consistent on each unit. However, each operator must be aware of all controls (including safety controls) and the operating limits of the particular unit in operation. The subsequent training materials contained in this learning module describe the general operating overview and is not intended to replace the manufacturer's Operator Manual for any given sewer flusher. Every effort has been made to ensure that key elements of vacuum operations have been included. The following section identifies and describes the general components found on the sewer flusher.

The illustrations in this element have been provided using the Vactor Ramjet™ unit. Please refer to the appropriate Manufacturer's Operating Manual for more detail, as necessary.

The operation begins with the high pressure water pump. Water is pumped from the water tank where it is filtered and pressurized by the water pump. Water enters the orange water hose which is stored on the hose reel, which is used for cleaning. This is sometimes referred to as 'jet rodding', meaning the cleaning of sewer lines with high pressure water.

Additionally, the water hose is the platform for many of the controls used in the cleaning function. With a turn of the ball valve on the hose reel, the water either returns to the tank or is sent out of the water nozzle on the end of the water hose.

Major Components of the Sewer Flusher Unit

The following section identifies and describes the major components found on the Sewer Flusher. Refer to the appropriate operator's manual for more detail, as necessary. A sewer flusher (pictured below) consists of the following components:

- 1) water tank,
- 2) engine,
- 3) hydraulics and water pump, and
- 4) hose reel and components.

Each of these components will be discussed in more detail below.



Sewer Flusher – Right Side

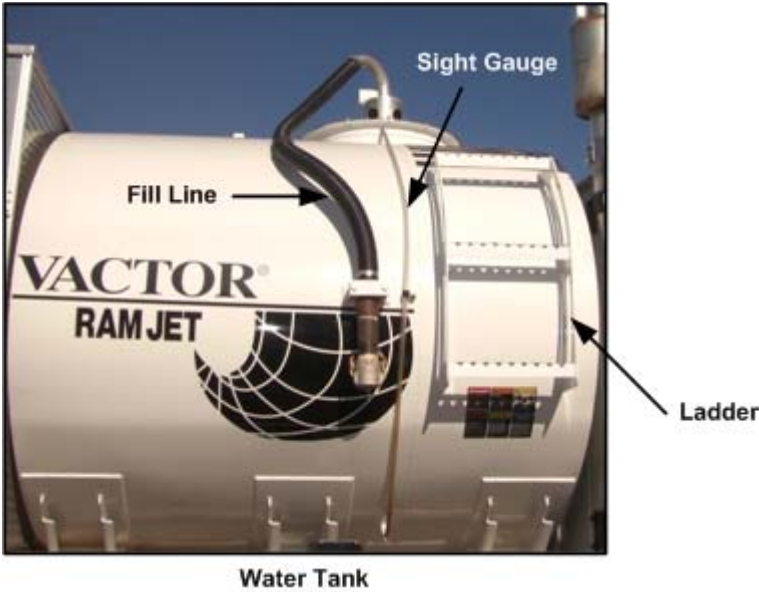


Sewer Flusher – Left Side

Hose Reel & Components



Water Tank



The water tank is situated directly behind the cab of the truck and holds 1,700 gallons of water. It is equipped with a water level sight gauge and a ladder for easy access to the top of the tank (as seen to the left).

The tank is also equipped with a water shut-off sensor that will detect the maximum level of water that the tank can be filled. When this level is reached, the sensor will signal the water shut off valve, causing the water to shut off.

A water truck is brought in to fill the water tank of the sewer flusher. The hose from the water truck is connected to the fill line located on the side of the water tank.

During filling, air in the tank is vented through the vent located on the top of the water tank (white vent). When the water tank is full it will spill out the holes on the top of the water tank (as seen to the right). The level of water in the tank can be seen by looking at the sight gauge located next to the fill line. Three red balls sit in the tube (or sight gauge) and indicate the water level.



Tank – Top View



Fill Line Close Up



Sight Gauge Close Up



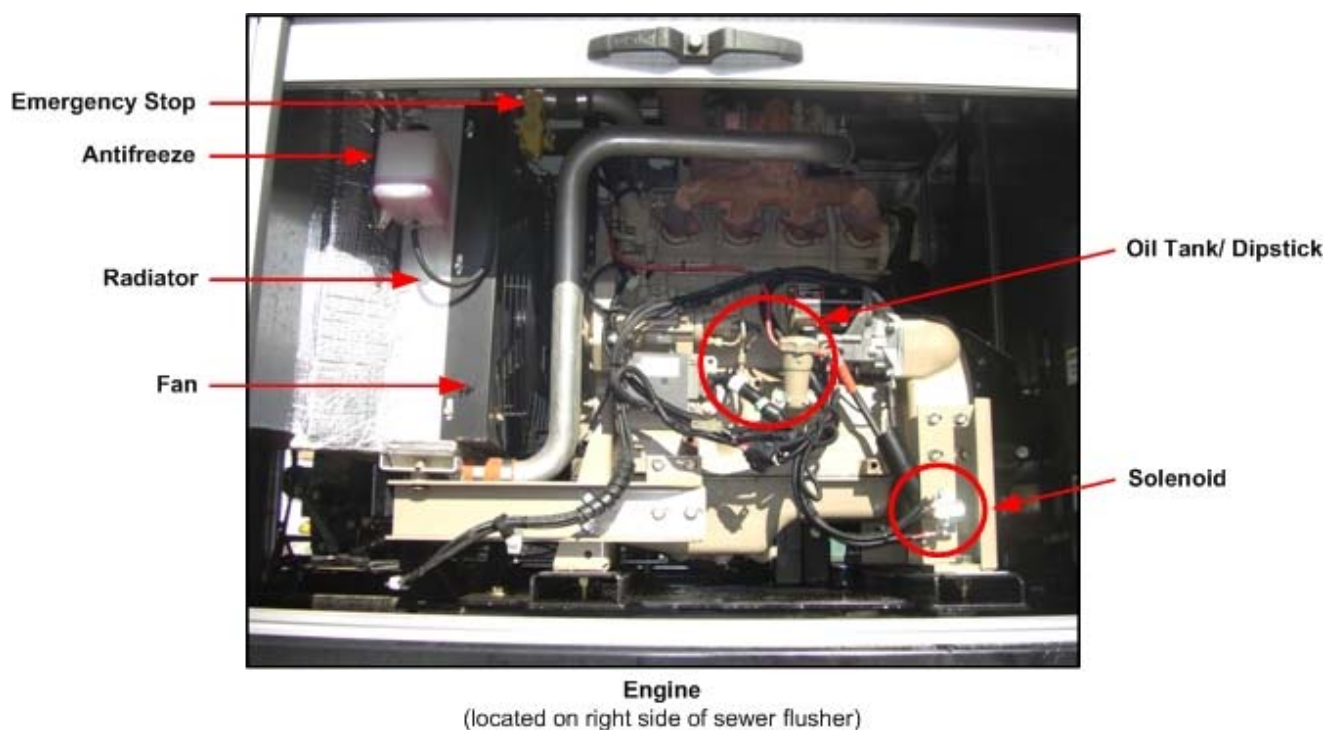
The water tank must be drained at the end of each shift. A drain located on the driver side of the vehicle on the bottom of the water tank can be used to empty the water tank. To operate, simply push in to close and pull out to open.



Water Tank Drain

Engine

The engine is located on the right side of the sewer flusher.

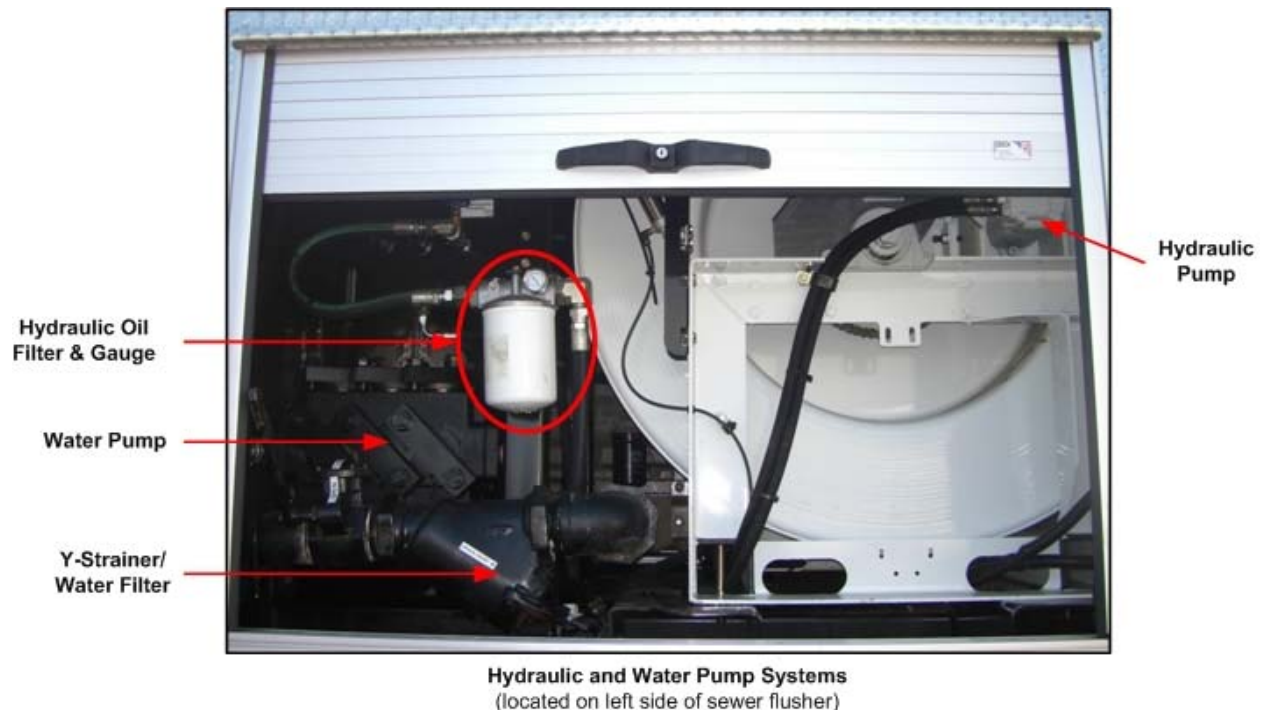


Glycol is stored in the engine compartment on the right side of the truck. The Glycol is circulated at the conclusion of cold weather operations. During winter months the antifreeze must be purged

prior to starting any new jobs. The Glycol can be deposited back into the Glycol storage tank or properly disposed.

The engine uses 15W40 and is also equipped with an emergency stop pull cord located above and to the right of the antifreeze compartment. To activate, simply pull the cord.

Hydraulic System and Water Pump System



Hydraulic System

The hydraulic system consists of the pump, hydraulic oil filter and gauge as well as a hydraulic oil sight gauge (not shown). The hydraulic pump is required to pay-in and out the hose reel.

This pump is live anytime the truck engine is running. Remember to always check the gauge on the control panel that indicates overheating.

During operation, ensure the hydraulic oil gauge stays within 0 to -5. Overheating will cause parts to melt. As for the hydraulic oil sight gauge, always fill to required line (as shown below).

Hydraulics that run the Pinch Roller (right)





Water System

The water system consists of a high pressure pump and Y-strainer with filter. The water pump is a Myers Triplex Pump that creates the pressure necessary to break-up the materials by the water hose. It is capable of producing 60 gpm at 2,000 psi. The water pump is driven by a power take-off (PTO).



Y-Strainer



Water Pump

A Y-strainer is located before the pump inlet and is used to prevent debris from entering the pump. The strainer filters any impurities in the water prior to entering the water pump. A metal basket (filter) traps these impurities or contaminants as water flows through it. The Y-strainer must be checked for debris prior to each use.



Y-Strainer - Open



Filter



Y-Strainer - Closed

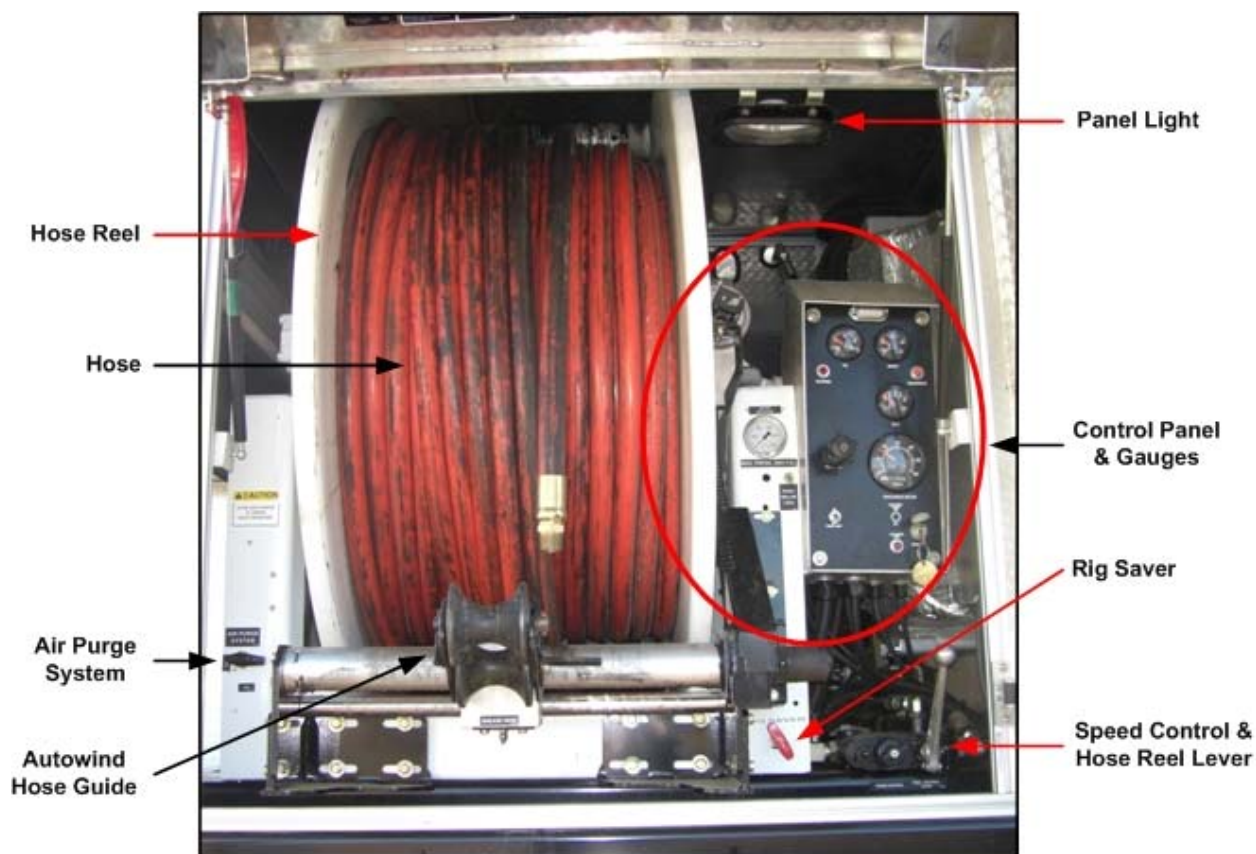
Drains

There are four drains located in the hydraulic and water systems compartment. Three are located just below the Y-Strainer as shown below and one is located just beneath the water pump as seen to the right.



Hose Reel and Components

The back of the sewer flusher contains the hose reel and all components to operate it. These components include the hose reel, control panel and valves to operate the flow of water.



Hose Reel and Components
(located at the back of the sewer flusher)

Hose Reel

The hose reel keeps the water hose together. The hose, controlled by the hose reel, is fed into the pipes or sewer lines. The hose reel rotation is powered by a hydraulic pump. The sewer flusher and hydraulic pump must be turned on before the hose reel can be used.

The water hose is fed through the autowind hose guide using the speed control and hose reel lever (see below) to guide it.

This guide is used to assist the operator in wrapping the hose back onto the hose reel. This guide allows for hands-free operation from the control panel. The hose moves through the middle of the reels.

Do not place the autowind hose guide over the hose until after the nozzle has been positioned onto the line.



Open the hose guide by lifting the locking lever on the right side and moving top portion of guide (below left). Using the hose reel lever, descend hose and place in the autowind hose guide. Simply close top portion over the hose and close the lever.



Auto Wind Hose Guide - Open

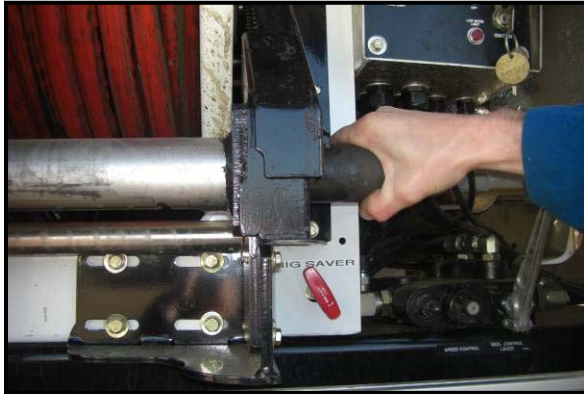


Auto Wind Hose Guide - Closed

As the hose is descending into the pipe or sewer the autowind hose guide will keep the hose straight by moving along the autowind bar. The hose guide can be manually adjusted if required.



For manual adjustment to the hose guide, simply grab the knurled knob on the end of the rod and turn to the desired location. (Below)



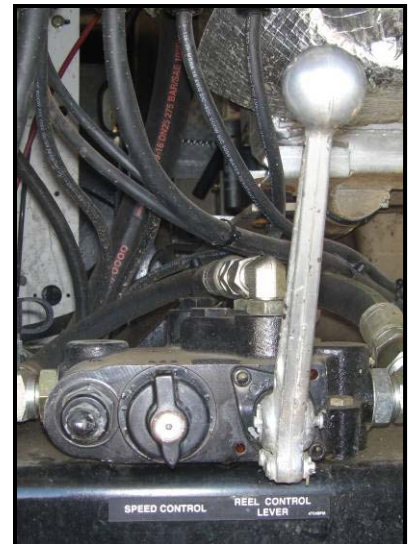
Hose Reel Lever and Speed Control Knob

The hose reel lever controls travel in and out of the pipe. To operate, push the lever in to propel hose into the pipe, pull lever out to remove hose from the pipe.

The speed control knob varies the speed of the hose reel. Turn the knob counter clockwise to increase the speed and clockwise to decrease the speed of the reel. The speed can be set from 1-12. The speed should be set at 1 or 2 for CEDA operations. The dirtier pipe, the slower the hose should be released. Turn the speed control fully clockwise to close before transporting.

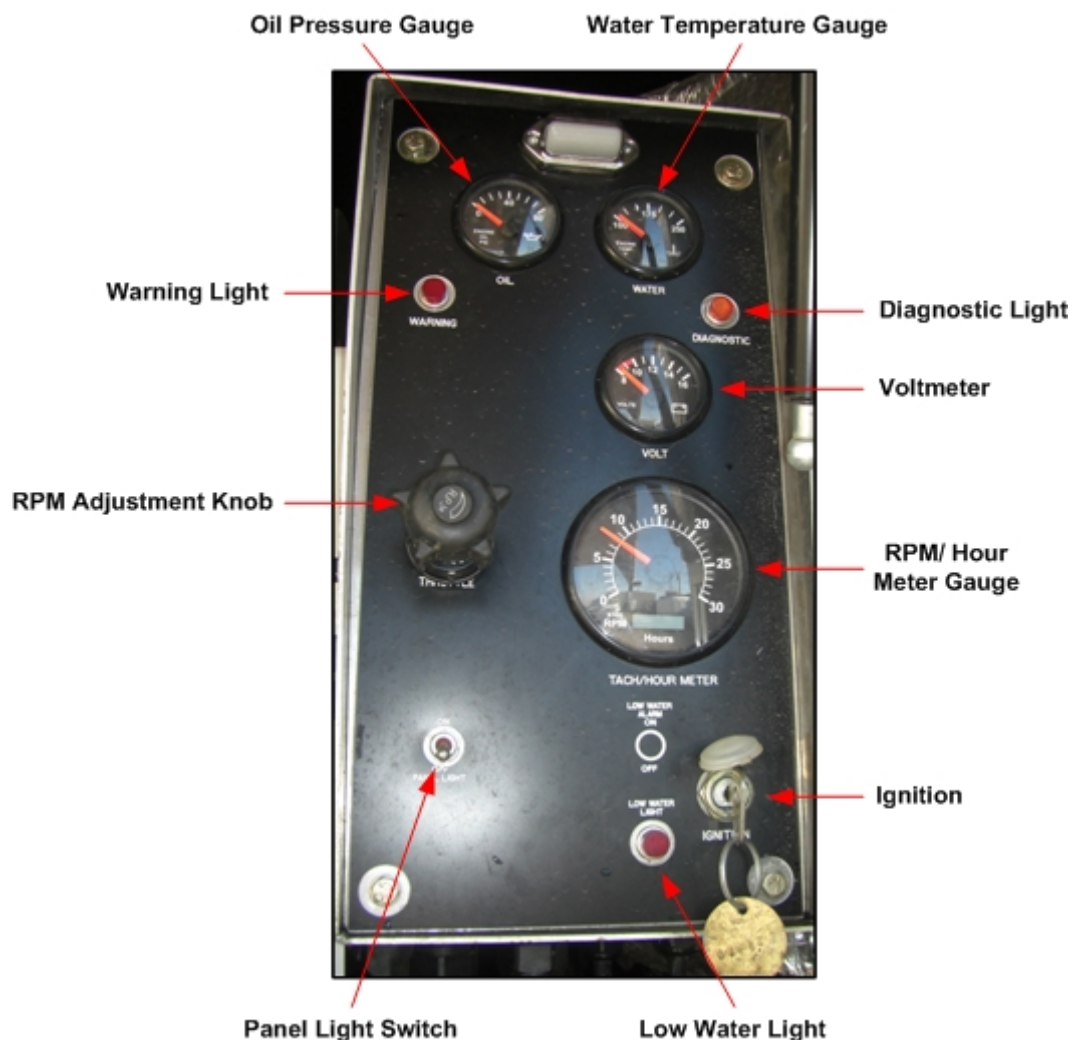
Speed Control Knob and Hose Reel Lever (Right)

Speed Control Knob close up (Below)



Control Panel

The control panel is located at the rear of the truck and allows the operator to control various functions. There are four gauges located on the control panel. The oil pressure gauge should never exceed 60 psi and the water temperature gauge should never exceed 180 °F. The voltmeter indicates current voltage. The warning and diagnostic lights will illuminate if service is needed or a problem arises, such as, overheating. If the low water light illuminates, this is an indicator that the water level has dropped below the sensor. The ignition switch is found in the bottom right corner which supplies power to the main operating components of the sewer flusher.



The large gauge indicates RPM (or tach) and provides a digital read-out of operation time (as seen to the right).

A panel light switch is located in the bottom left corner of the control panel and can be switched to the ON position to turn the panel light on. The panel light is located above control panel as seen below.



Also located beside the control panel is the water pressure gauge and pinch roller switch (as seen to the right). Always ensure the water pressure never exceeds 2,000 psi. The pinch roller switch locks the pinch roller in place. The pinch roller is located on the hose reel and will stop the hose from unraveling.



Hose Reel Indicator

The sewer flusher is equipped with a hose reel indicator that displays how much hose has been released. To reset, turn the wing nut until the dial displays '00000'.



Rig Saver

The rig saver is located directly to the right of the hose guide rod. To operate, pull the rig saver out and this will shut down the operation.



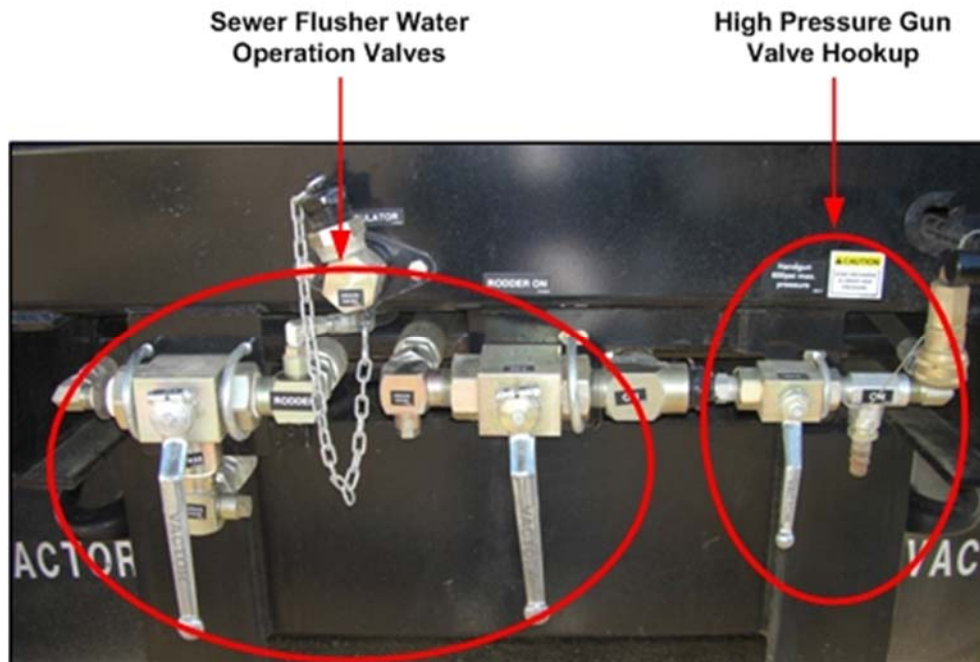
Air Purge

The air purge located on the sewer flusher will simply clean out the lines with air. To operate, simply turn the knob to the ON position. Always ensure the lines are not capped, this will allow any excess water to drain out.



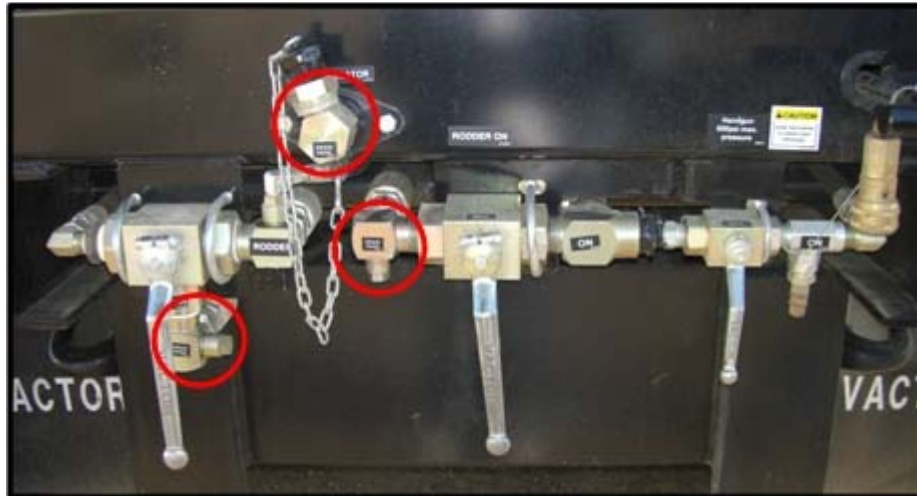
3-Way Valve System

The valve system pictured below is located on the bumper at the back of the unit. This system controls water flow to the water hose on the hose reel or the high pressure gun (when connected).



The left two valves are used for operating the sewer flusher and the third is used with the high pressure gun. The third valve must be in the closed position while performing sewer flusher operations. When the high pressure gun is to be used, the first two valves must be closed.

There are also three places to drain water on the 3-way valve system as shown below circled in red.



ToolBox

The sewer flusher has a toolbox on the right side of the unit below the water tank. Inside the toolbox are pylons, hand tools (e.g. wrench), high pressure hose and gun, nozzles, stinger and a vest. The items in the toolbox may differ depending on the unit and location



High Pressure Hose and Gun

A high pressure hose and gun is kept with the sewer flusher for cleaning the unit. It hooks up to a water supply at the back of the unit. The maximum pressure of the high pressure gun is 600 psi (below Left). Water to the high pressure gun is supplied by a ball valve at the back of the

truck (below Right). To supply water to the high pressure gun, turn the ball valve 90 degrees to the right (as seen below).



Water Hose Attachments

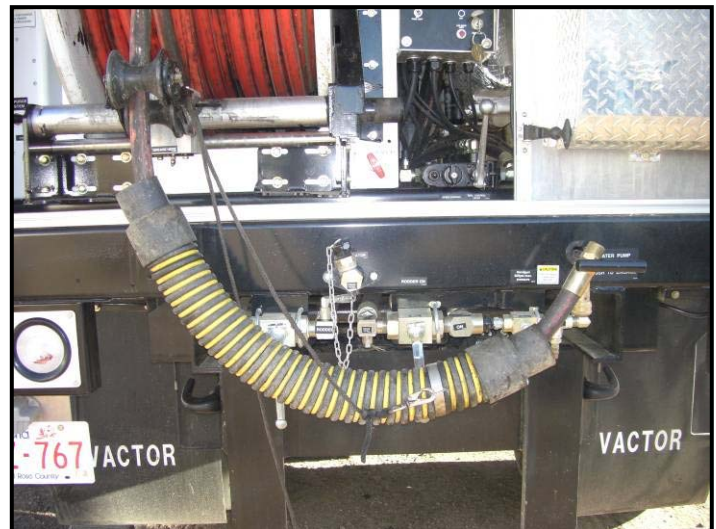
When performing the sewer flusher operation, there are a number of attachments (hose guide, stinger and nozzle) to be used to help prevent the nozzle from turning in the pipe and returning toward the operator. First off, a hose guide (below) is placed over top of the water hose and then a guide rope is attached to the ring.



Hose Guide



Hose Guide With Rope



Hose Guide with Rope attached to water hose

High Pressure Hose Anti-Withdrawal Device

Anti-Withdrawal Devices prevent the high pressure flex lances from reversing and exiting the tubes being cleaned. These devices ensure the safety of the operator and **MUST** be in place prior to starting the cleaning process or introducing pressure. If the job application does not allow the use of an anti-withdrawal device then a “Critical High Pressure Water Blasting Authorization Form” must be completed and approved by the leader

CEDA uses two different types of nozzles:

1. Sand nozzle
2. Sanitary nozzle.

The sand nozzle has two forward jets and six rearward jets. The forward jets are at an outward angle not to cross. Forward jets wash down sand buildups to allow nozzle to cross and have rear jets to clean or move sand. These nozzles are good for cleaning and unblocking plugged lines with sand and grease.



Sand Nozzle (Forward and Rearward Views)

The sanitary nozzle (to the right) only has six rearward jets which are good for loosening debris in larger lines and running long lines.

Nozzles are attached to a stinger which is then attached to the water hose.

- Always flush system before installing the tip



Sewer Flusher Safety

Fire Extinguisher

An ABC fire extinguisher is located on the left side of the truck, near the driver's door. This is a multipurpose dry chemical extinguisher. The ABC type is filled with monoammonium phosphate, a yellow powder that leaves a sticky residue.



Door Locking Mechanism

To ensure back door stays open, be sure to use the door locking mechanism (red). Simply place door rod into the groove of the mechanism (as shown below).



Operating Limits

It is important to operate the sewer flusher within the specified parameters set forth by the manufacturer; failure to do so will likely result in premature equipment failure.

Physical Limits	Consequences of Deviations
Do not increase engine speed above which is necessary to obtain a maximum of 600 psi water pressure with handgun.	<i>Damage to hose and handgun.</i>
Maximum pressure 2000 psi.	<i>Damage to hose and pump.</i>
Overheating (hydraulic pump temperature)	<i>Burns, hose bursts, hot hydraulic gauges, etc.</i>
Prior to installing tip, the hose needs to be flushed.	<i>Damage to hose and /or personnel due to pressure build-up.</i>



Safe Work Practices

To prevent possible injury or death while operating, or working near a sewer flusher, the following safety precautions must be taken.

Do not go underneath the vehicle while the engine is running.

Do not work near a rotating drive shaft to prevent getting caught or tangled.

Do not attempt to operate the controls of the PTO or other driven equipment from underneath the vehicle with the engine running.

Do not operate the controls of the PTO or other driven equipment in any position that could result in getting caught in the moving machinery.

Do not attempt to work on an installed PTO with the engine running.

Do not attempt to operate the water pump if the flow light is on.

Use only factory supplied hose fittings and tools.

Do not alter system components.

PPE must be worn at all times during sewer flusher operations. See required PPE below

Shut down immediately if any equipment becomes damaged during sewer flushing.

Ensure protective guards are in place before working.

Be informed and aware of hand signals and who is to give them. **Do not** accept hand signals from more than **one person**.

Always operate sewer flusher with the lights turned on.

Never point the handgun at yourself or at another individual.

Always set the parking brake before operating sewer flusher.

Do not attempt to run the water pump when the hose is frozen.

Always lock hose reel before driving.

Be aware of trips, slips and other fall hazards.

Receive medical attention for injuries associated with cleaning sewers, drains and catch basins if contamination is suspected.

Never operate high pressure pump with a damaged water hose.



Personal Protective Equipment

Ensure you are aware of all the hazards of materials you are handling to ensure proper PPE is worn.

The following PPE must be worn:

- ✓ Rubber gloves
- ✓ Approved safety glasses with full face shield
- ✓ Approved steel toed boots (Rubber Boots)
- ✓ Hearing protection
- ✓ Reflective vest for spotter (in truck)
- ✓ Nomex coveralls
- ✓ Approved hard hat
- ✓ Full Face Shield
- ✓ Rain Gear
- ✓ Respiratory Protective Equipment
- ✓ Safety Glasses

Job Hazards

Working with a sewer flusher can be potentially dangerous and extreme caution must be used at all times. PPE is the last line of defense and should not be relied on for protection against injuries. The following are hazards that employees need to be conscience of at all times.

Never stand position any body parts near or in front of the high pressure gun. **Never** point the high pressure gun in the direction of another person. Coming into contact with a high pressure water stream can cause serious injury.

Never place body parts or loose clothing near any moving parts. If any clothing or body part comes into contact with moving parts, serious injury may result.

Always wear hearing protection when the sewer flusher is on. Failure to do so could negatively impact hearing.

An **Anti-Withdrawal Device** must be used to prevent the hose from exiting the line/pipe. If for some reason an anti-withdrawal cannot be used, your Supervisor must be contacted. A risk assessment and a Critical High Pressure Water Blasting Authorization Form must be completed to put controls and mitigations in place to prevent Line of fire incident or injury

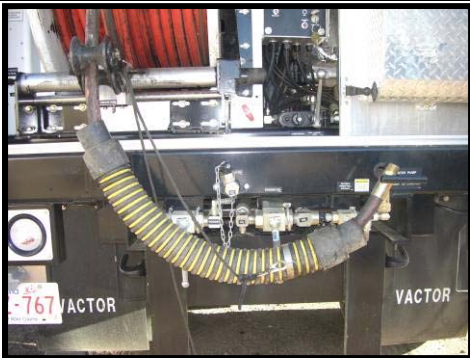
Be aware of the material flushed out of sewer lines. Coming into contact with any of the debris can result in serious injury.



Operate Sewer Flusher

ACTION		NOTES
Drain Water Tank		
1.	CLOSE gate valve.	
2.	REMOVE filter cap.	
3.	REMOVE Y-strainer water filter and leave filter out...	... Leave filter out allowing water to drain. ... As seen below.
 Y-Strainer - Open  Filter  Y-Strainer - Closed		
4.	REPLACE water filter and CLOSE Y-strainer.	
Set Up		
1.	OBTAIN work permit.	
2.	COMPLETE daily pre-job checklist.	
3.	DON required PPE.	
4.	POSITION sewer flusher near the line or pipe to be cleaned.	
5.	SET parking brake.	
6.	FILL water tank...	... Performed by a water truck operator.
7.	PLACE pylons, signage, flagging and tagging identifying the work area...	... Place high pressure water blasting sign, danger sign and hearing protection sign in place.
8.	OPEN back door...	... Contains controls.



9.	OPEN two side doors.	
10.	REPLACE micro screen.	
11.	DISCONNECT hose from transport position...	<i>... Place five feet of hose on the ground.</i>
12.	OPEN Y-valve and FLUSH system.	
13.	SLIDE flexible hose guide onto the hose.	
14.	Install Anti-Withdrawal Device	<i>...If the job allows, otherwise a Critical High Pressure Water Blasting Authorization form must be completed</i>
15.	PLACE tip/ stinger on hose...	<i>... As shown below. When required</i>
		
16.	ATTACH rope to flexible hose guide...	<i>... As shown below.</i>
		
17.	LOWER nozzle into open pipe...	<i>... Until nozzle rests in the invert.</i>
18.	LIFT nozzle and INSERT it a minimum of three feet inside of line needing cleaning...	<i>... Using rope. ... Proper position is half in and half out of the line.</i>



19. TIE OFF rope when flexible hose guide is in position...	... To prevent hose from moving.
Operation	
1. ENSURE nozzle is positioned a minimum of three feet into the line being cleaned before proceeding.	
2. TURN (3-way) ball valve to the OFF position...	... To prepare water to be diverted back to tank.
3. TURN (rodder) ball valve to the ON position.	
4. TURN high pressure gun ball valve to the OFF position.	
5. TURN ignition switch to ON position.	
6. OPEN valve when engine is at idle speed...	... Water should now be pumping back into tank. ... As seen below.
	
7. PUSH water pump clutch to engage...	... Water should now flow through hose reel to the nozzle. ... As seen below.



8. INCREASE RPM's slightly...	... When a steady water flow is coming from nozzle.
9. SET the footage counter...	... As seen below.



10. USE hose reel control valve to feed hose into the line....	... Push to extract hose off the hose reel. ... Pull to retract hose back onto hose reel. ... mark hose at intervals to give warning if hose is getting close to exiting the line being cleaned
--	--



11. ALLOW hose to feed itself through at a moderate pace...	... DO NOT allow hose to race or coil up in the bottom of the manhole or beginning of the pipe. Keep hose tight
---	---



12. TURN knob marked 'THROTTLE' to the right to increase engine RPM or left to reduce engine RPM...	... Until desired engine RPM has been reached. ... As seen below.
	
13. CONTINUE cleaning in sections until pipe is clean.	
Shut Down	
1. LOWER RPM.	
2. DISENGAGE water pump.	
3. REEL hose out of pipe.	
4. REMOVE nozzle from pipe.	
5. REEL remaining hose onto hose reel.	
6. CLEAN UP.	
12. SIGN-OFF work permit and leave site.	

Sewer Flusher Maintenance

As with any equipment used regularly, all components of the Sewer Flusher must receive the appropriate preventative maintenance in order to operate properly. Perform the required maintenance for routine operation.

Item	Service Required	Frequency
Chassis Fluid Levels	Determine appropriate level.	Daily
Water Hoses	Repair/replace if necessary.	Daily
Hydraulic Oil	Determine appropriate level.	Daily



Chassis	Service per manufactures manual.	Daily
Safety Equipment	Inspect. Repair/replace is necessary.	Daily
Water Relief Valve	Inspect for proper functioning.	Daily
Handgun	Inspect for damage.	Daily
Y-Strainer Filter Screen.	Inspect and clean	Daily
Water Pump	Check oil level.	Daily
Safety Equipment	Inspect. Repair/replace is necessary.	Daily
Chassis	Service per manufactures manual.	Daily
Strainer and Gaskets	Check and Clean.	Daily
Water Pump	Drain and Flush Water Pump	Weekly
Auto wind Guide	Grease Auto wind Guide	Weekly
Seals	Inspect Seals	Weekly
Air Tank	Drain Air Tank	Weekly
Water Pump	Drain Water Pump (Only in winter)	Weekly
Hose Wheel Bearings	Grease Hose Wheel Bearings	Weekly
Warning Labels	Inspect Warning Labels	Weekly
Truck	Wash Truck	Weekly
Chassis	Service per manufactures manual.	Monthly
Hose Reel Drive Chain	Check tension, adjust if necessary.	Monthly
Auto-Wind Drive Chain	Check tension, adjust if necessary.	Monthly
Hose Reel Drive Chain Tension	Ensure proper operation.	3 Months
Auto wind Guide Chain Tension	Ensure proper operation.	3 Months
Chassis	Service per manufacturers manual.	3 Months
Hydraulic Oil and Filter	Change.	3 Months

Winterization



Due to the inclement weather conditions, appropriate winterization is critical for proper operation. The winterization procedure is as follows:

ACTION	NOTES
Drain Water	
1. DON proper PPE.	
2. SHUT unit down.	
3. LOCATE area for draining excess water.	
4. CLOSE gate valve...	<i>... Located on water pump intake.</i>
5. REMOVE clamp, cap and water screen from Y-strainer	
6. OPEN both gate valves...	<i>... Allow water tank to drain completely.</i>
7. REMOVE hand gun quick disconnect coupling.	
8. OPEN hand gun valve.	
9. START engine.	
10. LEAVE the engine at idle RPM.	
11. TURN water pump on...	<i>... Stand clear of handgun outlet.</i>
12. ALLOW unit to run until all water is expelled from handgun system.	
13. TURN water pump OFF.	
14. REMOVE nozzle from water hose.	
15. SECURE end of water hose to adjacent wrap of hose reel...	<i>... Wind water hose tightly and orderly.</i>
16. ENSURE engine is at IDLE speed.	
17. TURN ON water pump...	<i>... Stand clear of water hose end.</i>
18. ALLOW unit to run until all water is expelled from hose and only air is discharged.	
19. TURN water pump OFF.	
20. ROTATE hose reel backwards to discharge any residual water from water hose...	<i>... Continue this until all water is expelled.</i>
21. SHUT DOWN engine.	
22. SET handgun valve and water ball valve to OPEN position...	<i>... Store strainer cap(s), gaskets and screen(s) in the supplied toolbox.</i>
23. OPEN water pump ball valve drains...	<i>... Leave all ball valves and gate valves open.</i>



24. ENSURE handgun quick disconnect is removed.	
25. STORE unit.	
On Start Up	
1. CLOSE water pump ball valve drains.	
2. CLOSE either the water pump valve or the handgun ball valve.	
3. REPLACE handgun quick coupler.	
4. REPLACE Y-strainer screen, gaskets and cap.	
5. CLOSE valves before filling water tank.	

Hose and Coupler Repair

If the hose and coupler break or become disconnected follow the proper process to ensure correct and timely hose repair. The process is as follows: Upon breakage, notify your Supervisor/ Foreman or site dispatch of hose breakdown. Obtain approval from Supervisor/ Foreman or Mechanic prior to taking hose into the depot.

IT IS IMPORTANT TO NOTIFY AND ENSURE THE REPAIR DEPOT GLUES AND CRIMPS THE COLLAR. IF THE HOSE IS NOT GLUED THE HOSE WILL CONTINUE TO FAIL.



Troubleshooting Sewer Flusher

To efficiently run the Hydrovac unit, the operator must be aware of the common failures that might prevent smooth operation. The following is a list of common problems encountered.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION(S)
Pressure drops off and pump fails to pump water during full stroke.	Dirty screen.	Remove and clean intake screen.
Pump fails to deliver water on both cycles.	Dirty screen.	Remove and clean intake screen.
	Rusty screen.	Replace screen.
	Intake valves may be stuck in OPEN position.	Close valves.
	Missing spring.	Replace.
	Check valve may be broken or bad.	Replace.
Pump is cycling back and forth however it is failing to deliver water to the nozzle.	Damaged or broken exhaust check valve.	Replace.
	Dirty intake screen.	Clean.
	Faulty seals on water piston.	Replace
	Broken water piston.	Replace.
Water pump pressure is correct but there is very little or no pressure on the other stroke.	One of the two intake check valves is stuck open.	Using a small hammer, tap on the intake manifold at the check valves. This should remove any dirt caught in valves.
	Defective check valves.	Remove intake manifold and replace check valves.
Water pump pressure is correct but the handgun does not have pressure.	Water hose valve may be open (ON).	Close (turn OFF).
	High pressure gun ball valve may be closed (off)	Open (turn on).



	Handgun pressure relief valve may be out of adjustment and is holding open.	Loosen the locking jam nut and turn the “T” handle clockwise. Adjust the pressure to 600 psi. (DO NOT adjust OVER 600 psi)
	Valve cannot be adjusted to 600 psi.	Replace.
Insufficient water volume or pressure at the nozzle during operation.	Nozzle being used is worn out or incorrectly sized.	Replace.
	Water hose is twisted or damaged.	Unwind hose, straighten or repair if necessary.
	Handgun ball valve must be closed (OFF)	Check valve and close if necessary.
	Handgun ball valve is leaking.	Be sure ball valve is closed. There should be no water leaking through the coupler connection. If there is, repair or replace ball valve.
Engine stalls when water pump is engaged.	All ball valves are closed (OFF).	Open one valve.
	The sensor or sensor wiring is defective.	Replace.
	The solenoid is defective.	Replace.
Indicator in the filter element turns YELLOW (warning) or RED (service).	Clogged filter element.	Service.
	Fluid temperature.	Service.
	Change in viscosity.	Service.
	Impending filter bypass.	Service.



Multiple Choice Questions (Technical Quiz)

Complete the following test, and have it graded by your assessor. If any questions are answered incorrectly, your assessor will explain what the correct answer is, and why it is correct. Once you understand the correct answer, both the assessor and students initials are required to indicate that mentoring or coaching has taken place.

Question	Assessor's Initials	Student's Initials
1. Chassis fluid levels must be checked daily. a. True b. False		
2. The water pump should be drained and flushed weekly. a. True b. False		
3. The water system does not need to be drained in cold weather. a. True b. False		
4. If the pump fails to deliver water on both cycles, it could mean: a. the screen is dirty or rusty. b. the intake valves may be stuck in OPEN position. c. there is a missing spring. d. the check valve may be broken or bad. e. All of the above.		
5. If the engine stalls when the water pump is engaged, it could mean: a. all ball valves are closed (off). b. there is a clogged filter element. c. water hose is twisted or damaged. d. there is a problem with the oil flow.		
6. If the high pressure gun relief valve is out of adjustment and held open, you should: a. remove and replace intake screen. b. remove intake manifold and replace check valves. c. loosen the locking jam nut and turn the "T" handle clockwise. d. service and replace if necessary.		
7. A work permit must be obtained before beginning any sewer flushing operation. a. True b. False		
8. The hose needs to be inserted a minimum of ____ feet into the line needing cleaning. a. 2 Feet b. 3 Feet c. 4 Feet d. 5 Feet		
9. The pre-job checklist can be completed in the middle of a job. a. True b. False		
10. Which of the following PPE is NOT required to operate a sewer flusher? a. Nomex Coveralls		



b. Rubber Gloves c. Tyvek Suit d. Safety Glasses/Face Shield		
11. The following warning signs must be in place before sewer flushing operation: (check all that apply) a. High Pressure Water Blasting b. Danger c. Hearing Protection Required d. Maximum Speed Limit		
12. The sewer flusher cleans blocked sanitary lines while flushing out debris. a. True b. False		
13. The water pump is commonly referred to as PTO. a. True b. False		
14. It is acceptable to exceed 600 psi water pressure with the handgun. a. True b. False		
15. The warning light on the control panel indicates: a. the screen is dirty or rusty. b. the intake valves may be stuck in OPEN position. c. the hydraulic pump is overheating. d. the voltage is too high.		
16. The rig saver is used for: a. reeling in the hose. b. turning on the beacon. c. relieve water pressure. d. shutting down the engine in emergency situations.		
17. Maximum water pressure is: a. 2000 psi b. 2500 psi c. 3000 psi d. 3500 psi		
18. The water pump runs the hose reel. a. True b. False		
19. The hose reel should always be locked before driving. a. True b. False		
20. You can keep working for up to 30 minutes if any equipment becomes damaged during sewer flushing. a. True b. False		
21. It is okay to work near the shaft when it is rotating. a. True b. False		
22. Do not attempt to work on an installed PTO while the engine is running. a. True b. False		
23. It is okay to point the high pressure gun at another person if you are not currently spraying water. a. True b. False		
24. PPE must be worn at all times during the sewer flushing operation.		



	a. True b. False		
25.	It is okay to turn the sewer flusher's lights off during the day. a. True b. False		



Practical Assessment – Sewer Flusher Operations

This form is to be filled out by the assessor as they observe the student successfully demonstrate these items in order to be deemed competent.

Assessment Check List

#	Locate and Identify the following components...	Trainer Initials	Assessor's Initials
Sewer Flusher Components			
1	Engine		
	Emergency Stop		
	Antifreeze compartment		
	Radiator		
	Fan		
	Oil Tank and Dipstick		
2	Hydraulics Compartment		
	Hydraulic Pump		
	Hydraulic Oil Filter and Gauge		
	Water Pump		
	Y-Strainer		
	Water Filter		
	Hydraulic Oil Sight Gauge		
	Drain (located beneath the water pump)		
	Drains (three that are located below the Y-Strainer)		
3	Hose Reel and Components Compartment		
	Panel Light		
	Control Panel:		
	• Oil Pressure Gauge		
	• Water Temperature Gauge		
	• Warning Light		
	• Diagnostic Light		
	• Voltmeter		
	• RPM Adjustment Knob		
	• Tach (RPM)/ Hour Meter Gauge		
	• Ignition		
	• Low Water Light		
	• Panel Light Switch		
	Rig Saver		
	Speed Control and Hose Reel Lever		
	Air Purge		



#	Locate and Identify the following components...	Trainee Initials	Assessor's Initials
Sewer Flusher Components			
3	Hose Reel and Components Compartment continued		
	Auto wind Hose Guide		
	Water Hose		
	Hose Reel		
	Hose Reel Distance Indicator		
	Water Pressure Gauge		
	Pinch Roller Lock		
	3-Way Valve System		
4	Water Tank		
	Water Level Sight Gauge		
	Ladder		
	Fill Line		
	Water Tank Drain		
	Water Shut-Off Sensor		
5	Toolbox		
	High Pressure Gun		
	High Pressure Hose		
	Sand Nozzle		
	Sanitary Nozzle		
	Hose Guide		
	Stinger		
6	Safety Equipment		
	Fire Extinguisher		
	Door Locking Mechanism		

#	Demonstrate...	Trainee Initials	Assessor's Initials
Set Up			
1	Obtain work permit.		
2	Complete daily pre-job checklist.		
3	Don required PPE.		
4	Position sewer flusher near the line or pipe to be cleaned.		
5	Set parking brake.		
6	Fill water tank (performed by a water truck operator).		
7	Place pylons around work area.		



8	Open back door.		
9	Open two side doors.		
10	Replace water filter (micro screen).		
11	Disconnect hose from transport position and place five feet of hose on the ground.		
12	Open Y-valve and FLUSH system.		
13	Slide flexible hose guide onto the hose.		
14	Place tip/ stinger on hose.		
15	Attach rope to flexible hose guide.		
16	Lower nozzle into open pipe.		
17	Lift nozzle and INSERT it a minimum of three feet inside of line needing cleaning.		
18	Tie off rope when flexible hose guide is in position.		
On Start Up			
1	Close water pump ball valves drains		
2	Close either the water pump valve or the handgun ball valve		
3	Replace handgun quick coupler		
4	Replace Y-Strainer screen, gaskets and cap		
5	Close valves before filling water tank		
Operation			
1	Ensure nozzle is positioned a minimum of three feet into the line being cleaned before proceeding.		
2	Turn (3-way) ball valve to the OFF position.		
3	Turn (rodder) ball valve to the ON position.		
4	Turn high pressure gun ball valve to the OFF position.		
5	Turn ignition switch to ON position.		
6	Open valve when engine is at idle speed.		
7	Push water pump clutch to engage.		
8	Increase RPM's slightly when a steady water flow is coming from the nozzle.		
9	Set the footage counter.		
10	Use hose reel control valve to feed hose into the line.		
11	Allow hose to feed itself through at a moderate pace.		
12	Turn knob marked 'THROTTLE' to the right to increase engine RPM or left to reduce engine RPM.		



13	Continue cleaning in sections until pipe is clean.		
	Shut Down		
1	Lower RPM.		
2	Disengage water pump.		
3	Reel hose out of pipe.		
4	Remove nozzle from pipe.		
5	Reel remaining hose onto hose reel.		
6	Clean up.		
7	Sign-off permits.		
	Drain Water Tank		
1	Don proper PPE.		
2	Shut unit down.		
3	Locate area for draining excess water.		
4	Close gate valve.		
5	Remove clamp, cap and water screen from Y-strainer.		
6	Open both gate valves allowing water tank to drain completely.		
7	Remove hand gun quick disconnect coupling.		
8	Open hand gun valve.		
9	Start engine.		
10	Leave the engine at idle RPM.		
11	Turn water pump on.		
12	Allow unit to run until all water is expelled from handgun system.		
13	Turn water pump off.		
14	Remove nozzle from water hose.		
15	Secure end of water hose to adjacent wrap of hose reel.		
16	Ensure engine is at IDLE speed.		
17	Turn on water pump.		



18	Allow unit to run until all water is expelled from hose and only air is discharged.		
19	Turn off water pump.		
20	Rotate hose reel backwards to discharge any residual water from water hose.		
21	Shut down engine.		
22	Set handgun valve and water ball valve to OPEN position.		
23	Open water pump ball valve drains.		
24	Ensure handgun quick disconnect is removed.		
25	Store unit.		

Assessment Sign Off

All boxes must be completed before signing an employee competent.

- ☐ Expectation Letter Signed
- ☐ Minimum 100 hours of on the job training completed
- ☐ On the Job Practical Assessment Completed by an approved Assessor
- ☐ Has reviewed and understands the operator manuals
- ☐ Reviewed and understands Procedures and Safety Documentation
- ☐ Technical review and Knowledge Exam complete
- ☐ Training documentation sent to CEDA Training Department

Assessor

I, _____ have taken the below named employee through this Assessment, and he/she has successfully demonstrated competence in the areas identified.

Signature Date

Student

I, _____ have completed this competency, including the on-job demonstration, practical assessment and multiple-choice questions. I understand the information presented and agree to follow all of the rules and procedures set out by CEDA.

Signature Date



Revision Log

Revision Date	Section Affected	Changes Made
October 21, 2021	All	Updated Template, multiple changes throughout.



Training Change Request Form

Date: _____

Location: _____

Name: _____

Contact information: _____

Email/Phone number

Description

Please use the back of this sheet to make additional comments.

Section Name: _____

Page Number: _____

Description of Problem/ Suggested Resolution:
