FS Solutions | Guzzler | TRUVAC | Vactor | Westech

Safety MANUAL

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815-672-3171 | sales@guzzler.com

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Solutions GUZZLER TRUVAC by Vactor Mfg. Inc. VACTOR WESTECH

Welcome to the our growing family of Vactor customers. The current series of units reflect the latest developments from the continuous research program of our engineering staff. Our research brings you the latest and most efficient pneumatic cleaning and jet-rodding equipment available in the world today.

This Safety Manual contains information on all aspects of the safe operation of a Vactor unit. We describe uses of the product to assist with the many unique jobs you will encounter. We also include representative samples of typically used safety and instruction decals. Because all Vactor units are custom, decals may vary. A guide listing decals is available for each specific model. We encourage you to replace decals when they become worn or illegible.

Proper operation and maintenance of your unit is critical to protect the safety of operators and others, and to maximize performance and product life. Each person should familiarize himself with this manual as well as proper operating procedures before operating unit or maintaining the unit.

The information, specifications, illustrations and parts numbers in these publications are based on the information in effect at the time of approval for publication. We are constantly improving our products and, therefore, reserve the right to make changes at any time without notice.

If a question arises concerning your Vactor product or this publication, please contact your Vactor® Manufacturing, Inc. distributor.

This manual is for use only with units meeting Vactor Mfg., standards. If your unit does not meet these standards, contact your Vactor representative to have your unit retrofit to meet these standards.

FSESG Environmental Solutions Group

Scan the QR Code with your mobile device or visit: http://www.fsesgsafety.com for the latest FSESG product and application safety information.

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FSESG Environmental Solutions Group

VACTOR Subsidiary of Federal Signal Corporation
Manufacturing, Inc.

1621 S. Illinois St.
Streator, IL 61364
Ph: 815-672-3171
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Subsidiary of Federal Signal Corporation

Please keep Vactor Mfg. Informed of any change of vehicle ownership or address.

This operator's manual should be considered a permanent part of the your unit and should be with the vehicle at all times for ready reference.

⚠ WARNING

IMPORTANT MEDICAL INFORMATION

An injury caused by high pressure waterjets can be serious. In the event of any waterjet injury:

- Seek medical attention immediately. Do not delay!
- Inform the doctor of the cause of the injury.
- Tell the physician what type of waterjet project was being performed at the time of the accident and the source of the water.

Medical Alert

Note Physician

This patient may be suffering from a waterjet injury. Evaluation and management should parallel that of a gunshot injury. The external manifestations of the injury cannot be used to predict the extent of internal damage. Initial management should include stabilization and a thorough neurovascular examination. X-rays can be used to assess subcutaneous air and foreign bodies distant from the site of injury. Injuries to the extremities can involve extensive nerve, muscle, vessel damage, as well as cause a distal compartment syndrome. Injuries to the torso can involve internal organ damage. Surgical consultation should be obtained. Aggressive irrigation and debridement is recommended. Surgical decompression and exploration may also be necessary. Angiographic studies are recommended pre-operatively if arterial injury is suspected. Bandages with a hygroscopic solution ($MgSO_4$) and hyperbaric oxygen treatment have been used as adjunctive therapy to decrease pain, edema and subcutaneous emphysema. Unusual infections with uncommon organisms in immunocompetent patients have been seen; the source of the water is important in deciding on initial, empiric antibiotic treatment, and broad-spectrum intravenous antibiotic treatment, and broad-spectrum intravenous antibiotics should be administered. Cultures should be obtained.

Operators using or working around high pressure water systems need to take additional precautions including specialized personal protection equipment. Additional information on high pressure water safety and this information is provided by and available as a wallet card from:

WJTA
WaterJet Technology Association

Also available from the WJTA-IMCA:

Recommended Practices for the Use of High Pressure Waterjetting Equipment

Recommended Practices for the Use of Industrial Vacuum Equipment

WJTA-IMCA
906 Olive Street, Suite 1200
Saint Louis, MO 63101

(314) 241-1445
fax (314) 241-1449
e-mail: wjta@wjta.org
website: www.wjta.org

The Vactor Service Team provides assistance to all Vactor/Guzzler/TRUVAC dealers and customers via remote (telephone, e-mail, fax, etc.) and on-site (dealer/customer visits, field training, etc.) support operations.

Toll-Free Telephone

1-877-DIAL ESG

(877) 342-5374

Fax (815) 673-1621 • Website www.vactor.com

Outside the USA or Canada call 01-847-741-4330

Technical Support • 24 hours/Day, 7 Days/Week!

You will be asked for specific information pertaining to the type of unit you are calling about, Vactor, Elgin, Guzzler, TRUVAC, etc. You will be asked for the zip code you are calling from. Your call will then automatically be transferred to the Vactor dealer closest to you. If it is after normal business hours and the closest dealer to you does not have a 24-hour line, your call will be transferred to a factory service technician.

When the dealer or the technician answers, you will be asked for the model and serial number of the Vactor unit you are working on. Please have that number available. It will definitely help to expedite our being able to help you with any questions or problems you have. Our plan is to service our customers to the best of our ability 24 hours a day, seven days a week, no matter where you are in the world!

WARNING

Vactor cannot possibly, know, evaluate, and advise the service trade of all conceivable ways in which operation or service might be done or the possible hazardous consequences of each way. Anyone who uses operational procedures, service procedures, or tools, whether recommended by Vactor or not, must first satisfy himself thoroughly that neither his safety nor the product safety will be jeopardized by the methods he shall select.

Vactor vacuum systems are designed to user specifications. The owner/operator/user is responsible for the safe use and application of this equipment and proper waste disposal. Transportation and disposal of waste may be subject to local, state or federal laws.

Read and follow the safety practices described in this manual and in the common industry references that are also provided to help in the decision making process.

General Safety Procedures

1. Perform all operations with at least two operators.
2. Only trained personnel should operate, perform maintenance, or repair the unit.
3. Work area must be clear and clean for good visibility and footing.
4. All operators must wear safety apparel: hard hat, visor and / or goggles, ear protection, rain suit, safety-toe shoes or boots with non skid soles and water proof gloves are recommended.
5. Never alter system components or reprogram. System components must be used only as intended.
6. If a malfunction occurs, immediately stop and follow repair instructions.
7. In case of freezing conditions, drain water from all components.
8. The unit must be thoroughly cleaned between jobs to prevent cross contamination or chemical reactions.
9. Never use this unit in any type of rescue operation where the vacuum is used for the rescue.
10. Operating the unit inside a building or confined areas can create additional risks to the unit, operators and building occupants. Engine exhaust gas can reach deadly levels. Heat build up from the engine and blower discharge can overheat people and equipment.
11. Never use an air mover machine for vacuuming hydrocarbon or flammable materials unless the flash point of the material is 140° (F) or higher. Pressurized or pump off loading is not permitted unless the flash point of the material is 140° (F) or higher unless nitrogen is present.
12. Never operate engines where there are or can be combustible vapors. Vapors pulled in to an engine air intake can cause engine acceleration and over-speeding. This can result in death, injury and property damage.
13. Reference to OSHA regulations are for informational purposes only and not intended as legal advice.
14. The use of this equipment in the removal or handling of any regulated substance or material must be performed in strict accordance with all applicable federal, state and local laws and regulations, and approved safety and personal protection equipment and clothing must be used and worn at all times.
15. Never use an air mover machine to vacuum dusty materials until the Safety Data Sheet(s) (SDS) have been consulted to determine if the dust(s) haves an explosive potential (Combustible Dusts). Only air mover units that are part of a verified assured grounding system that have bags, doors and any other non-welded debris body components grounded to the debris body can be used if the materials contain combustible dusts.
16. Consult any applicable SDS as well as OSHA regulations, guidelines, and information to ensure safety of operators for exposure to potentially hazardous dust.
17. Distracted or impaired operation and driving - This covers a broad range of issues that includes texting, cell phone use, under the influence of drugs or alcohol, fatigue, etc. All put operators and bystanders at risk of an accident. All operators must be alert and attentive to the work at hand.

NOTICE

Everyone associated in any way with a Vactor® Mfg. product must thoroughly understand and apply the contents of this manual. It is the responsibility of the owner to train his employees in the operation and safety procedures while operating or repairing this equipment.

No one shall operate or service this Vactor Equipment until they have read and understand the operating manual. Additional copies of the manuals may be obtained from your Vactor distributor or by contacting the factory.

Please specify model and serial no(s).

NOTICE

Jump Starting Or Welding Can Damage Electrical System

To avoid damage:

- **Disconnect ECU, control modules and batteries before welding on unit.**
- **Disconnect control modules before jump starting. Consult chassis service manual for details on jump starting.**
- **Never use a test light when troubleshooting. Only use digital multimeter on all circuits. Test lights and older analog meters can damage the electronic systems.**
- **Set all ignition switches to OFF before testing CANbus system.**

NOTICE

Consult OEM chassis and engine operation and maintenance manuals for complete details on operation.

NOTICE

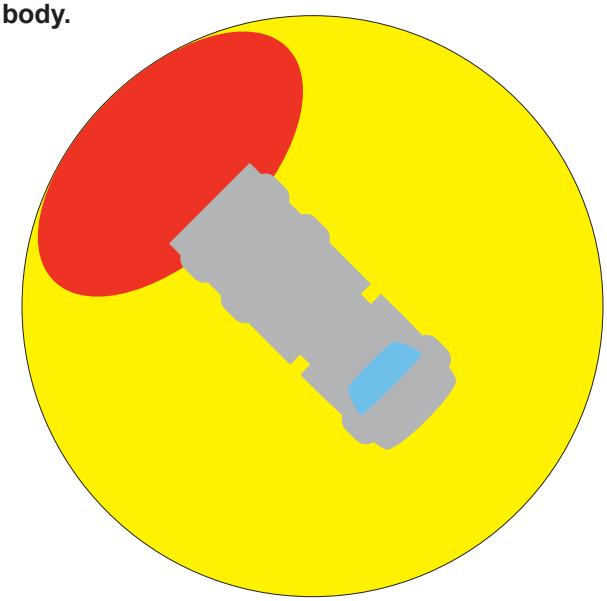
Custom Machine Parameters

Reprogramming the chassis or engine controls will result in problems ranging from improper operation to complete loss of service. Follow chassis manufacturer's procedures when reprogramming to avoid the loss of the custom machine parameters.

NOTICE

Safe Work Zone

Bystanders must be kept a minimum of 15 feet from the work area. NEVER stand directly behind the truck when raising or lowering the body.



Know Your Units' Capacity and Rules of Operation

NEVER exceed your Gross Vehicle Weight (G.V.W.). It is possible to overload the unit capacity just as well as the family car or pick-up truck.

Know your Gross Vehicle Weight Rating (G.V.W.R.). Know your axle capacities. The following procedures should be adhered to.

1. Load your vehicle to stay within the G.V.W.R. while traveling on the highway.
2. Load your water supply at or near the job site.
3. Regulate your work to maintain minimum water storage when leaving the work location.
4. If in off-road applications and industrial usage the G.V.W. is exceeded, operate the unit at 15mph or less. Speed limits are estimates and conditions such as rough terrain may require much lower speeds.
5. Maintain proper brake adjustment at all times. Check brakes daily.

Note: In operation on public highways, the combined weight of the chassis, body, and payload must not exceed the Gross Vehicle Weight Rating of the chassis as rated by the Chassis Manufacturer.

These standards apply to the operation and maintenance of Vactor® Mfg. equipment, both old and new units.

The following definitions apply to all terms used throughout this manual unless otherwise stated.

DISTRIBUTOR: A person that distributes Vactor® equipment to a person or employer.

EMPLOYER: A person that hires one or more persons to work in the business of maintaining or operating equipment.

HAZARD: Description of a physical or environmental condition that creates the potential for injury.

MAINTENANCE PERSON: A person who cares for, inspects, cleans, maintains and repairs Vactor® Mfg. equipment.

OPERATOR: A person who controls the use and operation of Vactor® Mfg. equipment other than in the course of servicing or repair.

PERSON: An individual, corporation, partnership, legal entity or business.

⚠ WARNING

Crushing Hazard

NEVER leave body raised or partly raised while vehicle is unattended or while performing maintenance or service under body unless body is propped to prevent accidental lowering. [Always disengage PTO when hoist is not in use or when moving vehicle.] The debris body MUST BE empty for service work.

NEVER attempt to raise body when vehicle is on unlevel ground.

Rear door MUST BE opened before the front of the body is 3 feet above the chassis frame. Operator must remain at controls during all operations.

OPERATION

It shall be the responsibility of the Employer to:

- INSTRUCT EMPLOYEES NEVER TO GO UNDER A RAISED LOADED BODY.
- INSTRUCT EMPLOYEES NEVER TO GO UNDER A RAISED BODY WITHOUT SECURELY PROPPING IT. BODY MUST BE EMPTY.
- INSTRUCT EMPLOYEES NEVER TO USE ACCESS LADDERS OR GO ON THE UNIT WHILE THE UNIT IS RUNNING. THE UNIT MUST BE SHUT DOWN.
- Provide properly maintained equipment that meets all applicable codes, local, state and federal ordinances and safety standards
- Instruct and train operator in safe and correct methods of operation before assigning any person to operate unit. Such instructions and training shall include all operational and safety data furnished by the manufacturer.
- Prohibit operator from operating unit unless trained and qualified. All employees should be properly trained.
- All personnel operating or in the vicinity of the equipment need to be trained on the hazards and precautions of vacuum, high pressure water and compressed air.
- All decals are in place and legible.
- Be sure the in-line vacuum relief safety is properly installed.

It shall be the responsibility of the Employee to:

- NEVER GO UNDER A RAISED LOADED BODY.
- NEVER GO UNDER A RAISED BODY WITHOUT SECURELY PROPPING IT. BODY MUST BE EMPTY.
- Use all safety features provided on the unit and abide by all safety instructions.
- Operate unit only after being instructed and trained in accordance with instructions given in (Employer Responsibility).
- Report any damage or malfunction of the unit or components to your employer, either at occurrence or at end of working day, depending on the extent of damage or malfunction.
- NEVER ride, or let any other person ride on ANY part of the vehicle other than in the cab when the vehicle or hoist is in motion.
- Be certain that all individuals and obstructions are clear to the hoist and body before operating the controls and be ready to stop operation at any time that a hazardous condition might occur.
- NEVER leave raised or partly raised body while vehicle is unattended or while performing maintenance or service under the body unless body is propped to prevent accidental lowering.

Shut off chassis engine and remove ignition keys under the above conditions.

- Jewelry should not be worn during operation and maintenance of the vehicle. This includes, but is not limited to, watches, rings, ear rings and necklaces.
- Be sure the in-line vacuum relief safety is properly installed.
- All personnel operating or in the vicinity of the equipment need to be trained on the hazards and precautions of vacuum, high pressure water and compressed air.

MAINTENANCE

It shall be the responsibility of the Employer to instruct maintenance personnel:

- NEVER GO UNDER A RAISED LOADED BODY.
- NEVER GO UNDER A RAISED BODY WITHOUT SECURELY PROPPING IT. BODY MUST BE EMPTY.
- Ensure adequate care for, cleaning, inspecting and maintaining the entire unit.
- Establish and follow a program of regular maintenance to ensure that the complete unit is in a safe operating condition and in accordance with the manufacturer's recommended specifications. A record of these inspections and of any maintenance work shall be kept.
- See that all maintenance personnel are competent personnel, trained for this purpose.
- Provide an adequate and safe work area for the maintenance personnel to maintain the unit. Complete area to be free from all hazards.
- Establish procedures for mandatory use of safety equipment when working.
- Establish a procedure wherein the engine will be shut off, the ignition key removed, and a sign stating "UNIT UNDER REPAIR - DO NOT OPERATE" be displayed on the steering wheel, during repairs to unit, except during maintenance testing.

It shall be the responsibility of the Maintenance Personnel to:

- NEVER GO UNDER A RAISED LOADED BODY.
- NEVER GO UNDER A RAISED BODY WITHOUT SECURELY PROPPING IT. BODY MUST BE EMPTY.
- Follow all of the employer's programs and use all the safety procedures established by the employer and manufacturer.
- Make all repairs in accordance with all applicable codes, local state and federal ordinances and according to the design specifications as recommended by the manufacturer.

⚠ WARNING

Part Failure Hazard

To avoid serious injury or death use only Vactor® Manufacturing supplied replacement parts. Use only Vactor® Mfg. supplied hose, fittings, and tools to repair or replace high pressure hose.

RECONSTRUCTIONS OR MODIFICATIONS

- Any reconstruction or modification to this Vactor® equipment shall be the responsibility of the person making these reconstructions or modifications.
- Any person reconstructing or modifying this Vactor® equipment must furnish instructions with the reconstruction or modification. These instructions shall include operating, maintenance and safety precautions associated with the reconstruction or modification.

⚠ WARNING

Cancer and Reproductive Harm

Required for compliance with California Prop 65. Refer to: www.P65Warnings.ca.gov

Vactor uses several different types of warning decals on their units. These decals come in a variety of colors, shapes and sizes. Not all decals are used different Vactor models. Each unit will have it's own set of warning decals. Each warning decal has a number located in the lower right corner. Contact the factory with that particular number for replacement decals. Even though Vactor uses many different decals on their units, the decals fall into five (5) different categories, danger, warning, caution, machine caution, and notice.

Machine caution is being phased out and replaced with notice due to updates to industry decal standards.

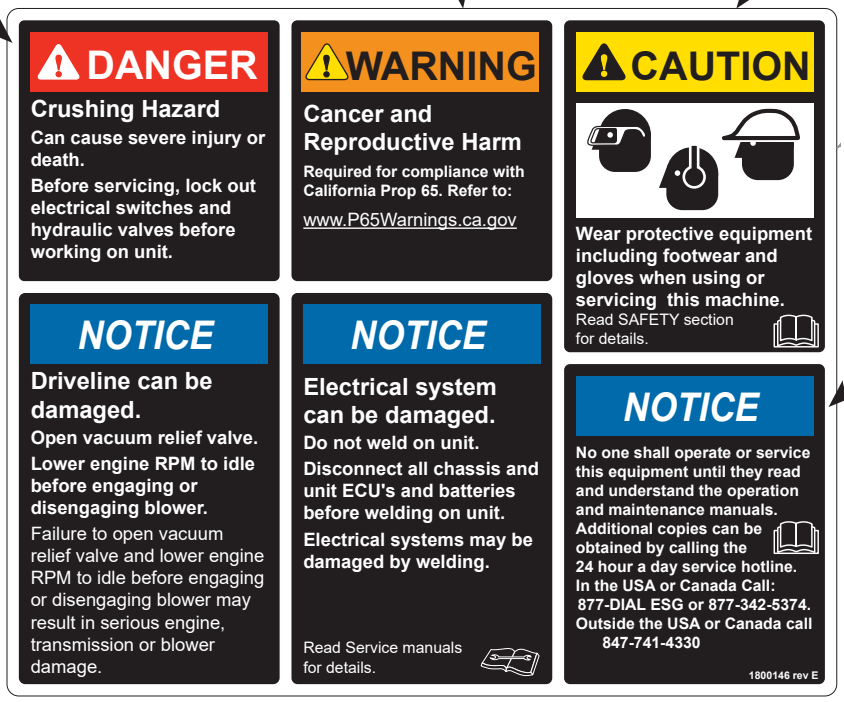
NOTICE

Check unit daily making certain all decals are in place and readable. Replace as needed.

CAUTION Decal - These indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices, which could cause damage to the equipment.

WARNING Decal - These warn the operator of a potentially hazardous situation which, if not avoided, could result in death or serious injury.

DANGER Decal - These warn the operator of an imminently hazardous situation which, if not avoided, will result in death or serious injury.



MACHINE CAUTION Decal - CAUTION without the safety alert symbol indicates a POTENTIALLY hazardous situation which, if not avoided, may result in equipment or property damage.

Note: MACHINE CAUTION is being phased out and replaced with NOTICE per changes in the ANSI Z535 industry standard.

NOTICE Decal - These indicate information considered important, but not hazard-related (e.g. messages relating to property damage).

SAFETY INSTRUCTIONS Decal - These indicate specific safety-related instructions or procedures

Safety is the primary concern in all operations and is everybody's responsibility. All vacuum truck operations must be performed with at least two operators. The operators of any equipment must always be aware and alert to any potentially unsafe condition due to its size, weight, operating capabilities or maneuverability. If a question or concern in this regard exists, the matter should be discussed with the supervisor before operating the machine.

Remember safety first and always, is a good motto. Constantly evaluate the safety concerns as you go. Short cuts, bypassing safety devices for the sake of production, jeopardize everyone's safety and should not be done. Doing a job well is doing it in a safe, efficient, timely and economical manner. Safety of the operator and other personnel involved is of the primary concern and overrides everything else.

Safe operation requires well maintained equipment. Constantly monitor the condition of your equipment, not only before operating it but also during and after the end of operations.

Before Operation - inspect the equipment prior to using it. Check the operating locale for overhead or surrounding obstructions. Is there any other equipment or personnel working in the vicinity of your loader which might interfere in your safe operation or theirs?

During Operations - constantly look out for any situation that may develop during operations which might compromise the safety of men and machine. Train your eyes and ears to the sights and sounds of the equipment - learn to distinguish between the normal and abnormal sounds of the unit in operation. Look for any movement in an area where none is expected.

After Operation - Make sure that the equipment is properly shut down and everything is properly stowed and secured. Any unintended movement of the machine should be blocked and all switches turned off.

General Safety Procedures

Inspect the cab for warning tags indicating a possible problem with the equipment. If warning tags are present, equipment must not be operated under any circumstances.

Always operate equipment with lights on.

Never wear loose clothing or jewelry that can catch on controls or other parts of the machine. The wearing of finger rings is prohibited.

Ensure that all protective guards and covers are in place.

Keep the machine, especially the walkways and steps, free of foreign materials. Loose items such as lunch boxes and tools must be secured. The operator compartment must be kept clean.

Keep windows clean for good visibility.

Know hand signals and who is to give them. Accept signals from only one person with the exception of the STOP signal, which must be accepted from anyone.

Never put maintenance fluids in glass containers. Only properly labelled and approved containers should be used.

Pressurized air can cause personal injury. When using pressurized air for cleaning, wear a protective face shield and protective clothing.

Approved ANSI Z89 standard hard hats, ANSI Z87 standard safety glasses with permanent side shields and approved hearing protection.

Protective boots or shoes should be worn at all times. OSHA says protective footwear must comply with the ASTM standards F2412-05 and F2413-05 (*American Society for Testing and Materials*. Formerly was ANSI Z41, *American National Standard Institute* standard for Personal Protection - Protective Footwear). A hazard assessment should be made to determine the correct level of footwear safety protection.

Refer to the PPE section for additional information.

Recommended Safety Apparel	
A	ANSI Z89 Hard Hat
B	Hearing protection
C	ANSI Z87 Safety Glasses w/ Side Shields
D	One-piece Protective Suit
E	Protective Handwear
F	Protective Footwear

Distracted or impaired operation and driving

This covers a broad range of issues that includes texting, cell phone use, under the influence of drugs or alcohol, fatigue, etc. All put operators and bystanders at risk of an accident. All operators must be alert and attentive to the work at hand.

National Highway Traffic Safety Administration

Crushing and Cutting Prevention

Unless otherwise specified, never make adjustments while the machine is moving, the blower is engaged or the engine is running.

Equipment and components and attachments should be properly supported when working beneath them. Any attachment can fall if a control is moved, or if a hydraulic line fails.

Everyone must be clear of the unit before any engine is started.

Stay clear of all rotating and moving parts.

Be aware of pinch points. Where there are attachment linkages or articulating equipment, the clearance in the linkage area will increase or decrease with movement of the attachment or articulation. Never be on the rear door platform while the rear door is being operated.

Keep objects away from moving fan blades. Tools or other objects which fall into moving blades might be thrown out, possibly causing injury to you or anyone nearby. All fans should be properly guarded.

Never use kinked or broken wire rope cable. Always wear gloves when handling any wire rope cable.

Striking retaining pins with force can cause them to fly out and injure you or persons nearby. Always wear protective glasses when striking a retainer pin, chisel or drift pin. Pieces of metal could fly off possibly causing an eye injury or enter your body causing internal injury.

Stay clear of turning drive-lines, belts or chains. All such components are clearly marked with decals on your units. If the decals are damaged, peeling or missing, replace them.

No modifications should be made without contacting the manufacturer. Contact factory service before making any modifications to ensure that such changes do not compromise the safety or void the warranty of the equipment.

Burn Prevention

Engine coolant is hot and under pressure at operating temperature. The radiator and all lines to heaters or the engine contain hot water or steam and any contact could cause severe burns.

Check coolant level before heating occurs, and if necessary, only after the engine has been stopped and the filler cap is cool enough to remove with your bare hand. Remove filler cap slowly to relieve pressure.

Cooling system conditioner contains alkali that can cause personal injury. Avoid contact with the skin and eyes.

Allow cooling system components to cool before draining. Do not allow hot oil or components to contact skin as they can cause personal injury.

At operating temperature the oil in the hydraulic tank is hot and can be under pressure. Remove the filler cap only after the engine has been stopped and the filler cap is cool enough to remove with your bare hand. Remove slowly to relieve pressure.

Relieve all pressure in air, oil, fuel or cooling systems before any lines, fittings or related items are disconnected or removed.

Battery electrolyte contains acid that can cause injury. Avoid contact with skin and eyes.

Fire and Explosion Prevention

All fuels, most lubricants and some coolant mixtures are flammable. Never smoke in fueling and lubricating areas or where batteries are charged, or where other flammable materials are stored.

Batteries in series may be located in separate compartments.

When using jumper cables, always connect positive (+) cable to positive terminal of battery connected to starter solenoid and negative (-) cable from external source to starter negative terminal. (Connect to the block if there is no starter negative terminal.) Always wear eye protection when working with batteries.

Battery electrolyte contains acid that could produce an explosion and possibly cause injury.

Clean and tighten all electrical connections. Check for frayed or loose electrical wires daily and have them repaired or tightened if needed.

Keep all fuels and lubricants stored in properly marked containers and away from unauthorized personnel. Store oily rags and other flammable material in a protective container. Ether is flammable. Never smoke when using ether and use only in well ventilated areas.

A suitable working fire extinguisher must be with the unit at all times.

Lines, Tubes And Hoses

Never bend or strike high-pressure lines.

Report loose or damaged fuel or oil lines, tubes or hoses to mechanics so repairs can be made. Leaks can cause fires.

Replace if any of the following exist:

1. Damaged, displaced or leaking end fittings.
2. Outer hose covering rubbed through or cut and wire reinforcement exposed.
3. Outer hose covering ballooning.
4. Flexible part of the hose kinked or crushed.
5. Armoring embedded in the outer hose cover.

Make sure that all clamps, guards and heat shields are installed correctly to prevent vibration, rubbing against other parts and excessive heat during operation.

Stay clear of the vacuum hose openings. The suction is high enough to suck in a limb and cause serious bodily injury.

Never use a bare open hose end for vacuuming. A variety of hose end attachments are available to keep the operator clear of the hose opening.

Never try to open any hatches or doors while the unit is still pressurized, doors could fly open and cause injury or death. Release pressure before attempting to open any door or hatch. Merely shutting off the pressurizing pump or the power source, does not relieve the pressure, it has to be released manually.

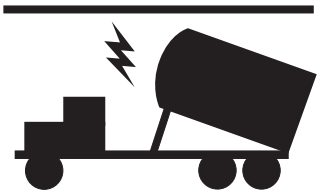
High Voltage Electrical Hazards

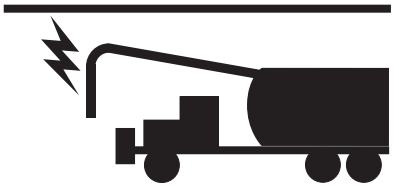
A potential electrical shock hazard exists with the operation of mobile equipment near high voltage power lines. Follow all OSHA and site rules and regulations.

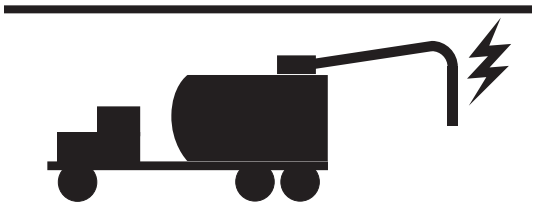
Equipment includes radio antennas, crane booms and masts, and load heights.

Never dump under power lines. End dumps with raised beds will violate the 10’ rule. Dump the load to the side and let a dozer push it into place.

Contact the local electrical utilities for identification of the power rating and proper procedures for working near the lines.







High Voltage Power Line

Exceptions are permitted for travel under or work near a power line only if:

(1) The electrical department is notified for a qualified electrical person to de-energize the power line and implement their Tag-Lock-Try procedures. Or,

(2) An electrician properly grounds the mobile equipment.

High Voltage Trailing Cables

Electrical equipment near mining pits is supplied power by trailing cables. In most cases the cables run along the service roads. If a trailing cable blocks your desired route, go back to the main road and find another route to your destination.

Follow all requirements for using mobile equipment when working around power lines. The Occupational Safety and Health Administration (OSHA) requirements apply to most workers. The following information is from OSHA. Additional information can be obtained from www.osha.gov.

Maintain distance from overhead power lines in accordance with federal, state, and local regulations.

NOTICE

Reference to OSHA regulations are for informational purposes only and not intended as legal advice.

OVERHEAD POWER LINE TIPS FOR CONSTRUCTION WORKERS

BEFORE YOU BEGIN CONSTRUCTION WORK

- Survey the site for overhead power lines. **LOOK UP!**
- **BEST SAFETY PRACTICE: NEVER GET CLOSER THAN 10 FEET TO AN OVERHEAD POWER LINE!**
- Consider all overhead lines as energized until the electric utility indicates otherwise, or an electrician verifies that the line is not energized and has been grounded.
- In construction work, an overhead power line safety component should be part of your employer's overall safety and health program and safety training.
- If overhead lines are present, call the utility company and find out what voltage is on the lines. Ask if the utility company can shut off the lines while you are working near them.
- If overhead lines cannot be shut down, ask the utility company if they can install insulation over the lines during the time you will be working near them.

WORKING WITH TOOLS & EQUIPMENT

- If the lines cannot be shut down and/or insulation applied, a minimum safe distance of 10 feet must be established. Have a brief job site meeting to discuss the planned work as it relates to the power lines. Discuss topics such as the use of long-handled tools, and equipment (raised dump trucks, back hoes, etc.) that could come in contact with the lines. Consider the need for a designated person to monitor activities around the lines.
- Only use nonconductive ladders when working on or near overhead power lines.
- Employees shall not be permitted to approach or carry any conductive object closer than 10 feet to an energized line. The only exception is for trained and qualified employees using insulated tools designed for high voltage lines.

(OVER)

Occupational Safety and Health Administration
Region VII
(5/99)

OVERHEAD POWER LINE TIPS FOR CONSTRUCTION WORKERS

CRANES/EQUIPMENT

- If using a crane/equipment near lines rated at 50,000 volts (50 kv) or less, minimum distance between the energized lines and any part of the crane (boom, load line, etc.) shall be at least 10 feet.
- If using a crane/equipment near energized lines rated at 50,000 volts (50 kv) or more, minimum distance between the energized lines and any part of the crane shall be at least 10 feet plus 0.4 inch for each 1,000 volts over 50,000 volts.
- Where it is difficult for the operator to maintain the desired clearance by visible means, an employee shall be designated to observe the distance between the crane/equipment and the line so as to give timely warning to the operator. This should be the **ONLY** job the monitor is performing when this hazardous condition is present.

FOR FURTHER INFORMATION

- The safety tips on this card are not intended to be all-inclusive; they are simply a starting point to help prevent electrocutions from overhead power lines.
- For further information, please refer to the Code of Federal Regulations (CFR), Part 1926. You may also contact your local OSHA Area Office at:

Kansas Toll-Free
1-800-362-2896 (KS only)

Nebraska Toll-Free
1-800-642-8963 (NE only)

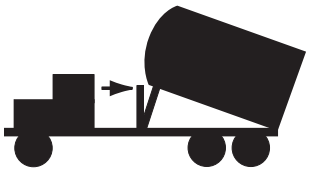
Western Missouri Toll-Free
1-800-892-2674 (MO only)

Eastern Missouri Toll-Free
1-800-392-7743 (MO only)

Occupational Safety and Health Administration
(OSHA)
Region VII
(5/99)

Several safety systems featured in the units. They are in place for the safety and protection of the operator. These systems are to be used when needed.

Body Support



When any maintenance is performed that requires working under a raised body (for however short a duration), the raised EMPTY body should be supported by the safety stand. The safety stand is not a lifting device and must be used in conjunction with the hoist cylinder. Never raise a loaded body unless you intend emptying it. Never support a loaded body with the safety stand. Never remove a hoist cylinder, leaving it supported by the safety stand. To use the safety stand, a) Raise EMPTY body high enough to clear the safety stand in its support position. b) Raise the safety stand. c) Slowly lower the body so that the safety stand rests in the receptacle for it under the body.

Rear Door Support

Always use the rear door support working inside a body or on or near an open rear door. Your unit has either a safety pin or a safety prop.

Remove and store the safety prop before closing the rear door. Closing the rear door with the prop still in place can cause extensive damage to the rear door.

⚠ WARNING

Overriding Controls

To avoid injury or death never override any operator controls, fail-safe or deadman features of a control; or hydraulic, mechanical, or electrical safety devices during use.

Follow service instructions for overrides during maintenance.

Drive-line guard

If a removable drive-line guard is provided to cover the upper drive-line from the transfer case to the blower it is to remain in place unless it is necessary to service the drive-line. If a latched, hinged door, is provided for easy access to the drive-line for greasing it must be closed and latched when the blower is running.

Safety Decals

Safety caution and warning decals are located at various points, which require attention while in the close proximity of the unit. These should be noted and heeded for safety. Never by-pass any safety device.

Prevent battery explosions

Batteries can explode. Keep sparks and flames away from batteries. Use a flashlight to check battery electrolyte level

Never check battery charge by placing a metal object across the posts. Use a voltmeter or hydrometer.

Always remove the grounded (-) battery cable first and replace it last.

Never charge a frozen battery; it may explode. Warm the battery to 60° F (16° C).

Vacuum and pressure relief valves

All units have safety relief valves, some operate automatically under various conditions and some are operated manually. These are provided for personnel safety and safety of the equipment. Keep all relief valves in good working condition.

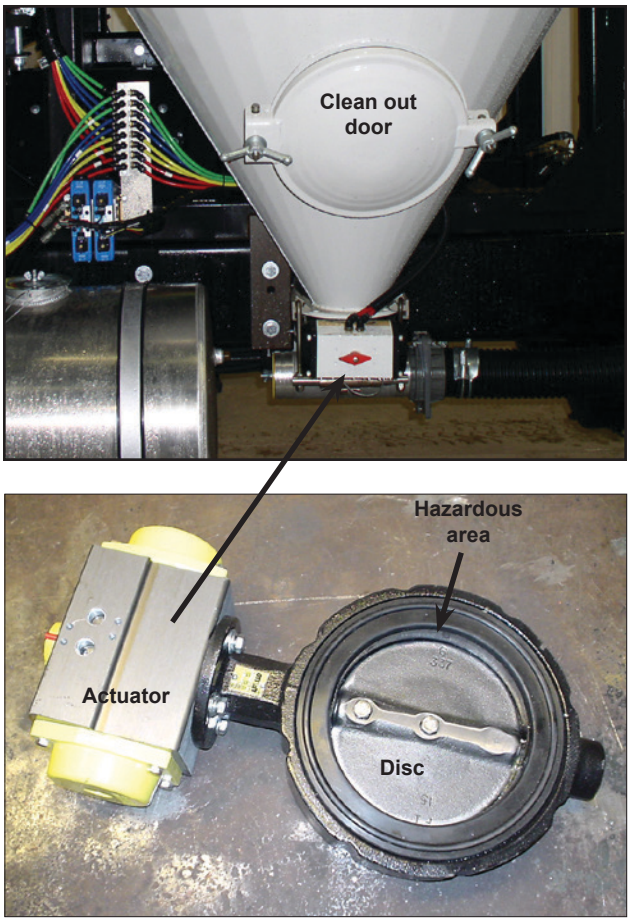
Relieve all system pressures before service work.

A variety of air and hydraulic actuated butterfly, knife gate and other style valves from a number of different manufacturers are used. A butterfly valve, shown at right, rotates a disc in the material flow to open and closed positions (shown in closed position). A knife gate valve pushes or pulls a sliding gate in the material flow to open and closed positions. When the gate is retracted the valve is open and material can flow.

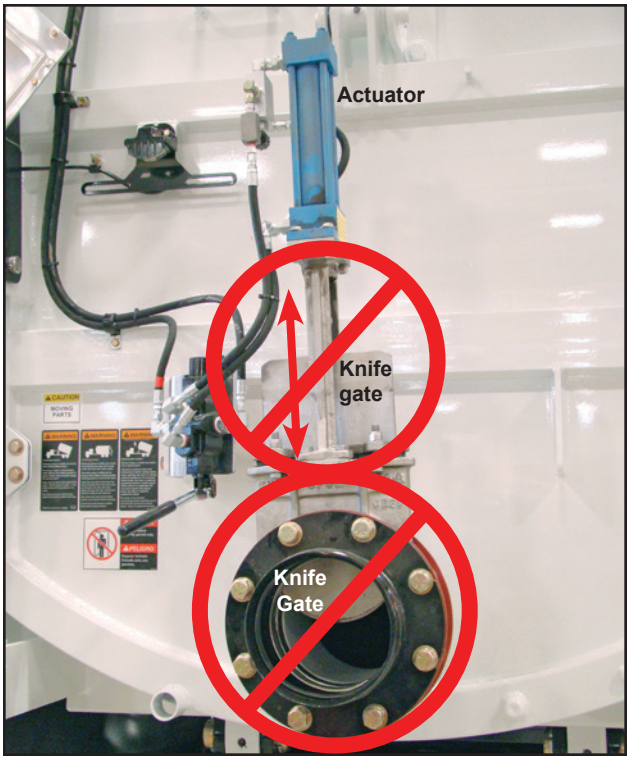
The valves are normally actuated by switches or automatically by the system controls. During servicing or use an inadvertent actuation could result in an injury from the moving parts. For example the butterfly valve at the cone bottom, shown at right, may automatically actuate while someone is unplugging the cone through the clean out door. The valves can still remain active when not installed unless the air or hydraulic lines are disconnected and all safety precautions followed.

Knife gate valves have external pinch points during operation as the gate is moving. Additionally, inside the material flow path the gate acts as a guillotine when closing.

Never allow tools, arm, hands etc. in the gate or butterfly areas as serious injury may occur. Shut down all systems and de-energize or disconnect the air or hydraulic system to the valve before servicing.



Butterfly Valve



Knife gate valve

⚠ WARNING

Crushing / Tipping Hazard

To avoid injury or death:

- **Position unit on level stable ground.**
- **Open rear door before dumping.**
- **NEVER move the unit with the debris body in the up or raised position.**

Starting The Truck Engine

Never Start the truck engine with the accelerator pedal depressed; always start the engine at low idling speed. These trucks have no oil at the center bearing for a short period of time and starting at high idle could cause bearing failure.

- Be sure that the warning lights for low engine oil pressure and battery charge go off.
- Check to make sure all gauges come up into operating range as truck engine warms up.
- Let the air pressure build up to its maximum, usually 120 psi.

Remember

Never crank the engine more than 30 seconds. Allow the starter to cool for 2 minutes between attempts. Excessive starting fluid use will burn pistons and lock up engines. Use only small amounts of starting fluid when absolutely necessary and you are directed to do so by a supervisor.

Before moving the truck

1. Adjust mirrors
2. Clean windows
3. Check for low hanging electric or telephone wires and power cables on the ground.
4. Recheck gauges and warning lights
5. A visual check and warning honk of horn should be performed before moving to ensure safety of people on the ground, and other equipment in use in the area. Operator should have sight of all work area ground personnel before moving. A spotter should be normally used to assist the driver backing up.
6. NEVER release the parking brake until the air pressure comes up to operating range on the two brake system gauges and the (Red) warning lights go off.
7. Select a gear position
8. Operate the truck at low RPM, until proper temperature is reached on the gauges.

Pedestrian Safety

Conduct a visual check and warning (honk of horn) before moving the truck to ensure the safety of people on the ground, and other equipment in the area.

Be aware of surveyors, supervisors, laborers, etc., who are working on the ground.

To avoid tipping hazards while dumping, park on firm and level ground and open the rear door before raising the body so that the unit does not become top heavy. Clear the area of all pedestrians and equipment before raising the body. Raise the body in steps, allowing material to dump out in a steady flow.

NOTICE

Preparing for Transport

Prior to transport secure all tools, hoses and all miscellaneous items in their storage locations.

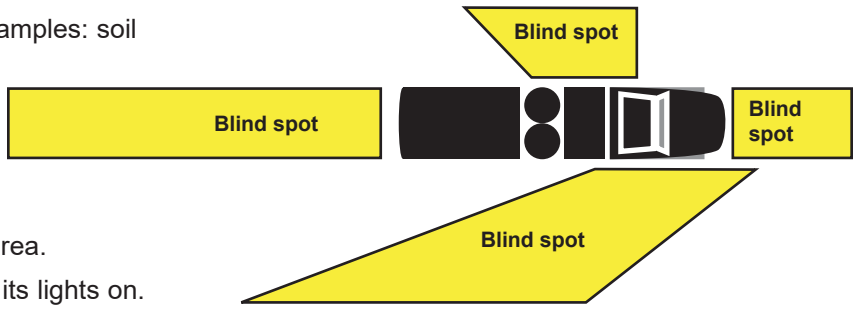
- **All items in tool trays and racks need to be secured or tied down.**
- **If equipped, secure boom in transport mode.**
- **If equipped, lower debris body, close rear door.**
- **If equipped, secure all hose ends on hose reels.**
- **Close and secure all cabinet, tool box and control panel doors and covers.**
- **Remove and stow all hoses, suction tube, extension pipes and accessories.**
- **Disengage the hydraulic, vacuum and water systems.**
- **Check and clear the area around the unit before moving.**

Proper operation

Besides being knowledgeable of the truck's controls, the operator must always be alert when traveling at high speeds, steering and dumping. Remember this truck is very heavy and will not stop in a short distance. Tipping can occur because of improper steering or dumping.

Below are some important operational techniques.

- Task train all employees before allowing them to operate the equipment.
- Equipment cabs must be kept neat and clean, free of loose objects and trash.
- Equipment operators must obey all traffic safety regulations and operate equipment at a safe speed according to the various road and field conditions.
- Operators must assess the field conditions and recognize the capability of the equipment and determine the safest, most efficient operating manner.
- Apply parking brake before operating unit and use wheel chocks.
- Before starting the operation of equipment, be aware of existing work conditions:
    1. Where fellow employees are located.
    2. Degree of slopes
    3. Field and road conditions (examples: soil stability, slick, muddy, or dusty)
    4. Sump holes in work areas
    5. Traffic patterns of your equipment as well as other equipment working in the area.
- Always operate the equipment with its lights on.
- Never drive over power trailing cables. Follow the requirements for operating near electrical power lines. (Example: raising dump bed near overhead power cables.)
- Never operate equipment under the influence of alcohol or illegal drugs. If you are taking prescription drugs, know the side effects.
- When stopping, feather the brake pedal to keep from having brakes fade because of heat.
- If a dashboard warning light comes on, stop and determine the cause. Operating a truck with a warning light on can compromise the safe operation of the truck.
- Maintain a safe distance (approximately four truck lengths) between all vehicles and/or equipment to insure a safe stop in the event of an emergency. Distance should be increased when road becomes wet (braking distance lengthens).
- Dusty conditions
    1. When following another truck, remain far enough back so you have enough time to react to an adverse condition.
    2. In the loading area, when the excavator creates a dusty condition, stay back until it is your turn to get loaded to keep from drawing dust into the engine air system. Be sure you are aware of other operators' locations.
    3. Contact your supervisor about dust control.
- Making a sharp turn too fast can result in a tip over. Always use caution when making turns.
- Use an observer for blind spots when maneuvering the unit.



⚠ WARNING

Collision Avoidance

To avoid serious injury or death wear a safety vest with the appropriate safety symbols when working on job sites in traffic areas. Many accidents occur due to inattentive drivers and collision with cars and trucks.

An injury caused by vacuum can be serious. The vacuum action must be stopped as quickly as possible. Seconds matter when the body is subjected to the forces of vacuum. The inline vacuum relief valve must always be used when operating near end of the hose or pipe. In the event of any vacuum injury:

- Seek medical attention immediately. Never delay!
- Tell the physician of the cause of the injury.
- Tell the physician what type of material was being vacuumed at the time of the accident as material may have entered the wound.

Vacuum hazards to avoid when operating include:

- Rupture - keep vacuum tools and hoses away from face and body. Concentrated vacuum on the body, such as through a hose end in full contact can result in evisceration of organs or the avulsion of limbs. Serious injury or death will result from vacuum.
- Suffocation - keep vacuum tools and hoses away from face and body. Serious injury or death will result from vacuum suffocation.
- Crushing and cutting - never attach hose, pipe or accessories with the vacuum on. Forces from the vacuum can trap fingers, hands and feet in the joint with enough force or impact to crush and cut. Material flow in system will increase the severity of the injury by physical damage and contamination of the wound.

⚠ DANGER

Vacuum Hazard

NEVER operate the vacuum system without the Vacuum Relief Valve being installed. Failure to install and operate the Vacuum Relief Valve properly may result in serious injury and / or death.

The INLINE VACUUM RELIEF VALVE must be INLINE within 50 feet from the end of the hose or pipe for proper operation.

Place the IN-LINE VACUUM RELIEF VALVE (also referred to as a safety Tee) as close as possible to the working end of the vacuum hose whenever the hose is manipulated by hand. Use the appropriate size Tee for the size hose or pipe being used.

The vacuum relief valve is designed to open the vacuum hose in the case of an emergency. When opened, it creates an immediate vacuum loss at the end of the vacuum hose. It is simple to operate but does require proper installation and testing in order to be effective in the system.

The in-line vacuum relief valve must be tested before each use. Shut down the vacuum system when assembling or moving the piping system.

Installation Instructions

1. Install the valve on level ground between two sections of hard pipe or vacuum hose close to the vacuum nozzle. Be sure to use the proper size Tee for the hose or have the proper adapters if the pipe being used is different than the Tee size.
2. Connect the lanyard to the operator's person. This can be attached to the operator's wrist or to a belt loop. Never place lanyard on the ground or tied to the pipe.
3. Adjust the lanyard to a proper length to allow freedom of movement but still allow for easy tripping of the relief valve.

Testing Instructions

1. Install the vacuum relief valve as described above
2. Start the vacuum truck and engage the blower. Be sure to follow the proper engagement instructions for the particular unit being used.
3. With the vacuum hoses in place, and the vacuum relief valve installed, adjust the engine speed to a mid range RPM.
4. Allow the nozzle inlet to become attached to a solid surface such as the ground, asphalt or cement.
5. Pull the lanyard to verify that the top plug of the valve will unseat.
6. Once you have verified that the valve will unseat properly, shut the vacuum system down and reset the vacuum relief valve. Now you are ready to go to work.

DANGER

Vacuum Hazard

NEVER operate the vacuum system without the Vacuum Relief Valve being installed. Failure to install and operate the Vacuum Relief Valve properly may result in serious injury and / or death.

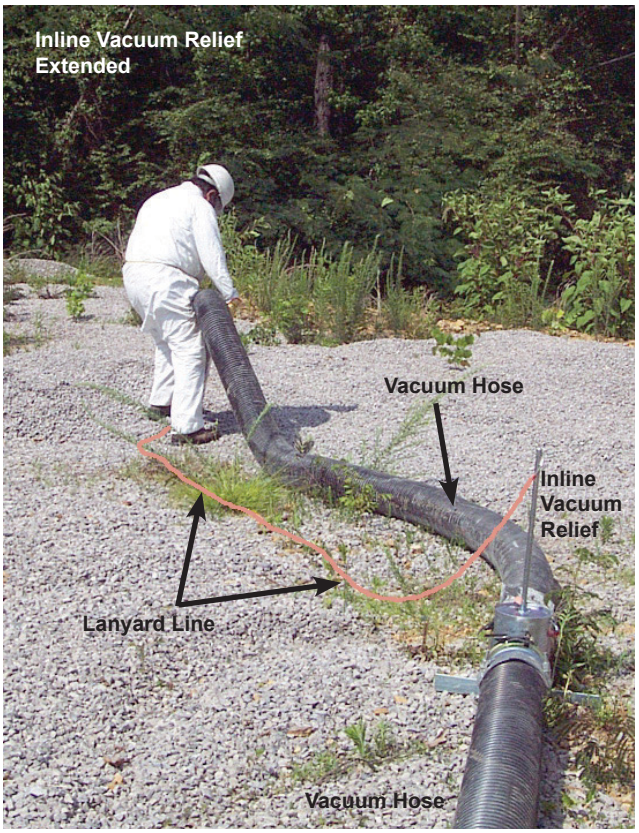
The INLINE VACUUM RELIEF VALVE must be INLINE within 50 feet from the end of the hose or pipe for proper operation.

Operating Instructions

Never use a bare open hose end for vacuuming. A variety of hose end attachments are available to keep the operator clear of the hose opening.

- Perform all operations with at least two operators.
- Install and test the inline vacuum relief valve as previously described.
- Should a problem arise with the suction end of the hose, such as a foreign object blocking the end of the hose, give a quick jerk of the lanyard. This will pull the top plug from its seat, which will relieve the vacuum at the end of the hose or nozzle.
- Clear the obstruction from the end of the hose or nozzle.
- Turn off the vacuum system and verify that all objects and personnel are clear before resetting the vacuum relief valve and turning on the vacuum system.
- Once you are certain that the hose or nozzle is clear reset the vacuum relief valve top plug and engage the blower and return to work.

The pendant is a remote control device used for activating the vacuum release valve. It is also used to control booms and other options installed on the unit. Optional wireless pendants are also available.



Pendant
(Varies with options)

SAFETY INSTRUCTIONS

Unit operator must hold the pendant/remote during vacuum operations and stay within line of sight of the hose end operation. In an emergency, use the E-stop or pendant/remote to disable the vacuum. Maintain clear access to all E-stops and place an operator near one.

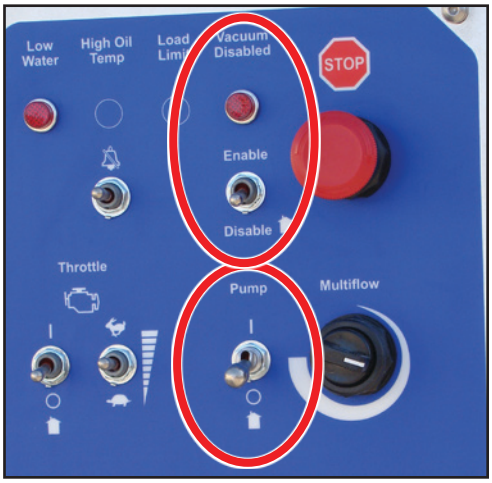
DANGER

Vacuum Hazard

NEVER operate the vacuum system without the Vacuum Relief Valve being installed. Failure to install and operate the Vacuum Relief Valve properly may result in serious injury and / or death.

The INLINE VACUUM RELIEF VALVE must be INLINE within 50 feet from the end of the hose or pipe for proper operation.

Refer to the Operations section of the manual for specific details on the unit. This material is intended as an overall guide for Vactor units in general.



SAFETY INSTRUCTIONS

In an EMERGENCY the VACUUM and WATER must be stopped

Activate the E-Stop

To shut down the system:

- Stop vacuuming.
- Enable vacuum relief valves.
- Reduce engine/blower/fan RPM.
- If required, shut down the engine.

Vactor unit emergency stop procedures

Know the procedures for shutting down the various components and options available on the unit. During rodding operations, placing the RODDER PUMP switch in the OFF position can immediately stop propulsion of a nozzle. As a safety feature, the switch must be pulled forward and forced up to engage the rodder pump. This feature prevents accidental engagement of the pump. However, the switch can be placed in the OFF position by simply pushing down on the toggle lever. In an emergency, slap or place the switch in the OFF position, the rodder pump will stop immediately.

The VACUUM RELIEF switch can be used to vent the vacuum system and immediately stop airflow at the end of the vacuum tube. Place the switch in the ON position to stop airflow and in the OFF position to resume air flow. Some units are equipped with an emergency stop switch that will open the vacuum relief and lower the engine to idle. Actual functions will vary with the model.

Get to know the throttle controls associated with the vehicle! In many situations, disengaging the throttle may prevent an accident or damage to the vehicle. Study this manual for information related to equipment operation and safety procedures.

Guzzler unit emergency stop procedures

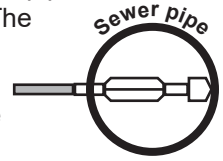
Know the procedures for shutting down the various components and options available on the unit.

The VACUUM RELIEF switch can be used to vent the vacuum system and immediately stop airflow at the end of the vacuum hose. Some units are equipped with an emergency stop switch that will open the vacuum relief and lower the engine to idle. Actual functions will vary with the model.

Get to know the throttle controls associated with the vehicle! In many situations, disengaging the throttle may prevent an accident or damage to the vehicle. Study this manual for information related to equipment operation and safety procedures.

The in-line vacuum relief valve is the primary safety to relieve vacuum at the hose end and must be used in all operations (see Vacuum Relief Valve in this section).

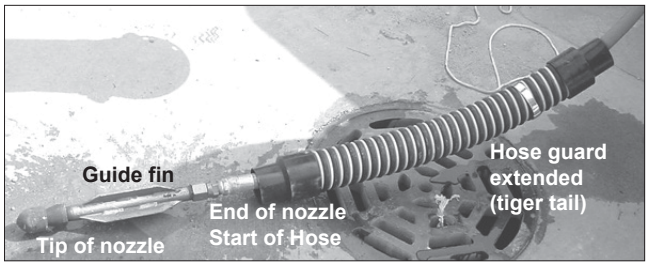
When setting up for rodding operations use the appropriate guide fin and hose guard (tiger tail) to prevent the nozzle from turning in the pipe and returning toward the operator. The length of the assembled nozzle and guide fin must be greater than the diameter of the pipe to be cleaned.



Correct minimum length

Inspect the rodder hose often for indications of damage or wear. Check the hose before each use for movement in hose fittings, exposed hose reinforcement, kinking or collapsing, blisters or bubbles and fittings that are improperly installed or cutting into the hose.

When splicing hoses read the maintenance section of the manual for instructions on hose repair. All hose manufacturers have instituted a color code system for identification of the hose, fittings and tools. When repairing a rodder hose the inside color of the hose, the color of the fitting and the die colors must match. Fittings from one manufacturer will not properly crimp onto hose from another manufacturer. The outside color of rodder hose indicates the pressure rating of the hose and



must match during splicing operations. Be aware of the operating pressures associated with the vehicle and the proper hose specifications for safe operation. National Association of Sewer Service Companies publishes a variety of industry related recommended practice guides.

NASSCO, Inc.

2470 Longstone Lane, Suite M

Marriottsville, MD 21104

(410) 442-7473 • Fax (410) 442-7788

http://nassco.org/

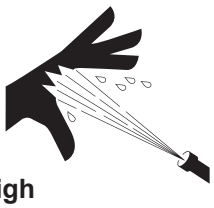
⚠ WARNING

Out of control hose can cause severe injury or death.

The rodder hose creates tremendous pressure and must not be fitted with a reducer or hand held nozzle, or operated outside of the sewer pipe. The back pressure created by such action will cause loss of control and violent movement of the hose and fittings, and the release of high pressure water.

Never use improper fittings or use out of sewer pipe. Refer to manual for details.

⚠ WARNING

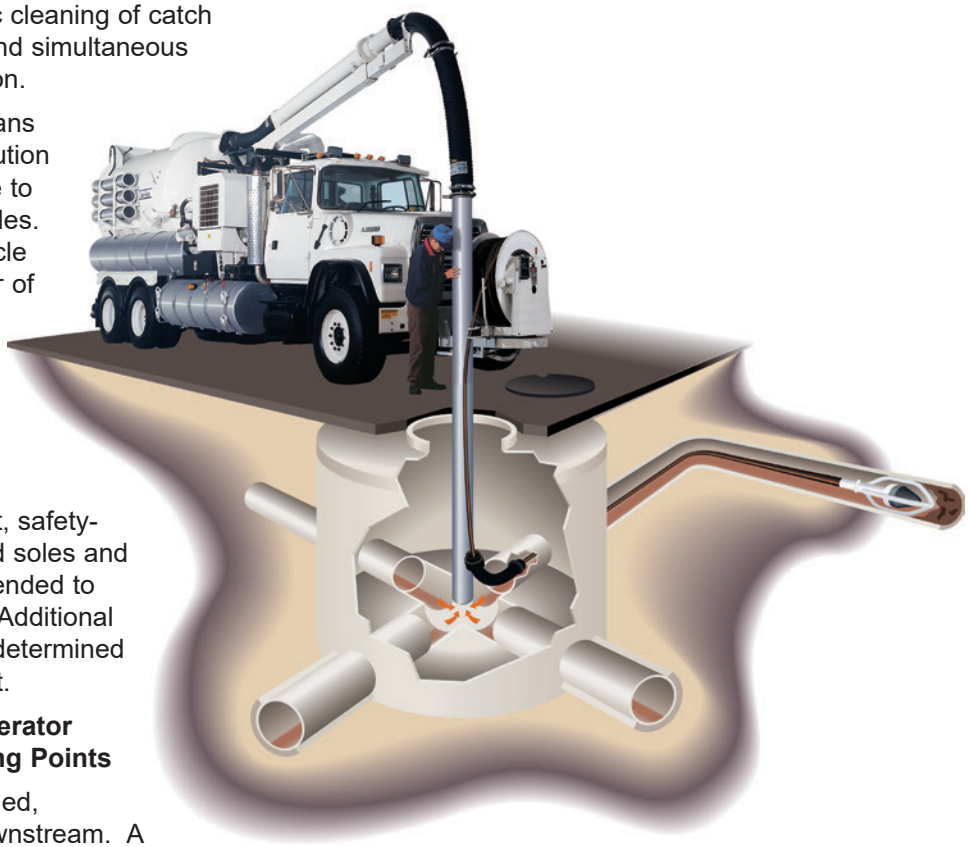


High pressure water

High pressure water can cause serious injury or death. The handgun operates under high pressure. Never point the handgun at another individual. Severe injury can result from the high-pressure water.

Special safety equipment is required when operating the high-pressure handgun. Always wear safety toe shoes or boots (waterproof shoes or boots preferred), coveralls, face shield and safety goggles and gloves (waterproof gloves preferred).

The following pages cover basic cleaning of catch basins, jet rodding operations and simultaneous vacuum and jet rodding operation.

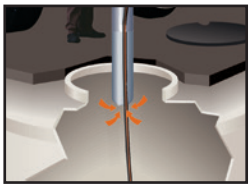


Be aware of traffic and pedestrians on the job site. Use extreme caution while moving around the vehicle to avoid contact with moving vehicles. When moving the boom or vehicle make sure pedestrians are clear of the area. Use orange safety cones to mark the work area.

Germs and other biological hazards are common in sewers. All operators must wear safety apparel: hard hat, visor and / or goggles, ear protection, rain suit, safety-toe shoes or boots with non skid soles and water proof gloves are recommended to avoid injury and contamination. Additional equipment may be required as determined by an on site safety assessment.

Before Jetting A Line, The Operator Should Consider The Following Points

- If the manhole is surcharged, relocate to a manhole downstream. A surcharged manhole is one that water has risen above the top of the outlet pipe. This makes it impossible to see the line you are trying to clean.
- The size of pipe should be determined in order to use the proper size nozzle and nozzle support guide.



- Determine the direction the line is supposed to flow. Always jet against the flow or upstream!

When Jetting a line

- When starting to jet a line or anytime the rodder nozzle cleaning the line is near the manhole, spray or mist can be forced out. If equipped, use the unit's vacuum system to reduce the spray or mist by lowering the vacuum tube into the manhole about one foot or more and allowing the vacuum airflow to capture it.

Starting nozzle in line

- Place nozzle in the line before turning water pump on.
- Use low water flow to minimize water jetting out of the line.
- Allow slack in line to enable the nozzle to move quickly up the line.
- Once insured nozzle is in the line, distance yourself from manhole and mist.
- If equipped, use a remote control to enable distance from manhole.

Retracting nozzle in line

- As nozzle comes close to manhole, lower water flow and retract slowly.
- Turn off pump before retracting nozzle out of the line.

⚠ WARNING

Sewer gas hazard.

Sewer lines often contain poisonous or explosive gas such as methane. NEVER enter or bend over a sewer without proper ventilation and personal protective equipment. If another person needs help in a sewer, immediately call for emergency assistance. NEVER enter the sewer to help unless you have been trained to do so and have proper personal protective equipment.

NEVER smoke in or around sewer lines, drains, or catch basins.

Failure to follow these instructions may result in death or serious injury.

⚠ WARNING

Chemical waste hazard

Many chemicals are illegally dumped in storm drains, catch basins and sewers. To prevent contamination and injury wear chemical resistant gloves, long sleeves, trousers and safety glasses or face shields. Seek immediate medical attention if exposure or contamination is suspected.

Observe environmental protection regulations

Be mindful of the environment and ecology.

Before draining any fluids, find out the correct way to dispose of them.

Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, and batteries.

⚠ WARNING

Biological hazards

Germs and other biological hazards are common in sewers. All operators must wear safety apparel: hard hat, visor and / or goggles, ear protection, rain suit, safety-toe shoes or boots with non skid soles and water proof gloves are recommended to avoid injury and contamination. Additional equipment may be required as determined by an on site safety assessment.

Immediately treat all abrasions, cuts and nicks for contamination. Get medical attention for injuries associated with cleaning sewers, drains and catch basins if biological contamination is suspected. Serious illness may result if this procedure is not followed.

⚠ WARNING

Trip, fall and other hazards

Open manholes and other access openings create risks of trips and falls. Be aware of such locations and do not step in or over them. Ensure that manhole cover and other covers are in place when job is completed. Failing to follow these precautions may cause serious injury or death.

Be aware of traffic and pedestrians on the job site. Use extreme caution while moving around the vehicle to avoid contact with moving vehicles. When moving the boom or vehicle make sure pedestrians are clear of the area. Use orange safety cones to mark the work area.

The glycol recovery vehicle is designed for vacuuming glycol deicing fluid after it has been used on airplanes. Special air separators are located at the top of a holding tank to separate the glycol from the air stream. The Environmental Protection Agency (EPA) and the Federal Aviation Administration (FAA) regulate the use and recovery of deicing fluids. All glycol recovery vehicle operators must follow site regulations for the safe handling and transportation of deicing fluids.

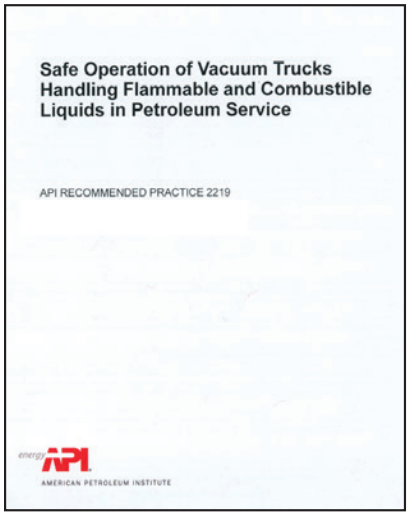
Additional information on deicing fluids can be obtained from the manufacturer. Hazards from deicing fluids can include eye irritation and serious illness or death from ingestion. Prolonged breathing of fluid vapors is also harmful, and fumes may also be flammable. Consult the manufacturers Material Safety Data Sheet for more specific information.

For additional information refer to:

EPA at: www.epa.gov

FAA at: www.faa.gov

The owner, operator and user are responsible for determining if static grounding is required and what level of protection is required for the specific job. Due to the possibility of static electricity build up in the system we recommend grounding the unit in all applications.



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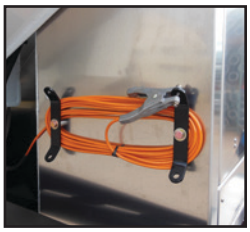

Typical static cable and clamp

The American Petroleum Institute provides additional resources and programs to industry which are based on API Standards. For more information, contact:

• Training/Workshops	Ph:	202-682-8490
	Fax:	202-682-8222
• Inspector Certification Programs	Ph:	202-682-8161
	Fax:	202-962-4739
• American Petroleum Institute Quality Registrar	Ph:	202-682-8130
	Fax:	202-682-8070
• Monogram Program	Ph:	202-962-4791
	Fax:	202-682-8070
• Engine Oil Licensing and Certification System	Ph:	202-682-8233
	Fax:	202-962-4739
• Petroleum Test Laboratory Accreditation Program	Ph:	202-682-8129
	Fax:	202-682-8070

In addition, petroleum industry technical, patent, and business information is available online through API EnCompass™. Call 1-888-604-1880 (toll-free) or 212-366-4040, or fax 212-366-4298 to discover more.

To obtain a free copy of the API Publications, Programs, and Services Catalog, call 202-682-8375 or fax your request to 202-962-4776. Or see the online interactive version of the catalog on our web site at www.api.org/cat.

American Petroleum Institute

Helping You Get The Job Done Right.™

Available from the WJTA-IMCA: *Recommended Practices for the Use of Industrial Vacuum Equipment*. Familiarize yourself with the Recommended Practices, particularly Section 2.0 Accidents & Section 5.5 Grounding/Bonding.

In addition, NFPA 77 Recommended Practice on Static Electricity provides more detailed grounding methods. This can be obtained from the National Fire Protection Association at www.NFPA.org (800-344-3555).

These three references are recommended to help in making good decisions in the proper use of vacuum truck technology. Other references are also available.

Library of Congress Cataloging-in Publication Data
Britton, Laurence G., 1951–
Avoiding static ignition hazards in chemical operations / Laurence G. Britton.
p. cm. — (A CCPS concept book)
Includes bibliographical references and index.
ISBN 0-8169-0800-1
1. Electrostatics. 2. Chemical plants—Safety measures.
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TP155.5.B75 1999 99-35855
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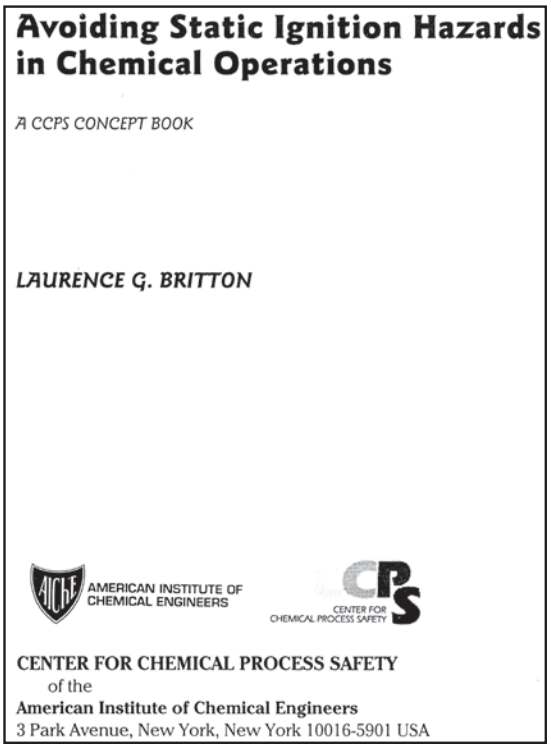


If use of Vactor equipment results in exposure to potentially hazardous dust, employers and users should consult any applicable SDS as well as OSHA regulations, guidelines, and information to ensure safety of operators. Under these circumstances, users should pay particular attention to possible increased exposure when dumping debris hoppers and changing bag filters. Wearing appropriate respirator during dumping operations and wetting down filter bags before service or removal may reduce exposure to certain dusts such as silica dust. To reduce exposure in presence of potentially hazardous dusts, employers should consider use of upgraded filters, broken bag detectors, and ensure that any leaking gaskets and seals are promptly serviced. Employers should monitor exposure of operators and ensure compliance with applicable OSHA regulations and standards.

Some common practices to reduce exposure include:

1. Upgrading filters
2. Servicing gaskets and seals if leaking
3. Wetting down filter bags, if appropriate before servicing or removal.
4. Operators wearing appropriate respirators when servicing, dumping or during air excavation.

Combustible dusts

Materials that are, or could produce, combustible dusts must be handled in such a way as to prevent combustible dust explosions and deflagrations (fires).

Combustible dusts consist of the following dust types as per NFPA 70: National Electrical Code 2014 Edition

- Group E - Metallic Dusts
- Group F - Carbonaceous Dusts
- Group G - Organic Dusts

It is the responsibility of the owner to insure that all of the following steps are taken before using any air mover unit on combustible dust materials.

5. All employees involved in handling combustible dusts must be trained as to the combustible dust hazards as part of their HAZCOM training. See: OSHA 3371-08 2009 - Hazard Communication Guidance for Combustible Dusts
6. Consult the SDS(s) of the material(s) for the recommended Safe Handling Procedures and Fire and Explosion potentials.
7. Dry materials and low relative humidity increase the dangers of handling combustible dusts.
8. Never dry sweep or *Blow Down* the dusts with compressed air to form piles for easier vacuum removal. Both of these methods can create conditions for a dust explosion to occur.
9. Position the air mover so that the top baghouse doors, which are the emergency relief vent in the event of an explosion, do not create a greater hazard should an explosion occur within the unit. Keep all personnel clear of the baghouse and cyclone clean out doors which may also vent should an explosion occur.
10. The air mover itself contains many possible exterior ignition sources (electrical and heat). Never operate the unit in an area containing airborne combustible dust.
11. Insure the grounding cable on the unit is properly mounted, bare metal bottom of the grounding reel to bare metal mounting surface on either the frame or bed of the unit, and that the grounding cable and clamp are in good condition.

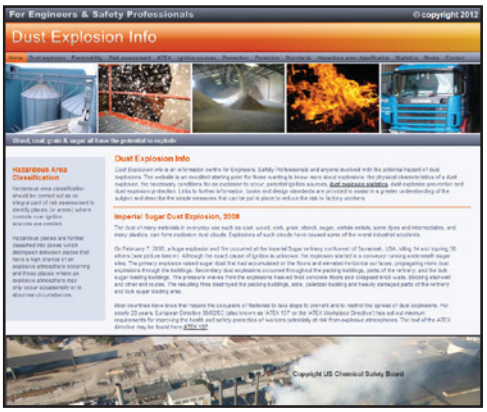
12. Ground the unit to an approved grounding point or grounding rod. If using a grounding rod(s), it must be designed for grounding and driven firmly into the soil per the site requirements. The grounding point should be wire brushed to remove oxidation or other materials that might prevent the free flow of electricity.
13. For rear loading air movers, a rubber baffle placed over the diverter plate is strongly recommended to prevent any potential metal to metal contact during vacuuming. This is essential when vacuuming metal combustible dusts.
14. All components of the vacuum line must be bondable. This includes: nozzle, hoses, pipes, fittings, safety tee, trunk hose.
15. Never use any non-conductive materials in any part of the vacuum line (PVC Pipe or Plastic Hose).
16. Never use bare copper wire inside or outside of the vacuum line as a jumper across non-conductive components.
17. Rubber hoses must include a continuous wire helical stiffener. The wire should be stripped 4-6” on each end of the hose, the bared wire pushed into the hose opening and then the metal hose shanks pressed in to the hoses and clamped together.
18. All bonds and grounds must be tested with a suitable Ohm meter to verify the bonding and grounding meet the site requirements.
19. Do not restrict the air flow to the unit to prevent overheating of the blower. Restricting the air flow could cause the blower to become an ignition source for dusts. Use multiple smaller hoses if a larger hose is not practical.
20. Run the unit at the lowest RPM that moves the material. Excess RPM’s create excess heat in the blower.
21. If the unit begins to blow dust from the discharge silencer, immediately shut the unit down, disconnect the vacuum line, repair any broken or unseated bags in the bag house, rinse any dust out of the silencer, clean or purge any dust remaining in the unit between the top of the bag house and the blower and finally reconnect the vacuum line and resume work. Failure to do so could result in a dust explosion.
22. Upon completion of the job, insure the air mover has been cleaned of any combustible dust residue.

Vactor can not possibly, know, evaluate, and advise the service trade of all conceivable ways in which operation or service might be done or the possible hazardous consequences of each way. Anyone who uses operational procedures, service procedures, or tools, whether recommended by Vactor or not, must first satisfy himself thoroughly that neither his safety nor the product safety will be jeopardized by the methods he shall select.

Vactor vacuum systems are designed to user specifications. The owner/operator/user is responsible for the safe use and application of this equipment and proper waste disposal. Transportation and disposal of waste may be subject to local, state or federal laws.

There is an increased risk of fire and/or explosion from combustible dust. The following section provides resources will assist in solving those issues.

http://www.dustexplosion.info/



General Information

FM Global, "Prevention and Mitigation of Combustible Dust Explosions and Fire", Data Sheet No. 7-76, January 2005.

Eckhoff, Rolf K. "Dust Explosions in the Process Industries," 3rd Edition, Gulf Professional Publishing, 2003.

Bartknecht, W. "Dust Explosions: Course, Prevention, and Protection," Springer- Verlag, 1989.

An online refresher course, OSHA's Combustible Dust National Compliance Directive, is available through Federal Signal. The course can be accessed at the following web address:

www.fssolutionsgroup.com/Training/OnlineCourses/tabid/115/Default.aspx

Hatwig, M., and Steen, H. (eds.), "Handbook of Explosion Prevention and Protection," Wiley-VCH, 2004.

Frank, Walter. "Dust Explosion Prevention and the Critical Importance of Housekeeping," Process Safety Progress, vol. 23, no. 3, September 2004, pp. 175-184.

Amyotte, P., Kahn, F., and Dastidar, A. "Reduce Dust Explosions the Inherently Safer Way," Chemical Engineering Progress, vol. 99, no. 10, October 2003, pp. 36-43.

Ebidat, Vahid. "Is Your Dust Collection System an Explosion Hazard?" Chemical Engineering Progress, vol. 99, no. 10, October 2003, pp. 44-49.

Center for Chemical Process Safety (CCPS). "Guidelines for Safe Handling of Powders and Bulk Solids." CCPS, American Institute for Chemical Process Safety, New York, New York, January 2005.

Code of Federal Regulations (CFR) [Standards]
U.S. Government Printing Office
732 N. Capitol Street, NW Washington, DC 20401
Telephone: 1-866-512-1800 (toll-free)
OSHA Standards, Interpretations, and Publications
U.S. Department of Labor/OSHA OSHA Publications Office
200 Constitution Ave., NW, N-3101
Washington, DC 20210
Telephone: (202) 693-1888
or by Fax: (202) 693-2498

Related OSHA standards found in 29 CFR:

1910.22 - General Requirements: Housekeeping

1910.94 - Ventilation

1910.107 - Spray Finishing Using Flammable and Combustible Materials

National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Telephone: (800) 344-3555

Related NFPA Standards:

NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities

NFPA 68, Guide for Venting of Deflagrations

NFPA 69, Standard on Explosion Prevention Systems

NFPA 70, National Electrical Code 2014 Edition

NFPA 91, Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids

NFPA 120, Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities

NFPA 432, Code for the Storage of Organic Peroxide Formulations

NFPA 480, Standard for the Storage, Handling, and Processing of Magnesium Solids and Powders

NFPA 481, Standard for the Production, Processing, Handling, and Storage of Titanium

NFPA 482, Standard for the Production, Processing, Handling, and Storage of Zirconium

NFPA 484, Standard for Combustible Metals, Metal Powders, and Metal Dusts

NFPA 485, Standard for the Storage, Handling, Processing, and Use of Lithium Metal

NFPA 495, Explosive Materials Code

NFPA 499, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

NFPA 505, Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation

NFPA 560, Standard for the Storage, Handling, and Use of Ethylene Oxide for Sterilization and Fumigat

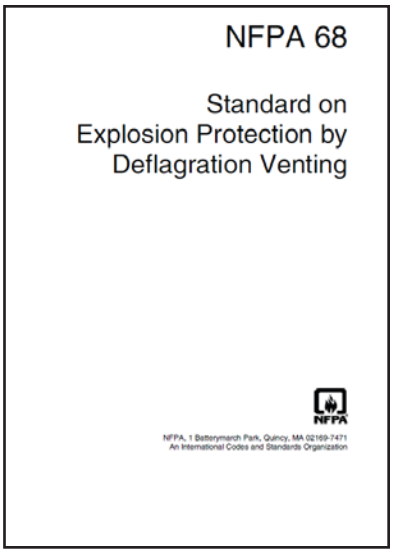
NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids

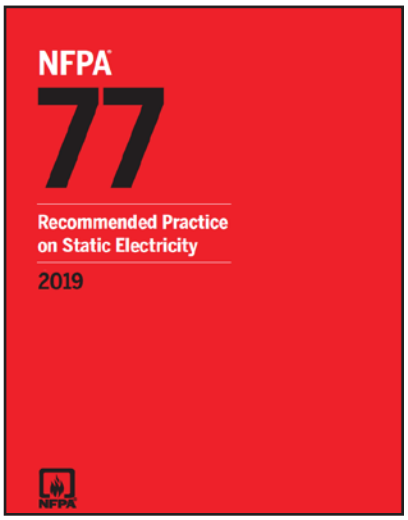
NFPA 655, Standard for Prevention of Sulfur Fires and Explosions

NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

NFPA 1124, Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles

NFPA 1125, Code for the Manufacture of Model Rocket and High Power Rocket Motors





OSHA® FactSheet

Hazard Alert: Combustible Dust Explosions

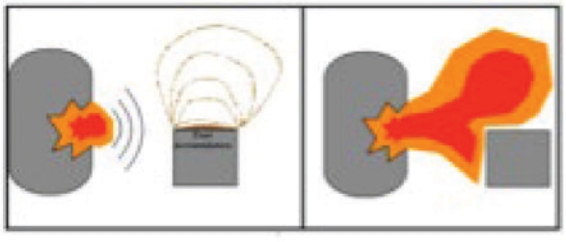
Combustible dusts are fine particles that present an explosion hazard when suspended in air in certain conditions. A dust explosion can be catastrophic and cause employee deaths, injuries, and destruction of entire buildings. In many combustible dust incidents, employers and employees were unaware that a hazard even existed. It is important to determine if your company has this hazard, and if you do, you must take action now to prevent tragic consequences.

How Dust Explosions Occur

In addition to the familiar fire triangle of oxygen, heat, and fuel (the dust), dispersion of dust particles in sufficient quantity and concentration can cause rapid combustion known as a deflagration. If the event is confined by an enclosure such as a building, room, vessel, or process equipment, the resulting pressure rise may cause an explosion. These five factors (oxygen, heat, fuel, dispersion, and confinement) are known as the "Dust Explosion Pentagon". If one element of the pentagon is missing, an explosion cannot occur.

Catastrophic Secondary Explosions

An initial (primary) explosion in processing equipment or in an area where fugitive dust has accumulated may dislodge more accumulated dust into the air, or damage a containment system (such as a duct, vessel, or collector). As a result, if ignited, the additional dust dispersed into the air may cause one or more secondary explosions. These can be far more destructive than a primary explosion due to the increased quantity and concentration of dispersed combustible dust. Many deaths in past incidents, as well as other damage, have been caused by secondary explosions.



A pharmaceutical plant after a dust explosion.

Industries at Risk

Combustible dust explosion hazards exist in a variety of industries, including: agriculture, chemicals, food (e.g., candy, sugar, spice, starch, flour, feed), grain, fertilizer, tobacco, plastics, wood, forest, paper, pulp, rubber, furniture, textiles, pesticides, pharmaceuticals, tire and rubber manufacturing, dyes, coal, metal processing (e.g., aluminum, chromium, iron, magnesium, and zinc), recycling operations, fossil fuel power generation (coal), and additive manufacturing and 3D printing.

Prevention of Dust Explosions

To identify factors that may contribute to a explosion, OSHA recommends a thorough hazard assessment of:

- All materials handled;
- All operations conducted, including by-products;
- All spaces (including hidden ones); and
- All potential ignition sources.

Dust Control Recommendations

- Implement a hazardous dust inspection, testing, housekeeping, and control program;
- Use proper dust collection systems and filters;
- Minimize the escape of dust from process equipment or ventilation systems;
- Use surfaces that minimize dust accumulation and facilitate cleaning;
- Provide access to all hidden areas to permit inspection;
- Inspect for dust residues in open and hidden areas at regular intervals;
- If ignition sources are present, use cleaning methods that do not generate dust clouds;
- Use only vacuum cleaners approved for dust collection; and
- Locate relief valves away from dust deposits.

Ignition Control Recommendations

- Use appropriate electrical equipment and wiring methods;
- Control static electricity, including bonding of equipment to ground;
- Control smoking, open flames, and sparks;
- Control mechanical sparks and friction;
- Use separator devices to remove foreign materials capable of igniting combustibles from process materials;
- Separate heated surfaces from dusts;
- Separate heating systems from dusts;
- Select and use industrial trucks properly;
- Use cartridge-activated tools properly; and
- Use an equipment preventive maintenance program.

Injury and Damage Control Methods

- Separation of the hazard (isolate with distance);
- Segregation of the hazard (isolate with a barrier);
- Deflagration isolation/venting;
- Pressure relief venting for equipment;
- Direct vents away from work areas;
- Specialized fire suppression systems;
- Explosion protection systems;
- Spark/ember detection for suppression activation;
- Develop an emergency action plan; and
- Maintain emergency exit routes.

Applicable OSHA Requirements Include:

- §1910.22 Housekeeping
- §1910.307 Hazardous Locations
- §1910.1200 Hazard Communication
- §1910.269 Electric Power Generation, Transmission and Distribution (coal handling)
- §1910.272 Grain Handling Facilities
- General Duty Clause, Section 5(a)(1) of the *Occupational Safety and Health Act* (Employers must keep workplaces free from recognized hazards likely to cause death or serious physical harm).

Resources

Readily available from www.osha.gov are:

- Combustible Dust National Emphasis Program
- Safety and Health Information Bulletin (SHIB) (07-31-2005) *Combustible Dust in Industry: Preventing and Mitigating the Effects of Fires and Explosions*

See the SHIB or www.osha.gov for other applicable standards.

The primary National Fire Protection Association (NFPA) consensus standards related to this hazard are:

- NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 61, Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
- NFPA 484, Standard for Combustible Metals
- NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities
- NFPA 655, Standard for the Prevention of Sulfur Fires and Explosions
- See www.nfpa.org to view NFPA standards.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

U.S. Department of Labor

DSG FS-3791 05/2015

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

OSHA's Respirable Crystalline Silica Standard for Construction

Workers who are exposed to respirable crystalline silica dust are at increased risk of developing serious silica-related diseases. OSHA's standard requires employers to take steps to protect workers from exposure to respirable crystalline silica.

What is Respirable Crystalline Silica?

Crystalline silica is a common mineral that is found in construction materials such as sand, stone, concrete, brick, and mortar. When workers cut, grind, drill, or crush materials that contain crystalline silica, very small dust particles are created. These tiny particles (known as "respirable" particles) can travel deep into workers' lungs and cause silicosis, an incurable and sometimes deadly lung disease. Respirable crystalline silica also causes lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease, and kidney disease. In most cases, these diseases occur after years of exposure to respirable crystalline silica.

How are Construction Workers Exposed to Respirable Crystalline Silica?

Exposure to respirable crystalline silica can occur during common construction tasks, such as using masonry saws, grinders, drills, jackhammers and handheld powered chipping tools; operating vehicle-mounted drilling rigs; milling; operating crushing machines; using heavy equipment for demolition or certain other tasks; and during abrasive blasting and tunneling operations. About two million construction workers are exposed to respirable crystalline silica in over 600,000 workplaces.

What Does the Standard Require?

The standard (29 CFR 1926.1153) requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers. Employers can either use a control method laid out in Table 1 of the construction standard, or they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures in their workplaces to the permissible exposure limit (PEL).

What is Table 1?

Table 1 matches 18 common construction tasks with effective dust control methods, such as using water to keep dust from getting into the air or using a vacuum dust collection system to capture dust. In some operations, respirators may also be needed. Employers who follow Table 1 correctly are not required to measure workers' exposure to silica from those tasks and are not subject to the PEL.

Table 1 Example: Handheld Power Saws

If workers are sawing silica-containing materials, they can use a saw with a built-in system that applies water to the saw blade. The water limits the amount of respirable crystalline silica that gets into the air.

Table 1: Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

Equipment/ Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hrs/ shift	> 4 hrs/ shift
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • When used outdoors. • When used indoors or in an enclosed area.	None APF 10	APF 10 APF 10

Excerpt from Table 1 in 29 CFR 1926.1153

In this example, if a worker uses the saw outdoors for four hours or less per day, no respirator would be needed. If a worker uses the saw for more than four

hours per day or any time indoors, he or she would need to use a respirator with an assigned protection factor (APF) of at least 10, such as a NIOSH-certified filtering facepiece respirator that covers the nose and mouth (sometimes referred to as a dust mask). See the respiratory protection standard (29 CFR 1910.134) for information on APFs.

Alternative Exposure Control Methods

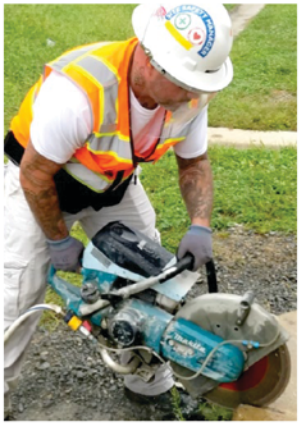
Employers who do not fully implement the control methods on Table 1 must:

- **Determine the amount of silica that workers are exposed to** if it is, or may reasonably be expected to be, at or above the **action level of 25 µg/m³** (micrograms of silica per cubic meter of air), averaged over an 8-hour day;
- Protect workers from respirable crystalline silica exposures above the **PEL of 50 µg/m³**, averaged over an 8-hour day;
- Use **dust controls** and safer work methods to protect workers from silica exposures above the PEL; and
- Provide **respirators** to workers when dust controls and safer work methods cannot limit exposures to the PEL.

What Else Does the Standard Require?

Regardless of which exposure control method is used, all construction employers covered by the standard are required to:

- Establish and implement a **written exposure control plan** that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur;
- Designate a **competent person** to implement the written exposure control plan;
- Restrict **housekeeping** practices that expose workers to silica, such as use of compressed air without a ventilation system to capture the dust and dry sweeping, where effective, safe alternatives are available;
- Offer **medical exams**—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year;
- **Train workers** on the health effects of silica exposure, workplace tasks that can expose them to silica, and ways to limit exposure; and
- **Keep records** of workers' silica exposure and medical exams.



Applying water to the blade of a handheld power saw reduces the amount of dust created when cutting.

Additional Information

Additional information on OSHA's silica standard can be found at www.osha.gov/silica.

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education.

OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing and improving safety and health management systems. To locate the OSHA On-Site Consultation Program nearest you, call 1-800-321-OSHA or visit www.osha.gov/consultation.

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3681 12/2017

Vacuum Excavation occurs when high-pressure water or pressurized air breaks up and cuts the soil, while a high-flow vacuum system lifts the soil up and out of the excavation area.

Buried natural gas, petroleum pipelines, and water mains can be quickly and efficiently uncovered with greatly reduced risk of strike. Fiber optic lines, cables, and other utilities can be efficiently located without the damage that can happen with traditional mechanical digging.

Operators can dig with precision, establishing a less invasive method for slot trenching, pot holing, and pipe location.

This manner of excavation causes less surface damage, reduces disruption of traffic and other surface activities and can be easier and less expensive to repair.

Non-destructive vacuum excavation has quickly gaining acceptance by cities, utilities, and contractors as a relatively safe, effective alternative to traditional excavation methods in a wide range of applications such as line location, installation and repair for utilities and pipelines, sewer and pipe, rehabilitation, slot trenching, waterline maintenance and repair, directional digging, excavation in congested areas, sign and pole installation, landscaping excavation and precision digging.

The following pages provide basic resources to plan and operate a hydro-excavation digging site safely.

Follow all federal, state, and local regulations for locating utilities before starting work.

⚠ WARNING

High pressure water

High pressure water can cause serious injury or death. The handgun operates under high pressure. Never point the handgun at another individual. Severe injury can result from the high-pressure water.

Special safety equipment is required when operating the high-pressure handgun. Always wear safety toe shoes or boots (waterproof shoes or boots preferred), coveralls, face shield and safety goggles and gloves (waterproof gloves preferred).

The AEM is a leading provider of training and safety material.

Association of Equipment Manufacturers
6737 West Washington Street
Suite 2400
Milwaukee, WI 53214-5647

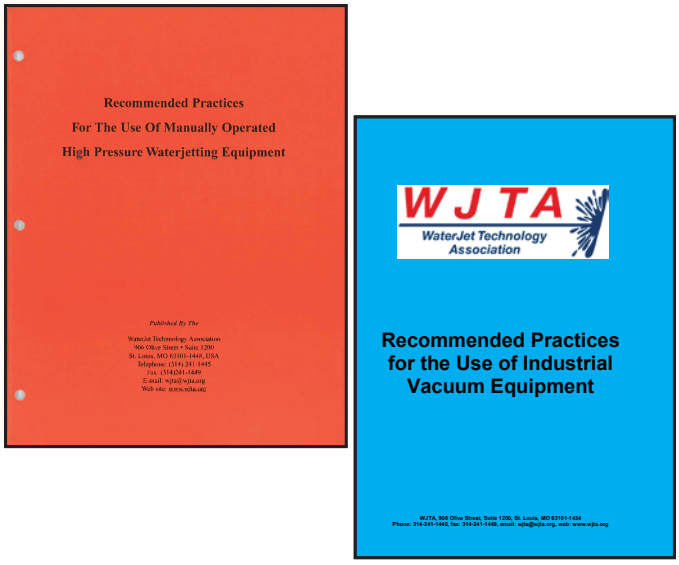
414.272.0943
Fax: 414.272.1170
Email aem@aem.org
website: www.aem.org

Operators using or working around high pressure water systems need to take additional precautions including specialized personal protection equipment. Additional information on high pressure water safety is available from the WJTA.

Also available from the WJTA:

Recommended Practices for the Use of High Pressure Waterjetting Equipment

Recommended Practices for the Use of Industrial Vacuum Equipment



WaterJet Technology Association
917 Locust Street, Suite 1100
St Louis MO 63101-1419

314-241-1445
Fax 314-241-1449
e-mail: wjta@wjta.org
website: www.wjta.org

Underground power lines may require special precautions including cutting power to the lines and the use of special protective bonding equipment.

Kri-Tech is a source of protective bond mats used during hydro-excavation:

Kri-Tech Products Ltd.
Box 364, Mirror
Alberta Canada T0B 3C0

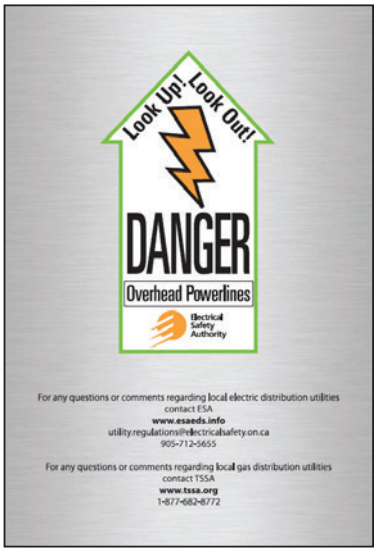
877-788-3883
Fax: 403-788-3723
Email: info@kri-tech.net
website: www.kri-tech.net

Common Ground Alliance
2300 Wilson Boulevard
Suite 400
Arlington, Virginia 22201

703-836-1709
Fax: 309-407-2244
websites:
www.commongroundalliance.com
www.call811.com
www.cga-dirt.com

Ontario Regional Common Ground Alliance
195 King Street, Suite 105
St Catharines, Ontario L2R 3J6

866-446-4493
Fax: 866-838-6739
Email: office@orga.com
website: www.orcga.com



Centre for Health and Safety Innovation
5110 Creekbank Road, Suite 400
Mississauga, ON L4W 0A1

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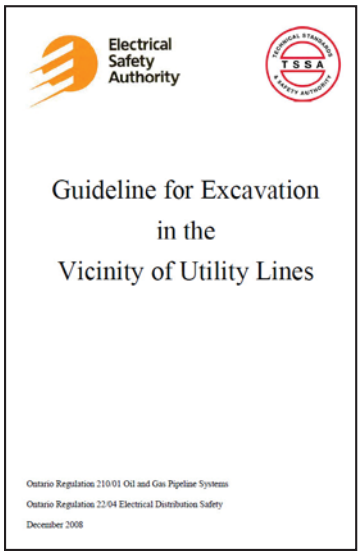
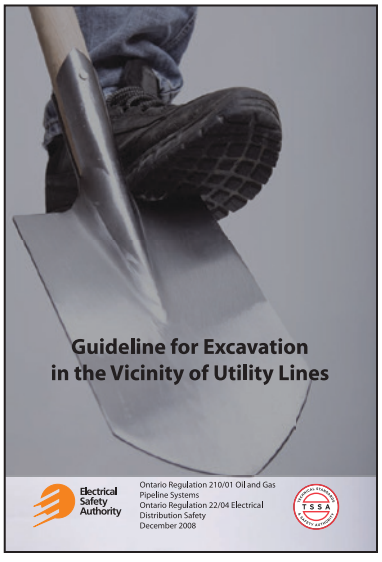
Fax: 905-625-8998
Email: info@ihsa.ca
website: www.ihsa.ca



Electrical Safety Authority

1-877-ESA-SAFE
1-877-372-7233
Customer Service Center

website: www.esasafe.com



Follow all requirements for PPE when operating and servicing. The Occupational Safety and Health Administration (OSHA) requirements apply to most workers. The following information is from OSHA 3151-12R 2003. The full document can be obtained from www.osha.gov.

A hazard assessment should be made to determine the correct level of footwear safety protection. Underground electrical utilities may require the use of insulating gloves and dielectric footwear. The minimum requirements for gloves are compliant with OSHA 1910.137, OSHA 1910.268, NFPA 70E and exceeds the ASTM D120 and European EN60903 standards. Refer to NFPA 70E for dielectric footwear.

National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Telephone: (800) 344-3555

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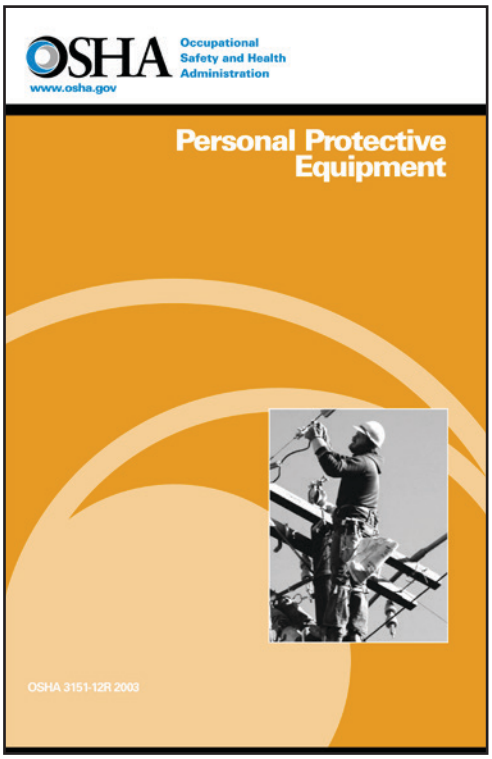

ASTM Labeling Chart
Natural Rubber Electrical Insulating Gloves

Class Color	Proof Test Voltage AC/DC	Max. Use Voltage AC/DC	Insulating Rubber Glove Label
00 Beige	2,500 / 10,000	500 / 750	10
0 Red	5,000 / 20,000	1,000 / 1,500	10
1 White	10,000 / 40,000	7,500 / 11,250	10
2 Yellow	20,000 / 50,000	17,000 / 25,500	10
3 Green	30,000 / 60,000	26,500 / 39,750	10
4 Orange	40,000 / 70,000	36,000 / 54,000	10

Refer to the Vactor/Guzzler Safety Manual for general site preparation. Site specific regulations may also apply.

1. Call 811 before all digging operations to locate and mark off all known utilities
2. All buried utilities suspected to be damaged must be de energized prior to digging.
3. Follow all recommended procedures for electrical bonding. Ground mats may be required.
4. Verify all equipment is in safe working order and suitable for the work to be performed. Water flows above 10gpm are normally not suitable due to the higher risk of erosion problems.
5. The working end of the vacuum tube should be equipped with a soft nonconductive end to help reduce the risk of contact or damage to buried lines and pipes.
6. Water pressure, volume and temperature can have a big impact on the risk of damaging the various underground utilities. Some testing may be required to avoid damage. Lower the water pressure and temperature when getting close to the utilities. The water nozzles must always be in motion.
7. Teamwork is very important when trenching and digging large holes. One person is operating the wand or hand gun. The other person is positioning the boom so the vacuum tube is in the right position to move the material as soon as it breaks away. It is not productive to try to wash the material to the nozzle or to try to vacuum the material a great distance to the nozzle.

The operational systems on the Vactor are dependent upon the options and capacities of the vehicle as ordered. The vehicle is custom designed to provide a combination of high-pressure water and suction to perform in a designated area and application. The water, hydraulic and vacuum systems work together to provide a powerful excavating machine.

811®

Know what's below.
Call before you dig.

It is important to remember that the vacuum tube uses air flow and not vacuum to pick up material. Keep the suction end of the nozzle in the upright position to receive air and material. Submerging the nozzle in material stops airflow, prevents material movement and creates a loading and unloading effect on the blower/fan. The nozzle is designed to pull air into the pipe to move material. The end is serrated with small holes; if the end is submerged no air is pulled in through the holes.

Follow all requirements for confined space when servicing. All debris body, large water bodies and vessels that can be entered may be considered permit-required confined space as defined by the Occupational Safety and Health Administration (OSHA). The following information is from OSHA 3138-01R 2004. The full document can be obtained from www.osha.gov.

Many workplaces contain spaces that are considered to be "confined" because their configurations hinder the activities of employees who must enter into, work in or exit from them. In many instances, employees who work in confined spaces also face increased risk of exposure to serious physical injury from hazards such as entrapment, engulfment and hazardous atmospheric conditions. Confinement itself may pose entrapment hazards and work in confined spaces may keep employees closer to hazards such as machinery components than they would be otherwise. For example, confinement, limited access and restricted airflow can result in hazardous conditions that would not normally arise in an open workplace.

The terms "permit-required confined space" and "permit space" refer to spaces that meet OSHA's definition of a "confined space" and contain health or safety hazards. For this reason, OSHA requires workers to have a permit to enter these spaces. Throughout this publication, the term "permit space" will be used to describe a "permit-required confined space."

Definitions

By definition, a confined space:

- *Is large enough for an employee to enter fully and perform assigned work;*
- *Is not designed for continuous occupancy by the employee; and*
- *Has a limited or restricted means of entry or exit.*

These spaces may include underground vaults, bodies, storage bins, pits and diked areas, vessels, silos and other similar areas.

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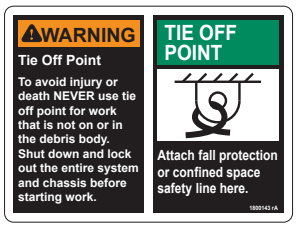
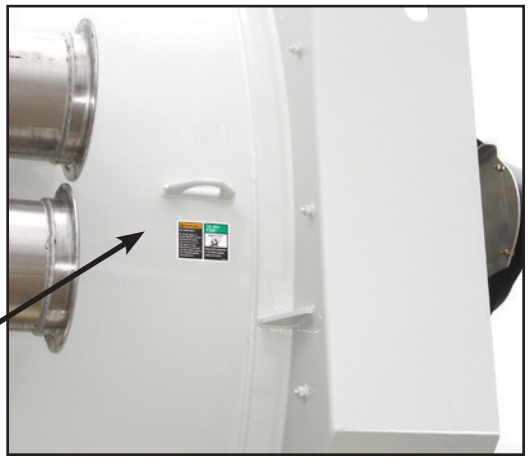
By definition, a permit-required confined space has one or more of these characteristics:

- *Contains or has the potential to contain a hazardous atmosphere;*
- *Contains a material with the potential to engulf someone who enters the space;*
- *Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and/or*
- *Contains any other recognized serious safety or health hazards.*





All units are equipped with a tie off point for entering the debris body. It is normally located on the driver side next to the rear door.

811®

Know what's below. Call before you dig.

Follow all federal, state, and local regulations for locating utilities before starting work.

OSHA Occupational Safety and Health Administration

Safety Tips

Working safely in trenches

Do NOT enter an unprotected trench!

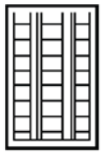
Each employee in a trench shall be protected from a cave-in by an adequate protective system.

Some of the protective systems for trenches are:

- Sloped for stability; or

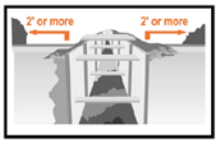
- Cut to create stepped benched grades; or

- Supported by a system made with posts, beams, shores or planking and hydraulic jacks; or

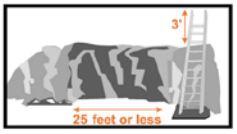


- Supported by a trench box to protect workers in a trench.

Additionally, excavated or other materials must be at least 2 feet back from the edge of a trench; and



A safe means of egress shall be provided within 25 feet of workers in a trench.



For more complete information:

OSHA Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA
TTY (877) 889-5627

OSHA 3243-03R-05

NOTICE

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Some service steps require being on top of the unit. Follow all requirements for fall protection when working around mobile equipment. The Occupational Safety and Health Administration (OSHA) requirements apply to most workers. The following information is from OSHA 3146 1998 (revised). The full document can be obtained from www.osha.gov.

In the construction industry in the U.S., falls are the leading cause of worker fatalities. Each year, on average, between 150 and 200 workers are killed and more than 100,000 are injured as a result of falls at construction sites. OSHA recognizes that accidents involving falls are generally complex events frequently involving a variety of factors. Consequently, the standard for fall protection deals with both the human and equipment-related issues in protecting workers from fall hazards. For example, employers and employees need to do the following:

- *Where protection is required, select fall protection systems appropriate for given situations.*
- *Use proper construction and installation of safety systems.*
- *Supervise employees properly.*
- *Use safe work procedures.*
- *Train workers in the proper selection, use, and maintenance of fall protection systems.*

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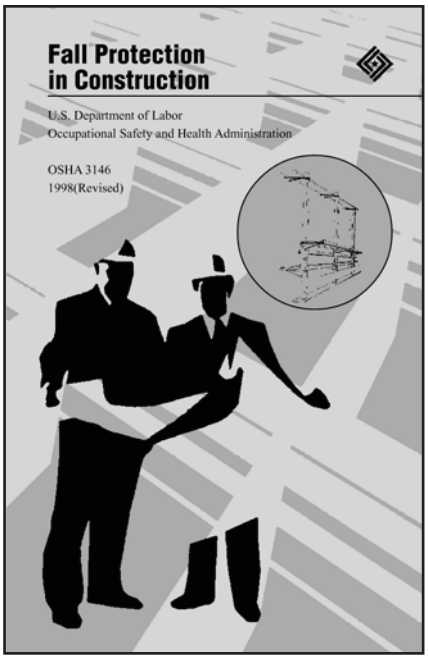
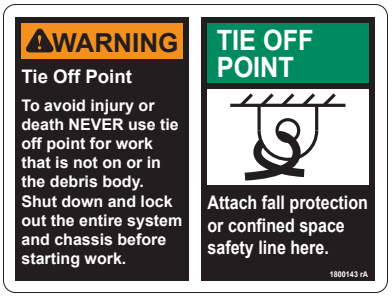
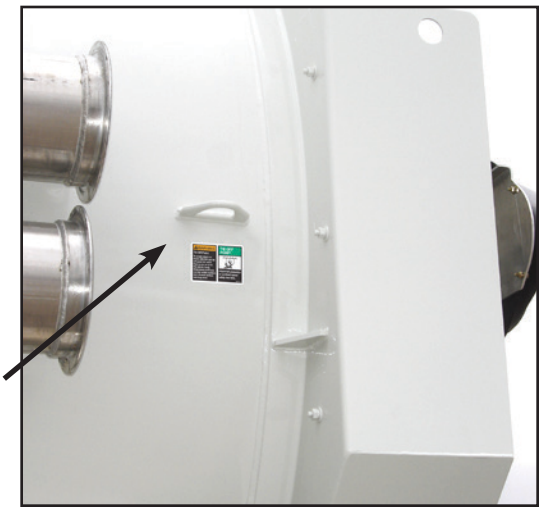




All units are equipped with a tie off point for entering the debris body.

Where needed units are equipped with additional designated tie off points. Only use these tie off points for fall protection. If no tie off point is marked as shown then an independent tie off system must be used.



Follow all requirements for lockout/tagout when servicing. The Occupational Safety and Health Administration (OSHA) requirements apply to most workers. The following information is from OSHA 3120 2002 (revised). The full document can be obtained from www.osha.gov.

"Lockout/tagout" refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities.1 This requires, in part, that a designated individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and that the authorized employee(s) either lock or tag the energy-isolating device(s) prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively. If the potential exists for the release of hazardous stored energy or for the reaccumulation of stored energy to a hazardous level, the employer must ensure that the employee(s) take steps to prevent injury that may result from the release of the stored energy.

Lockout devices hold energy-isolation devices in a safe or off" position. They provide protection by preventing machines or equipment from becoming energized because they are positive restraints that no one can remove without a key or other unlocking mechanism, or through extraordinary means, such as bolt cutters. Tagout devices, by contrast, are prominent warning devices that an authorized employee fastens to energy-isolating devices to warn employees not to reenergize the machine while he or she services or maintains it. Tagout devices are easier to remove and, by themselves, provide employees with less protection than do lockout devices.

Why do I need to be concerned about lockout/tagout?

Employees can be seriously or fatally injured if machinery they service or maintain unexpectedly energizes, starts up, or releases stored energy. OSHA's standard on the Control of Hazardous Energy (Lockout/Tagout), found in Title 29 of the Code of Federal Regulations (CFR) Part 1910.147, spells out the steps employers must take to prevent accidents associated with hazardous energy. The standard addresses practices and procedures necessary to disable machinery and prevent the release of potentially hazardous energy while maintenance or servicing activities are performed.

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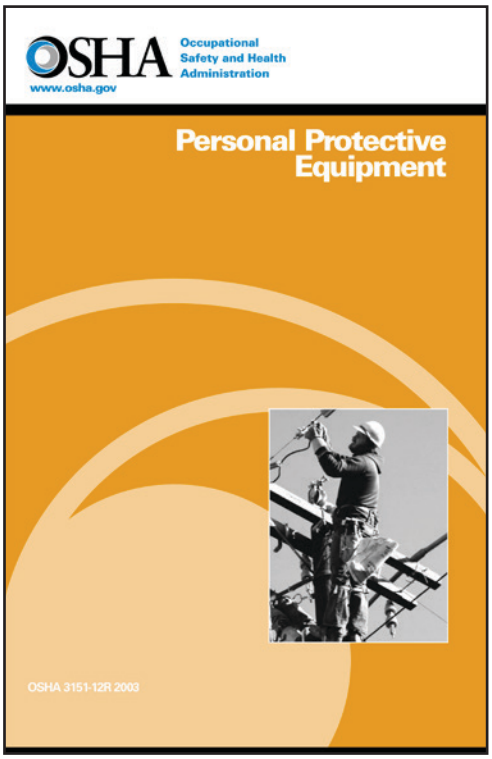

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Before and after all work serious issues need to be addressed which include:

1. Has the unit been thoroughly cleaned?
2. Will any of the debris react with any of the components of the unit?
3. Has the debris been positively identified?
4. In the case of a spill, there may be cross contamination issues with material soaked into the surrounding area.

Cleaning

The owner, operator and user are responsible for determining what level of cleaning is required for the specific job due to the possibility of cross contamination of chemicals. Two common resources for information are shown here for reference.

Things to consider when cleaning:

1. Visually inspect the debris body, cyclone(s), baghouse(s) and all material flow paths. They should be clean and clear of all visible debris and should be dry.
2. Replace all filter media in the debris path.
3. Disassemble and clean all filter screens and hoses.
4. Dispose of all waste in accordance with federal, state, and local laws and regulations.
5. Maintain an MSDS/SDS for all materials the units is used for.
6. A procedure should be developed and strictly followed to track the last material the unit was used for and cleaning. A sample form is included here.

WARNING

Cross Contamination Hazards

Serious hazards from poison gasses, fire and explosions are possible when the wrong chemicals or materials come in contact with each other.

Serious injury or death may result if cleaning procedures are not followed.

Safe Operation of Vacuum Trucks in Petroleum Service

API RECOMMENDED PRACTICE 2219

Additional copies available from API Publications and Distribution: (202) 682-8375

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American Petroleum Institute

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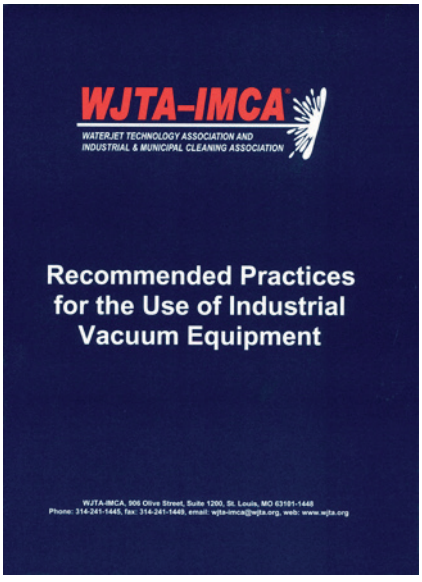
Washington, D.C. 20005-4070
202-682-8000

API American Petroleum Institute

Available from the WJTA-IMCA: *Recommended Practices for the Use of Industrial Vacuum Equipment*.



Unit			
Work performed by		**Date**	
Notes			
Areas NOT decontaminated			
1			
2			
3			
4			
5			
Last material in unit			
MSDS/SDS attached			**Yes - No**
Cleaning agents used			**Yes - No**
MSDS/SDS attached			**Yes - No**
Other			
1	**Unit fully winterized?**		**Yes - No**
2	**Water tanks drained and flushed?**		**Yes - No**
3	**All filters, strainers, filter bags cleaned or replaced?**		**Yes - No**
4	**Exterior of unit cleaned?**		**Yes - No**
5	**Debris body, cyclone(s), bag house(s), dump tube(s) cleaned?**		**Yes - No**
6	**All other areas material passes or accumulates cleaned?**		**Yes - No**

Units used around or for sewer work present some special handling issues due to biological hazards. This also includes all of the unit's exterior that may have come in contact with waste material. The unit's water tanks, debris body, pumps, filters and plumbing can all become contaminated in use. Recycling units will require additional cleaning before servicing.

Thoroughly flushing with fresh water is the first step to cleaning a unit. A wide variety of chemicals and procedures are available for decontamination. Machine components and seals can be damaged by some chemicals. Consult Vactor Service before use. The owner, operator and user are responsible for determining what level of cleaning is required.

⚠ WARNING

Biological hazards

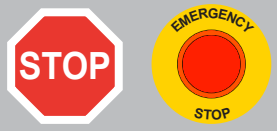
Germs and other biological hazards are common in sewers. All operators must wear safety apparel: hard hat, visor and / or goggles, ear protection, rain suit, safety-toe shoes or boots with non skid soles and water proof gloves are recommended to avoid injury and contamination. Additional equipment may be required as determined by an on site safety assessment.

Immediately treat all abrasions, cuts and nicks for contamination. Get medical attention for injuries associated with cleaning sewers, drains and catch basins if biological contamination is suspected. Serious illness may result if this procedure is not followed.

Shown are common industry standard symbols used on the various controls. Actual symbols used will vary with options.

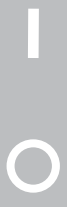

Refer to manual


Refer to Service manual



Emergency Stop


Operator Alert


On Off

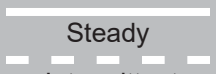

Lock Unlock



Adjustment Range
Max. to Min.


Alarm On / Off


Audible Alert
On / Off

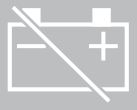



Remote Control

Counter


Timer


Hour meter


Battery power Disconnect


Battery charging and/or volts


Plug Connection or Socket


Scale


Slower / Faster

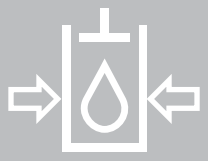

Increase Decrease


Pressure


Oil


Oil Temperature


Hydraulic Oil


Hydraulic Oil Pressure


Hydraulic Oil Temperature


Temperature Low/Normal Range/High


Switch Home Position


Hot Water


Spray


Water


Water Level Indicator

Shown are common industry standard symbols used on the various controls. Actual symbols used will vary with options.

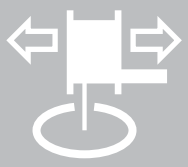
Worklights
Front - Side - Rear

Water Recirculation

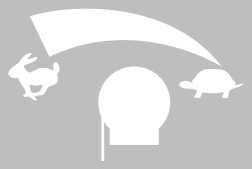
Vibrator

Valve
Open
Closed

Heater or Cabinet heater



Hose reel IN/OUT

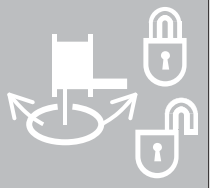


Hose reel Speed

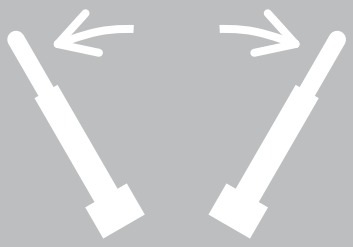
Hose reel PAY IN/PAY OUT

Hose reel IN/OUT

Hose reel pinch roller lock



Hose reel lock (swivel)



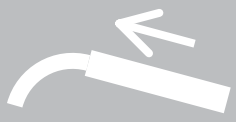
Boom rotate CCW or CW

Strobe/Beacon/ Revolving Light

Mirror Strobe

Boom retract

Boom Clump Buster



Boom extend

Debris Body Up/DOWN

High Rail UP/DOWN

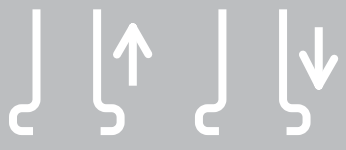
Boom down

Rear Door OPEN/CLOSE

ENGAGE/DISENGAGE

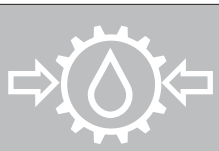
Boom up

Vacuum ENABLE / DISABLE



Suction pick up head UP/DOWN

Shown are common industry standard symbols used on the various controls. Actual symbols used will vary with options.



Transmission or Transfer Case Oil Pressure

Transmission or Transfer Case Oil

Transmission or Transfer Case

Clutch

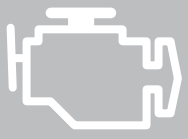
Engine Run

Engine Start

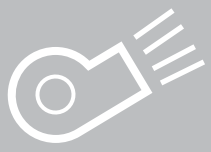
Engine Stop

Engine RPM

Power Take Off (PTO)



Engine



Fan

Park Brake

Road Mode

Blower or Compressor RPM

Blower or Compressor

Rotary Compressor, Liquid Ring or Vacuum Pump

Water Pump

Liquid Pump

Centrifugal Pump

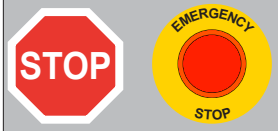
Engine REGEN

Reset

Recirculator

Automatic Cycle

Water Reclaimer



Emergency Stop

E-Stop - normally disables vacuum and water pressure. Refer to the controls section for each model for the additional functions controlled by the E-Stop.

Activate the E-Stop daily to verify it functions correctly and that no error message appear on the display (if equipped).

Red indicator light - activated when a condition requires immediate attention or the function has been activated.

Hydraulic Oil Temperature

Red indicator light - normally activated when condition requires immediate attention.

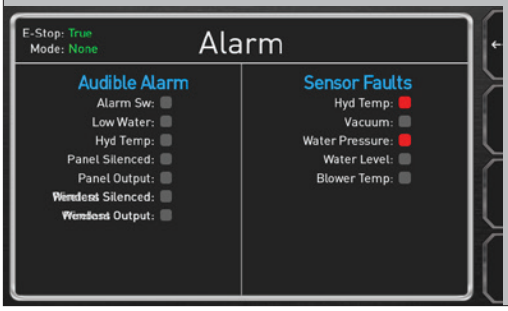
Oil Temperature

Red indicator light - normally activated when condition requires immediate attention.

Vacuum ENABLE / DISABLE

Red indicator light - normally activated when vacuum relief valve is set for vacuuming. The vacuum relief valve works differently on PD and fan machines. Refer to the control pages for details.

Note - on many older units (pre-2011) this indicator was used for the vacuum relief valve open/closed position. Refer to the unit's manual for details.



Displays use a variety of colors and message boxes to indicate function status and alerts. Refer to the display information in the unit manual for the specific use when equipped.

Note - Other colors of lights may be used on water level indicators and vendor supplied components like lighting, cameras, scales, etc.

Typical labels and decals found on units. Actual decals used will vary with options.

NOTICE

Hydraulic System can be damaged.

Loose hydraulic couplings prevent oil flow. Hydraulic quick couplings must be fully tightened to avoid hydraulic system damage.

Refer to manual for details.

507018 r0

CAUTION

MOVING PARTS

Old style

New style

53676 rA

WARNING

Tie Off Point

To avoid injury or death NEVER use tie off point for work that is not on or in the debris body. Shut down and lock out the entire system and chassis before starting work.

TIE OFF POINT

Attach fall protection or confined space safety line here.

1800143 rA

Scan the QR Code with your mobile device or visit: **http://www.fsesgsafety.com** for the latest FSESG product and application safety information.

507048 r0

NOTICE

Custom Machine Parameters

Reprogramming the chassis or engine controls will result in problems ranging from improper operation to complete loss of service. Follow chassis manufacturer's procedures when reprogramming to avoid the loss of the custom machine parameters.

Refer to manual for details.

507047 r0

NOTICE

Cabinet Heater System

When temperatures are 32° F and below, units equipped with cabinet heaters are required to use winter fronts in order to maintain the proper chassis engine operating temperature.

Refer to manual for details.

507044 r0

71551 rA

DANGER

Rotating Driveline Hazard

Contact with driveline may cause severe personal injury or death.

Never operate with covers removed. Stay clear when operating.

1321054 rA

CAUTION

Noise outside cab can cause permanent hearing loss. Always wear approved hearing protection when operating equipment.

ATENCIÓN

Se puede perder el poder de audición

Protección de orejas se requiere cuendo este equipo esta en uso para evitar pérdida de audición.

1800173

NOTICE

Service Access

Never use access ladders or platforms with the unit running. Shut down and lock out the unit before all service to avoid injury. Refer to the unit manual and safety manual for details.

507592 r0

WARNING

Explosion and fire hazard

Static electricity build up can result in electrical shocks, fire and/or an explosion when vacuuming dry and/or combustible materials. A static electricity charge may build up as material moves through the vacuum system. Grounding and/or bonding the unit may be required. Follow site procedures for static electricity.

Refer to manual for details

1800170

CAUTION

Fire hazard

Do not use water heater when unit is in motion.

For proper combustion air flow and to avoid fuel build up the unit must be stationary and the cabinet door must be open during operation.

Refer to manual for details

47954KP rA

CAUTION

HOSE DISCHARGE IS UNDER HIGH PRESSURE

(L-012) 53678

NOTICE

Parts in debris box

Unload parts in debris box before using vacuum system. Machine and parts can be damaged if parts are not removed before using.

AVISO

Repuestos dentro de la caja

Quite los repuestos dentro de la caja antes de prender el sistema de vacío. La máquina y las piezas pueden ser dañadas si no las quiten antes de usar.

61724A rA

WARNING

Explosion and fire hazard

To avoid severe injury or death never use an air mover to move hydrocarbon or other materials with a flashpoint below 140° (F). Vacuuming, or pump or pressurized off-loading is not permitted unless the flashpoint of the material is 140° (F) or higher.

Refer to manual for details

1800180 r0

WARNING

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel

512289 r0

WARNING

Breathing engine exhaust exposes you to chemicals, including carbon monoxide, known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel

512289A r0

NOTICE

Boom Can Be Damaged

This lift eye should only be used to lift and move manhole grates to 700 lbs max. weight. Break grates loose before lifting.

Other use can damage the boom.

61924 rB

Typical labels and decals found on units. Actual decals used will vary with options.

Control Panel Battery Power

NOTICE

Control Panel Can Be Damaged
Battery terminals are for control panel power only. To avoid damage do not jump start or run other accessories from these terminals.

Battery + X X Battery —

507985 r0

WARNING

Cutting and crushing hazard

Moving parts can crush and cut.

Keep clear when valve or mechanism is operating.

1800169

Blower Oil Service

Check blower oil daily or the start of each shift.

All vacuum blowers are equipped with at least one sight glass at each end of the blower. Depending on blower configuration the sight glasses may be located on either side or the end of the blower at each end, and there may also be upper and lower sight glasses. The oil level must be checked at both ends of the blower while the unit is off and on level ground.

Refer to the maintenance section in the manual and the blower manufacturer's manual.

1800167

CAUTION

Hot!

Hydraulic oil only.

Read manual for fluid details.

1800145

CAUTION

Driveline can be damaged.

Open vacuum relief valve.

Lower engine RPM to idle before engaging or disengaging blower.

Failure to open vacuum relief valve and lower engine RPM to idle before engaging or disengaging blower may result in serious engine, transmission or blower damage.

1800121A rA

WARNING

Vacuum hazard

Never operate at the hose end without a properly installed safety relief valve.

Failure to do so could result in serious injury or death.

Safety relief valve must be installed within 50 feet of hose length of the working end. Relief valve tether line must be within line of sight of valve and attached to operator. Adjust tether line to have minimal slack so the relief valve can readily be opened.

Consult the OPERATOR's manual for complete details.

1800132 rev A

NOTICE

Pump Can Be Damaged

Do not operate pump without water.

Refer to manual for details.

61721 rA

WARNING

Vacuum Hazard

Cutting, crushing, suffocation or body rupture from the forces of vacuum could result in serious injury or death.

Stay clear of the suction hose inlet end.

Turn vacuum off before attaching hose, pipe or accessories.

Keep suction hose inlet end near ground level when vacuum is operating.

Refer to SAFETY manual for details.

ADVERTENCIA

Riesgo Por Altovacío

Trituración, asfixia, amputación o desgarre corporal por las fuerzas altovacío pudieran resultar en lesiones serias o mortales.

Manténgase lejos de la boquilla de la manguera de succión.

Apague el compresor de altovacío antes de conectar la manguera, tubos o accesorios.

Mantenga el extremo de la manguera de succión cerca del nivel del suelo cuando esté funcionando el compresor de altovacío.

Refiérase a la sección de SEGURIDAD en el manual para detalles.

1800174

WARNING

Crushing hazard.

Serious injury or death can result from falling debris body.

Never go under a raised debris body without the safety prop(s) in place. Debris body must be clean and empty for service work.

On firm level ground raise the body above the height of the props. Tilt the prop(s) in place. Lower debris body until it just rests on the prop(s). Use all props.

Shut down and lock out the entire system and chassis before servicing.

Unload any items stored in debris body before using machine.

Refer to manual for details.

WARNING

Crushing hazard.

Serious injury or death can result from falling rear door. Never go under the rear door when open.

Use door prop(s) or safety pin(s) to secure door before entering body, working under or around the door.

Open the rear door to just clear the prop(s) and lower door until it just rests on the prop(s). On units that use a safety pin(s) open the door until the pin holes are aligned and insert pin. Use all props or pins.

Shut down and lock out the entire system and chassis before servicing.

Unload any items stored in debris body before using machine.

WARNING

Electrocution hazard.

Serious injury or death can result from electrocution.

Check for overhead wires and obstructions before raising debris body, opening rear door or raising optional equipment. Never leave debris body, rear door or optional equipment raised or partly raised while vehicle is unattended. Never move vehicle with debris body, rear door or optional equipment raised.

Be aware of the vehicle's surroundings before operating any of the hydraulic functions to prevent death, injury or equipment damage.

1800128 rE

Typical labels and decals found on units. Actual decals used will vary with options.

NOTICE

Rear Door Can Be Damaged

Remove safety support(s) before closing door to avoid damage. Open rear door before raising the debris body. Make sure rear door attachments clear the bumper and ground when raising the debris body.

89384CA rev E

DANGER

Crushing Hazard

Can cause severe injury or death.

Before servicing, lock out electrical switches and hydraulic valves before working on unit.

WARNING

Cancer and Reproductive Harm

Required for compliance with California Prop 65. Refer to:

www.P65Warnings.ca.gov

CAUTION

Wear protective equipment including footwear and gloves when using or servicing this machine.

Read SAFETY section for details.

NOTICE

Driveline can be damaged.

Open vacuum relief valve.

Lower engine RPM to idle before engaging or disengaging blower.

Failure to open vacuum relief valve and lower engine RPM to idle before engaging or disengaging blower may result in serious engine, transmission or blower damage.

NOTICE

Electrical system can be damaged.

Do not weld on unit.

Disconnect all chassis and unit ECU's and batteries before welding on unit.

Electrical systems may be damaged by welding.

Read Service manuals for details.

NOTICE

No one shall operate or service this equipment until they read and understand the operation and maintenance manuals. Additional copies can be obtained by calling the 24 hour a day service hotline. In the USA or Canada Call: 877-DIAL ESG or 877-342-5374. Outside the USA or Canada call 847-741-4330

1800146 rev E

DANGER

High pressure.

Can cause severe injury or death.

Relieve tank pressure before opening any covers or unlocking the rear door.

This truck is equipped with a tank pressurization system. Untrained operators shall not operate.

DANGER

High pressure.

Can cause severe injury or death.

Failure to follow will lead to explosion.

Do not pressurize with inlet hose connected.

Remove inlet hose and install camlock cap before pressurizing.

1800144

NOTICE

Seatbelt use required

1800168 rA

CAUTION

Water Pump can be damaged.

Charge Pump PTO MUST be ON when using water pump

Refer to manual for details.

49936 r0

CAUTION

Overheating water tank can damage tank insulation.

Water must not be heated above 100° (F).

Consult the factory for additional information.

49857 rA

NOTICE

Rear Bumper Extension Can Be Damaged

Rear door attachments can damage the rear bumper extension. Fully open the rear door or remove the rear bumper extension before raising the debris body to avoid damage.

506187 r0

WARNING

Fall Hazard

Do not stand or ride on cyclone.

1321111 rev A

WARNING

Close Door

Close door before using ladder. Failure to do so can make the ladder unstable. Never use the access ladder while the unit is running.

Refer to manual for details.

508916 r0

WARNING

Electrocution hazard

Serious injury or death can result from electrocution.

Check for overhead wires and obstructions before raising or moving boom. Do not leave boom raised while vehicle is unattended. Do not move vehicle unless boom is in travel mode. Do not allow boom to contact the vehicle or any obstruction.

Be aware of the vehicle's surroundings before operating any of the boom functions to prevent death, injury or equipment damage.

Refer to SAFETY section in manual.

1800149A rev A

Liquid vacuum units only.

WARNING

Explosion and fire hazard

NEVER operate an engine where there are combustible vapors. Combustible vapor can enter air intake system and cause the engine to over-speed. This can result in extensive engine damage, flying parts, and severe injury or death .

Refer to manual for details

KH0026E r0

WARNING

Keep Clear of Door

Over pressurization may cause door to open suddenly resulting in injury. To avoid injury keep clear of all doors, lids and caps.

Refer to manual for details.

507585A r0

CAUTION

Flying Debris

Debris may be expelled when door is open and air cannon activates. To avoid injury shut down unit and lock out. Stand to the side when opening the door to avoid any debris that may fall out.

Refer to manual for details.

507585 r0

Water Tank

Water ONLY

Drain and flush daily.

Never allow to freeze.

Fully drain and purge.

Do not store water in tank(s).

Refer to manual for details.

1800179 rev 0

DANGER

Crushing Falling Hazards
Can cause severe injury or death.
Before servicing, shut down unit, remove the ignition key, lock out electrical switches and hydraulic valves before working on unit.
Never use access ladders or platforms with the unit running.

WARNING

Explosion and fire hazards

To avoid severe injury or death never use an air mover to move hydrocarbon or other materials with a flashpoint below 140° (F). Vacuuming, or pump or pressurized off-loading is not permitted unless the flashpoint of the material is 140° (F) or higher.

Static electricity build up can result in electrical shocks, fire and/or an explosion when vacuuming dry and/or combustible materials. A static electricity charge may build up as material moves through the vacuum system. Grounding and/or bonding the unit may be required. Follow site procedures for static electricity.

Electrocution hazard

Serious injury or death can result from electrocution.

Check for overhead wires and obstructions before raising or moving boom. Do not leave boom raised while vehicle is unattended. Do not move vehicle unless boom is in travel mode. Do not allow boom to contact the vehicle or any obstruction.

Be aware of the vehicle's surroundings before operating any of the boom functions to prevent death, injury or equipment damage.

WARNING

Cancer and Reproductive Harm
Required for compliance with California Prop 65.
Refer to: www.P65Warnings.ca.gov

CAUTION

Noise can cause permanent hearing loss.
Always wear approved hearing protection when operating equipment.

Wear protective equipment including footwear and gloves when using or servicing this machine.

Read SAFETY section for details.

Electrical system can be damaged.

Do not weld on unit.

Disconnect all chassis and unit ECU's and batteries before welding on unit.

Electrical systems may be damaged by welding.

Read Service manuals for details.

NOTICE

Water pump can be damaged

To avoid damage never operate water pump without water.

Instructions for draining water pump and lines in freezing weather

1. Open drains in water tanks and allow tanks to empty.
2. Open all drain valves on water pump, filter and lines. Remove quick disconnect from handgun outlet.
3. Run water pump for 5 seconds and blow remaining water from lines.

Refer to manual for details

Rear Door Can Be Damaged

Remove safety support(s) before closing door to avoid damage. Open rear door before raising the debris body. Make sure rear door attachments clear the bumper and ground when raising the debris body.

Operation

No one shall operate or service this equipment until they read and understand the operation and maintenance manuals. Additional copies can be obtained by calling the 24 hour a day service hotline. In the USA or Canada

Call: 877-DIAL ESG or 877-342-5374

Outside the USA or Canada

Call: 847-741-4330

510135 rev B

NOTICE

Rear Door and Hoses Can Be Damaged

To avoid damage:

- **Remove the air and offload hoses before opening the rear door.**
- **Do NOT raise debris body all the way up with rear door closed.**
- **Fully open rear door before fully raising the debris body.**

508654 r0

NOTICE

Water pump can be damaged

Do not operate water pump without water.

Water System Can Be Damaged By Freezing

Ice in the water system can severely damage components. To avoid ice damage:

- Verify that water flows when valves or plugs are opened. Insure that ice has not plugged drain lines, valves or drain plugs.
- Leave all drain plugs open to keep residual tank water from the tanks from migrating to the system during transport.
- Leave all valves open, Y-strainers out and drain plugs out when the unit will sit overnight or longer. This will allow residual water to drain.
- If the unit cannot be properly drained, move the unit to a warm area and allow the water system to warm completely to drain.
- Never operate water pump(s) if system is frozen.
- Run the water pump for a few seconds to clear any remaining water.

Refer to manual for details.

53732 rA

NOTICE

Do not raise debris body without fully opening the rear door.

Failure to open the rear door before raising the debris body will result in the discharge port being damaged by hitting the ground.

1800126 rA

Winterizing

Draining the water system

1. Remove Y strainer water filter and leave out.
2. Open the tank drains and leave them open. The composite water tank has two drain valves.
3. Allow water to drain from the system.
4. Slowly cycle the T handled drain valves to drain any residual water and leave open.
5. Unwind all hose to allow the water to drain.
6. Turn the water pump on for no more than 10 seconds to push water out of the pump.

If equipped with air purge

7. If equipped set the dual hose real valves to rear ON and Front OFF.
8. Open the ball valve at the end of the hose on the hose reel to depressurize the system and remove the valve assembly.
9. Open the FILL RESERVOIR valve on the Air Purge and close when the gauge shows 90psi.
10. Close the charge pump isolation valve.
11. Turn the water pump on for 10-15 seconds at lowest speed while SLOWLY turning on PURGE SYSTEM. Allow the air to drop to 15psi, recharge tank to 90psi and repeat purging until all the water is drained.
12. Repeat purging procedure to blow out the hose reel and lines until all the water is drained.
13. Place the Fill reservoir and Purge System ball valves in the OFF position.

For all units

14. Slowly rewind the hose onto the hose reel.
15. Open the two charge pump drains.
16. Open all mini ball valves on the pump.
17. Open the charge pump isolation valve.
18. If equipped set the dual hose real valves to rear OFF and Front ON and repeat purging process.
19. Disengage the hydraulics.
20. Put the water pump ball valve in the OPEN position.

If equipped - Anti-Freeze System
Prepare for transport

1. Turn off the water to the water pump.
2. Open the antifreeze tank and pump valves.
3. Operate the handgun at low speed until antifreeze can be seen coming out the nozzle.
4. Stop the handgun and shut down the water pump.
5. Close the anti-freeze tank and pump valves.
6. The water pump is now ready for transport.

Refer to manual for details.

WARNING

High pressure water

High pressure water can cause serious injury or death. The handgun operates under high pressure. Never point the handgun at another individual. Severe injury can result from the high-pressure water.

Special safety equipment is required when operating the high-pressure handgun. Always wear safety toe shoes or boots (waterproof shoes or boots preferred), coveralls, face shield and safety goggles and gloves (waterproof gloves preferred).

NOTICE

Water pump can be damaged

Do not operate water pump without water.

Water System Can Be Damaged By Freezing

Ice in the water system can severely damage components. To avoid ice damage:

- Verify that water flows when valves or plugs are opened. Insure that ice has not plugged drain lines, valves or drain plugs.
- Leave all drain plugs open to keep residual tank water from the tanks from migrating to the system during transport.
- Leave all valves open, Y-strainers out and drain plugs out when the unit will sit overnight or longer. This will allow residual water to drain.
- If the unit cannot be properly drained, move the unit to a warm area and allow the water system to warm completely to drain.
- Never operate water pump(s) if system is frozen.

If equipped - Anti-Freeze System
Prepare for use

1. Turn off the water to the water pump.
2. Attach the handgun hose to quick coupling return to the anti-freeze tank.
3. Operate the water pump at low speed until all the anti-freeze has been pumped from the system.
4. Shut down the water pump.
5. The water system is now ready for use.

508705 r0

WARNING

Crushing and Electrocution hazard.

Serious injury or death can result.

Never go under a raised debris body. Check for overhead wires and obstructions before raising debris body, opening rear door or raising optional equipment. When hi-dump system is ON, never drive over 3 mph.

All personnel must be clear of the unit when in motion. NEVER allow anyone to get between the unit and the collection hopper.

Refer to manual for details

1720010J2 r0

Winterizing

Draining the water system

1. Remove Y strainer water filter and leave out.
2. Open the tank drains and leave them open.
3. Allow water to drain from the system.
4. Slowly cycle the drain valves to drain any residual water and leave open.
5. Unwind all hose to allow the water to drain.
6. Turn the water pump on for no more than 10 seconds to push water out of the pump.

If equipped with air purge

7. Open the ball valve at the end of the hose on the hose reel to depressurize the system and remove the valve assembly.
8. Turn the water pump on for 10-15 seconds at lowest speed while SLOWLY turning on PURGE SYSTEM. Repeat purging until all the water is drained.
9. Repeat purging procedure to blow out the hose reel and lines until all the water is drained.
10. Place the Purge System ball valves in the OFF position.

For all units

11. Slowly rewind the hose onto the hose reel.
12. Open all mini ball valves on the pump.
13. Disengage the hydraulics.
14. Put the water pump ball valve in the OPEN position.

If equipped - Anti-Freeze System
Prepare for transport

1. Turn off the water to the water pump.
2. Open the antifreeze tank and pump valves.
3. Operate the handgun at low speed until antifreeze can be seen coming out the nozzle.
4. Stop the handgun and shut down the water pump.
5. Close the anti-freeze tank and pump valves.
6. The water pump is now ready for transport.

If equipped - Anti-Freeze System
Prepare for use

1. Turn off the water to the water pump.
2. Attach the handgun hose to quick coupling return to the anti-freeze tank.
3. Operate the water pump at low speed until all the anti-freeze has been pumped from the system.
4. Shut down the water pump.
5. The water system is now ready for use.

Refer to manual for details.

508705B r0

WARNING

High pressure water

High pressure water can cause serious injury or death. The handgun operates under high pressure. Never point the handgun at another individual. Severe injury can result from the high-pressure water.

Special safety equipment is required when operating the high-pressure handgun. Always wear safety toe shoes or boots (waterproof shoes or boots preferred), coveralls, face shield and safety goggles and gloves (waterproof gloves preferred).

NOTICE

Water pump can be damaged

Do not operate water pump without water.

Water System Can Be Damaged By Freezing

Ice in the water system can severely damage components. To avoid ice damage:

- Verify that water flows when valves or plugs are opened. Insure that ice has not plugged drain lines, valves or drain plugs.
- Leave all drain plugs open to keep residual tank water from the tanks from migrating to the system during transport.
- Leave all valves open, Y-strainers out and drain plugs out when the unit will sit overnight or longer. This will allow residual water to drain.
- If the unit cannot be properly drained, move the unit to a warm area and allow the water system to warm completely to drain.
- Never operate water pump(s) if system is frozen.

Winterizing

Draining the water system

1. Remove Y strainer water filter and leave out.
2. Open the tank drain and leave them open.
3. Allow water to drain from the system.
4. Slowly cycle the drain valves to drain any residual water and leave open.
5. Unwind all hose to allow the water to drain.
6. Turn the water pump on for no more than 10 seconds to push water out of the pump.

If equipped with air purge

7. If equipped set the dual hose real valves to rear ON and Front OFF.
8. Open the ball valve at the end of the hose on the hose reel to depressurize the system and remove the valve assembly.
9. Open the FILL RESERVOIR valve on the Air Purge and close when the gauge shows 90psi.
10. Close the water supply valve.
11. Set the water pump on for 10-15 seconds at lowest speed while SLOWLY turning on PURGE SYSTEM. Allow the air to drop to 15psi, recharge tank to 90psi and repeat purging until all the water is drained.
12. Repeat purging procedure to blow out the hose reel and lines until all the water is drained.
13. Place the Fill reservoir and Purge System ball valves in the OFF position.

For all units

14. Slowly rewind the hose onto the hose reel.
15. If equipped set the dual hose real valves to rear OFF and Front ON and repeat purging process.
16. Disengage the hydraulics.
17. Put the water pump ball valve in the OPEN position.

If equipped - Anti-Freeze System
Prepare for transport

1. Turn off the water to the water pump.
2. Open the antifreeze tank and pump valves.
3. Operate the handgun at low speed until antifreeze can be seen coming out the nozzle.
4. Stop the handgun and shut down the water pump.
5. Close the anti-freeze tank and pump valves.
6. The water pump is now ready for transport.

Refer to manual for details.

WARNING

High pressure water

High pressure water can cause serious injury or death. The handgun operates under high pressure. Never point the handgun at another individual. Severe injury can result from the high-pressure water.

Special safety equipment is required when operating the high-pressure handgun. Always wear safety toe shoes or boots (waterproof shoes or boots preferred), coveralls, face shield and safety goggles and gloves (waterproof gloves preferred).

NOTICE

Water pump can be damaged

Do not operate water pump without water.

Water System Can Be Damaged By Freezing

Ice in the water system can severely damage components. To avoid ice damage:

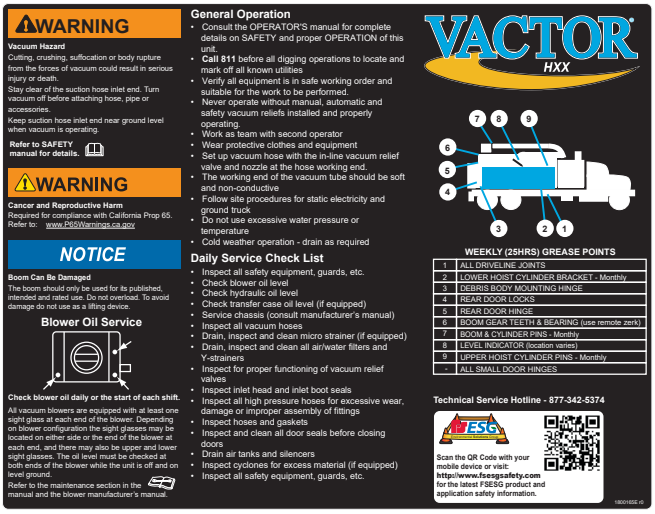
- Verify that water flows when valves or plugs are opened. Insure that ice has not plugged drain lines, valves or drain plugs.
- Leave all drain plugs open to keep residual tank water from the tanks from migrating to the system during transport.
- Leave all valves open, Y-strainers out and drain plugs out when the unit will sit overnight or longer. This will allow residual water to drain.
- If the unit cannot be properly drained, move the unit to a warm area and allow the water system to warm completely to drain.
- Never operate water pump(s) if system is frozen.

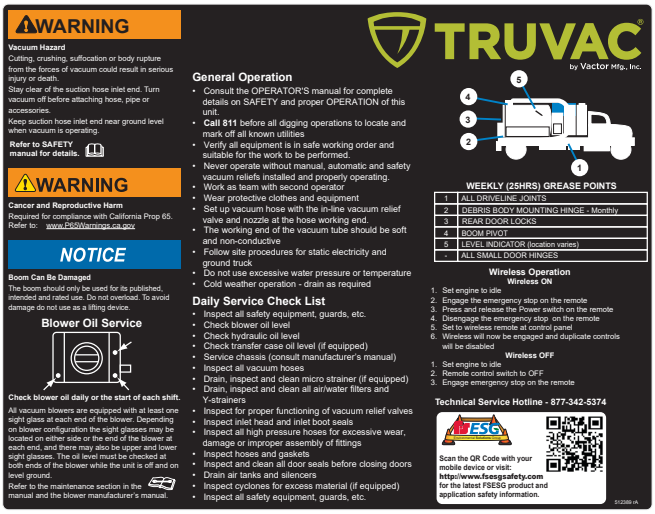
If equipped - Anti-Freeze System
Prepare for use

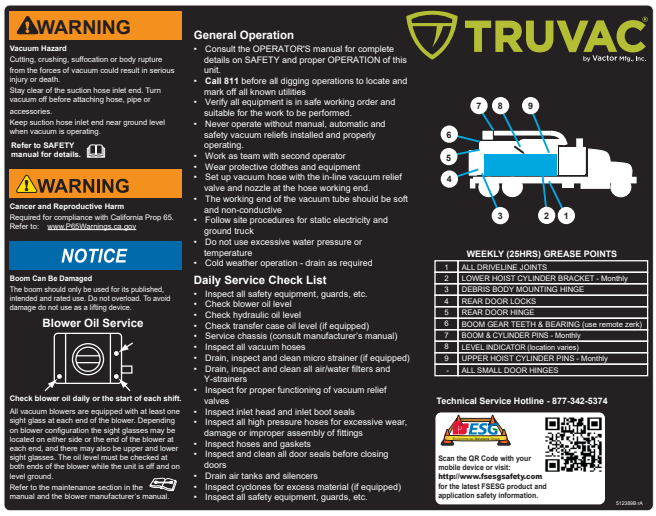
1. Turn off the water to the water pump.
2. Attach the handgun hose to quick coupling return to the anti-freeze tank.
3. Operate the water pump at low speed until all the anti-freeze has been pumped from the system.
4. Shut down the water pump.
5. The water system is now ready for use.

508705A r0

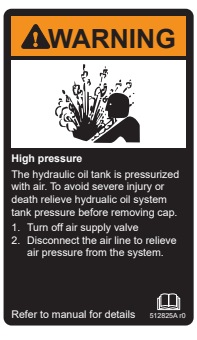

SAFETY INSTRUCTIONS
Debris Body Safety Prop
Rotate up to use
Stowed position
512417B r0


WARNING
Vacuum Hazard
Cutting, crushing, suffocation or body rupture from the forces of vacuum could result in serious injury or death.
Stay clear of the suction hose inlet end. Turn vacuum off before attaching hose, pipe or accessories.
Keep suction hose inlet end near ground level when vacuum is operating.
Refer to SAFETY manual for details.
WARNING
Cancer and Reproductive Harm
Required for compliance with California Prop 65.
Refer to: www.P65Warnings.ca.gov
NOTICE
Boom Can Be Damaged
The boom should only be used for its published, intended and rated use. Do not overload. To avoid damage do not use as a lifting device.
Blower Oil Service
Check blower oil daily or the start of each shift.
All vacuum blowers are equipped with at least one sight glass at each end of the blower. Depending on blower configuration the sight glasses may be located on either side or the end of the blower at each end, and there may also be upper and lower sight glasses. The oil level must be checked at both ends of the blower while the unit is off and on level ground.
Refer to the maintenance section in the manual and the blower manufacturer's manual.
General Operation
Consult the OPERATOR'S manual for complete details on SAFETY and proper OPERATION of this unit.
Call 811 before all digging operations to locate and mark off all known utilities
Verify all equipment is in safe working order and suitable for the work to be performed.
Never operate without manual, automatic and safety vacuum reliefs installed and properly operating.
Work as team with second operator
Wear protective clothes and equipment
Set up vacuum hose with the in-line vacuum relief valve and nozzle at the hose working end.
The working end of the vacuum tube should be soft and non-conductive
Follow site procedures for static electricity and ground truck
Do not use excessive water pressure or temperature
Cold weather operation - drain as required
Daily Service Check List
Inspect all safety equipment, guards, etc.
Check blower oil level
Check hydraulic oil level
Check transfer case oil level (if equipped)
Service chassis (consult manufacturer's manual)
Inspect all vacuum hoses
Drain, inspect and clean micro strainer (if equipped)
Drain, inspect and clean all air/water filters and Y-strainers
Inspect for proper functioning of vacuum relief valves
Inspect inlet head and inlet boot seals
Inspect all high pressure hoses for excessive wear, damage or improper assembly of fittings
Inspect hoses and gaskets
Inspect and clean all door seals before closing doors
Drain air tanks and silencers
Inspect cyclones for excess material (if equipped)
Inspect all safety equipment, guards, etc.
VACTOR HXX
WEEKLY (25HRS) GREASE POINTS
1 ALL DRIVELINE JOINTS
2 LOWER HOIST CYLINDER BRACKET - Monthly
3 DEBRIS BODY MOUNTING HINGE
4 REAR DOOR LOCKS
5 REAR DOOR HINGE
6 BOOM GEAR TEETH & BEARING (use remote zerk)
7 BOOM & CYLINDER PINS - Monthly
8 LEVEL INDICATOR (location varies)
9 UPPER HOIST CYLINDER PINS - Monthly
- ALL SMALL DOOR HINGES
Technical Service Hotline - 877-342-5374
Scan the QR Code with your mobile device or visit: http://www.fsesgsafety.com for the latest FSESG product and application safety information.
180018SE r0


WARNING
Vacuum Hazard
Cutting, crushing, suffocation or body rupture from the forces of vacuum could result in serious injury or death.
Stay clear of the suction hose inlet end. Turn vacuum off before attaching hose, pipe or accessories.
Keep suction hose inlet end near ground level when vacuum is operating.
Refer to SAFETY manual for details.
WARNING
Cancer and Reproductive Harm
Required for compliance with California Prop 65.
Refer to: www.P65Warnings.ca.gov
NOTICE
Boom Can Be Damaged
The boom should only be used for its published, intended and rated use. Do not overload. To avoid damage do not use as a lifting device.
Blower Oil Service
Check blower oil daily or the start of each shift.
All vacuum blowers are equipped with at least one sight glass at each end of the blower. Depending on blower configuration the sight glasses may be located on either side or the end of the blower at each end, and there may also be upper and lower sight glasses. The oil level must be checked at both ends of the blower while the unit is off and on level ground.
Refer to the maintenance section in the manual and the blower manufacturer's manual.
TRUVAC by Vactor Mfg., Inc.
General Operation
Consult the OPERATOR'S manual for complete details on SAFETY and proper OPERATION of this unit.
Call 811 before all digging operations to locate and mark off all known utilities
Verify all equipment is in safe working order and suitable for the work to be performed.
Never operate without manual, automatic and safety vacuum reliefs installed and properly operating.
Work as team with second operator
Wear protective clothes and equipment
Set up vacuum hose with the in-line vacuum relief valve and nozzle at the hose working end.
The working end of the vacuum tube should be soft and non-conductive
Follow site procedures for static electricity and ground truck
Do not use excessive water pressure or temperature
Cold weather operation - drain as required
Daily Service Check List
Inspect all safety equipment, guards, etc.
Check blower oil level
Check hydraulic oil level
Check transfer case oil level (if equipped)
Service chassis (consult manufacturer's manual)
Inspect all vacuum hoses
Drain, inspect and clean micro strainer (if equipped)
Drain, inspect and clean all air/water filters and Y-strainers
Inspect for proper functioning of vacuum relief valves
Inspect inlet head and inlet boot seals
Inspect all high pressure hoses for excessive wear, damage or improper assembly of fittings
Inspect hoses and gaskets
Inspect and clean all door seals before closing doors
Drain air tanks and silencers
Inspect cyclones for excess material (if equipped)
Inspect all safety equipment, guards, etc.
WEEKLY (25HRS) GREASE POINTS
1 ALL DRIVELINE JOINTS
2 DEBRIS BODY MOUNTING HINGE - Monthly
3 REAR DOOR LOCKS
4 BOOM PIVOT
5 LEVEL INDICATOR (location varies)
- ALL SMALL DOOR HINGES
Wireless Operation
Wireless ON
1. Set engine to idle
2. Engage the emergency stop on the remote
3. Press and release the Power switch on the remote
4. Disengage the emergency stop on the remote
5. Set to wireless remote at control panel
6. Wireless will now be engaged and duplicate controls will be disabled
Wireless OFF
1. Set engine to idle
2. Remote control switch to OFF
3. Engage emergency stop on the remote
Technical Service Hotline - 877-342-5374
Scan the QR Code with your mobile device or visit: http://www.fsesgsafety.com for the latest FSESG product and application safety information.
512388 rA


WARNING
Vacuum Hazard
Cutting, crushing, suffocation or body rupture from the forces of vacuum could result in serious injury or death.
Stay clear of the suction hose inlet end. Turn vacuum off before attaching hose, pipe or accessories.
Keep suction hose inlet end near ground level when vacuum is operating.
Refer to SAFETY manual for details.
WARNING
Cancer and Reproductive Harm
Required for compliance with California Prop 65.
Refer to: www.P65Warnings.ca.gov
NOTICE
Boom Can Be Damaged
The boom should only be used for its published, intended and rated use. Do not overload. To avoid damage do not use as a lifting device.
Blower Oil Service
Check blower oil daily or the start of each shift.
All vacuum blowers are equipped with at least one sight glass at each end of the blower. Depending on blower configuration the sight glasses may be located on either side or the end of the blower at each end, and there may also be upper and lower sight glasses. The oil level must be checked at both ends of the blower while the unit is off and on level ground.
Refer to the maintenance section in the manual and the blower manufacturer's manual.
TRUVAC by Vactor Mfg., Inc.
General Operation
Consult the OPERATOR'S manual for complete details on SAFETY and proper OPERATION of this unit.
Call 811 before all digging operations to locate and mark off all known utilities
Verify all equipment is in safe working order and suitable for the work to be performed.
Never operate without manual, automatic and safety vacuum reliefs installed and properly operating.
Work as team with second operator
Wear protective clothes and equipment
Set up vacuum hose with the in-line vacuum relief valve and nozzle at the hose working end.
The working end of the vacuum tube should be soft and non-conductive
Follow site procedures for static electricity and ground truck
Do not use excessive water pressure or temperature
Cold weather operation - drain as required
Daily Service Check List
Inspect all safety equipment, guards, etc.
Check blower oil level
Check hydraulic oil level
Check transfer case oil level (if equipped)
Service chassis (consult manufacturer's manual)
Inspect all vacuum hoses
Drain, inspect and clean micro strainer (if equipped)
Drain, inspect and clean all air/water filters and Y-strainers
Inspect for proper functioning of vacuum relief valves
Inspect inlet head and inlet boot seals
Inspect all high pressure hoses for excessive wear, damage or improper assembly of fittings
Inspect hoses and gaskets
Inspect and clean all door seals before closing doors
Drain air tanks and silencers
Inspect cyclones for excess material (if equipped)
Inspect all safety equipment, guards, etc.
WEEKLY (25HRS) GREASE POINTS
1 ALL DRIVELINE JOINTS
2 LOWER HOIST CYLINDER BRACKET - Monthly
3 DEBRIS BODY MOUNTING HINGE
4 REAR DOOR LOCKS
5 REAR DOOR HINGE
6 BOOM GEAR TEETH & BEARING (use remote zerk)
7 BOOM & CYLINDER PINS - Monthly
8 LEVEL INDICATOR (location varies)
9 UPPER HOIST CYLINDER PINS - Monthly
- ALL SMALL DOOR HINGES
Technical Service Hotline - 877-342-5374
Scan the QR Code with your mobile device or visit: http://www.fsesgsafety.com for the latest FSESG product and application safety information.
512388B rA


WARNING
Crushing hazard.
Serious injury or death can result. Keep clear of unit when dumping.
Before raising the debris body, opening the rear door:
The unit must be on firm level ground
Check for overhead wires and obstructions
Drain the watertanks and dump the suspension air bags
Open the rear door
Stand clear of the unit when the debris body is raised
Never go under a raised debris body. Use all safety props.
Debris body must be clean and empty for service work. Shut down and lock out the entire system and chassis before servicing.
Refer to manual for details
512825 r0


WARNING
High pressure
The hydraulic oil tank is pressurized with air. To avoid severe injury or death relieve hydrualic oil system tank pressure before removing cap.
1. Turn off air supply valve
2. Disconnect the air line to relieve air pressure from the system.
Refer to manual for details
512525A r0


DANGER
Crushing Falling Hazards
Can cause severe injury or death.
Before servicing, shut down unit, remove the ignition key, lock out electrical switches and hydraulic valves before working on unit.
Never use access ladders or platforms with the unit running.
WARNING
Vacuum Hazard
Cutting, crushing, suffocation or body rupture from the forces of vacuum could result in serious injury or death.
Stay clear of the suction hose inlet end. Turn vacuum off before attaching hose, pipe or accessories.
Keep suction hose inlet end near ground level when vacuum is operating.
Refer to SAFETY manual for details.
WARNING
Cancer and Reproductive Harm
Required for compliance with California Prop 65.
Refer to: www.P65Warnings.ca.gov
Wireless Operation
Wireless ON
1. Set engine to idle
2A. Baly pack:
a. Engage the emergency stop on the remote
b. Press and release the Power switch on the remote
c. Disengage the emergency stop on the remote
2B. Handheld remote:
a. Press and release the Power switch on the remote
3. Set to wireless remote at control panel
4. Wireless will now be engaged and duplicate controls will be disabled
Wireless OFF
1. Set engine to idle
2. Remote control switch to OFF/Pendant
3. Engage emergency stop on the remote
NOTICE
Water pump can be damaged
To avoid damage never operate water pump without water.
Instructions for draining water pump and lines in freezing weather.
1. Open drains in water tanks and allow tanks to empty.
2. Open all drain valves on water pump, filter and lines. Remove quick disconnect from handgun outlet.
3. Run water pump for 5 seconds and blow remaining water from lines.
Refer to manual for details
Operation
No one shall operate or service this equipment until they read and understand the operation and maintenance manuals. Additional copies can be obtained by calling the 24 hour a day service hotline: In the USA or Canada
Call: 877-DIAL ESG or 877-342-5374
Outside the USA or Canada
Call: 847-741-4330
WARNING
Explosion and fire hazards
To avoid severe injury or death never use an air mover to move hydrocarbon or other materials with a flashpoint below 140° (F). Vacuuming, or pump or pressurized off-loading is not permitted unless the flashpoint of the material is 140° (F) or higher.
Static electricity build up can result in electrical shocks, fire and/or an explosion when vacuuming dry and/or combustible materials. A static electricity charge may build up as material moves through the vacuum system. Grounding and/or bonding the unit may be required. Follow site procedures for static electricity.
Electrocution hazard
Serious injury or death can result from electrocution.
Check for overhead wires and obstructions before raising or moving boom. Do not leave boom raised while vehicle is unattended. Do not move vehicle unless boom is in travel mode. Do not allow boom to contact the vehicle or any obstruction.
Be aware of the vehicle's surroundings before operating any of the boom functions to prevent death, injury or equipment damage.
NOTICE
Rear Door Can Be Damaged
Remove safety support(s) before closing door to avoid damage. Open rear door before raising the debris body. Make sure rear door attachments clear the bumper and ground when raising the debris body.
CAUTION
Noise can cause permanent hearing loss.
Always wear approved hearing protection when operating equipment.
Wear protective equipment including footwear and gloves when using or servicing this machine.
Read SAFETY section for details.
Electrical system can be damaged.
Do not weld on unit.
Disconnect all chassis and unit ECU's and batteries before welding on unit.
Electrical systems may be damaged by welding.
Read Service manuals for details.
NOTICE
Service Access
Never use access ladders or platforms with the unit running. Shut down and lock out the unit before all service to avoid injury. Refer to the unit manual and safety manual for details.
NOTICE
Boom Can Be Damaged
The boom should only be used for its published, intended and rated use. Do not overload. To avoid damage do not use as a lifting device.
TRUVAC by Vactor Mfg., Inc.
General Operation
Consult the OPERATOR'S manual for complete details on SAFETY and proper OPERATION of this unit.
Call 811 before all digging operations to locate and mark off all known utilities
Verify all equipment is in safe working order and suitable for the work to be performed.
Never operate without manual, automatic and safety vacuum reliefs installed and properly operating.
Work as team with second operator
Wear protective clothes and equipment
Set up vacuum hose with the in-line vacuum relief valve and nozzle at the hose working end.
The working end of the vacuum tube should be soft and non-conductive
Follow site procedures for static electricity and ground truck
Do not use excessive water pressure or temperature
Cold weather operation - drain as required
Daily Service Check List
Inspect all safety equipment, guards, etc.
Check blower or fan spindle box oil level
Check hydraulic oil level
Check transfer case oil level (if equipped)
Service chassis (consult manufacturer's manual)
Inspect all vacuum hoses
Drain, inspect and clean micro strainer (if equipped)
Drain, inspect and clean all air/water filters and Y-strainers
Inspect for proper functioning of vacuum relief valves
Inspect inlet head and inlet boot seals
Inspect all high pressure hoses for excessive wear, damage or improper assembly of fittings
Inspect hoses and gaskets
Inspect and clean all door seals before closing doors
Drain air tanks and silencers
Inspect cyclones for excess material (if equipped)
Inspect all safety equipment, guards, etc.
WEEKLY (25HRS) GREASE POINTS
1 ALL DRIVELINE JOINTS
2 LOWER HOIST CYLINDER BRACKET - Monthly
3 VACUUM RELIEF (FAN ONLY)
4 DEBRIS BODY MOUNTING HINGE
5 REAR DOOR LOCKS
6 REAR DOOR HINGE
7 BOOM GEAR TEETH & BEARING (use remote zerk)
8 BOOM & CYLINDER PINS (PD ONLY) - Monthly
9 LEVEL INDICATOR (location varies)
10 UPPER HOIST CYLINDER PINS - Monthly
- ALL SMALL DOOR HINGES
Technical Service Hotline - 877-342-5374
Scan the QR Code with your mobile device or visit: http://www.fsesgsafety.com for the latest FSESG product and application safety information.
512389A rB

Typical labels and decals found on units. Actual decals used will vary with options.

WARNING

Electrocution hazard

Serious injury or death can result from electrocution.

Check for overhead wires and obstructions before raising or moving boom. Do not leave boom raised while vehicle is unattended. Do not move vehicle unless boom is in travel mode. Do not allow boom to contact the vehicle or any obstruction.

Be aware of the vehicle's surroundings before operating any of the boom functions to prevent death, injury or equipment damage.

Refer to SAFETY section in manual.

1800149 rev A

WARNING

High pressure water.

Serious injury or death can result from sudden release of high pressure water. The hose end and water discharge direction may become uncontrolled.

One pressure side water valve must be open prior to operating rodder pump.

The rodder hose must be properly in place before running rodder pump.

Refer to manual for details.

1800151

WARNING

NEVER operate this equipment with a damaged rodder hose or a hose that has not been supplied or approved by Vactor Mfg., Inc.

Serious injury or death can occur from rodder hose or fittings failure.

Inspect hoses and fitting before each use. Replace all hoses and fittings in accordance with Vactor Mfg. instructions.

Vactor Mfg., Inc. is not responsible for loss, damage or injury to persons or property for operation of this equipment with hoses other than those supplied or authorized by Vactor Mfg.

WARNING

Loose hose/nozzle

Serious injury or death can result from high pressure water or impact from hose/nozzle.

Use rigid nozzle support/guard of proper length.

Refer to SAFETY section in manual for details.

1800152 rA

CAUTION

Accumulator Pressurized

Open accumulator valve prior to removing valve drain plug to avoid injury.

Refer to manual for details.

47047GD rA

WARNING

Crushing or Accident Risk

To avoid injury and prevent the hose reel from falling during operation or transport the hose reel locks must be in place when the reel is in the up position.

Refer to manual for details.

53693 rA

2100 Series • Freezing Weather Drain Procedure

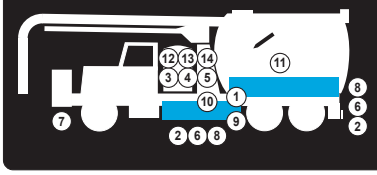
Drain Checklist

1.	Empty all water tanks
2.	Remove all Y-strainers at fill, water pump & other options
3.	Remove hand gun outlet(s), recirc & HXX drain plugs
4.	Remove accumulator valve drain plug
5.	Drain water guns
6.	Remove optional debris body washout system plug
7.	Remove plug from under the front hose reel
8.	Open optional water valve to rodder pump
9.	Open heat exchanger(s) drain(s)
10.	Remove plug to water pump manifold (2100Plus)
11.	Open all cyclones and allow to drain
12.	PD units - Open microstrainer housing drains
13.	PD units - Open silencer drain
14.	Fan units - Open the fan housing(s) drain

Leave all drains open until next use

Purge System

1. Open handgun and rodder ball valves.
2. REMOVE rodder nozzle and SECURE hose end to an adjacent hose loop so reel can rotate. Point the hose end towards the ground as ice and water may be ejected while running rodder pump.
3. Start engine and engage water pump for two minutes at slow speed to expel any water.
4. Turn OFF water pump.
5. Remove drain plugs from water pump or open optional drain valves and engage water pump for one minute at slow speed to expel any water.
6. Turn OFF water pump.
7. Rotate hose reel in the PAYIN direction to expel any water in hose.



WARNING

High pressure water.

Serious injury or death can result from sudden release of high pressure water. Remove the rodder hose nozzle and secure the hose end to an adjacent hose loop so reel can rotate. Point the hose end towards the ground as ice may be ejected while running rodder pump.

Both pressure side water valves must be open prior to operating rodder pump.

Refer to manual for details.

53695A rE

WARNING

Do not run engine with inspection cover removed.

ADVERTENCIA

No poner el motor en marcha con la cubierta de inspección retirada.

SAFETY INSTRUCTIONS

If fans cause excess vibrations, shut engine off and follow procedure as described in the maintenance section of the operator's guide.

INSTRUCCIONES DE SEGURIDAD

Si los ventiladores causan vibraciones excesivas, apagar el motor y seguir los procedimientos descritos en la sección de mantenimiento de la guía del operador.

1800150

WARNING

Out of control hose can cause severe injury or death.

The rodder hose creates tremendous pressure and must not be fitted with a reducer or hand held nozzle, or operated outside of the sewer pipe. The back pressure created by such action will cause loss of control and violent movement of the hose and fittings, and the release of high pressure water .

Do not use improper fittings or use out of sewer pipe. Refer to manual for details.

Refer to manual for details.

49074

CAUTION

Driveline can be damaged.

Open vacuum relief valve.

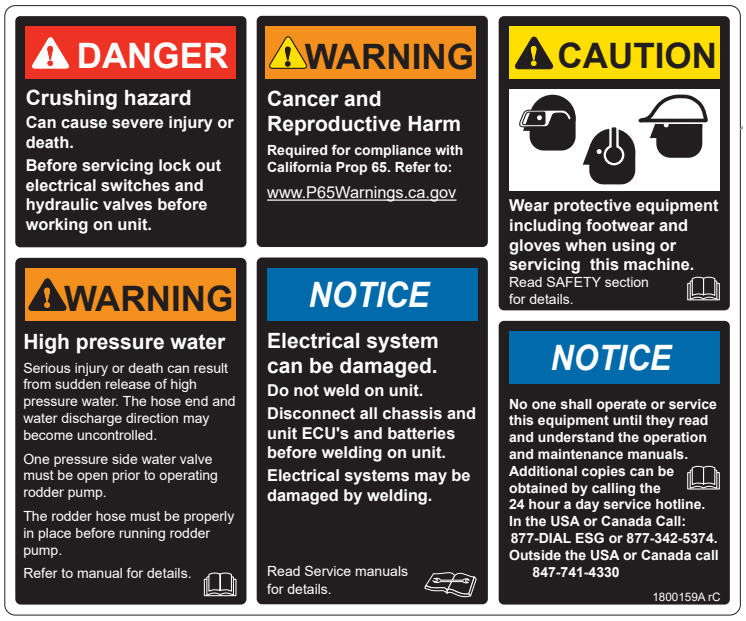
Lower engine RPM to idle before engaging or disengaging blower.

Failure to open vacuum relief valve and lower engine RPM to idle before engaging or disengaging blower may result in serious engine, transmission or blower damage.

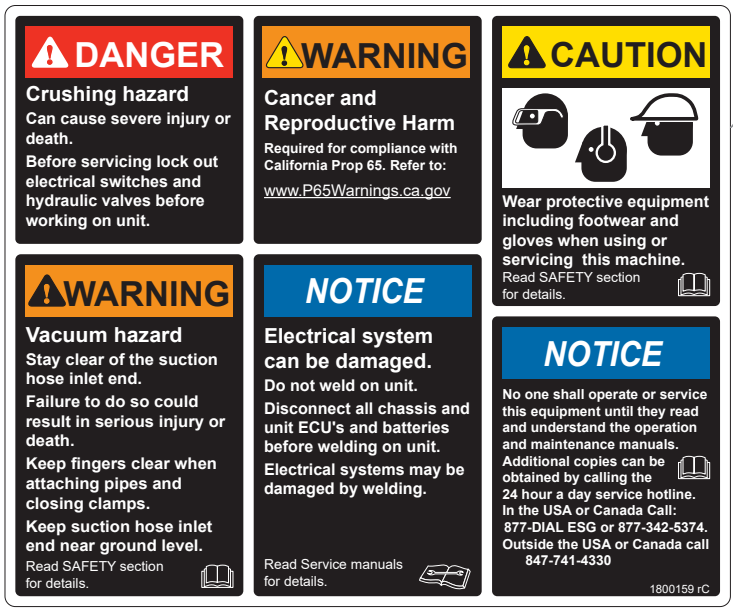
1800121A rA

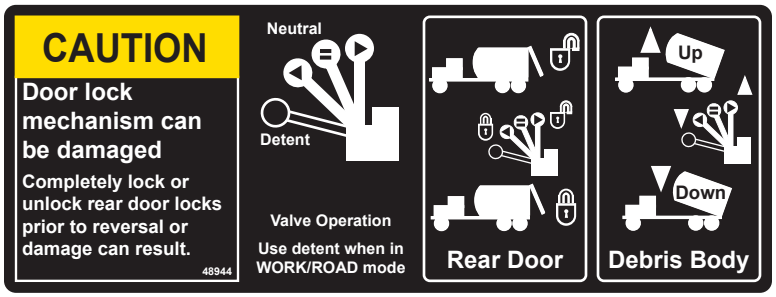
Typical labels and decals found on units. Actual decals used will vary with options.

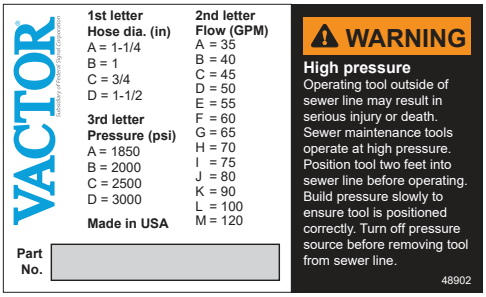
Jetter units

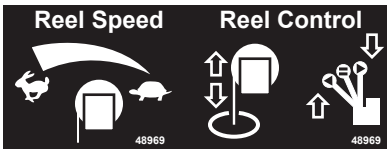


Combination units









New models with 2100i type controls

WARNING

Loose hose/nozzle

Serious injury or death can result from high pressure water or impact from hose/nozzle.

Use rigid nozzle support/guard of proper length.

Do not operate jet-rodder with damaged rodder hose or rodder hose that is not authorized by Vactor Mfg., Inc.

Serious injury or death can result from rodder hose or fittings failing.

Frequently inspect hoses and fittings. Install fittings properly.

Vactor Mfg., Inc. accepts no responsibility for this equipment while operated with any other hose than that hose furnished by Vactor Mfg., Inc.

DANGER

Crushing Falling Hazards

Can cause severe injury or death.

Before servicing, shut down unit, remove the ignition key, lock out electrical switches and hydraulic valves before working on unit.

Never use access ladders or platforms with the unit running.

WARNING

Cancer and Reproductive Harm

www.P65Warnings.ca.gov

Hose Swivel Grease

Use only Vactor No: 508541-30 waterproof green grease.

Bearing Grease

Use only GC-LB synthetic EP NLGI #2 grease.

x

WARNING

Explosion and fire hazards

To avoid severe injury or death never use an air mover to move hydrocarbon or other materials with a flashpoint below 140° (F). Vacuuming, or pump or pressurized off-loading is not permitted unless the flashpoint of the material is 140° (F) or higher.

Static electricity build up can result in electrical shocks, fire and/or an explosion when vacuuming dry and/or combustible materials. A static electricity charge may build up as material moves through the vacuum system. Grounding and/or bonding the unit may be required. Follow site procedures for static electricity.

x

WARNING

Electrocution hazard

Serious injury or death can result from electrocution.

Check for overhead wires and obstructions before raising or moving boom. Do not leave boom raised while vehicle is unattended. Do not move vehicle unless boom is in travel mode. Do not allow boom to contact the vehicle or any obstruction.

Be aware of the vehicle's surroundings before operating any of the boom functions to prevent death, injury or equipment damage.

WARNING

High pressure water.

Serious injury or death can result from sudden release of high pressure water. The hose end and water discharge direction may become uncontrolled.

One pressure side water valve must be open prior to operating rodder pump.

The rodder hose must be properly in place before running rodder pump.

Out of control hose can cause severe injury or death.

The rodder hose creates tremendous pressure and must not be fitted with a reducer or hand held nozzle, or operated outside of the sewer pipe. The back pressure created by such action will cause loss of control and violent movement of the hose and fittings, and the release of high pressure water.

Do not use improper fittings or use out of sewer pipe. Refer to manual for details.

CAUTION

Noise can cause permanent hearing loss.

Always wear approved hearing protection when operating equipment.

Wear protective equipment including footwear and gloves when using or servicing this machine.

Read SAFETY section for details.

Electrical system can be damaged.

Do not weld on unit.

Disconnect all chassis and unit ECU's and batteries before welding on unit.

Electrical systems may be damaged by welding.

Read Service manuals for details.

NOTICE

Boom Can Be Damaged

The boom should only be used for its published, intended and rated use. Do not overload. To avoid damage do not use as a lifting device.

NOTICE

Water system can be damaged

To avoid damage the system must be drained.

Instructions for draining water pump and lines in freezing weather:

1. Open drains in water tanks and allow tanks to empty.
2. Open all drain valves on water pump, filter and lines. Remove quick disconnect from handgun outlet.
3. Run water pump for 5 seconds and blow remaining water from lines.

Refer to manual for details

Rear Door Can Be Damaged

Remove safety support(s) before closing door to avoid damage. Open rear door before raising the debris body. Make sure rear door attachments clear the bumper and ground when raising the debris body.

Operation

No one shall operate or service this equipment until they read and understand the operation and maintenance manuals. Additional copies can be obtained by calling the 24 hour a day service hotline. In the USA or Canada

Call: 877-DIAL ESG or 877-342-5374

Outside the USA or Canada

Call: 847-741-4330

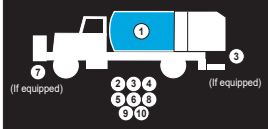
511416A rev B

RamJet 850 • Freezing Weather Drain Procedure

1. Empty all water tanks
2. Remove all Y-strainers at fill, water pump, & other options
3. Open handgun and rodder ball valves.
4. REMOVE rodder nozzle and SECURE hose end to an adjacent hose loop so reel can rotate. Point the hose end towards the ground as ice and water may be ejected while running rodder pump.
5. Remove handgun outlets(s) & recirc drain plugs
6. Start engine and engage water pump for two minutes at slow speed to expel any water.
7. Turn OFF water pump.
8. Remove plugs to water pump manifolds
9. Remove drain plugs from water pump or open optional drain valves and engage water pump for one minute at slow speed to expel any water.
10. Remove accumulator drain plug
11. Remove plug from under the front hose reel*
12. Open Baird relief drain
13. Open heat exchanger(s) drain(s)
14. Drain water guns
15. Rotate hose reel in the PAYIN direction to expel any water in hose.

Leave all drains open until next use

*Only front hose reel modules have a drain.



WARNING

High pressure water.

Serious injury or death can result from sudden release of high pressure water. Remove the rodder hose nozzle and secure the hose end to an adjacent hose loop so reel can rotate. Point the hose end towards the ground as ice may be ejected while running rodder pump.

Both pressure side water valves must be open prior to operating rodder pump.

Refer to manual for details.

512624 r0

WARNING

High pressure water.

Serious injury or death can result from sudden release of high pressure water. The hose end and water discharge direction may be uncontrolled.

One pressure side water valve must be open prior to operating rodder pump.

The rodder hose must be properly in place before running rodder pump.

Out of control hose can cause severe injury or death.

The rodder hose creates tremendous pressure and must not be fitted with a reducer or hand held nozzle, or operated outside of the sewer pipe. The back pressure created by such action will cause loss of control and violent movement of the hose and fittings, and the release of high pressure water.

Do not use improper fittings or use out of sewer pipe. Refer to manual for details.

Loose hose/nozzle

Serious injury or death can result from high pressure water or impact from hose/nozzle.

Use rigid nozzle support/guard of proper length.

Do not operate jet-rodder with damaged rodder hose or rodder hose that is not authorized by Vactor Mfg., Inc.

Serious injury or death can result from rodder hose or fittings failing.

Frequently inspect hoses and fittings. Install fittings properly.

Vactor Mfg., Inc. accepts no responsibility for this equipment while operated with any other hose than that hose furnished by Vactor Mfg., Inc.

NOTICE

Boom Can Be Damaged

The boom should only be used for its published, intended and rated use. Do not overload. To avoid damage do not use as a lifting device.

DANGER

Crushing Falling Hazards

Can cause severe injury or death.

Before servicing, shut down unit, remove the ignition key, lock out electrical switches and hydraulic valves before working on unit.

Never use access ladders or platforms with the unit running.

WARNING

Electrocution hazard

Serious injury or death can result from electrocution.

Check for overhead wires and obstructions before raising or moving boom. Do not leave boom raised while vehicle is unattended. Do not move vehicle unless boom is in travel mode. Do not allow boom to contact the vehicle or any obstruction.

Be aware of the vehicle's surroundings before operating any of the boom functions to prevent death, injury or equipment damage.

WARNING

Cancer and Reproductive Harm

Required for compliance with California Prop 65.

Refer to: www.P65Warnings.ca.gov

CAUTION

Noise can cause permanent hearing loss.

Always wear approved hearing protection when operating equipment.

Wear protective equipment including footwear and gloves when using or servicing this machine.

Read SAFETY section for details.

Electrical system can be damaged.

Do not weld on unit.

Disconnect all chassis and unit ECU's and batteries before welding on unit.

Electrical systems may be damaged by welding.

Read Service manuals for details.

Hose Swivel Grease

Use only Vactor No: 508541-30 waterproof green grease.

Bearing Grease

Use only GC-LB synthetic EP NLGI #2 grease.

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WARNING

Explosion and fire hazards

To avoid severe injury or death never use an air mover to move hydrocarbon or other materials with a flashpoint below 140° (F). Vacuuming, or pump or pressurized off-loading is not permitted unless the flashpoint of the material is 140° (F) or higher.

Static electricity build up can result in electrical shocks, fire and/or an explosion when vacuuming dry and/or combustible materials. A static electricity charge may build up as material moves through the vacuum system. Grounding and/or bonding the unit may be required. Follow site procedures for static electricity.

NOTICE

Water system can be damaged

To avoid damage the system must be drained.

Instructions for draining water pump and lines in freezing weather:

1. Open drains in water tanks and allow tanks to empty.
2. Open all drain valves on water pump, filter and lines. Remove quick disconnect from handgun outlet.
3. Run water pump for 5 seconds and blow remaining water from lines.

Refer to manual for details

Rear Door Can Be Damaged

Remove safety support(s) before closing door to avoid damage. Open rear door before raising the debris body. Make sure rear door attachments clear the bumper and ground when raising the debris body.

Operation

No one shall operate or service this equipment until they read and understand the operation and maintenance manuals. Additional copies can be obtained by calling the 24 hour a day service hotline. In the USA or Canada

Call: 877-DIAL ESG or 877-342-5374

Outside the USA or Canada

Call: 847-741-4330

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2100i • Freezing Weather Drain Procedure

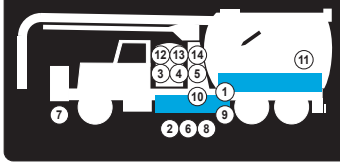
Drain Checklist

1.	Empty all water tanks
2.	Remove all Y-strainers at fill, water pump & other options
3.	Remove hand gun outlet(s), recirc & HXX drain plugs
4.	Remove accumulator valve drain plug
5.	Drain water guns
6.	Remove optional debris body washout system plug
7.	Remove plug from under the front hose reel
8.	Open water valve to rodder pump
9.	Open heat exchanger(s) drain(s)
10.	Remove plug to water pump manifold
11.	Open all cyclones and allow to drain
12.	PD units - Open microstrainer housing drains
13.	PD units - Open silencer drain
14.	Fan units - Open the fan housing(s) drain

Leave all drains open until next use

Purge System

1. Open handgun and rodder ball valves.
2. REMOVE rodder nozzle and SECURE hose end to an adjacent hose loop so reel can rotate. Point the hose end towards the ground as ice and water may be ejected while running rodder pump.
3. Start engine and engage water pump for two minutes at slow speed to expel any water.
4. Turn OFF water pump.
5. Remove drain plugs from water pump or open optional drain valves and engage water pump for one minute at slow speed to expel any water.
6. Turn OFF water pump.
7. Rotate hose reel in the PAYIN direction to expel any water in hose.



WARNING

High pressure water.

Serious injury or death can result from sudden release of high pressure water. Remove the rodder hose nozzle and secure the hose end to an adjacent hose loop so reel can rotate. Point the hose end towards the ground as ice may be ejected while running rodder pump.

Both pressure side water valves must be open prior to operating rodder pump.

Refer to manual for details.

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