Fuels & Lubricants
Vacuum Truck Standard

Approved: November 2021

Version 1.0

1.0 Purpose, Objectives and Scope

1.1 Purpose

The purpose of this Standard is to protect personnel, the environment and the facility by specifying the minimum requirements for safe vacuum truck and system operations within Fuels & Lubricants (F&L) operated facilities.

1.2 Objective

This document is intended to highlight the safety precautions required for carrying out vacuum truck and system activities and should be used in conjunction with the relevant service provider's safe operating procedures, industry standards and established risk mitigation practices. In cases where this Standard is different than governing regulations or codes, the more stringent of the two standards/regulations will apply.

1.3 Scope

Vacuum trucks for collection and transfer of hazardous materials should only be used after consideration of the relative risk, feasibility and availability of alternative technologies. For example, using a positive displacement pump in lieu of the truck's vacuum pump shall be considered where practical.

1.3.1 In Scope

The scope of this standard includes the movement of materials in non-permanent systems such as vacuum trucks and related systems in the following services/areas:

- Flammable and combustable liquid service
- Rotary Lobe (solids/dry materials and sludge) vacuum trucks
- Vacuum truck service for miscellaneous process fluids and chemicals

1.3.2 Out of Scope

This standard does not address:

- The use or requirements of trucks used in the service Portable Toilets and similar sanitary containments.
- Engineered, fixed systems involving the use of vacuum
- Other material transfer operations using other methods
- Transfers using vacuum trucks for non-chemical / non-hydrocarbon liquids, such as water basins, storm drains and sumps

Exceptions:

- Transfer, collection and discharge may be excluded from requirements provided the sites are identified, reviewed to specify requirements, approved and documented as noted below:
- Pre-identified sites with materials determined to be non-flammable in which the transfer would take place outside of Class 1, Div. 1 or 2 areas do not

require a job-site review with the site's permit issuer as specified, a joint job site visit for the permit to work or an Essentials Checklist/SWC as specified. Examples of these sites include:

- Fresh Water Hydrants
- Vacuum Truck Wash Down Station(s)
- Bio Reactor/Water Settling Ponds
- Pre-identified recurring, routine collection sites that may involve hazardous materials but material risks and mitigations are known, understood and established, may also be exempted from requirements and a Joint Job Site Visit for the Permit to Work is not required. Such examples may include:
- Roof drains
- Recovered oil drums
- Lab waste runs
- Cutter rack
- Offloading to Oily Water Separator
- Retail turbine sumps for rainwater collection

2.0 Terms and Definitions

Refer to the DS&C Terms and Definitions document

3.0 Standard Instructions

3.1 Documentation and Permits

Permit and Documentation Requirements: All vacuum truck work shall have the following paperwork completed in addition to any other documentation required by the Task Consequence Catalogue (TCC) or regulatory requirements:

- General Work Permit
- SWC (either Liquid or Dry depending on the material)
- Vacuum Truck Safety Worksheet
- Hazard Analysis (HA)

Vacuum Systems: Vacuum systems other than vacuum trucks must meet the following minimum requirements:

a. The system must be grounded/earthed to an approved ground point with less than 1000 ohms of resistance.

b. The system must have continuity throughout the system through the use of conductive hoses and/or bonding systems.

c. The HA requirements of defined.

d. The stop work requirements as defined below.

3.1.1 General Work Permit

- A General Work Permit must be in place for the vacuum work being done. If the work will be in a classified area, a Hot Work Permit will also be required.
- The General Work Permitting will conform to the Permit to Work Standard.

3.1.2 Start Work Check (SWC)

A SWC for either Liquid or Dry vacuum operations must be completed as part of the permitting process. Essentials Checklists/SWC are required for all “In Scope” vacuum truck operations (section 1.3.1)

A SWC is VALID FOR ONE (1) DAY ONLY and is good for only one truck. If there are multiple trucks for the opertions then a SWC is required for each.

The requirements listed on the SWC must be assured to be in place by the vacuum truck operator and verified by the Competent Verifier / Permit Issuer.

- System continuity from hose end, through the vacuum truck, to the ground /earthing point.
    - Grounding/earthing cables must be connected to a verified ground point.
    - Complete continuity test of hoses and fittings by either:
        - Conducting a circuit test from end of hose to ground point (must be less than 10,000 ohms) or
        - Conduct tests on individual hoses and connections — Hoses must be less than 100 ohms; Connections must be less than 10 ohms.
- Vacuum Truck Operator must wear a personal 4 gas monitor with sensors for combustible gases (%LEL), oxygen (%O2), hydrogen sulfide (H2S) and carbon monoxide (CO) when transferring under the following conditions.
    - Flammable materials
    - Combustible liquid service where the combustibles are within 15° F (8.3° C) of their flash point
    - Transfer of materials in a hazardous (classified) area
    - Rotary Lobe (solids/dry materials and sludge) vacuum trucks in any area
    - Vent exhaust hose to safe location

3.1.3 Vacuum Truck Safety Worksheet

The Vacuum Truck Safety Worksheet is required to communicate relevant information to the vacuum truck driver / service provider, as well as providing a checklist of safety items that must be in place. Example sources for this information would include process knowledge, SDS, monitoring equipment (pH paper, temperature indicators) or sampling.

Vacuum Truck Safety Worksheet is VALID FOR ONE (1) DAY ONLY and is good for only one truck. If there are multiple trucks for the operations then a SWC is required for each.

At a minimum, the information provided to the vacuum truck driver/service provider must include and is included on the Worksheet:

- Material name (or SDS),
- Quantity,
- Location – plant/equipment
- Flash point,
- Total Vapor Pressure (TVP) (required for light hydrocarbons)
- Temperature
- Identification of hazards associated with the material (e.g., presence of toxics such as benzene or H2S, pH or corrosivity, reactivity, static accumulators, etc.)

Worksheet Requirements for **Hazardous Materials**: When relevant for transfers of hazardous materials, the Vacuum Truck Safety Worksheet must detail the hazards associated with the material, including but not limited to:

- Considerations for incompatible mixtures, including hydrocarbon "Switchload" concerns.
- Size, type and metallurgy of truck and equipment needed.
- Washing requirements for truck between loads.
- Exhaust management for hydrocarbon or odor mitigations needed.

3.1.4 Hazard Analysis (HA)

A Hazard Analysis (HA) or equivalent shall be conducted at the work site in accordance with the F&L Hazard Analysis Standard prior to work involving Vacuum Trucks.

3.2 Equipment Requirements

3.2.1 Basic Requirements:

Vacuum Systems: Vacuum systems other than vacuum trucks must meet the following minimum requirements:

a. The system must be grounded/earthed to an approved ground point with less than 1000 ohms of resistance.

b. The system must have continuity throughout the system through the use of conductive hoses and/or bonding systems.

All vacuum trucks shall have the equipment outlined in Appendix A - Basic Equipment Requirements for all Vacuum Trucks. All required equipment shall be inspected on an appropriate schedule and shall be in good working order.

Liquid Vacuum Truck Requirements: For all Liquid Vacuum Trucks, the following Material and Equipment Limits apply:

a. Materials with 2.5 pH or less must be handled with a stainless-steel truck or similar materials designed for these low pH liquids. Hose type and fittings must also be compatible
b. No vacuum truck shall handle material with a True Vapor Pressure (TVP) of greater than 11 psia (76 kPa) (see Appendix B for Reid Vapor Pressure (RVP) conversion)
c. The vacuum truck driver/operator must remain within 25 feet (7.6 m) of the truck during the transfer
d. Temperature limit of 120°F (50°C) unless truck and disposal site equipment is specifically verified to accommodate higher temperatures
e. Pyrophoric or oxidizing materials must not be handled by any vacuum truck without steps taken as required to mitigate and determine the hazard has been neutralized.
f. Combustible solids such as sulfur dust must not be handled with any type of vacuum truck.
g. To prevent collapse or overpressure of vacuum truck tank or process equipment, if the vacuum hose is to connect to process equipment, a site approved procedure must be used. For connecting to in-service equipment, an MOC or site-specific procedure must be used. Approval for connecting to equipment shall consider necessity of drain/vent valve on vacuum truck piping for confirmation the hose is safe to disconnect.
h. If connecting to process equipment, the process pressure must not exceed the PSV set point on the vacuum truck.
i. If the vacuum exhaust is planned to be returned to the source container, approval must be obtained from Vacuum truck Coordinator/SME and engineering SME.
j. If exhaust scrubbers are used, they must be rated for the vent rate.
k. The vendors/providers of scrubbers and media used for exhaust scrubbers must provide a technical or engineering review for size and type recommendations, media limitations (including break-thru and heat-up considerations) and cautions necessary to make informed decisions on their use.
    - BU Engineer(s)/SME shall also be consulted for first time uses and participate in the MOC for approval.

l. When loading materials from different locations or if a load is different from what was moved previously, ensure materials are compatible to prevent violent reactions. Examples of materials warranting concern include but are not limited to:
    - Acids
    - Bases/caustics
    - Flammable/combustibles
    - Oxidizers / peroxides

m. For US locations:
    - Check the testing dates on the side of vacuum truck (see Appendix F) to ensure that the truck is in compliance with DOT requirements prior to loading.

3.2.2 Cleaning Requirements

For all Liquid Vacuum Trucks, cleaning requirements for vacuum trucks include:

a. All liquid vacuum trucks must be cleaned between loads unless materials in each load are the same. A cleaning certificate must be supplied to Chevron personnel prior to conducting work.
b. Steam or high pressure water must not be used for initial wash of residue from a truck's tank having handled flammables or combustibles due to their propensity to develop high levels of static electricity
c. Proper PPE must be worn by all personnel involved in the cleaning operation and shall consider all potential exposures
d. Unless specifically instructed to hold material in debris tank, (i.e. storage or disposal site not immediately available) vacuum truck tanks are to be left rinsed and emptied after completion of assigned work and left parked in a designated area when not in use. Note: The vacuum truck tank internal space is a confined space and entry must be controlled per local standard for Confined Space Entry.
    - All vacuum trucks to enter or exit the site must have all lines and hoses capped and be flushed and empty of any hazardous materials and residue per local regulatory requirements. If it is the intent to ship material in the truck over public roads, the truck must be properly placarded and manifested to comply with local, regional and national regulations.

3.2.3 Equipment Requirements for Classified Hazardous Areas

For Sites transferring flammables or combustible materials in Hazardous (Classified) Areas - Job Site Equipment Set-up and approval requirements include:

a. Truck must be spotted on level ground, safely away from flammable sources with vacuum exhaust hose routed away from personnel, a minimum of 50 feet (15 meters), downwind from truck and other ignition sources. Trucks designed and equipped with vacuum vent stack exhausting at 12 ft. (3.65 m) above the truck's cab also acceptable (not approved for still wind days).

b. All collection containers and scrubbers must be made of conductive material.

c. Truck and equipment grounding/earthing, bonding and verifications must follow SWC (DS&C Dry Vacuum Checklist and DS&C Liquid Vacuum Checklist.) See Appendix C.

    - If during job set-up, a hose tests at >100 ohms, the Supervisor must be notified and driver must either replace the hose or use Circuit Test with a total resistance limit of <10,000 ohms. Hose must be replaced following the transfer operation

d. For non-conductive collection areas such as concrete containment areas, sewer boxes, bermed areas, ditches, drum spill containment/spill guards, etc., the liquid vacuum truck hose must be bonded to a verified ground point

e. For tank cleaning operations conducted through manways, the open end of the hose shall be bonded to the tank being cleaned (See Appendix D & E)

f. When carbon is used in an exhaust scrubber, considerations for monitoring heat-up must be made to prevent fire. A flame arrestor must be installed upstream of the scrubber(s) when carbon media scrubbers are used.

g. Vacuum transfer operations shall minimize agitation of flammables or hydrocarbon bearing liquids to reduce static generation by:

- Hydrocarbons/flammables shall be transferred to truck or containers from truck through the bottom line to avoid splash filling
- Whenever possible, the vacuum hose should be submerged in the liquid. Where submersion is not possible and job duration is prolonged, the hose end should be bonded to a ground point to ensure safe dissipation of the static generated in the hose.
- Flammables, and combustibles, shall be loaded at reduced rates until the vacuum truck inlet port is well covered.
- Gravity discharge for all materials shall be used where possible. Pumping off is also a common and Chevron approved practice. The use of alternative methods such as pressuring off shall only be used in accordance with thorough hazard analysis and proper safeguards for hazard mitigation.
- Pressure off-loading is prohibited for materials with an open cup flash point below 100°F (38°C). If pressurized tank discharge is required (only when open cup flash above 100°F (38°C), a JLA (short-term) or MOC (long-term) showing process steps with risks and mitigations must be reviewed and approved by BU Management and Vacuum Truck SME.

h. After any loading or discharge operation, the vacuum truck shall be left with grounding/earthing cable attached for 5 minutes to allow for dissipation of static that may have accumulated in the debris tank during the operation.

3.2.4 Rotary Lobe Requirements

For Rotary Lobe (Dry Material) Vacuum Trucks are primarily designed for use in the transfer of non-combustible dry materials, soil or heavy sludge, absent of free standing hydrocarbons. Due to the heat generated in the blower and areas of the transfer system, Rotary Lobe equipped vacuum trucks are not permitted for use with combustible or flammable materials, or to be used in a flammable environment.

a. Requirements for Using Rotary Lobe Trucks.

- If the potential exists for pockets of low flash material to be mixed in with the non-flammable material (e.g., contaminated soil), monitoring of hydrocarbon vapor/air concentrations at the point of pick-up is required.
    - The readings must remain <5% LEL.
    - If, at any time, 5% LEL is exceeded, the transfer must be shut down and the Permit Issuer notified.
    - Material should be evaluated for the potential for changing conditions and a monitoring plan should be developed to address this hazard accordingly.
- Personnel working with Dry Material Vacuum Trucks must be protected from static discharge by either or both of the following:
    - Static PPE (e.g., rubber gloves, clothing).
    - Conductive hoses that have been continuity tested with ohm meter.

- Vacuum breakers or electronic emergency shut-down devices (E-Stop) must be used if a hose operator will be required.
- The Dry Vacuum SWC must be used to verify & validate essential safeguards are in place with each material transfer.

3.3 Stop Work Authority

Work must be stopped/suspended, the vacuum truck made safe, and the Permit returned to the Permit Issuer for revalidation in the following circumstances:

- Any abnormal transfer conditions such as excessive heat, smoke, noise, etc. that may indicate an unsafe condition.
- Loss of ground/earthing connections.
- Wind shifts or simultaneous operations that may make the vent location unsafe.
- Abnormal odors
- High level reached in the vacuum truck

4.0 Roles, Responsibilities and Training Requirements

Vacuum Truck Operator/Driver

- Understand all aspects and hazards of their planned vacuum truck operations before conducting work
- Understand and use stop work authority when appropriate
- Be current with training and know procedures for safe use of equipment
- Conduct a pre-trip and pre-job audit as well as all required equipment inspections
- Participate in and assure completion of specific pre-job JLAs, SWC and Permits

Facility Vacuum Truck Coordinator / Company Representative

- Be knowledgeable of the content in the Vacuum Truck standard and familiar with the relevant Safe Work Practices.
- Provide required support documents and meet any record retention requirements.
- Review vacuum truck service requests for completeness. Collaborate with Service Provider to ensure needs are understood and hazards are addressed.
- Provide detailed description of material and associated hazards (i.e. SDS); coordinate additional SME support when necessary
- Work with requestor to determine disposal locations and obtain appropriate permits
- Audit field activities
- Be aware of and provide the means for acquiring the proper vapor mitigation equipment
- Assist contractor in finding suitable ground/earthing location when requested

- Manage execution of work to enforce compliance with contract and safe work practices

Competent Verifier

On the SWC for Vacuum Trucks there are tasks to be done involving the confirmation of essential safeguards. The Competent Verifier is somone with the knowledge and expertise to understand if the required safeguards are in place and functioning correctly. Some of these safeguards include, but are not limited to:

- Grounding and bonding of the systems. Typically, this will be done by persons meeting the requirements of a Qualified Electrical Person per the F&L – Electrical Safety standard.
- Gas detection for flammable or other gases/vapors. Typically, this will be done by persons meeting the requirements of a Qualified Gas Tester per the F&L – Portable Gas Detection standard.
- Etc.

COEM Process: Only vacuum system & truck service providers that have been approved through the COEM process by the responsible contract owners are permitted to transfer materials in Lubricants facilities.

4.1 Training - General

Facility Vacuum Truck Coordinator / Company Representative

- Trained in the following Safe Work Practice Standards
  - Hazard Analysis
  - Permit to Work
  - Isolation of Hazardous Energy
  - Hot Work
  - Confined Space Entry
  - Portable Gas Detection
  - Vacuum Truck

4.2 Refresher Training

Refresher training must be provided as follows:

- Whenever an individual demonstrates insufficient knowledge of the Vacuum Truck or other relevant Standards
- At least every three years

5.0 Records

5.1 Required Records

The following records are required for conformance with this standard:

- Permit packages including:
  - General Work Permit
  - JLA
  - Vacuum Truck Safety Worksheet
  - Vacuum Truck SWC

5.2 Retention Requirements

All documents will be retained in accordance with the Chevron's Policy 566: Information Retention, and as required by local regulations. At a minimum, records will be kept for the periods specified below:

- Copies of all work permits, forms and associated documentation will be kept for one year or from audit to audit, whichever is the lesser.
- Training records will be kept for personnel until five years beyond termination of employment.

6.0 References

The following is a complete list of the documents referenced by this standard.

Table 1. Document List

Title	File Name
DS&C – SWP Terms and Definitions	DS&C - MSW Terms and Definitions
F&L Confined Space Entry Standard	
F&L Permit to Work Standard	
F&L Hot Work Standard	
F&L Isolation of Hazardous Energy Standard	

7.0 Other Guidance Documents

Table 2. Document List

Title	File/Link Name
Dry Vacuum Truck Essentials Checklist	Dry Vac Truck EC
Liquid Vacuum Truck Essentials Checklist	Liquid Vac Truck EC
Vacuum Truck Safety Worksheet	Vac Truck Safety Worksheet

8.0 Revision History

Table 3. Revision History

Description	Chevron Lubricants
Origin Date	November 2021
Next Revision Due	November 2021

Table 4. Amendment Details

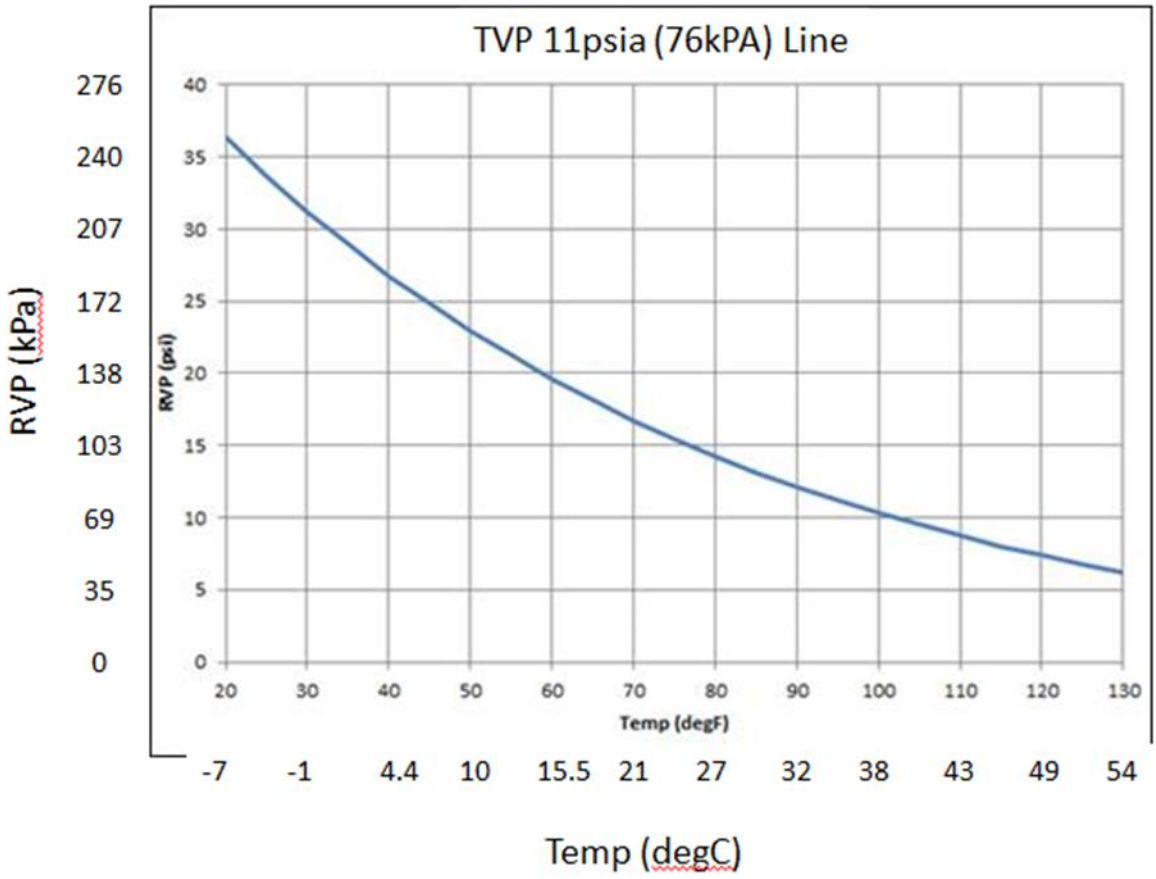
Changes made to this standard since the previous version was issued.

Date	Author	Section Number	Change Reference

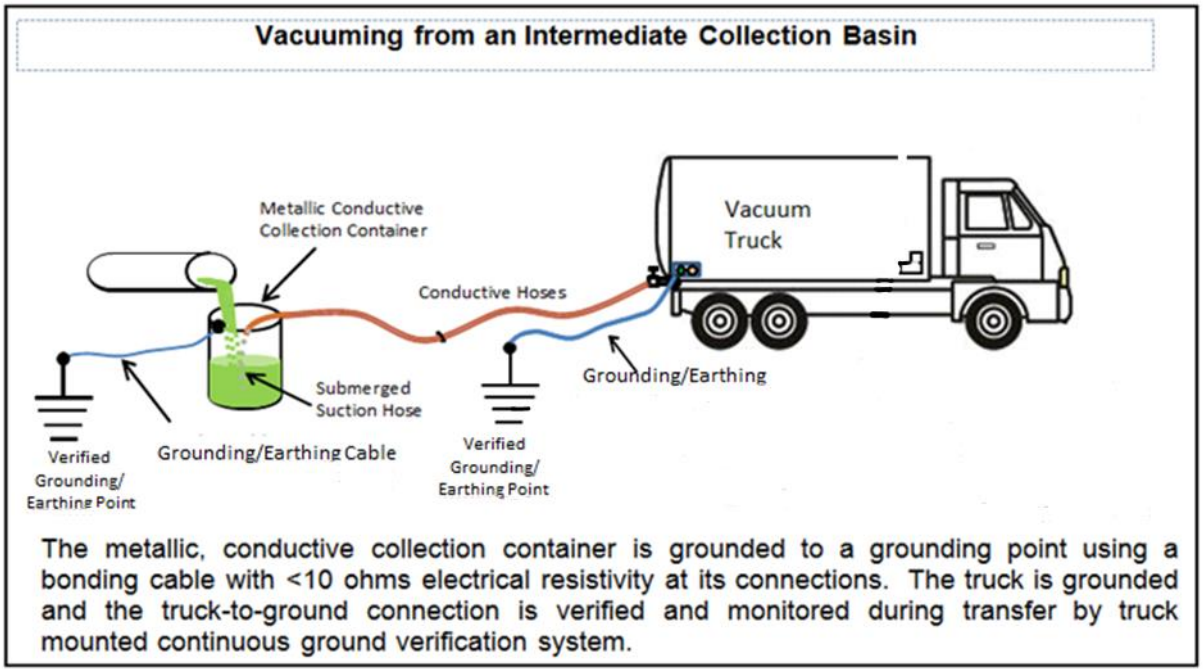
Appendix A: Basic Equipment for All Vacuum Trucks

No.	Equipment Required	Minimum Requirement for Vacuum Trucks
1	Fire Extinguisher (Liquid Vacuum Trucks only)	20 lb B/C (9kg DCP) dry chemical fire extinguisher that is readily accessible at all times near the rear of the vehicle (Site provided - OK)
2	Bonding Cables & Clamps	Clamps shall have strong springs with sharp, pointed contacts to displace rust or paint. Types of screw-down, C-clamp design are also acceptable.
3	Grounding / Earthing Verification	Ground point verification of <1000 ohms of electrical resistance requires one of the following methods: • Use of an MGV, or • Use of an approved Hand-Held Ground Detection Meter by a qualified Chevron person or • Testing by a qualified electrician
4	Spill Response	Spill response in their job planning and JLA/JSA/JHA
6	Liquid and Vent Hoses	Conductive liquid and vent hoses with lockable connections that are tested periodically and results are documented of their condition. Rotary Lobe trucks exempted.
7	Debris Tank Gauge (Liquid Vacuum Trucks only).	Working tank level gauge
8	Warning Tape/ Barricades	Site able to provide barricading and/or signage as required to secure work area

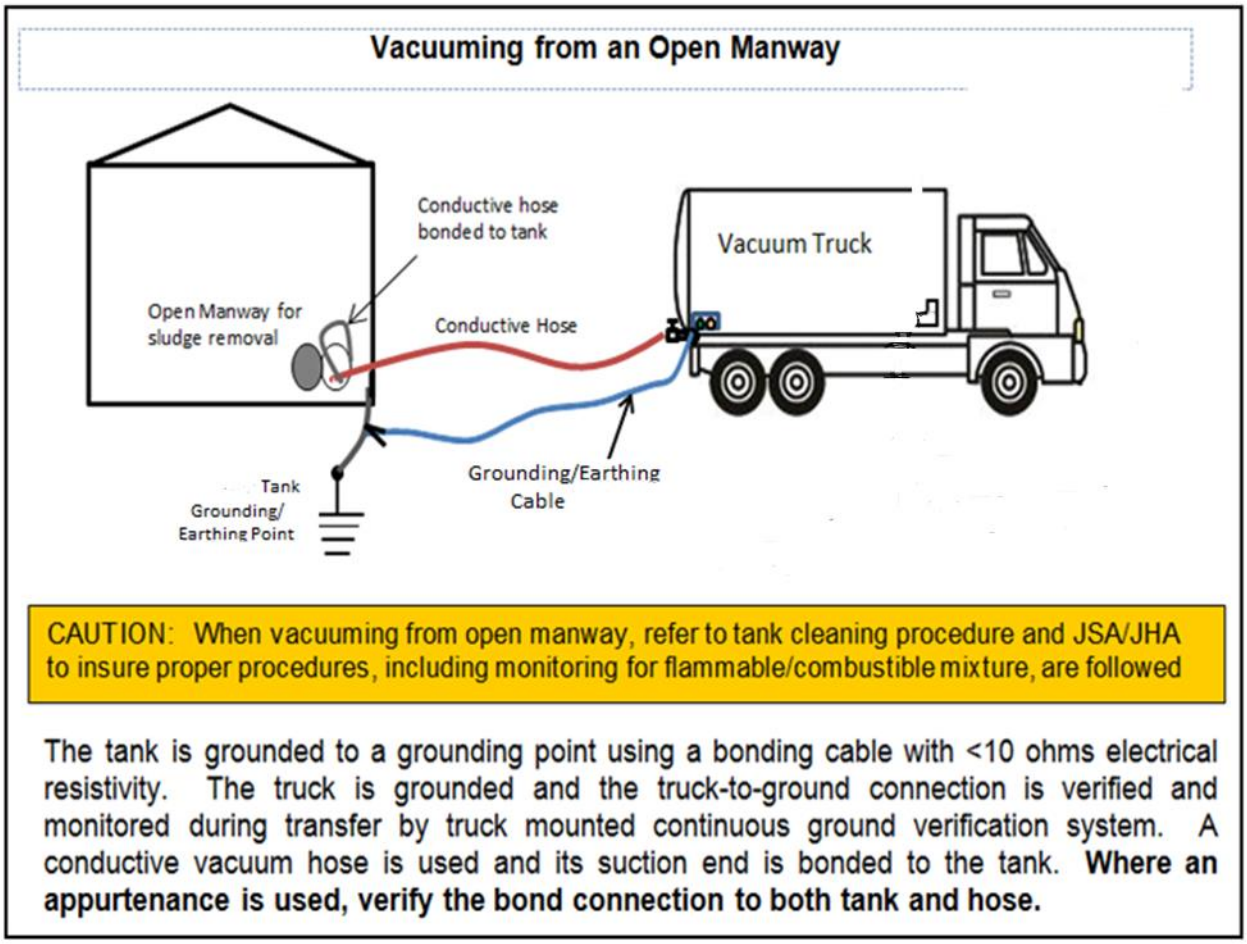
Appendix B: TVP-RVP Conversion for Vacuum Truck Loading



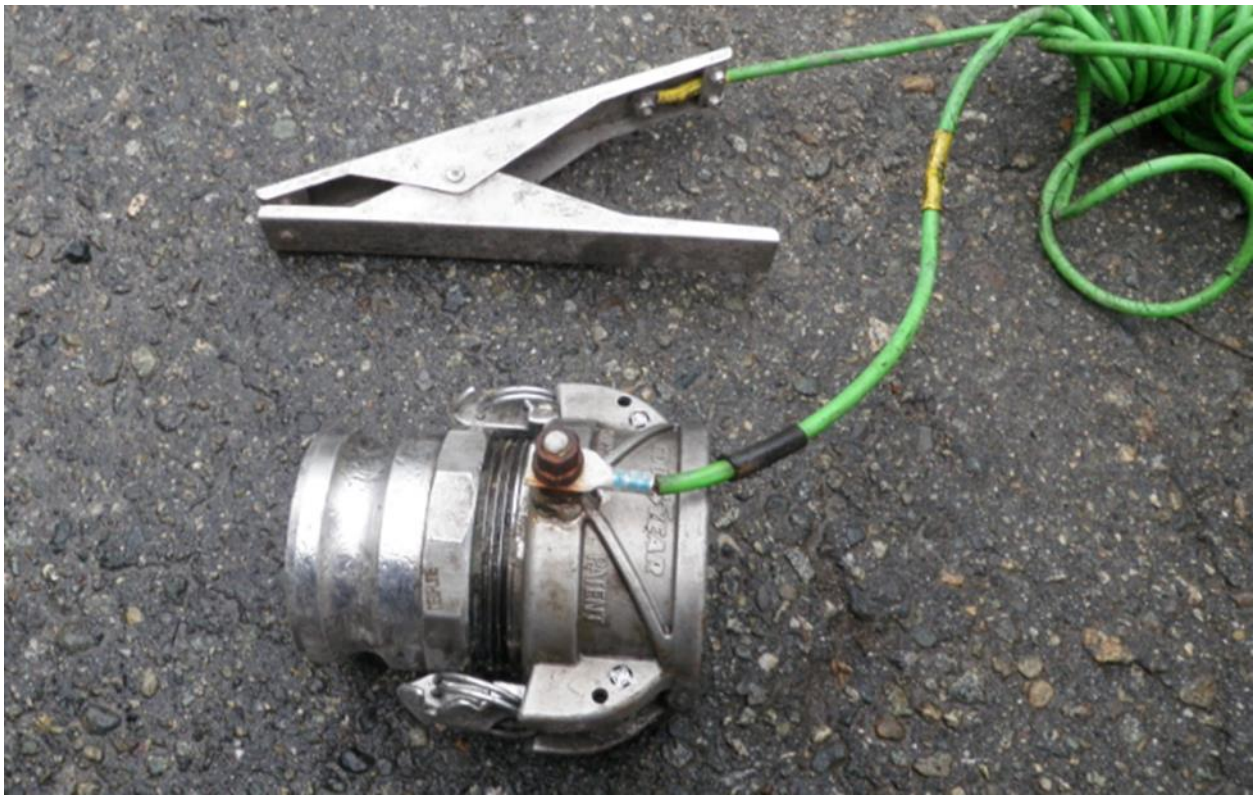
Appendix C: Vacuuming From an Intermediate Collection Basin



Appendix D: Vacuuming From an Open Manway



Appendix E: Hose End Fitting for Tank Cleaning or Other High Static Operations



Appendix F: US Department of Transportation Markings

Stenciling on side of vacuum trucks:

Code	Definition	Frequency
V	External Inspection	Annual
K	Leakage Test	Annual
I	Internal Visual Inspection	Five Years
P	Pressure Test	Five Years
T	Thickness Test	Two Years
UC	Upper Coupler Inspection	Five Years
Trucks with rear doors require V every 6 months		
Vacuum Relief Valve only required for trucks not tested to full vacuum		

Appendix G: Safeguards List

The following chart highlights required (some exceptions might apply) safeguards for preventing serious injuries and fatalities.

Powered Industrial Motor Vehicle Tipping Over:

Safeguard	Preventative / Mitigative	Human Action / Hardware / Both
Grounding of the Vacuum Truck	Preventative	Both
Bonding of the hoses and fittings to provide continuity to a ground point	Preventative	Both
Electrically continuous hoses and fittings used	Preventative	Both
Tanks or other equipment being vacuumed are open to atmosphere prior to starting work	Preventative	Human Action
Four gas monitor for Vacuum Truck operator if certain conditions exist (flammable materials, in a hazardous classified area, using a rotary lobe truck, etc.)	Preventative	Both
Debris tank level gauge being used and monitored	Preventative	Both
Warning tape and barricades and being respected	Preventative	Human Action
Low rate of flow being used at start to avoid splash loading and generating of static	Preventative	Human Action
Cleaning of the Vacuum Truck prior to loading unless products are similar	Preventative	Human Action
Vacuum breaker or E-stop in place for dry vacuum trucks	Preventative	Both
Emergency management • Fire extinguisher available and understood how/when to use • Spill response kit available and understood how/when to use	Mitigative	Human Action
PPE requirements being adhered to, based off of the SDS for the material(s)	Mitigative	Human Action