

Bruce

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87282-87295

VINYL CHLORIDE (VCM) TANK CAR LOADING PROCEDURE

1990

VINYL CHLORIDE (VCM) TANK CAR LOADING PROCEDURE

1. Close derails and set up blue flags. Set hand brakes and place wheel chocks in position.
2. Secure area against unauthorized personnel and all sources of ignition.

Check cars for the following:

- a. Four placard holders. Insert 4 new placards - (UN 1086)
- b. Proper stenciling, i.e., DOT No., water capacity, VINYL CHLORIDE in four inch letters, "Vinyl-cancer suspect" statement on dome.
- c. Test dates and test location for tank and safety relief valve must be on car. Tank test interval is 10 years, safety relief valve interval is 5 years. Year tested and year due test should be stenciled on car.

EXAMPLE: SRV TESTED - 1988 DUE - 1993 PPG L.C. LA
TANK TESTED - 1988 DUE - 1998

3. Lower access ramp onto car. Attach two grounding cables, one connected from loading line to tank car dome and one connected from rack to tank car handrail. Check both ends of grounding cables with a continuity meter.
4. Check gauging device to insure it is operational.

Float Device - Operate gauge rod until magnet in rod engages magnet in float. If rod and float magnets cannot be engaged or if float is stuck at top, notify Foreman.

5. Remove plugs from all valves and leave out during loading. Possible leak through on any of the car valve will trap VCM behind plug. Airline mask will be provided and used if necessary when removing plugs. Make sure all plugs are attached to the valves with a chain or cable. Install two 2" loading nipples, one in a liquid valve and one in the vapor valve.

6. Liquid and vapor hoses must be purged with nitrogen before removing plugs.

NOTE: Notify EC Operator each time you will be using the incinerator header.

Make sure the incinerator and equalizer valves at the loading stations are closed.

Pressurize both hoses with nitrogen. Shut off nitrogen and release pressure to the incinerator header. (Repeat this procedure three (3) more times.

7. Connect the liquid loading hose to the liquid valve nipple. Close bleed valve on the nipple.
8. Connect the vapor line to the vapor valve nipple. Close the bleed valve on the nipple.
 - a. Pressurize liquid and vapor hoses to 75 psig with nitrogen. Leak check all connections with Leak Tek, including the outlet flanges on valves when present. Correct any leaks before loading.
 - b. Secure a 2" plug with a nitrogen adaptor attached in the other liquid valve and check the valve face flange for leaks with nitrogen at 75 psig. Correct any leaks before loading.
9. Open both liquid and vapor valves on the tank car. Note and record returned tank car pressure on Loading Form.
10. Connect portable oxygen analyzer and analyze gas sample for oxygen content.
11. If oxygen content is greater than 1,000 ppm the car must be pressurized to 50 PSIG with nitrogen, blown down to the VCM incinerator and recheck to make sure the vapor space contains less than 1,000 ppm oxygen. If test is good the car must be equalized to sphere while loading.
12. If car is to be stabilized, phenol must be added to pipe connected to liquid valve on car prior to hooking up loading hose.

NOTE: Foreman or Leadman will notify Tankerman if certain cars are to be stabilized.

Use caution when adding phenol. Wear glasses, gloves, goggles and apron.

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13. When ready to load open suction line from sphere and suction and discharge valves on pump. Make sure re-circulation line back to sphere being used for loading is open about one round. Close 1/2" valve on re-circulation line at pumps.

Use caution during line up of sphere and pump. Look for valves and packing leaks. Correct all leaks before loading.

14. Open loading valve and gravity feed car for a few minutes before starting loading pump.
 - a. Watch for leaking flanges, hammer unions, hoses, etc. Leaks must be corrected before loading starts.
 - b. Loading pumps must be started from the pump pad only. Pump seals and valve packing should be inspected frequently while loading is in progress.
15. Consult applicable tank car outage table, at the appropriate temperature, for loading outage.
16. When loading is completed:
 - a. Shut down loading pump if no other car is to be loaded and close liquid loading valve on rack.
 - b. Sample vapor space in car as before for oxygen content, then close angle valve on car. If oxygen content is in spec (500 ppm), proceed to clear VCM from loading and vapor hoses.
 - c. If the oxygen content is not in spec (500 ppm), pressure car up to 50 psig of nitrogen and blowdown to VCM incinerator. Continue this step until the car is in spec, (500 ppm or lower).
 - d. With nitrogen, and using block and bleed system, force VCM from loading hose into car. The time required to do this without adding excess nitrogen to the car will have to be determined by experience, (approximately 3-4 times).
 - e. Close off liquid angle valve and vapor valve on the car. Connect the short purge hose between the liquid and vapor fittings on the car. Open the bleed valves on the fittings.
 - f. Purge liquid and vapor hoses to the VCM incinerator header with nitrogen for approximately 3 minutes.

17. Depressurize both liquid and vapor hoses. Plug ends of hoses with proper fittings. Remove piping to liquid and vapor valves.

18. Check all angle valves on car. Secure all plugs in the valves with Teflon tape, using the appropriate size wrench. Check for leaks. If liquid leak is found on car, repairs must be made using an Airline mask. If you cannot correct the leak, call your Foreman.

If the car is going to Union Carbide, perform leak check per report form for Union Carbide.

19. Disconnect ground connections and seal dome cover. Apply VCM I.D. dome tag. Raise access ramp from the car.

20. Complete Loading Report. Car is now ready for shipment.

a. Remove the wheel chocks.

b. Open blue flag signs.

c. Leave derails closed.

21. After finishing at rack and before leaving area secure loading pumps at sphere.

Close discharge valves and open 1/2" valve on re-circulation line to float line back to sphere. Leave sphere suction valve open to float lines back to sphere.

KEY POINTS

1. Per DOT regulations, severe penalties can be imposed upon us for not placarding tank cars properly.
2. Check to make sure all port hole covers are on the dome and are closed after loading.
3. A rain cap must be in place and attached to each dome lid.
4. Hands on training will be provided by an experienced Tankerman.

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PROCEDURE FOR SAMPLING VCM TANK CARS

1. Connect closed system sampling apparatus to Camlock (R) coupling at bleed valve point on liquid loading line.
2. Connect sample coil to sampling apparatus.
3. Close by-pass valves on each side of sample coil.
4. Open both valves to sample coil.
5. Open liquid angle valve on car and bleed valve on loading line.
6. Open discharge end of sampling apparatus to control system and allow VCM to flow through sample coil about two minutes to control system.
7. Close sample coil valves and discharge to control system.
8. Pressurize sampling hose with nitrogen.
9. Open by-pass on each side of sample coil and allow nitrogen to flow into car about three minutes.
10. Close bleed valve on loading line and shut off nitrogen.
11. Close by-pass valves on each end of sample coil and disconnect coil.
12. Disconnect sampling apparatus from bleed valve on loading line.
13. Clear VCM from loading line following outline in "Tank Car Loading Procedure".

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Thompson

VINYL CHLORIDE EMISSIONS CONTROL PROGRAM

PLANT "B" SHIPPING DEPARTMENT

1990

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VINYL CHLORIDE EMISSIONS CONTROL PROGRAM

PLANT "B" SHIPPING DEPARTMENT

I. INTRODUCTION

Vinyl chloride monomer (VCM) is a cancer suspect agent. Federal laws apply to the manufacture, handling, and storage of VCM. Specifically, these laws deal with employee exposure to VCM and to the amount of VCM that can be released to the environment.

Employee exposure limits are set by the Occupational Safety and Health Act (OSHA). The current OSHA permissible exposure limit for VCM is as follows: (1) No employee may be exposed to VCM at concentrations greater than 1 ppm averaged over any 8 hour period; (2) no employee may be exposed to VCM at concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes; (3) no employee may be exposed to VCM by direct contact with liquid VCM.

Releases of VCM to the environment are governed by the Environmental Protection Agency (EPA). Following EPA guidelines, PPG has established a leak detection program in all areas of VCM manufacture, storage, or handling. The Plant "B" Shipping Department has such a leak detection program. The program covers the VCM tank car loading rack and is outlined in the remainder of this section of the standard operating manual.

II. LEAK DETECTION - VCM LOADING RACK

A. Fixed Point Monitoring

An Arcas -

The Shipping Department is responsible for maintaining the instrument gas supplies. Gas cylinders must be checked daily to insure an adequate supply is on hand. The pressure of each cylinder connected to the analyzer also must be noted and recorded on the cylinder log sheet.

The Arcas system provides for alarm and leak detection. A detection of 5 ppm (parts per million) or greater is classified as an alarm. An audible alarm sounds on the tank car loading rack at an alarm panel, while indicating lights show the sample point which is alarming. An alarm will also sound in both the EC/HCL and VCII control rooms. Personnel at these two units are responsible for investigating all leaks detected at the tank car loading rack when Shipping personnel are not working at the rack.

The alarm at the tank car rack alarm panel will sound until it is acknowledged by Shipping (or other) personnel. Two successive detections of 5 ppm or greater is classified as a leak. All analytical determinations are recorded on a hard copy printout in EC/HCL control room, showing the sample point and level of VC detected. Operators at EC/HCL will notify Shipping personnel as to the sample point and level of VC for each alarm. Shipping personnel are responsible for correcting the leak problem. Once the leak has been eliminated, notify EC/HCL personnel to report the corrective action taken to resolve the leak. The operator will record this information on the hard copy printout, which will be maintained in the unit's files.

The sample points, as they are identified on the printout and the alarm panel are shown below:

Sample Point Location for VCM Monitor

Stream 1	Track 4	Station 1
Stream 2	Track 4	Station 2
Stream 3	Track 4	Station 3
Stream 4	Track 4	Station 4
Stream 5	Track 5	Station 1
Stream 6	Track 5	Station 2
Stream 7	Track 5	Station 3
Stream 8	Track 5	Station 4
Stream 9	Spare	
Stream 10	Calibration	

B. Portable Monitoring

An HNU Model PL 101 or a TIP II model is employed for portable leak detection. The instrument is calibrated weekly and is used for both leak patrol and pinpointing leaks detected by the fixed point monitoring system.

C. Leak Patrol

The VCM loading rack is surveyed once per week using the HNU portable analyzer. Included in this survey is a check of flanges, valves, pump seals, pressure gauges, etc. Results of this monitoring are recorded on a form and the records retained in the Shipping Department files.

III. REACTION TO LEAKS DETECTED BY ARCAS

A leak detected by the Arcas analyzer is defined as two successive detections of 5 ppm VCM or greater. When a leak occurs it must be located and eliminated by the prompt action of loading personnel or their supervisors.

The procedure below outlines the steps to be taken when a leak occurs.

Procedure for Locating a VCM Leak

1. Determine the location of the leak as indicated by the alarm panel.
2. Wearing a full face breathing air mask, inspect the area near the alarming station in an effort to determine the leak source visually. If a leak is found, attempt to correct it by appropriate action.
3. If visual inspection is unsuccessful, employ the HNU Model P 101 portable analyzer and continue to seek out the leak source. Correct any leak found by taking appropriate action.

NOTE: Notify your supervisor to assist you with the HNU if necessary.

4. Complete the VCM leak report. Record the date, time, cause, and location of leak on the "Leak Report" and in the VCM rack logbook. Include a brief statement of your corrective action to eliminate the leak. Also, report your corrective action to the EC/HCL operator.

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Script for VC film

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Start with BLEVE film.

1. start 51 stop 312
2. start 334 stop 790
3. start 1004 stop 1080
4. start 1362 stop 1413
5. start 1449 (Houston) stop 1535 (New York)
6. start 1652 stop 1728 for credits

PPG loading procedure film script

1. Classroom shot
- 1b. Before any vinyl chloride tank cars can be loaded, the loading area must be secured. No unauthorized personnel or sources of ignition are allowed.
2. Next, close the blue flag and derail.
3. Place the wheel chocks in position and set the tank car hand brakes. Make sure the brake pads are touching the wheels.
4. If needed, insert 4 new UN#1086 placards. Check the tank car stenciling and due test dates. The tank must be pressure checked every 10 years. The safety relief valve must be tested every 5 years.
5. Before loading, check the Do Not Load List, tank car strapping table, and start the various paperwork involved at the loading rack.
- 5b. Lower the access ramp and lock in place.
6. Attach the two grounding cables. One wire, seen here, is connected from the tank car handrail to the loading rack. The other wire is connected from the loading line to the tank car dome. Check for ground continuity. This will prevent any static electricity that could occur while loading.
7. Check the gauging device to insure it is operational. The rod should engage with the metal float near the bottom. If the rod does not engage, the car can not be loaded.
8. Here is what the gauging device, liquid loading legs, and the bottom of the safety relief valve look like outside the car. Notice the float does not start moving until there is about 2 feet of material in the car.

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9. Remove the plugs from all valves and leave out during loading. Make sure all plugs are attached to the valves with a chain or cable.
10. Install the 2 inch vapor valve nipple and tighten securely with a pipe wrench.
11. Install the 2 inch liquid valve nipple and tighten securely.
12. Liquid and vapor hoses must be purged with nitrogen before removing plugs. First, make sure the incinerator and equalizer valves at the loading stations are closed. Next, open the nitrogen valve and pressurize both hoses. Shut off the nitrogen and release the pressure to the incinerator header. This procedure should be performed 3 times.
13. Remove the liquid loading hose plug and connect the hose to the liquid valve nipple. The bleed valve on the nipple should be closed.
14. Connect the vapor line to the vapor valve nipple. Close the bleed valve on the nipple.
15. Pressurize liquid and vapor hoses with nitrogen. Leak check all connections with Leak Tek, including the outlet flanges on valves. Correct any leaks before loading.
16. Here is an example of a valve face flange leak. The valve must be changed or repaired before loading.
17. Insert a 2 inch plug with a nitrogen adaptor into the other liquid valve and check the valve face flange for leaks with nitrogen. Repair any leaks before loading.
18. Remove the liquid valve pressure checker adaptor before loading.
19. Open both liquid and vapor valves on the tank car. Note and record tank car pressure on the loading form. A normal car has less than 20 pounds of gauge pressure. Connect a portable oxygen analyzer and analyze the gas sample for oxygen content. If oxygen content is greater than 1,000 ppm the car must be pressurized to 50 PSIG with nitrogen, blown down to the incinerator and rechecked to make sure the vapor space meets specification. This oxygen check insures non-polymerization of the vinyl chloride with oxygen.
20. When ready to load, open the pump suction valves from sphere. Make sure the re-circulation line back to the sphere being used for loading is open about one round.

- 20b. ~~Close~~ the 1/2" valve on the re-circulation line. Open the automatic pump discharge valves and press the start button for both pumps.
21. Partially open the loading valve and gravity feed car for a few minutes. Watch for leaking flanges, hammer unions, hoses, and connections. Leaks must be corrected before loading starts. Fully open the loading valve and again check for leaks. The loading pump may now be started.
22. Loading pumps must be started from the pump pad only. Pump seals and valve packing should be inspected frequently while loading is in progress.
23. When the tank car pressure reaches 40 pounds of gauge pressure, open the equalization valve. *The Sphere Pressure*
24. When the tank car level gauge reaches its loaded level, close the loading and equalization valves and slightly open the incinerator valve.
25. Connect the short purge hose between the liquid and vapor nipples.
26. Making use of the double block and bleed system, force vinyl chloride vapors from the vent hose into the car with nitrogen. Open and close the vapor valve 3 to 4 times to clear the hose. This procedure must also be followed for the liquid line and valve. Open and close the liquid valve 3 to 4 times.
27. With the nitrogen open to the liquid hose and the tank car liquid and vapor valves shut, open the bleed valves on the liquid and vent nipples and purge the loading and vent lines to the incinerator for 3 minutes. The incinerator pressure should not exceed 5 pounds of gauge pressure.
28. ~~Shut~~ off the nitrogen and depressurize both liquid and ~~vapor~~ hoses to the incinerator. When the line pressure is zero, shut off the incinerator valve and nitrogen block valve.
29. Shut off the liquid bleed valve and carefully remove the purge hose. Disconnect the liquid hose and insert and tighten the hose plug. Remove and plug the remaining connections.

30. Install the gauge rod cover and secure all Teflon taped plugs in the valves using the appropriate size wrench. Check for leaks with a vinyl detection meter. If a liquid leak is found, repairs must be made using an Airline mask. If you cannot correct the leak, call your Foreman. Be sure to check around all flanged joints, valve plugs and packing, the gauge rod and safety relief valve opening.
31. If no leaks are found, close and pin the dome lid. Attach a metal numbered seal and product tag.
32. Check all 4 port hole covers and dome lid rain cap. PFG and you can be fined for non compliance.
33. The car is now ready for shipment. Remove the wheel chocks.
34. Open the blue flag sign and leave the derail closed.
35. After the vinyl tank car loading at the rack is complete. Shut off both pumps, open the 1/2 inch valve on the recirculation line to float line back to sphere, and close the automatic pump discharge valves. Leave the sphere suction valve open to prevent pressure buildup.
36. In the event of a leak occurring while loading, an airline mask or self contained breathing apparatus must be put on before repairing the leak. After the mask is securely in place, close the loading valve and blow nitrogen through the loading hose into the car. Open and close the loading valve several times, obtain the correct tools, and repair the leak.
37. On back shifts or whenever the vinyl rack is vacant and a vinyl leak is reported, a self contained breathing apparatus must be secured and carried back to the vinyl rack. The vinyl rack is constantly monitored for vinyl chloride. A concentration of 5 ppm vinyl chloride will alarm the detection system. If any of the 8 sample points pick up 2 consecutive readings of 5 ppm or more, a leak has occurred and corrective action must be taken. Using the vinyl detection meter, find and correct the problem. A leaking hose connection is seen here.