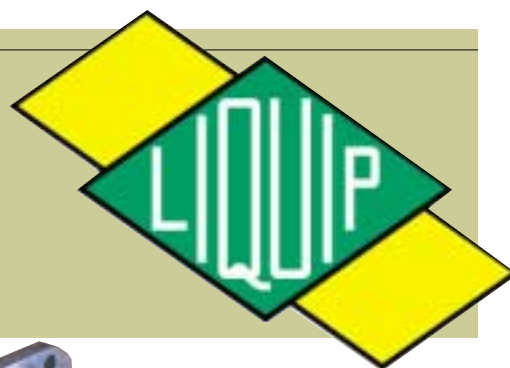


## Road Tanker Equipment Service and Maintenance



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### Equipment covered:

- **Manhole covers -**  
VOH200, VOH500,  
VOH400, VOH700
- **Footvalves -**  
SLV5-AR0Z
- **Vapor recovery vents -**  
AVV3, AVV075V
- **API outlet adaptors -**  
API403, API450 series
- **Vents -**  
PWV104, PWV204
- **Overfill protection**  
probes LC99, LC95,  
AGP102, AGP105



This document was written by Liquip Sales Pty Limited, and is intended to be used as a guide to owners and operators of road tankers.

It does not represent the complete and final word on tanker maintenance and serves as a recommendation only.

A lack of regular maintenance and periodic checks to vital fluid and vapor handling equipment on road tankers is potentially dangerous and adds to the running cost of the vehicle in unplanned maintenance emergencies and tanker downtime.

Through regular maintenance and periodic inspections, we can make the petroleum transport

industry safer and more efficient.

We trust that you will find it useful and informative.

Happy trucking.



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### Codes and Regulations

This document should be read in conjunction with AIP CP15 "Code of Practice for Road Tanker Maintenance (Tank and Fittings)", which was first published in 1985 by the Australian Institute of Petroleum and remains one of the better publica-

tions for maintenance. Also referenced is AIP CP7 - 1981, section 5 on safety related maintenance recommendations, AS2809, ACTDG and Workcover Authority of NSW.



## Recommended Monthly Inspections - walkway

- |   |  |   |  |
|---|--|---|--|
| 1. Visual inspection of hatches and vents for damage and leaks. Open 9" inspection hatch to check seal for degradation (swelling, cracking) and damage that could cause a leak. Hatch operation (smooth) and spindles (for excessive wear). | 2. Visual inspection of tank interior through hatch. Look for foreign objects, security of dip and fill tubes and lifting cable. | 3. If fitted, with hatch still open, check manual operation of camlift and observe internal valve opens to full lift. | 4. Check seals and security of dip and fill adaptors. Ensure caps are chained. |
| 5. If fitted, check security of ladder and ladder mounting bolts.   | 6. If fitted, check operation of air valves on walkway.  | 7. If fitted, visually inspect vapor hoses for damage and leaks.  |  |

## Recommended 6 Monthly Inspections - walkway

- |   |  |  |   |
|---|--|--|---|
| 1. Visual inspection of hatches and vents for damage and leaks. Open 9" inspection hatch to check seal for degradation (swelling, cracking) and any damage that could cause a leak, plus check emergency vent operation. Lubricate hinge pins and grease cam-track on bridge. | 2. Visual inspection of tank interior through hatch. Look for foreign objects, security of dip and fill tubes and lifting cable. | 3. If fitted, with hatch open, check manual operation of camlift and ensure internal valve opens completely. Grease cam track. | 4. Check tightness of main hatch securing bolt or bolts. If any are loose, re-torque all hatch bolts. |
| 5. Check seals and security of dip and fill adaptors. Ensure caps are chained.  | 6. If fitted, check security of ladder and ladder mounting bolts.  | 7. If fitted, check operation of air valves.   | 8. If fitted, visually inspect vapor hoses for damage and leaks.                                      |

## Recommended Annual Inspections - walkway

- |  |  |   |  |  |  |   |  |  |
|--|--|---|--|--|--|---|--|--|
| 1. Remove PV & vapor vents. Strip, clean and inspect. Replace all suspect seals, re-assemble, bench-test & re-fit. Bench test includes testing all spring settings (15kPa pressure, 2 kPa vacuum) & rollover ball removal (inverted test—all vents should close) | 2. Fit blanks to vent openings & pressure test to 20 kPa and check for leaks. (Care should be taken if you use pressurized air). Re-torque hatch bolts & lubricate cam & hinges. | 3. Re-fit vents with new gaskets, check dip & fill adaptors are secure & chained. | 4. Inspect interior of tank through hatch, checking for foreign objects & security of dip tube, fill tube & lifting cable. | 5. If fitted, check manual operation of camlift & that internal valve lifts to full height. Grease cam-tracks. | 6. Visually inspect state of anti-skid surface on walkway. | 7. If fitted, check operation of air valves on walkway & that internal valves & vapor vents fully open & close. | 8. If fitted, visually inspect vapor hoses for damage and leaks. | 9. If fitted, check security of ladder and mounting bolts. Check walkway drain tubes are clear and discharge in a safe area. |
|--|--|---|--|--|--|---|--|--|

## Recommended Monthly Inspections - ground level

- |  |  |   |
|--|--|---|
| 1. Visually inspect tank shell, sub-frame, pipe-work and joints for cracks and leaks | 4. Check security of ancillary equipment - hose tray, signs, tool-box, spare wheel carrier, mudguards, lights. | trol valves and brake interlock. Check air service unit for pressure setting and oil. |
| 2. Visually inspect electrical wiring conduit for damage and cracks or gaps          | 5. Check fire extinguishers tagged and emergency procedure guide, hazard signs and torch are in cab.           | 7. Check continuity of static reel.   |
| 3. Check security of outlet valve caps and ensure they are chained.                  | 6. If fitted, check operation of pneumatic con-  | 8. Check sight glass for cracks & leaks. Replace as necessary.                        |



## Recommended 6 Monthly Inspections - ground level

- |   |  |  |
|---|--|--|
| 1. Visually inspect tank shell, sub-frame, pipe-work and joints for cracks and leaks. | spare wheel carrier, mudguards, lights.  | service unit for pressure setting and oil.   |
| 2. Visually inspect electrical wiring conduit for damage and cracks or gaps.          | 5. Check fire extinguishers tagged and emergency procedure guide, hazard signs and torch are in cab. | 8. Check continuity of static reel.  |
| 3. Check security of outlet valve caps and ensure they are chained.                   | 6. Visually inspect hoses and hose couplings for damage.   | 9. Test rollover sensor if fitted by tilting 45 degrees sideways. Isolation switch should activate (and engine strangler should shut if fitted). |
| 4. Check security of ancillary equipment - hose tray, signs, tool-box,                | 7. If fitted, check operation of pneumatic control valves and brake interlock. Check air             |  |

## Recommended Annual Inspections - ground level

- |  |  |   |
|--|--|---|
| 1. With tank pressurized check that outlet valve seals with the internal valve open, and that the internal valve seals with the outlet valve open. | 3. Visually inspect the tank, joints, hoses and wiring as per 6 monthly service.                                   | 6. Check pressure settings of air service unit (should be 6 bar) and top-up oils if applicable. |
| 2. With tank pressurized, check that vapor vents are sealing. Then open vapor vents and check vapor ducting system for leaks.                      | 4. Check for equipment fastenings, presence of safety equipment and pneumatic operations as per 6 monthly service. |   |
|  | 5. Check continuity of static reel.  |   |

## VOH200, 400, 500 & 700 Manhole Covers

Manhole covers incorporate an emergency vent (also known as a fire engulfment vent), and a pressure / vacuum vent. All have seals and springs which must be maintained to ensure continued proper function.

Aside from checking the seals, springs and general operation, care should be taken to ensure that the inspection hatch is operating properly.

The method of attachment should also be checked. For example, check that the clamp-band is on securely and the lock-nut is secure.

### Visual Inspection of Manholes

Liquip recommends replacing the gaskets on the dip & fill points, vapour vent and PVV prior to carrying out a hydro test. The 9" lid seal should be visually inspected for wear. If in doubt, replace it. In most cases the clamp band seal

shouldn't need replacing, unless it shows signs of wear.

The bridge pins and pivot point on the 9" bridge & handle should be inspected & grease applied on the cam lever lock points on the bridge itself.

Apart from that, very little will deteriorate on the manhole itself. Swing-back hatches are held by four screw wing nuts. The hinge pin and the pins holding the 4 locking nuts will need greasing to ensure that they operate freely.

### Emergency Vents

Emergency Vents can be tested during the bi-annual hydrostatic tank test. The emergency vent will begin to leak at the prescribed venting pressure, and once you have established that this occurs at the right setting, you can wedge it closed and carry out the rest of the hydro test on

the compartment.

When camming handle/bridge to open or close the emergency vent, check that the spacer tube is moving freely in the bridge.

If emergency vent has fixed bridge, vent must be activated (e.g. by hydrostatically pressurising cpt) at least once a year to check free movement of the spacer tube in the bridge.

### Emergency Vent

- Opens at 30 kPa
- Capacity 8500 m<sup>3</sup>/hr @ 45 kPa

### PVV104 Pressure

- Opens at 15 kPa
- Capacity 98 m<sup>3</sup>/hr @ 35 kPa

### PVV104 Vacuum

- Opens at 2 kPa
- Capacity 57 m<sup>3</sup>/hr @ 7 kPa



Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.

## Periodic Checks

### Recommended MONTHLY checks:

1. Visually inspect hatch fittings and vent for damage and leaks.
2. Visually check that centre bolt has clearance to bridge.
3. Visually check security of all fittings.

### Recommended SIX MONTHLY checks:

1. Visually inspect hatch and vent for damage and leaks.
2. Visually check that centre bolt has clearance to bridge.
3. Check coaming to walkway for cracks.
4. Open Emergency Vent Lid to check seal. Lubricate hinge pins and grease cam-track on bridge.
5. Check the free operation of the vertical spacer tube in the bridge.
6. Check tightness of main hatch securing bolts. Re-torque all hatch bolts to 10 to 12Nm (**high tensile screws**) or clamp band to 27 to 34Nm.

### Recommended ANNUAL checks:

1. Using air or water pressure test compartment to 20kPa. Blank all PV vents & wedge close the emergency vents.
2. Open emergency vent lid & remove all fittings from manhole cover.
3. Clean & inspect all fittings, replace suspect seals.
4. Re-fit fittings with new gaskets, check dip/fill adaptors are secured & chained.
5. Re-torque all hatch bolts to 10 to 12Nm or clamp band to 27 to 34Nm.
6. Lubricate cam and hinges, grease cam track.

7. Check overfill protection on probes (if part of manhole assembly).
8. Every 3 years: Check emergency vent function (can be done on the truck or on the bench). If on truck, the PV vents must be blanked. For 'fixed-bridge' style, check the free operation of the emergency vent annually.



## Footvalves

Footvalves are a vital piece of fluid handling equipment and should be treated accordingly.



The footvalve includes a sealing valve in the top half of the body, which is designed to withhold fuel inside the compartment, should the bottom half of the valve be sheared off.

The valve integrity should be regularly tested, by shutting the valve mid-way through a delivery, with the API adaptor open. The fuel flow should stop completely and be free of leaks. The air actuator may be tested by visually inspecting the poppet with the tank empty, and applying air to the actuator.

### VISUAL INSPECTION

The poppet seal has an array of sealing wings which are designed to achieve a seal even when the valve seat is slightly distorted due to the

tank flange distorting from the welding process. To inspect this properly (annually) either remove the complete valve from the flange or enter the tank and open the valve using normal means.

Don't use a lever or open the flap by hand - you will destroy the seal. The action of the valve is patented. The back of the valve seat lifts up, allows the poppet to pivot and open, and prevents it from tearing the seal - if you lift the poppet with a screw driver or by hand you will damage the seal.

While the poppet is open, check the roller and the roller pin. Then with valve closed, remove the diaphragm or ARO air ram and visually inspect. The diaphragm should be free of cracks, and not affected by fuel.

### VARIATIONS

Some SLV5s will be fitted with a diaphragm actuator which uses a diaphragm chamber to

enable compressed air to force the spring loaded poppet open, while newer versions are fitted with an air ram piston assembly.

The diaphragm can be visually inspected and/or replaced by removing 2 bolts which hold the cover in place. Check that the diaphragm itself is not eroded or damaged by product. If so, replace the diaphragm AND replace the shaft seal assembly. The product must leak past these seals to get to the diaphragm.

If fitted with the piston operator, if the plunger is returned into the housing when not pressurised there is a 99.9% chance that it is operating satisfactory and will for a long duration of time.

The SLV5CO and SLV5-NO are cable operated valves. Check cable condition and make sure the cable has enough length to allow the valve to close completely and enough tension to open fully.

Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.

## Periodic Checks

### Recommended MONTHLY checks:

1. Visually inspect valve for damage and leaks, externally only.
2. Visual check of security of all fittings.
3. Carry out operational test by closing valve during a delivery. Observe sight-glass for leaks.
4. Check operation of valve.

### Recommended SIX MONTHLY checks:

1. Visually inspect valve for damage and leaks, externally and via inspection hatch (enter tank or use mirror on probe).
2. Visual check of security of all fittings.
3. Check operation of valve.
4. Check tightness of bolts. Re-torque pipeline and air ram mount bolts to 24-27Nm. Re-torque tank flange bolts to 10-12 Nm.

### Recommended ANNUAL checks:

1. Visually inspect valve for damage and leaks, externally and via inspection hatch (enter tank or use mirror on probe).
2. Visual check of security of all fittings.
3. Check operation of valve.
4. Check tightness of bolts. Re-torque pipeline and air ram mount bolts to 24-27Nm. Re-torque tank flange bolts to 10-12 Nm.

## Vents



This item is available as a Service Exchange part. Service Exchange parts carry 6 month factory warranty.

Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.

Vents allow the tank to “breathe” during normal operation.

There are 4 main vents commonly used on road tankers. They are: PVV104, found on the underside of every 9” inspection hatch on manhole covers; PVV204, commonly used as an additional vent providing extra air intake during gravity discharge; 9” emergency vent found on the manhole cover and serving as a emergency bulk pressure release during fire engulfment, rollover or during loading if other vents fail; vapor recovery vents which provide free release of vapors during loading.

Vapor vents and emergency vents are covered elsewhere in this publication.

The PVV204 and the PVV104 contain a rollover ball to close the vent in event of a rollover. The operation of the vent must be tested annually to ensure the rollover ball is operating as

designed. Normal spring settings and sealing of the vents should be tested annually.

### FUNCTION TESTS

Vent function should be tested according to AS2809, CP15 and others. Liquip can perform this testing, or alternatively have testing rigs available for sale.

### Servicing and Inspection of Pressure Vacuum Vents

Given the nature of this equipment, Liquip recommends that our service exchange program for periodic exchange of pressure vacuum vents at reduced prices. Liquip branches are accredited to service vents according to the design regulations, and have the necessary equipment to ensure spring settings are correct. Testing involves checking the vacuum and pressure settings using equipment that has been certified and approved. Pressure

gauges must have a current calibration certificate.

If you choose not use our service exchange program, the pressure vacuum vents must be completely dismantled, thoroughly inspected to ensure that the integral parts are operating smoothly, cleanly and not jammed or jamming. The springs should be in good condition, and the pressure and vacuum settings must be checked. All springs are stainless steel to withstand rusting from elements present in the atmosphere.

Consult the overhaul manuals and data sheets for relevant information. You may also obtain information from your Liquip Distributor to ensure that you correctly re-assemble the components to ensure smooth operation.

We seriously recommend our exchange service for pressure vacuum vents.

## Periodic checks

### Recommended MONTHLY checks:

1. Visually inspect vent for damage and leaks. (Inspect hatch will need to be opened to access the PVV104).
2. Visual check of security of all fittings.

### Recommended SIX MONTHLY checks:

1. Visually inspect vent for damage and leaks.
2. Visual check of security of all fittings.
3. Check tightness of screws. Re-torque PVV104 mount screws to 3.5Nm. Re-torque PVV204 mount bolts to 10-12Nm

### Recommended ANNUAL checks:

1. When VOCs not present, remove PV vent from manhole cover or walkway.
2. Clean and inspect all parts, replace suspect seals.
3. Ensure gauze meshes are in place and are in good condition.
4. Bench test vent to check performance is within specification.
5. Re-fit to manhole cover or walkway with new gasket.
6. Check tightness of screws. Re-torque PVV104 mount screws to 3.5Nm. Re-torque PVV204 mount bolts to 10-12Nm.

## Vapour Recovery Vents

Air operated vapor recovery vents provide a free vent to channel vapors from the compartment during loading, to a central collection point on the tanker.

It consists of a downward acting spring return poppet actuated by air pressure applied from above.

A poppet o-ring provides the seal and should be checked regularly together with the operation of the air chamber.

Most oil companies now require vapor vents to be sequentially actuated. This simple feature makes the vapor vents in effect "self checking" by interlocking their operation with the overfill protection

system (if any vapor vent fails to open the overfill system will not give a permissive signal to enable loading).

The air actuator itself can be inspected for air leaks and the operation of the poppet can be checked by applying air.

### VARIATIONS

The AVV3 is a simple design which uses a diaphragm chamber to enable compressed air to force the spring loaded poppet down. Simple visual inspection of the diaphragm can be done by removing the 4 bolts on the top cover.

These valves give virtually no trouble except if the dia-

phragm deteriorates through vapours attacking it. If the diaphragm is deteriorated, replace the shaft seals to ensure that vapours from the compartment are not entering the valve.

Not all vents have a diaphragm and seal system. The AVV075V is a new design using a pneumatic ram cylinder to actuate the poppet. When necessary the o-rings on the piston within the chamber should be checked and replaced.

The AVV075 "breathes" down through the shaft and has no seal in the shaft area.



This item is available as a Service Exchange part. Service Exchange parts carry 6 month factory warranty.

**Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.**

## Periodic checks

### Recommended MONTHLY checks:

1. Visually inspect vent for damage and leaks.
2. Visual check of security of all fittings.

### Recommended SIX MONTHLY checks:

1. Visually inspect vent for damage and leaks.
2. Visual check of security of all fittings.
3. Check hose and clamps.
4. Check tightness of bolts. Re-torque mounting screws to 10 to 12Nm.
5. Check operation of vent.
6. With air pressure on listen for any signs of air leaks.

### Recommended ANNUAL checks:

1. When VOCs not present, remove vent from manhole cover or walkway.
2. Clean and inspect all parts, replace suspect seals.
3. Clean and inspect hose and replace if necessary.
4. Re-fit to manhole cover or walkway with new gasket.
5. Re-torque mounting screws

## API Outlet Adaptors

The API adaptor is the inlet and outlet to the compartment during loading and discharge.

Typically a handle operated valve, the sealing poppet is returned by a coiled spring behind the poppet.

During your periodic inspections, check the amount of wear on the nosecone. This wear is caused by the action of the terminal API coupler claws, and when significant wear occurs, the liquid seal between the API adaptor and API coupler could be compromised, resulting in leaking during loading, or in worst case, jamming or accidental disconnection.

Use a Liquip jig annually to do a quick wear test.

If the front of the API adaptor is worn replace the nosecone or the complete adaptor. API-RP1004 provides dimensional information for use as a guide.

The API has a flat spot in the bottom to assist in draining so rotation is not normally recommended (though it can be done).

Check shaft movement and ensure it has a maximum of 3mm "end float". That means the shaft can move horizontally a maximum of 3mm. Any more than 3mm and internal wear will be accelerated. A new cam lever assembly may be necessary.

### VISUAL INSPECTION

After hydro testing, operate the handle to see if the valve opens and closes cleanly. If there is any catching or harshness it should be inspected to find the cause.

The hydrostatic test checks the seal, but it is good practice to also visually inspect it's condition and the nose cone for wear.

Open the valve and tie the handle against the pin so it can't close when you have your fingers inside. Run your fingers around the "O" ring seal and feel for imperfections. Run your fingers around the sealing area of the aluminium nose cone to see if this is worn due to valve movement.

With the API450 series valves, very little wear takes place in this area. If the valve is used for chemicals and/or with Teflon trim, Teflon will wear the aluminium quickly and then if not addressed the valve will leak. To fix the sealing surface on a chemical trim valve use steel wool and run it over the Teflon seal and the sealing surface on the aluminium nose cone. The steel wool will clean it up and remove ragged edges which are produced by the slight Teflon seal movement due to road vibration when the vehicle travels.

### VARIATIONS

The API450 series is now the standard petroleum API adaptor, however thousands of API403 series valves remain in operation. These are repairable at any Liquip outlet, but are only sold for chemical use as new. The API401 adaptors are also repairable but not available as a Service Exchange item..



This item is available as a Service Exchange part. Service Exchange parts carry 6 month factory warranty.

**Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.**

## Periodic checks

### Recommended MONTHLY checks:

1. Visually inspect adaptor and pipeline for damage and leaks, particularly at the poppet o-ring, handle shaft and mounting flange.
2. Check cap levers

### Recommended SIX MONTHLY checks:

1. Visually inspect adaptor and pipeline for damage and leaks, particularly at the poppet o-ring, handle shaft and mounting flange.
2. Check tightness of mounting bolts. Re-torque to 24-27Nm.
3. Check operation of adaptor to ensure smooth operation of the handle.
4. During discharge, shut off valve against flow of fuel. Remove hose to ensure

there are no leaks at the poppet.

5. Check any interlocks for operation.
6. Check cap by opening API adaptor to ensure it is capable of holding fuel.

### Recommended ANNUAL checks

1. Visually inspect adaptor and pipeline for damage and leaks, particularly at the poppet o-ring, handle shaft and mounting flange.
2. Check tightness of mount-

ing bolts. Re-torque to 24-27Nm.

3. Check operation of adaptor to ensure smooth operation of the handle.
4. During discharge, shut off valve against flow of fuel. Remove hose to ensure there are no leaks at the poppet.
5. Check any interlocks for operation.
6. Check cap by opening API adaptor to ensure it is capable of holding fuel.



## Overfill Protection

The overfill protection system is a critical safety system which should be regularly maintained to ensure continued safe loading operation.

As a critical safety device, optic overfill protection is designed to be self checking and fail safely (i.e. non-permissive), however periodic wet-testing (wetting the sensor when connected to the terminal monitor or tester to ensure it changes to non-permissive

signal) can identify any “rogue” sensors before they become involved in an overfill situation.

Wiring should also be periodically inspected to prevent inconvenient non-permissive red lights at the terminal.

Portable testers (HTA204) are available from Liquip to check the operation of individual sensors, the whole tanker or the terminal monitor.

If there are any interlocks, such as pressure switches in

the line attached to vapour recovery vents, check their operation.



Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.

### Periodic checks

#### Recommended MONTHLY checks:

1. Visually inspect probes and housing for damage and leaks.
2. Visual check of security of all fittings. Check probe is still tightly secure.

#### Recommended SIX MONTHLY checks:

1. Visually inspect probe and housing for damage and leaks.
2. When VOCs not present, visual check of security of all fittings. Check probe is still tightly secure.
3. Remove probe if necessary and check probe operation by dipping into product (wet cup test) and checking that the monitor shows wet. (Note: before removing, note and mark height to ensure correct trip point when re-installed)
4. Check to confirm the probe trip height meets the minimum ullage requirement.
5. Re-fit and torque bolts to 8.5Nm on VOH200-5. Torque probe retaining screws of PJB300 to 10–12Nm and 2" nut to 15–20 Nm.

#### Recommended ANNUAL checks:

1. Visually inspect probe and housing for damage and leaks.
2. When VOCs not present, visual check of security of all fittings. Check probe is still tightly secure.
3. Remove probe if necessary and check probe operation by dipping into product and checking that the monitor shows wet. (Note: before removing, note and mark height to ensure correct trip point when re-installed)
4. Re-fit and torque bolts to 8.5Nm on VOH200-5. Torque probe retaining screws of PJB300 to 10–12Nm and 2" nut to 15–20 Nm.
5. Using tester, check operation of sequential vapour vent interlock.



## Truck Plug periodic checks



Refer to AIP CP15 - 1986 for information re Pre-Shift Safety Check, Three Monthly or 50,000 km (whichever comes first) and Annual or 200,000 km (whichever comes first) Inspections.

### Recommended MONTHLY checks:

1. Visually inspect truck plug for damage and water penetration.
2. Visual check of security of all fittings.
3. Check cap.

### Recommended SIX MONTHLY checks:

1. Visually inspect truck plug for damage and water penetration.
2. Visual check of security of all fittings.
3. Remove cover and check seal, replace if necessary.
4. Check wiring is secure and in good condition.
5. Check grounding continuity.
6. Check grounding bolts and re-torque to 8.5Nm.
7. Re-fit cover with seal and torque bolts to 8.5Nm.

### Recommended ANNUAL checks:

1. Visually inspect truck plug for damage and water penetration.
2. Visual check of security of all fittings.
3. Remove cover and check seal, replace if necessary.
4. Check wiring is secure and in good condition.
5. Check grounding continuity.
6. Check grounding bolts and re-torque to 8.5Nm.
7. Re-fit cover with seal and torque bolts to 8.5Nm.

## Wiring and Conduit periodic checks



### Recommended MONTHLY checks:

1. Visually inspect conduit for damage and water penetration.
2. Visual check of security of all fittings.

### Recommended SIX MONTHLY checks:

1. Visually inspect conduit for damage and water penetration.
2. Visual check of security of all fittings.
3. Check seal on junction boxes. Replace if necessary.
4. Check wiring is secure and in good condition.
5. Check securing bolts and re-torque.

### Recommended ANNUAL checks:

1. Visually inspect conduit for damage and leaks.
2. Visual check of security of all fittings.
3. Check seal on junction boxes. Replace if necessary.
4. Check wiring is secure and in good condition.
5. Check securing bolts and re-torque.

## Pipelines periodic checks

### Recommended MONTHLY checks:

1. Visually inspect pipelines for damage and leaks.
2. Visual check of security of all fittings.

### Recommended SIX MONTHLY checks:

1. Visually inspect pipelines for damage and leaks.
2. Visual check of security of all fittings.
3. Check tightness of bolts. Re-torque bolts to 24-27Nm.

### Recommended ANNUAL checks:

1. Visually inspect pipelines for damage and leaks.
2. Visual check of security of all fittings.
3. Check tightness of bolts. Re-torque bolts to 24-27Nm.



## Vapor adaptor periodic checks

### Recommended MONTHLY checks:

1. Visually inspect adaptor and pipeline for damage and leaks.
2. Visual check of security of all fittings.
3. Check cap

### Recommended THREE MONTHLY checks:

1. Visually inspect adaptor and pipeline for damage and leaks.
2. Visual check of security of all fittings.
3. Check operation of adaptor.
4. Check tightness of bolts. Re-torque bolts to 24-27Nm.
5. Check any interlocks for operation
6. Check cap

### Recommended ANNUAL checks

1. Visually inspect adaptor and pipeline for damage and leaks.
2. Visual check of security of all fittings.
3. Check operation of adaptor.
4. Check tightness of bolts. Re-torque bolts to 24-27Nm.
5. Check any interlocks for operation
6. Check cap



## Guard Bar periodic checks



### Recommended MONTHLY checks:

1. Lift bar, check operation of hinges, safety catch and air interlock.
2. Visual check of security of all fittings.

### Recommended THREE MONTHLY checks:

1. Lift bar, check operation of hinges, safety catch and air interlock.
2. Visual check of security of all fittings.
3. Check operation of air valve on brake interlock.
4. Lubricate pivot points if required.

### Recommended ANNUAL checks:

1. Lift bar, check operation of hinges, safety catch and air interlock.
2. Visual check of security of all fittings.
3. Check operation of air valve on brake interlock.
4. Lubricate pivot points if required.

## Pneumatics (air circuit) periodic checks



### Recommended MONTHLY checks:

1. Check air pressure setting.
2. Visually inspect lines and fittings for damage.
3. Listen for air leaks while walking around the vehicle.
4. Drain air dryer unit and/or regulator base and air tanks.

### Recommended THREE MONTHLY checks:

1. Check air pressure setting.
2. Visually inspect lines and fittings for damage.
3. Check the air lubricators (if fitted) for oil level and that lubricator flow rate is correctly set.
4. Drain air dryer unit and/or regulator base and air tanks.
5. With the system under pressure, check for audible air leaks when the valve are operated. Check for falling air pressure over several minutes.

### Recommended ANNUAL checks:

1. Check air pressure setting.
2. Visually inspect lines and fittings for damage.
3. Check the air lubricators (if fitted) for oil level and that lubricator flow rate is correctly set.
4. Drain air dryer unit and/or regulator base and air tanks.
5. With the system under pressure, check for audible air leaks when the valve are operated. Check for falling air pressure over several minutes.
6. With tank valves all actuated, check operation of emergency stop buttons on tanker plus auxiliary operators such as brake override.

## GENERAL NOTES

### Operating Conditions

The recommended Service and Inspection periods are based on normal operating conditions which would see between 100 and 140 hours per week of active operation. Equipment being used in the transportation of chemicals and unleaded petroleum would normally require shorter service and inspection periods due to the nature of these products.

### Hydrostatic Tests

Road tankers carrying petroleum products must be regularly hydrostatically tested according to AS2809.2 - 1999 and AS2680.

Hydrostatic testing involves filling the tanker with water and adding pressurized air on top, then checking for air leaks with soapy water.

It can also be done in conjunction with required vents tests.

### Testing Jigs

Testing jigs and rigs can make the job of testing and maintaining tanker equipment much easier and more accurate.

Liquip can make to order, a complete range of testing equipment to serve your maintenance needs.

Testing jigs are available for PVV104/PVV204, API nose-cone.

Make sure gauges are calibrated as per manufacturer recommendations, and that the appropriate gauge is being used. Example: if testing to 35 kPa, the gauge should have a maximum reading of 50 kPa, not 10,000 kPa.

### Test Procedures

Always follow test procedures as specified in appropriate Australian Standards and Australian Institute of Petroleum Codes of Practice.

### Service Exchange

Liquip have a complete range of tanker equipment available as Service Exchange items. This is a program developed by Liquip to ensure minimal downtime.

Liquip stock a range of completely refurbished equipment, which has been overhauled, critical components replaced, re-assembled and tested. They come with a 6 month warranty.

To utilize this service, simply purchase the Service Exchange component, and when you return your original item, we will credit you for up to half of the original value.

With such critical equipment you do not want to risk repairing it wrongly.



## Codes and Regulations

There are many existing codes and regulations already in place to give guidance and instruction on your responsibilities as a tanker operator/owner with regards to maintenance and inspection of the tank and fittings.

Australian Standards (AS)

Australian Institute of Petroleum (AIP)

Australian Dangerous Goods Code (ADG)

### **AS2809.2-1999**

**3.5.1 Hatches, vents and valves** *At intervals not exceeding two and a half years, the pressure tightness of every hatch, vent, and valve, including vapour vents on the vapour recovery system, shall be tested at 25 kPa.....*

**3.5.2 Pressure-vacuum vents** *At intervals not exceeding two and a half years, P/V vents shall be removed and com-*

*pletely dismantled and cleaned. New seals and gaskets shall be fitted.....*

### **AUSTRALIAN DANGEROUS GOODS CODE**

**4.8.2** *A bulk container...that forms part of, or is attached to, a road vehicle must be:*

- A) *hydraulically tested at intervals of not more than 5 years to ensure that the tank continues to meet the test pressures specified.....*
- B) *Visually inspected internally and externally at intervals of not more than 5 years.....*

### **AIP SAFE LOAD PASS SYSTEM**

Published by the Australian Institute of Petroleum, the Safe Load Pass System is a system designed to ensure that tankers loading at partici-

pating terminals meet minimum equipment and inspection requirements.

Liquip are authorized to inspect and certify vehicles to this standard and issue Safe Load Passes.

Where vehicles do not load at participating terminals (example load at inland or private depots) compliance with the Safe Load Pass System is still advised as it is a very useful "health check" for your tanker and vehicle.

### **DEPT OF MINES W.A.— DANGEROUS GOODS (ROAD TRANSPORT) REGULATIONS 1983**

A fairly detailed local regulation describing the inspection, testing and maintenance requirements. Also includes accreditation of testers and repairers.

