



Leakage Test (K)

Typical interval of Leak test (K) is every year (annually).

Leakage test ensures that tank closures, piping, valves, and gaskets are in good condition and do not leak within the piping or to the exterior. It is used for all kind of tank specification including 306,307,312,331,338,341,406,407,412 and TC portable tanks.

Note the following items in the test:

- The tank must successfully pass External Visual Inspection prior to performing this test.
- Do not pressurize the tank past MAWP
- While the tank is under pressure, tank shall have signs that reads "TANK UNDER PRESSURE" hanging at both ends of vessel.
- All product piping valves and accessories shall be in place except any re-closing pressure relief valve with a set pressure less than the leakage test pressure.
- Test pressure must be not less than 80% of the tank design test pressure or MAWP, whichever is less, and marked on the certification plate, except if a tank with a MAWP of 690 kPa (100 psig) or more is used in dedicated service or services, the test pressure shall be the maximum normal operating pressure of the tank.
- One of the following shall be used as the test medium:

(i) the normal lading of the tank;	(iv) inert gas;
(ii) a less hazardous lading of equal or less viscosity	(v) air.
(iii) water;	

Note: When using air as a test medium, the tester should be aware of the need for proper purging and ensure that there is no possibility of creating a mixture of product and air within the explosive limits of the product.

Test procedure for pneumatic pressure test:

- 1) Test **each valve and closure in sequence** with the tank laden under normal operating conditions. For testing valves see the following procedures:
 - For tanks other than liquefied compressed gases, see '*Maintenance and testing procedure for PAF surge relief valve 406-96&98*'.
 - For liquefied compressed gases tanks follow '*Checking valves instruction for TC331, TC338 and TC341 tanks*' to avoid bleed off a flammable gas to the environment
- 2) Close internal valve and open manifold valve (if equipped) and all other valves in discharge line, including external valve.
- 3) Fill compartment with enough test medium to cover the valve sump and fill the piping. Close all remaining openings.
- 4) Pressurize the tank to the correct pressure with regulated air. Once the test pressure is reached, shut off the supply. The test pressure must be maintained for **at least 5 minutes** with no loss. If a tank is in dedicated service and over 100 psi the normally lading of the product will be used at the maximum of the normal operating pressure. **MC 331 or TC 331 in LPG or NH3 service shall be tested at no less than 60 PSI.**
- 5) With tank under pressure, check all weld seams with **soap and water mix**. Check for signs of any leakage. Inspect gaskets at internal valves and manhole covers, and venting devices.
- 6) Close first valve or closure in discharge system and open internal valve, leaving all other valves in discharge line open including external valve. Adjust pressure to the correct pressure for the tank being tested and shut off the supply. The piping and the first valve in discharge system will now be pressurized in addition to the tank shell; test pressure must hold for 5 minutes with a 0 psig drop.
- 7) Repeat the above procedure (8) for each valve and closure in discharge line, until all valves and closures have been tested. If piping includes pumps and meters these should be tested at the tank leak test pressure in sequence with the immediate downstream valve or closure closed and all upstream valves and closures open. Carefully inspect all joints in pumps and meter for signs of leakage. Hose tests are a separate tests which also must be done annually. It requires that hoses be removed and tested. Unless the meter is turned on and making a delivery, the block valve downstream of the meter will be closed.
- 8) If piping system includes hose reel, unreel the hose to its full length and carefully inspect hose connections for leakage.
- 9) The secondary containment space of a TC406 tank that is double-walled or otherwise constructed to provide secondary containment shall be tested by ensuring that any adjacent compartments and void spaces are empty and open to atmosphere i.e. double walled tanks. After the test pressure is achieved, the secondary containment space shall be disconnected from the source and held the pressure for **10 minutes** without change or any sign of leakage.
- 10) Relieve pressure in tank and ensure normal breathing vent is returned to operative status.
- 11) Indicate all defects found and methods used to repair on Form No.: NEE-FRM-007.

Maintenance and testing for PAF surge relief valve 406-96 & 98

- A. Regulations Requirements:** This portion of the manual refers to the regulations and is intended to serve as an interface to relate the manual to the code. *This manual does not take the place of the Code of Transport Canada (TC) Regulations.* A current copy of the Code of TC Regulations should be reviewed and followed to insure the requirements are met for each individual case.

There are three basic tests/inspections mandated by 49CFR Part 180 for TC306 and TC406 tanks.

Test/Inspection	Interval Period	B620 Related Section
External Visual Inspection	1 year	7.2.1
Leakage Test	1 year	7.2.5
Pressure Retest	5 year	7.2.7

- 1. External Visual Inspection:** As part of the annual external visual inspection, CSA-B620 requires that all pressure relief valves, be visually inspected for any corrosion or damage which might prevent the valve from functioning. If the cargo tank is used to haul product that is corrosive to the relief valve, the valve must be removed from the cargo tank for inspection and bench testing.

- 1.1. Visually inspect all external surfaces of the manhole and PAF, which includes opening the *Latch (1)* and *Strongback (5)*.

NOTE: If any corrosion or damage to the PAF or manhole is observed, it must be repaired and successfully bench tested prior to returning to service. Refer to 3.5 for PAF bench test procedure.

- 1.1.1. Clean and inspect the bottom side of the PAF for signs of damage, corrosion, or product gumming that could effect the operation of the Relief Valve.
- 1.1.2. Closely inspect the *Cylinder (10)* for any damage or dents. Also, insure *Cylinder (10)* is threaded tightly to the *Cover (9)*. See figure 1.
- 1.1.3. Inspect and clean the *Normal Vent (8)*.
- 1.1.4. Inspect the *10" Seat (25)* for damage or corrosion. Build-up or grim on the seat should be removed. Nicks on the 10" seat may cause the gasket not to seal.
- 1.1.5. Inspect the *10" Fill Gasket (24)* for signs of wear or degradation. Replace gasket if required.
- 1.1.6. Inspect the *Clamp Ring Gasket (26)* for evidence of product seepage. Replace any gaskets where seepage is detected.

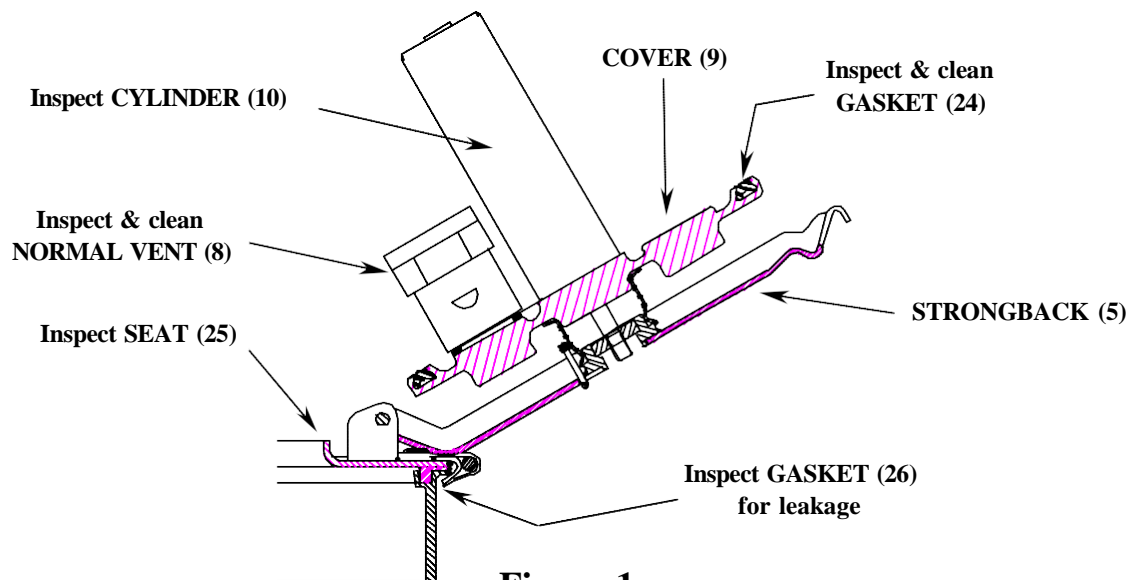


Figure 1

2. **Leakage Test:** CSA-B620 requires tanks to be tested annually at 80 % of the tank design pressure or MAWP, whichever is marked on the tank certification or specification plate. All tank components must remain in place during this test, except any re-closing pressure relief valve with a set pressure less than the leakage test pressure must be removed or rendered inoperative during the test. Betts Normal Vents, therefore, must be removed during the leakage test.

- 2.1. Remove Normal Vent from manhole cover and plug opening with Betts Plug No. 3013.
- 2.2. Apply test pressure in accordance with the QC manual
- 2.3. Inspect all gasket joints on PAF and manhole for leaks. If PAF leaks, adjust in accordance with Set Pressure Adjustment instructions (Section 3 of this manual) and retest the unit. Replace damaged or worn gaskets as required.

3. **Pressure Retest:** As part of the pressure retest, CSA-B620 requires that all re-closing pressure relief valves be removed from the tank for inspection and bench tested to verify that the relief valve is functioning properly. The pressure retest and the relief valve bench test must be performed at least every five years.

3.1. Pressure Retest Procedures:

- 3.1.1. CSA-B620 requires that all closures except pressure relief devices must be in place during the test
- 3.1.2. Manholes must remain in place during pressure test.
- 3.1.3. Open 10" PAF Relief Valve.
- 3.1.4. Install Betts Retest Fixture (part no. 6556LCB) to seal the 10" opening. See figure 2.
- 3.2. Betts Push and Air Operated Vapor Recovery Valves remain in place during the test.
NOTE: If vapor recovery valves from other manufactures are installed, refer to the manufacturers' instructions to see if they should be removed.
- 3.3. After preparing the rest of the tank, perform the pressure test in accordance with the regulations. Inspect all parts of manhole assembly for leakage. Repair or replace parts as required.
- 3.4. Remove all clamps or plugs from relief valve immediately after test is completed.

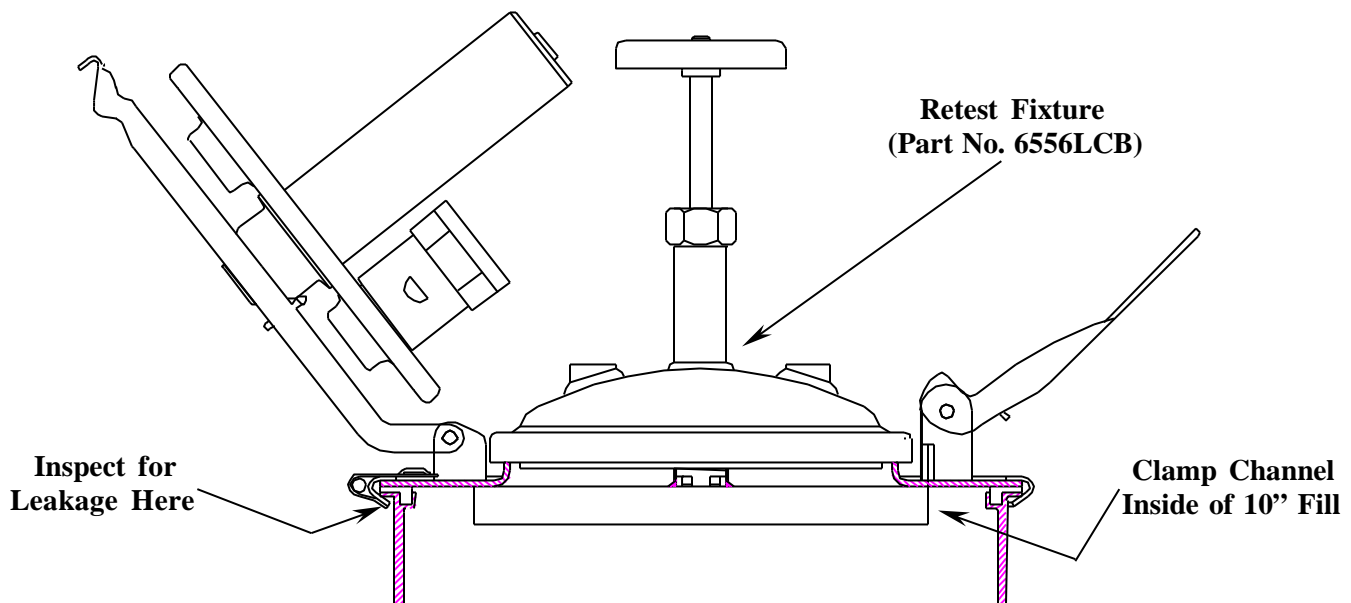


Figure 2

3.5. Bench Test Procedure for PAF Surge 406-96 & 98

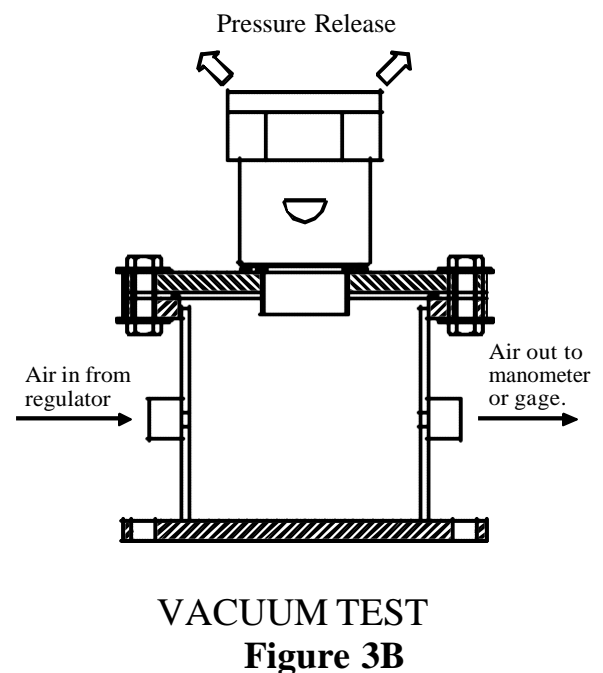
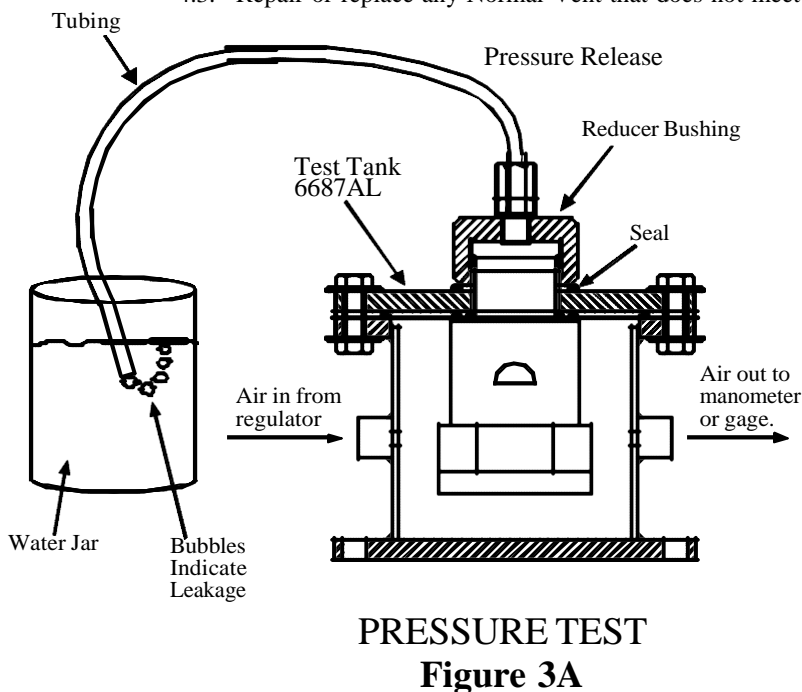
- 3.5.1. Remove manhole assembly from tank by removing the clamp ring bolt and clamp ring.
- 3.5.2. Remove *Normal Vent* (8) and plug port with Betts Plug (No. 3013)
- 3.5.3. Attach manhole assembly to appropriate Betts PAF 406-96 Test Fixture (No. 6685SL.)
- 3.5.4. Apply a soap solution around the perimeter of the DoveTail 10" Gasket.
- 3.5.5. Gradually apply pressure to the tank and observe the pressure at which bubbles first appear.
- 3.5.6. Per CSA-B620 the set pressure must not be less than 3.63 psig and not more than 4.55 psig for a tank with a MAWP of 3.3 psig.
- 3.5.7. Slowly release the pressure from the test fixture and verify the PAF reseals not less than the MAWP of the tank.
- 3.5.8. Replace or adjust any relief valve that fails the set pressure test requirements. Refer to instructions for Set Pressure Adjustment (Section 3 of this document) to adjust the set pressure, and retest the unit.

4. Model 6496AL (Normal vent for TC 406) Test Procedure:

A Normal Vent Test Tank (Part No. 6687AL) must be used to test the Normal Vents.

Note: A regulator must be used to slowly apply pressure to the tank.

- 4.1. Pressure Test: CSA-B620 states that the normal vent for a TC 406 must be set to open at not less than 1 psig.
 - 4.1.1. Screw the Normal Vent into the lid of the test tank as shown in figure 3 A. In order to detect leakage, attach the reducer bushing, compression fitting, and tubing. Place the end of the tubing in a water jar. The water jar is not included with the test tank.
 - 4.1.2. Slowly apply pressure to the tank. Bubbles will indicate the opening pressure of the vent.
 - 4.1.3. A properly functioning 6496AL Normal Vent should open between 1.0 to 1.5 psig, but in no case open less than 1 psig.
- 4.2. Vacuum Test: CSA-B620 states that the normal vent for a TC 406 must be set to open at no more than 6 ounces vacuum (.375 psig).
 - 4.2.1. Screw the Normal Vent into the lid of the test tank as shown in figure 3 B.
 - 4.2.2. Slowly apply pressure to the tank and inspect the top opening for pressure release. Apply soapy water to the top of the vent in order to detect the point at which the vent opens.
 - 4.2.3. A properly functioning 6496AL Normal Vent should vacuum relieve between 0.25 to 0.375 psig, but in no case more than 0.375 psig.
- 4.3. Repair or replace any Normal Vent that does not meet the specifications.



Checking valves instruction for TC331, TC338 and TC341 tanks

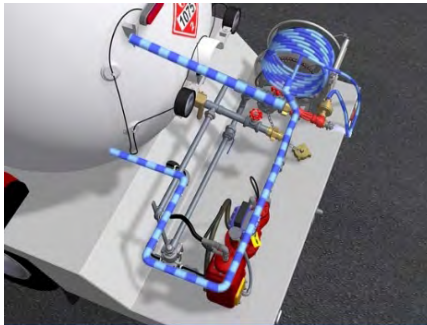
1. Connect the Delivery Nozzle to the tank liquid fill connection or the vapour equalizing connection



2. Start the vehicle engine and run it at idle. Prepare the truck meter according to the truck manufacturer's instructions.



3. Engage the power take-off (PTO) to start the pump.
4. Open the delivery nozzle and tank fill line valve(s) as well as other valves in the tank discharge system to establish product flow through the meter.



5. Close one of the valves, then after the flow has stopped, open the valve again to establish the flow, repeat for each valve in sequence to check for any leakage, which can be observe through the meter. (There shouldn't be less than 4 valves to check: Nozzle, meter shut-off valve, manual isolation valve, ISC valve, and other valves may be located in the stream line)
Caution: Care must be taken to not damage the pump by running it too long without the product)
6. Document the leakage test in the related NEE-FRM-007 form.

