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Operation of **Vmi** LDT-890(\AF) Leak Detector Tester for Catastrophic Leak Test

Successful completion of this test establishes qualification for certification by **Vmi** to generate catastrophic (3 GPH @ 10 PSI) leaks for the post installation testing, annual testing and trouble shooting of mechanical (MLLD) and electronic line leak detection (ELLD). This test is specific to **Vmi** MLLD and ELLD and is also applicable to any mechanical or electronic line leak detection system insofar as manufacturer guidelines due not exclude this method of generating catastrophic leak testing. Specific instructions as to when and how to introduce a leak and the specific instructions of when and how to determine failure are directed by: 1) Federal Rules and Regulations 2) State Rules and Regulations 3) Manufacturer Guidelines. Refer to “Install and Replace **Vmi** Mechanical Line Leak Detectors” for installation and replacement certification of **Vmi** MLLD’s.

Circle the correct answer

1. **Vmi** 99 series 2” leak detectors being used on a 30 psi pump will go to leak search at
 - A. approximately 18 psi
 - B. approximately 30 psi
 - C. approximately 21 psi
2. All **Vmi** 99 series leak detectors search for leaks at a higher pressure than other manufacturer’s MLLD’s.
 - A. True
 - B. False
3. **Vmi** 99 series 2” leak detectors being used on a 24 PSI pump will go to leak search at
 - A. approximately 18 psi
 - B. approximately 30 psi
 - C. approximately 21 psi

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4. There are two gauges on the LDT-890(\AF) leak detector tester. Which gauge would you look at to determine if the leak detector has found and is holding the leak?
- A. Right hand gauge
 - B. Left hand gauge
5. Using the LDT-890(\AF) leak detector tester, you are testing a 99 LD-3000 leak detector that is installed on a 5 hp pump and the right hand gauge is reading 40 psi. In what position is the leak detector?
- A. Full flow
 - B. Reset
 - C. Leak search
6. When using the LDT-890(\AF) you must first purge the piping system and the LDT-890(\AF) of air.
- True
 - False
7. To calibrate the LDT-890(\AF) to find a 3 gallon per hour leak, you should turn the 4-way valve to
- A. Dispenser Nozzle Position
 - B. GPH Test
 - C. Calibrate G.P.H.
 - D. Pressure Step Test
8. On an LDT-890(\AF) Leak Detector Tester the Calibrate Orifice knob is used to adjust the leak search pressure.
- True
 - False
9. If the pump is off and the line pressure is reading zero psi, in what position is the leak detector?
- A. Leak Search
 - B. Reset / Park
 - C. Full Flow

10. A mechanical line leak detector cannot function on above ground storage tanks with underground piping.

True

False

11. Resiliency (bulk modulus) of a product line is measured by bleed-back. Bleed-back is measured by;

A. With a beaker held under LDT-890(\AF), turn on pump, watch the right hand gauge go to full pressure, turn off pump, set 4-way valve on Dispenser Nozzle, watch right hand gauge go to -0- psi and measure how much fuel entered the beaker.

B. Go to farthest nozzle, authorize the dispenser for 30 seconds, turn off pump, open nozzle, drain nozzle into beaker and measure how much fuel runs into the beaker.

C. With a beaker held under LDT-890(\AF), turn on pump, watch the left hand gauge go to 30 psi, turn off pump, set 4-way valve to Pressure Step Test, and measure how much fuel runs into the beaker.

12. With the pump running and the 4-way valve in the Pressure Step Test position, the right hand pressure gauge should read

A. leak search pressure

B. full pump pressure

C. 40 psi

13. The definition of a catastrophic leak is

A. 5 gallons per hour at 10 psi

B. 3 gallons per hour at 10 psi

C. 3.5 gallons per hour at 10 psi

14. Using the LDT-890(\AF) Leak Detector Tester to test a **Vmi** 99 series 2" leak detector and having started the submersible with pressure at 0 psi and the LDT 890(\AF) in the GPH Test position, the right hand gauge is holding at 21 psi. In what position is the leak detector?

A. Reset

B. Full Flow

C. Leak Search

D. Vertical

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15. The left hand gauge of the LDT-890(\AF) is used to set the pressure at 10 psi during Calibrate GPH
- True
- False
16. The ability of a line leak detector to find a leak is adversely affected by
- A. thermal expansion
- B. high head pressure
- C. high line resiliency (high bleed-back)
- D. all of the above
17. A manifold piping system with two submersibles, each submersible has a leak detector installed, both submersibles start at the same time. How many gallons per hour are being metered into the piping system when both leak detectors are in leak search?
- A. 3
- B. 6
- C. 9
18. Step through time of a leak detector is measured with a stop watch while watching the leak detector
- A. go from full pump pressure to 0 psi watching the right hand gauge of the LDT-890(\AF)
- B. go from 0 psi to full pump pressure while watching the left hand gauge of the LDT-890(\AF)
- C. go from 0 psi to full pump pressure while watching the right hand gauge of the LDT-890(\AF)
19. An anti-siphon valve or normally closed solenoid valve should be installed between the submersible and the leak detector housing (tee) of the piping coming out of the submersible on above ground storage tank installations with a leak detector.
- True
- False
20. During a leak detector test, if a master / satellite dispenser system is included in the piping configuration, testing should occur from the satellite dispenser to insure total line leak detection.
- True
- False

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21. If a 99 LD-3000 leak detector fails a catastrophic test and the leak detector is unable to be adjusted to detect a catastrophic leak, you may remove the Leak Detector Cylinder assembly and replace it.

True

False

22. All **Vmi** 99 series mechanical line leak detectors may be adjusted in the field.

True

False

23. The 99 LD-2000 leak detector is more successful detecting 3 gph leaks in high bleed-back lines than leak detectors without an integrated check valve.

True

False

24. When two pressure relief valves are installed in series you add the relief pressures of each valve to determine the holding pressure.

True

False

25. When adjusting a **Vmi** leak detector in the field

A. always rotate the piston assembly in a clockwise direction, moving the adjustment the distance equal to 3 minutes as on a 60 minute analog watch face.

B. always rotate the piston assembly in a counter-clockwise direction, moving the adjustment the distance equal to 3 minutes as on a 60 minute analog watch face.

C. You cannot adjust a **Vmi** leak detector.

26. After installing a new **Vmi** leak detector you should fill out the warranty registration card and return it to the factory.

True

False

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27. If a customer complains the submersible functions well with a few customers but drops into slow flow during high volume pumping, possible problems include: obstructed submersible inlet, worn out submersible, inadequate submersible horsepower. Possible solutions include:

- A. clean submersible inlet
- B. replace submersible
- C. upgrade to higher horsepower submersible
- D. install 99 LD-2000\75 or 99 LD-2200\75 leak detector
- E. All of the above

28. The 99 LD-2000\E leak detector should be considered when the piping system

- A. has extremely high head pressure
- B. has extremely high bleed-back (600 ml or more)
- C. has PP-1500 TCI pipe (yellow)
- D. B & C
- E. All the above

29. When testing a leak detector and the leak detector is in leak search, in what position is the 4-way valve?

- A. GPH Test
- B. Dispenser Nozzle
- C. Pressure Step Test
- D. Calibrate GPH

30. You may use the LDT-890(\AF) to test electronic line leak detectors for a catastrophic leak.

True

False

31. The term “leak detector has tripped” means

- A. the leak detector is in “full flow” position
- B. the leak detector has reset to the leak search position
- C. none of the above

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32. A **Vmi** 2-inch mechanical leak detector is warranted for

- A. 1 year from date of invoice
- B. 18 months from date of installation
- C. 2 years from date of installation

33. A **Vmi** 3-inch mechanical leak detector is warranted for

- A. 1 year from date of invoice
- B. 18 months from date of installation
- C. 2 years from date of installation

34. Thermal contraction does not occur in warm climates.

- True
- False

35. A **Vmi** leak detector may be used with variable and non-variable speed submersibles.

- True
- False

36. After completion of installation of a leak detector, it must be tested to assure it will find a catastrophic leak before the station is put into service.

- True
- False

37. "Slow Flow" problems may occur when

- A. a leak is present in the line
- B. thermal contraction is occurring
- C. there is excessive line resiliency
- D. the packer 'o' ring of the pump is leaking, resetting the leak detector
- E. there is no delay or a short delay for the dispenser solenoid valve
- F. all of the above

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38. Thermal contraction will occur when the temperature of the product in the underground storage tank is higher than the ground temperature of the delivery line.

True

False

39. The sensitivity of catastrophic line leak detectors is established in Federal Regulation as a device capable of detecting a leak of 3 GPH @ 10 PSI or greater. This means the leak orifice (hole) is calibrated at 10 PSI, to flow 3 GPH. It does not mean the leak detector has to search for a leak at 10 PSI.

True

False

40. Electronic LLD automatically starts a catastrophic line test after dispensing operations are completed and the last authorization is removed. Unless otherwise instructed by Electronic LLD manufacturer's instructions, the following test protocol is followed for Electronic LLD testing. Circle all that apply.

A. Tag-out Lock-out procedure for all submersible pumps involved.

B. Install LDT-890(\AF) as per manufacturer's guidelines in test port of dispenser or appropriate fitting.

C. Energize submersible(s)

D. Purge line and test equipment.

E. Take a break.

F. Calibrate a 3 GHP @ 10 PSI leak as per LDT-890(\AF) protocol.

G. Turn LDT-890(\AF) Four Way Valve to 3 GPH Test

H. Remove authorization from submersible

I. Wait for electronic line leak detection system to declare leak

41. After completing the installing of the LDT-890(\AF), before the pump(s) are energized, it is important to check the position of the four-way valve of the LDT-890(\AF) to prevent fuel from being accidentally discharged while the operator is powering the pump(s). To ensure no flow discharges from the LDT-890(\AF) when the pump starts, the operator should check the four-way valve is set to

A. GPH Test

B. Dispenser Nozzle

C. Pressure Step Test

D. Calibrate GPH

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42. With a mechanical line leak detector installed, there is no way the submersible can start without human authorization, potentially spraying fuel on the installer.

True

False

43. A leak detector can take longer than 3 seconds to step through to full flow for the following reasons:

A. Thermal contraction

B. Leak in the line system

C. Large amount of bleed-back

D. Thermal expansion

E. Fuel running through the vent line in a steady stream

F. A, B, C, & E

G. All of the above

44. Using the LDT-890(\AF) leak detector tester, you are testing an MLLD. With the right hand gauge of the LDT-890(\AF) reading 0 PSI, and a catastrophic (3 GPH @ 10 PSI) leak introduced into the line, you authorize the pump and watch your right hand pressure gauge go from 0 PSI to full pump pressure without any hesitation at leak search pressure. This scenario indicates:

A. No problem

B. Line resiliency too high for the installed MLLD

C. Wrong MLLD for the fuel

D. Head pressure too high for the installed MLLD

45. Testing an MLLD with the LDT-890(\AF) in G.P.H. Test mode, the MLLD should never open up to full flow. How long should you test the MLLD to make sure it stays in leak search position?

A. At least 30 seconds

B. 3 – 5 seconds

C. At least 10 seconds

46. If the opening (step-through) time of the MLLD is 40 seconds, it is acceptable to run a G.P.H. Test for 30 seconds.

True

False

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