

## **FAQ-FREQUENT ASKED QUESTIONS ABOUT PIPELINE LEAK DETECTION SYSTEMS**

1. What is the distance between sensors?

Depends on the pipeline parameters, like pressure, fluid and diameter. Prior to installation, Asel-Tech gathers specific pipeline data and enters into an advanced simulation program to calculate sensitivity which dictates distance between sensors. As an example, a 24" liquid pipeline, operating @ 700 psi would require the distance between sensors to be around 20 km.

2. Can the SLDS/ILDS work on buried pipelines?

YES! Buried pipelines are good candidates for the SLDS/ILDS

3. Can the SLDS/ILDS work on submarine pipelines?

YES, though there must be an onshore or above sea section where to install the pressure sensors and electronics.

4. What is the required electrical power for the FPU's (Field Processing Units)?

The FPU is powered by 24V dc or 110/220V ac, 20 W max

5. What is the typical detection time of a Leak?

Usually 20 to 60 seconds, depending on the distances between sensors and the communication system.

6. What is the typical leak location accuracy?

Usually within a few meters, less than 2% of the pipeline length between sensors.

7. Is the acoustic leak detection system able to detect leaks in NG pipeline?

Yes. However NG is not as good signal carrier as liquids are, therefore, the distance between sensors is reduced, resulting in more sensors needed.

8. What is the cost of an acoustic pipeline leak detection system?

The cost depends on the pipeline's parameters like length, diameter, fluid, pressure, and specific features and their locations along the pipeline. In General, we can say that the cost per meter of our system reduces the longer pipeline is.

Furthermore, pipelines equipped with fiber optic cable do allow for the elimination of FPU's at each sensor. This will substantially reduce the total cost.

9. Do acoustic leak detection systems quantify the amount of a spill?

The acoustic portion of the Asel-Tech ILDS does not, however, the mass-balance portion of the

system will do.

10. What size of orifice will the system detect.

A-The ACOUSTIC SLDS will detect very small orifice – down to 2mm. The exact capabilities of any particular system will depend on the customer's needs and budget. In other words, we can increase sensitivity by increasing the number of sensors we install on the pipeline.

Customers have the ability to decide just how sensitive they want the system to be. Asel-Tech has the ability to generate a "Sensitivity Study" for each pipeline project, giving the detectable hole size, detection time and location accuracy.

11. Does it works with any type of fluid?

Yes! The SLDS is the only technology available which is compatible with any pipeline transporting any fluid, even multi-phase flow can be monitored.

12. What is the minimum differential pressure required?

30 psi

13. What communication protocols does the SLDS/ILDS/ MARC ONE require?

The systems require at least serial communication, though Ethernet is the best option. Pipelines already equipped with fiber optic cable will work with the Marc One system.

14. Is the Acoustic Pipeline Leak Detection applicable for water.

Yes, as long as the operating pressure is more than 30 psi .

15. Is the system able to detect leaks very close to the sensors?

Yes. Asel-Techs systems don't have "mute" or "silent" zones close to the sensors.

16. - What about slow developing leaks resulting from isolated corrosion pit(s)?

It will depend upon the pressure and the fluid. Our experience has shown that in pipelines transporting liquids at high pressure, i.e. 500 psi or greater, a small corrosion pit can initiate a large sudden leak, which will be detected/declared by the system. If a liquid pipeline operating at low pressure develops a small corrosion pit, the leak will generally start & remain a very small, slow leak, and will not be detectable. Depending on the volume of the spill, the ILDS mass balance portion of the system, may be able to detect this leak over time.

17. Can the SLDS/ILDS interface be connected to an existing SCADA system?

Yes, the systems will work connected through OPC

18. How does a pipeline's ambient noise affect the SLDS/ILDS system?

The system employs several noise filtering techniques. There are however certain types of noise which can affect sensitivity. Asel-Tech has the ability to design special filters to eliminate such issues if they are present during the design of the project.

19. Does the SLDS/ILDS system require any tuning after commissioning?

Normally there is no need, only if there is a substantial change in the pipeline configuration or operational conditions.

20. What type and how often are maintenance activities required for the SLDS/ILDS system?

Basically the SLDS does not require maintenance. Testing general system parameters is relatively easy to perform. Asel-Tech does however recommend at least one "real leak simulation" per year to guarantee the leak detection system is working effectively.

21. Does the size and volume of leakage interfere with the time to detect?

No, leak detection time is not dependent on leak size, but rather on the speed of sound through the fluid.

22. What is the probability of false alarms?

After all pipeline operations are totally mapped within the system, the probability of a false alarm is very close to zero.

23. Will opening and shutting valves cause a false alarm?

Not if this operation is mapped into the system.

24. Can you present any estimates on probability of detection for different sizes of leakages?

Can those figures be demonstrated or validated by an independent 3<sup>rd</sup> party?

Yes, Asel-tech has data gathered from lab scenarios/studies. We can generate the necessary sensitivity studies prior to any project. Part of the commissioning process for any project is to induce an actual leak in the pipeline, and provide the customer with the results. We welcome validation by any 3<sup>rd</sup> party.

25. Is there any license or software charges for using the system?

No, Asel-Tech doesn't sell "software", therefore there are no License fees.

26. Can this systems work under losses of the power?

Yes , backup battery power can be installed as an option.



27. How do we know the system will work once installed?

As part of the commissioning process, Asel-Tech performs an actual leak test. We induce an actual leak in the pipeline (using specially designed equipment and procedures) and test the system sensitivity.

28. Can we view an actual system before purchase?

Yes is possible. We may be able to secure an invitation to a customer installation, or we can arrange a visit to our pipeline laboratory in Brazil or to visit the CTDUT-Pipeline Research Center.

29. What is the cost of maintenance and operation?

Basically there is no maintenance need for the SLDS, as long as there are no significant changes in the pipeline operational parameters. Should that change, then some software re-configuration might be necessary.

30. Can we monitor PIGs with the SLDS?

Yes. The SPL – Sonic Pig Locator technology can be added to a SLDS for PIG location.

31. Is this system reliable for long cross county pipelines?

Yes. The SLDS/ILDS/MARC ONE are totally suited for long pipelines. The best choice would be the MARC ONE, which does not require FPU's – Field processing Units for each sensor. The total system cost for longer pipelines is thus reduced.

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