



Asset Care Counts #24

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Inspection of FRP Tanks using Acoustic Emission

Fibre reinforced plastic (FRP) tanks hold an important place in industry as an alternative tank type to other corrosion resistant materials due to factors including:

- A relatively low cost of construction;
- Excellent corrosion resistance; and
- High strength to weight ratios.

They have however proven difficult to reliably inspect with traditional NDT techniques, such as dye penetrant inspection, hardness testing, visual inspection and/or ultrasonic inspection.

These methods also often require the tank to be drained and thoroughly cleaned prior to inspection, potentially putting the vessel out of use for several days and incurring significant preparation costs.



Figure 1 – A typical FRP Process Tank

A Better Way – Acoustic Emission

ALS Industrial delivers **Acoustic Emission** inspection of FRP tanks as both an improved technique and a more cost effective inspection.

Acoustic Emission works by measuring stress waves originating from defects in the tank when it is under load. The normal process of assessment involves draining and filling the tank and measuring the stress waves generated via sensors mounted on the tank.

If a developing defect exists within the material, it generates particular stress waves that are detected by the sensors.

Acoustic Emission offers the following key benefits over other inspection methods:

- **The whole tank can be inspected in one site visit.** With sensors around the entire tank, defects can be tested in all critical areas of the tank in the same load test. This includes testing for both internal and external defects. **This saves inspection time and therefore cost.**
- **Only ‘malignant’ defects are found.** The stress waves created in testing come from defects that are active / growing in size. Benign defects do not create a stress wave in the Acoustic Emission test. The technique is also able to find microscopic defects which are very difficult to find using other methods. **The probability**

of correctly assessing the condition of your tank can therefore be improved with acoustic emission.

- **The tank does not need to be emptied or cleaned.** As Acoustic Emission uses the operating fluid as a method of generating load for the test, there is typically no need to fully empty the tank and no need to clean the tank and prepare it for internal inspection. **This leads to a lower cost of inspection.**

Acoustic Emission – Recommended by relevant Standards

It is also important to note that Acoustic Emission testing of process vessels is recommended by several industrial standards, including ASTM E1067-11, ASME Section V Article 11, ASME Section X, and the Committee on Acoustic Emission from Reinforced Plastics.



Figure 2 – An Installed Acoustic Emission Sensor

Our Tank Inspection Team

ALS Staff hold Level III qualifications in Acoustic Emission testing.

Our broader national tank inspection team supports an **Engineering Led Approach** to tank inspection.

This approach strives to ensure:

- A tank is only inspected as often as its risk profile requires (RBI approach).
- The most cost effective and reliable inspection techniques are used to inspect the tank.
- The information gathered is formatted for maximum ease of use by the client in their information systems.

For further information or to enquire about tank inspection please contact:

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