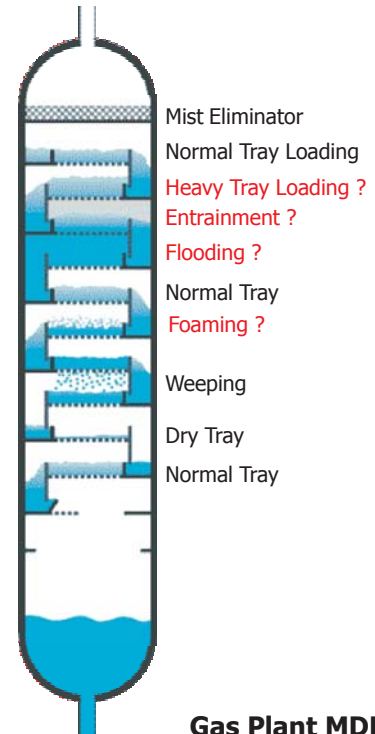


# On Site Lab Service

1. Differentiating Foaming Causes
2. *SigmaPure* Prequalification

## Causes of Plant Foaming - Chemical, Mechanical or Both

Amine solutions foam because of chemical contamination OR tower internal damage, given similar concentrations. Mechanical and chemical foaming are two different things that produce the same symptoms, and are currently treated in the same way. One of the reasons differentiating these two phenomena is important is because of the ways activated carbon and particle filters work. If the foaming cause is chemical contamination, adding antifoam works against the particle filter's and activated carbon's function and service life (\$). If the cause is mechanical, filters and carbon work against the antifoam's ability to stabilize the plant (\$). Either way the cost in time, distraction away from operating focus and maintaining reliability of the treating system, materials, and plant throughput can be substantial. Undefined foaming causes create this vicious circle most gas processing plants, refineries and chemical plants deal with daily.



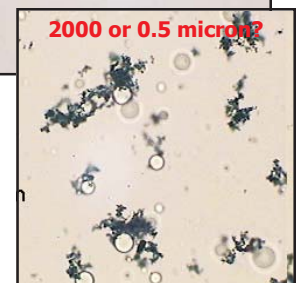
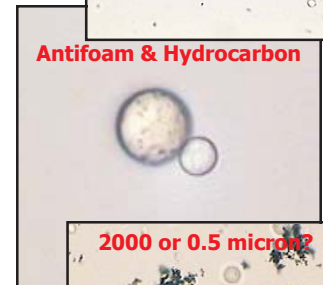
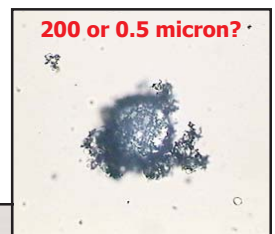
## D-Foam Has The Answers That Save Money

1. D-Foam has combined a series of tests that help differentiate chemical and mechanical foaming causes. These tests work together to verify each other. For example, foaming tendency and surface tension tests are notoriously inaccurate, and even misleading representations of solution foaming properties. Why? One reason is because just a little free hydrocarbon breaking out of an existing emulsion inhibit sample foaming. We use microscopic examination to see the immiscible hydrocarbon bubbles. The presence of antifoam will also produce false or misleading results.

2. If foaming is being caused by chemical contaminants we have developed a treating technology; SigmaPure, specifically to remove chemical surfactants responsible for solvent foaming. It also removes solid and liquid contaminants that enhance foam stability without removing anything else. The system does not require pretreatment of any kind, does not utilize particle filters or activated carbon, works in the presence of antifoam, and requires no addition of chemicals to the circulation solution.

Whether used as a temporary device to clean up a contaminated inventory, or as a permanent slip stream system, the SigmaPure system has repeatedly demonstrated in large refinery and gas plant systems to be the most cost effective method of foaming abatement.

### Gas Plant MDEA Samples



## **SigmaPure System Prequalification**

The SigmaPure system removes chemical foaming agents by “pre-foaming” the solution and removing the foam. The D-Foamed solvent is discharged back to the solution circuit. Contaminants that cause foaming make up the foam’s structure. The DEA sample photo on the bottom right shows SigmaPure’s efficiency when the suspended contaminants are responsible for foaming or enhance its stability.



One of SigmaPure’s greatest features is that it does not remove anything but foam causing contaminants from the solution, thereby generating extremely low waste volumes. However, this also means that if the solution is not foaming due to chemical contaminants there will not be anything for the SP unit to remove. Therefore, we suggest pre-qualifying SigmaPure’s installation with on site testing.



## **On Site Solvent Testing**

The solvent tests consist of a visual examination for color and optical clarity, microscopic examination for suspended solid and liquid particles, foaming tendency/break time, and surface tension for surfactant contamination. All of the tests are performed at process temperature. Several samples are taken from at least three locations in the plant, e.g., rich stream, lean stream, reflux, and make up water.

Questions we anticipate being able to answer in the final report prior to leaving the plant include:

1. Are the plant foaming symptoms due to chemical causes?
2. Will the SigmaPure system help relieve the plant’s foaming symptoms?
3. Is the solvent foaming at the location of the symptoms?
4. Filter and activated carbon premature exhaustion potential?
5. How well the filters are working?
6. Are they being affected by antifoam or hydrocarbon - solids agglomerates?
7. Surface activity of soluble contaminants?
8. If antifoam is affecting the entire circuit?
9. What is causing the solution color if present?
10. Surface tension comparison of circulating solution, fresh make up, make up water.

D-Foam will supply everything we need to perform the tests. Plant laboratories will only be asked for a small amount of bench space. We will also ask for sampling supervision if required by plant safety.