Perfecting HF Acid Sampling

Sampling Hydrofluoric Acid Requires a High Level of Experience!

Hydrofluoric (HF) acid is one of the most challenging and dangerous process medias to sample. Not only does it require special materials of construction for corrosion resistance, but it is also incredibly toxic in small amounts and presents the potential for significant injury or worse. Collecting samples of HF acid requires a unique grab sampling system and professionals with a high degree of understanding on how to sample HF acid while maintaining safety in the alkylation unit.

SENSOR Sampling Systems is knowledgeable on Hydrofluoric acid and has HF systems actively in service. Product Manager, Billy Terry, is one of the top subject matter experts in the world on manual grab sampling this challenging chemical. During his 25+ years of hands-on experience designing, building, troubleshooting, and advising clients on HF sampling systems and associated sampling practices, Billy has:

Billy Terry,
Product Manager

- Experienced in designing and building HF acid sampling systems.
- Personally been in the field to help install HF systems.
- Educated customers on the intricacies and challenges of the HF acid collection process.
- Trained both plant and lab personnel on how to properly operate the HF sample systems.
- Participated in the act of collecting samples.
- Assisted with troubleshooting on numerous occasions, including systems built by other manufacturers.

SENSOR Sampling understands the complexities of the HF acid sampling process.

We know…

HF
Collection
Assembly

1. **How to obtain a good representative sample.**
   a. Take from a high pressure point and return to a low pressure point to ensure adequate flow so that sample is representative.
   b. Small amounts of sample (10-20g) are collected, so traditional sample cylinders cannot be used and instead requires a special collection assembly.

2. **How to collect a good sample without exposure to the operator or a release to atmosphere.**
   a. Neutralize and flush out the acid at the end-connection points of the collection assembly with isobutane to the process return line.
   b. Purge isobutane to the acid flare, then flush with nitrogen before breaking the end-connection points and removing the collection assembly.

3. **How to prevent waste to minimize environmental footprint.**
   a. The SENSOR Sampling design allows the HF acid to always flow through the collection assembly to the return line or only during collection, if desired.
   b. Rather than sending residual HF acid to the acid flare, we utilize an isobutane flush to push residual HF back to the return line.

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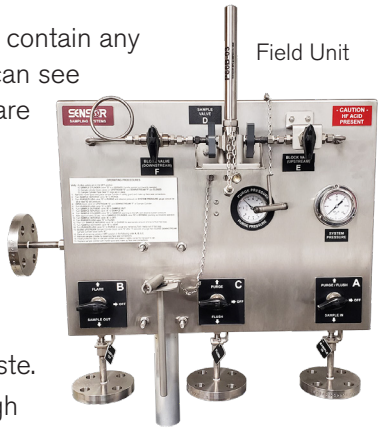
SAMPLING SYSTEMS

4 How to safely transport the sample from the field back to the lab.

Carrying Case

a. The SENSOR Sampling collection assembly is provided with safety caps that are threaded over the ends of the connections to prevent exposure if the valve were to leak during transport.

b. We provide a sealed transport case for the collection assembly to contain any potential leaks. It has windows on both sides of the case so you can see directly through it and see the collection assembly. The windows are made of acrylic to prevent etching over time from the HF acid.


Field Unit

5 What the lab needs for a properly collected sample.

a. The lab will have already weighed the empty collection assembly before it goes out to the field.

b. Collection of the HF must be done right the first time, as this is probably the most dangerous sample collection done in a refinery, but also to minimize waste.

c. The SENSOR Sampling HF system lines up the sample to flow directly through the collection assembly to ensure the appropriate amount of sample is collected every time.

d. The connection assembly fits the lab unloading system and lines up perfectly, so the lab isn't trying to connect it manually or clamp it in place. Also includes actuator to rotate the valve to the extract position which can be done remotely from outside the fume hood.

6 How to unload the sample in the lab to obtain desired moisture and purity results.

a. After returning to the lab, the collection assembly is weighed again to determine how much sample was collected in the field.

b. If not constrained by limited space under the fume hood, two lab unloading systems are recommended, with one being used for the moisture test and the other for the purity test.

c. We design the lab unloading system(s) to best serve your needs.

7 And finally, why the system needs to be designed so that you can not only collect a good sample but have a system that allows for proper cleaning and consistent operation.

Lab Unit

a. The field collection system needs to be continuously available for collecting samples with zero down time.

b. SENSOR Sampling Systems are specifically designed and constructed with materials that resist HF such as M400, PTFE seats, and Kalrez® o-rings.

c. The Isobutane flush provides a means to remove residual HF from any connection points and the nitrogen purge then cleans out the lines every time a sample is collected. This flush and purge leads to a cleaner system which extends the life, while also making a clean break so there is no exposure to the operator.

d. We understand the importance of consistently obtaining a representative sample. If you do not consistently get a representative sample, then it requires additional samples to be taken or a return to an old method of collecting, thereby creating more environmental waste and unsafe conditions for the operator.

Sampling Hydrofluoric acid requires a high level of experience.

SENSOR has an active install base of satisfied customers as well as the hands-on knowledge and expertise to solve your HF acid sampling challenge.