How to sample anhydrous Hydrofluoric Acids (HF)

Project description

Anhydrous Hydrofluoric Acid is a lethal and extremely dangerous chemical. It will destroy skin, the tissue beneath the skin and bones. It will damage the eyes (loss of vision) upon contact. Deaths have been reported from concentrated acid burns involving as little as 2.5% Body Surface Area (BSA).

Challenges

- Safety: Because anhydrous HF is a lethal product, absolutely no exposure is allowed.
- One way to reduce anhydrous HF's toxicity is to mix it with water / to make it aqueous HF.
- When anhydrous HF is mixed with water, the chemical reaction creates two problems: (1) A lot of fumes/vapor and (2) heat.

Proposed solution

BIAR Sampling Systems for HF composed of:

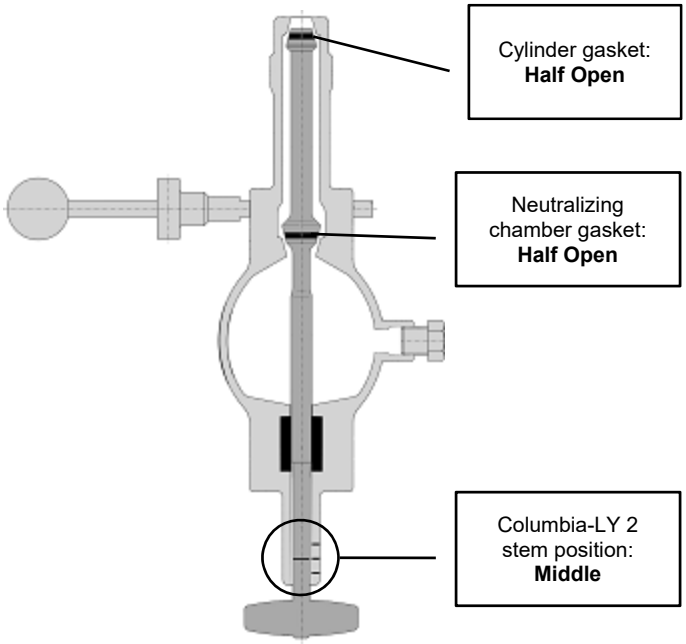
- Metallic Sample Valve ***type MLB*** to allow collection of the sample
- 2-chamber Sample Cylinder ***type Columbia-LY 2*** to collect / grab the sample
- Bayonet adapter ***type RXB26*** to connect the Sample Cylinder to the Sample Valve
- Safety plug ***type RY26*** to comply with the Code of Federal Regulations on open-ended valves standards

Working principle

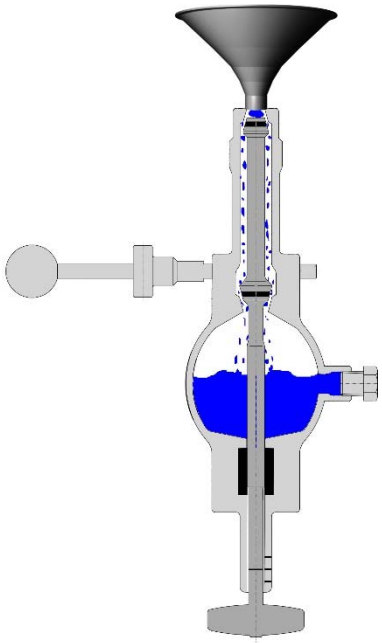
- The sample is collected in a Sample Cylinder / AKA closed container. This eliminates all exposure.
- The 2-chamber Sample Cylinder allows HF to be mixed with water without releasing fumes
- The heat created through the chemical reaction is transferred to the metallic Cylinder
- Aqueous HF can now be transported to and handled at the laboratory in a safe manner

Sampling anhydrous Hydrofluoric Acids (HF) in a safe way with BIAR Sampling Systems

1. At the lab, make sure the Columbia-LY 2 stem is in position "Middle".



2. Fill the cylinder with the desired amount of water



BIAR, Inc.
2506 S. Philippe Ave.
Gonzales, LA 70737
☏ 225-647-4300
🖷 225-647-4309
contact@biar.us
www.biar.us

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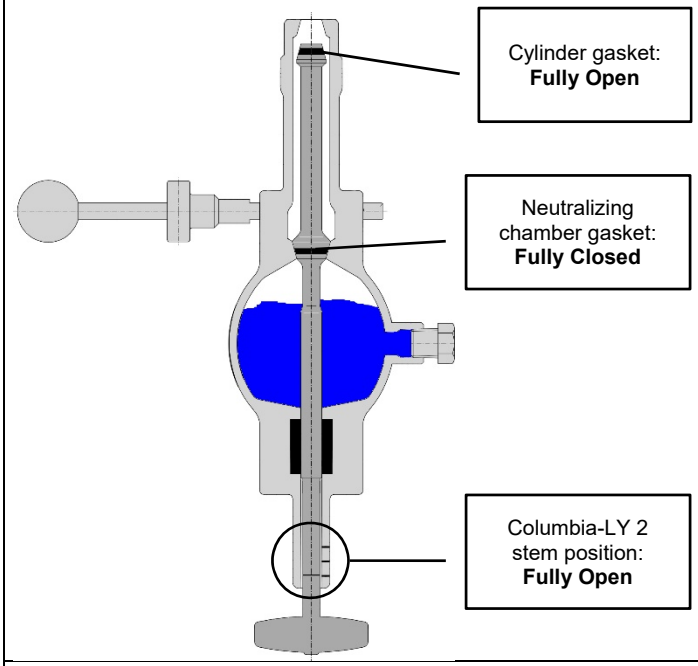
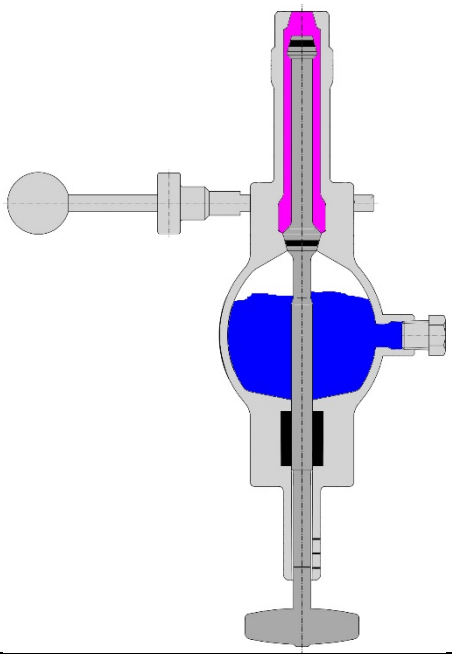
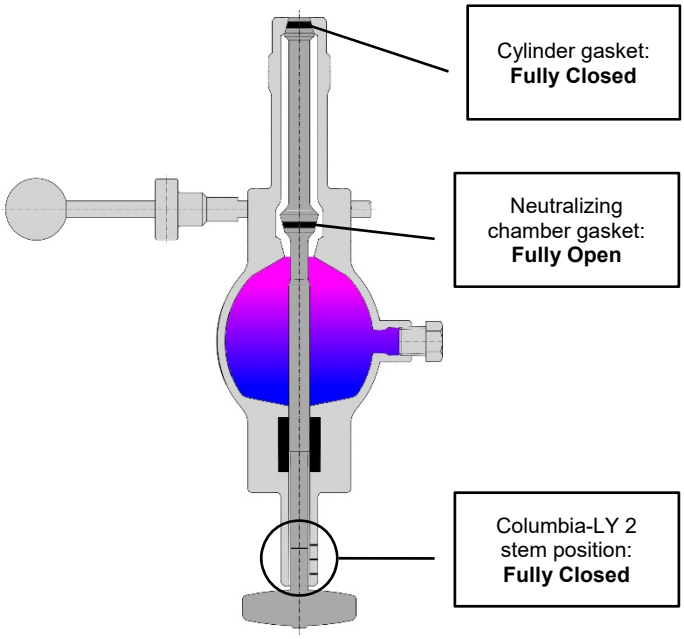
3. Once the desired amount of water is in the cylinder, turn the hand wheel to position "Fully Open". This closes the neutralizing chamber.



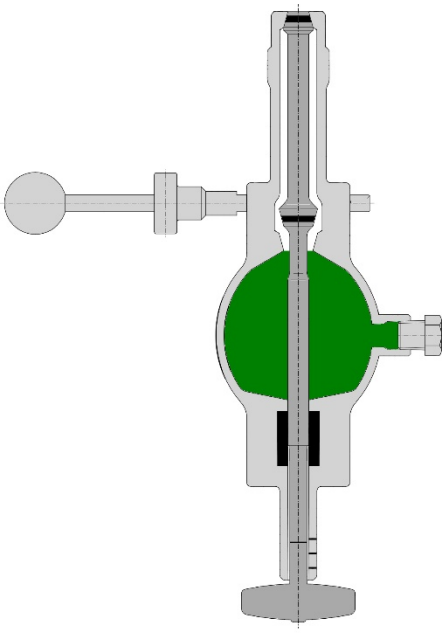
4. Bring and connect the Columbia-LY 2 to the Sample Valve. Open the Sample Valve. HF will fill the product chamber.



5. Close the Columbia-LY 2 to "Fully Closed". HF mixes with water and the Chemical reaction occurs in a totally closed environment.



6. Once the cylinder has sufficiently cooled down, disconnect and bring the Columbia-LY 2 to the lab for analysis. You now have aqueous HF.



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