Mixed Acid Recovery Systems

Vacuum Evaporation for $HF + HNO_3$ Recovery

Sustainable Solutions for Industry

Beta Control Systems, Inc.

Beta's Mixed Acid recovery process combines the best in environmental technology with the best return on investment. We provide sustainable solutions to meet both environmental & financial goals.

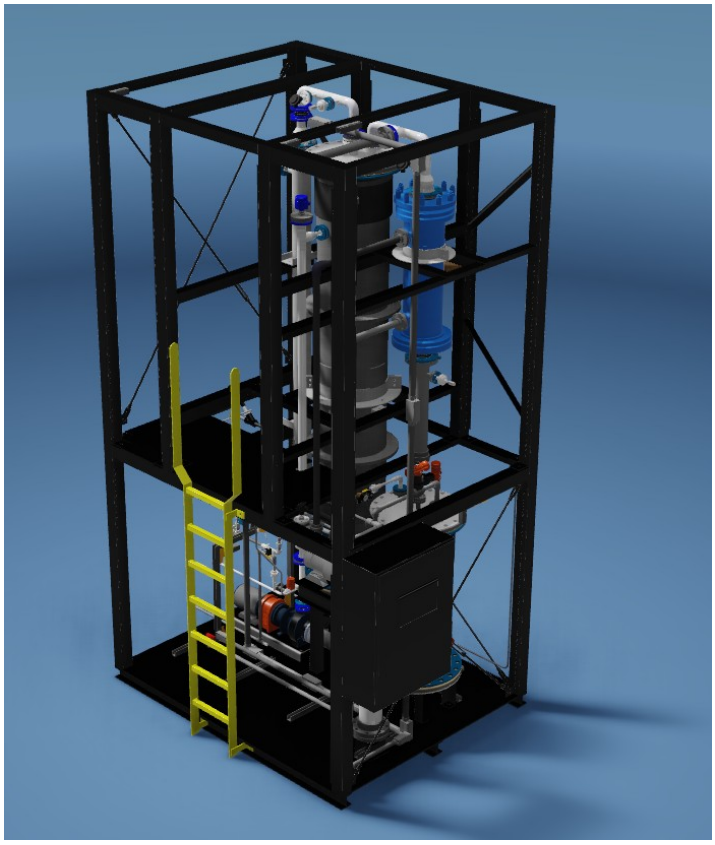
We design our systems with unique features such as automatic cleaning, efficiency monitoring, and modular maintenance. Our experience is reflected in our unsurpassed operating software which is customized for every installation.

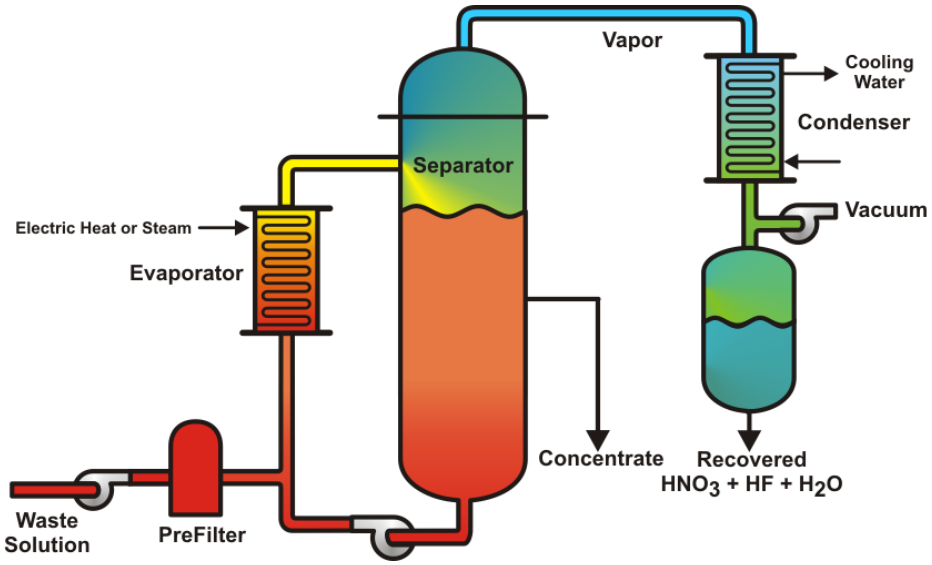
Overview

Beta uses vacuum evaporation to filter contaminants and to concentrate mixed acids for reuse. Our HF + HNO_3 recovery system works continuously to maintain your acid at its optimum concentration and purity.

- Reduces acid consumption, quick return on investment
- Unique heat exchange reduces energy required
- Compact design integrates into existing facilities
- High quality components & automation minimize downtime

Pictured: *(upper right)* Smallest system, *(lower left)* Model 2MT, *(lower right)* Model 5MT - 20MT





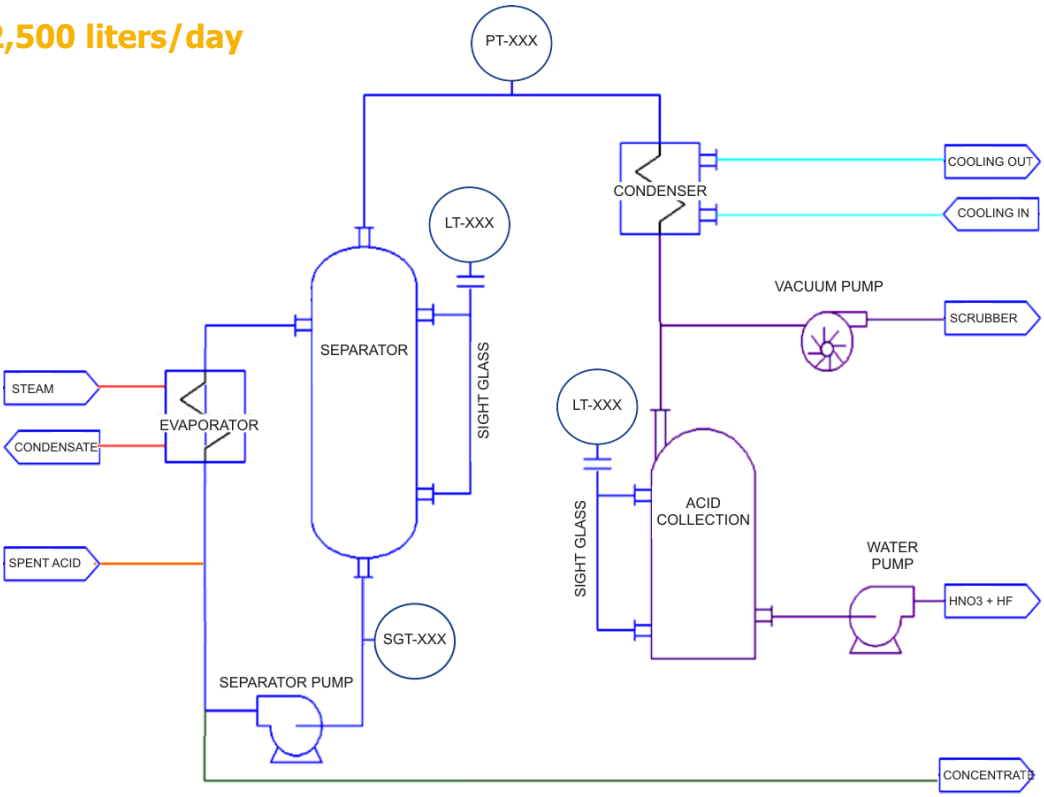
Operation

A pump forces the waste acid through a pre-filter and into the evaporator loop, comprised of the Evaporator exchanger and the Separator tank. In the evaporator loop, the HF, HNO_3, and water vaporize as they travel through the heat exchanger and are released into the liquid/vapor Separator. The remaining metal salt solution (metals + H_2O) continues to circulate through this pressurized boiling loop until it reaches a predetermined concentration and is withdrawn to a storage tank.

Under a controlled vacuum, the acids (HF and HNO_3) and water vapors are drawn from the Separator and into the Condenser. The acids and water vapors, devoid of metal salts, are condensed back into liquid form and recovered into a special thermoplastic vacuum tank. The recovered acids, now more concentrated than the original spent solution fed into the system, are pumped back to the process for reuse.

The system has no exposed metal parts and is designed to withstand a vacuum. Industrial PLC automation is used to control the process using proven software developed specifically for this application. The system requires a boiler or external heat source, cooling water, and electricity.

Example: 2,500 liters/day



Energy	
60 kW	steam

Chilling
<57> kW

Spent Acid Feed	
100 kg/hr	spent
10 kg/hr	HNO_3
3 kg/hr	HF
5 kg/hr	$M+F_4$
82 kg/hr	H_2O

90 kg/hr	Recovered
10 kg/hr	HNO_3 11%
3 kg/hr	HF 3%
77 kg/hr	H_2O 86%

10 kg/hr	Recovered $M+F_4 + H_2O$
5 kg/hr	$M+F_4$ 50%
5 kg/hr	H_2O 50%

Sustainable Solutions

Beta designs, manufactures, installs, and supports its own resource recovery equipment. We provide cost effective, robustly engineered systems that recover your assets and attain your company's environmental and financial goals.

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