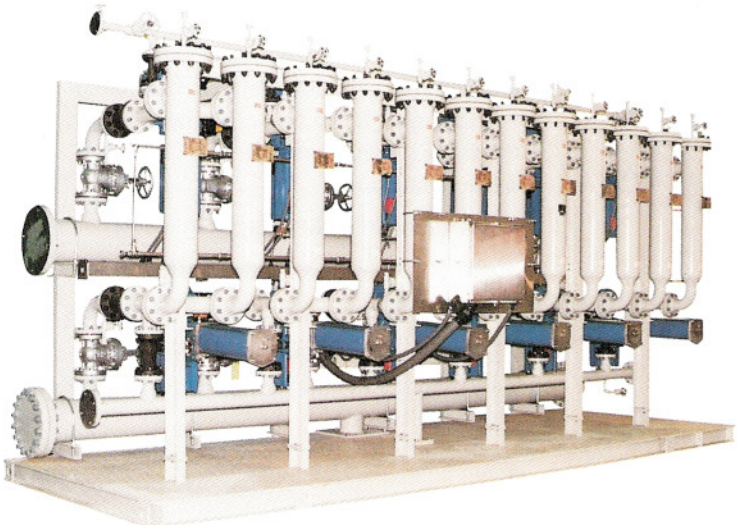
Amine Filtration

application bulletin

Tubular Backwashing or Pressure Leaf Both FSD Systems Eliminate Bags and Cartridges



Tubular Backwashing Amine Filter System for Parsons Engineering features self-cleaning, reusable filter elements and refinery-grade features such as nitrogen purge.

Expertise

FSD incorporates over 60 years of filtration experience in every amine filtration system we build. Founded in 1933, FSD manufactures a broad line of self-cleaning Tubular Backwashing Filters, Pressure Leaf Filters, Pressure Nutsches, Filter Presses and Sludge Dryers.

FSD's worldwide customer list includes companies such as Koch Refining, Texaco/Star, Aramco, Bechtel, Black & Veatch/Pritchard and Parsons Engineering. Systems range in size from 5 gpm to 3,000 gpm ($1m^3$/hr - $700m^3$/hr) and incorporate pre-coat, admix, piping, pump and automation skids.

Application

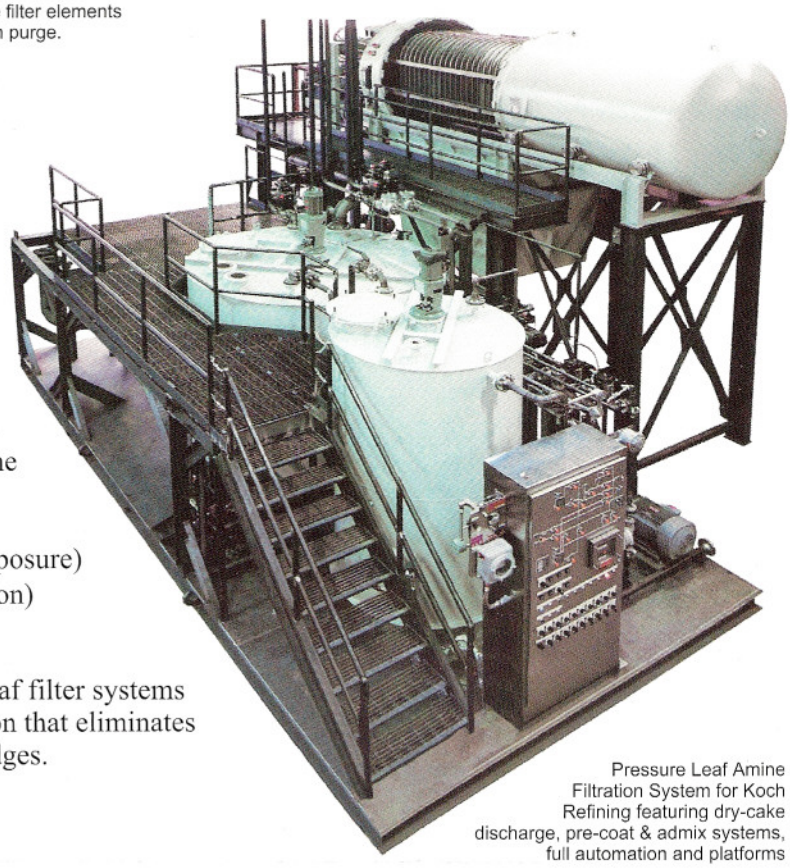
Oil and natural gas often contain high levels of sulphur that require removal (sweetening) in order to lower the environmental impact and increase value. Amine systems are commonly employed to perform this "sweetening."

Challenge

Amine systems become contaminated with organic and inorganic solids that cause severe foaming in the contactor and stripper, resulting in poor system performance. Filtration systems are challenged to provide safe operation (eliminate personnel H_2S exposure) and efficient solids removal. (0.5-20 micron filtration)

Solution

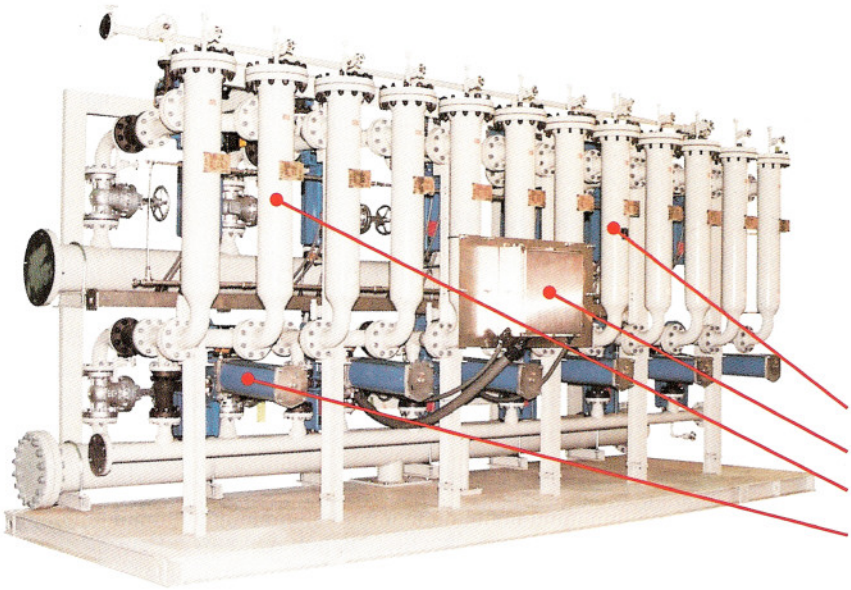
Tubular backwashing filter systems and pressure leaf filter systems are self-cleaning and provide safe, low cost filtration that eliminates the cost and hazards of replaceable bags and cartridges.



Pressure Leaf Amine Filtration System for Koch Refining featuring dry-cake discharge, pre-coat & admix systems, full automation and platforms

Tubular Backwashing Amine Filtration Systems

Continuous Duty, High Flow Rates



FSD Tubular Backwashing Amine Filtration Systems offer continuous and self-cleaning operation through sequential backwashing of individual filter elements. They eliminate the hazards and costs associated with bag and cartridge filter replacement. In addition, isolating the amine from the backwash water through the use of control and nitrogen purge limits the COD load to waste treatment.

High Pressure Housings

Total Range of Control Options

Flanged, Removable Filter Elements

Fire Safe Features including ANSI flanged valves and double acting, spring return actuators

ASME, HIC and NACE Construction - FSD systems meet the most stringent refinery specifications and international requirements

High Temperature and Pressure Designs to meet the demands of refinery service

Filter Media including perforated, slotted, wire mesh and fabric to match the specific application

Particle Retention Down to Sub Micron Levels with precoat. Typical non-precoated retention to 20 micron

Modular Configuration providing large filtration area and future expandability.

Skid Mounted to provide low-cost field installation

Technical Data

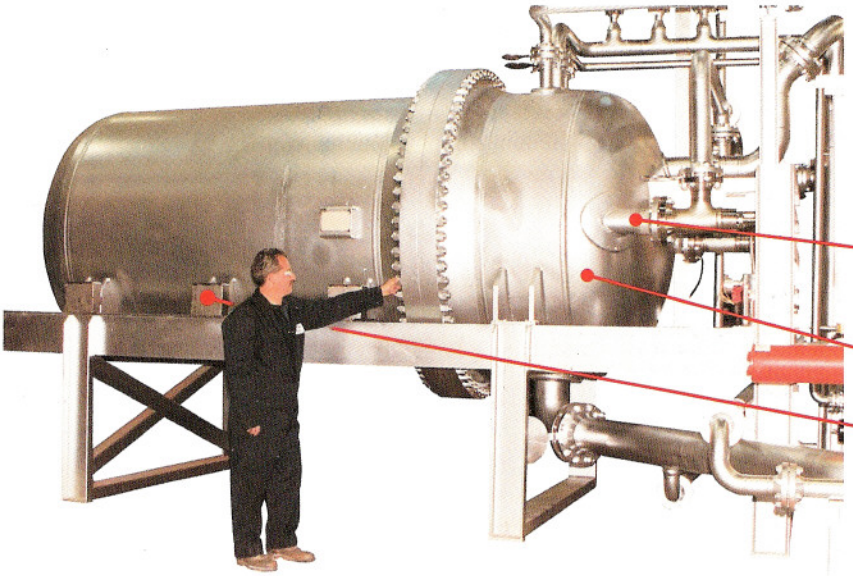
Application	Removal of organic and inorganic solids from MEA, DEA, TGA, and proprietary rich and lean amine/glycol solutions
Equipment	Custom engineered tubular backwashing filter system with Sequential, External Backwash and Nitrogen Purge
Materials of Construction	Steel, Alloy Steel, and Stainless Steel
Backwash Fluid	Water (isolated from amine via nitrogen purge)

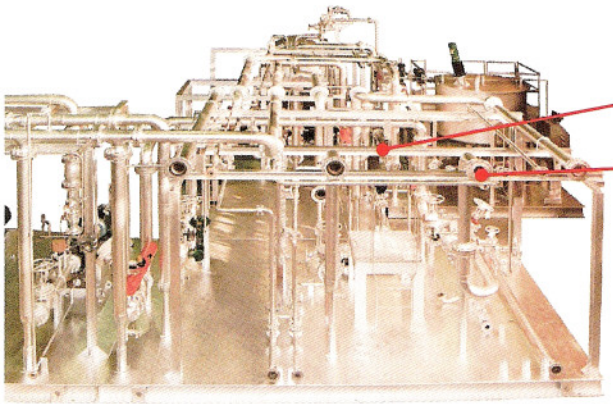
Filtration Data

Suspended Solids	Rust, Pipe Scale and Other Solids up to 300ppm
Flow Rate	Up to 240 gpm ($55 m^3/hr$) per module
Particle Retention	20 micron nominal (sub micron with precoat)
Cycle Length (typical)	Continuous

Pressure Leaf Amine Filtration Systems

Sub-Micron Removal





FSD Pressure Leaf Amine Filtration Systems are ideal when sub-micron particle retention is required. These systems eliminate operator contact with waste and handle high flow rates and upset solids. Other Features and Benefits include:

Dual Sluicers for efficient media cleaning and wet cake discharge without opening filter vessel

ASME, NACE and API Standards to meet the strictest specifications

Wheel Guards to eliminate pinch points and hazards

High Temperature and Pressure Designs

Constant Flow Batch Operation - Multiple day cycle times

Skidded, Modular Piping reduces installation time and cost

Stress-Relieved, Post-Weld Heat Treated Piping when required

High Flow Rates with less than 1% solids loading

Closed System limits personnel exposure to H_2S and amines

Side Stream or Full Stream Filtration

Technical Data

Application	Removal of organic and inorganic solids from MEA, DEA, TGA, and proprietary rich and lean amine/glycol solutions
Equipment	Custom engineered horizontal tank or vertical tank pressure leaf filter system with wet cake discharge and precoat/admix stations
Materials of Construction	Steel, Alloy Steel and Stainless Steel (NACE, HIC)

Filtration Data

Suspended Solids	Rust, Pipe Scale and Other Solids
Flow Rate	Up to 2,000 gpm ($455 m^3/hr$) per unit
Particle Retention	0.5 micron
Cycle Length (typical)	Multiple Days Depending on Solids Loading
Precoat	20 lb Diatomaceous Earth/$100 ft^2$

Amine Filtration Systems

Typical Amine Filtration Flowsheet