



Durco Tubular Filters & Pressure Leaf Filters Tubular Filter / Pressure Leaf Filter Installations Case Study #2

Amine Treater Filtration For Hydrocarbon Desulfurization

***Durco Tubular Filter Continuous Filtration System With Automatic Backwash
And Durco Pressure Leaf Filter With DE For Sub-Micron Particle Removal***

Industry: Gas / Oil / Petrochemical

Locations: Various

Installation Dates: Various

Process Flows: Various

More Information

Web: [Durco Tubular Filter Units](#)

[Durco Pressure Leaf Filter Units](#)

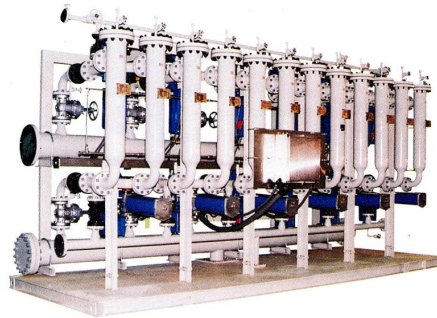
e-mail: filterengineering@asmfab.com

Designed For Efficient & Reliable Operation

August 2008 - This Durco Pressure Leaf Filter Unit (bottom right) has reliably filtered 2,630,000,000 gallons of amine, removing all particulate down to 0.6 microns, since it was installed in the 1980's.

This saved the environment from over 3,000 cubic feet of spent plastic filter cartridge waste that has a 10,000 year disposal life cycle.

You just can't beat the reliable long-term value that a Durco brand filter brings to Your industrial operation.



Durco TE Tubular Filter Automatic Backwash Amine Filtration System With Refinery Grade Options Including Nitrogen Purge



Durco DHC Horizontal Pressure Leaf Amine Filtration System With Fully Automatic Control, Dry Cake Discharge, And DE Precoat & Admix Systems

Prevents Amine Foaming – Eliminates Bags & Cartridges – Approx. 1 Year Payback!

The Durco TE [Tubular Backwash Filter](#) Amine Filter was deployed for **Parsons Engineering** in the 1980's. The [Durco DHC Pressure Leaf](#) Amine Filtration system was installed at **Koch Refining**, also in the 1980's. Both units have operated reliably since initial installation, are still in operation today, and are estimated to have continuously provided an annual ROI equivalent to more than their initial capital cost.

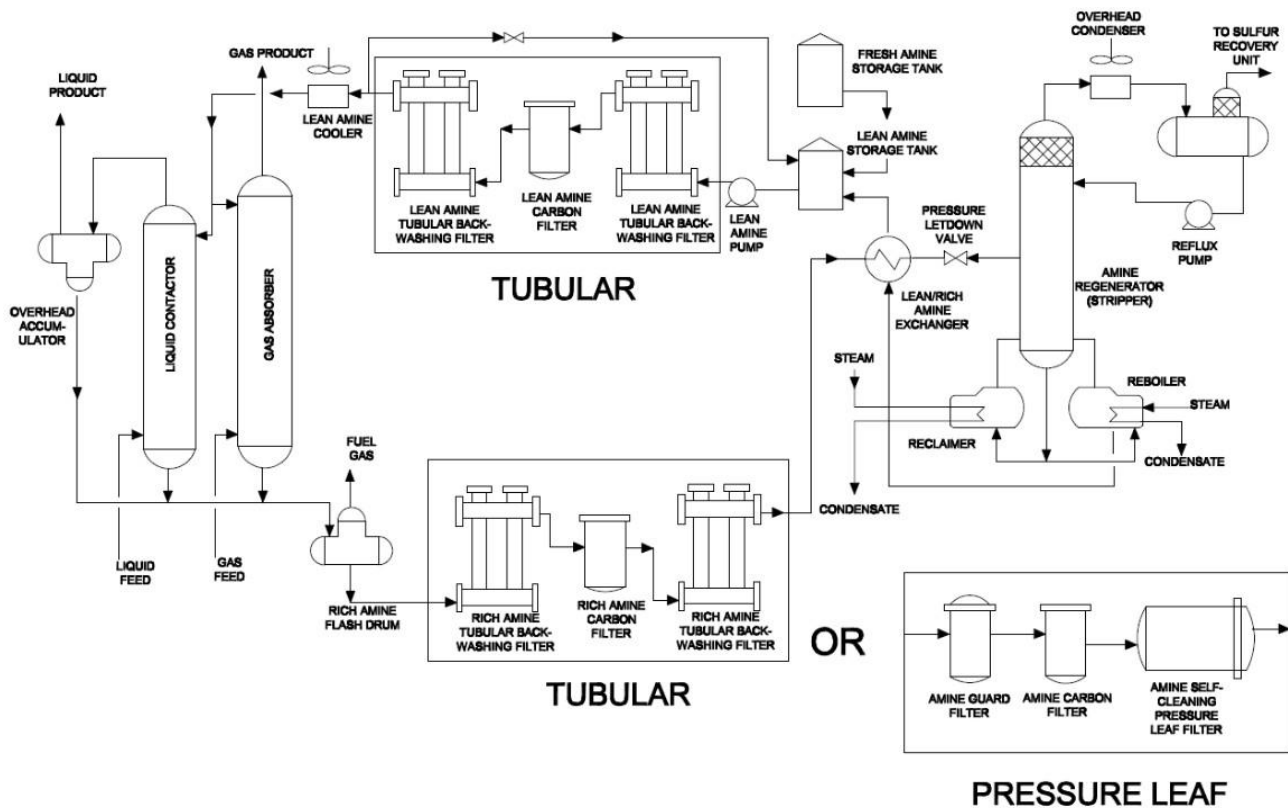


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Hydrocarbon 'Amine Treater' Application

Unrefined hydrocarbon fuel stocks usually contain sulfur compounds, which must be removed to avoid SO_x pollution from their products of combustion. *Oil Refineries, Petrochemical Producers, and Natural Gas Producers* all rely on processing units known as '**Amine Treaters**' to remove these sulfur containing compounds from their sulfur-rich 'sour' process streams, to yield low-sulfur 'sweet' products.

A typical **Amine Treater** is comprised primarily of a **Liquid Contactor / Gas Absorber unit** and a **Regenerator unit**, as presented in the amine flow schematic:



'Sour' hydrocarbon is piped into the Contactor / Absorber unit, where it makes intimate contact with an aqueous/glycol amine solution, which efficiently absorbs sulfur-containing compounds. A typical amine solution contains about 30% of an alkanolamine (such as MEA or DEA), although the optimum solution for a particular process depends on the specific sulfur compounds present, the process temperature, and other factors.

The used sulfur-rich amine solution is then piped to the Regenerator unit that distills off the amine solution, leaving behind the dried sulfur compounds. The resultant sulfur-lean amine solution can then be recycled back into the Contactor / Absorber unit to treat more hydrocarbon.



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The Problem – This side of the Amine Treater process loop typically includes a **carbon filter** to absorb any hydrocarbon carryover from the Regenerator unit. It is also very important to use a **particulate filter** to remove entrained solids from the carbon filter, as well as pipe scale and other contaminants from the Regenerator. This debris must be removed from the lean amine solution in order to avoid foaming – which prevents efficient contact with the hydrocarbon stream in the Absorber and promotes formation of hot-spots in the Regenerator (creating a foam-inducing feedback loop).

The use of **replaceable cartridge filters** in this role has proven problematic:

- They require a long and expensive supply line into and out of the Amine Treater
- Ongoing acquisition & disposal costs are prohibitive
- Personnel exposure to H₂S and amines is an issue
- They do not handle system upsets well
- They regularly demand considerable down-time for change-out

The Durco Solution - Durco Tubular Backwash Filter units and Durco Pressure Leaf Filtration units have both been successfully applied in amine filtration applications, demonstrating a proven performance record by running reliably for decades:

- **Durco Tubular Filter units** provide continuous duty at high flow rates and can achieve particle removal at the 5-10 micron level. The backwashed fluid may be sent to waste fluid treatment or may be rerouted to the front of the re-boiler for reprocessing.
- **Durco Pressure Leaf Filter units** with Diatomaceous Earth (DE) pre-coat and a body feed of DE can achieve submicron particle removal down to about 0.6 micron, producing “Mountain Spring Clear Amine” with unbeatable clarity. The waste signature of this filtration process is very low (the DE filter aid becomes standard land fill stock once the residual fluid has evaporated).
- Both the Tubular Filter units and the Pressure Leaf Filter units offer **Automatic Filtration Options** to minimize human interface with sulfur compounds and amines (which would otherwise be required to clean the screens). Pressure Leaf Filter systems do require that an attendant keep the pre-coat tank and body feed tank filled with DE. The Tubular Filter units only require occasional replacement of filter media at planned maintenance intervals.

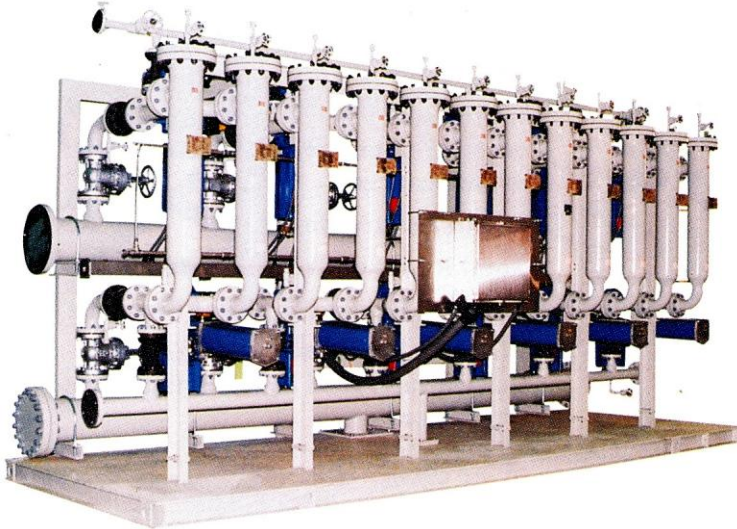
Durco Experience – With decades of experience in this application, Durco’s clients include companies such as Texaco / Star, Aramco, Bechtel, Black & Veatch/ Pritchard and Parsons Engineering. Systems range in size from 5gpm to 3,000gpm (1m³/hr to 700 m³/hr), and incorporate pre-coat, admix, piping, pump and automation skids.

More Benefits – Tubular Filter or Pressure Leaf Filter - each **Durco** Filter unit is a self-cleaning, closed system that limits personnel exposure to H₂S and amines. These systems eliminate the costs and hazards associated with replaceable bags and cartridges.



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Durco Tubular Filter Continuous Amine Filtration System With Automatic Backwash



The **Durco TE Tubular Filter System** offers continuous self-cleaning operation through sequential backwashing of individual filter elements. Automatic Control and Nitrogen Purge isolates amine from the backwash water and limits the COD to waste treatment.

- *High Pressure Housings*
- *Range Of Control Options*
- *Flanged Removable Filter Elements*
- *Fire Safe Features – includes ANSI flanged valves and double-acting, spring-return, actuators*

Durco Tubular Continuous Filtration Systems meet the most stringent refinery specifications and international requirements:

- *ASME, HHC and NACE Construction*
- *High Temperature & Pressure Designs* - to durably meet the demands of refinery service
- *Filter Media Range* –including perforated, slotted, wire mesh and fabric
- *Modular Configuration* – providing large filtration area and future expandability
- *Skid Mounted* – to provide low-cost installation

Durco Tubular Backwash Amine Filtration Systems Technical Data

- *Application* – Removal of organic and inorganic solids from MEA, DEA, TEA and proprietary amine / glycol solutions.
- *Equipment* – Custom engineered Durco TE Tubular Filter system with Sequential External backwash and Nitrogen Purge
- *Materials Of Construction* – Steel, Alloy Steel, Stainless Steel
- *Backwash Fluid* – Water (isolated from amine via Nitrogen purge)
- *Suspended Solids* – Rust, scale, organic & inorganic particulates up to 300ppm
- *Flow Rate* – Up to 240gpm (55m³/hr) per module
- *Particle Retention* – Down to 5 micron
- *Cycle Length* – Continuous operation

In A Typical Amine Filter Application, A Durco Tubular Backwash Filter System Or Pressure Leaf Filter System Can Often Provide A Full ROI In About 1 Year Of Service!

Contact Durco Filtration To Find Out More

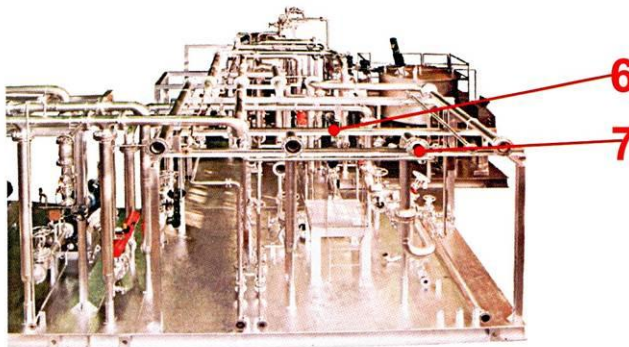
Call 716-693-9882 ext.217 or e-mail filtersales@asmfab.com



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Durco Pressure Leaf Filter Amine Filtration System With Automatic Control

Durco DHC Stainless Steel Pressure Leaf Filter Unit:



Durco Pressure Leaf Filters offer

- Sub-Micron Particle Retention
- High Flow Rates
- Dual Sluicers for efficient media cleaning and wet cake discharge without opening the vessel (1)
- ASME, NACE and API Standards for the strictest specifications (2)
- Wheel Guards to eliminate hazardous pinch points (3)
- High Temperature & Pressure Design
- Constant Flow Batch Operation allows multiple day cycle times
- Skidded Modular Piping reduces installation time and cost (6)
- Stress-Relieved, Post-Weld Heat Treated Piping when required (7)
- Closed System limits personnel exposure to H₂S and amines
- Side-Stream or Full-Stream Filtration

Durco Pressure Leaf Amine Filtration Systems Technical Data

- *Application* – Removal of organic and inorganic solids from MEA, DEA, TEA and proprietary amine / glycol solutions.
- *Equipment* – Custom engineered Durco Horizontal Tank or Vertical tank Pressure Leaf Filter System with Wet Cake Discharge and DE Pre-Coat / Admix Stations
- *Materials Of Construction* – Steel, Alloy Steel, Stainless Steel (NACE,HIC)
- *Suspended Solids* – Rust, scale, organic & inorganic particulates
- *Flow Rate* – Up to 2,000gpm (455m³/hr) per unit
- *Particle Retention* – Down to 0.5 micron
- *Cycle Length* – Typically multiple days depending on solids loading
- *Pre-Coat* – 20lb Diatomaceous Earth (DE)/100ft³

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