Filtration Group®
Filtering The World

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Cricketfilter®
For gas treating solvents

1. Introduction

Natural gas, synthetic gas, and various industry-gases contain in some extent hydrocarbons, acid-gases like CO_2 H_2S and, sulphur compounds such as COS and mercaptans. Gas containing acid components is classified to be ‘sour’. For reasons of operation (equipment erosion/corrosion prevention), economics (meeting sales/transportation quality), environmental (health and safety, sulphur and, CO_2 emission reductions) or reuse (hydrogen used for hydrogenation and hydrocracking) the acid gases and other impurities may have to be removed. The most widely used method for removal is absorption of the components in an aqueous gas treatment solvent, the so called ‘gas sweetening’ process. Commonly used gas treatment solvents are alkanolamines, referred to as amines, being; DEA, MEA, MDEA and DIPA. The H_2S removed from the 'sour' gas can be recovered by transforming it into sulphur through a sulphur recovery unit (SRU) and marketed on its own. In fact, recovered sulphur forms the vast majority of all elementary sulphur produced worldwide.

Next to afore mentioned components, raw natural gas also contains dissolved water (vapour), which needs to be removed prior to transportation or further treatment. Water removal is a dehydration process, most frequently used method is absorption, using glycol (EG, DEG, TEG, MEG) or methanol desiccants as dehydrator.

2. Gas sweetening

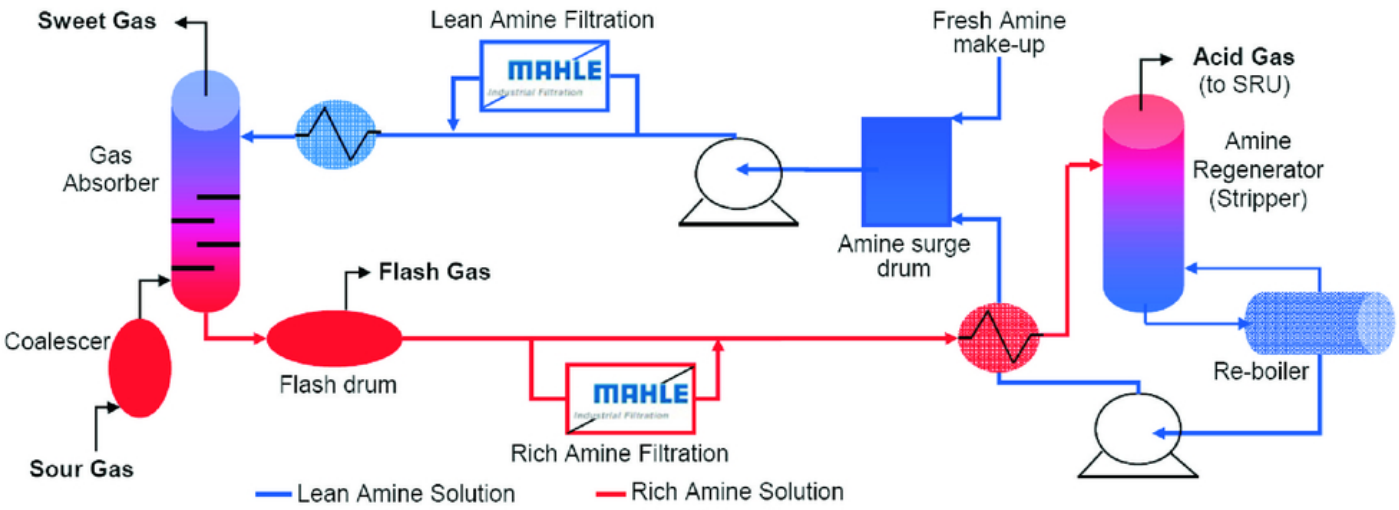
A typical amine gas treating process includes a gas absorber unit and an amine regenerator unit as well as accessory equipment (see schematic). In the absorber, the down-flowing amine solution absorbs H_2S and CO_2 from the up-flowing sour gas to produce sweetened gas (i.e., H_2S-free gas) and an amine solution rich in the absorbed acid gases. The resulting "rich" amine is then routed into the regenerator (a stripper) to produce regenerated or "lean" amine that is recycled for reuse in the absorber. The gas stripped from the amine is concentrated H_2S and/or CO_2. The H_2S rich stripped gas is usually routed into a SRU to convert it into elemental sulphur. CO_2rich gas can be further processed and can be sent to storage (CCS).

3. Gas dehydration

The primary process for dehydration is quite similar to the gas sweetening processes. In this case however a dehydrator is used to absorb water vapour from the gas. In the absorber the dehydrator absorbs water from the gas, increasing its particle weight which sink to the bottom. From here the water bearing dehydrator is put through a regenerator (specialized boiler) where the water is vaporized out of the solution allowing reuse of the dehydrator.

4. Typical gas treating problems

Depending on the process, added contaminants include antifoam agents, well-treating compounds, corrosion inhibitors, pipe scale, lube oil, rust and aerosols like hydrocarbon condensate and free water. Contaminants created within the gas treatment solution include acidic and basic degradation products, iron sulphides and oxides.
Problems created by dirty or unfiltered gas treatment solutions are particle fouling of the system, general corrosion and erosion and solvent foaming. All contributing to reduced plant operating performance and increased operation costs.
In many cases gas treating plants are designed assuming the gas to be free of contaminants and degradation of the gas treating solvent to be negligible (based on reports of the supplier). Minimizing filtration equipment is then justified reducing the initial investment. In practice, neither condition holds true. As the treating solutions degrade, and become exposed to influent contaminants, **filtration becomes increasingly important.**
Preventing contaminants from entering the system is the first step to a trouble free gas treatment system. For this reason the inlet gas should be treated, immediately prior to the entry of the gas treating system. In addition and equally important is the removal of contaminants and impurities originating from or created within the gas treatment system. This group will disperse in the gas treatment solution.



Schematic ofsimplified gas sweetening system

5. Gas treating problems solving

Filtration Group offers a wide range of filtration solutions, filters and engineered systems to create and maintain a superb treatment solution quality to aid a trouble free gas treating operation.
Our two stage filter system consisting of a particulate (mechanical) filter, such as the Cricketfilter®, in combination with an activated carbon filter (frequently followed by a safety filter) is the key to maintain good solvent quality.

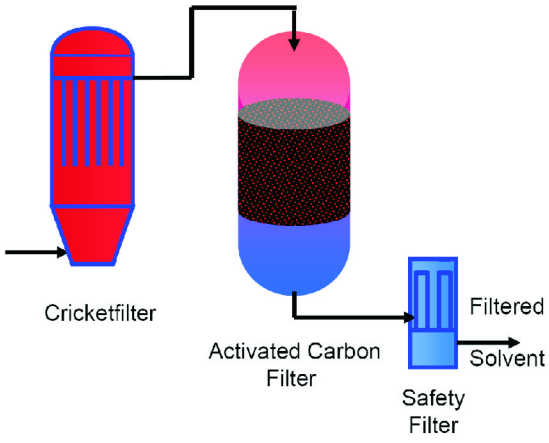
The filter system is designed to remove suspended particles as well as surface active containment sand. It can be located on the lean as well as the rich solvent stream. Although surface active impurities are less soluble in rich solvent (better filterable), the draw back is the increased safety and environmental risks. Making filtration of lean solvents favourable over rich solvents.

Cricketfilter® highlights

- Fully automated, minimizing manual intervention and totally enclosed from the environment.
- Filtered waste can be disposed of as dry cake, easily disposed of as landfill or being incinerated.
- The heart of the Cricketfilter® is a reusable filter element, regenerated after each cycle resulting in significant reduction of filter element usage, maintenance and downtime.
- The solid/liquid separation of the Cricketfilter® is based on precoat filtration, using a filter aid. The filter is extremely capable of handling high flow rates and system upsets. The unique Cricketfilter® element design offers superb filtration area vs. filter vessel diameter. Solids discharge wet as well as dry

Alternatives : Horizontal Leaf Filter or Cartridge Filter

Activated Carbon Filter
To remove chemical surface active contaminants, using activated carbon selected based on the specific process conditions. Mechanical and process design of the filter will be optimized to meet your system requirements, using accepted process parameters and critical conditions.

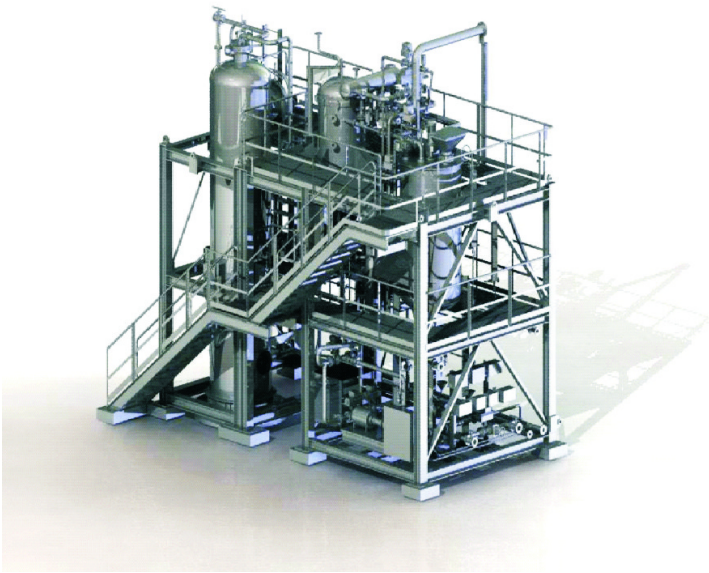


Schematic of simplified filtration system

Filtration Group designs, builds and supplies complete engineered filtration systems. Systems can be delivered skid mounted, fully automated and commissioned by our own application engineers.
Engineered filtration systems typically include a mechanical filter, an activated carbon filter, a safety filter, precoat suspension preparation tank, piping, auxiliaries, instrumentation and an automation control cabinet.

Advantages of Filtration Group engineered filtration systems are, amongst others :

- Process and mechanical design tailored to your requirements
- Compliance with most common codes and standards, like PED, ASME, GOST, NACE, API, and many more
- Automatic process control, limiting manual intervention closed system, minimizing environmental and health risk
- Wide range of filter media possible, offering great filtration selectivity flexibility



Typical amine filtration system

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6. Gas treating solvents engineered filtration systems

Filtration Group has a wide range of value adding services available. These Filter Care Services can help minimizing your on-going operating costs, extend equipment lifetime, optimize your process and reduce health and environmental risks.

Filter Care Services are tailored to meet your individual needs and include, but certainly not limited to:

Technical consultation
Immediate access to a team of professional application engineers

Plant installation and commissioning services
- On-time delivery and start-up
- On site operator training
- Turn key installation management

Plant optimization
- Improving filtration performances
- Minimizing system downtown
- Minimizing process production disruption

Customized training programs
- On site training on equipment, resulting in reduced operating costs while extending equipment life time
- On site filtration process training tailored to your process

Laboratory services
- Filtration Group's state of the art laboratory facilities provide a wide range of services helping you to analyze your process and optimize your filtration requirements
- Provision of equipment and support to conduct filterability test on site

7. Filter care services reference list

EXTRACT of Filtration Group reference list of engineered systems for the filtration of gas treatment solvents

Customer	Location	Engineering	Country	Filter type	Capacity [m³/h]
B.P.	Lavéra	Technip	France	SCF100/SCF50	12/6
GAIL	Auraya	EIL	India	SCF600	72
CFR	Flandres	Technip	France	SCF150	20
Machino Import	Orenbourg	Cocei	USSR	SCF600	75
CFR	La Méde	Technip	France	SCF100	12
Bonny Island	Harcourt	Kellog Ltd.	Nigeria	2x48H	2x50
CFR	La Méde	Foster Wheeler	France	SCF100	12
KOC	Ras El Zor	Technipetrol	Kuwait	SCF100	15
Qapco		Technip	Qatar	SCF500	62
CFR	Gronfreville	Lummus	France	SCF100	10
Machino Import	Astrakhan II	Technip	USSR	5xSCF1000	625
Machino Import	Tenguiz	Lavalin	USSR	2xSCF600	180
ONGC	Hazira I	KTI	India	3xSCF200	60
ONGC	Hazira II	KHIC	India	2xSCF200	40
Machino Import	Tenguiz II/III	Lurgi	USSR	4xSCF600/2xSCF300	4x90/2x30
QGPC	Qatar	Technip	Qatar	2xSCF300	2x60
Adnoc	Habshan	Technip	UAE	2xSCF900/SCF500	115/58
ONGC	Hazira III	Daelim/Hyundai	India	SCF200/SCF100	25/30
Elf Petr.	Maharaja Lela	TP Malaysia	Brunei	SCFT150	15
Adnoc II	Habshan	Technip	UAE	3xSCF900	115
Aramco	Hawiyah	Technicas Reunidas	Saudi Arabia	2xSCF	175/113

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