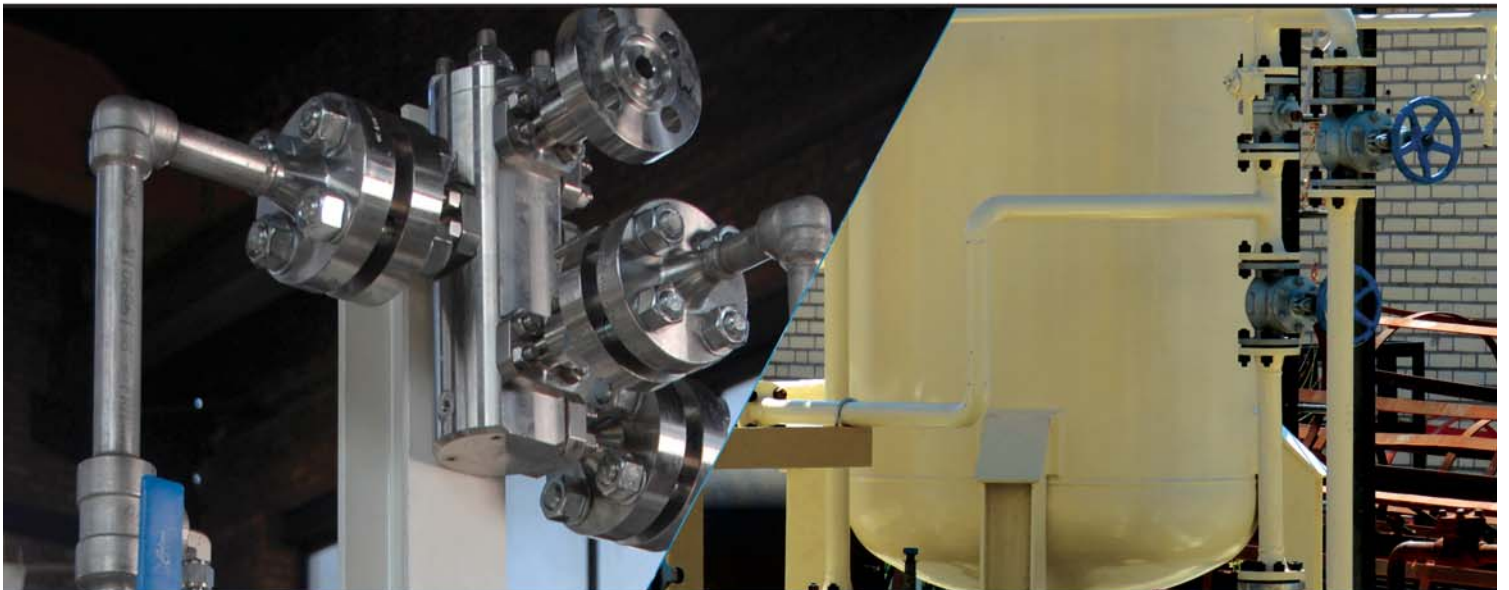




**TEHRAN JAVAN**  
Consulting Engineers & Managers

## Filters & Separators



**Production  
Refining  
Treatment Facilities  
for Oil & Gas Industries**



## AMINE FILTER PACKAGE

For more than 25 year, the hydrocarbon processing industry has successfully used alkanolamines to treat sour gas for removal of acid gas constituents, principally H<sub>2</sub>S and CO<sub>2</sub>.

Today , major refineries, gas processing facilities and ammonia plants increasingly rely on the proven scrubbing capabilities of standard amine solution (including MEA,DEA and MDEA) as well as specialty amines. Plant managers, engineers and Sulfur Recovery Unit superintendents recognize that properly designed, efficiently operated amine recirculating system add significant value to their company's bottom line. That value can be realized through

- The potential of an amine system to reduce energy and other plant operating costs,
- High selectivity and efficiency of amine solutions to remove specific acid gases,
- The flexibility of an amine system to meet changing gas treatment requirements,
- The ability of an amine system to meet increasingly strict environmental standards.



Before refiners and gas processors can realize the full benefits, however, they must first solve a variety of problems associated with the typical amine scrubbing process. For example:

- Amine contamination by heavy hydrocarbons and organic acids.
- Foaming, amine losses, and expensive anti-foam addition.
- Generation of degradation products which reduce amine activity.
- Formation of heat stable salts.
- Increased amine system corrosion and inhibitor cost.
- Increased amine circulation, steam, and energy requirements.
- High maintenance and operational costs, with frequent downtime.

### Clean Amine Process Improves Amine Systems Efficiency

Tehran Javan uses powder and granular activated carbon (PAC & GAC) for multiple Industrial applications.

Based upon this engineering and applications experience, Tehran Javan has introduced the pre-engineered, pre-packaged Clean Amine system to help clean and maintain amine solution while reducing plant costs associated with acid gas removal. Many refineries and gas plants around the world now rely on the Clean Amine Process to maintain consistent high amine quality.



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## Functional Description and Key Operating Parameters

The TEHRAN JAVAN Clean Amine Process includes a pre-assembled, skid-mounted, easily installed carbon adsorption system specifically designed to purify recirculating amine streams.

Clean Amine system meet all necessary API refinery equipment standards, including ASME Code, Section VIII, for heat treatment and stress relief relative to carbon steel equipment in amine service. It features well-designed absorber under-drain systems that historically have demonstrated a record of mechanical integrity, and have a proven ability to retain the carbon.

Mechanical filtration equipment is supplied on a standard basis to augment carbon adsorption efficiency. Clean Amine systems have two cartridge type filters, for both pre-and post-adsorption. The upstream filter protects the carbon system from suspended solids and the associated pressure drop, thus enhancing its capacity to adsorb dissolve organic contaminants and amine degradation products. Should any carbon fines exit the adsorber, the downstream filter ensures complete fines removal. In-line sample taps allow easy inspection of amine solution.

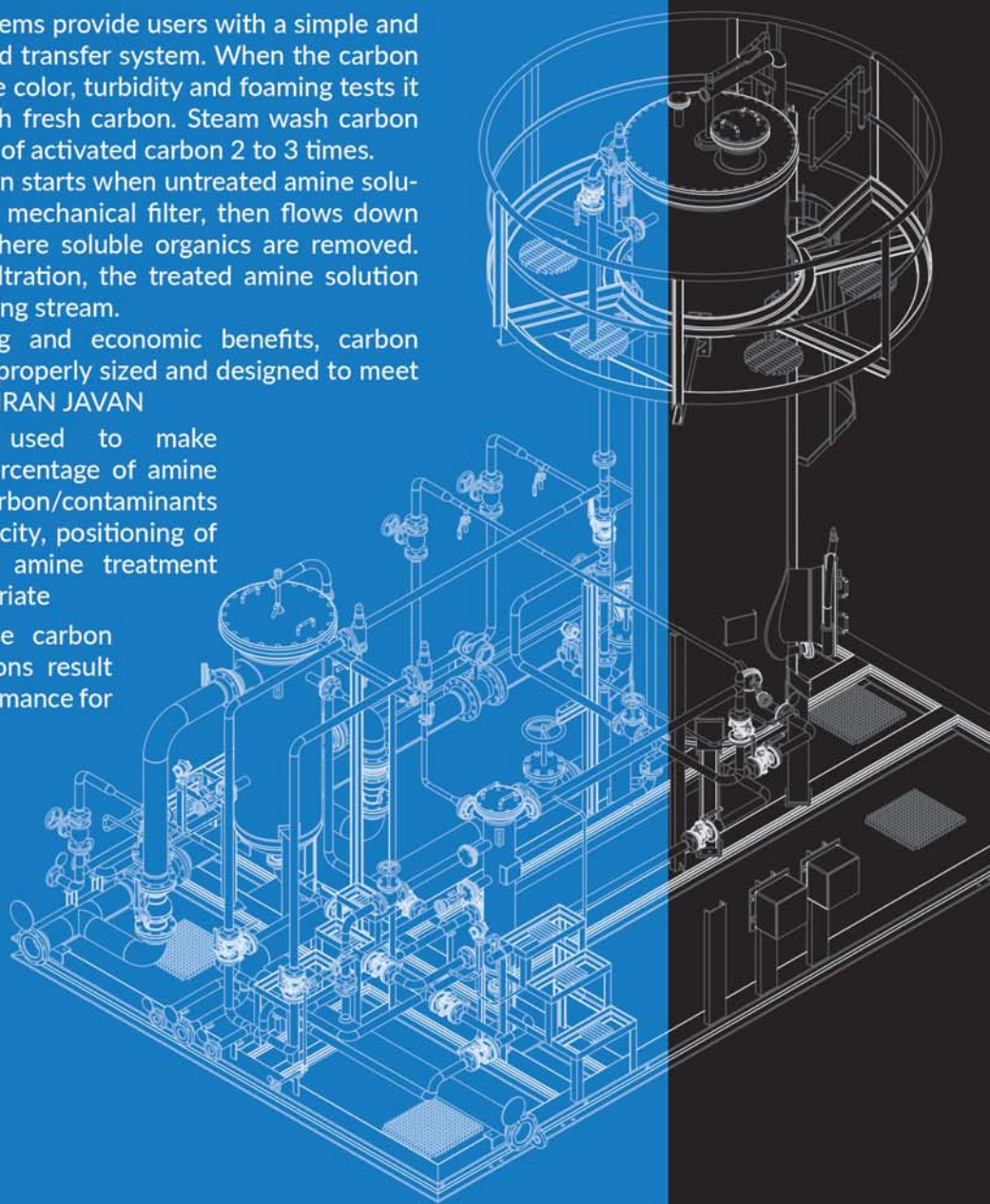
In addition, Clean Amine systems provide users with a simple and complete carbon handling and transfer system. When the carbon is spent as indicated by amine color, turbidity and foaming tests it is removed and replaced with fresh carbon. Steam wash carbon reactivation increase lifetime of activated carbon 2 to 3 times.

Typical Clean Amine operation starts when untreated amine solution enters a pre-adsorption mechanical filter, then flows down flow into the carbon bed where soluble organics are removed. After passing through post-filtration, the treated amine solution then returns to the recirculating stream.

To enjoy the full operating and economic benefits, carbon adsorption systems must be properly sized and designed to meet user needs. For example, TEHRAN JAVAN

adsorption expertise is used to make recommendations on the percentage of amine slipstream to be treated; carbon/contaminants contact time, superficial velocity, positioning of the carbon system in the amine treatment configuration, and for appropriate

carbon mesh size and base carbon stock. These recommendations result in optimum adsorption performance for the user.





TEHRAN JAVAN Clean Amine Process system are now in service treating MEA, DEA, MDEA and a growing number of specialty solvents. At refinery and gas plant sites, these particular amines are used to treat fuel gas, hydrogen, field gas, etc. Experience from user plant indicates the following key benefits of the Clean Amine Process:

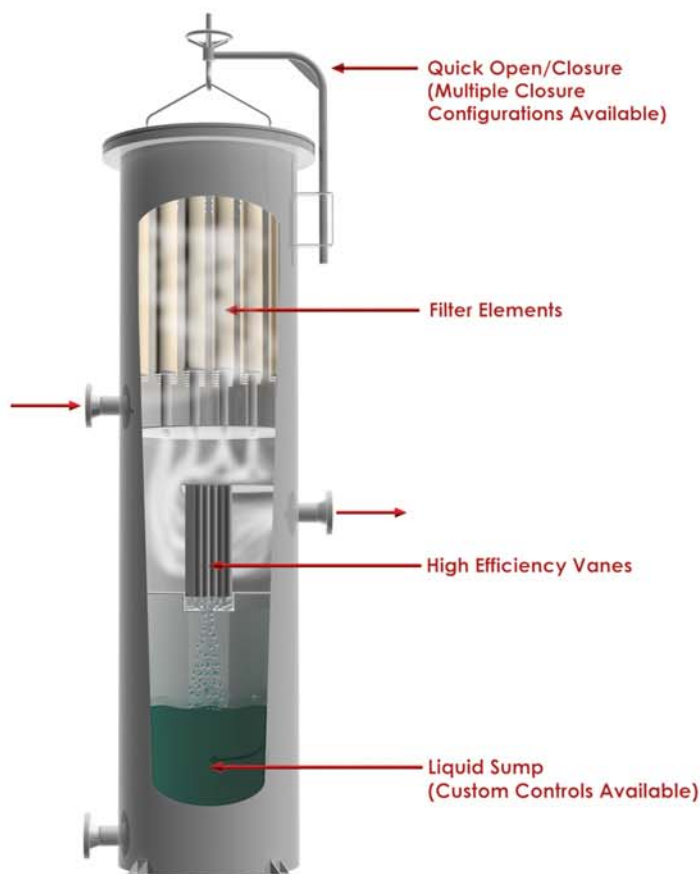
**Clean Amine Process Benefits**

- Improve amine scrubbing efficiency and product quality.
- Reduces operating costs.
- Improve unit operating stability.
- Ensures environmental compliance.
- Provides all of the above benefits in a cost-effective manner.

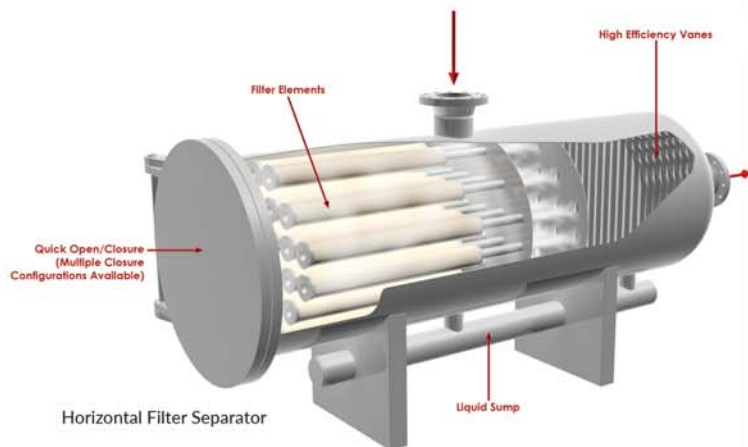


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TEHRAN JAVAN Horizontal double barrel and/or Vertical filter separators are designed to provide efficient liquid/solid removal and high gas capacities. The coalescer filter section removes bulk liquid and solid particles and coalesces fine liquid droplets into larger ones. These larger droplets are then removed in the second section. TEHRAN JAVAN could utilize special filter cartridge or high capacity DP Vanes to increase the separator's through put and thus minimize the separator diameter. The double barrel configuration allows you to maximize the gas flow in the upper barrel without re-entrainment while the liquid drops into the lower barrel. TEHRAN JAVAN offers standard coalescing filters that can be replaced periodically or designs that can be cleaned and reused.



Vertical Filter Separator



Horizontal Filter Separator

## Benefits:

- High gas capacity with a compact vessel
- Low maintenance
- No plugging of the DP Vane
- High efficiency
- Debottle neck existing equipment

## Applications:

- Gas Plants
- Transmission Stations
- Gas Inlet to Chemical & Petrochemical Plants
- Gas Gathering Systems
- Turbine Fuel Gas
- Inlet/Outlet Reciprocating Compressor
- Turbine Protection
- Inlet/Outlet Amine Contactor
- Low and Ultra-low NOx Burner Protection
- Inlet/Outlet Glycol Contactor
- Gas Separation Membrane Protection
- Mole Sieve Protection
- Sales Gas
- Mercury Removal Catalyst Protection
- Pipeline Metering / Compression Stations

## Performance data:

- Liquids: 99.999% at 0.3 micron per DOP test and 1 ppb downstream liquids
- Solids: 99.7% for particles >0.3 micron per NaCl test
- Max Burst Pressure: 50 psid (3.45 bard)
- Maximum operating temperatures for filter cartridge:  
180°F (82 °C) in gas service with no water present  
140°F (60 °C) in gas service with water present



## Multiphase Separators

Crude oil wells contain oil, gas, water and various contaminants. To optimize field production, TJ multiphase separators perform the primary separation of other phases from crude. Multiphase separators are usually the first and most comprehensive set of equipment in the upstream oil production field, with downstream equipment completely dependent on the proper functioning of the multiphase separators. Multiphase separators are used to separate vapors from the liquid phase, which can be a single continuous phase or a mixture of two immiscible phases.



TJ supplied the following types of multiphase separators:

- 2-phase and 3-phase
- HP (High Pressure)
- LP (Low Pressure)
- IP (Intermediate Pressure)
- Free Water KO Drum
- Inlet Separator
- Test Separator
- WOSEP (Water Oil Separator)
- KOD (Knock-out Drum)
- Degasser





Dry gas seals are used as shaft seals in turbo machines in the petrochemical industry. The sealing gas which is pressurized externally is continually adjusted to maintain a higher pressure than that of the process medium inside the machine. This effectively seals the housing and shaft from the process gases (which are wet, contaminated with particles, toxic and often flammable) to prevent the process medium from leaking into the atmosphere. Dry gas seals on turbo machines are very complex systems and extremely sensitive to contamination from solid particles, aerosols and condensates. While the shaft is rotating, a tiny gap, just 3  $\mu\text{m}$  wide, is formed at the seal ring, through which the seal gas flows. To protect these seals, the seal gases must be filtered accordingly to ensure the seal has as long a service life as possible.

## Application

- TEHRAN JAVAN Gas Filters GCF are high performance change-over duplex coalescing filters in stainless steel which have been specially developed for use in dry gas seals in turbo compressors.
- All the filter components, including the filter housings are made of stainless steel machined parts without weld connections and comply with the requirements of API 614-5.
- The modular filter design means that a cyclone pre-separator can also be retrofitted to an existing standard filter by replacing individual filter housing parts.
- For special high pressure applications or those using hazardous gases, filters are also available in a "Double Block & Bleed" version.

## Features

- Modular filter – cyclone pre-separator is available as an option
- Compact filter design, optimized for pressure and flow
- Duplex seals without exception throughout the whole filter
- All flow paths throughout the filter are "full port" – no cross-sections in the filter are restricted relative to the inlet cross-section
- Efficient pre-separation of liquids and particles through the use of integrated cyclone – even under increased flow rates
- Redundant, patented pre-separator, tailored to the particular process and the filter stage downstream
- Sufficiently large chambers for collecting fluids, can be adapted to customer requirements
- High quality ball change-over valve which is easy-to-operate, with maximum negative overlap, gas-tight in all port directions, spindle has an anti blow-out device and encapsulated springs.







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