

PANTAN

The background of the slide features a complex illustration of industrial equipment. On the left, there are vertical distillation columns and storage tanks. On the right, a large, intricate piping system is shown, with various valves and connections. The entire scene is rendered in a clean, technical style with a color palette dominated by blues, greys, and oranges.

Engineered Smarter

Process Technology

A graphic of a molecular structure is positioned in the bottom right corner. It consists of several blue spheres of varying sizes, connected by dark blue lines to form a network. The spheres and lines are set against a light blue background with faint, larger-scale molecular patterns.



PANTAN process equipment technology team design and provide specialized tower internal solutions that cover a broad spectrum of conventional and proprietary mass transfer equipment and other process vessel internals. Beyond providing innovative process equipment, we offer practical solutions backed by process optimization and energy saving studies for separation column systems.



- Providing optimized solution in mass transfer and separation processes to utilize in new units or troubleshooting & revamping of existing units
- Modular process systems



We service the oil, gas, refining, petrochemical, mining, power, pharmaceutical, Oleochemical, biotech, food and general process industries with typical applications such as:

- Binary and Multicomponent Separations
- Gas Sweetening
- Gas Dehydration
- Liquid-Liquid Extraction
- Solvent Purification Systems
- Gas Separation / Gas Scrubbing Systems
- Multiphase Separation
- Crude Oil Stripping Systems
- Deaerator Systems

PANTAN offer know-how across all aspects of project execution includes:

- Simulation
- Design
- Fabrication
- Assembly
- Testing
- Installation
- Commissioning

Our process equipment technology team offers a full spectrum of engineering services, packaged chemical process unit and process plant solutions to support clients in their process developments and decision making.

Our experience is available to competently guide you through the complex decisions involved in selecting the best and most competitive process solution for your application with below concerns as well:

- Reducing operating cost
- Improving product quality and yield
- Reducing energy consumption
- Improving safety and stability of production
- Increasing capacity
- Solving operation trouble
- Optimizing process and equipment
- Field services
- Meet environmental pollution control regulation

We utilize leading edge technologies to guide you through selecting the best and most competitive process solution as stand-alone units, skid mounted or integrated modular assemblies or providing optimal design so as to help clients to increase production capability, improve product quality as revamp challenges, debottleneck and cut operating cost.





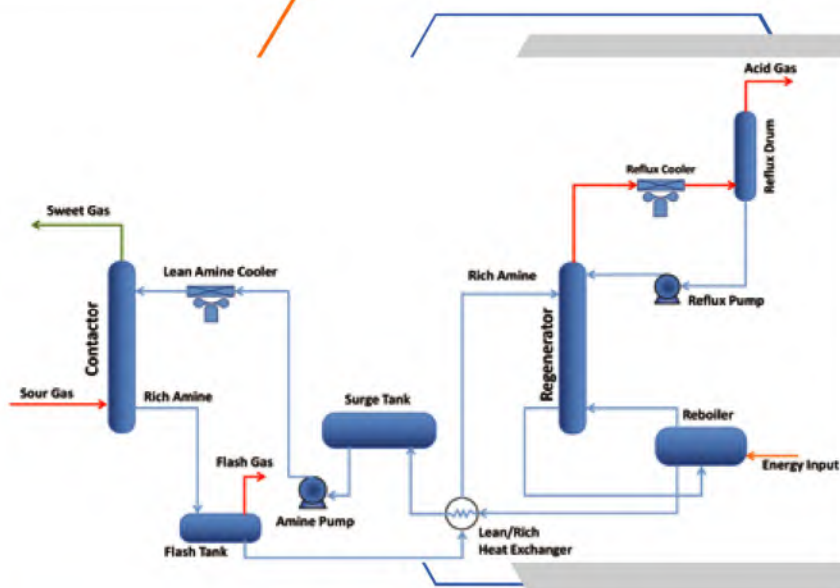
Gas Sweetening is a critical procedure in gas processing facilities. Carbon dioxide (CO_2) and hydrogen sulfide (H_2S) are common impurities in natural gas. These impurities need to be removed to different levels by sweetening process to remove contaminants; primarily H_2S because of its corrosiveness and CO_2 for its lack of heating value.

Gas sweetening units are found in gas production sites, gas processing plants, LNG facilities, refineries, petrochemicals, etc. This robust process is widely used to treat a range of gas streams, including natural, associated, tail and flare gas.

Each client's specific process requires to protect downstream equipment to maintain efficient operation, improve worksite safety, reducing the environmental footprint of site operations and meet sales specifications.

We offer generic Amine systems that chemically absorb both H_2S and CO_2 . Also we can specify the right amine for each project.

Our team of engineers will work with your business to provide the right solution and tailor process designs based on gas composition, production rates and the end-user of treated gas to design and build a complete turn-key ready package with particular emphasis on specific requirements.



Process Description

The Inlet gas enters the bottom of the absorber/contacter column flowing upwards with the aqueous amine solution where the amine chemically absorbs H_2S and CO_2 to produce a sweetened gas stream. The Purified (sweet) gas exits at the top of the absorber / contactor column while Rich amine solution containing H_2S and CO_2 enters the upper section of regeneration section where flash gases are removed in a flash vessel and cooling down in a cross heat exchanger.

The rich amine is heated in the regenerator / stripper column by contacting hot vapors from the re-boiler causing the acid gas to be stripped from the amine and the regenerated lean amine is cooled in the heat exchanger before being fed back into the absorption section.



Natural gas usually contains a large amount of water and is typically water-saturated. This water causes several problems for downstream processes and equipment like corrosion or freezing in pipelines.

Dehydration requires for pipe line transmission, NGL recovery units and off shore facilities. Sales gas plants must meet climate specific dew point requirements for pipeline

The use of generic glycols (MEG, DEG and TEG) to dehydrate gas streams is an established method that has proven its functionality and versatility over many years in both onshore and offshore facilities.

The design of TEG and MEG Dehydration system will vary to meet the specified moisture content of the gas at the process conditions, while a smart balance between packing height, glycol purity, and glycol amount allows you to benefit from minimized utility consumption levels and minimized energy consumption besides reboiler temperature control to prevent unwanted glycol degradation.

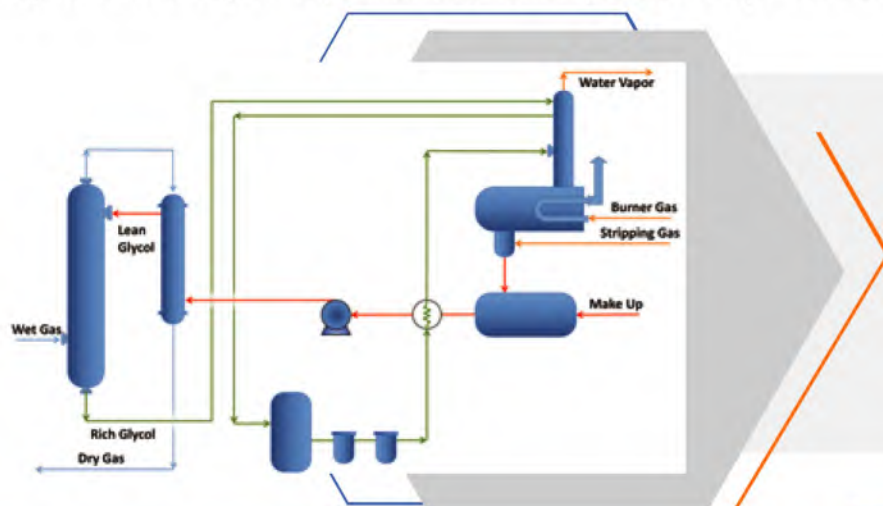
Our team of engineers will work with your business to provide the right solution and tailor process designs to meet a complete drying solution to meet the gas demands of the downstream processes, production rates and the end-user of treated gas to design and built a complete turn-key ready package with particular emphasis on specific client requirements.

Process Description

In a typical TEG package, water saturated gas and lean glycol enters the contactor counter currently, to dry the gas by physical absorption through the internal (Trays/Packing).

The TEG Regeneration process typically consists of a still column, an overhead condenser, and a reboiler where the rich glycol thermally regenerated to remove excess water and to regain the high purity to pumped back to the top of the Contactor Tower to repeat the process after passing through the Flash Drum and Filters to remove scaling and dissolved hydrocarbon.

The TEG gas dehydration unit can experience various operational issues including fouling and foaming which have to design mitigate by properly designed mass transfer and mist elimination equipment like high capacity structured packing to ensure higher Capacities and lower pressure drops besides improving separation efficiency .



Gas Scrubbers

The scrubber separators serve primarily to efficient liquid and dust removal from gas stream. In gas fields the high or low pressure scrubbers can be used for the removal of entrained liquids. These liquids can be hydrocarbons, water and also glycol (downstream gas dehydration systems). The Vane inlet device/schoepentoeter breaks the momentum of the incoming stream and performs primary gas/liquid separation.

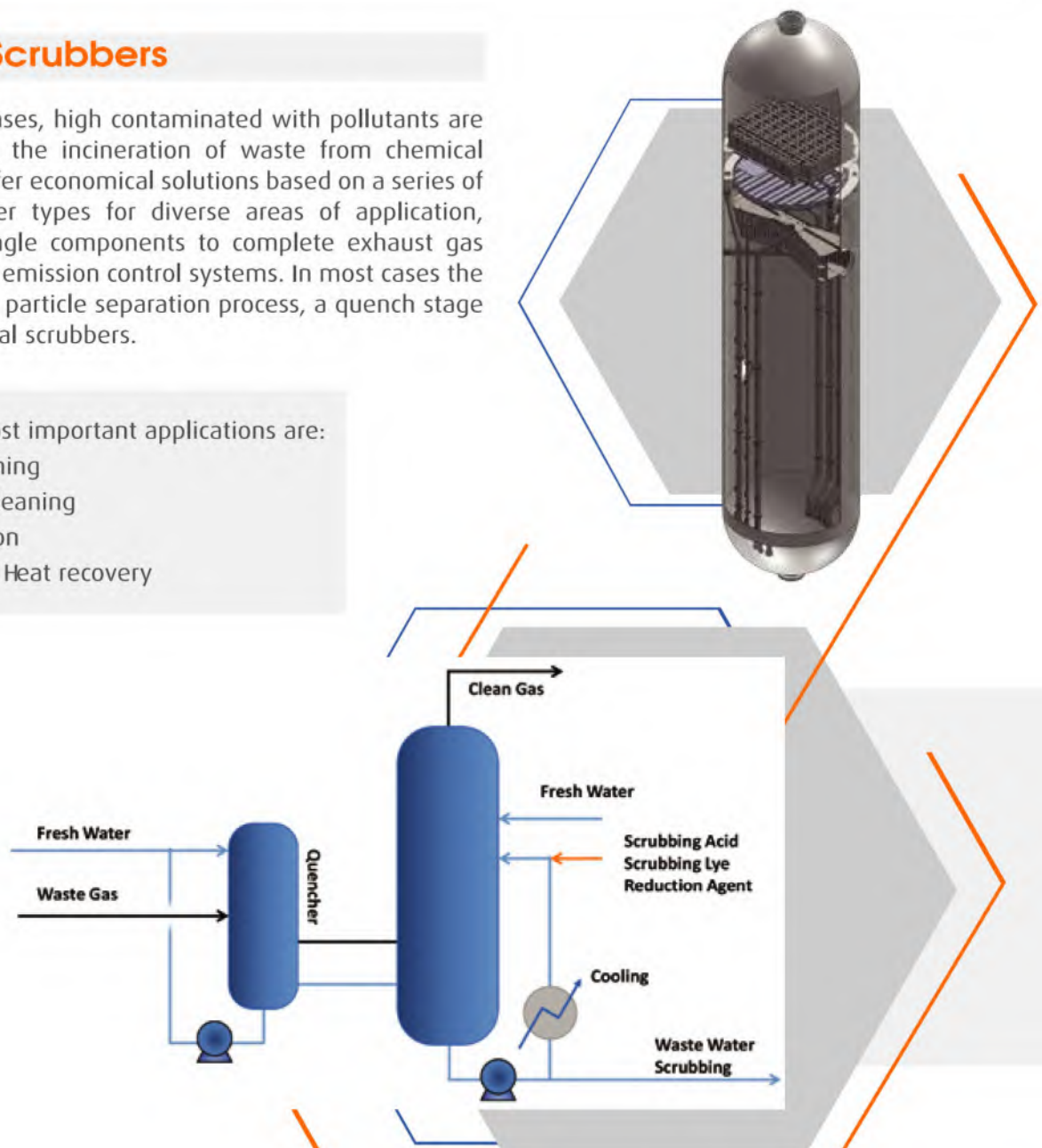
Further gas/liquid separation is achieved by wire mesh demisters in combination with Multi Cyclones or Vane-Pack device that removes any remaining droplets from the gaseous phase to achieve the required performance. The liquid droplets are collected at the bottom of the vessel, from where they can be removed through an outlet nozzle.

Wet Gas Scrubbers

Process waste gases, high contaminated with pollutants are produced during the incineration of waste from chemical processes. We offer economical solutions based on a series of standard scrubber types for diverse areas of application, ranging from single components to complete exhaust gas cleaning units as emission control systems. In most cases the units consist of a particle separation process, a quench stage and one or several scrubbers.

Some of the most important applications are:

- Flue Gas Cleaning
- Process Gas Cleaning
- Dust Separation
- Gas Cooling / Heat recovery



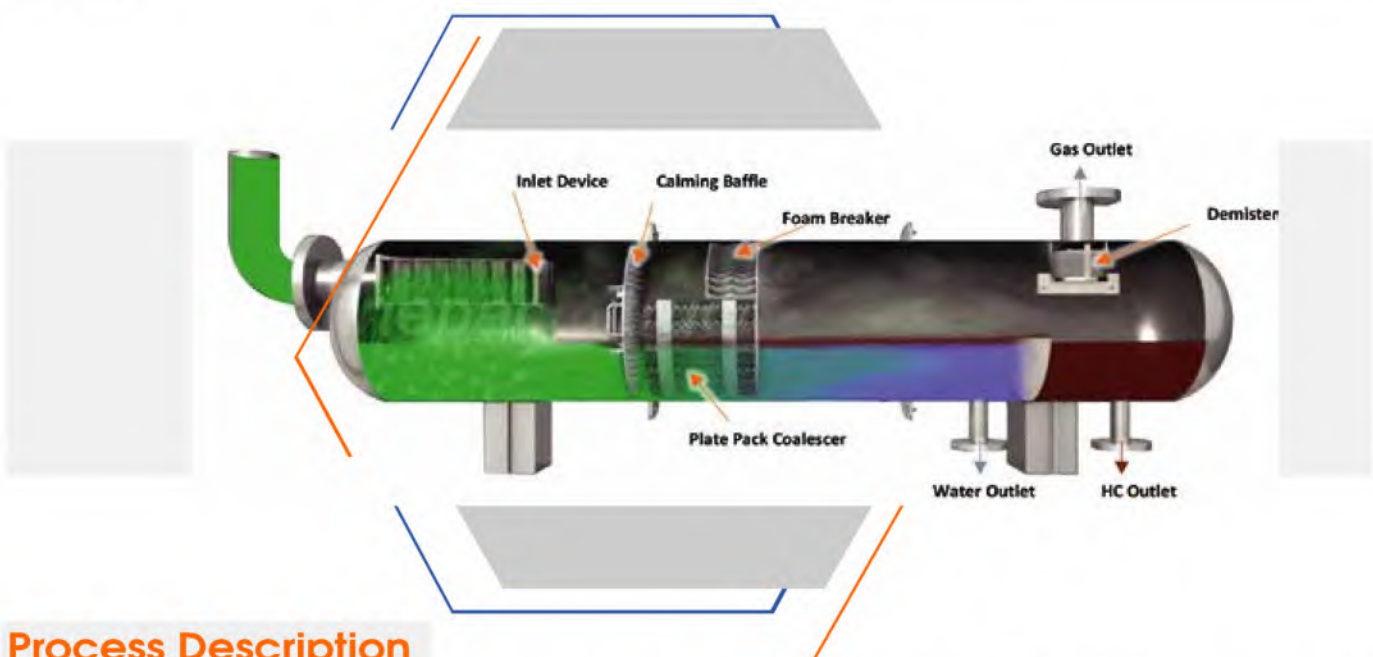
The main purpose of the surface facilities in oilfield is to separate vapors from the liquid phase, which can be a single continuous phase or a mixture of two immiscible phases. Multiphase separators are generally the first process equipment in an oil production platform, and their efficiency influences the performance of all downstream equipment.

Thus, oilfield separators play a key role in the production capacity of entire facility, and a properly sized primary multiphase separator can increase the capacity of the entire facility. However, usually, three-phase separation of oil, water, and gas is required in order to prepare the produced multiphase fluid for downstream processing.

PANTAN simulates and designs an optimized vessels for various situation and flow rates. Our compact separation vessels provide state-of-the-art separation technologies which are supplied as follow multiphase separators:

In high operating capacity and processing capabilities horizontal vessels are preferred, but when the incoming liquid rate is low, vertical vessels are designed

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



Process Description

- Fluid mixture pass through an inlet device to reduce the momentum of the fluid and disperse into vessel. Also in this stage gas phase would be separated from liquid phase
- From inlet section, appropriate settling time utilize to separate light and heavy liquids which immiscibly dispersed into each other with gravity force in compact space. Liquid-liquid separation enhancer internals such as calming baffle and plate pack coalescers are added to provide best performance.
- In the certain type of crude oils, foaming will occur commonly due to pressure reduction which will handled with foam breaker in top of settling zone.
- Gas-liquid separation device such (typically Demister Pad or Vane pack) will dry the outlet gas from maintained liquid droplets.

For liquid phase, weirs and control valves will separate two immiscible liquid after coalescence and oil at the specified guarantee level will discharge at the oil outlet nozzle, while water and gas will discharge through their respective outlets.

In different industries, liquid –liquid extraction is an important process unit operation in which two immiscible liquids are brought into contact and the dissolved components of the mixture distribute themselves between the two liquid phases and one of the liquids is dispersed into the second liquid in the form of droplets.

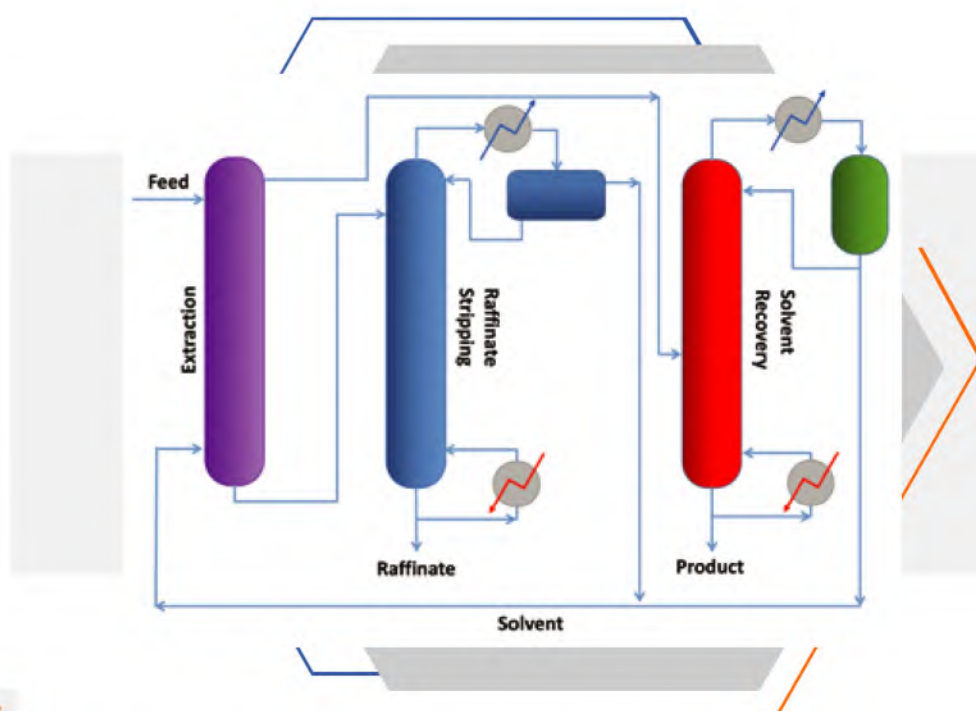
It is mostly used to remove products and pollutants from dilute aqueous streams, wash polar compounds or acids/bases from organic streams, separate heat sensitive products, Purify non-volatile materials, process azeotropic and close boiling mixtures avoid and finally separation of components that distillation is either uneconomical, or even impossible.

liquid –liquid extraction is used in many applications in different industries like separation of aromatics from hydrocarbon stream in the petrochemical industry, the removal of phenol from wastewater in the general industry, wet purification of Phosphoric acid for the food industry , the separation of metals in hydrometallurgy, purification of organic acids, solvent recovery and many other applications.

A wide range of equipment for liquid –liquid extraction is available, which can be categorized as follows:

- Extraction columns
- Mixer-settlers
- Centrifugal extractors

We deliver our extraction technology as a basis design package with state-of-art proprietary equipment. In addition, we have a specific long-term experience in fabrication, installation and start-up of our solutions.



Solvent Recovery

One of the applications of extraction solutions is solvent recovery which is separation and recovery of various solvents include extraction like Removal of water –soluble components from a complex solvent mixture, Recovery of high-boiling and organic components in low concentrations from industrial wastewaters and breaking azeotropes.

Environmental regulations, new solvent costs and waste disposal costs can easily exceed the cost of solvent recovery equipment and operation.

We design solvent recovery systems to meet the industrial needs found in markets such as: chemical manufacturing, pharmaceuticals, biodiesel & biochemical, petrochemical, food and beyond.

The dissolved gases normally present in water cause many corrosion problems. Deaeration is a process in which these dissolved gasses, specifically oxygen and carbon dioxide, are mechanically removed from water.

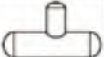





Oxygen-rich water is heated to its boiling point using oxygen-free steam flowing counter-currently. As the temperature of the water rises, the solubility of air in water decreases and free oxygen is released, where it is driven off into the steam phase.

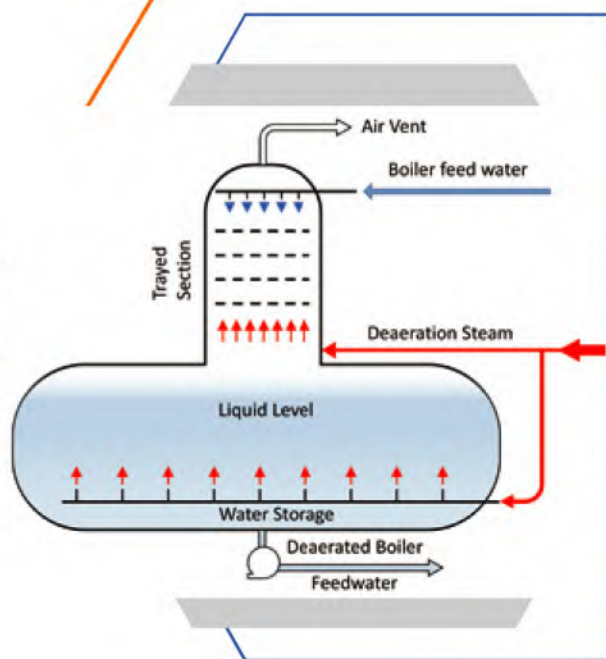
The primary application for deaerator heaters is boiler feed water systems.

PANTAN designs deaerating heaters for use in small industrial plants up to large utility applications

There are different types of arrangement for boiler feed water deaerator as follow:

Standard Designs

Deaerating Heater Type	Application
	Vertical with attached horizontal storage. 10+ minutes storage. Size restricted by vertical shipping clearances.
	Vertical with attached horizontal storage. 10+ minutes storage. Small to medium capacity units.
	Vertical with storage in same shell. Up to 10 minutes of storage where floor space is limited but unlimited headroom.
	horizontal with storage in same shell. 10+ minutes storage where headroom is limited.
	horizontal with detached horizontal storage. Large capacity units.
	Vacuum tower. For 3-10 minute storage where steam is not available in the process and headroom is unlimited.



Commissioning

Separations

Binary and Multicomponent

Deaerator Systems

Installation

Fabrication

Liquid-Liquid Extraction

Technology

Process

Technology

Simulation

PANTAN

Engineered smarter

Solution Technology

process

Plant specialist

Excellence in Design

Engineered to Innovate

Design

Multiphase

Separation

Troubleshooting

Gas Scrubbing **Systems**

Solvent Purification Systems

Your optimal solution
for **mass transfer**
processes

PANTAN

Revamping

Crude Oil Stripping Systems

Engineered smarter

Gas Separation

Gas Sweetening
Dehydration

Solution Technology

Leading-Edge Technologies