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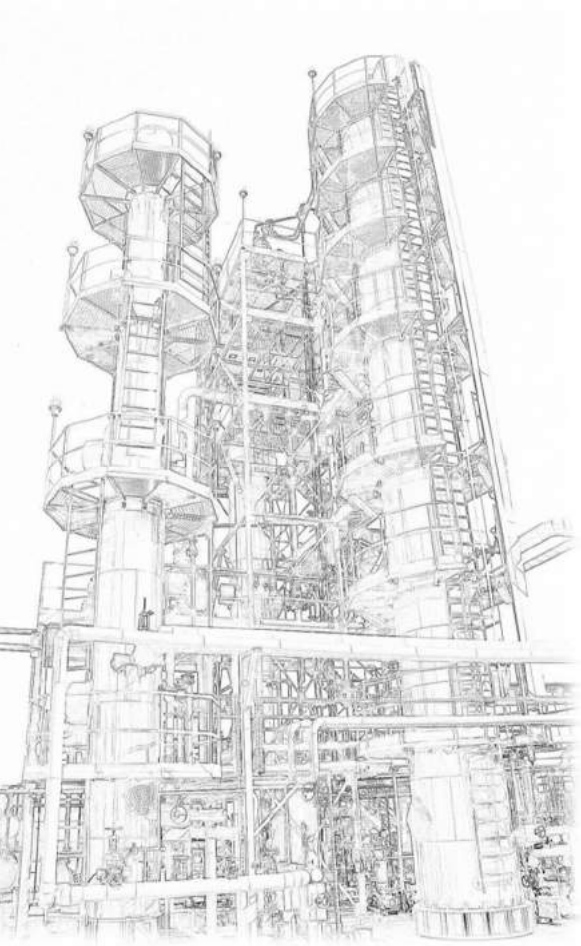
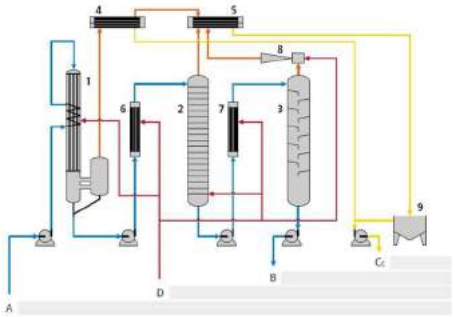
Catalog **Mass Transfer & Separation**



CONTENTS

A Broad Range of

Innovative & High-performing Product

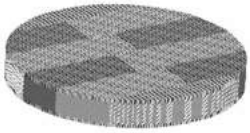


Designs, develops and manufacturing a comprehensive mass transfer and separation internal equipment, also offer engineering solutions for mass transfer and separation project to serve clients' need. The portfolio includes state-of-the-art products for distillation, absorption, striping, evaporation, multiple phase separation and membrane separation.

Product Portfolio

Distillation Tray

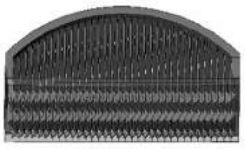
Feed Inlet Device



Structured Packing

Mist Eliminator

Random Packing



Vane Demister

Column Internals

Reactor Internals

Tray Hard Wares

Wedge Wire Screen

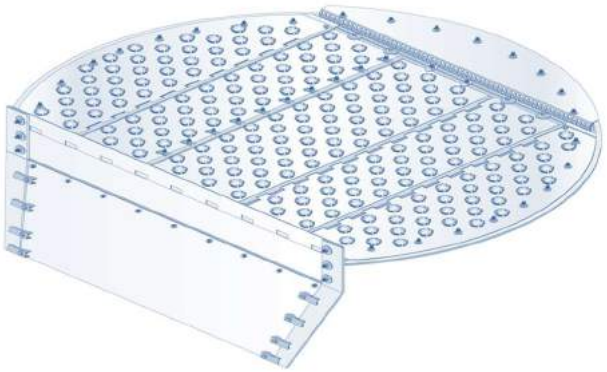
Working with our clients performs the design and engineering for a project, selects the appropriate equipment meticulously as if we were designing and constructing our own facility using our own funds. It incorporates into the design only those features that we would be willing to purchase ourselves. Thus translates into a high level of project quality, integrity and consistency.

Dedication to detail, analysis, design, testing and optimization are crucial to our approach. where deliver optimum results and an immediate return on investment.

Distillation Trays

Distillation trays play an essential part in mass transfer technology of hydrocarbon, chemical industry and other related industries. Years of accumulated extensive experience combines with steady development let to industry standard tray and patented tray designs which shape a top manufacturer of trays. Apart from a comprehensive range of products, also provides its flexibility and competence by tailored designs adapted to the unique need of clients.

Trays are designed using its in house programs, which give a full hydraulic output for the individual cases considered. The final design is optimied from both a cost and operational point of view. The optimum style of valves, from a venture cage valve for a low pressure drop to a min fixed valve for maximum performance, can be specified by our experienced design engineers.



Supply of new trays for new construct column

Extensive experience in the supply of trays with a full hydraulic design for brand new columns. We take extra care in the layout and the design of the vapour and liquid inlets to ensure that maximum performance is achieved.

The internal arrangements are considered carefully to ensure full compliance with the required specifications as well as a design that is reasonable to install. Special consideration may also be given to the tray design to allow for a reduced onsite installation period.

Replacement of existing trays on a like for like

Can supply a partial or full replacement of existing distillation trays. This usually occurs during routine maintenance. We supply designed trays that fit up to existing support structures and operate identically to the previous equipment.

We offer equivalent valve and identical downcomer sizing to ensure identical column operation. Our commitment also extends to the emergency situation where, as a result of an unscheduled breakdown, replacement trays can be drawn and manufactured in a very short time frame.

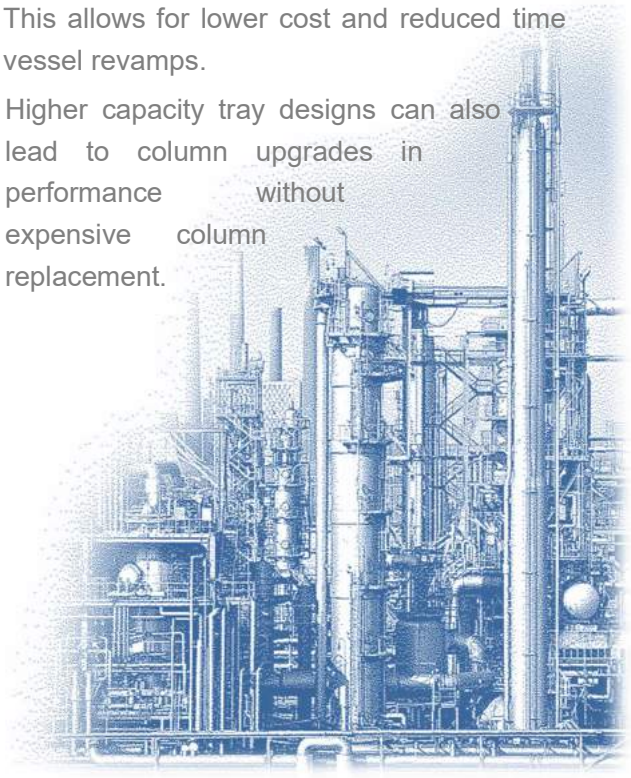
Our experienced draftsman are experts at taking a theoretical design and developing a full three dimensional model. This model ensures that there are no conflicts when the equipment is installed.

Upgrading existing columns for new operating conditions

Old columns need to be upgraded for new flow conditions. We have developed systems that allow for the modification of down comer sizes and overall tray dimensions without the need for hot modification of the existing vessel welded in attachments.

This allows for lower cost and reduced time vessel revamps.

Higher capacity tray designs can also lead to column upgrades in performance without expensive column replacement.



Portfolio of Trays

- Valve tray
- Bubble cap tray
- Sieve tray
- Dual flow
- Tunnel tray
- Disc & Donut tray
- Cartridge Tray

Mass Transfer Trays

The overall solutions for trays

To increase the performance of your columns
Design, verifying and optimization of mass transfer trays
Simulation tests
Design of feed and draw off arrangements

Installation & Supervision

Per your requirements we can install trays at your plant or at the column fabricator's facility.

Materials

Materials of construction include:
carbon steel, stainless steel,
hastelloy, nickel and titanium.
thermoplastic materials:
PPH, PE, PVC, PVC-C, PTFE.
Our staff members are certified to work with all metal and thermoplastic materials.

Technical Support

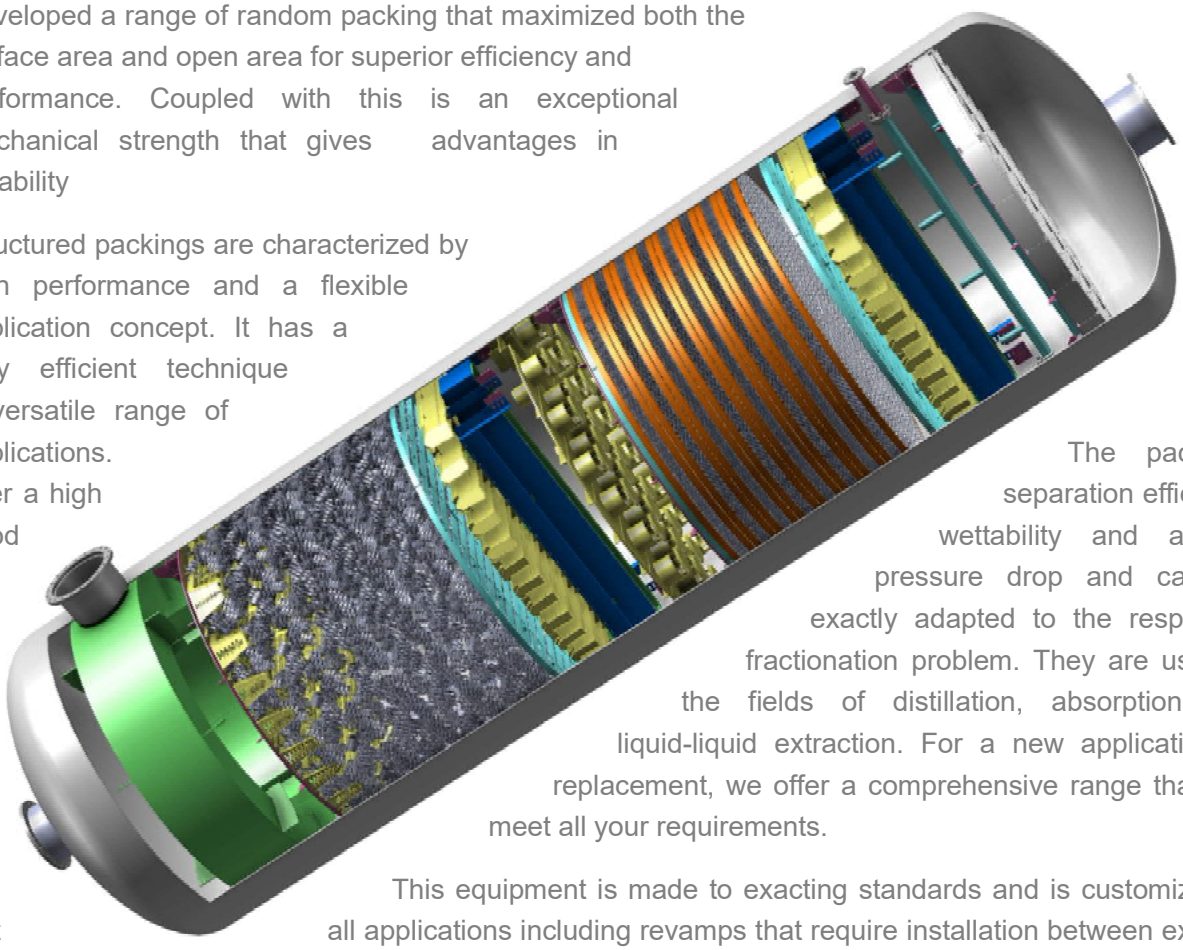
In case of emergency we can supply separate parts and short term deliveries.

Column Packing

The selection of the correct style of packing for a particular separation is the most important decision that will be made during the design of a packed column. With so many options available, experience counts. The tradeoff between cost, efficiency and capacity are a delicate balancing act that should be at the heart of any packing selection.

There is an ever present trade off in the design of column packing. With a higher surface area comes a greater efficiency, but also a lower capacity. When this is also balanced against the overall size of the column and the associated cost, the choice of packing may no longer be as clear cut as it first appeared to be.

Developed a range of random packing that maximized both the surface area and open area for superior efficiency and performance. Coupled with this is an exceptional mechanical strength that gives advantages in durability



Structured packings are characterized by high performance and a flexible application concept. It has a very efficient technique and a versatile range of applications. The packings offer a high separation efficiency, good wettability and a low pressure drop and can be exactly adapted to the respective fractionation problem. They are used in the fields of distillation, absorption and liquid-liquid extraction. For a new application or replacement, we offer a comprehensive range that can meet all your requirements.

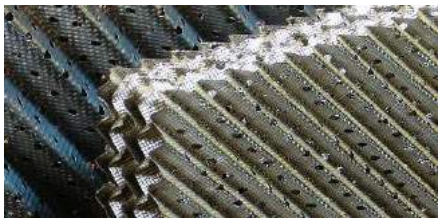
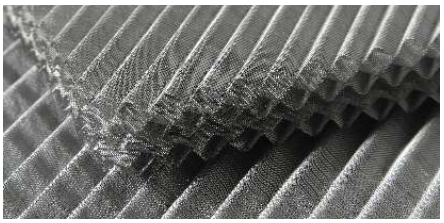
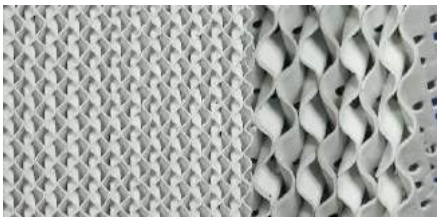
This equipment is made to exacting standards and is customized to suit all applications including revamps that require installation between existing weld-in attachments. Overall, these packings provide our clients with exceptional cost sensible solutions.

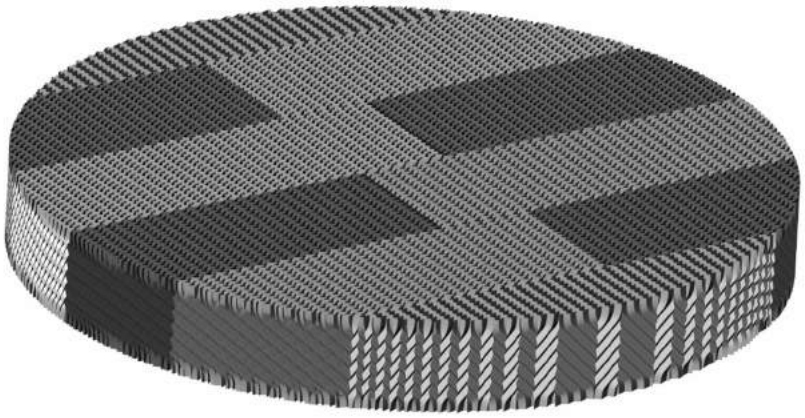
Utilize our extensive test and research data as well as our in-house design programs, can provide optimum packing selection solutions. Along with our expertise in the design of the associated column internals, you can expect a one stop shop for optimized packed column designs

Random Packing

Pall Ring		Nutter Ring	
IMTP		Saddle Ring	
CMR		Fleximax	

Structured Packing

Metal sheet	Wire mesh Type	Ceramic Type
		



Material Available

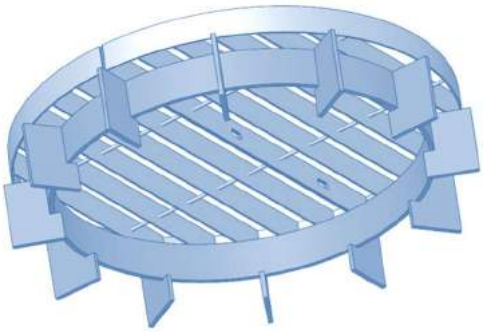
- Metallic----Carbon Steel, Stainless Steel,
- Alloy--- Monel, Zirconium, Titanium, Hastelloy
- Plastic----PP, PE, CPVC,PVDF,PEFE,ETFE
- Ceramic--- For Corrosive & High Temp
- Graphite

Column Internals

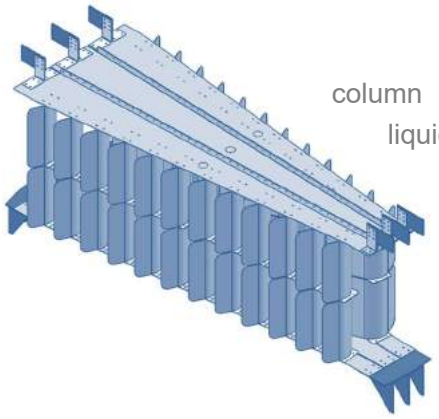
The success of a packed tower application depends as much on the performance of the tower internals as it does on the performance of the packing.

The most important consideration in the design of packed column is the careful and accurate selection of the associated internals such as liquid distributors, collector trays, feed inlet and packing supports. These create ideal hydraulic conditions for optimum performance of the selected packing. Careful selection of internals is required as incorrect equipment selection can cause operating issues in even the most basic systems.

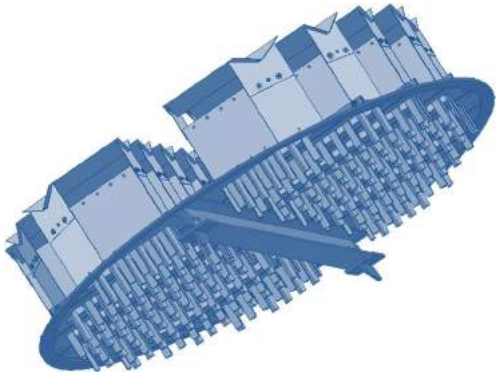
Takes in the design of all packed columns to ensure that the liquid and vapour distribution is uniform throughout the packing in the column.



Special consideration is given to ensure that feed inlets to the vessel are able to function efficiently under all process conditions.



Feeds into a packed column are either all vapour, liquid or a combination of the two. For all packed column designs, each of these feed conditions need separate design methods and differing equipment geometries.



A mixed feed that flashes when it enters the column between beds can lead to maldistribution. In this instance, there may be a requirement for a complex inlet distributor design that produces both, an even composition and flow rate at each point in the column cross section.

Vapor or two phase feeds to the base of the column may require a vane inlet device to ensure uniform flow.

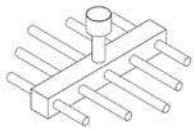
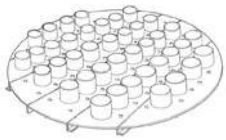
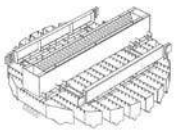
Liquid Distributor & Redistributors

Other then packing, liquid distributors are probably the most important item in tower internals. Proper liquid distribution usually determines the successful operation of the tower and the performance failure of many packed towers stems from liquid distribution problems. In addition to providing a uniform liquid distribution pattern to the top of the packed bed, the distributor also must provide sufficient gas passage area to avoid a high pressure drop or liquid entrainment. The liquid distributor should have a flow range suitable for the service, and provide resistance to plugging, fouling, and foaming.

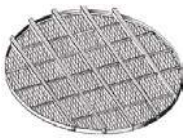
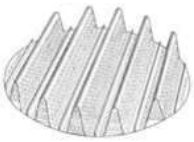
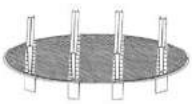
Liquid redistributors are used wherever an intermediate liquid feed is introduced into a packed column, and between packed sections, wherever liquid redistribution is required.

Flashing / Vapor Feed Distributors

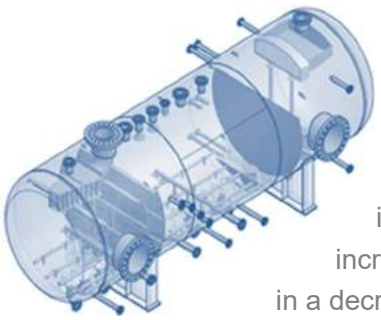
Flashing Feed Distributor	
Vapor Sparger	
Vapor Horn	
Vapor Diffuser	

Pipe Orifice Distributor	
Riser Type Distributor	
Trough Type Distributor	
Wall Wiper Redistributor	

General Internals & Collector Trays

Hold-down Grid	
Bed Limiter	
Hump Support	
Collector tray	 
Support / Distributor	

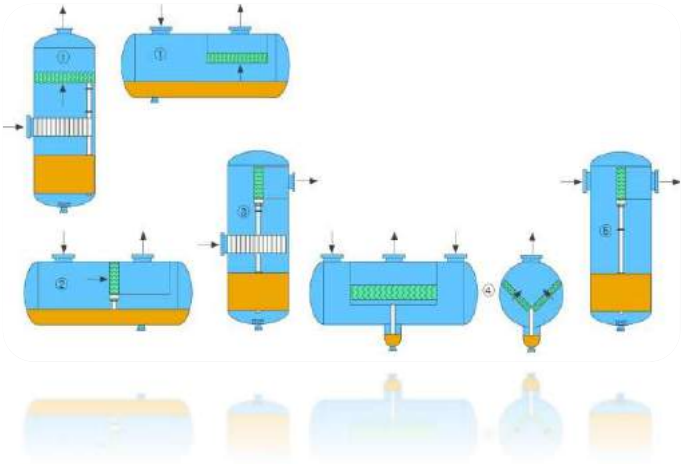
Separation Internals.



Driving the research and development activities of the separation equipment arm of is the process industry's need to increase separating capacity in a decreasing vessel size.

For the off shore oil and gas industry, space on a typical platform is at a cost premium. Even a small reduction in a vessel size or the reuse of an existing vessel will lead to great savings in the overall cost.

Put a great deal of time and effort in the development of optimal design methods and innovative equipment geometries to satisfy the need for more efficient separation.



As the hydrocarbon gas/oil/water mixture is extracted from below the sea bed, the mixture is fed into a production separator vessel on the offshore platform.

Here the three and sometimes four phases must be efficiently separated to become the feed stocks for the production of various petroleum products.

As the various hydrocarbon cuts are further processed and purified (either off shore or on shore), they are subjected to compression, heated up, cooled down, dumped into storage vessels and further separated and treated in various ways.

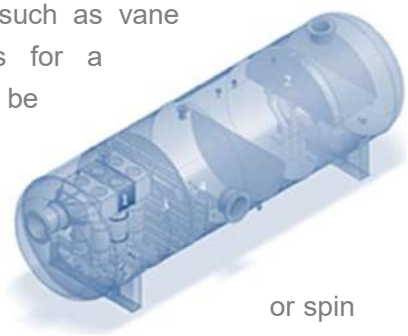
Most of these steps require efficient gas and liquid separation before further processing or handling and separation equipment and optimizing technology has been developed to achieve this cost effectively.

Separation Equipment

- Mist eliminator
- Chevron style droplet separators
- Single pocket vane packs
- Double pocket vane packs
- Spin droplet separators
- Settle droplet separators
- Vane inlet devices
- Sand jetting systems
- Overall layout design
- Design of liquid/liquid separators
- Design of gas/liquid/liquid separators

Old can be new again

With the use of newer, more efficient internal equipment, the life of a separator can be extended. As new discoveries lead to greater production rates, existing equipment is required to process greater volumes of product than what it was initially intended.



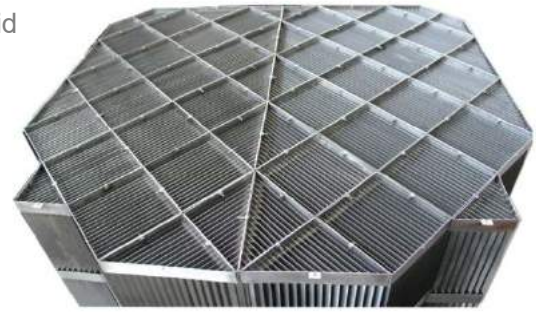
Refitting equipment such as vane inlet devices allows for a greater throughput to be processed in what would otherwise be an undersized inlet nozzle. A higher capacity vane pack or spin separator will allow for a greater separation capacity in the existing vessel.

The settle plate packs allow separation previously impossible in an open separator. The use of bolted in support assemblies that require on hot work on the vessel means existing vessels avoid the need

for recertification using the new internals, leading to considerable cost savings.

Every process is unique and operating conditions differ. The design principles behind every piece of equipment allow our engineers to confidently design a unique solution for you. Our expertise can be applied with certainty to your process problems.

Remove liquid droplet from a gas stream



The removal of liquid droplets from a gas stream is one of the most common requirements for separation equipment. A good separation not only prevents the loss of valuable product but can also reduce damage to expensive equipment such as compressors that are located downstream.

Efficient separation is achieved using a simple mesh mist eliminator, a vane pack or spin cyclonic separator. The style of separator will be selected based on the process conditions and designed removal efficiency. With our in house design programs and experience gained from thousands of installations of our equipment around the world. Guarantees our equipment to ensure complete client satisfaction.

Remove liquid droplet from a liquid stream

There are strict requirements on the amount of water in oil and oil in water that leave process vessels. Water in the oil stream causes operational issues with downstream equipment and oil in the waste water from a platform or production facility is an environmental concern.

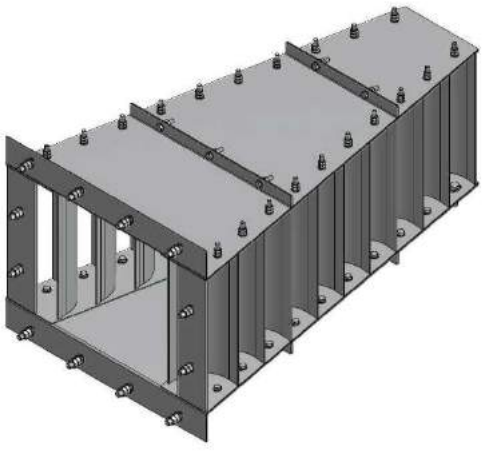
In a static container oil will separate from water at a rate reasonably estimated based partly on a difference in densities. Predicting the rate of separation of a continuously flowing mixture of oil and water at varying temperatures that has the ability to remix becomes more difficult. Eventually the designer relies on his experience gained with equipment installed in the field. This basic physics for this type of separation shows that if the allowance for setting time is long enough, then the phases will eventually separate to an adequate level. However when equipment space is limited and the project budget tight, large vessel sizing is always a concern.

The settle plate pack can lead to a reduction of up to 2/3 in the size of the vessel required to achieve the same level of separation, leading to substantial savings in the initial capital investment required.

Vane inlet device

Feed inlet devices consist of a serious of curved vanes arranged in a heavy duty housing to simultaneously reduce inlet momentum, and promote initial bulk separation of vapour-liquid feeds to a vessel.

Depending on the vessel configuration and separation duty, our feed inlet device offers the potential benefits over open nozzles, half open pipes, inlet baffles or simple tangential inlets:



Technical & process support

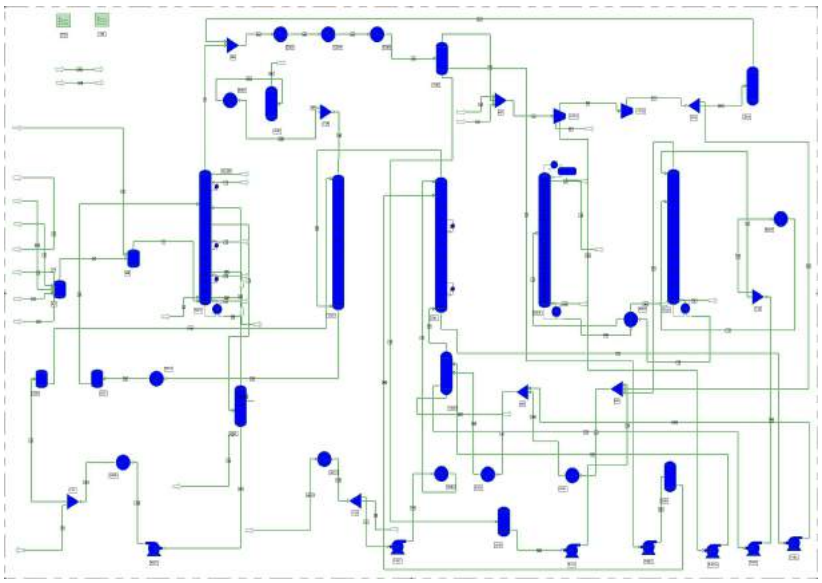
Has accumulated application know-how and experience in developing, designing, supplying and servicing mass transfer and separation equipment in the Chemical, Petrochemical, Refining, Oil & Gas Processing and Specialty industries. Only the very best technology solutions can secure the competitive advantage that our customers need in today's highly demanding conditions. Leadership in technology and applications are fundamental to our success.

That the professional and highly experienced technicians allow us to tackle client's trouble and challenges by use powerful tools including Aspen Plus, Pro II, Star, Solid works and the proprietary software we developed. We offer the following services:

- Column simulations and design
- Process simulations and optimization
- Hydraulic calculation
- CFD modeling
- 3-D modeling

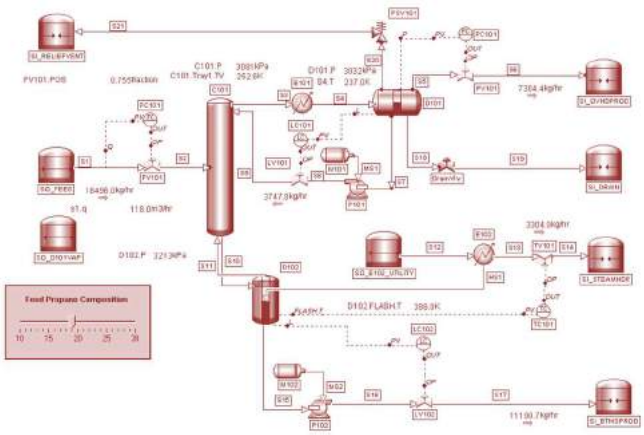
Column Simulation and Design

Utilizing the commercial simulators Aspen Plus, Aspen Dynamics and Pro II, our process engineers combine the vast plant real operation data and design model, give accurate and reliable simulation on the columns and towers that we designing. The simulation defines the base of unit operation conditions thus further detail design and optimization can be expected.



We design a comprehensive industry columns and towers, from primary design to optimzation, new construction to retrofit, packed column to trayed column. Tailor made can be also available to suit customers' unique application.

Hydraulic Calculation



Hydraulic calculation is essential for column and tower design. it not just defines key operation parameters of a column, including pressure drop, flooding limit, but also stipulates the mechanical structure and geometries of the internals.

We have developed proprietary software that suits all that designing of our internals product---trays, packings and internals

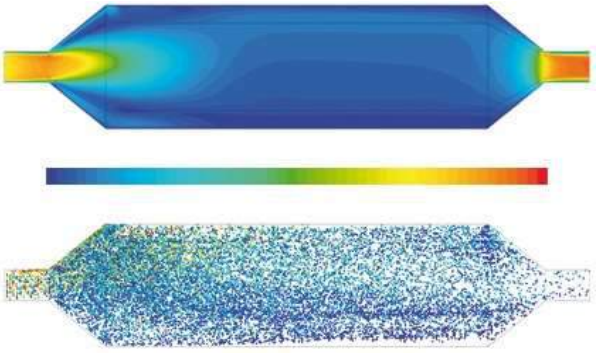
CFD Modeling

Computational Fluid Dynamics (CFD) analysis is a powerful tool that provides a three dimensional analysis of the fluid flow characteristics over time. Computers are used to perform the fluid dynamics calculations for the entire flow domain which may comprise of millions of cells.

It is an integral part of product development. Multiphase flow simulations are used to predict, visualize and understand the fluid flow behaviour inside process equipment like separators and scrubbers at both test and full scale conditions.

Typical Application involves:

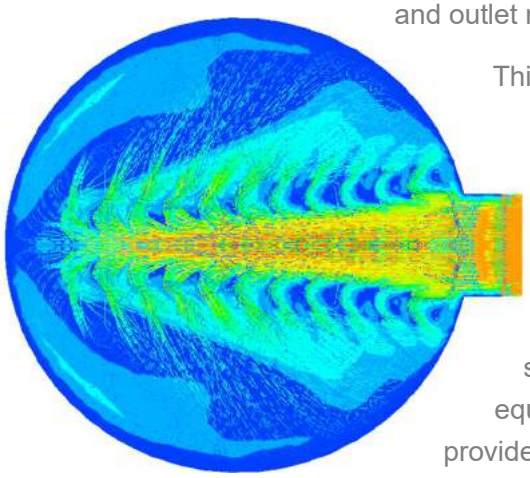
- Tray deck flow analysis
- Horizontal 2 and 3 phase separators
- Cyclones, demisting, hydrocyclones
- Vertical 2 and 3 phase gas-liquid separators (scrubbers)
- knock out drums
- Glycol contractors



Many years of practical experience coupled with client feedback of actual plant separation performance has resulted in reliable design correlations for the design of our range of separation internals

The challenge to constantly improve our equipment separation capability has been made possible through the additional use of CFD analysis utilizing plant performance data.

.Engineers at investigate various characteristics of the client proposed vessel including gas side flow patterns, expected particle flow patterns and conditions at the inlet and outlet nozzles.



This information, combined with the CFD analysis results of our specialized equipment, provides confidence in the initial design or allows for recommendations to be made to improve separation capacity. Changes to equipment geometries or alternative equipment selection may eventually be needed to accommodate for upset conditions or future upgrades.

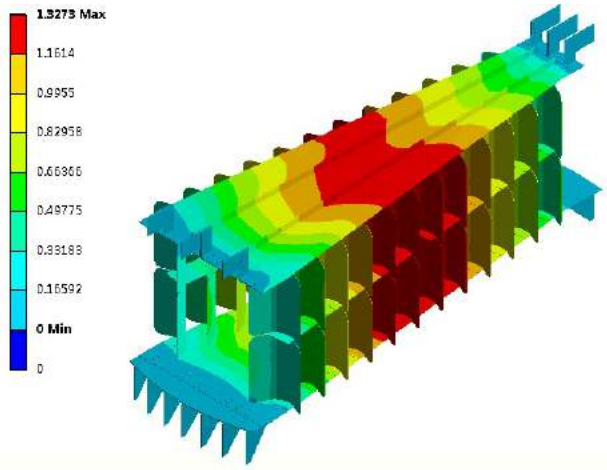
CFD analysis can be used to improve equipment selection in installations that our clients deem as sensitive or critical.

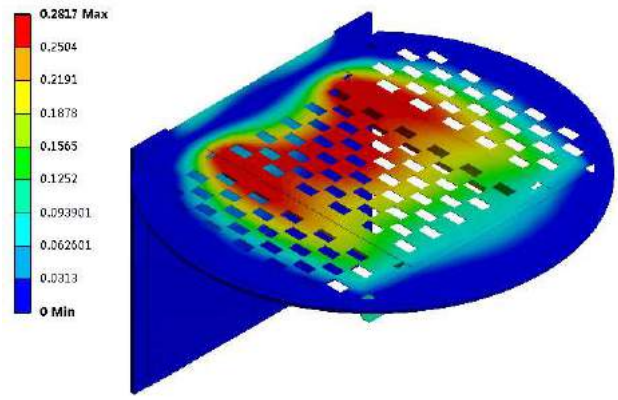
An added benefit is our ability to interface various output from the CFD models with Finite Element Analysis (FEA) software in order to examine the mechanical reliability of the proposed equipment installation. This allows us to investigate the mechanical stress on the separation equipment caused by a liquid slug or developed by the mechanical support arrangement inside the vessel.

Engineering Design

Engineering design is essential part of all our jobs; it turns out that process and technical design idea to realistic equipment. We are not just deliver clients with quality products but also have to make sure these products are safe, reliable, yet with competitive cost.

Engineers at use powerful tools Auto CAD and Solid works to achieve that goals--give that blueprint and detail drawing for fabrication, 3-D design for every component, make strength & deflection analysis available.





Layout drawings of critical equipment are produced, reducing the time required for a replacement as the manufacture can begin as soon as the need is recognized.

Flexible working and souring arrangements worldwide that allows for the most cost and time effective replacements delivery.

Capacity is reserved on requests to enable fabrication when it is critically required.

Maintenance & Replacement

Site maintenance activities can be expensive for the client and stressful for all involved. Despite the best planning and preparation, unplanned problems may arise. In an ideal world there would be a spare of each piece of equipment on the shelf, but with the just in time economics of the modern world, this will never occur.

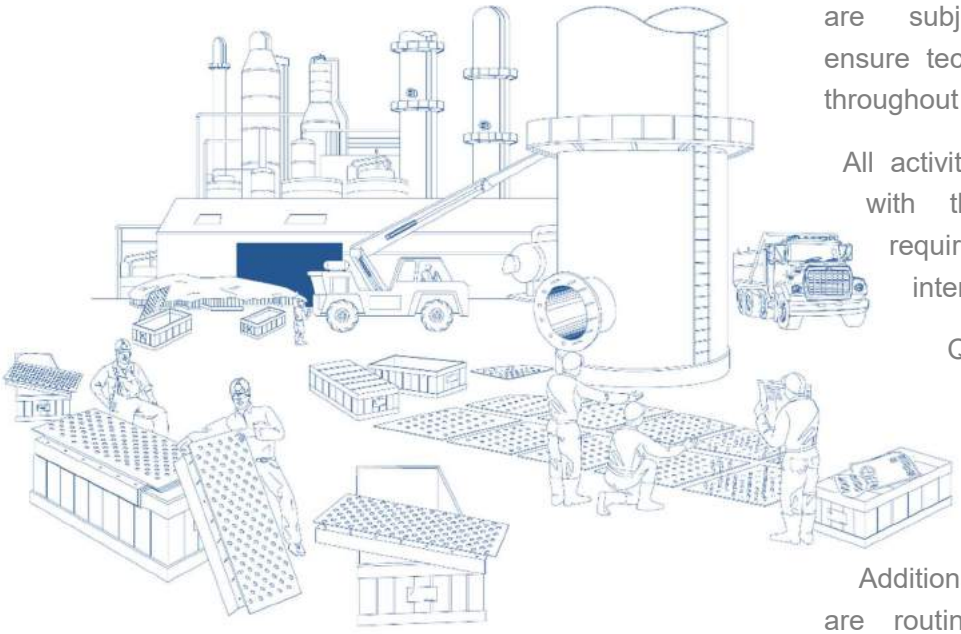
Engineer work with the maintenance department to supply strategic stocks of spare parts such as bolting and clamping that will work in most typical situations. A container of typical spares is then kept on site for use, and only the equipment actually used is paid for.

Reliable and fast supply through a modern equipped manufacturing workshop and logistics network of:

- Any hardware
- Valves and complete trays
- Random and structured packings
- Demister, Mist eliminator
- Other internals

Field Services

Some internal suppliers forget the very importance role that site service support plays in the supply of process equipment. Incorrectly installed equipment is not only an inconvenience, it can lead to a very expensive downtime.



Field service has skilled and expertised personnel that are well placed, equipped and experienced to service our customers in any needs and requirements regarding the maintenance, installation and revamping of process equipment for towers and vessels.

- Installation consulting, inspection or supervision
- Full installation services
- Trouble shooting assistance
- Start up assistance

At, our service is designed to assist you when you need it most; Three dimensional layout drawings allow installers to see the internals as they will look in the vessel; Final inspection services check all critical dimensions against the requirements of the design. Pre installation briefing allows all concerns and questions to be answered prior to the work commencing.

Quality Control

Has developed ISO 9001 compliant procedures that are independent from sales and marketing activities through to the shipping and installation of the finished goods.

After an order is placed, design requirements are subject to stringent reviews to ensure technical standards are maintained throughout the manufacturing activity.

All activities are documented in accordance with the stringent engineering quality requirements expected of the vessel internals industry.

Quality control plans are developed for each project and these documents control every aspect of the correct equipment manufacture and supply using documented procedures.

Additional client quality requirements are routinely incorporated into quality control plans to ensure total customer satisfaction.

Manufacture

Meeting client's schedule for the manufacture, supply and delivery of equipment requires a commitment to efficient and sensible planning. We have been supplying process and separation equipment for many years from our manufacturing facilities though out the world.

All suppliers are fully audited before any equipment is sourced from them and they incorporate our strict quality and documentation requirements, monitored and reviewed by our inspection staff or inspection representatives. Regardless of the manufacturing location, all products are covered by our standard guarantee.