Fractionation Trays

PANTAN

صنایع پنتان شیمی

PANTAN is a well-established leading designer and manufacturer of a vast range of equipment for the Oil, Gas and Petrochemical Industries.
For almost two decades, our company has developed a comprehensive range of products and services including:

PANTAN is a complete solutions provider in mass transfer and separation systems for oil, petrochemical, refining, gas processing and other chemical process industries. We can offer a comprehensive and efficient range of products and services for distillation, absorption, adsorption and multiphase separation processes.

Bussiness Segment

1. Process Vessel Internals
- Fractionation Trays
- Packing and Internals
- Separation Internals
- Reactor Internals

2. Process Packages
3. Miscellaneous Process Equipment

Today, the company is leading specialist in process vessel internals and modular separation systems (as turnkey process packages) for the chemical process industries in Iran's market.

Based on highly skilled professional experts, innovation & research center and modern production facilities, PANTAN is operating as “one-stop solution provider” for wide range of process applications.

Vision

We want to be the best company throughout the region for "Mass Transfer and Separation Technologies" demanded by the market.

Mission

PANTAN is a pioneer and knowledge-based company in designing, manufacturing, installation, and related services by utilizing cutting-edge technologies at a world-class level focused on "Mass Transfer and Separation Technologies" in Oil, Gas, and other process industries.

PANTAN is a professional designer and manufacturer company that offers a wide range of Tower internals based on well established, tried and tested, industry standard design concepts with unique mechanical enhancements to ensure effective and reliable performance.
Our design expertise and manufacturing standards are obtained by many different successful projects in the field of separation for different customers including petrochemicals, refineries, food industries, power plants, steel manufacturing companies, etc.

Our professional well-trained engineers are ready to offer the best solution that is tailor-made for your specific separation requirement.

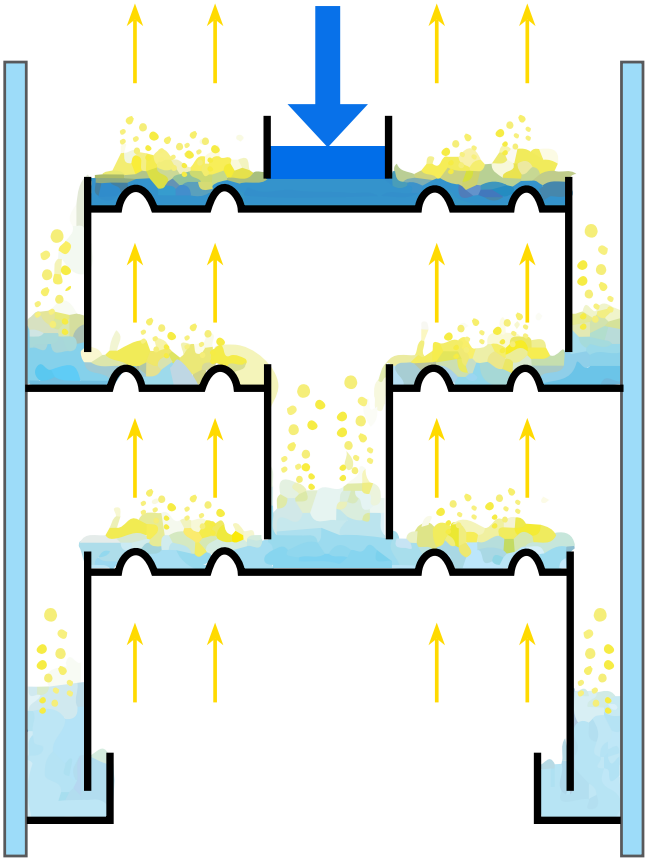
Tray columns play an important role in fractionating processes in the Oil, Gas and Petrochemical Industries. Characteristics which tend to favor trayed columns in fractionating and separation columns are :

Operation flexibility
High liquid load traffic handling
Suitable for fouling systems
Suitable for corrosive/erosive services

Tray **Fundamental**

In classical hydraulic model, liquid and vapor flow counter currently. The liquid phase flows horizontally across the tray deck from downcomer to downcomer and vapor phase passes vertically upward from bottom tray to the upper tray and disperses through the continuous liquid phase creating a froth on each tray deck.
Effectively this creates a series of mixer-settlers with vapor-liquid mixing in the froth on the tray deck and subsequent vapor-liquid disengagement in the downcomers. by this contact between two phase, mass transfer happens. In normal steady operation, the pressure loss across each tray deck will balance the liquid head on each tray preventing the liquid from “weeping” through the tray open area.
With an appropriate velocity of the vapor, the liquid can flow to the outlet downcomer without being carried upwards to the top tray. Adequate spacing between the trays also prevents the formation of foam and the occurrence of flooding in the tray spacing.

Some vapor separates from mixed phase and go upward and remaining froth releases over weir to the downcomer. In downcomer vapor phase disengages from mixture extensively and goes toward upper tray. to keep downcomer safe from "downcomer choke flood" height of downcomer is about half liquid and half vapor to allow vapor disengagement and prevent liquid back flow to tray deck which is known as "downcomer backup flood" In this normal flow regime most contacting surface area between phases will be provided but different direction of phases causes noticeable pressure drop.



Conventional **Tray**

Sieve Tray

Consists of tray panels uniformly punched with holes and approximately 5%-15% open area they are be used because of their simplicity, versatility, capacity and cost effectiveness

Features:

- Simple and low cost
- Narrow operation flexibility over a range of 2:1 turndown ratio

Bubble Cap

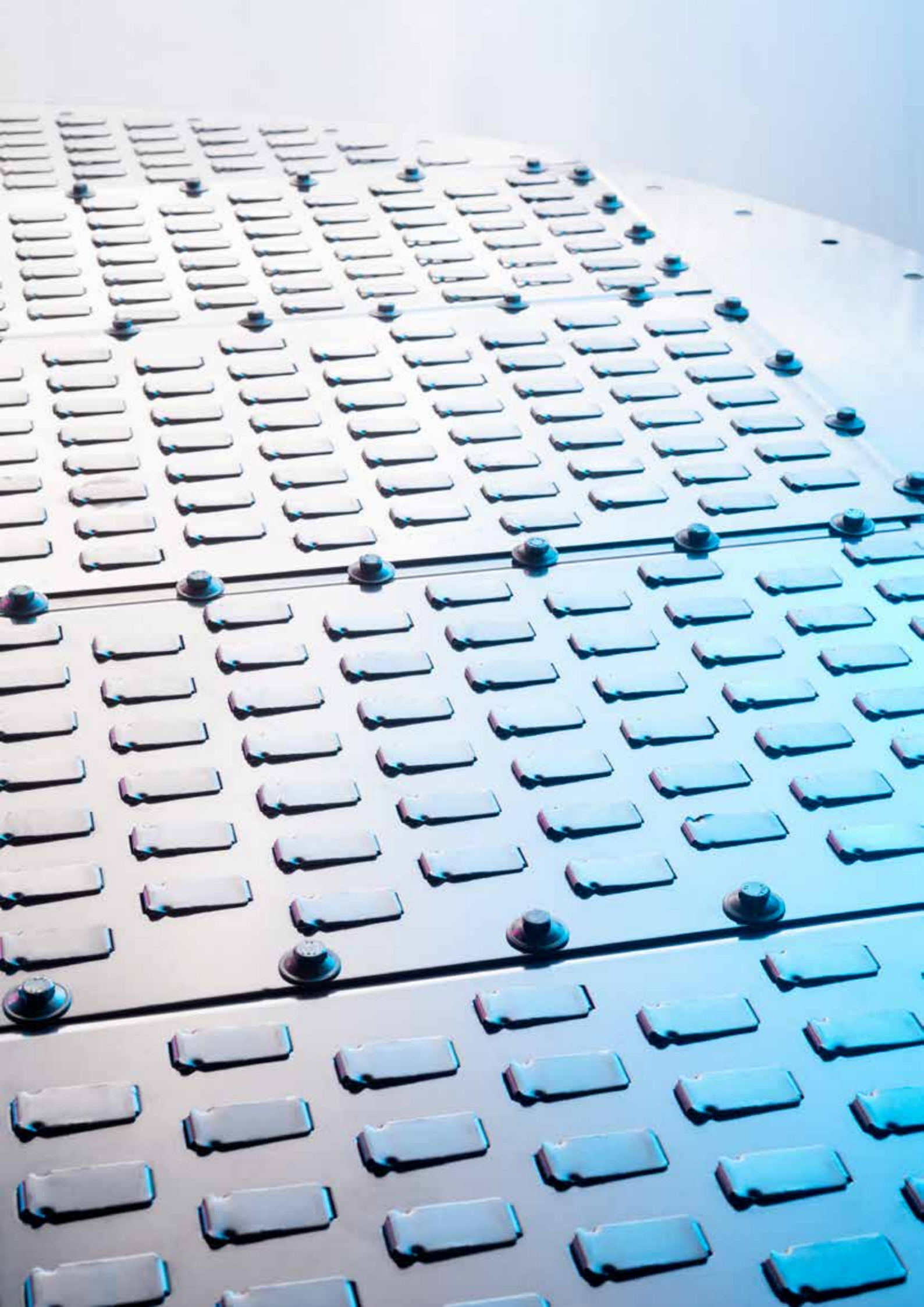
This traditional tray type is used for low liquid rate and high turndown ratio.

Float **Valve**

Float Valve Trays are composed of punched tray decks fitted with movable valves to vary the tray open area with changing vapor load. In cases where high turndown ratios are considered, floating valve trays are an option. There are various valve types which may either have legs integrated to the valve disc to limit upwards movement or alternatively the valve disc movement is restricted by a cage fitted to the tray panel. Valve discs/caps are available in both round and rectangular shapes. The capability of floating valves makes these valves to control vapor flow so as a result, they provide better sustained efficiency over a wider operating range than sieve trays.

Features:

- High operating flexibility up to 4:1 turndown ratio
- Enhanced liquid-vapor contact
- Steady liquid movement across the tray deck
- Less froth height and weeping
- Turndown parameters adjustment by selecting suitable range of valve lift and weight more resistance against fouling or corrosive fluids
- Extra fatigue causes the legs to be damaged cage valves solve this problem easily

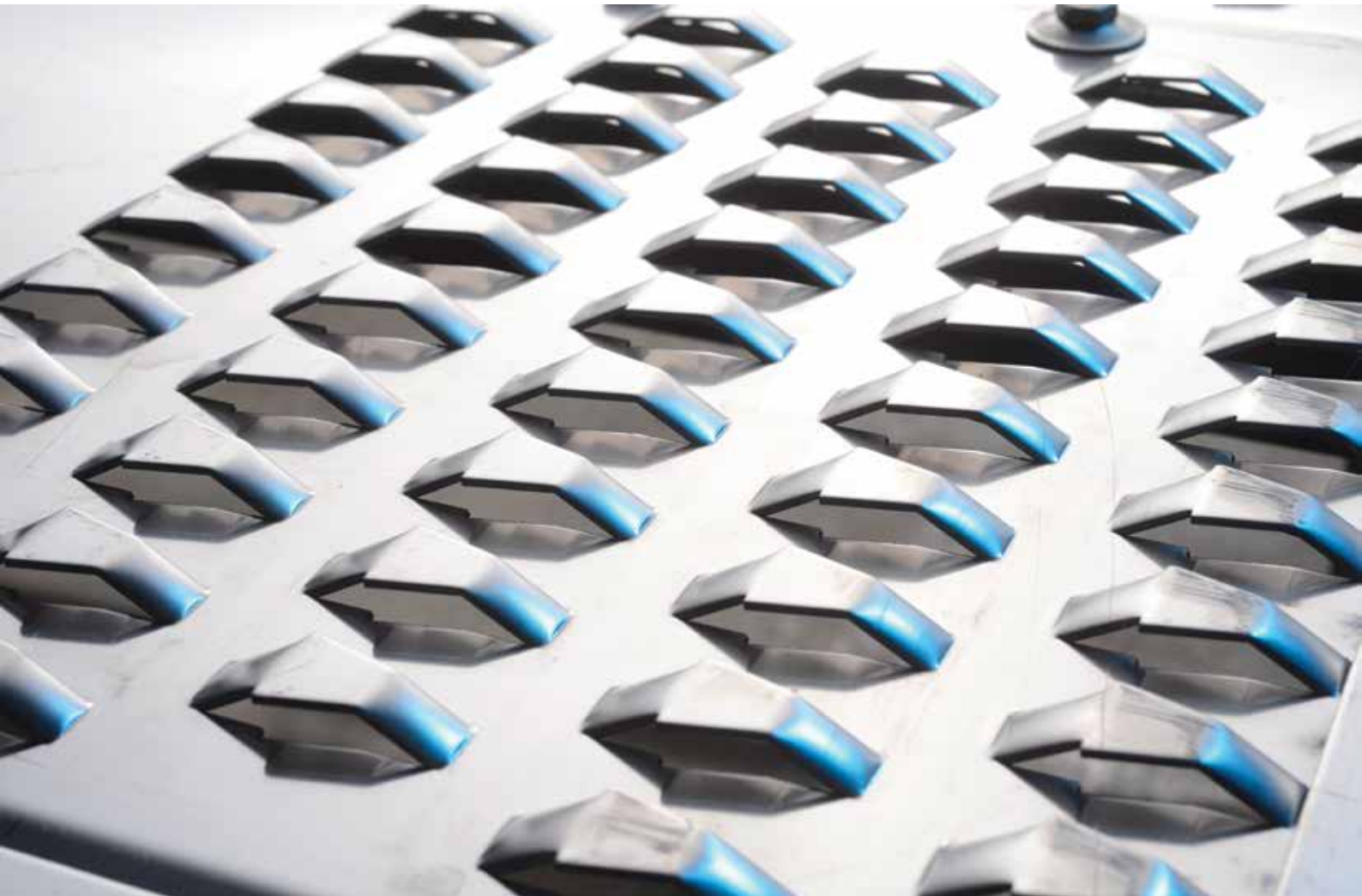


Fixed Valve

This type of valve tray has been developed to achieve both sieve and floating valve tray specifications as moderate pressure drop, turndown ratio and cost. Fixed Valve Tray is the preferred tray when fouling conditions are possible. Also it has higher efficiency than flooding valves. However, it provides lower turndown and less efficiency than floating valve. Smaller fixed valves provide more capacity than larger valves owing to the fact that pressure drop and entrainment decrease.

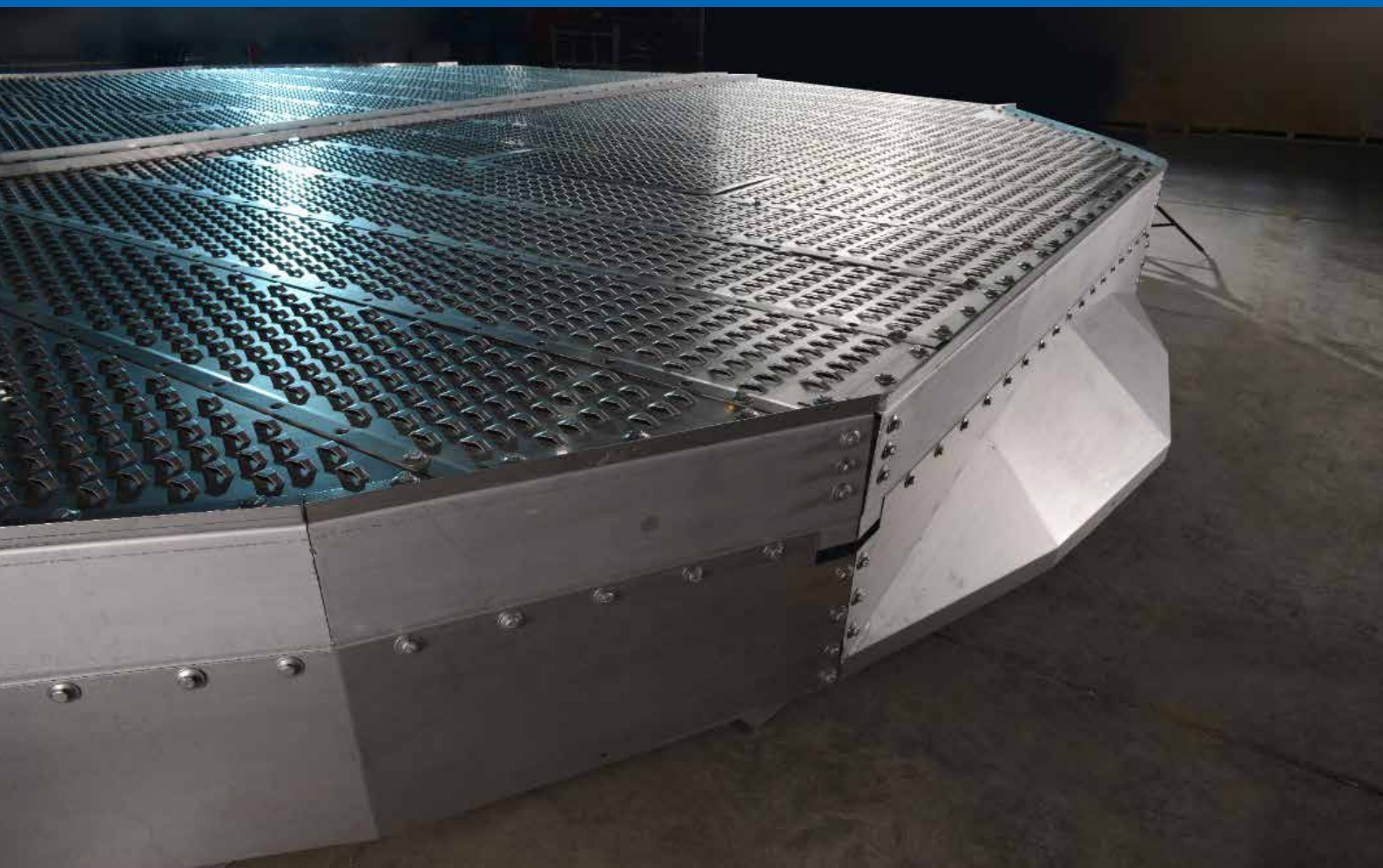
Features:

- More resistance against fouling services
- Moderate operation flexibility about 2.5:1 turndown ratio.
- Lower entrainment and pressure drop
- Higher Capacity as tray spacing can be reduced especially in existing columns it allows to increase the number of trays
- High efficiency is attainable over wide range of operational condition
- Excellent mechanical strength
- Low Leakage



High Performance **Tray**

The main feature of these trays with special downcomer design such as highly sloped, Truncated, StepArc (stepped) and ModArc (multi-chordal) is to increase vapor handling capacity and reducing pressure drop and liquid backup.
Beside enhancing downcomer design, weir special design is applied to maximize liquid load handling. These trays can be equipped with high capacity fixed valves or float valves.



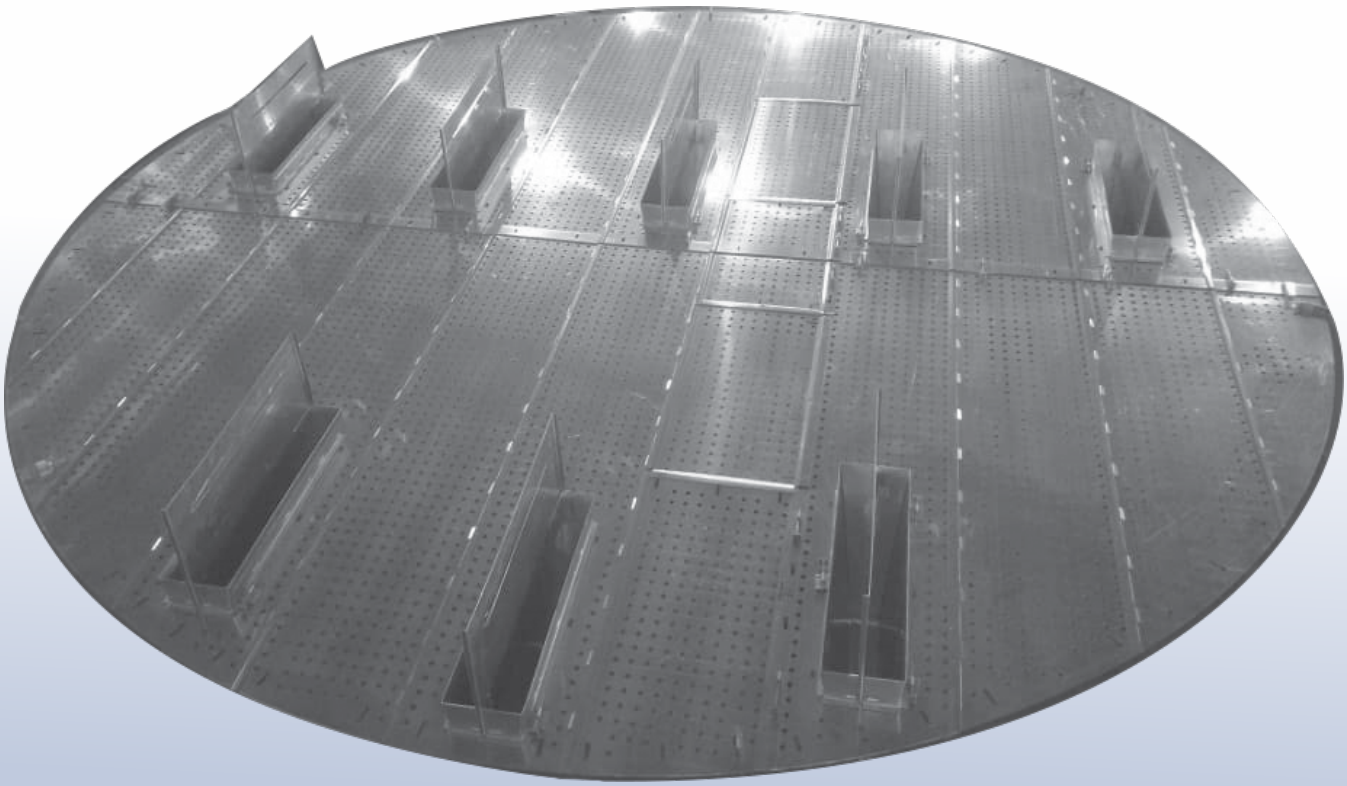
Multi **Downcomer Tray**

Tray columns play an important role in fractionating processes in the Oil, Gas and Petrochemical Industries.
Characteristics that tend to favor trayed columns in fractionating and separation columns are:

- Operation flexibility
- High liquid load traffic handling
- Suitable for fouling systems
- Suitable for corrosive/erosive services.

To handle large liquid loads and small tray spacing Multi Downcomer Trays are recommend. These types of trays are capable to minimize jet flood and entrainment.

These trays have several downcomers on tray floor besides sieve holes/float valves/ fixed valves in bubbling area to achieve high hydraulic capacity. they are also designd to maximize downcomer capacity, along with high bubbling area even below downcomer.
It is possible to achieve more downcomer area, weir length, and lower pressure drop per tray, uniformity in liquid and vapor distribution and more NTS per column height for better performance either efficiency or throughput.

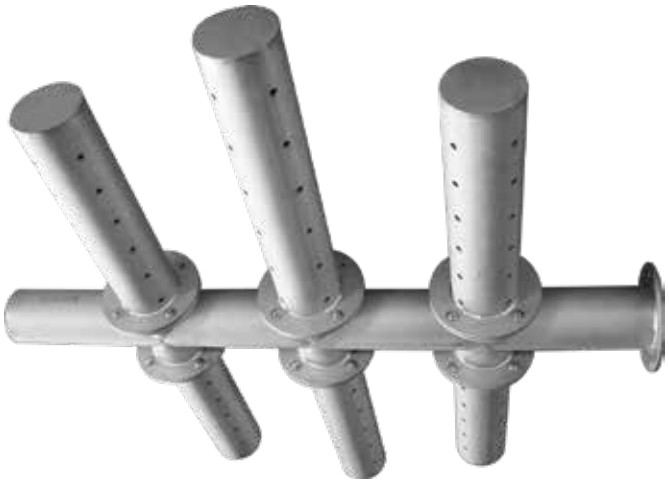


Tower **Internals**

Proper distribution of a vapor, liquid or vapor-liquid stream onto a tray is essential for reaching the hydraulic capacity potential of the internals. Feed devices help to distribute the inlet feed through the tower and they are classified as below:

Liquid Feed Pipe:

Liquid Feed Pipe is used when liquid is fed from outside the column for distributors. The incoming flow must contain less than 1% vapor by volume. A perforated pipe composed by a main header and secondary flanged branches are typically used for liquid inlets.



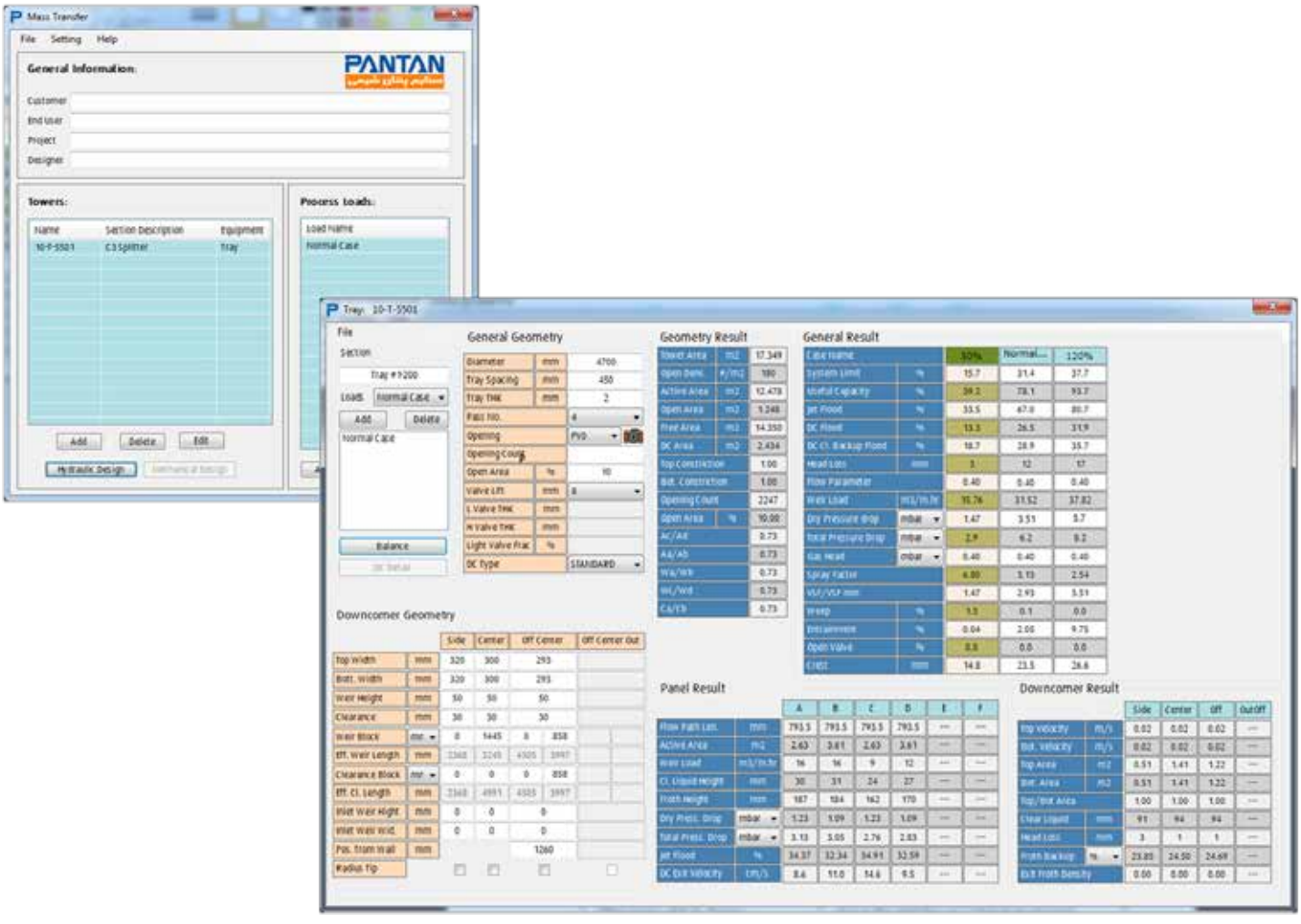
Flash feed Gallery:

Flashing Feed Gallery is a feed inlet device to accommodate mixed liquid/vapor or flashing feeds. The two phase is fed to the column through a nozzle tangentially against the tower wall. The residence time allows the vapor phase to disengage from the liquid and then the clear liquid flows directly to a distributor.

PANTAN **Tray Design**

PANTAN has in-house hydraulic calculation and rating software

- Multi pass tray
- Conventional and special downcomers
- Multi downcomer Trays



Engineering/Field **Services**

Apart from excellent products for mass transfer and separation systems, PANTAN can also offer complete engineering services for distillation plants, thus ensuring an exact planning and a comprehensive and professional project execution.

PANTAN provide below services to customers:

- Installation
- Installation Supervision

PANTAN also survey client problems and provide solution if it could be possible in revamp mode.

- Replacing and/or adding separation devices in existing vessels with modern/modified internals
- Planning and execution of modification works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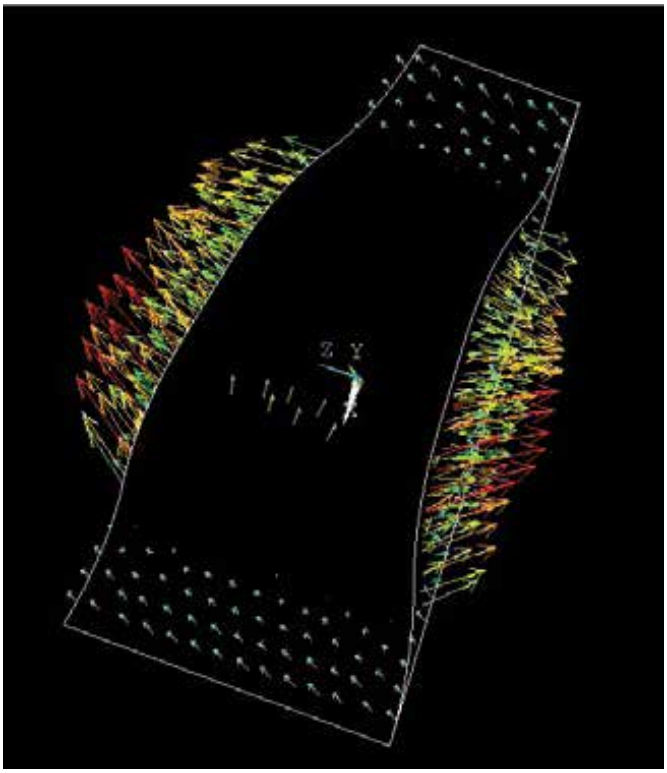
R&D & Product **Development**

PANTAN uses different approaches to improve his product performance. It is believed that to fulfil market requirement and new operation demands, it is necessary to establish new product.
For these two goals, PANTAN uses field tests in "Research & Development Center" located in PANTAN factory and even client site in small and large scales to check hydraulic performance of equipment.

The other ways to check performance is to maintain calculation and model with mathematical calculation. So Computational fluid dynamics "CFD" and process simulation could be so helpful and prevent in wasting capital cost and time.

The CFD is used to analyze products, key further and new products development whilst CFD reduces the volume of necessary experiments for design studies where would hardly be available.

PANTAN uses CFD to investigate the flow regime in wide range of products like Fixed and Float Valve Trays. This approach allows us to increase the separation efficiency and to optimize the design rules. PANTAN uses all these techniques to provide services to his clients.

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Catalyst Support Grid

Excellence in design

Process Technology

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One Stop Solution Provider

Spent Caustic Treatment

Catalyst Support Grid

Packed Tower Internals

Reactor Internals

Static Mixer

Special Equipment

Seprator Internals

Vapor/Liquid Distributor

Wedge Wire Screens

Liquid Diffuser & Outlet Collector

PANTAN - Your Specialist

for Mass Transfer and Separation Technologies

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