FENIX™

Distillation

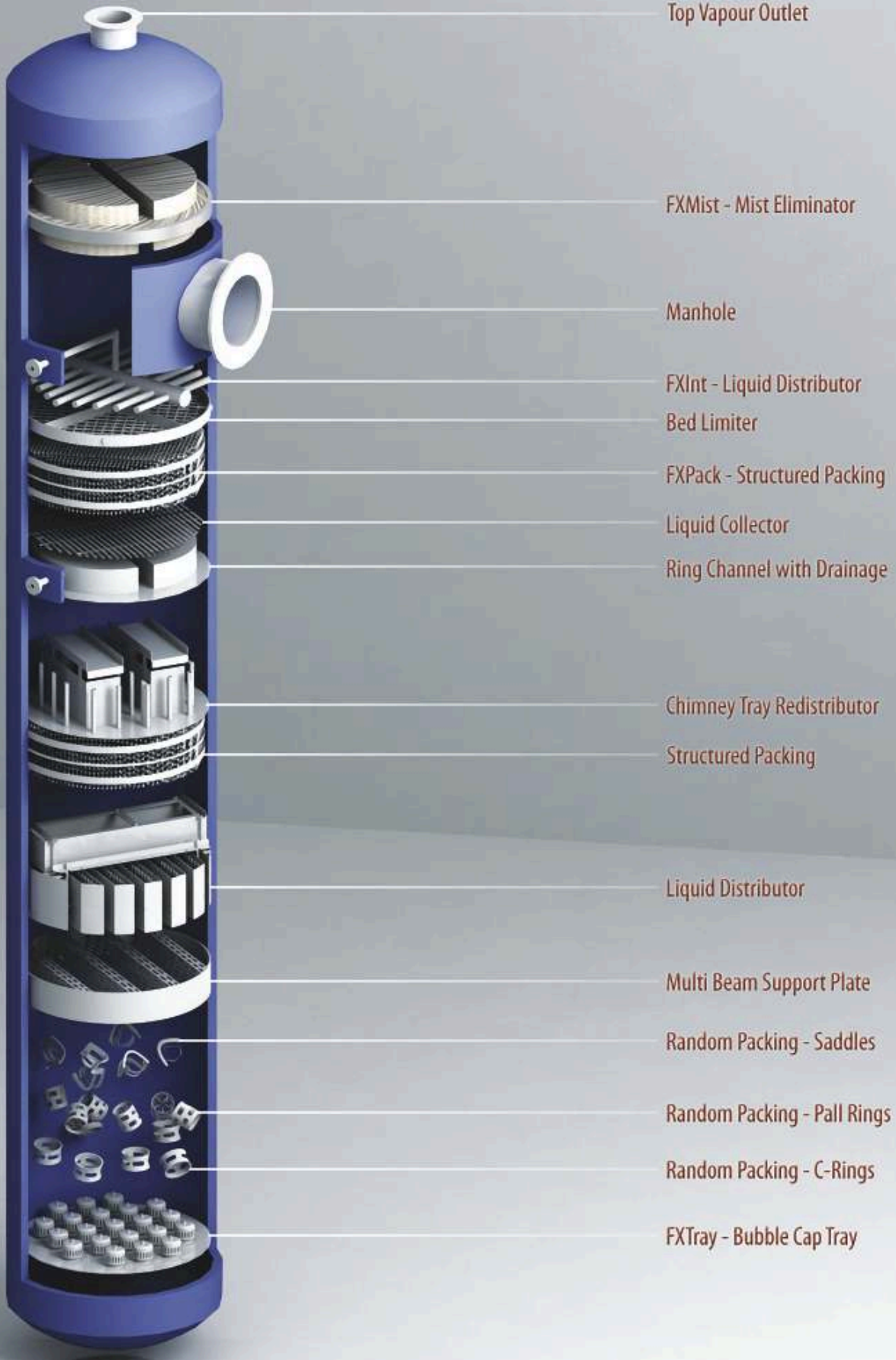
Absorption

Rectification

Extraction

Reactive Distillation

Your Partner
For Complete Mass Transfer Solutions.



Typical Internal Accessories of Distillation Column

Columns / Towers
Distillation, Absorption, Extraction & Reactive Distillation

OFFERING YOU THE COMPLETE FXRANGE OF MASS TRANSFER & SEPARATION INTERNALS

Fenix Process Technologies is a Mass transfer equipment manufacturing company with an integrated engineering solution. This enables us to provide high efficiency process design & detailed mechanical design.
Our vertical centric solution approach makes us a trusted partner for all our client needs.
Headquartered in Pune and headed by an efficient team with over three decade of cumulative experience in the process design & manufacturing industry, Fenix is poised to lead its industry segment.
Fenix has a state-of-the-art manufacturing plant with an area of 10,000sq.ft. and an able set of resource for the process and mechanical design capabilities.
The below table represents our process engineering capabilities.

Domain	Sub Domain
Chemical Industry	• Solvent Recovery • Separation/Purification of Chemicals • Absorption • Extraction • Reactive Distillation
Food Technology	• Vegetable Oil Refining
Pharmaceutical Industry	• Solvent Recovery • Absorption • Extraction
Alcohol Technology	• Fuel Ethanol
Ethanol Derivatives	• Acetaldehyde • Glacial Acetic Acid • Ethyl Acetate
Aromatic	• High Vacuum Distillation of Perfumery Products
Bio-diesel	• Methanol Recovery • Glycerol Recovery
Dyes & Intermediates	• Distillation/Purification of Intermediates • Solvent Recovery
Oil & Gas	• Crude Distillation • Vacuum Distillation • Cleaning of Crude Oil

Content

Structured Packings


Structured Packing from Sheet Metal

FXPack 60.0L/M
FXPack 1.25L/M
FXPack 1.70L/M
FXPack 2.5L/M
FXPack 3.5L/M
FXPack 5.0L
FXPack 7.5L
FXPack 10.0L

MOC : Stainless steels, 904L, 254SMO, Duplex, SS410S, Titanium, Hastelloy, etc.
Sizes : 50 mm to 8.0 m diameter.
Application : Standard application, Moderate vacuum to high pressure, Low to high liquid loading.
F-factor : 1.2 to 3.5
Surface area : 60 to 1000 m2/m3
NTSM : 1.0 to 4.5


Structured Packing from Wiremesh

FXPack WM5.0M
FXPack WM7.5L

MOC : Stainless steels, Carbon steel, Phosphor bronze, or any metal/alloy according to customer request.
Sizes : 25 mm to 3.0 m diameter
Application : High vacuum to low pressure. Good for where low pressure drop required.
High no. of stages per meter. Highly efficient even at low liquid loading.
F-factor : 1.5 to 2.2
Surface area : 500 to 750 m2/m3
NTSM : 6 to 9


High Capacity Structured Packing from Sheet Metal

FXPack SUPER* 250
FXPack SUPER 450
FXPack SUPER 750
FXPack SUPER 1000

MOC : Stainless steels, 904L, 254SMO, Monel, Hastelloy, or any metal/alloy according to customer request.
Sizes : Up to 8.0 m diameter
Application : High liquid loading, High vapour loading, Useful for heat-sensitive systems.
Very low pressure drop
F-factor : 2.2 to 2.8
Specific surface area : 250-1000 m2/m3
NTSM : 2.2 to 5.0


Packing for Liquid-Liquid Extraction

FXExtract 2.5L
FXExtract 3.5L
FXExtract 5.0L

This is a specially designed packing combination made from sheet metal for liquid-liquid extraction.
MOC : Stainless steels, Carbon steel, or any metal/alloy according to customer request.
Available upto 3 m diameter.


Structured Grid Packing

FXGrid 45L
FXGrid 60L/M
FXGrid 90L/M

MOC : Stainless steels, SS410S, Duplex, Monel, Hastelloy, Carbon steel, or according to customer request.

Application : Fouling systems, corrosive environment, where frequent cleaning or replacement needed.

Sheet Thickness : 1.0 - 2.0 mm

* FXPack SUPER is only available in countries where no patent infringement occurs.

Laboratory Packing (Wiremesh)

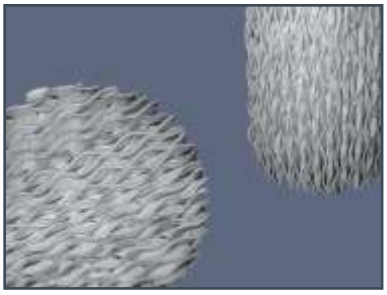
FXLab-EM
FXLab-DM

Standard MOC : SS, others on request.
Suitable for heat-sensitive systems.
NTSM : 2.0 - 4.0
Pressure drop low, 2 to 4 mbar/m.
Suits low liquid load 0.05 m3/m2h.
Can be used for high vacuum to 2 mbar.
Can be scaled up easily.
Diameter : 25 - 100 mm

Reactive Distillation Packing

FXReact 2.5L
FXReact 3.5L
FXReact WM 5.0M
FXReact WM 7.5L

MOC : According to customer request.
High separation efficiency.
Reaction capacity/rate can be high.
Flexible design of catalyst element.
Can be used in laboratory columns.
Diameter : 50 - 500 mm

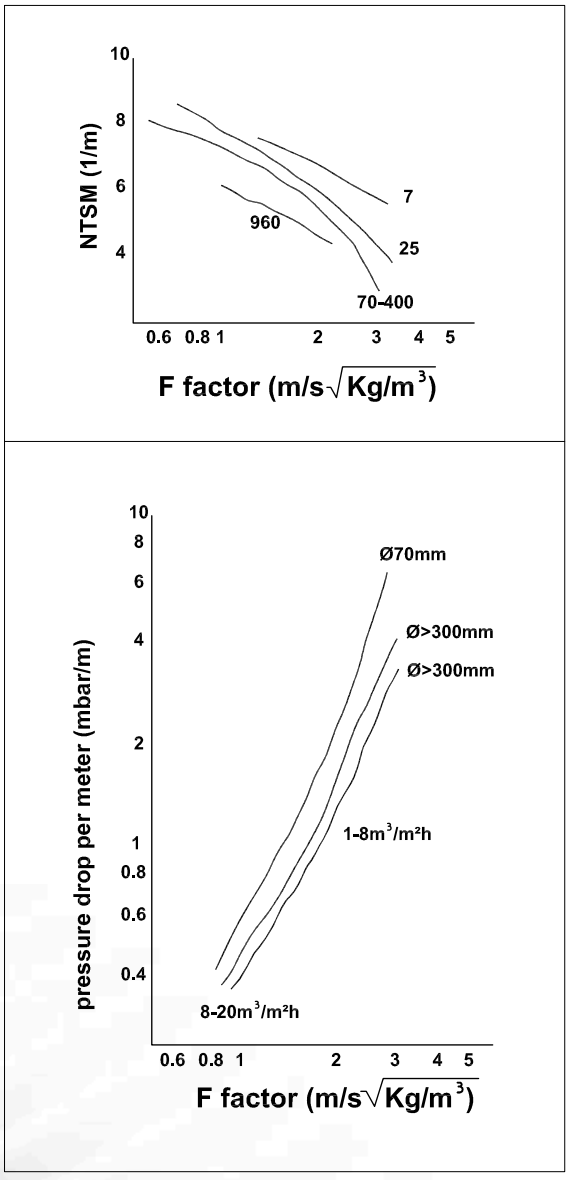


FXPack PTFE
FXPack PP

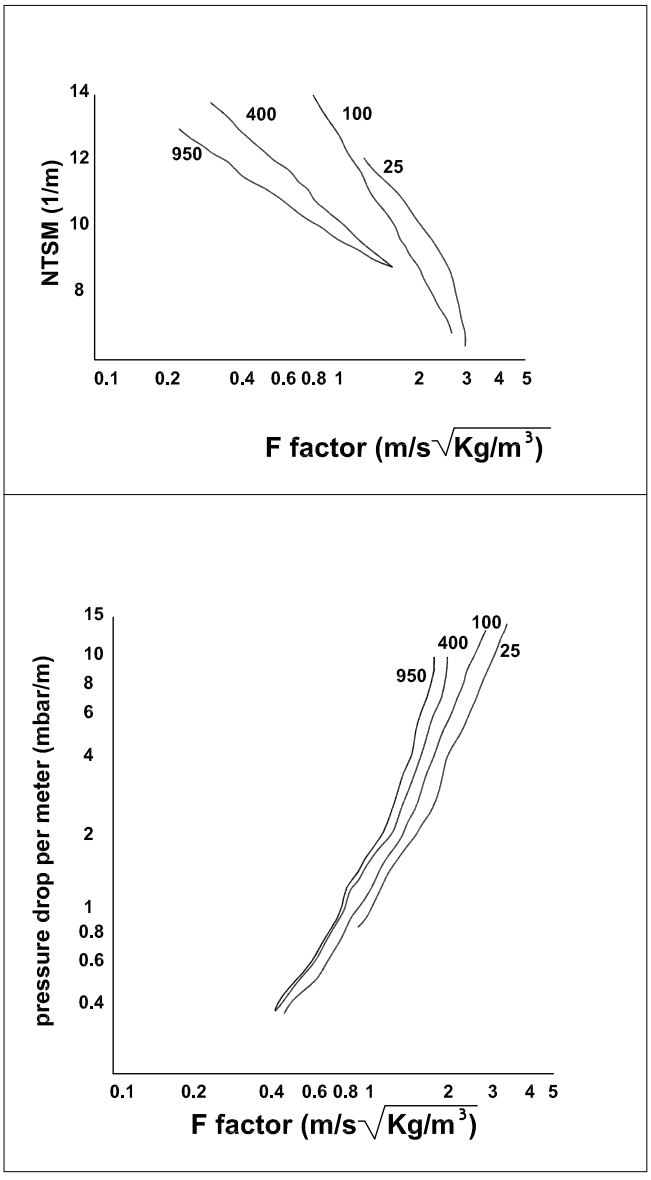
Sizes : 100 mm to 1.5 m
Application : Corrosive systems
Temperature : Up to 250° C

Typical Performance Characteristics

Performance characteristic curves for FXPack WM 5.0M and FXPack WM 7.5L is given underneath. The values plotted in the graphs are mean values and were obtained by using standard/ideal test mixtures. Production plant data/results may vary marginally from system to system.



PACKING GRAPH : FXPack WM 5.0M

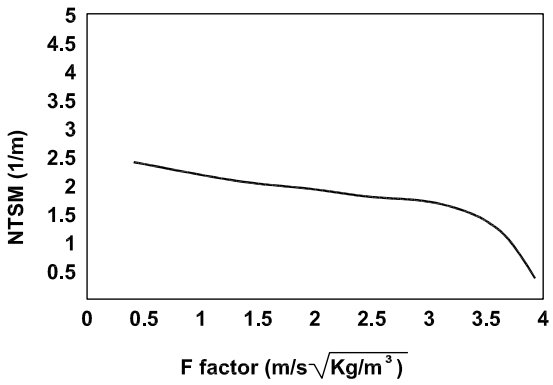


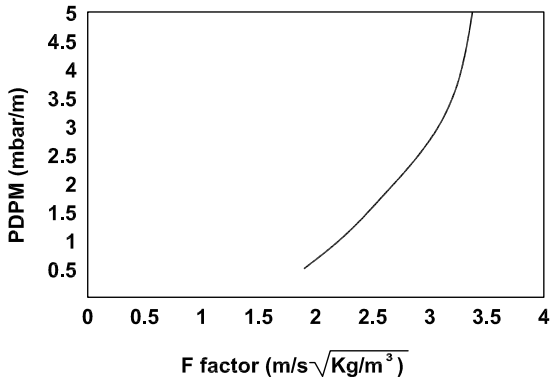
PACKING GRAPH : FXPack WM 7.5L

NTSM : Number of theoretical stages per meter packing height [m^{-1}]

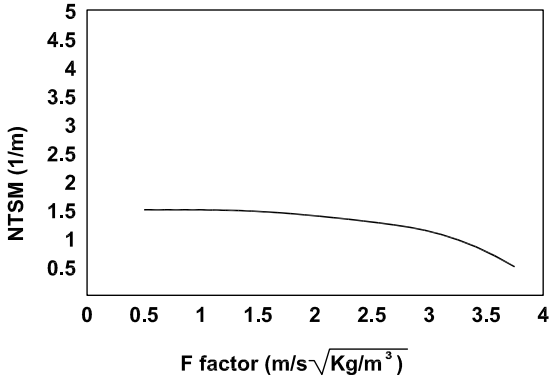
F-factor : A measure of vapour throughput [$m/s\sqrt{Kg/m^3}$]

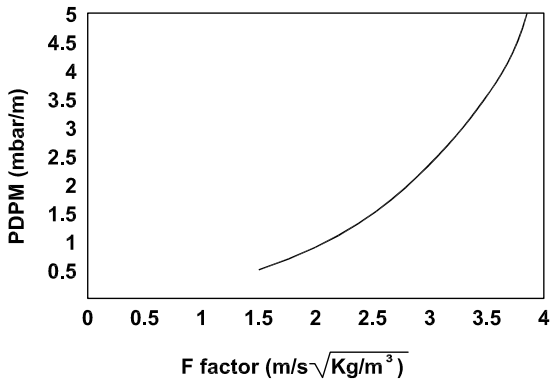
Performance Curves of FXPack 1.7L



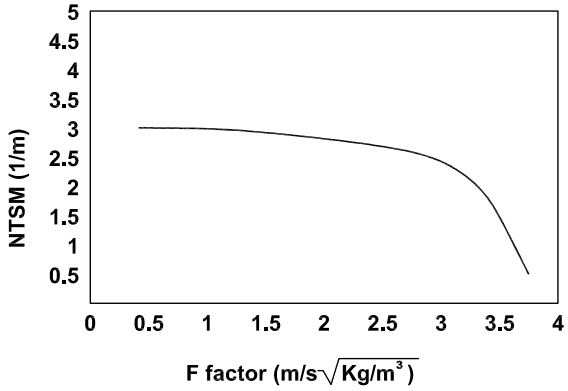


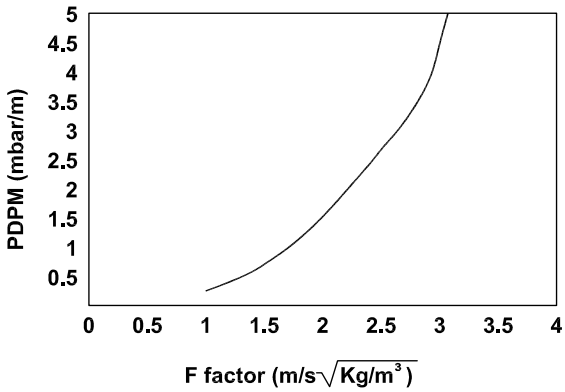
Performance Curves of FXPack 1.7M



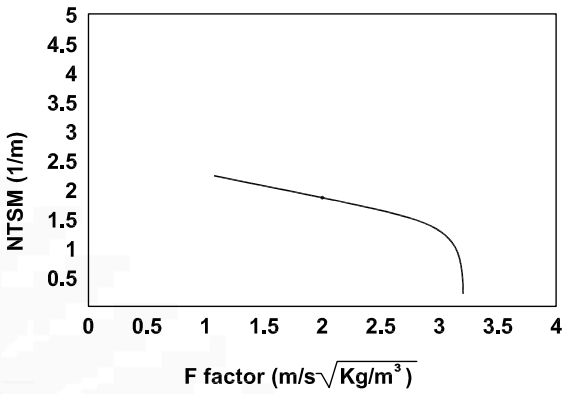


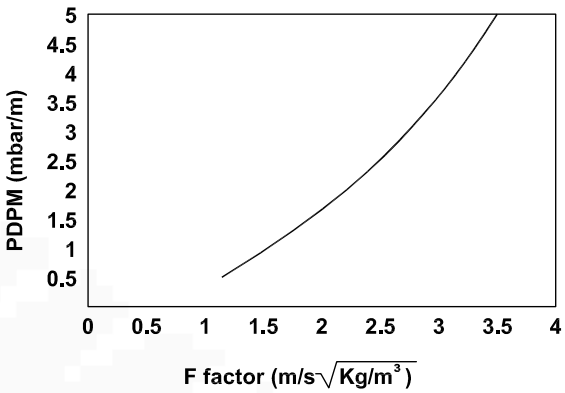
Performance Curves of FXPack 2.5L



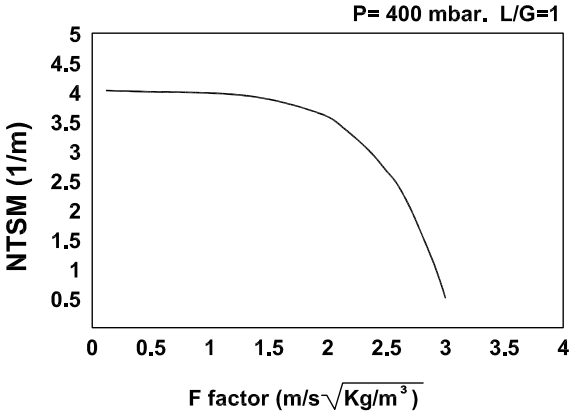


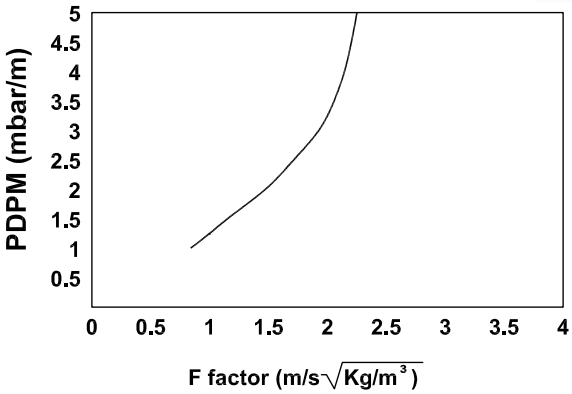
Performance Curves of FXPack 2.5M



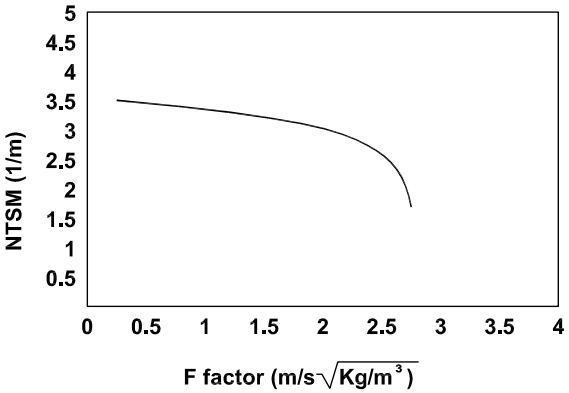


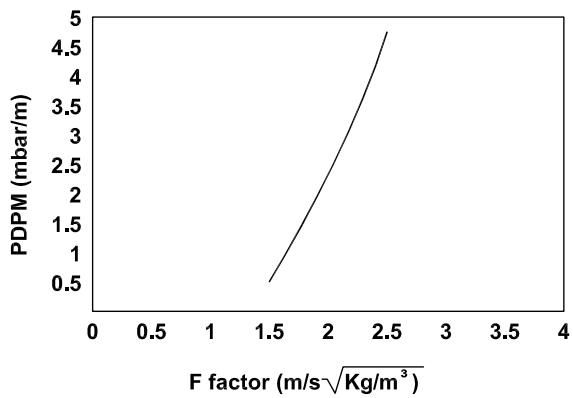
Performance Curves of FXPack 5.0L



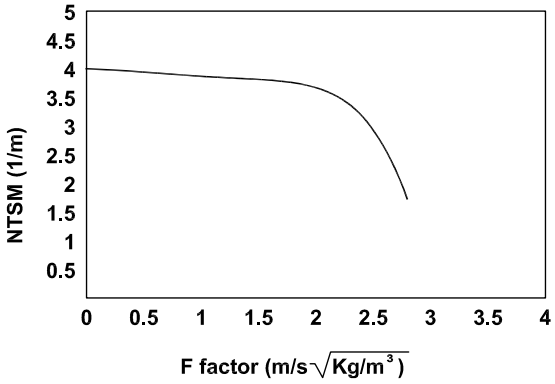


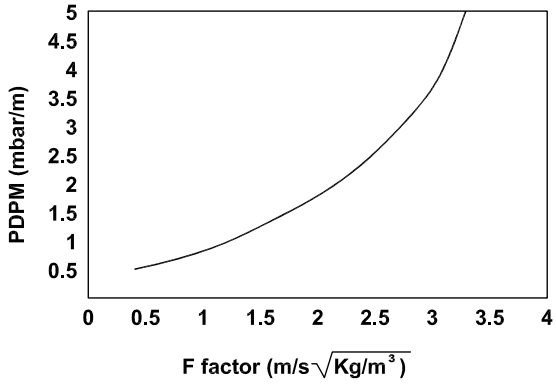
Performance Curves of FXPack 5.0M



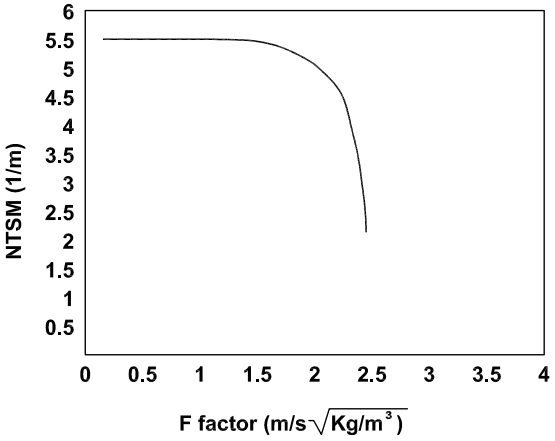


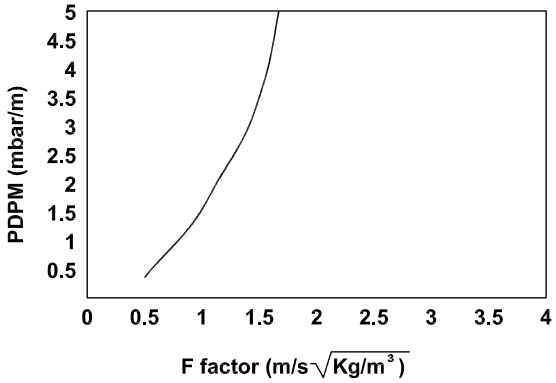
Performance Curves of FXPack 3.5L



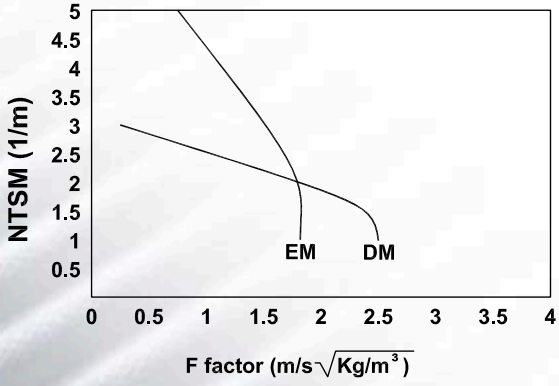


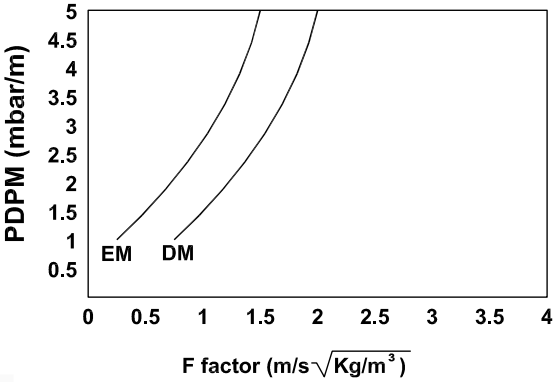
Performance Curves of FXPack 7.5L





Performance Curves of FXLab EM & DM





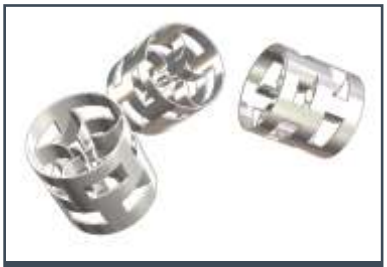
• Basis of the Graphs : NTSM given is for pure organic system it may vary from process to process.

Random Packings

Cylindrical Rings

FXPack RR13
FXPack RR19
FXPack RR25
FXPack RR38
FXPack RR50
FXPack RR70

MOC : SS, or any metal/alloy according to customer request.
Bulk density : 200-900 kg/m3
Surface area : 90-600 m2/m3
NTSM : 1.5-1.8
High mechanical strength.
Thickness : 0.3mm - 1.0mm



Fenix P-Rings

FXPack P13
FXPack P16
FXPack P19
FXPack P25
FXPack P38
FXPack P50
FXPack P75

MOC : SS, or any metal/alloy according to customer request.
Bulk density : 220-350 kg/m3
Surface area : 85-380 m2/m3
NTSM : 1.8-2.2
Better than Cylindrical rings.
Thickness : 0.3mm - 0.6mm

C-Rings

FXPack C1.0
FXPack C1.5
FXPack C2.0
FXPack C2.5
FXPack C3.0

MOC : SS, or any metal/alloy according to customer request.
Bulk density : 150-250 kg/m3
Surface area : 110-220 m2/m3
NTSM : 2.2-2.5
Low pressure drop, Suits vacuum systems.
Better liquid distribution.
High throughput.
Low liquid hold-up.
Thickness : 0.3mm - 0.8mm

Saddle Rings

FXPack S15
FXPack S25
FXPack S40
FXPack S50
FXPack S70

MOC : SS, or any metal/alloy according to customer request.
Bulk density : 120-330 kg/m3
Suits low liquid load 0.05 m^3/m^2h
NTSM : 2.2-2.5
Very low pressure drop, Suits high vacuum application.
Very low liquid hold-up.
Thickness : 0.3mm - 0.6mm

• These are also available in Plastics & Ceramics.

FXInt LD Liquid Distributors

FXInt LD-1

Splash Plate Type Distributors

A large channel provided above the distributor facilitates accurate control of the liquid flow rate. Due to large openings in the construction, it does not have tendency of plugging or choking.

FXInt LD-2

Channel Type Distributors with bottom holes

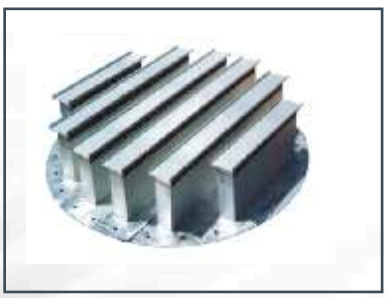
Conveniently provides liquid sealing and distributor leveling. Intermediate liquid loading. Turndown upto 2:1

FXInt LD-3

Channel Type Distributors with tubes

Large variation in liquid loading is well taken care of in this type of distributor. Supplied in both segmented form and as one piece.

Channel Type Distributors without tubes can also be manufactured.



FXInt LD-4

Chimney Tray Collector-Distributors

For applications with very high liquid loads, when both collection and distribution of the liquid are needed, this collector-distributor is highly suitable.

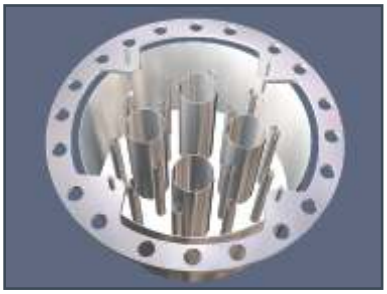
FXInt LD-5

Antenna type Distributors

FXInt LD-6

Feed Pipe Distributors

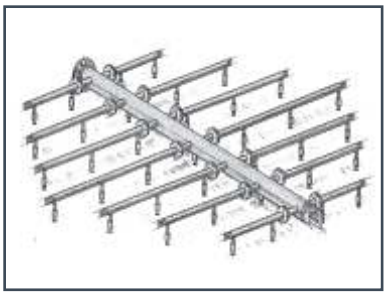
Better for batch columns where liquid holdup is minimum. i.e. < 5m3/m2h



FXInt LD-7

Pan Type Distributor

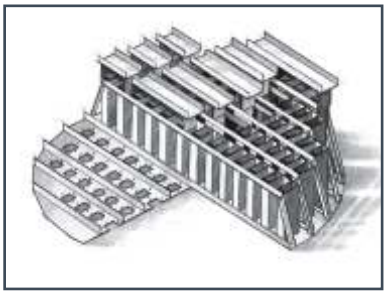
Liquid loading : 0.5 to 250 m3/m2h
Size : 200 mm to 8.0 m



FXInt LD-8

Spray Nozzle Type Distributor

Liquid loading : 2 to 200 m3/m2h
Size : upto 8.0 m



FXInt LD-9

Deck Type Distributor

Liquid loading : 5 to 220 m3/m2h
Size : upto 8.0 m

FXInt LD-10

Trough Type Distributor

Liquid loading : 0.3 to 50 m3/m2h
Size : upto 3.0 m

FXInt LC Liquid Collectors

FXInt LC-1

Vane Type Collectors

Also known as “ring type collectors”, these collectors have very low pressure drop – almost negligible.

FXInt LC-2

Collectors With Support Grid

This is a combination of packing support grid and vane type collector.

FXInt LC-3

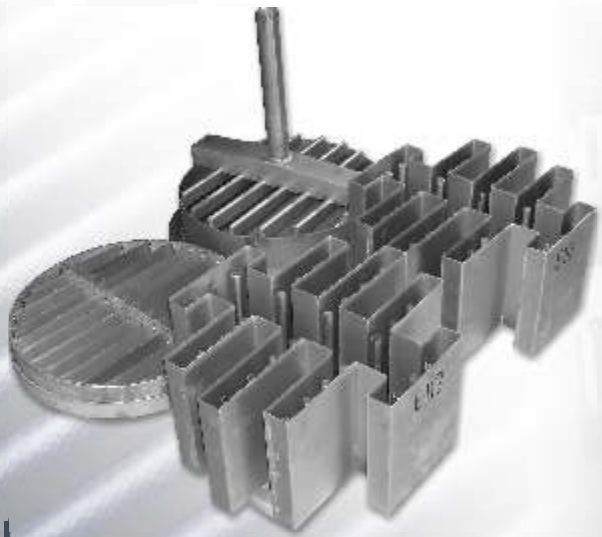
Flanged Type Collectors

This is suitable for comparatively smaller diameter columns where manholes are not practicable and the column sections are flanged in construction.

FXInt LC-4

Chimney Tray Type Collectors

Normally used for large diameter columns with high liquid throughput, available in both welded and bolted structure.



FXInt LF Liquid Feed Systems

FXInt LF-1A

This “L” type of feed inlet is most suitable for comparatively smaller diameter columns with feed liquid at bubble point or lower temperatures.

FXInt LF-1B

Comparatively larger diameter columns perform well with this “T” type of feed inlet for feeding liquid at bubble point or lower temperatures.

FXInt LF-2

This type is used for feeding process liquids containing gases.

FXInt GF Gas Feed Systems

FXInt GF-1

Plain Inlet

FXInt GF-2

Pipe Inlet

FXInt GF-3

Impingement Inlet

FXInt GF-4

Tangential Inlet

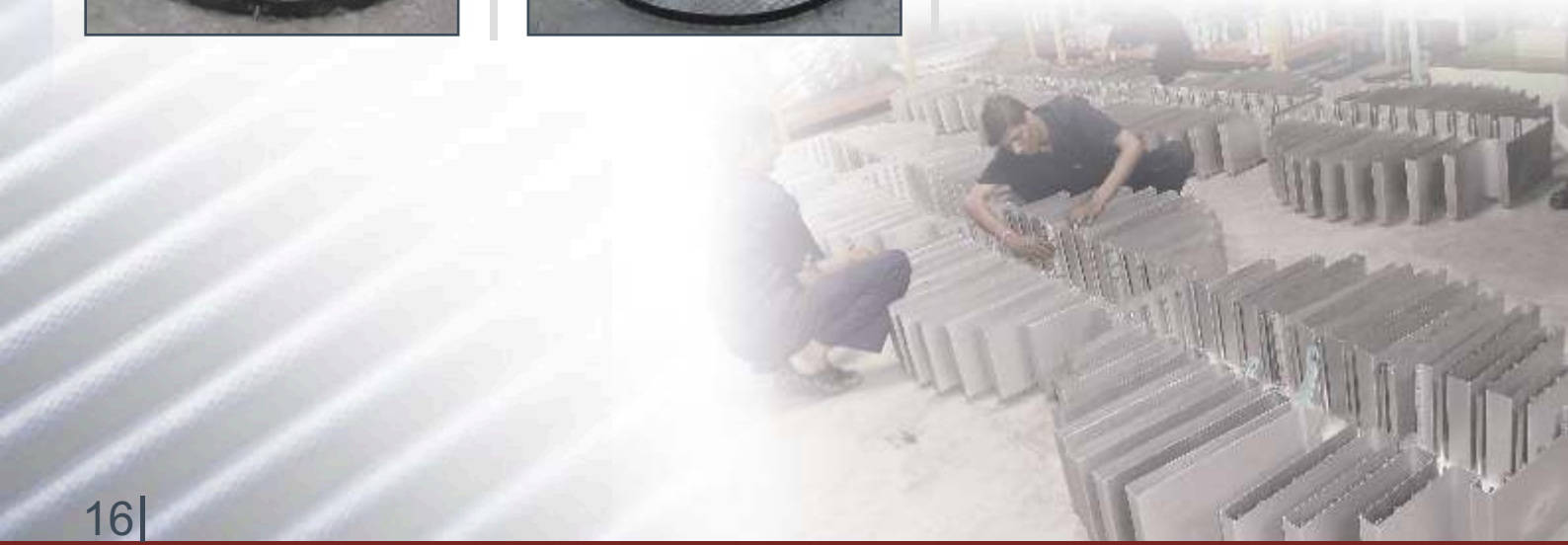
These systems are used in cases where the gas velocity is high, ensuring reduction of kinetic energy content of incoming gas thus improving the gas distribution.

FXInt PS Packing Supports

	FXInt PS-1	Support grid used for structured packings.
	FXInt PS-2	Multi beam support used for random packings.
	FXInt PS-3	For large columns.

FXInt BL Bed Limiters

Bed Limiters are installed directly above a packed bed in a distillation column to prevent any movement or shifting of packing elements under turbulent conditions of liquid or vapour flow. These are fabricated as segmented and bolted for large diameter columns but in one piece for small columns.



FXInt ME Mist Eliminators

FXInt ME-1

Knitted Mesh Type

Low cost. High efficiency. Upto 3-5 micron size particles can be removed. Almost complete removal of droplets for turndown ratio of 3:1.

Mostly used for vertical gas flow.

FXInt ME-2

High Efficiency Mesh Type

Denser weaving and thinner wire used compared to FXInt ME-1 for more demanding applications.

Mostly used for vertical gas flow.

FXInt ME-3

Standard Vane Type

Low pressure drop. Normally used for larger droplets. Fouling systems can be handled.

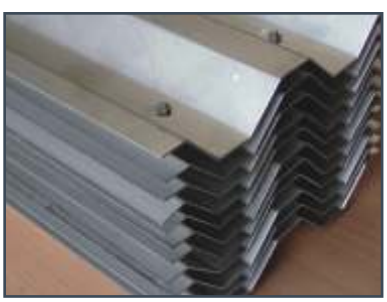
Used for both vertical and horizontal gas flow.

FXInt ME-4

Pocketed Vane Type

Low pressure drop. Well-suited for applications with high gas/vapour velocity. Fouling systems can be handled.

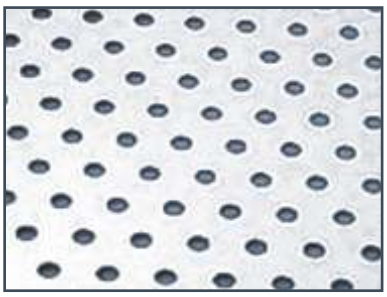
Especially designed for horizontal gas flow.



FXInt ME-5

Chevron Type Mist Eliminator

Distillation Trays



FXTray-1

Sieve Tray

Stainless steels, 904L, 254SMO, Duplex, SS410S, Titanium, Hastelloy or any metal/alloy according to customer request
Up to 8.0 m diameter.

Low cost. Not flexible for wide range of turndown ratio.

FXTray-2

Fixed Valve Tray

Stainless steels, 904L, 254SMO, Duplex, SS410S, Titanium, Hastelloy or any metal/alloy according to customer request.
Up to 8.0 m diameter.

Wider turndown ratio and better resistance to fouling compared to FXTray-1.

FXTray-3

Floating Valve Tray

Stainless steels, 904L, 254SMO, Duplex, SS410S, Titanium, Hastelloy or any metal/alloy according to customer request.
Up to 8.0 m diameter.
Tray open area automatically changes according to vapor flow rate. Most versatile – can be used for almost all services. Widest turndown ratio. Available in two modules : rotating and non-rotating.

FXTray-4

Bubble Cap Tray

Stainless steels, 904L, 254SMO, Duplex, SS410S, Titanium, Hastelloy or any metal/alloy according to customer request.
Bubble Caps : 10-100 mm diameter

Used for low liquid loads. Very wide turndown ratio.

FXTray-5

Cartridge Tray

Stainless steels, 904L, 254SMO, Duplex, SS410S, Titanium, Hastelloy or any metal/alloy according to customer request.

Normally supplied in small sizes up to 1.0 m diameter.

Highly suitable for fouling and foaming applications. and for systems which require frequent maintenance or replacement. Wide turndown ratio.

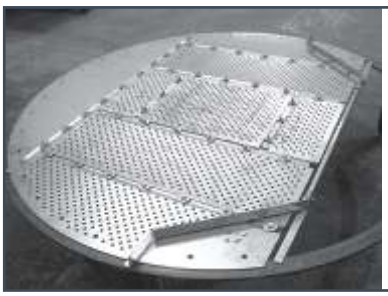
EXOGI™

Separation Internals for Oil & Gas Industry

Vane Pack Module

Vane Inlet Device

Chevron Type
Mist Eliminator



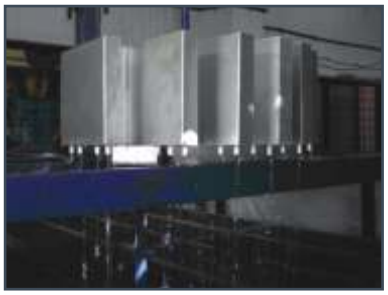
Double Skin
Perforated Baffle

Sand Jet Assembly

Liquid Distributor Testing

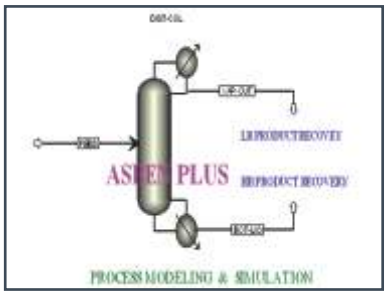
Fenix has a state-of-the-art testing facility for performance of liquid distributors to facilitate developing engineering standards to design and manufacture Liquid Distributors. This ensures that any Liquid Distributor designed and manufactured by Fenix performs consistently, efficiently and economically during operation. Statistical technique is applied to quantify the quality of liquid distribution and its effect on the performance of the packing to be used in the system. In this test rig, important performance parameters are verified before the Liquid Distributor is installed into the column. Designed duty is confirmed by a flow test with water.

This facility is capable to handle Liquid Distributors up to 4 m (more than 13 ft) diameter and can be operated with liquid loads up to 270 m3/h. All liquid distributors manufactured by us are subjected to test with water in this facility for ascertaining quality and performance. This water test is free of additional costs and executed before dispatch of the equipment.



Process Modeling & Simulation

One of the most sophisticated process simulation software Aspen Plus is available at our disposal. Process simulation with Aspen Plus allows us to predict the behavior of a process using basic engineering relationships such as mass and energy balances, phase and chemical equilibria and reaction kinetics.



Given reliable thermodynamic data, realistic operating conditions, and the rigorous Aspen Plus equipment models, we can simulate chemical process systems including distillation columns and compare the design with actual plant behavior. Thus better plants are designed and enhanced profitability in existing plants can be achieved.

With Aspen Plus we can interactively change specifications, such as flowsheet configuration, operating conditions, select proper packing and feed compositions by analyzing and comparing with numerous alternatives.

Aspen Plus contains data, properties, unit operation models, reports, and other features and capabilities.

With Aspen Plus we can check different types of structured packing, random packing and trays to get a thorough idea of efficient and economic column diameter and capacity.

Process & Equipment Design

We have modern facility, capable management, well trained engineers and skillful technicians to carry out the complete process and equipment design for our valued clients.

- Process Simulation using ASPEN
- Process Design of Heat Exchangers
- Column Hydraulics
- GA Drawing
- Mechanical Design of all Equipments
- Equipment Drawing
- P&I Diagram
- Plant Layouts
- Instrumentation & Automation

Softwares at our disposal :

'AspenPlus' (version 2006 Aspen 7.1)

'Designer's Desktop'

'TZValve' (version 5.0)

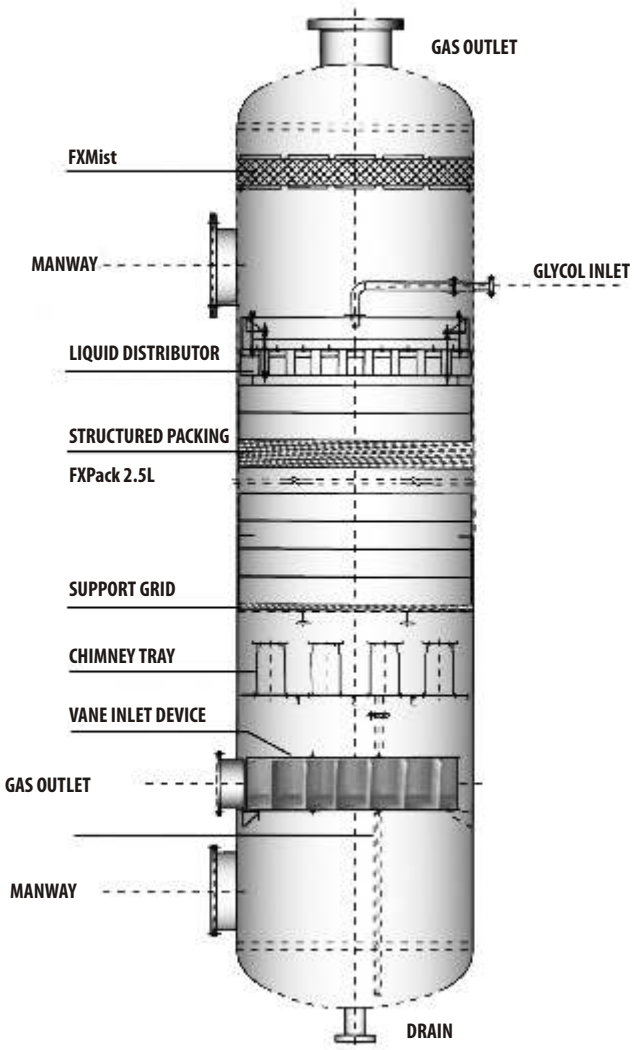
'PCOL' (version 1.1)

And various internally developed programs/softwares for in-house use.

Revamping/Retrofitting of Existing Columns

Erection, Commissioning & Troubleshooting

TEG Contactor



Fenix™ has the requisite design strength to model and design TEG contactor columns i.e. Triethylene Glycol dehydration systems (for hydrocarbon processing) with stringent process guarantees.

Saturated gas is fed to the first column where lean Triethylene Glycol removes moisture to bring it to 10 ppm level using packed bed counter current operation. The column works as an absorber. Fenix packing FXPack is used for efficient moisture removal. The exit TEG, after absorbing moisture is regenerated using two columns - Stripper and Regenarator. In the stripper, moisture is removed from TEG by heating, usually employing a reboiler. The moisture in TEG is further removed by recycling small quantity of dry gas generated in the first column.

H2S Stripper

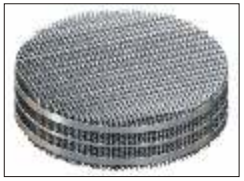
We have the required strength to model and design high-efficiency internals for petrochemical processing units such as Amine Contactors and H2S Strippers and the related mechanical design. Fenix packing FXPack is used as column internal for these equipments.

The basic design consideration is to estimate stripping gas required for H2S Strippers.

For Amine contactors, the design basis is the specified ppm level concentration of amine in the exit gas.

The FXRange of Mass Transfer & Separation Internals from Fenix Process Technologies

FXPack™


Structured Packing


Wire Mesh Packing

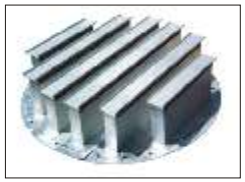

Pall Rings


Fenix Rings


Saddle Rings

FXInt™


Trough Distributor


Chimney Tray Distributor


Pan Type Distributor


Feed Pipe Distributor


Support Grid

FXMix™


Static Mixer


Jacketed Mixer


Teflon Element


Housing with Elements


Shear Mixer

FXTray™


Distillation Trays


Bubble Caps


Tray Panel


Bubble Cap Tray


Cartridge Tray

FXOGI™


Vane Pack Module


Sand Jet Assembly


Perforated Baffle


TEG Contactor


Vane Inlet Device

FXPRO™


Pusher Centrifuge


Heat Exchanger


SS Distillation Column

FENIX™

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