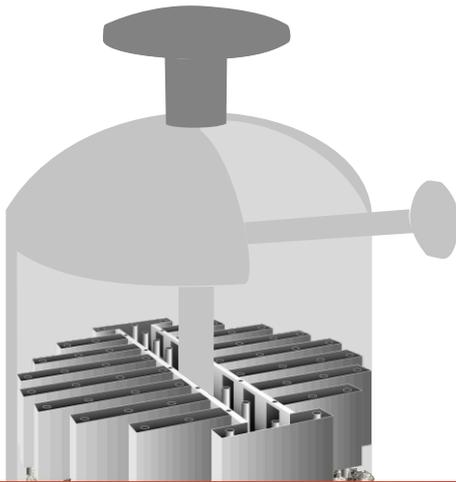
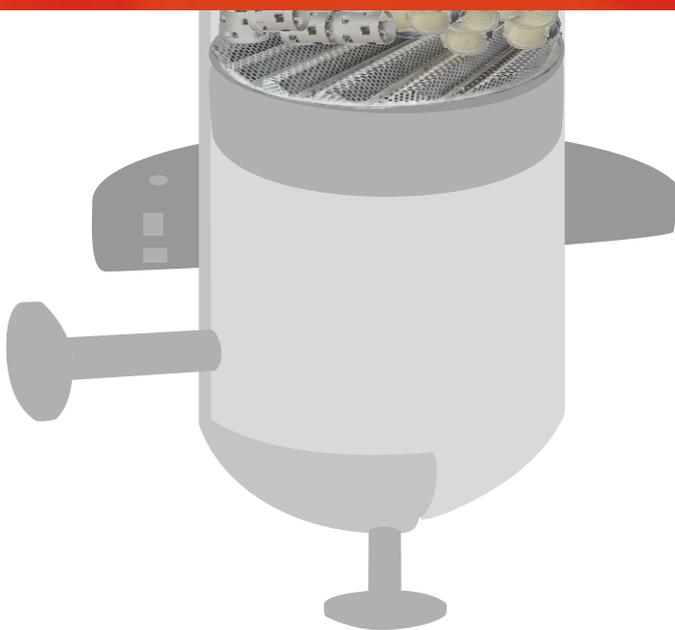


**ULTIMO**<sup>®</sup>  
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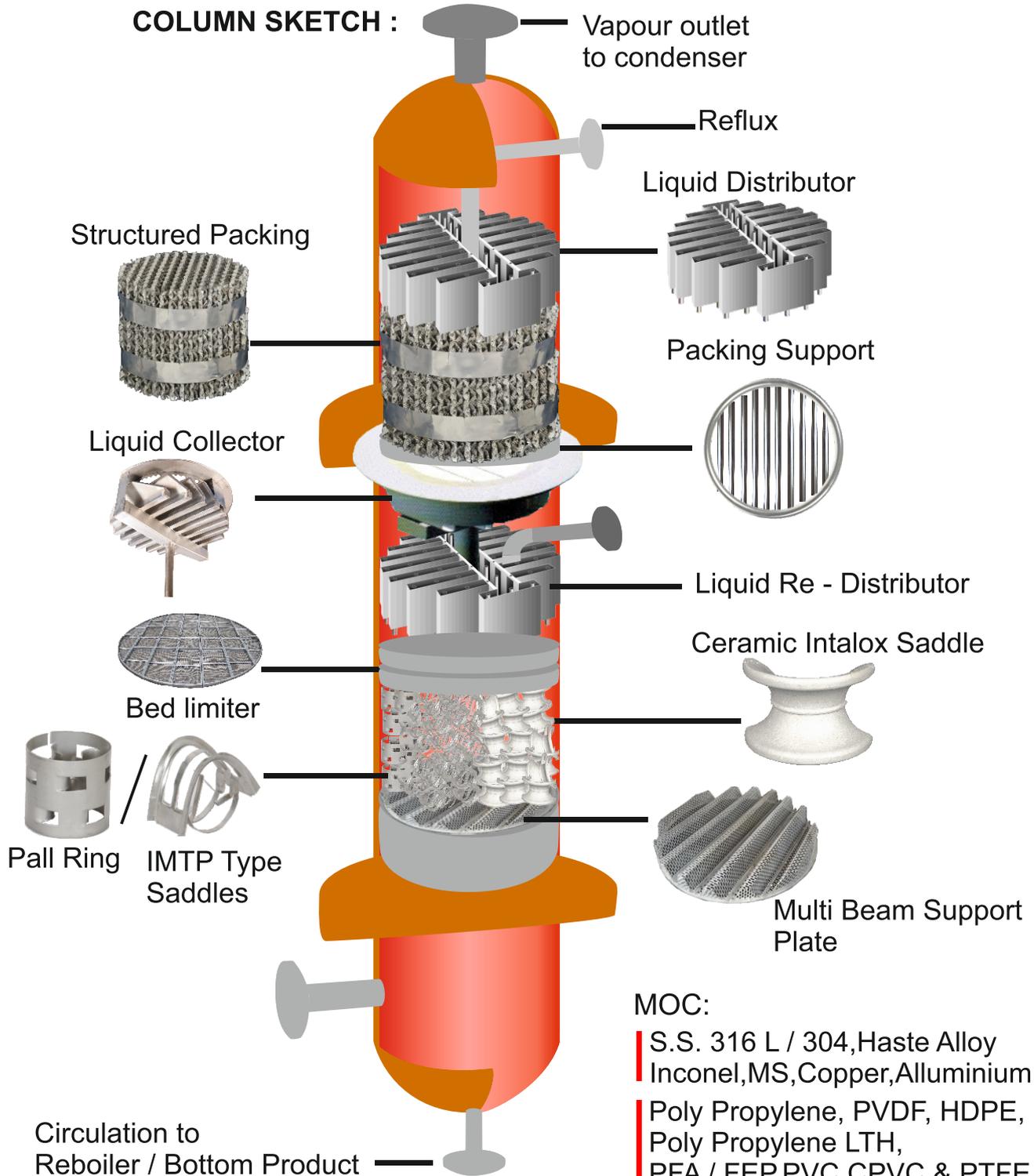
- Distillation Columns
- Gas Absorption
- Petroleum Refinery
- Solvent Recovery
- Liquid- Liquid Extraction
- COD Strippers
- Structured Packings & Internals
- Random Packings & Internals



# PROCESS AND COLUMN DESIGN

Supply of Distillation Column with Process Hydraulic & Mechanical designs are our expertise. Computer aided Design & Simulation softwares are used for the purpose.

- DMF-WATER SEPARATION
- METHANOL-WATER SEPARATION
- IPA-WATER SEPARATION
- ETHYL ACETATE-WATER SEPARATION
- SOLVENT RECOVERY UNITS (SRU)
- GAS SCRUBBERS FOR CORROSIVE MEDIA LIKE HCl - SO<sub>2</sub> - H<sub>2</sub>S - Cl<sub>2</sub> - HBr - NO<sub>x</sub> GASES
- LIQUID - LIQUID EXTRACTION
- HIGH COD STRIPPERS
- MULTI EFFECT EVAPORATOR



## MOC:

- S.S. 316 L / 304, Hastelloy
- Inconel, MS, Copper, Aluminium
- Poly Propylene, PVDF, HDPE, Poly Propylene LTH,
- PFA / FEP, PVC, CPVC & PTFE
- Chemical grade white porcelain

# STRUCTURED COLUMN PACKINGS

## STRUCTURED TOWER PACKING:

It's an advanced Column Packing with high efficiency performance in distillation column for solvent recovery, stripping or absorption. A high specific surface area facilitate efficient mass transfer. Hence higher NTSM, higher voidage and lower packing factor provides lower pressure drop & higher throughput with lower energy consumption. This also reduces required column diameter and height, hence lower capital investment.

- Available in specific mass transfer surface areas ( $m^2 / m^3$ ) of 125, 250, 350, 500, 750, 1000 & 2000.
- Material of Construction ( MOC ) :  
SS 304/304L, SS 316/316L, Duplex, SS 904L, Alloy 825, Hastelloy C-22, Ceramics, PTFE, P.P, PVDF Etc.

## APPLICATIONS & FEATURES:

- Ranging from laboratory columns to large scale process systems.
- Solvent recovery.
- Close boiling components distillation.
- Azeotropic distillation.
- High vacuum process columns.
- Suitable for both batch & continuous distillation systems.
- Process & Hydraulic designs are available if required.
- Ideal for quality improvement.
- Heat sensitive materials.
- High efficiency.
- Low energy consumption.
- Low pressure drop.
- Minimum hold-up.
- High vacuum operations.
- Available in SS 316L / 304L and Alloy Steels like Hastelloy, Duplex Steels Etc.
- Available in specific area of 250, 350, 500, 750 sq.m. / cu.m.



Sheet Metal Structured Packing



Sheet Metal Structured Packing



Segmental Sheet Metal Structured Packing



Segmental Structured Packing  
( For large dia. columns )

## SHEET METAL STRUCTURED PACKINGS :

These are made from thin metal sheets formed to provide maximum surface area with higher void fraction and efficient surface characteristics. On account of high surface area per cubic meter, high NTSM and lower pressure drop across structured packings, column diameter is considerably reduced as compared to conventional types of random packings for the same application.



Types	Surface Area SQ m/ CUm.	F-Factor	No. of Theoretical Stages per meter ht. (NSTM)*
ULT PACK 1.25 L/M	125	1.2	1.0
ULT PACK 1.70 L	170	1.5	1.5
ULT PACK 2.00 L	200	1.8	2.0
ULT PACK 2.50 L	250	2.2	2.3
ULT PACK 3.50 L	350	2.7	2.8
ULT PACK 5.00 L	500	3.0	3.8
ULT PACK 7.50 L	750	3.5	4.5



## WIRE MESH STRUCTURED PACKING :

Wire Mesh Structured Packings are made from woven wire mesh to provide higher surface area & voidage required for separation of closed boiling mixtures. Wire mesh packing is available in WM 5.0M, WM7.5L. These are the most efficient structured packings with better wetting characteristics and used for high cost heat sensitive products.

### SALIENT FEATURES :

- WM5.0M (Surface Area 500 m<sup>2</sup>/m<sup>3</sup>)
- High no. of theoretical stages per unit height.
- WM7.5L (Surface Area 750m<sup>2</sup>/m<sup>3</sup>)
- Maximum no. of theoretical stages per unit height

Types	SurfaceArea SQ m/ CUm.	F-Factor	No. of Theoretical Stages per meter ht. (NSTM)*
ULT PACK W M 5.0 M	500	1.5	6.0
ULT PACK W M 7.5 L	750	2.2	9.0

### High Capacity Low Pressure Drop Metal Structured Packings

Types	Surface Area SQ m/ CUm.	F-Factor	NSTM
ULT PACK HC 7.52L	500 m <sup>2</sup> /m <sup>3</sup>	2.7	3.8
ULT PACK HC 4.52L	350 m <sup>2</sup> /m <sup>3</sup>	3.0	2.8
ULT PACK HC 3.52L	250 m <sup>2</sup> /m <sup>3</sup>	2.2	2.3



## LABORATORY PACKING:

Ultimo Laboratory Packings are designed for 25 mm to 200 mm diameter columns and provide large specific surface area per unit height.



## APPLICATION

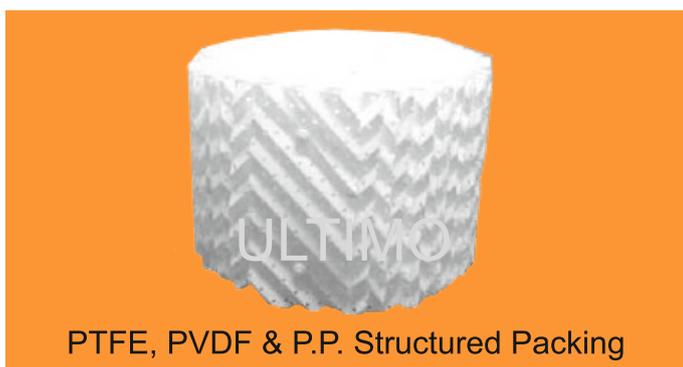
- Laboratory Column from 25 mm to 200 mm diameter.
- Where a high number of theoretical stages is required .
- With low pressure drop & high capacity.
- NTSM remain constant over wide range of liquid loading.
- Available in stainless steel, alloys & various plastics like PTFE, PVDF & Ceramic also.

Types	Specific Surface Area
ULT LAB PACK - 1000	1000 Sqm / Cu.m
ULT LAB PACK - 2000	2000 Sqm / Cu.m

Material of construction :  
SS 316L Wiremesh , PTFE, PVDF & PP

## CERAMIC STRUCTURED PACKING :

Ceramic Structured Packings replaces random ceramics packings in many process applications owing to it's high separation efficiency and lower pressure drop.



Type	Specific Surface.( m <sup>2</sup> /m <sup>3</sup> )
250 Y	250
350 Y	350
400 Y	400
450 Y	450
550 Y	550

# COLUMN INTERNAL FOR STRUCTURED PACKING

A mass transfer tower is fitted with various internal equipments to enhance the process performance.

Liquid Distributor : For uniform liquid distribution across the tower.

Liquid Collector : To collect the liquid from above the bed for redistribution.

Packing Support : To support the bed with minimum pressure drop.

Bed Limiter : To retain the packings and prevent the expansion of the bed.

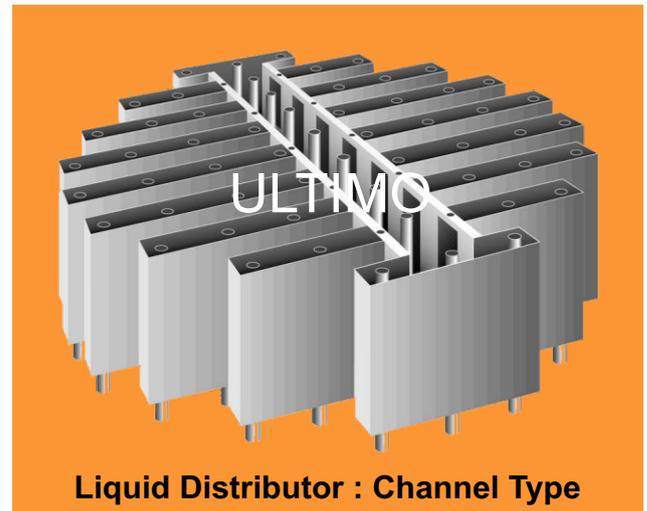
Ultimo manufactures tower internals in a variety of metals for use in virtually all mass transfer process with hydraulic designs.

Material of Construction :

S.S 304 / 316 / Hastelloy / Inconel / PVDF / PTFE / Graphite / Ceramic.

## LIQUID DISTRIBUTOR

- Channel Type Distributor : It is in single piece or segmented distributor with intergral channel.
- Liquid Distributor VEP : Large hole dimension than conventional discharge systems
- Liquid Distributor Trough Type
- Liquid Distributor Branched Pipe
- Liquid Distributor Chimney Tray
- Liquid Distributor Cum Collector



**Liquid Distributor : Channel Type**

## LIQUID COLLECTOR

Lamella (Vane) type Collector :

The primary function of the collector is to collect liquid from above bed and feed to re-distributor below. This collector requires a ring channel to be welded to the column wall. The pressure drop across the collector is negligible.



**Liquid Distributor Cum Collector**

# TOWER INTERNALS FOR RANDOM PACKING

To achieve the desired performance of the packed column, the use of properly designed column internals play the most important role.

## LIQUID DISTRIBUTORS

MOCs.: S.S, P.P, PVDF, FRP, PFA Coated, Virgin PTFE, Hastelloy Alloy, Graphite, Titanium.

Uniform initial liquid distribution at the top of the packed bed is essential for efficient column operation. This is accomplished by a device called Distributor, which spreads the liquid uniformly across the top of the packings. If the distributor is not designed properly, the mal-distribution can cause channelling and by passing of the liquid and gas resulting in poor performance of the column.

- Trough Type Liquid Distributor
- Orifice Pan with Gas Injection Type Liquid Distributor

## PACKING SUPPORT

MOCs.: S.S, P.P, PVDF, FRP, PTFE Coated, Graphite.

While primary purpose of the support plate is to retain packings without excessive restriction to gas and liquid flow, it also serves to distribute both streams. Unless carefully designed, the support plate can cause premature column flooding. Thus, design of the support plate significantly effects column pressure drop and stable operating range.

## DEMISTER PADS OR MIST ELIMINATORS

MOCs.: S.S, ALLOYS , PTFE, P.P, PVDF Etc.

These are Metal / PP wire knitted pads with maximum openings and contact surface. Useful to trap liquid droplets escaping along with vapour. Thus it prevents high boiler products droplets carry-over into low boiler top condenser and acidic or corrosive mist droplets escape from the vent of the gas scrubber.

## BED LIMITERS

MOCs.: S.S, P.P, PVDF, FRP, PTFE Coated, Graphite Etc.

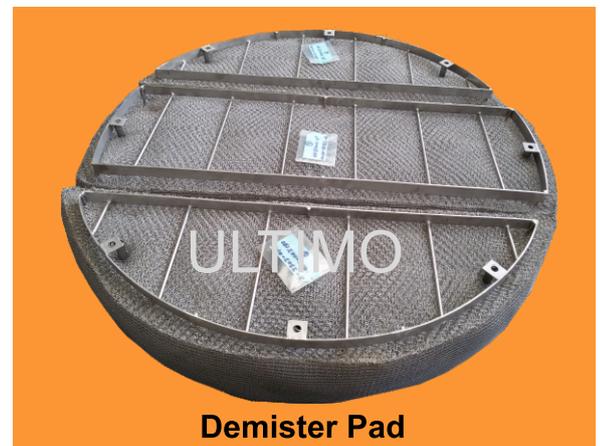
Bed Limiters are usually recommended for metal and plastic random packings. The primary function of it is prevent the expansion of the bed and retain the packings in its position, Bed limiter is to be clamped on a support ring or fixed by using friction bolt.



Orifice pan with gas filters



Gas Injection Type Packing support



Demister Pad



SS Bed Limiters

# METAL TOWER PACKING

Metal Packings are available in MOCs. S.S. 316 / 304, and S.S. Alloys like Hastelloy, Inconel, Monel, MS, Copper and Aluminium etc. These are used in a solvent recovery plants & multi purpose distillation units. Standard as well as higher thickness are also available.

## PALL RINGS

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage	Packing Factor F
13 mm	4,00,000	430	90	73
16 mm	2,10,000	345	93.1	71
19 mm	1,00,000	250	94	63
25 mm	51,000	208	94.5	48
38 mm	13,500	131	95	28
50 mm	6,500	100	96	20
75 mm	1,800	68	96	18
90 mm	1,050	58	97	14



## IMTP TYPE METAL INTALOX SADDLES

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage	Packing Factor F
Saddle No. 15	3,47,500	290	95	51
Saddle No. 25	1,36,500	226	96.2	41
Saddle No. 40	50,000	150	97.3	24
Saddle No. 50	14,750	99	98	18
Saddle No. 70	4,625	59	98	12



## RASCHIG RINGS

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage	Packing Factor F
13 mm	4,00,000	430	87	73
16 mm	2,10,000	345	90	71
19 mm	1,00,000	250	91	63
25 mm	51,000	208	92	137
38 mm	13,500	131	95	82
50 mm	6,500	98	96	57
75 mm	1,800	71	96	45
90 mm	1,050	55	97	18.5

Available in 6,8,10,13, 16, 19, 25, 38, 50 and 70 mm sizes . (ht. x dia)



# PLASTIC TOWER PACKINGS

Engineering Plastic Packings are widely used for corrosive applications like Gas Scrubbers, Strippers, STP, ETP Plants & Formaldehyde plants.

M.O.C.s	Poly Propylene	PVDF	Poly Propylene LTHA	HDPE	Glass Filled PP	PFA / FEP	PVC	CPVC	PTFE
Indicative Temp. Operating	80°C	140°C	120° - 130°C	60°C	130° - 150°C	Upto 225°C	60°C	80°C	200° - 250°C

## PALL RINGS

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor F
16 mm	2,10,000	338	88	95
19 mm	1,00,000	240	88	68
25 mm	51,000	210	89	52
38 mm	13,500	135	90	32
50 mm	6,500	100	92	25
75 mm	1,800	70	93	20
90 mm	1,050	60	93	16
100 mm	760	50	94	12

Also Available in PVC, CPVC, PTFE, PFA & FEP



## INTALOX TYPE SADDLES

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor F
25 mm	48,500	210	90	33
38 mm	12,000	140	91	25
50 mm	6,600	110	93	21
75 mm	1,350	89	94	16

Also Available in PFA, FEP, PVDF, PVC & CPVC



## CMR TYPE MINI RINGS

Type	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor F
CMR 0	Data available on request			
CMR 1	23,500	330	89	53
CMR 2	7,000	230	96	18
CMR 3	2,650	90	96.5	12



## TELERETTE TYPE PACKINGS

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor F
50 x 18	23,500	185	88	36
74 x 27	7,000	127	89	18
93 x 36	3,600	102	90	16

Also Available in PVC, CPVC, PVDF, & PFA



## PTFE PALL RING

Size	25	38	50	75	100
Wall Thickness	2 mm	2.5 mm	2.5 mm	3 mm	3 mm



## PTFE RASCHIG RING

Size	25	38	50	75	100
Wall Thickness	2 mm	2.5 mm	2.5 mm	3 mm	3 mm



## RASCHIG RINGS

Size	Nos. / Cu.m.	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor F
25 mm	51,000	210	86	137
38 mm	13,500	135	90	82
50 mm	6,500	100	92	57
75 mm	1,800	92	93	20

Also Available in PVC, CPVC, PFA & PTFE



## HELIX # 200

Size	Nos. / Cu.m.	Thickness
75 x 75	4100 Nos / Cu.m	1.5 - 2.5 mm



## U-FLAKE TYPE RING SAME AS SNOW FLAKES

Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %
100 m <sup>2</sup> / m <sup>3</sup>	95%



# CERAMIC TOWER PACKING

Made from chemical grade white porcelain with exceptionally good chemical resistance except HF and strong alkali. Available with glazed (smooth) or unglazed surface finish. Most suitable for Sulphuric Acid Applications.

## INTALOX TYPE SADDLES

Size	Wt. kg / m <sup>3</sup> (Aprox)	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor
12-13 mm	680	623	71	200
20 mm	660	334	72	145
25 mm	650	255	73	92
38 mm	575	165	74	52
50 mm	540	121	75	40
75 mm	430	91	77	22



## PALL RINGS

Size	Wt. kg / m <sup>3</sup> (Aprox)	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor
25 mm	625	220	73	107
38 mm	560	160	76	55
50 mm	540	120	77	43
80 mm	425	109	70	25



## RASCHIG RINGS

Size	Wt. kg / m <sup>3</sup> (Aprox)	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor
15 mm	650	330	70	560
20 mm	640	240	72	255
25 mm	625	195	73	155
38 mm	560	140	76	95
50 mm	540	98	77	65
80 mm	425	70	77	37



## BERL SADDLES

Size	Wt. kg / m <sup>3</sup> (Aprox)	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %	Packing Factor
25 mm	550	220	73	110
38 mm	470	160	76	65
50 mm	450	120	77	45



## CERAMIC CATALYST SUPPORT BALLS

Size	Wt. kg / m <sup>3</sup> (Aprox)	Surface m <sup>2</sup> / m <sup>3</sup>	Voidage %
10 mm	1300	314	45
12 mm	1300	230	45
20 mm	1280	157	45
25 mm	1280	125	45
40 mm	1200	80	48
50 mm	1300	63	48



Also available Ceramic Grinding Media Balls in Porcelain Steatite & High Aluminium ( 65% & 92% )

## RASCHIG RINGS with 2 cell partition

Size Dia X Ht.
25 mm
38 mm
50 mm
75 mm



Raschig Rings with 2 cell partition

## RASCHIG RINGS with 4 cell partition

Size Dia X Ht.
75 mm
100 mm
120 mm
150 mm
200 x 150 (mm ht)



Raschig Rings with 4 cell partition

## HONEY COMBS

Size
Single 25x15x15
Single 40x25x15



Honey Comb

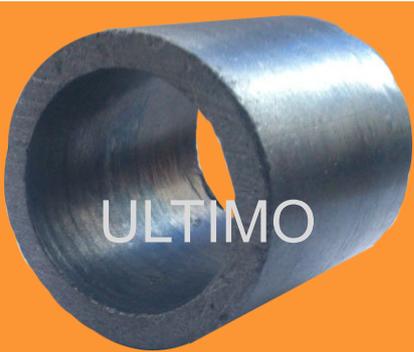
## MINI PARTITION RINGS

Type
No. 2
No. 3
No. 5
No. 7



Mini Partition Ring

## CARBON RASCHIG RINGS



Carbon Raschig Ring

### FEATURES

- Resistant to a wide range of acids, alkalis and solvents
- Very high resistance to hot strong Alkalis
- Available in a variety of sizes
- High mechanical strength
- Fully carbonized – no extractable impurities

These are available in sizes 12mm, 19 mm, 25mm, 38mm, 50mm and 75mm diameter and height. Suitable for highly corrosive applications.

## BOROSILICATE GLASS RASCHIG RINGS



Borosilicate Glass Raschig Ring

- Suitable for Bromine application and Pharmaceutical plants.
- Due to their low bulk densities, Glass Raschig Ring are particularly suitable for packing glass columns.

### Note:

1. Data provided in this brochure shall not form the basis of any contract unless specifically given in writing by us.
2. Data may vary by 10% depending on column diameter also.
3. Depending upon column diameter, 10% excess packing may require for large dia. column with small size random packing.

## PTFE COLUMN INTERNALS FOR GLASS LINED & PTFE LINED COLUMNS



PTFE Pall Ring



PTFE Raschig Ring

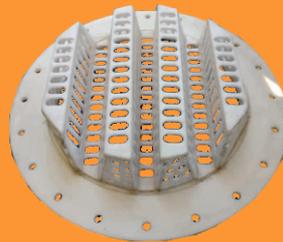


PTFE Liquid Distributor For Glass Lined or PTFE Lined or PFA Coated Columns

PTFE GRID SUPPORT



PTFE Packing Supports For Glass Lined or PTFE Lined or PFA Coated Columns



PTFE & PVDF Gas Injection Type Packing Supports For Glass Lined or PTFE Lined or PFA Coated Columns

HEAVY DUTY PTFE PACKING

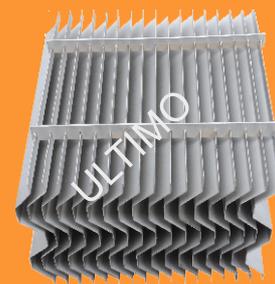


PTFE Packing Supports For Glass Lined or PTFE Lined or PFA Coated Columns

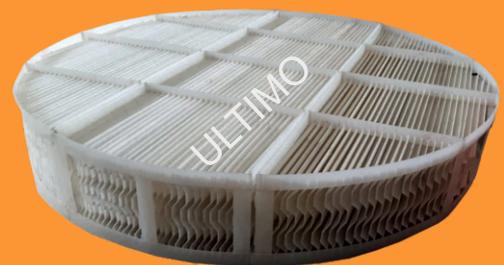
## VANE PACKS OR CHEVRON TYPE MIST ELIMINATOR

Vane pack is designed to separate entrained liquid from gas stream. The basic design considerations are particle size of the liquid droplets to be entrained & physical properties of the fluid to estimate pressure drop throughout & efficiency. It comes in complete range of efficient vane packs for both horizontal & vertical flow. Size of mist droplets that can be separated are 10 microns or larger.

- Stainless Steel Vane Pack Mist Eliminator
- PVDF Vane Pack Mist Eliminator
- PTFE Vane Pack Mist Eliminator
- PVC Vane Pack Mist Eliminator
- Polypropylene or HDPE Vane Pack Mist Eliminator



SS Vane Pack



PVDF Vane Pack

# DEMISTER PAD

**Wire Mesh Demister** ( also known as mesh eliminator, mist, catching mist ) is used for gas entrained mist separation column, in order to guarantee the efficiency of the filter, can increase productivity by 5%. Demisters can reduce the residence time required to separate a given liquid droplet size there by reducing the volume and associated cost of separator equipment. Demisters are often used where vapour quality is important in regard to entrained liquids particularly where separator equipment costs are high ( e.g., high pressure systems ) or where space or weight savings are advantageous.



Segmental Demister Pad ( For Large Dia. Columns )

The separation of liquid droplets entrained in a vapour ( Gas ) stream is a key requirement in many process operations to improve the ( capacity & separation ) performance of the plant, to protect downstream equipment, to reduce the loss of valuable chemicals to comply with stringent environmental protection regulation.

Mesh type demisters are designed to achieve an optimum gas velocity to maximum removal efficiency. To high velocity will result in re-entrainment of the liquid droplets whilst too low velocity will allow very small droplets to pass straight through the demister.

## Applications :

- Elimination of toxic air pollutants.
- Reduction of solvent losses in absorbers, scrubbers and distillation equipment.
- Optimization in kettles, re-boilers and crystallisers.
- Elimination of entrainment.
- Used in liquid - liquid systems
- Gas - liquid, solid liquid separation

## Features

- Simple Structure.
- Light weight and easy to transport.
- High porosity, less pressure drops.
- Large surface area and high separating efficiency.
- Easy to install, operate and maintain.
- Durable and long service life.
- Corrosion and rust resistance.

## Materials of constructions ( MOC ) :

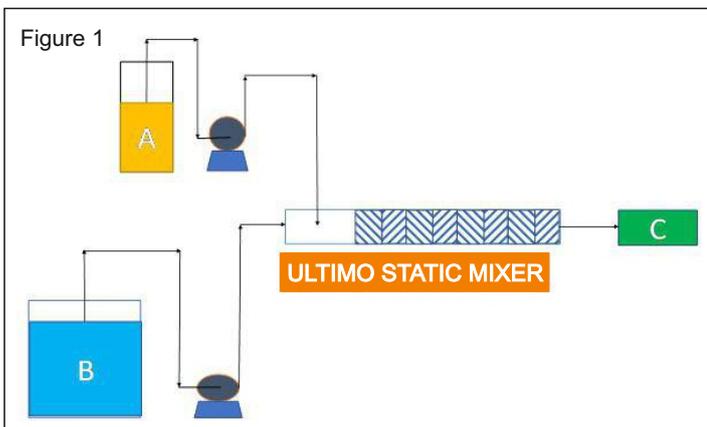
SS 304, SS 304L, SS 316, SS 316L, MS, INCONEL.  
PP, PVDF, PTFE, FEP, PFA, Etc.

# STATIC MIXER



For more than 40 years, static mixers ( also known as motion less mixers ) have been successfully used as inline mixers for the mixing / dispersing, reaction and heating / cooling of high and low viscosity liquids, slurries, gases and the multi-phase contacting of gases, solids and liquids. Motionless mixers are capable of mixing materials with equal or very different viscosities and volumetric flow rates. The static mixer design best suited for a specific application is based on the process unit operation being practised.

As shown in figure #1, static mixers are used in continues processes where they homogenize fluids with no moving parts. Pumps or blowers are used to deliver the components to be mixed at the desired volumetric flow rates and to also supply the pressure energy required for mixing. Typical sizes of static mixers range from very small laboratory size units that fit into 3/16" diameter tubing, process piping that ranges from 1/4" Sch. 40 to over 120" - diameter and square / rectangular ducting such as 46 - feet by 13 - feet for power plant flue gas treatment.

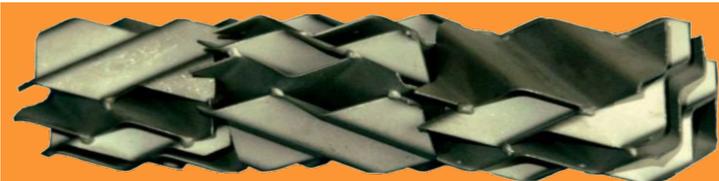


## MATERIAL OF CONSTRUCTION:

SS 304, SS 316L, HASTE ALLOY,  
INCONEL 625, INCONEL 825, DUPLEX,  
SUPER DUPLEX PLASTIC: PP, FRP,  
PTFE, MS + PFA, MS + PTFE, FRP + PP,



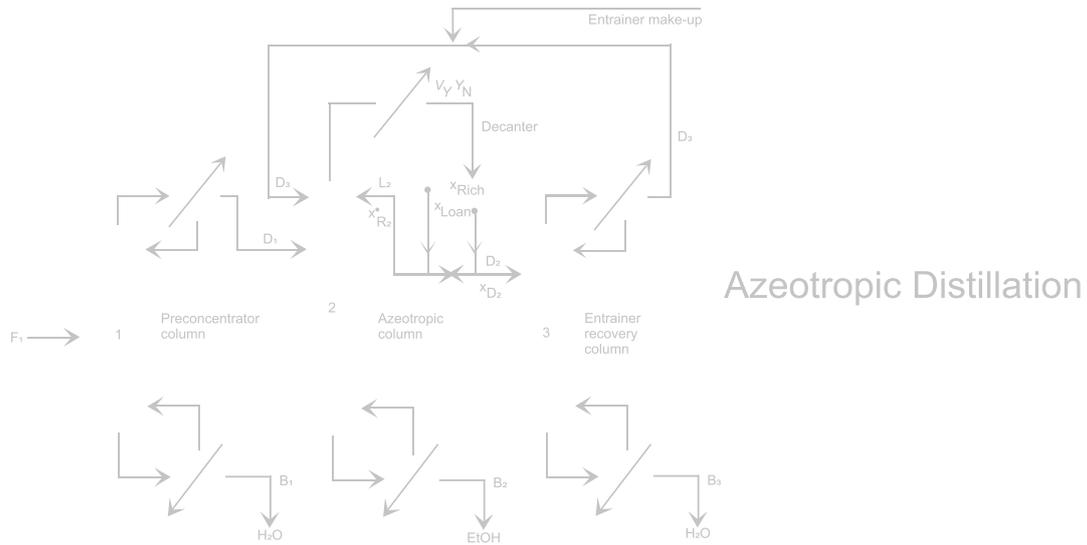
Type "UMX" : High Performance Mixing of high viscosity liquids with similar and extreme viscosity and volumetric ratios; inducing plug flow; boosting viscous heat transfer; and the processing of molten polymers.



Type "UMV": High Performance Primary use is for turbulent flow, liquid - liquid and gas - gas mixing applications, immiscible liquid dispersion and gas - liquid contacting.



Type "UMH": Low Performance Primary use is for small diameter simple turbulent and laminar flow mixing and heat transfer applications where low pressure drop and fouling service are issues.



- DMF-Water Separation
- Methanol-Water Separation
- IPA-Water Separation
- Ethyl Acetate-Water Separation
- Solvent Recovery Units (SRU)

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