

**INNOVATIVE COOLING SOLUTION**

## Profile

Since its inception in 2010, Innovative Cooling Solutions has emerged as one of the prestigious manufacturers and exporters of premium quality PVC Fill Media, Drift Eliminators & Industrial Nozzles for cooling tower applications and Biodek Media, Fab Media(MBBR Media), Lamella Plates(PVC tube settler) and Air Diffusers for water and wastewater treatment application. Manufactured in compliance with industry set norms and parameters, using good quality metal, cutting-edge technology and advanced machinery, these products are extensively demanded around the globe in chemical, petrochemical, pharmaceutical and food processing industries.

Our organization is engaged in the manufacturing, supplying, distributing and exporting of best quality products. Our quality controllers check these products on several parameters before the final dispatch. Globally acknowledged for their fine finishing, smooth installation and cost-effectiveness, offered products are highly demanded by the clients. Furthermore, we also deliver prompt installation services to our customers.

The client centrist policies and strategies taken by our mentor MR. SANDEEP KAUSHIK inspire the employees to manufacture the best products. His dedication, domain expertise and training session help the entire team to work in a smooth and pressure free environment. We are export our products in Gulf Countries, Malaysia, Singapore, Indonesia, Thailand, Abu Dhabi and Dubai.

## FAB MEDIA / MBBR MEDIA

At innovative Cooling Solution we design and manufacture and supply Moving Bed Bio Reactor (MBBR) fluidized Aerated Bed Reactor (FAB) media for Municipal & industrial wastewater treatment. Essentially FAB system is a hybrid reactor where attached growth and suspended growth activity takes place simultaneously and has good effect on denitrification and de-phosphorization; it is widely used in the industrial waste water treatment and municipal waste water treatment.



### Process Principal

The waste water goes through the suspending media of MBBR reactor, form the biological membrane on the surface of the media gradually, with the action of the microbial on the biological membrane, the waste water is purified. The media can move freely in the reactor with the mixing of the water; for the aerobic reactor, the aeration will make the media move; for the anaerobic reactor, mechanic mixing will make the media move. Our MBBR media is new-developed media for the MBBR process, has better treatment effect compared to traditional media.

<b>SPECIFICATIONS For MBBR media :</b>		
Length	: 19.80mm	Void Ratio (v/v) : 80-85
Average diameter	: 23.75mm	Material : PP/PE
Shape	: Conical Frustum	Suface area by
Type	: Semi Clog	75,500 pieces : 500m2
PSA/TSA ratio	: 0.7000	Media Fill Range,
		% Fill of V : 15-67
		Operating Life : >10 Years
		Membrane Forming Time : 7-15 Days

Excess biomass sloughs off from the media and is washed out of the process with the treated effluent. Several process combinations have been realized in upgrading activated sludge treatment plants. The existing tanks can be either retrofitted to MBBR tanks or they are preceded by a so-called roughing MBBR reactor. However, it is also possible to realize hybrid solutions using the bio film carriers in the existing tanks without any retrofitting. When a pure MBBR process is employed, a typical overall treatment design consists of pre-treatment (screening) followed by one or more MBBR tanks, where the degradation processing of soluble matter take place. The final stage of the treatment is normally the particle separation.

## TUBEDEK

Traditional sedimentation tanks or clarifiers are large structures occupying much valuable space on side and are perceived as high investment cost items. Attacking the very crux of this problem, innovative's TUBEdek is a PVC tube settler which offers enhanced capacity for settling which offers enhanced capacity for settling suspended solids in a fractional area. Using Munters technology, TUBEdek provides the most economical way of improving clarifier performance in a variety of municipal, industrial and wastewater applications. TUBEdek can the installed within settling tanks, both existing and new. TUBEdek settling media helps reduce the amount of suspended solids in carrier fluids thus improving effluent quality significantly, which in turn improves the efficiency of existing plants. Moreover, with TUBEdek, new clarification tanks can be designed smaller and yet maintain the same performance level, at far less cost. The use of TUBEdek leads to the formation of large settling areas and small sink paths.



The TUBEdek model is easy to install in any shape of clarifier; its hexagonal chevron shape is the most ideal for effective settling with our without coagulation or flocculation. High settling surface area (11 and 13m<sup>2</sup>/m<sup>2</sup>) leads to a very small clarifier size and the detention time requirement is also very low when compared to conventional clarifiers.

### Features

- TUBEdek increases the capacity of a clarifier, improves the resultant effluent and increases the stability of the process in the event of surges of other process upsets.
- TUBEdek increases the effective area of a basin (by 5.5m<sup>2</sup>/m<sup>2</sup> for a 500mm deep module) and decreases the effective particle settling distance drastically.



- TUBEdek enhances the particle agglomeration and growth, bringing the particles into closer contact with each other at the bottom of the tube. This is aided by the v-shape of the tubes and the counter-current flow of the incoming effluent and receding solids.

### Advantages

- When fitting TUBEdek to an existing clarifier, the suspended solids concentration in the effluent is greatly reduced. The improved settling environment means that the flow can be increased significantly while still achieving excellent results.
- In a new clarifier design, the use of TUBEdek can reduce the cross sectional area of the tank substantially, hence reducing civil costs and minimizing space requirements, while still maintaining a high quality effluent.
- The simple hexagonal-chevron configuration is a proven superior design in settling applications.
- The controlled flow pattern in TUBEdek provides the best settling conditions. This also dampens the eddy currents and turbulences leading to the basin, thus approaching an ideal situation.
- The robustness of the TUBEdek pack easily allows foot traffic for periodic maintenance.
- Installation is fast and easy. The tubes are supplied as profiles in nested form to save on transportation cost. These are easily installed at site with the tongue and groove arrangement which is an integral part of the package.
- Tube dek profiles can be assembled to fit into any size or shape of settling tanks, whether square, rectangular or circular, without any difficulty.

### Application

#### Water Treatment

- Application of TUBEdek provides effective settling in potable and industrial water treatment plants, to settle chemically treated water in the clarification stage.

#### Waste Water Treatment

TUBEdek may be widely applied in the field of wastewater treatment plants to provide effective settling at primary and secondary stages.

#### Anaerobic Digestors

This is a new application of TUBEdek where solid retention is maintained in sludge blanket type of reactors. TUBEdek is placed above the sludge blanket in the clarification zone of the anaerobic digester to remove solids from digested waste. This maintains the required solid concentration in sludge blankets.

### Other Applications

- Clarification of raw river water in water treatment plants.
- Clarification of process water from coal fines in coal washeries.
- Clarification of wastewater from wet Scrubbers.
- Mineral processing Industry.
- Concentrate Thickener (Primary thickener).
- Clarifier/Secondary Thickeners.
- Middling Thickeners.
- Tailing thickeners (clarifiers) for reclaiming process water.
- Phosphoric acid clarification.
- Clarification of water from sand in hydraulic slowing systems in underground mines.
- Various settling/clarification applications in thermal power plants.
- Various settling applications in iron and steel plants.

### Media Configuration

TUBEdek is designed to expand the settling capacity of existing and new clarifiers and sedimentation basins, of either circular or rectangular shape. This is achieved by providing multiple tubular channels, sloped at an angle of 60° and adjacent to each other, with a wave-like geometry of flow cavity which allows a rapid sloughing-off of any accumulated solids.

Individual tubes are continuous and smooth to minimize any mixing currents within the tubes. The configuration and shape of each tube is designed to give a low "Reynolds Number" and laminar flow conditions. This enables rapid accumulation and settlement of solids through the tubes.

Moreover, the individual tubes are continuous and imperforate and prevent any transfer of liquid between each tube. This eliminates any mixing currents within the tubes. Mixing currents adversely affect the settlement of solids within each tube. The high surface area of tubes, combined with these features, enable substantial expansion of settling capacity at high "rise rates".

The tube settling modules are assembled to give multiple tubes of approximately hexagonal-chevron shape. Tube settlers can be placed adjacent to each other, to snugly fit and cover as much area as is required in the clarifiers or sedimentation basins.

The availability of TUBEdek in multiple lengths offers flexibility in the design and spacing of tube settler "supports". For circular clarifiers, the tube settler module ends are "angle cut" to offer a close fit in pile segments.

### Installation

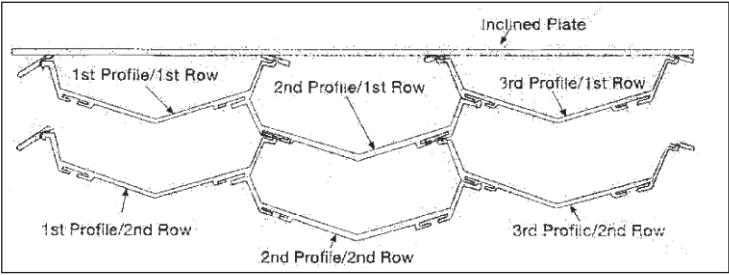
- 1 A module of standard size block is placed in one corner of the tank along with the centre channel. Care should be taken that the module is placed right side up, with the tongue and groove system underneath. The slope of the module is inclined to the side wall of the tank and slight pressure is then applied on the module to push it into the corner, so that it touches the two wall sides. The space underneath the slope at the end of the module and the wall can stay empty.
- 2 The next standard module has to be placed alongside the first one. The tow modules have to touch each other so that the grooves of the second module lie upon the tongues of the first.
- 3 The step has to be repeated until the last standard module is installed. Care must be taken that each module is supported by at least two beams symmetrically. If a module is not supported. If a module is not supported symmetrically, it has to be lengthened or shortened to achieve the necessary support symmetry.

All modules that are required to be stored in the open beyond 2 weeks should be covered by a light coloured cover (such as a tarpaulin) and securely anchored on all sides, to prevent any wind or atmospheric damage. In view of the media modules getting brittle at low temperatures other than ambient.

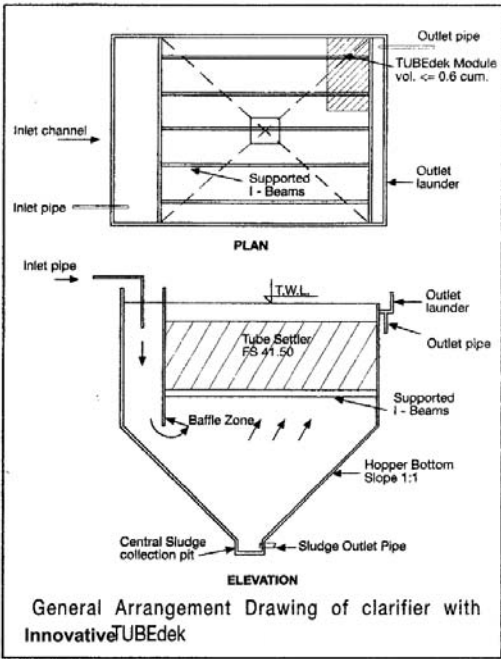
When designing basins using TUBEdek, it should be remembered that if the hydraulic loading is to be increased, the rate of sedimentary deposition on the tank bottom will also increases. This will place an additional burden on sludge removal equipment.

### Technical Specs

The material used for TUBEdek is rigid, fire - proof, Self-extinguishing PVC. The material is also resistant to naturally occurring constituents in water and to the recommended dosage of any treatment chemicals required in the treatment process.



TUBEdek Mounting Procedure

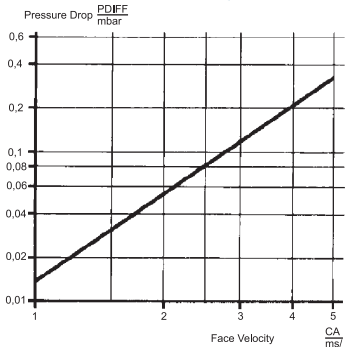
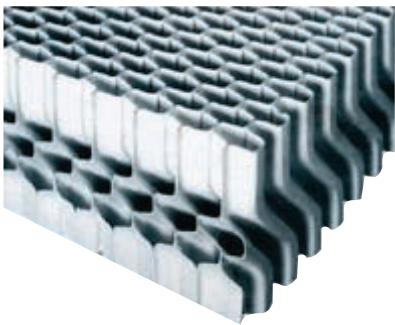


Design Data			
Settling area	60° slope : 11.0 m2 per m3 55° slope : 13.0 m2 per m3	Block widths	(R - 1) x 127mm + 176mm; where R = number of profile rows
Hydraulic radius	1.5 cm	Block volumes	W X L X H <= 0.6M <sup>3</sup> , Otherwise a lifting aid is required for moving the blocks
Cross sectional area	120 x 44mm	Block length	to be adapted to the distance of supports in such a manner that the block is supported by 2 beams.
Shape	Hexagonal-Chevron	Support	Distances at max. 1000mm, Larger distances possible if the blocks are also supported by T sections. Support width : minimum 60mm
Product Data		Transport volume	Finished blocks : 2 to 3 times the separator volume. Profile : approx. 25% of the volume of finished separator.
Weight	approx 75 kg/m3		
Separator heights			
Standard 500mm	5.5 m2 settling area/m2		
1000 mm	11.0 m2 settling area/m2		
Other heights	upon request		
Material	PVC		
Maximum continuous Working Temperature	55°C (depends on the load and the kind of supporting structure)		

## D 15 DRIFT ELIMINATOR

**Efficiency:**

When used in counter-flow cooling towers  
The measurable residual liquid load behind a droplet separator characterises its efficiency.  
The Performance data of our droplet separators have been determined under laboratory conditions.  
At a face velocity (CA) of 3.5 m/s and a specific water flor (rw)- 22t/m2h the residual liquid load of the air is **15mg/m3**.  
If this residual load is related to the circulating cooling water volume this equates to a value smaller than **0.001%**.  
Fundamental conditions required to achieve these high efficiencies in practice are : A workman like installation : The droplet separator sections must be installed without any gaps between themselves or the tower walls to ensure by passing does not take place.  
The face velocity shall not exceed the maximum permissible value at any position across the total area of the separator.  
Any performance testing of the separator must be carried out immediately above the separator and by using a test method consistent with that employed in our laboratory or otherwise agreed with ourselves.  
We can advise on the likely operating efficiencies of specific towers provided that their operating data are made available to us.



Material	PVC	Distance between supports	Max 600mm
Weight	7.0kg/ m2	Width of Supports	10 mm
Continuous Working Temperature	55°C	Dimensions	Length 1200mm
Max. face Velocity	4.5 m/s		Width 600mm

## PVC FILL MEDIA

We are the manufacturers, traders, suppliers, distributors and exporters of PVC Fill Media. For inducing highly turbulent mixing between the water and the air, which increases heat and moisture transfer, Cross moisture fluted designs is introduced.

### ITEM CODE: IC 10-12

Backed by a team of qualified professionals, we are involved in offering our clients PVC Fill Media with utmost quality. These components are widely used cooling towers as an integral component. The offered fills are also available in different specifications to meet the various demands of the clients across the nation and world. In addition to this, these are delivered to the clients at reasonable rates.

**Features:**

- Easy maintenance
- Intricate design
- Easy installation

**Specifications:**

- Flute Size : 12 mm
- Surface of Exchange : 243 m2/ m3
- Min. Water Load : 8 m3/ m2h
- Materials : PVC
- Weight : 35 Kg/ m3





## ITEM CODE: IC 10-19

Our company offers premium quality **Structured Film Fill Media** at nominal market prices. Manufactured in accordance with industry set parameters, these products undergo several quality checks, before the final dispatch. Demanded in construction industry, offered products are acknowledged for their rugged construction and high durability.

### Features:

- Rugged construction
- High durability
- Available at market leading prices

### Specifications:

- Flute Size: 19 mm
- Surface of Exchange: 148 m<sup>2</sup>/m<sup>3</sup>
- Min. Water Load: 5 m<sup>3</sup>/m<sup>2</sup>h
- Weight: 27 Kg/m<sup>3</sup>



## ITEM CODE: IC 10-27

We are instrumental in offering our clients a complete range of **Cooling Tower Fill Media** that are highly demanded for different industries. Owing to its silent features such as decay proof, low pressure drop and fire safe, these fills are highly admired among clients. Available in various in various specifications, we can also customize these fills as per specific needs of clients within promised time frame.

### Features:

- Light weight
- Mass transfer and heat transfer coefficient
- Fire resistant

### Specifications:

- Flute Size : 27 mm
- Surface of Exchange : 112 m<sup>2</sup>/m<sup>3</sup>
- Min. Water Load : 3 m<sup>3</sup>/m<sup>2</sup>h
- Materials : PVC
- Weight : 28 Kg/m<sup>3</sup>



SPECIFICATION

Type		IC10-12	IC10-19	IC10-27
Flute Size		12 mm	19 mm	27 mm
Surface of exchange		243 m <sup>2</sup> / m <sup>3</sup>	148 m <sup>2</sup> / m <sup>3</sup>	112 m <sup>2</sup> / m <sup>3</sup>
Min. Water Load		8 m <sup>3</sup> /m <sup>2</sup> h	5 m <sup>3</sup> /m <sup>2</sup> h	3 m <sup>3</sup> /m <sup>2</sup> h
Standard Dimensions				
	Length	1200 mm	1200 mm	1200 mm
	Width	300 mm	300 mm	300 mm
	Height	300 mm	300 mm	300 mm
Distance of Support		max 1000 mm		
Width of Support		50 mm		
Material Thickness		0.20 mm	0.25 mm	0.40 mm
Materials		PVC	PVC	PVC
Drainage System		HVT/AT	AT	
Weight		35 kg/m <sup>3</sup>	27 kg/m <sup>3</sup>	28 kg/m <sup>3</sup>
Field of Application		Cross Flow and counter - flow processes		



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Khandsa Dhani, Gali No. 3, VPO Khandsa, Anjana Colony,  
Near Pearl Honda, Sector-37, Gurgaon-122001 (Haryana) INDIA  
Telephone : + 91-124-4382193, Fax: +91-124-4382235

Mobile : +91 9999723674, +91 7838817922 Email : [innovativecooling@gmail.com](mailto:innovativecooling@gmail.com), [info@innovativecooling.net](mailto:info@innovativecooling.net)  
Website: [www.innovativecooling.net](http://www.innovativecooling.net)