

TUBE SETTLER- CLARIFIER



EFFICIENT BY DESIGN

TUBE SETTLER- CLARIFIER

The  TUBE SETTLER CLARIFIER provides a cost effective alternative to conventional clarifiers for waste water clarification process. It consists of a service of tubes inclined at an angle of 60° each other and joined together with the result that large settling surfaces are obtained with a relatively small area. This clarifier is 5 times more efficient than any other clarifier.

Multiple tubular channels-inclined at an angle and adjacent to each other-separate the suspended solids from water or any other liquid effluent.

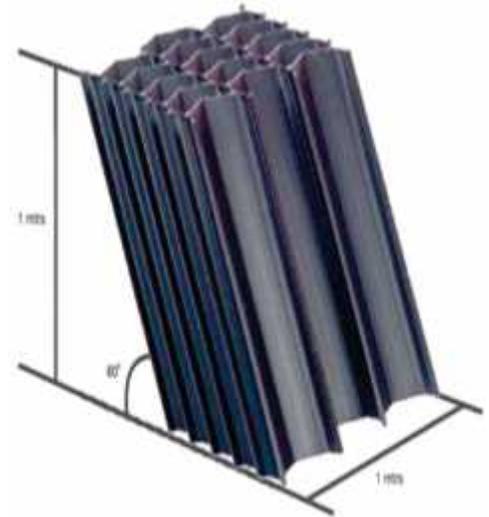
Individual tubes are continuous and smooth to minimise mixing of currents within the tube. The configuration and shape of each tube is designed to obtain a low Reynolds number and laminar flow conditions for rapid accumulation and settlement of solids through the tubes. The high surface area of tubes enabling substantial improvement of settling capacity.

Advantages

- The advantages of tube settlers can be applied to new or existing clarifiers/basins of any size
- Clarifiers/basins equipped with tube settlers can operate at 2 to 4 times the normal rate of clarifier/basins without tube settlers.
- It is possible to cut coagulant dosage by up to half while maintaining a lower influent turbidity to the treatment plants filters.
- Less filter backwashing equates to significant operating cost savings for both water and electricity.
- New installations using tube settlers can be designed smaller because of increased flow capability.
- Flow of existing water treatment plants can be increased through the addition of tube settlers.
- Tube settlers increase allowable flow capacity by expanding settling capacity and increasing the solids removal rate in settling tanks.
- Very cost economical since it uses 1/10th of space required by conventional clarifiers.
- No moving parts, operates totally on Gravity.
- Laminar flow ensures excellent treated water quality.
- Wide choice of materials of construction such as steel, concrete/FRP.
- Non-corrosive tubes can be lifted easily for cleaning without shutdown.
- Flexible configurations
- Required very less space
- Easy installation
- No power consumption
- Simple in operation
- Easily mobility

TECHNICAL SPECIFICATIONS

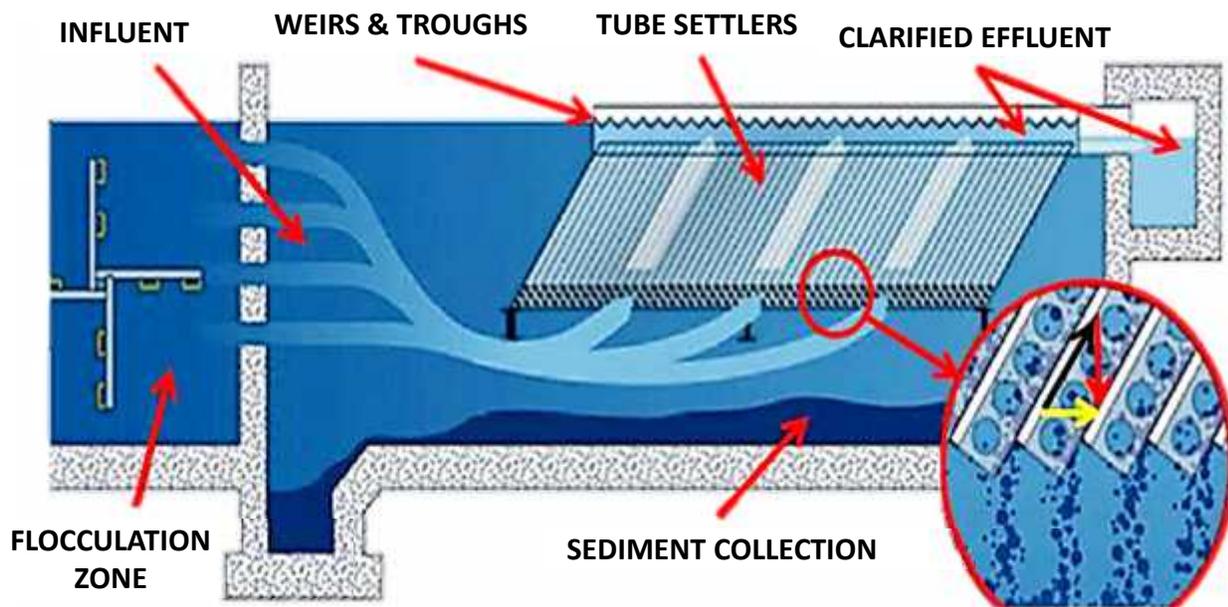
DISTANCE BETWEEN ADJACENT TUBES	HORIZONTAL – 120mm VERTICAL – 44mm
MOC of Media	PVC
SHAPE OF TUBE	HEXAGONAL & SQUARE SHAPE
TUBE FITTING	TOUNGE AND GROOVE
THICKNESS	1.1mm (+/- 0.1 mm)
MAXIMUM CONTINUOUS	55 DEG. C
WORKING TEMPERATURE	
STORAGE	MEDIA MUST BE STORED IN A COVERED PLACE WITH ADEQUATE VENTILATION
COLOUR	BLACK
PLAN SETTLING AREA	11m ² /m ³ (AT 60 DEG. SLOPE) 13m ² /m ³ (AT 55 DEG. SLOPE)



WORKING PRINCIPAL

Inclined plate & tube settling are shallow settling devices used to enhance the settling characteristics of the sedimentation basin. They are based on the theory that settling depends on settling area rather than detention time.

To be self cleaning, plate or tube settlers are usually set an angel between 45 and 60 above the horizontal. When the angle is increased above 60 deg the efficiency decrease.if the tubes and plate are inclined at angel less than 45 deg solids will tend to accumulate within the plates or tubes. Attention must be given to provide equal flow distribution to each settler. Producing good flow distribution within each settler and collecting settled solids without re suspension.



Settling occurs and sludges form as the suspended solids are pulled into the boundary layer by gravitational forces. Once in the boundary layer, the particle passes through the velocity gradients to the lowest velocity of the fluid. Near the surface of the hydraulic structure the velocity approaches zero, the density of the particle will cause it to contact the surface. Adherence of the particles under the force of gravity to the plane surface will separate it from carrier fluid. The formation of the sludge occurs as many particles adhere to the surface and agglomerate. A constant increasing density of the suspended particles occurs and the sludge passes through transition zone into compression zone. As the layer of sludge thickens, the boundary layer of the carrier fluid continues to rise until the equivalent hydraulic diameter is reduced so that the laminar flow is destroyed. At this time sludge removal and cleaning of plates are required.

INSTALLATION

In tube settler each tube serves as an individual settling basin. For a horizontal tube of size 5 x 5 x 60 cm, l/d is 12, which is not too difficult to obtain in any settling basin. The major advantage of tube settlers is that the tubes are stacked one above the other in a module providing a system with a number of small settling basins occupying the same space. Surface overflow rate through each tube calculated as flow through the tube divided by the surface area of the is actually less than that of conventional settling but, because the total surface area exposed to flow in tube settler is many times more than in the conventional settling tanks, the net result is considerably increased in capacity of settling basin. Laminar flow through the tubes is maintained even at high flow rates by the increased drag force due to relative large surface area of the tubes.

Periodic cleaning of tubes is emphasized.

Tube settlers were easily able to overcome the problem like

- Unstable hydraulic conditions encountered with very wide, shallow trays.
- The minimum tray spacing required for mechanical sludge removal equipments

APPLICATION	
1	Raw water clarification
2	Waste water treatment
3	Ash/Scrubber waste management
4	Brine clarification
5	Coal and other mineral separation
6	Food and dairy processing and waste treatment
7	Iron removal
8	Pulp and paper effluent
9	Pretreatment to RO unit and demin system



**WATER RESULT OF
LAMELA**



WATER RESULT OF TUBE

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