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*Engineering & Manufacturing Jash Ltd, Hong Kong*



***Thinking Innovative, Since 1948***

# JASH SCREENING EQUIPMENTS

Over 2,000 screens in operation



*Better Screening...  
Increased Plant Efficiency... 2*

# TRAINING PROGRAMME ON SCREENS

Selection of Screens



Material of Construction



Screening Equipments



Technical Features of Jash Screens



Essential Data Required for Proper Selection of Screen



Factors influencing Proper Selection of the Screen



Some of the Myths about the Screen



Factors Contributing to Poor Performance of the Screen



# SELECTION OF SCREENS



## FACTORS GUIDING SELECTION OF SCREENS :

Raw water, Waste water or effluent invariably contains lot of floating waste, debris etc and it is very essential that they are removed at the first instance. The process of removal of this floating waste is called Screening.

Screening-out of waste and debris maintains efficiency of equipments installed in the down stream and reduces frequent breakdowns. Hence selection of the best screening system for a particular project is an important step.

Important factors guiding selection of screening equipment are :

1. Size of opening to be provided in the screen.
2. Installation particulars especially the depth of the channel.

Other criteria may include capital cost of equipment, capital cost of civil works, operating cost of equipment and equipment life expectation.

## 1. SELECTION BASED ON SIZE OF OPENING TO BE PROVIDED IN SCREEN:

Size of opening to be provided in the screen is dependent on :

- a) Solid handling capacity of the equipment installed at the down stream, and
- b) Maintaining efficiency of equipment installed down stream and reduce frequent breakdown of these equipment.

The opening to be provided in the screen could be single dimensioned (1D) or two dimensioned (2D) and the decision about single dimensioned or two dimensioned opening has to be taken based on the type of equipment installed in the downstream.

Lesser or smaller the size of opening, more the load on the screen and more will be the head loss. This results in to increase in the size of the screen to handle given amount of flow and may also involve multiple stage screening which would ultimately increase the capital cost of the equipment and project as well as the operation and maintenance cost of screening equipment.

Hence selection of size of opening to be provided in screen should be done after careful evaluation of project requirement.

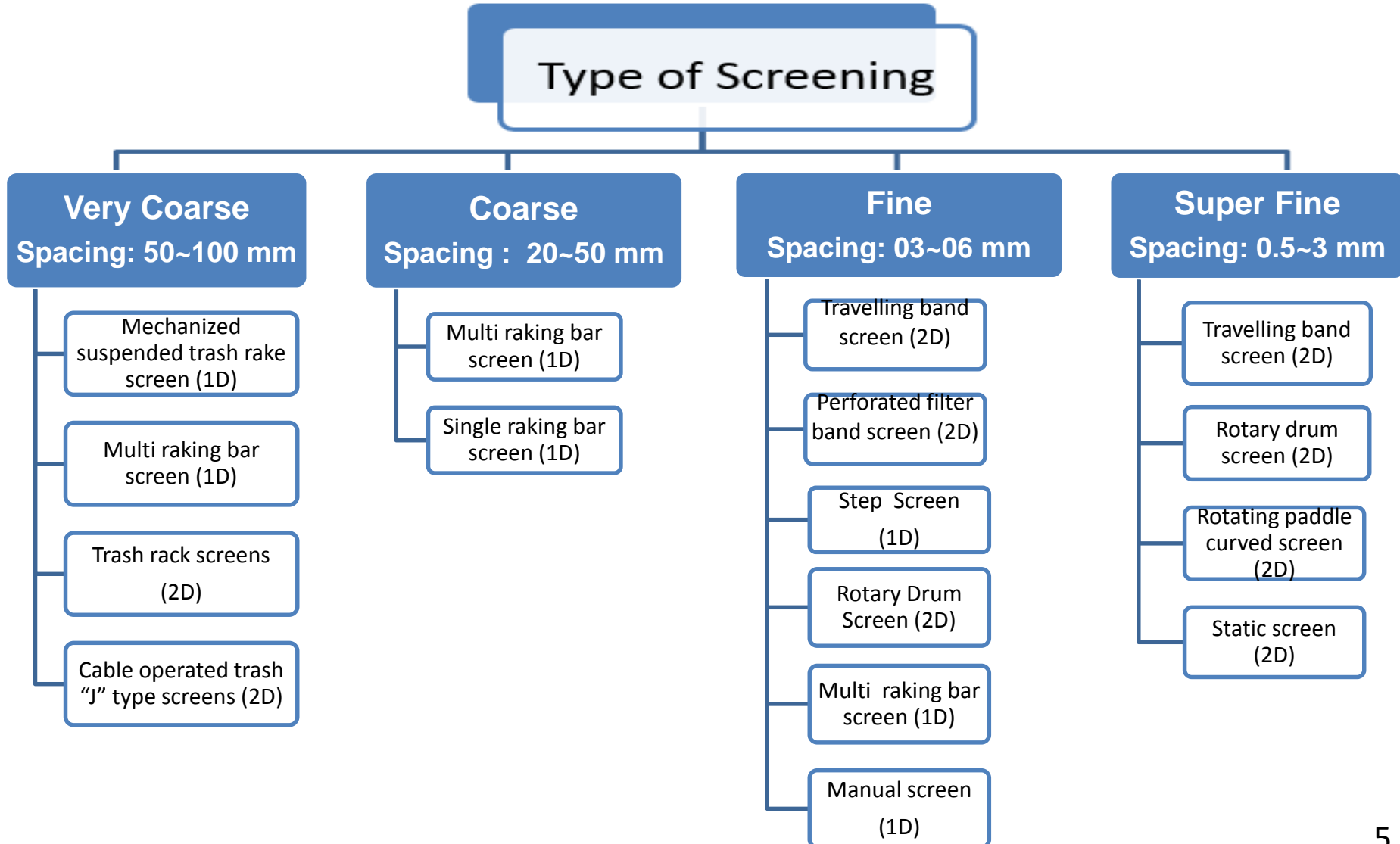
## 1. SELECTION BASED ON SIZE OF OPENING TO BE PROVIDED IN SCREEN:

Based on the opening provided in the screen, the process of screening can be grouped in to four categories:

- Very coarse screening,
- Coarse screening,
- Fine screening, and
- Superfine screening

The type of screen that can meet the above screening process requirements are given hereunder :

## TYPE OF SCREENING Vs TYPE OF SCREEN :





## TYPE OF SCREENING Vs TYPE OF SCREEN :

**A. Very Coarse Screening:**

Very coarse screening is required where there is possibility of large undefined size of waste is coming with the flow.

Ex: Wooden logs and branches, water hyacinth or weeds, bodies of animals, rubber tyres etc.

The main objective of very coarse screening is to prevent the mechanical screens from any damage by heavy objects coming with the flow. Since the waste coming with the flow is undefined in nature, the screens are installed outside the intake structure / pumping stations.

Very coarse screening equipments that are commonly employed are:

- A. Mechanized suspended trash rake screen
- B. Multiple raking bar screen
- C. Trash rack screens
- D. Cable operated trash screens ( J-Type screen )

} Manually cleaned

The spacing generally are in the range of 50 to 100 mm.

## TYPE OF SCREENING Vs TYPE OF SCREEN :

### **B. Coarse Screening:**

Coarse screening is required to remove medium sized floating waste coming with the flow in to a pumping station.

Ex: Plastic bottles, cans, cloths, plastic bags, napkins, household wastes, weeds, shrubs etc.

There are two major objectives of the coarse screening

- a) To prevent pumps from frequent breakdowns by restricting the size of waste material from entering in to pump.
- b) To ensure that the efficiency of pumps do not decrease due to chocking of impellor cavity on account of entry of cloths, plastics and other fibrous wastes.

Coarse screens are generally installed with in a pumping station with an isolation gates/stoplogs located before and after the screen.

Coarse screening equipments that are commonly employed are:

- A. Multi raking bar screens
- B. Single on mono raking bar screens ( For small size channels)

The spacing generally are in the range of 20 to 50 mm.

## TYPE OF SCREENING Vs TYPE OF SCREEN :

### C. Fine Screening:

Fine screening is required to remove fine sized floating waste coming with the flow in to a treatment plant.

Ex: Plastic pouches, fibrous vegetable waste, shredded and torn cloths, condoms, grass and various material , that passes through the coarse screen.

The objective is to remove all the fine inorganic floating waste from the flow so that equipments on the down stream of the screen function efficiently. Fine screens are installed in the intake of the treatment plant.

Isolation gates / stoplogs are installed before and after the screen for the maintenance purpose.

Fine screening equipments that are commonly employed are:

- A. Step screens
- B. Rotary drum screen ( Requires ample of wash water with high pressure)
- C. Multiraking bar screens
- D. Manual screen ( Only as standby)

The spacing generally are 6 mm. In exceptional cases like industrial application it could be less than 6 mm.

## TYPE OF SCREENING Vs TYPE OF SCREEN :

**D. Super Fine Screening:**

Super fine screening is required to remove very fine sized floating waste coming with the waste water after the water has passed through the fine screen installed at the inlet chamber of the treatment plant. Ex: Very fine fibrous waste, hair etc .

These screens are generally installed before the membranes in Tertiary treatment plant. Superfine screens are also ideal for industrial effluent treatment plants etc.

Super fine screening equipments that are commonly recommended are:

- a) Travelling band screen
  - b) Perforated Filter band screen
  - c) Rotary drum screen ( With very narrow opening)
  - d) Rotating paddle curved screen
  - e) Static screens
- } For plant of very small capacity

The spacing generally are in the range of 0.5 to 3 mm.

## 2. SELECTION BASED ON DEPTH OF CHANNEL :

Once size of opening to be provided in the screen is decided then the depth of channel or distance from the bottom of channel to top of operating platform decides the type of screen that can be used for a particular installation.

Categorization of depth and type of screen suitable for that depth is given hereunder :

- a) Shallow depth ( up to 2.5 meters ) : Trash rack, Manual screen, J-Type screen, Single-raked screen, Multi-raked screen, Step screen, Drum screen, Perforated band screen, Travelling band screen.
- b) Medium depth ( above 2.5 meters and up to 7 meters ) : Trash rack, J-Type screen, Suspended grab screen, Single-raked screen, Multi-raked screen, Perforated band screen, Travelling band screen.
- c) High depth ( above 7 meters ) : Trash rack, J-Type screen, Multi-raked screen, Travelling band screen.

## SELECTION OF SCREEN BASED ON APPLICATION :

	Mechanically cleaned screens							Manually cleaned / Static screens		
	Travelling Band Screen	Suspended Trash Rake Screen	Multiple Raking Bar Screen	Perforated Filter Band Screen	Step Screens	Rotary Drum Screen	Half drum paddle Screen	Trash rack screens	Cable operated "j" type Screens	Static Screen
Raw water intakes	✓	✓						✓		
Storm water pumping Station		✓	✓							
Sewage pumping Station	✓		✓						✓	
Water reclamation pumping	✓			✓						
Raw Sewage intake of STP				✓	✓	✓				
Wood product Industry			✓		✓	✓				
Water Reclamation				✓		✓	✓			✓

***While manual screens can be employed in most of the application, being labour intensive and hazardous, not recommended***

# MATERIAL OF CONSTRUCTION



## SELECTION OF MATERIAL OF CONSTRUCTION OF SCREENING EQUIPMENT:

Properly selected screens based on best technology may fail in providing expected working life if the material of construction of the screen is not appropriate to the chemical properties of the fluid and also the atmosphere where the screen is installed.

While carbon steel is less expensive, it fails to withstand the corrosive atmosphere. For this reason only screens, particularly mechanical screens are made of stainless steel of various grade world wide.

While Stainless steel of grade AISI 304 provides moderate working life in the sewage atmosphere, it is not a suitable material for the sea water application or industrial effluent with more acid content and high temperature.

For sea water application, stainless steel of grade 316L or Duplex or Superduplex with PREN value of 40+ is highly recommended.

Following table describes recommended material of construction for different kind of fluid to be screened.



## SELECTION OF MATERIAL OF CONSTRUCTION OF SCREENING EQUIPMENT:

Type of Water	Mechanized Screens
Raw water	Stainless steel AISI 304 is suitable
Municipal Sewage	Stainless steel AISI 316 is most suitable. AISI 304 can also be used but life will be shorter as compared to AISI 316
Storm water	Stainless steel AISI 316 is most suitable. AISI 304 can also be used but life will be shorter as compared to AISI 316
Sea water	Duplex steel is the most suitable material. AISI 316L can also be used but life shall be shorter than Duplex steel
Aggressive Sea water	Super Duplex with PREN 40+ is the most suitable material
Effluent with pH value 8+ and temp. above ambient	Stainless steel AISI 316L is the most suitable material

# SCREENING EQUIPMENTS



## VERY COARSE SCREENING

### 1. Trash Racks:

Trash racks are manually cleaned very coarse screening equipment used to prevent large sized undefined floating waste from entering in to intake structure.

#### **Construction & Working:**

Trash racks comprises of flat bars spaced apart in horizontal & vertical direction encompassed within a sturdy frame structure forming a unit that can be inserted in to a vertical guide channel.

The guide channel extends up to the top of the platform so as to guide the upward movement of the trash rack to the platform level for manual cleaning.

Trash rack can also be additionally provided with wire mesh so as to trap medium sized waste.

Height of Trash racks are so kept that it covers the specified water depth.

## VERY COARSE SCREENING

### 1. Trash Rack ( Contd...):

Trash rack could be in Single piece or in Multiple pieces

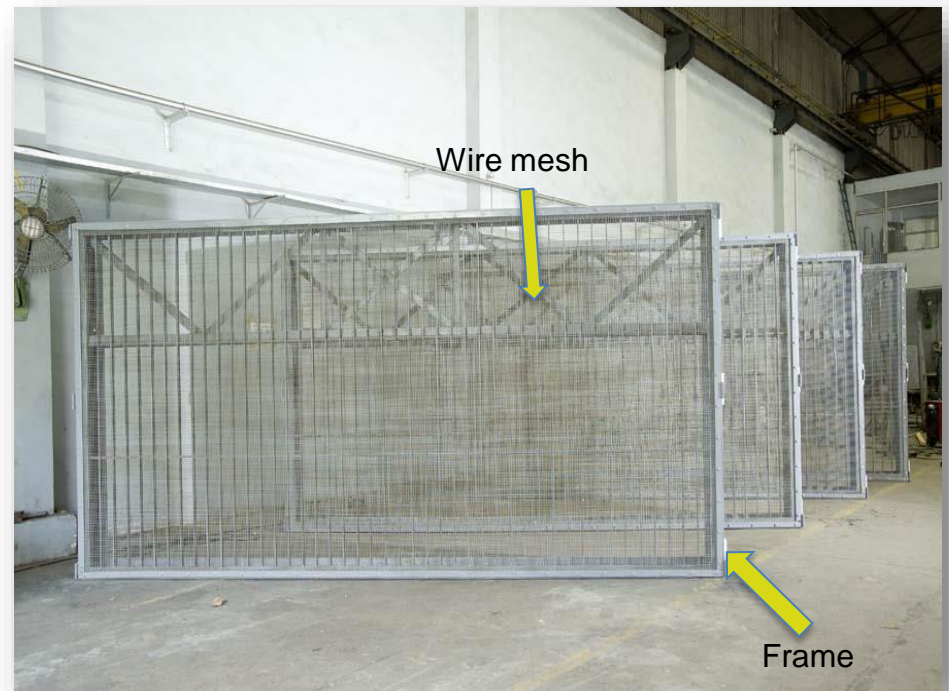
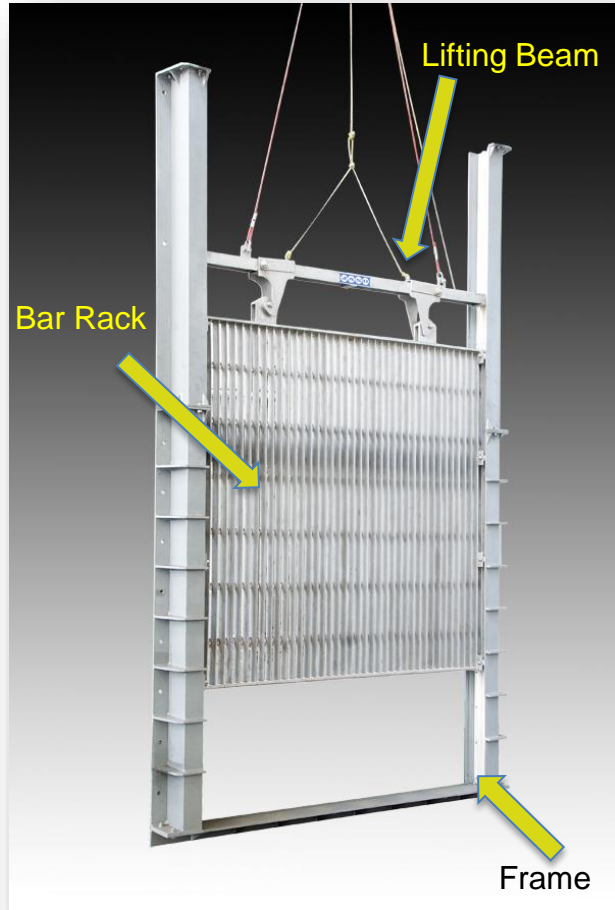
- When the height of water is very high, provision of Single-piece Trash rack becomes difficult due to its size and weight. In that case Multi-piece trash racks are used.
- Multi-piece trash racks comprise of number of racks of smaller heights stacked over one another covering the full depth of water.

Trash racks are to be lifted up to platform using suitable lifting devices for removing the trash. Before removal from its position , Sluice gates/Stop-logs should be lowered to shut off the flow to pump chamber.

After cleaning, Trash rack is lowered back in to its postion and then Stop-logs are removed to allow only screened water to flow in to the pump chamber.

## VERY COARSE SCREENING

### 1. Trash Rack:



## VERY COARSE SCREENING

### 1. Trash Rack:

Spacing between bars	50 ~ 100mm
Single piece width	6000 mm Max
Single piece height	4000 mm Max
Bar profile	Flat
Bar size	08~12mm thick x 50~100mm depth
Material of construction	Carbon steel/ Stainless steel 304/316
Installation Angle	Vertical
Mode of operation	Manual

## VERY COARSE SCREENING

### 2. J-Type Trash Rack:

J-type trash screen is a manually cleaned coarse screening equipment used to prevent large and medium sized undefined floating waste from entering in to intake structure of pumping station.

J-type trash screen comprises of flat bars spaced apart in horizontal direction encompassed within a sturdy frame structure forming a unit that can be inserted in to a vertical guide channel.

The vertical guide channel extends up to the top of the platform so as to guide the upward movement of the screen to the platform level for manual cleaning.

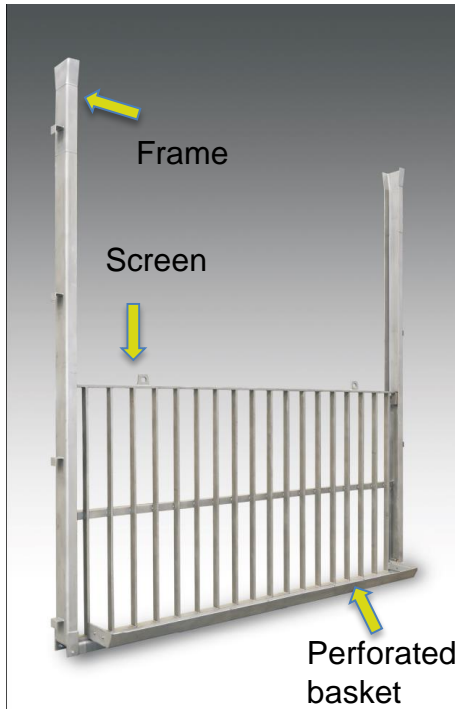
Height of J-type screen is so kept that it covers the specified water depth.

The screen structure is provided with a perforated basket at its bottom and guide rollers on both the sides.

J-type trash screen moves within the vertical guide channel using rollers .

## VERY COARSE SCREENING

### 2. J-Type Trash Rack:



#### Construction & Working:

J-type trash screen are to be lifted up to platform using suitable lifting devices for removing the trash. Before removal from its position, Stop-logs or sluice gates are to be lowered to shut off the flow to pump chamber.

After cleaning, screen is lowered back in to its position and then Stop-logs are removed to allow only screened water to flow in to the pump chamber.

Alternatively two screens can be installed in series to operate one at a time thus ensuring that no unscreened water passes through.



## VERY COARSE SCREENING

### 2. J-Type Trash Rack:

Specification:

Spacing between bars	20 ~100mm
Single piece width	4000 mm Max
Single piece height	5000 mm Max
Bar profile	Flat
Bar size	8~12mm thick x 40~100mm depth
Material of construction	Carbon steel/ Stainless steel 304/316
Installation Angle	Vertical
Mode of operation	Manual

## VERY COARSE SCREENING

### 3. Mechanized Suspended Trash Rake:

Suspended trash rake screen is a mechanically cleaned very coarse screening equipment used to prevent large sized undefined floating waste from entering in to intake structure.

Cleaning of Trash racks manually is time consuming and labourious particularly when stoplogs are to be lowered. *This can be avoided by using Mechanized suspended trash rake screen.*

Suspended trash rake screen comprises of two parts

**a) Screen and**

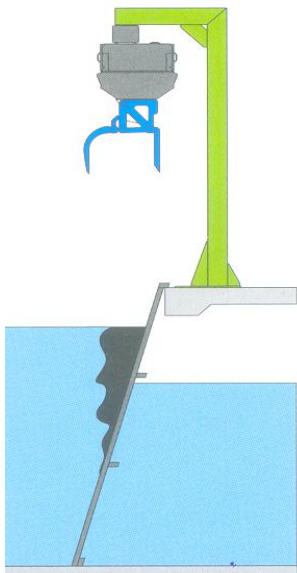
**b) Mechanized suspended Grab**

Screen comprises of equally spaced bars starting from the invert of opening and extending up to the top of water level covering the entire width of intake structure.

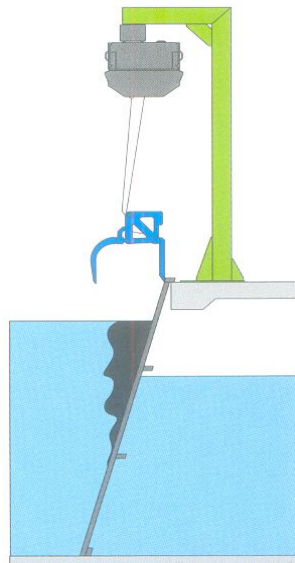
The Grab on a carriage above the platform runs on a track parallel to the screen.

## VERY COARSE SCREENING

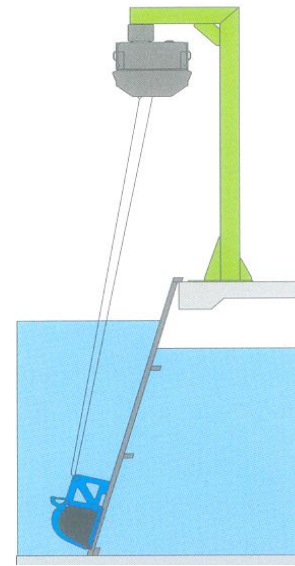
### 3. Mechanized Suspended Trash Rake:



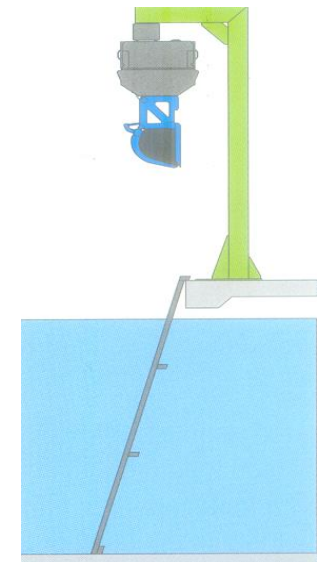
The Grab open up and starts travelling



The Grab travels down in open condition with bottom portion getting engaged with the bars pushing the waste till the bottom.



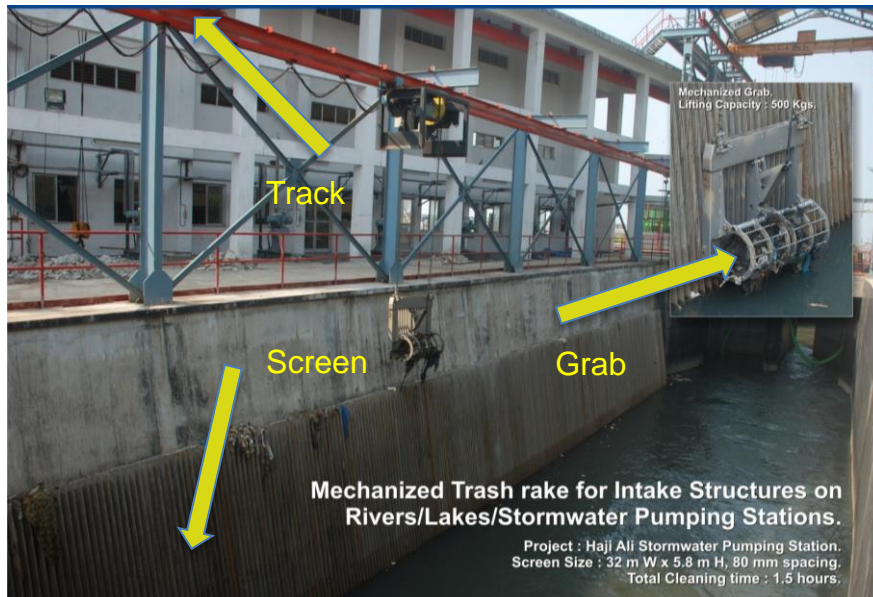
Then it starts traveling upwards towards the carriage



Once the grab is out of the water, it travels laterally to the end of carriage and deposits the waste. Grab laterally shifts on the screen after each cycle and cleans the entire screen width.

## VERY COARSE SCREENING

### 3. Mechanized Suspended Trash Rake:



#### Salient Features:

- Fully automatic- Saves labour and time.
- Ease in maintenance- Grab remaining un-submerged, easily accessible for maintenance.
- No need of isolation gates/ stoplogs
- High efficiency- Can clean as large as 300 sq.mtr in 2 hours.
- Redundancy- Possibility of using 2 grabs to achieve faster cleaning.



## VERY COARSE SCREENING

**3. Mechanized Suspended Trash Rake:**

Specification:

Spacing between bars	30~80mm
Channel Width	1000~40,000 mm
Channel depth	2000~10,000 mm
Bar profile	Flat
Bar size	10~15mm thick x 150~200mm depth
Material of construction	Screen and superstructure-Carbon steel/ SS 304/316
	Grab- 304/316
Installation Angle	80°
Mode of operation	Mechanized

## COARSE SCREENING

### 1. Jash “JMR” Multi-rake Screen:

Jash “**JMR**” Multi-rake screen is mechanically cleaned medium/coarse screening equipment used to prevent medium sized floating waste from travelling to the pumps located in the wet well of water and waste water pumping station or travelling further in to water and waste water treatment plant.

#### **Construction & Working:**

- It comprises of equally spaced flat bars covering the width of the screen and extending to the top of water level specified.
- The bars are followed by a dead plate extending up to the discharge point located above the platform.
- Upon receiving the signal, the rake located on the upstream side of the screen starts moving upward. When the rake reaches to the discharge point, the wiper wipes the waste from the rake and discharges on to the in-built chute.
- Multiple rakes cleans the bars one after the another and carry the waste to the discharge point.
- The waste can either be collected in to the collection bin or on to the conveyor installed accross the screen.

## COARSE SCREENING

### 1. Jash “JMR” Multi-rake Screen ( Contd...):



#### **Salient Features:**

- Wear resistant comb- made of UHMWPE sandwiched between SS plates.
- Superior sprockts and chains: SS sprokets and SS chains with Delrin rollers ensuring long life.
- Overload protection- Equiped with torque switch.
- Minimum welding- Minimum distortion, high functional reliability.
- Factory assembled and pre-shipment tested- Ensures effectivity of movement, faster erection.

## COARSE SCREENING

## 1. Jash “Multi-rake Screen:

Specification:

Spacing between bars	10~50 mm
Channel Width	750~2,000 mm
Channel depth	1,000~10,000 mm
Bar profile	Flat
Bar size(in mm)	10x50/8x40
Material of construction	Stainless steel SS 304/316
Sprockets	Stainless steel
Chain MOC	SS/SS with Delrin rollers
Breaking load of chain (in KN)	40



## COARSE SCREENING

### 1. Jash “Multi-rake Screen:

Specification:

Overload protection	Mechanical
Comb/Rake	UHMWPE sandwiched with SS plate
Individual bars replacement	Not possible
Convertibility	Not possible
Auto jam removal	Not available
Variable speed	Not available
Side wall anchoring	Required
Installation Angle	75~80°
Head loss	< 300mm @ 50% chocking

## COARSE SCREENING

### 2. Jash Mahr Maschinenbau “MM2MM” Multi-rake Screen:

**MM2MM** is manufactured in technical collaboration with *Mahr Maschinenbau, GmbH of Austria*.

**MM2MM** Multi-rake screen is mechanically cleaned fine /coarse screening equipment used to prevent fine / medium sized floating waste from travelling to the pumps located in the wet well of water and waste water pumping station or fine sized floating waste travelling further in to water and waste water treatment plant.

**MM2MM** Multi-rake screens with bar spacing of 2~4mm are also used to reduce the load on very fine Travelling water screens or Perforated screens used in MBR based treatment plants.

#### **Construction & Working:**

**MM2MM** Multi-rake screens It comprises of equally spaced taper bars covering the width of the screen and extending to the top of water level specified.

The bars are followed by a dead plate extending up to the discharge point located above the platform.

## COARSE SCREENING

### 2. Jash Mahr Maschinenbau “MM2MM” Multi-rake Screen:



Upon receiving the signal, the rake located on the upstream side of the screen starts moving upward.

When the rake reaches to the discharge point, the wiper wipes the waste from the rake and discharges on to the inbuilt chute.

Multiple rakes one after the another clean the bars and carry the waste to the discharge point.

The waste can either be collected in to the collection bin or on to the conveyor installed accross the screen.



## COARSE SCREENING

### 2. Jash Mahr Maschinenbau “MM2MM” Multi-rake Screen:

#### **Salient Features:**

- Superior design and rugged construction- Able to withstand 3 times the maximum water depth specified.
- Engineering superiority: Can be used for fine as well as coarse screening application.
- Very narrow bar spacing- As low as 2mm possible.
- Superior bar profile- Taper section resulting in to very low headloss.
- Replaceable bars- If damaged, Individual bars can be replaced in installed condition.
- Future convertibility- Replaceable bars enable easy conversion from wider to narrower and narrower to wider spacing.
- Very strong rake-made of up to 16mm stainless steel.



## COARSE SCREENING

### 2. Jash Mahr Maschinenbau “MM2MM” Multi-rake Screen:

#### **Salient Features:**

- Automatic jam removing feature- In the evnt of blockage, rake travels reverse-forward-reverse.
- Variable speed- In the flooding situation, speed becomes double automatically.
- Superior sproket - Heavy duty SS sproket with ceramic bushes.
- Superior Chains- SS chains with hardened chain pins of special grade. Breaking load of 112 KN
- Very effective overload protection- Equiped with Electromechanical Overload device.
- Minimum welding- Minimum distortion, high functional reliability.
- Heavy contruction- Eliminates anchoring to side walls. Can be pulled out for any major maintenance.
- Factory assembled and pre-shipment tested- Ensures effectivity of movement, faster erection.

COARSE SCREENING

2. Jash Mahr Maschinenbau “MM2MM” Multi-rake Screen:

Specification:

Spacing between bars	02~30 mm. Even wider spacing available
Channel Width	750~4,500 mm
Channel depth	1,000~60,000 mm
Bar profile	Trapezoidal
Bar size(in mm)	12x6x50, 8x4x40, 6x3x25
Material of construction	Stainless steel SS 304/316/ Duplex/ Super duplex
Sprockets	Heavy duty SS with ceramic bushes
Chain MOC	SS chains with hardened SS pins
Breaking load of chain (in KN)	112

## COARSE SCREENING

## 2. Jash Mahr Maschinenbau “MM2MM” Multi-rake Screen:

Specification:

Overload protection	PLC based electro-mechanical
Comb/Rake	Stainless steel plate up to 16mm thick
Individual bars replacement	Possible
Convertibility	Possible
Auto jam removal	Available
Variable speed	Possible
Side wall anchoring	Not required
Installation Angle	75~80°
Head loss	< 100mm 25% chocking

## FINE SCREENING

### 1. Jash “Screenmat” Step Screen:

Screenmat step screen is compact mechanically cleaned fine screening equipment used to prevent fine sized floating waste from travelling further in to and waste water treatment plant.

#### **Construction & Working:**

Screenmat comprises of 2mm thick equally spaced lamella having an inverse step covering the width of the screen and extending discharge point located above the platform.

Depending up on the size, Screenmat is driven by either a geared motor mounted directly on the screen or hydraulically through a power pack.

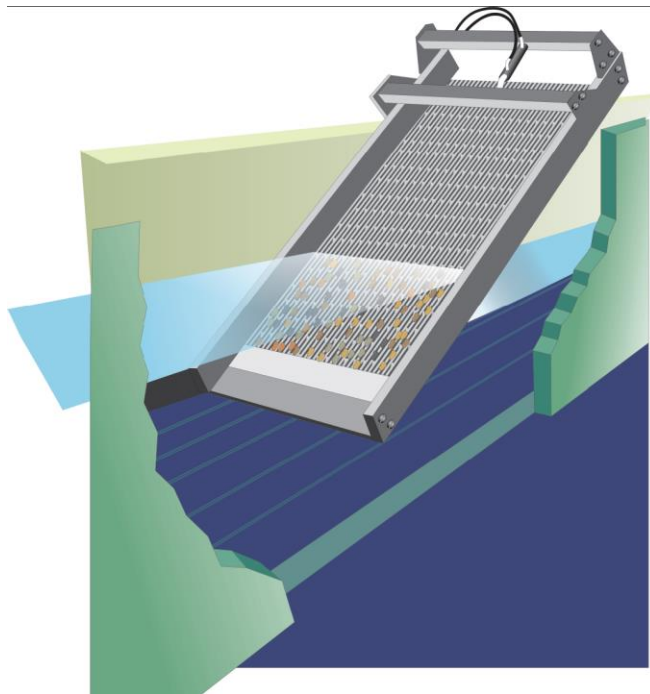
Upon receiving the signal, set of movable lamella lift the waste deposited over the screen portion and deposits them a step above on the set of fixed lamella.

After depositing , the set of movable lamella returns back to start the new operating cycle. This way the waste keeps moving upwards in steps till it reaches the discharge point.



## FINE SCREENING

### 1. Jash “Screenmat” Step Screen:

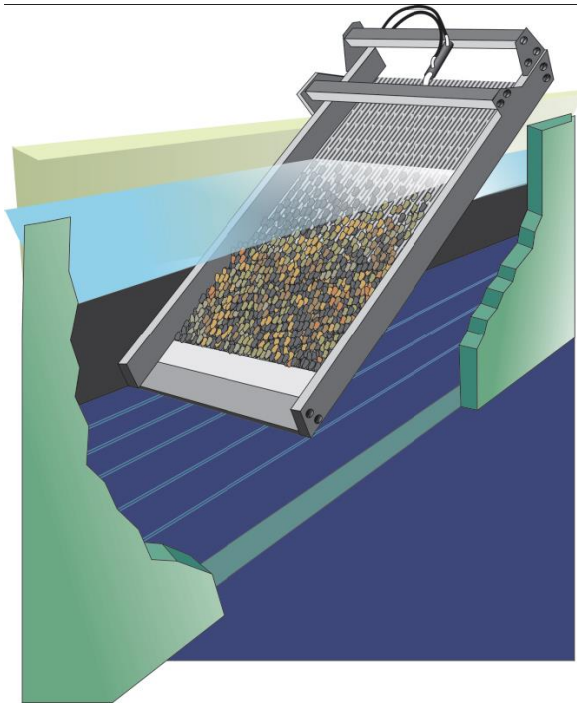


#### How Screenmat works:

- I. As the water flows through the screen, the floating waste starts depositing on the the submerged portion of the screen thus gradually forming the mat of the waste.

## FINE SCREENING

### 1. Jash “Screenmat” Step Screen:



#### How Screenmat works:

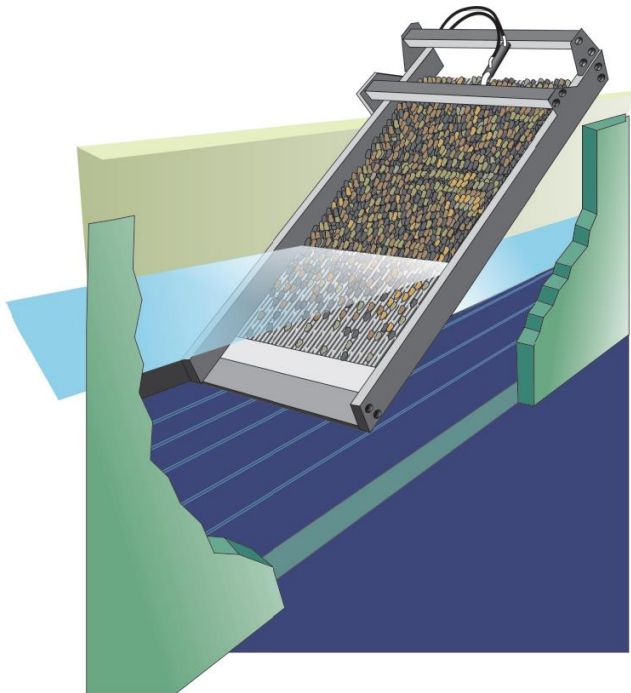
- II. As the density of the mat increases, the amount of water passing through the screen decreases, thereby resulting in an increase in the water level on the upstream side of the screen. Once the water level reaches the preset level, the level sensor activates the motion due to which the set of movable lamella lifts outward and starts moving upward carrying the mat of waste resting on the screen.

Upon reaching upward, the set of movable lamella retracts below the set of fixed lamella, thereby depositing the unbroken mat of waste onto the set of fixed lamella.

The set of movable lamella then reaches to the initial downward position ready for the next cycle.

## FINE SCREENING

### 1. Jash “Screenmat” Step Screen:



#### How Screenmat works:

- III. As the mat of waste starts moving upwards out of the water, the area of the screen exposed to incoming water now has lower density of the mat on it. Because of this the amount of water passing through the screen increases resulting in to decrease of the water level.

When the water level recedes to the preset level, the level sensor deactivates the motion and the screen stops.

Thus the screen starts when the water level increases to the preset level and stops when the water level recedes to the preset level.

***For efficient screening, screen should always be allowed to operate automatically through level sensors.***

## FINE SCREENING

### 1. Jash “Screenmat” Step Screen:



#### Salient Features:

- Superior lamella profile- Inverse steps
- High capture rate- Mat helps in capturing small size waste than the spacing.
- No entrapment of solid- Lesser thickness of lamella provides flexibility.
- Low power consumption- Operation controlled by rise and fall of water level
- Low maintenance- Travel of movable lamella very short.
- Minimum maintenance- Parts can be replaced in installed condition.
- Factory assembled and pre-shipment tested- Ensures effectivity of movement, Faster erection

## FINE SCREENING

### 1. Jash “Screenmat” Step Screen:

Specification:

Spacing between bars	3~6 mm.
Channel Width	300~2000 mm
Channel depth	600~2200 mm
Lamella profile	Flat with inverse step
Lamella thickness(in mm)	2mm
Drive	Geared motor or through hydraulic power pack
Material of construction	Stainless steel SS 304/316/ 316L
Head loss	Below 50mm at 25% chocking
Installation Angle	40°
Head loss (in mm)	<300@50%
Wash water requirement	Not required

## FINE SCREENING

### 2. Jash “Rotoclean” Rotary drum Screen:

Rotoclean is a mechanically cleaned fine screening equipment used to prevent fine sized floating waste from travelling further in to waste water treatment plant.

Rotoclean comprises of equally spaced wedge wire bars located radially and braced together by lateral reinforcement tie bars to form a drum or the drum with punched holes.

The screen is installed at an inclination with the open end of the drum facing the water. The screen is provided with a waste collection trough located at its center and a screw conveyor to transfer the waste to the discharge point.

The waste water enters through the open end of the drum and the floating waste bigger than the bar spacing/ opening is retained on the inner surface of the drum while the screened water flows out from the sides and bottom of the drum.

The rotating drum brings the captured waste to the top, a set of water jet mounted along the the outer length of the drum pushes the waste on to the collection trough.

## FINE SCREENING

**2. Jash “Rotoclean” Rotary drum Screen:**

The screw conveyor located in the trough is provided with an integral washing zone where a high pressure water jet washes the waste to remove any fecal soluble matter coming with waste.

The compaction zone dewateres the waste by squeezing and reduces the volume of waste for easy and hygienic disposal.

**Salient Features:**

- Compact design- Screening, transportation, washing and compaction built in.
- Minimum waste disposal cost- 40% DR and 50% weight by squeezing reduces disposal cost.
- Very hygienic- Screenings are washed before final discharge.
- Factory assembled and pre-shipment tested- Ensures effectivity of movement.

## FINE SCREENING

**2. Jash “Rotoclean” Rotary drum Screen:**

Specification:

Wedge wire spacing / Perforation	0.5~6 mm / Ø2~6mm
Channel Width	800~2,200 mm
Channel depth	600~2,000 mm
Bar profile	Trapezoidal/ Punched hole
Wedge wire thickness	2.2mm
Drive	Geared motor
Material of construction	Stainless steel SS 304/316/ 316L
Installation Angle	35°
Head loss	< 200mm at 50% chocking
Wash water requirement	400 lpm at 5 bar pressure



## FINE SCREENING

### 3. Jash Mahr Maschinenbau“Per-scalator“ filter band screen:

Per-scalator screens are manufactured in technical collaboration with Mahr Maschinenbau, *GmbH of Austria*

Per-scalator is a mechanically cleaned fine screening equipment used to prevent fine sized floating waste from travelling further in to the water and waste water treatment plant, especially, in waste water treatment plants based on MBR applicaion.

Per-scalator screen comprises of a screen frame of rugged construction, filter elements, set of high pressure nozzles, a pair of chains and high efficiency drive unit.

The filter elements are made of step type perforated plates covering the entire width of the screen field and are linked to a continuous chain thus forming an endless band.

The waste coming with the water while gets retained on the face of the perforated filter, the water passes through.

## FINE SCREENING

### 3. Jash Mahr Maschinenbau“Per-scalator“ filter band screen:



As the endless band of filter elements escalates upward, they carry the deposited waste along with it till the top of the screen.

At the turning point, where the filter element is about to start its downward journey, wastes are dislodged by the series of high pressure water jets.

The waste alongwith the used water falls on to the built-in chute.

From the chute, the water can either be collected in to a launder or screw conveyor for seperation of waste and wash water for further disposal.

## FINE SCREENING

### 3. Jash Mahr Maschinenbau“Per-scalator“ filter band screen:

#### **Salient Features:**

- High reliability- Rugged construction, continuity of operation even at higher water depth than specified.
- Unique shape of filter elements- step type can carry large sized waste and avoids formation of sausage.
- High screening effect- Due to round opening.
- Superior water spray system- Use of double high pressure nozzle system. Primary system above the discharge level ejecting entrapped screenings and secondary system bringing any remaining residue through drain pipe back in to upstream of the channel.
- Avoidance of rotating brush- Rotating brush has the tendency of wearing fast and clogging the perforation.
- Superior sprockets and chains- Heavy duty SS chains with hardened SS pins

## FINE SCREENING

### 3. Jash Mahr Maschinenbau“Per-scalator“ filter band screen:

#### **Salient Features:**

- Long operative life- Special grade ceramic bushes in the lower sprockets.
- Minimum welding- Minimum distortion, high functional reliability.
- Heavy construction- Eliminates anchoring to side walls. Can be pulled out for any major maintenance.
- Factory assembled and pre-shipment tested- Ensures effectivity of movement, faster erection.

## FINE SCREENING

**3. Jash Mahr Maschinenbau“Per-scalator“ filter band screen:**

Specification:

Perforation $\varnothing$	2~10mm
Channel Width	600~3,000 mm
Channel depth	1,000~11,000 mm
Drive	Geared motor
Material of construction	Stainless steel SS 304/316/ 316L
Installation Angle	45~60°
Head loss	< 200mm@50% chocking
Wash water requirement	500 lpm at 5 bar pressure

## FINE SCREENING

### 3. Jash Travelling band screen:

Jash Travelling band screens are offered in association of FSM Frankenberger GmbH of Germany.

Jash Travelling band screen is a mechanically cleaned fine screening equipment used to prevent medium to fine sized floating waste from travelling to the pumps located in to the wet well / pump chamber of water and waste water pumping station or to prevent fine sized floating waste from travelling further in to water and waste water treatment plants.

Travelling band comprises of a screen frame of rugged construction, panel of perforated plates or woven wire mesh connected to two matched strands of roller chains and forming a continuous band of panels.

The screen elements and screen frame are sealed at the sides to prevent solids from circumventing the filter.

For mesh smaller than 3mm the horizontal space between the adjoining panels is also positively sealed to prevent solids from escaping.

## FINE SCREENING

### 3. Jash Travelling band screen:

The continuous band of panels trap the suspended waste coming with the water while the filtered water passes through.

The waste / debris laden panels travels out of the flow and reach to the discharge point at the top of the platform.

The waste is then removed from the panels by water spray located at the upper deflection point .

The cleaning process can be optionally be assisted by a rotating brush depending on the screening load.

The waste removed from the panels can either be collected in to a launder or screw conveyor for seperation of waste and wash water for further disposal.

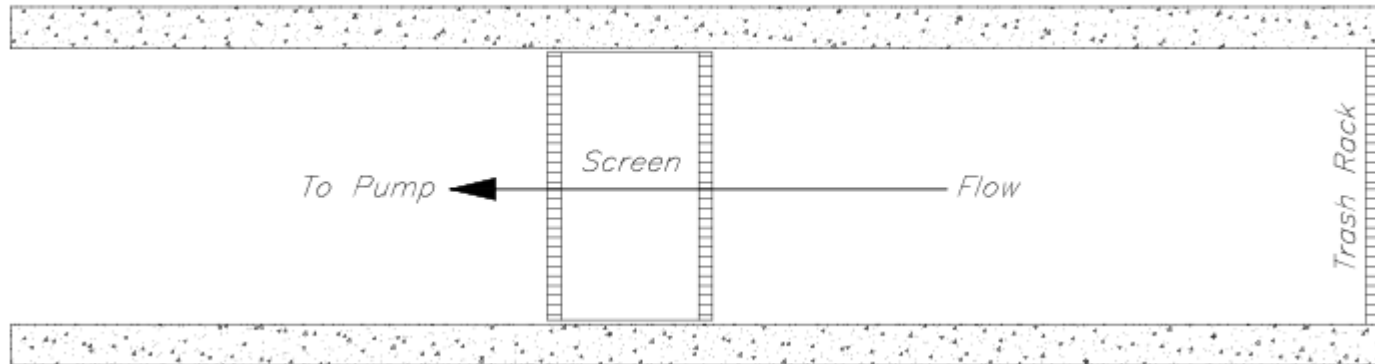
In Travelling band screens, the laden panels remain on the uncleaned water side at all the times thus prevents the screening from carried over to the cleaned water side.

## FINE SCREENING

### 3. Jash Travelling band screen:

There are three types of flow patterns used in **Travelling band screens**:

#### 1. Thru Flow



#### Advantages

- Less expensive
- Simple and less expensive civil structure

#### Disadvantages

- Potential for debris carry over
- Risk of damage to downstream equipment's
- Lower screening capacity

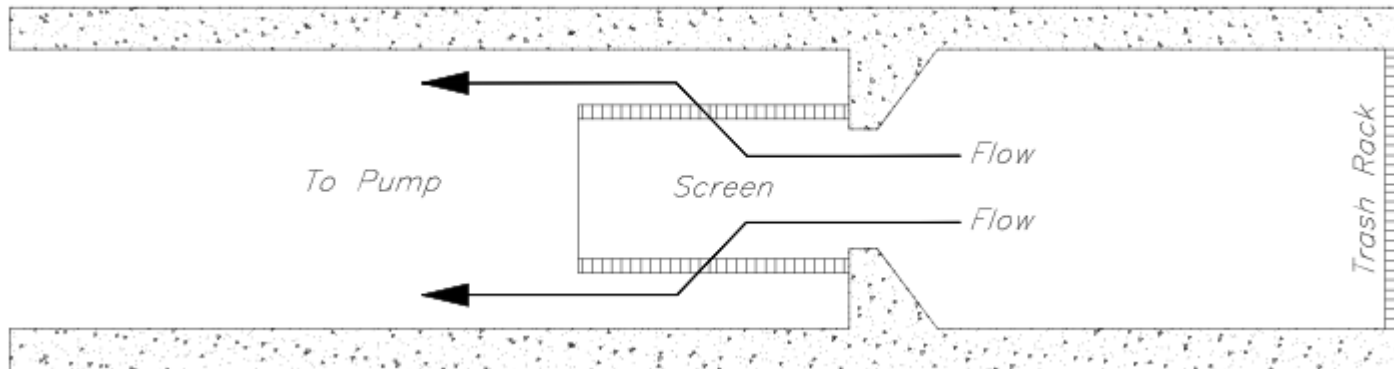


## FINE SCREENING

### 3. Jash Travelling band screen:

There are three types of flow patterns used in **Travelling band screens**:

#### 2. Center Flow



#### Advantages

- Entire submerged screen area is utilized.
- Higher screening capacity (up to 100% more)
- Eliminates possibility of debris carry over

#### Disadvantages

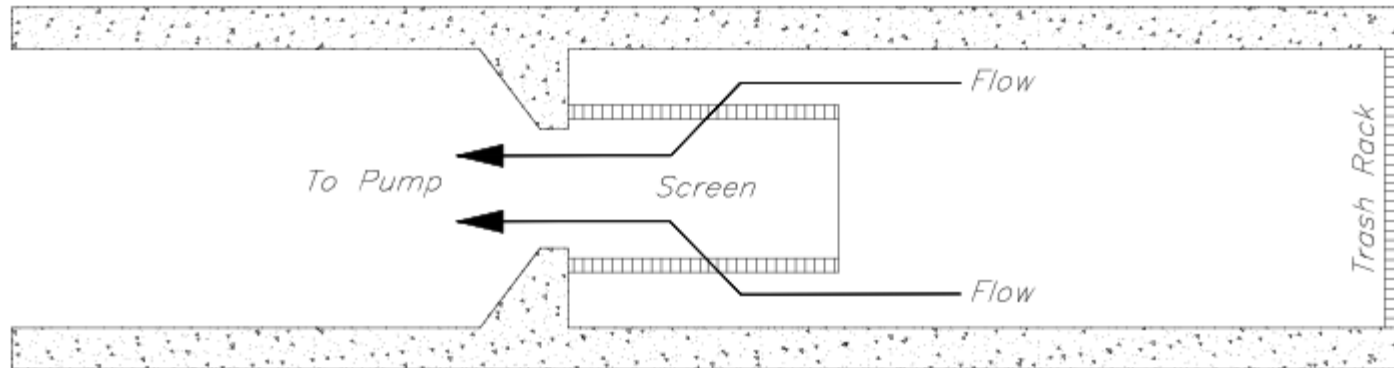
- Higher civil construction cost.
- Higher equipment cost but offsets with higher screening capacity.

## FINE SCREENING

### 3. Jash Travelling band screen:

There are three types of flow patterns used in **Travelling band screens**:

#### 3. Dual Flow



#### Advantages

- Entire submerged screen area is utilized
- Higher screening capacity (up to 100% more)
- Eliminates possibility of debris carry over

#### Disadvantages

- Higher civil construction cost.
- Higher equipment cost but offsets with higher screening capacity.

## FINE SCREENING

### 3. Jash Travelling band screen:



## FINE SCREENING

### 3. Jash Travelling band screen:

#### **Salient Features:**

- High reliability- Rugged construction, continuity of operation even at higher water depth than specified.
- Different designs of filter panels- Perforated as well as mesh type.
- High screening effect- Filter panels and frame sealed at the sides preventing escape of solids.
- Optimum cleaning- Use of high pressure nozzle system. Optionally by brush.
- Easy maintenance- Individual filter panels easily replaceable.
- Superior sprockets and chains- Heavy duty SS chains with hardened SS pins
- Long operative life- No sprocket wheels and bearings under the water.
- Factory assembled and pre-shipment tested- Ensures effectivity of movement, faster erection.

## FINE SCREENING

**3. Jash Travelling band screen:**

Specification:

Filter panel perforation	Ø1~12mm
Filter panel mesh size	0.5mm~3mm
Filter panel width	300~5,000 mm
Channel depth	1,000~15,000 mm
Drive	Geared motor
Material of construction	Stainless steel SS 304/316/ 316L
Installation angle	Vertical
Head loss	<200mm @ 50 % chocking
Wash water requirement	500 lpm at 5 bar pressure

## SUPER FINE SCREENING

### 1. Jash “Rotobrush” screen:

Rotobrush is a mechanically cleaned very fine screening equipment used to prevent very fine sized floating waste from travelling further in to waste water treatment plants based on MBR or similar technology so as to prevent damage to the membranes.

Rotobrush is also used in the ETP of very small capacity of various industries.

Rotobrush screen comprises of a semi-circular sieve made of sheet with equally spaced punched holes or of equally spaced mesh of wedge wire and rotating peddles.

The waste water is fed through an inlet pipe from the side of the screen by pumping or by gravity. While the waste bigger than the opening is retained on the inner surface of the screen, the screened water passes downward.

The captured waste is then swept out by rotating peddles and brought to the end of the semi-circular screen. Here the sweeping arm sweeps the waste from the brush of the peddle and throws out.

The waste thrown out can either be collected in to a bin or allowed to fall on a conveyor.

## SUPER FINE SCREENING

### 1. Jash “Rotobrush” screen: ( Contd...)



Easy installation- Box type structure. Just to be placed on top of the channel.

Very low operating cost- No moving parts, no power requirement and no spares.

Hygeinic- Screen is completely encapsulated. No odor nueuecence.

Specification:

Wedge wire slot width/ punched hole size	0.5~1mm / Ø 2mm
Throughput capacity	75~100 m3/hr
Material of construction	Stainless steel SS 304/316/ 316L

## SUPER FINE SCREENING

### 2. Jash “Hyperbole” Static screen:

Hyperbole is a self screening very fine screening equipment used to prevent very fine sized floating waste from travelling further in to waste water treatment plants based on MBR or similar technology so as to prevent damage to the membranes.

Hyperbole is also used in the ETP of very small capacity of various industries.

Hyperbole being a static screen, it does not require any power except that the waste water or effluent is to be pumped in to it.

The waste water/effluent is fed from the back of the screen through an inlet pipe in to the wier crest by way of pumping.

The overflow water from the crest gets evenly distributed on to the front side of the creen with the help of flow control baffle plate.

The waste of size bigger than the slot width is retained on the screen and the filtered water passes through to the outlet chamber at the bottom portion of the screen. The retained solid on slides down the screen to the bottom where it is either collected manually or can be allowed to drop on the screw conveyor.



## SUPER FINE SCREENING

### 2. Jash “Hyperbole” Static screen (Contd...):



Easy installation- Box type structure. Just to be placed and pipe connected

Very low operating cost- No moving parts, no power requirement and no spares.

Specification:

Slot width	0.5 ~ 2mm
Throughput capacity	75~100 m <sup>3</sup> /hr
Material of construction	Stainless steel SS 304/316/316L

## TECHINCAL FEATURES OF JASH SCREENS

		Trash racks	"J" Type	Suspended Trash Rake	"JMR" Multiraking	"MM2MM" Multiraking	"Screenmat" Step	"Rotoclean" Drum	Per-scalator	Travelling band	"Rotobrush"	"Hyperbole" static
Application	Raw water intakes	✓								✓		
	Storm water pumping Station			✓		✓						
	Sewage pumping Station		✓		✓	✓				✓		
	Water reclamation pumping								✓	✓		
	Raw Sewage intake of STP						✓	✓	✓			
	Wood product Industry					✓	✓	✓				
	Water Reclamation							✓	✓		✓	✓
Bar spacing / Opening ( mm)	50~100	20~100	30~80	10~50	10~60 Even up to 2mm	3~6	0.5~6 Ø 2~6	2~10	1~12	Ø 2	0.5~1	
Channel Width ( mm)	6000	4000	40000+	750~2000	750~4500	300~2000	800~2200	600~3000	300~5000			

## TECHINCAL FEATURES OF JASH SCREENS ( Contd...)

	Trash racks	"J" Type	Suspended Trash Rake	"JMR" Multiraking	"MM2MM" Multiraking	"Screenmat" Step	"Rotoclean" Drum	Per-scalator	Travelling band	"Rotobrush"	"Hyperbole" static
Channel Depth ( mm)	Any	Any	10000+	1050~10000	1000~60000	500~2000	600~2000	1000~11000	1000~15000		
Bar Profile	Flat	Flat	Flat	Flat	Trapez.	Flat	Trapez/punched	Punched	Punched	Punched	V-Wedge wire
Bar Size (mm)	8~12 x 50~100	8~12 x 50~100	10~15 x 150~200	10x50 8x40	12x6x50 8x4x40	2~3	2.2				
Material of Construction	CS/SS 304/316	CS/SS 304/316	CS/SS 304/316	SS 304/316	Any Grade of SS	Any Grade of SS	Any Grade of SS	Any Grade of SS	Any Grade of SS	SS 304	SS304
Inclination Angle °	90	90	80	75	75	40	35	45~60	90	90	90
Wash water requirement				Not Reqd	Not Reqd	Not Reqd	Reqd	Reqd	Reqd	Not Reqd	Not Reqd
Sprockets				Any Grade of SS	Any Grade of SS			Any Grade of SS			
Chain MOC				Any Grade of SS	Any Grade of SS			Any Grade of SS			

## TECHINCAL FEATURES OF JASH SCREENS ( Contd...)

	Trash racks	"J" Type	Suspended Trash Rake	"JMR" Multiraking	"MM2MM" Multiraking	"Screenmat" Step	"Rotoclean" Drum	Per-scalator	Travelling band	"Rotobrush"	"Hyperbole" static
Breaking load of chain(kN)				40	112						
Overload protection				Mech	Electro-Mech	Elect.	Elect.	Elect.	Elect.		
Comb/Rake				UHMWE+ SS	SS						
Individual bars replacement				Not Available	Available						
Convertibility				Not Possible	Possible						
Auto Jam removal				Not Possible	Possible						
Variable speed				Not Possible	Possible	Not Possible	Possible	Not Possible	Not Possible	Not Possible	
Head loss (mm)				<300@ 50%	<100@ 25%	<300@ 50%	<200@ 50%	<200@ 50%	<200@ 50%		

## ESSENTIAL DATA REQUIRED FOR THE PROPER SELECTION OF THE SCREEN:

- ✓ **Application:** Water intake/ SPS/ STP etc
- ✓ **Material of Construction-** SS 304/316/Duplex/Super Duplex etc
- ✓ **Average flow per screen** (in m<sup>3</sup>/hr or liters/day)
- ✓ **Peak factor** – Applicable for Municipal waste water
- ✓ **Spacing between the bars/Size of opening** (in mm)
- ✓ **Channel width and depth** (in mm)
- ✓ **Maximum water depth before the screen** (in mm)
- ✓ **Approach velocity in the channel** (in m/sec)
- ✓ **Discharge height** – Level of point of discharge of waste from the platform level
- ✓ **Type of level sensors** – Upstream type/ Differential type
- ✓ **Supply voltage and frequency-** ( Applicable for overseas enquiry)
- ✓ **Location of installation-**If not in the channel

## FACTORS INFLUENCING PROPER SELECTION OF THE SCREEN:

### 1. **Civil design is completed:**

- Channels have been built without considering minimum width of the channel.
- Roof has been casted resulting that the screen can not inserted in to the channel.

### 2. **Anamoly in the Tender specification:**

Some time the tender spcification insists on few things, that can not be implemented and if they are implemented they are detrimental to the performance of the screen.

## SOME OF THE MYTHS ABOUT THE SCREEN:

### 1. **Screens must remove grit:**

No screen is able to remove grit. Screens are meant to remove floating waste only

### 2. **Screen must remove all kinds of waste -Very high expectations:**

Once installed, screen must remove all kind of waste irrespective of its size and shape. Screens are meant to remove the floating waste of the size greater than the size of opening. This does not mean that waste of unpredicted shape and size can also be removed. Where unpredicted shape and size of waste is expexted, Trash rack must be installed before the mechanical screen.

### 3. **More the penetration of the rake, better the screening :**

In case of muti raking screen, amount of penetration of the rake does not contribute on the quality of the screening. In fact more the penetration, more the pssibility of fibrous waste getting entagled to the rake teeth and poor screening. It is the precise gap between the comb and the bars that affects quality of the screening.

## SOME OF THE MYTHS ABOUT THE SCREEN:

### 4. **Automatic screens does not need supervision of operation :**

Mechanically operated screen if automized, does not require operator to run the screen but it definitely calls for regular supervision of operation. Power failure is a common phenomenon particularly in India and during the period of non availibility of power there is possibility of excessive accumulation of waste on to the screen field or during the normal coperation of the screen, waste of very big size and shape may hit the screen field and block the screen field. This kind of situation is more predominant in case of screens installed in intake / pumping stations. In such a situation it is very essential that such wastes are removed manually before parmanent damage occurs to the machine.



## FACTORS CONTRIBUTING TO POOR PERFORMANCE OF THE SCREEN:

1. Improper installation by the customer
2. Machine is operated by un-trained personnel.
3. Operation & Maintenance manual not made available to the operator.
4. No cleaning at regular interval, no refill of the oil, no scheduled preventive maintenance.
5. Auto-running of the screen bypassed- Running the machine on manual mode.
6. Flow much more than what was provided at the time of selection
7. Very high water level than what was considered at the time of selection
8. Ultrasonic slevel sensors missing or damaged.
9. Fiddling with the Control panel circuits
10. Not maintaining any inventory of the spares
11. Large amount of grit accumulaltion just before the screen.

We are pleased to support – Contact us !

*Thank You*



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