

Side Stream Filtration !!

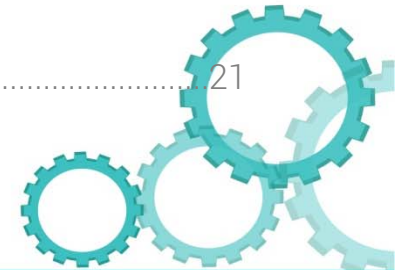


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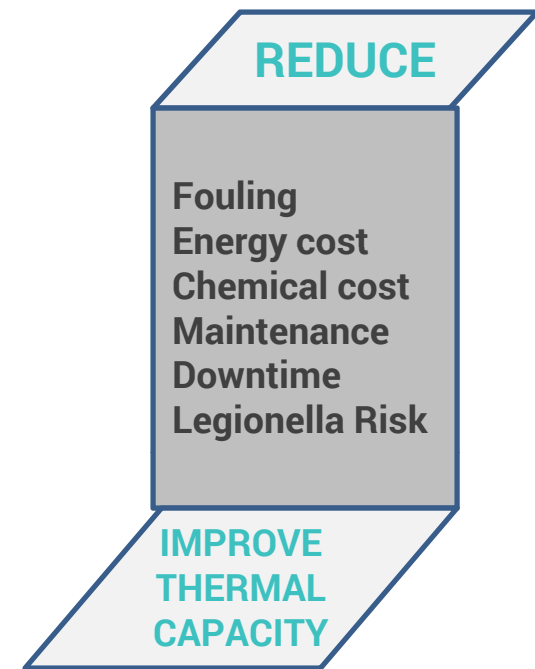
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Cooling towers act as giant air washers. Finely misted water is sprayed into a column of moving air. In cooling towers this mist increases the surface area of the water so heat transfer from water to air is more efficient and effective. In air washers this mist traps particulate matter out of the air and "washes" it into a sump for disposal.

Unintended and un-desireable though it may be, cooling towers accumulate large quantities of dirt, dust, and other airborne solids. They become suspended solids in cooling water coursing through cooling towers, pumps, chillers, condensers, heat exchangers, etc. As dirt and suspended solids accumulate in cooling water and cooling equipment, there are a number of undesirable results.



LESS

Suspended Solids in cooling tower



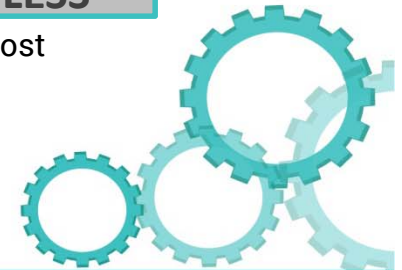
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IS MORE

Thermal capacity

FOR LESS

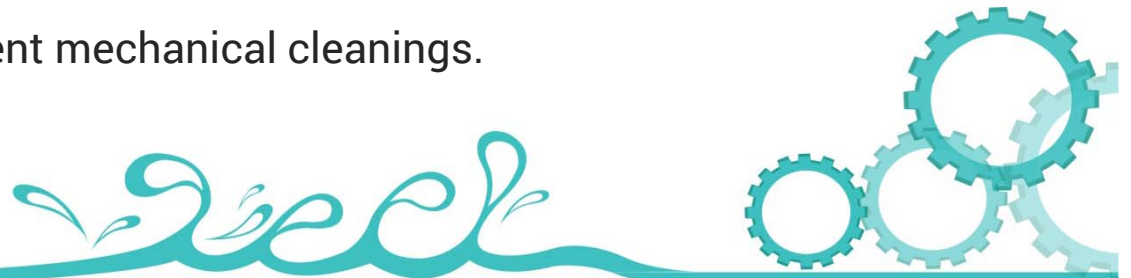
Operating Cost



- Filtration of cooling tower water with a side connection from main stream line or cooling tower pond called side stream filter.
- Side Stream Filter does not filter entire water of cooling tower main stream.
- SSF is designed on 2 – 10% of circulating flow.

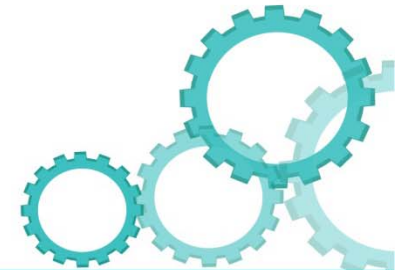


- The primary makeup is from an un-clarified water source (river, sewage treatment, etc.) that is high in suspended solids and turbidity.
- The system is having a difficult biological problem even though a good biocide program is in effect.
- Heat exchangers are opening dirty even though a good antifoulant program is being used.
- Excessive corrosion rates can be traced to fouling.
- Loss of heat transfer is attributed to deposition rather than corrosion.
- High levels of solids are building up in the sump.
- Heat exchangers require frequent mechanical cleanings.



Need of SSF for Cooling Tower

- Cooling Tower Sump cleaning.
- Removal of TSS & Turbidity from cooling water.
- Removal airborne dust.
- Increase cooling tower efficiency.
- Enhance cooling tower life.
- Reduce chemical cost.
- Reduce maintenance.
- Lower Shut down frequency
- Increase cycle of concentration.
- Reduce corrosion rate



SSF – Design criteria

- It is strongly recommended to particle size distribution, TSS and turbidity analysis be done on the representative stream that is to be treated.
- Based on total suspended solids and turbidity load, filter can be designed



Surface Filtration

- Screen Filter
- Bag / cartridge Filter
- Membrane filter (UF / MF)

Depth Filtration

- Pressure sand Filter
- Dual Media Filter
- Multi Media Filter
- Up flow – Dynasand



Based on media, velocity and loading rate, there are 4 type of major side stream filters are available



- Pressure Sand Filter – only silica quartz sand with supporting layers of gravels and pebbles participate in filtration process. PSF Works on low velocity between 8 – 12M/Hr.





- Dual Media Filter – combination of Anthracite and silica sand participate in filtration process. DMF work on comparatively on higher velocity from 13 – 16M/hr.



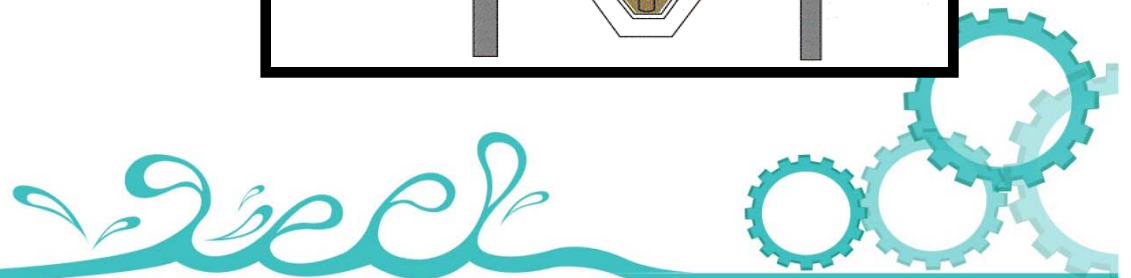
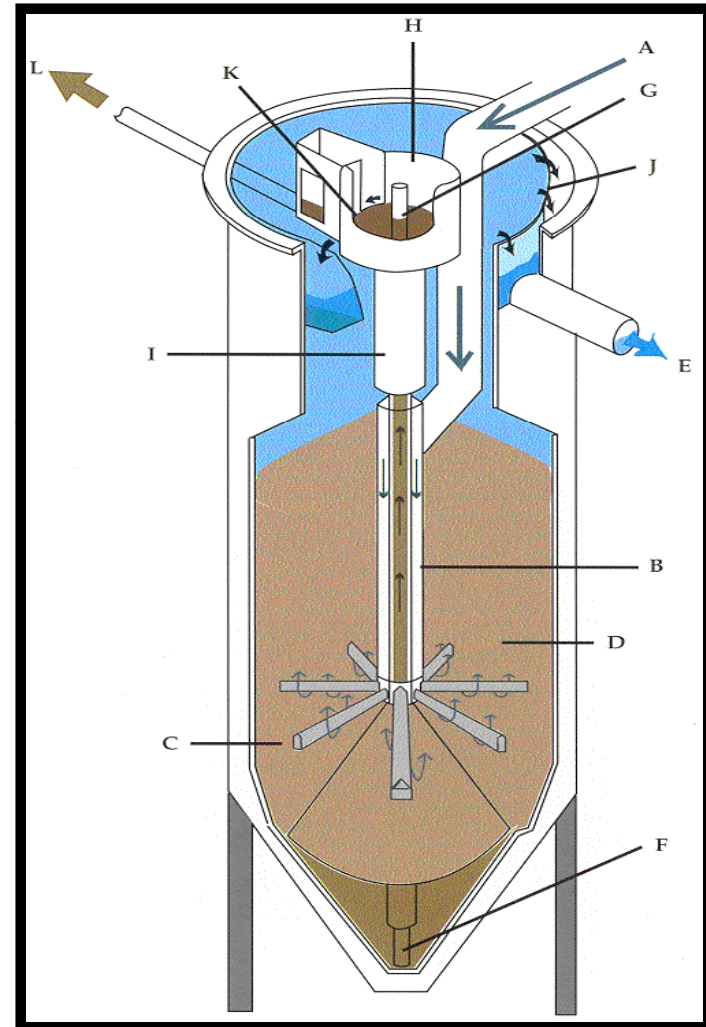


- Multi Grade Filter – uses of coarse sand, fine sand along with anthracite and garnet make effective MGF which can run upto 25M/Hr velocity.

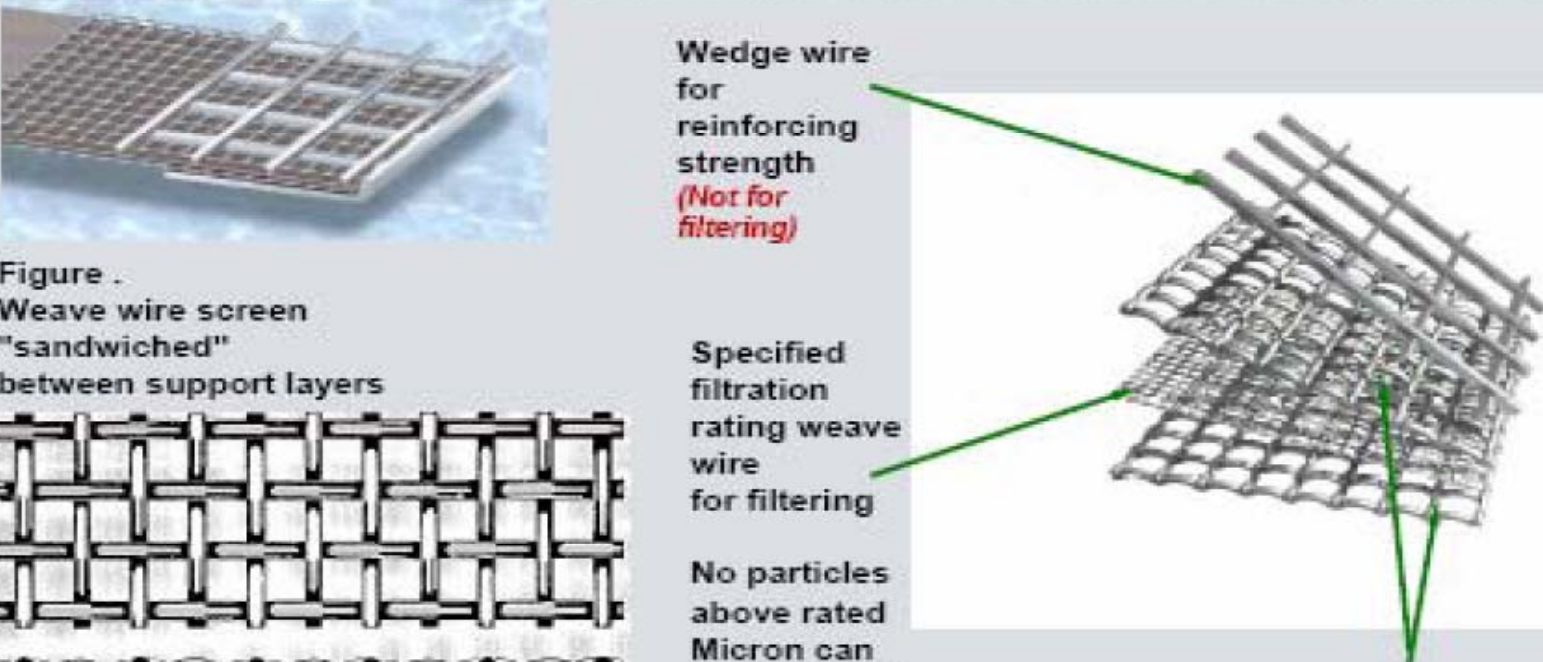


DYNASAND (Up Flow – Continuous Backwash Filter)

- A. Feed
- B. Feed assembly
- C. Distribution
- D. Sand bed
- E. Filtrate
- F. Airlift pump
- G. Airlift discharge
- H. Reject compartment
- I. Washer section
- J. Filtrate weir
- K. Reject weir
- L. Reject line



SSF – Type based on Filter Media



Wedge wire for reinforcing strength
(Not for filtering)

Specified filtration rating weave wire for filtering

No particles above rated Micron can pass through.

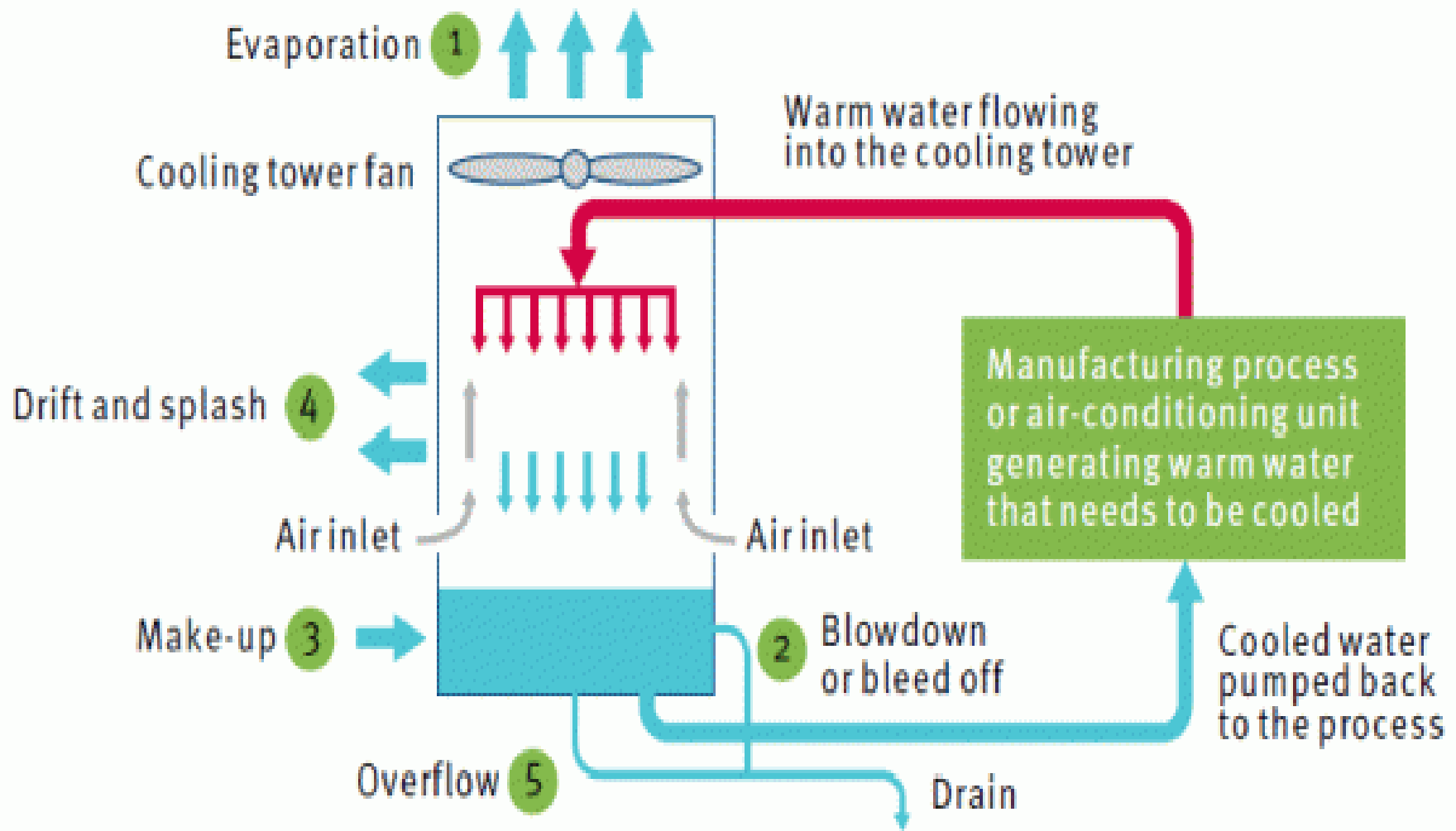
Thick weavewire for holding filtering element
(Not for filtering)

Figure .
Weave wire screen "sandwiched" between support layers

Figure .
Typical Weave wire screen with well defined pore size.

The diagram illustrates the construction of a wedge wire screen filter. It shows a central layer of woven wire with a specific mesh size, sandwiched between two support layers. The support layers are made of thicker, more robust wires. Labels indicate that the top and bottom support layers are for reinforcing strength and are not used for filtering. The central woven wire is the filtering element, and its pore size is specified. A note states that no particles larger than the rated micron size can pass through. A detailed view of the woven wire shows its regular, grid-like structure.

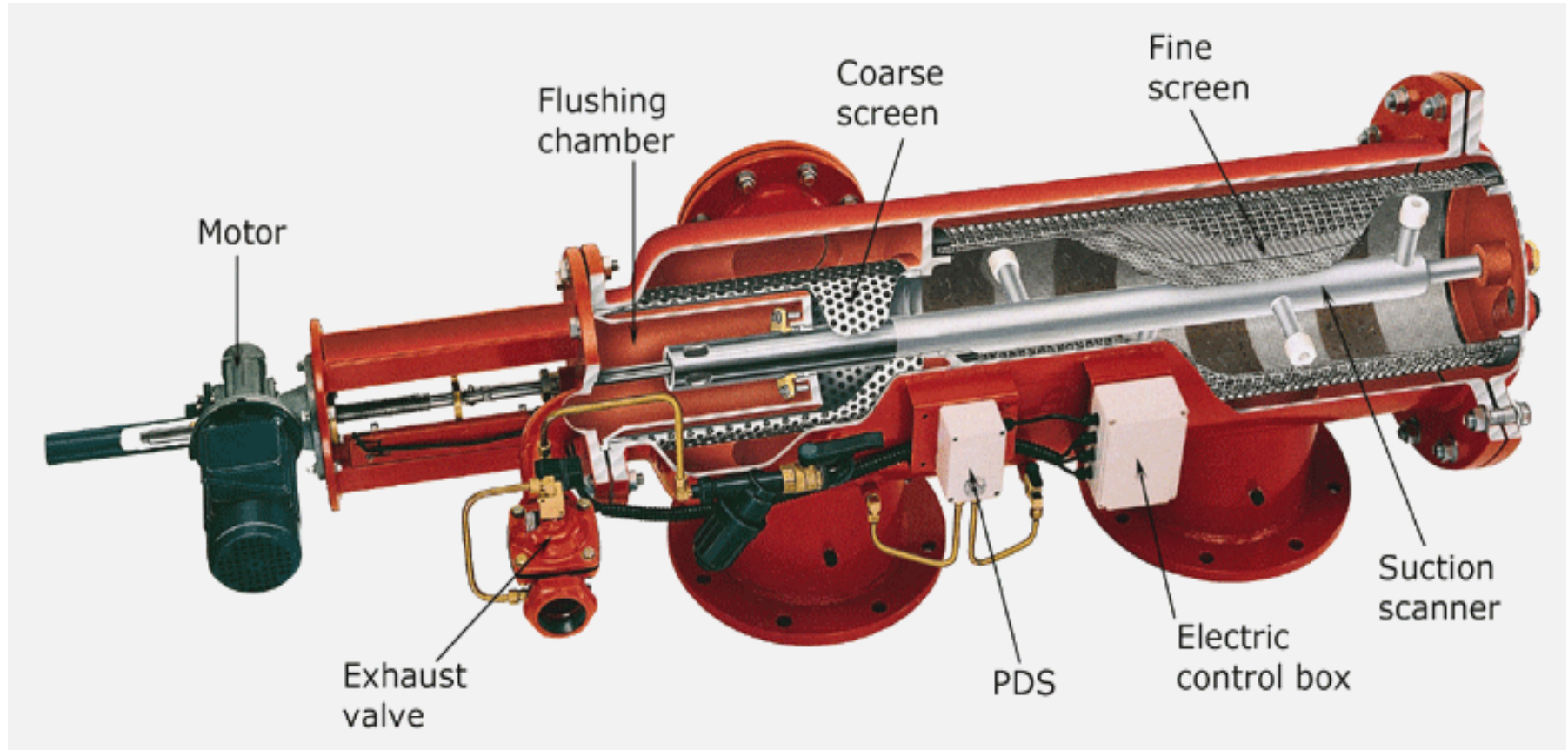








Auto backwash – Screen Filters



COMPARISON CHART

	PSF / DMF	Screen	DYNASAND
Area for installation	High	Low	High
Filtration Efficiency	Excellent	Average	Excellent
Velocity	10 – 22 M3/Hr/M2	400 – 500 M3/Hr?M2	5 – 12 M3/Hr/M2
TSS Removal	Excellent	Excellent	Excellent
Turbidity Removal	Excellent	Poor	Excellent
Maintenance	None	Critical	None
OPEX	Average	Average	Low
CAPEX	Low (if Manual) High (if Auto)	Very Low	Higher (Patented product)



OFFICE ADDRESS

501, Kalash – II, Nr. Jain Derasar, B/h. Navrangpura Post Office,
Navrangpura,
AHMEDABAD, Gujarat - INDIA.

VOICE +91 – 79 – 30086162 – 66 | FAX 91 – 79 – 30086163

HEAD OFFICE

A – 305, Shivalik Yash, Opp. Shastri Nagar BRTS, 132 Ft.
Ring Road, Naranpura,
AHMEDABAD, Gujarat – INDIA

VOICE +91 - 79 – 40086151 - 54 | FAX 91- 79 -40086155

WORKS ADDRESS

Survey No. 481/2/3/1 , Gokul Hotel Lane, B/h Khodal Kathiyavadi
Hotel,
B/s One Shine Marbles, S. G, Highway Gota, AHMEDABAD, Gujarat –
INDIA

E mail - info@shubahmindia.com

