



Next Generation of Filtration Technology

Introducing the Next Generation of Filtration Technology



Filtra-Systems STiR industrial water filter is the next generation of automatic back washable media filter. It incorporates Filtra-Systems' patented STiR fluidization technology which significantly improves filter performance when compared to older technologies like sand, anthracite and carbon media filters, which do not completely fluidize the media during backwash and are susceptible to media fouling. The STiR filter fluidization technology has been validated in production and mathematically proven to clean 100% of the filter media during each backwash cycle.

This means, the STiR Filter will provide the following **benefits**:

- Generate the smallest backwash volume of any competing technology.
- Regenerate the media for the life of the product (20 years).
- Consistently provide high removal efficiency; year-after-year.
- Easily handle upset conditions (very high loading of solids or oils).



◀ High throughput filtration of oily process water and industrial wastewater.

Other benefits include:

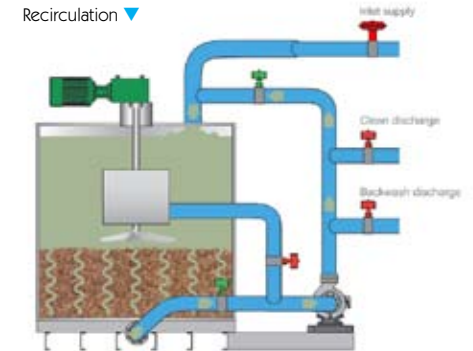
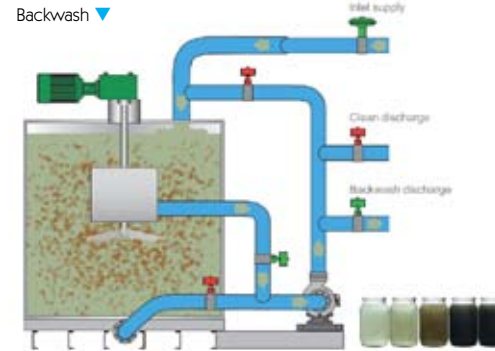
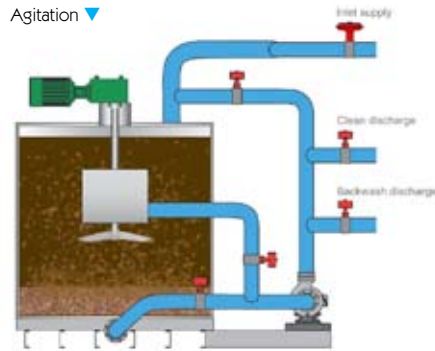
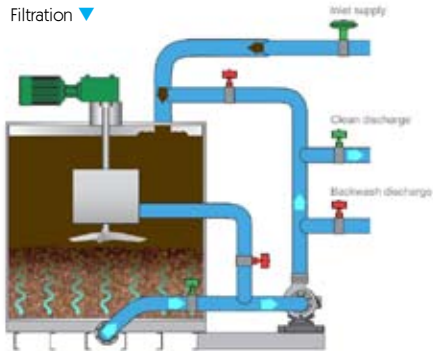
- **Lower Capital Cost** – The STiR Filter utilizes an open tank design, in lieu of a pressure vessel, which significantly reduces costs.
- **Lower Installed Cost** – The STiR Filter is provided with level control and a dedicated pump to control both flow rate and pressure. No additional equipment is required to operate.
- **Permanent Filter Media** – The STiR Filter utilizes black walnut shell media, a “green” sustainable material, which is not mined, chemically inert, hard, resilient and preferentially water wetted.

STiR removes suspended solids and oil

STiR industrial water filter systems provide double the throughput efficiency of conventional sand filters or graded media filters. Under normal operating conditions, they remove 95% to 99% of suspended solids and 90% to 99% of insoluble hydrocarbons, without the use of chemicals.

In the waste water, these deep bed filters are used to remove suspended solids and hydrocarbons from waste water, surface water, sea water, rivers, lakes and well water. In metal working, power generating, municipal, chemical and petrochemical applications, they treat and remove suspended solids, oily residues, ash and metallic hydroxides from industrial liquids.

How STiR™ Industrial Water Filters work



Operational Principals:

The STiR filter is a down flow media filter, capable of removing suspended solids and oil from water streams. The filtration principles employed are tortuous path, in conjunction with coalescence. As suspended solids enter the filtration tank from the inlet pipe at the top of the tank, they lose velocity and begin to travel downward through the media. As they attempt to pass through the small void space of the media bed, the fine particles lose velocity, and become trapped by the bed. Oil droplets follow the same path, however once the small oil droplets come into contact with previous captured oil, they then coalesce, forming larger pools of captured oil.

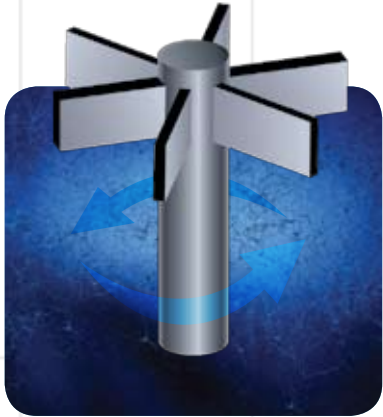
As contaminants are captured, and flow is restricted, a vacuum pressure builds. Once the vacuum pressure reaches its designated set point, the regeneration cycle is automatically triggered, and the media is cleaned, and the contaminants are then removed. This process is verified via the visual indicating media bed sight glass, located on each unit, and return of the vacuum pressure to its clean bed set point of 0.

Once proper vacuum pressure is reached, the filter begins the patented media cleaning/regeneration process. All flow is eliminated and the agitator becomes energized to completely stir the tank. The philosophy being that all of the filter media, and contaminants captured, become a homogeneous mixed slurry in the filter tank. Once mixed, process water is allowed to enter via the filter inlet, while the pump pulls the liquid, containing all of the contaminants, out through the backwash exit port. The filter media is retained in the filter during this cycle by the backwash screen, as contaminated water flows through, and is sent to upstream processing or to waste handling.

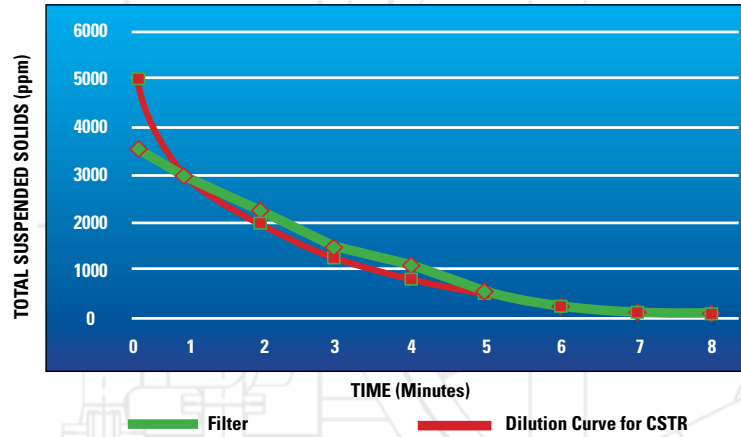
Filter Sequence of Operation and Valve Position

● Indicates valve is open; all other valves are closed.

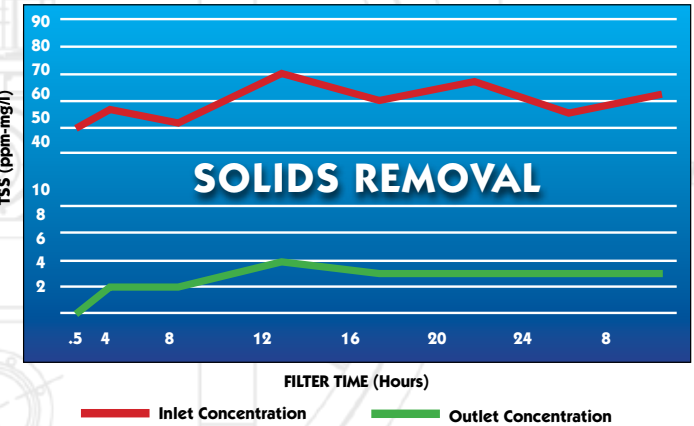
CYCLE	A	B	C	D	TIME
Filtration		●			"x" Hrs.
Agitation			●		30 Sec.
Backwash	●		●		8 Min.
Delay					15 Sec.
Recirculation				●	3 Min.



CSTR Dilution Performance vs. Filter Backwash



Typical Efficiency Curve



The STiR filter utilizes the kinetic model of a Continuously Stirred Tank Reactor (CSTR) to efficiently and completely remove contaminants during every media regeneration cycle.

Maximizing backwash (regeneration) efficiently allows the unit to have the smallest required backwash volume, shortest offline cycle time, eliminates channeling or short cycling, and guarantees that the media bed is completely cleaned, cycle after cycle.

Competitive Advantage

Continually backwashing or mixed media sand filters have two process deficiencies that the STiR has overcome.

- 1) Mudballing and media fouling** can be a nightmare for operations personnel, and is caused by leaving the media bed, incrementally dirtier, cycle after cycle. By using a mixer instead of a pump or air sparger, we clean 100% of the media, every cycle, which eliminates media fouling. Our media has a 30 year life, and does not need to be replaced.
- 2) Waste generation/recycle rate/or backwash volume** is a critical consideration, when selecting a filtration technology. Recycle rates (waste volume generated) of conventional and continually backwashing sand filters can be 10-40%. The STiR is less than 1%, as the fluidization of the entire bed creates a highly concentrated backwash slurry, which is removed as quickly as possible.

The jar photos below show backwash water samples taken over the 8 minute backwash interval (0, 2, 4, 6, 8 min samples). The backwash water at the end of the 8-minute cycle is as clean as the inlet process water, illustrating the regeneration cycle is complete. There is 100% recovery in less than 10 minutes, due to the vigorous agitation and maximized efficiency.





Only a STiR filter will give you the confidence of clear effluent, maintenance-free operation and production efficiency payback—year after year.

Filtra-Systems offers 14 models of the STiR to accommodate virtually any application need.

FILTER MODEL	A	B	C	D
STiR-7V	3'	9'-2"	7'-8"	7'-1"
STiR-12V	4'	9'-3"	7'-9"	7'-3"
STiR-19V	5'	9'-9"	9'-4"	7'-9"
STiR-28V	6'	10'-4"	9'-11"	8'-9"
STiR-39V	7'	10'-11"	10'-11"	9'-3"
STiR-50V	8'	11'-4"	12'-10"	11'-4"
STiR-64V	9'	11'-11"	13'-8"	12'-4"
STiR-78V	10'	12'-2"	16'-10"	13'-4"
STiR-95V	11'	13'-3"	17'-2"	15'-3"
STiR-113V	12'	13'-9"	18'-9"	16'-3"
STiR-133V	13'	14'-6"	19'-5"	17'-3"
STiR-201V	16'	16'-4"	23'-6"	20'-10"
STiR-314V	20'	17'-4"	23'-8"	21'-3"
STiR-452V	24'	18'-4"	35'-2"	31'-10"

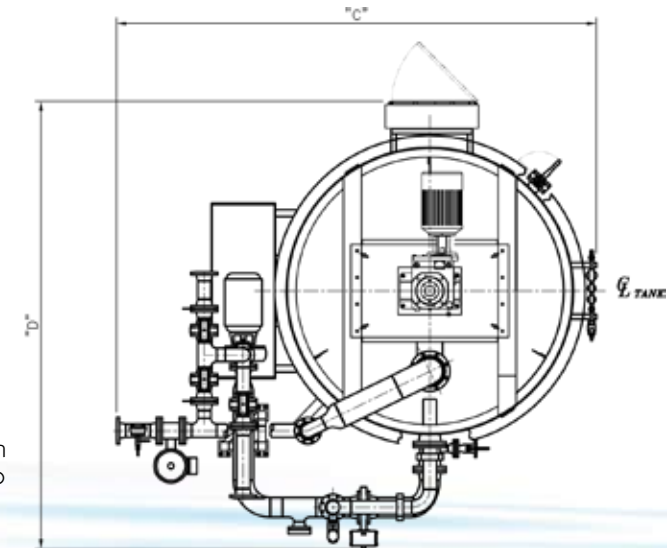
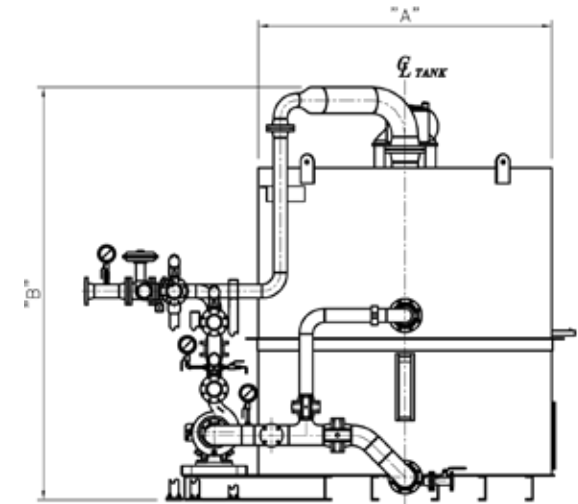
Note: Filters with an A dimension, above 13' have filter tanks which are designed in multiple sections.

This product consideration allows the unit to meet standard shipping requirements.

The sections are easily assembled on-site.

Sized to fit your needs:

Single filtration units are able to process 50 to 6,500 gpm each, depending on the application. Units are pre-assembled at the factory and shipped to the site, skid mounted, ready for installation. Units having a diameter greater than 20' have filtration tanks designed in easily shipped and site assembled sections, to minimize freight and installation costs, while maximizing single unit throughput.



These wastewater filters have been selected as the best available technology in many water filtration applications, and have been utilized to remove oil and grease, as well as suspend solids from a variety of waste water streams.

Site Specific Installations

- In the South East, an aluminum producer protects their outfall by filtering 300 gpm of oil plant wastewater.
- In Kentucky, a metal working facility filters 250 gpm of contact caster water, to remove suspended solids, and increase the casters efficiency.
- In Colorado, a mine site filters 400 gpm of mine runoff, to remove cadmium and other minerals, prior to discharge to a river.

Industrial Process Water

- A power company process filters the water in fly ash ponds, prior to river discharge. The units operate at 4,000 gpm.
- In steel production plants, filters are used to remove the oil from a continuous casting operation. These units operate at 6,500 gpm.
- A chemical manufacturer filters a variety of process water streams, prior to deep well injection for disposal. The unit operates at 750 gpm.

Environmental Projects

- A fish hatchery utilizes the technology to filter waste water from the growing ponds, to meet river discharge requirements.
- In Colorado, our filters are being used for groundwater remediation work. The groundwater was contaminated by fuel oils leaking from a boiler at a former paper mill. The unit operates at 300 gpm. Once cleanup is completed, the water rights will be issued to the state for agriculture use.
- A metal producer utilizes a filter to recover PCBs from non-contact caster water. The filter processes 8,000 gpm and discharges into a fish bearing stream.
- A U.S. EPA Superfund Site processes 70 gpm of groundwater containing PCPs and DNAPLs. The filter discharges into a fish bearing water system. Once the cleanup is completed, the land will be converted into a city park.

Sample Customers

Aera Energy
Alberta Infrastructure
Army Corps of Engineers
Arizona Chemical
Bechtel
BP Chemicals
Brush Wellman
Chevron
Compania Minera Collahuasi
Conoco Phillips
Devon Energy
EnCana
Hawaiian Electric
Husky Oil
Imperial Oil
Inland Steel
International Paper
Kaiser Aluminum
Kuwait Oil Company
Occidental Petroleum
PDVSA
SunCor
U.S. Energy
Weirton Steel
Werner Aluminum



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