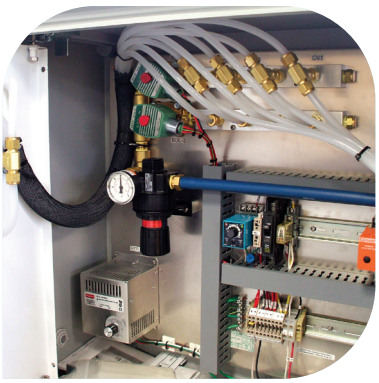


Parkson™
Treating Water Right

DynaSand®

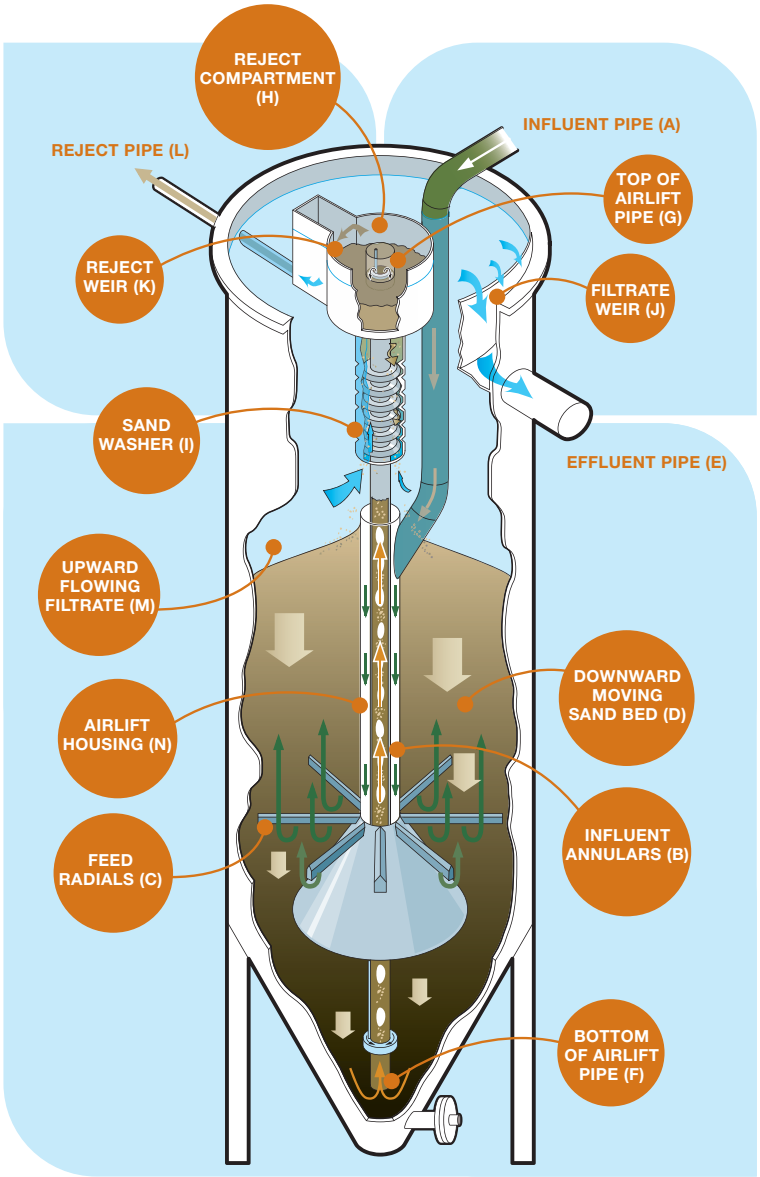
Continuous, Upflow, Granular Media Filter

- Continuously cleaned sand bed
- Low power requirement
- Elimination of ancillary backwash equipment
- Reduced operator attention

Great performance, low maintenance

The DynaSand® Filter is an upflow, deep bed, granular media filter with continuous backwash. The filter media is cleaned by a simple internal washing system that does not require backwash pumps or storage tanks. The absence of backwash pumps means low energy consumption.

The DynaSand® Filter's deep media bed allows it to handle high levels of suspended solids. This heavy-duty performance may eliminate the need for pre-sedimentation or flotation steps in the treatment process in some applications.



The DynaSand® Filter is available in various sizes and configurations. This flexibility allows for customization to fit specific site and application requirements.

DynaSand® Filter Principles of Operation

Influent Filtration

Influent feed is introduced at the top of the filter (A) and flows downward through an annular section (B) between the influent feed pipe and airlift housing. The feed is introduced into the bottom of the sand bed through a series of feed radials (C) that are open at the bottom. As the influent flows upward (M) through the downward moving sand bed (D), organic and inorganic impurities are captured by the sand. The clean, polished filtrate continues to move upward and exits at the top of the filter over the filtrate weir (J) and out through the effluent pipe (E).

Sand Cleaning

The sand bed containing captured impurities is drawn downward into the center of the filter where the airlift pipe (F) is located. A small volume of compressed air is introduced at the bottom of the airlift, drawing the sand into the airlift pipe. The sand is scoured within the airlift pipe at an intensity of 100-150 SCFM/ft^2. The effectiveness of this scouring process is vastly greater than what can be expected in conventional sand filtration backwash. The scouring dislodges any solid particles attached to the sand grains.

The dirty slurry is pushed to the top of the airlift (G) and into the reject compartment (H). From the reject compartment, the sand falls into the sand washer (I) and the lighter reject solids are carried over the reject weir (K) and out the reject pipe (L). As the sand cascades down through the concentric stages of the washer, it encounters a small amount of polished filtrate moving upward, driven by the difference in water level between the filtrate pool and the reject weir. The heavier, coarser sand grains fall through this small countercurrent flow while the remaining contaminants are carried back up to the reject compartment. The clean, recycled sand is deposited on the top of the sand bed where it once again begins the influent cleaning process and its eventual migration to the bottom of the filter.

DynaSand® Filter Configurations

The DynaSand® Filter is available as either stand alone package units or in a modular concrete design. The package units are constructed of either 304 SST or FRP. Materials of construction for the internal components of both package and concrete units are SST and/or FRP. Filters are available in 40” standard bed or 80” deep-bed design depending on the nature of the application.

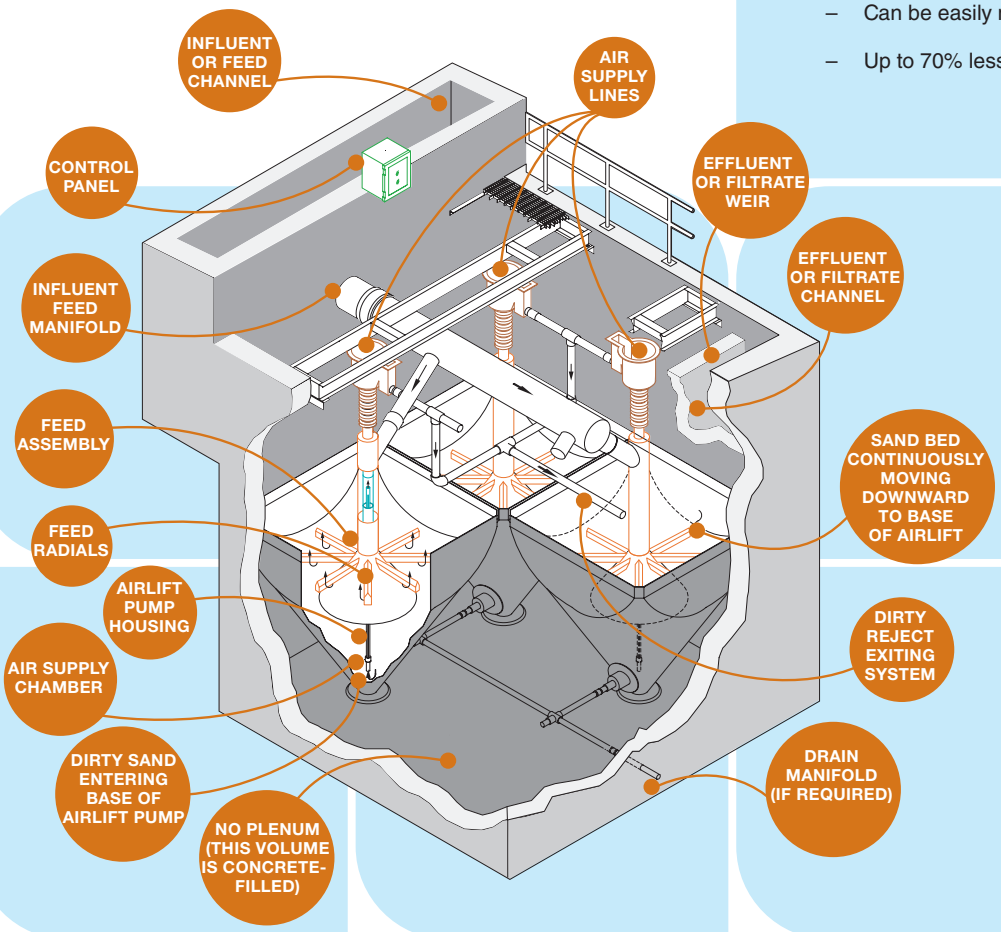
Concrete modules are frequently used for high flow capacity systems by placing multiple modules into a common filter cell. The modules in a filter cell share a common filter bed where cones at the bottom of each module distribute sand to their respective airlifts and sand washers. A concrete DynaSand® installation can be designed for any size filter area. This enables the technology to be applied to any size water or wastewater treatment plant. Since all filter beds are being continuously cleaned, the pressure drop remains low and even throughout all the filters. Equal pressure drop ensures even distribution of feed to each filter without the need for splitter boxes or flow controls. Therefore, a typical multiple unit installation can use a common header pipe with feed connections and isolation valves for each filter.

Features

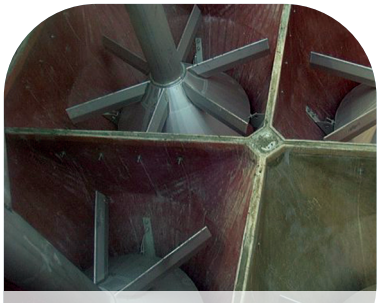
- Continuously cleaned sand bed
- No underdrains or screens
- Sand washed with filtrate
- No level control
- Internal, vertical airlift
- Low power requirements

Benefits

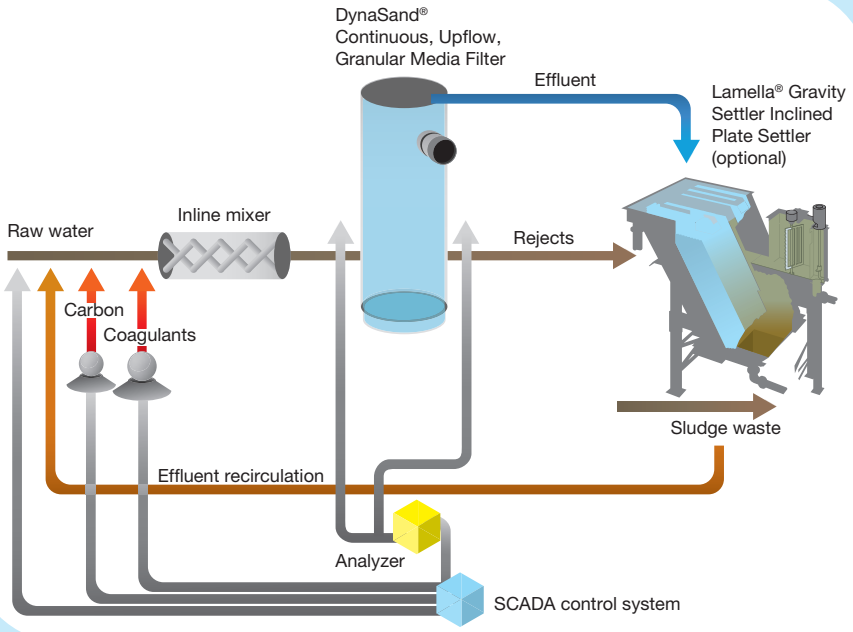
- No shutdown for backwash cycles
- Elimination of ancillary backwash equipment
- No flow control valves, splitter boxes, or backwash controls
- No short-circuiting
- Optimum sand-washing efficiency
- Superior filtrate quality
- Reduces operator attention
- Minimizes overall pressure-drop
- Reduces potential for pluggage
- Significantly reduces wear/maintenance
- Can be easily maintained without filter shutdown
- Up to 70% less compressed air vs. other self-cleaning filters



DynaSand® Filter above ground package units



DynaSand® Filter modules in concrete basin



DynaSand® Filter Applications

- Tertiary filtration
- Algae removal
- Potable water (turbidity and color)
- Oil removal
- Process water
- Brine filtration
- Metal finishing
- Cooling tower blowdown
- Steel mill scale
- Chemical processing
- Phosphorus removal
- Product recovery
- Denitrification
- Cryptosporidium and Giardia removal
- Surface water
- Ground water
- Arsenic removal
- Effluent reuse

DynaSand® Continuous Contact Filtration Process

Water and wastewater treatment in conventional plants typically involves flocculation, clarification and filtration. Direct filtration eliminates clarification but still requires flocculation. The DynaSand® Filter utilizes a proprietary process known as Continuous Contact Filtration. The DynaSand® Filter's 80" media bed depth provides greater hydraulic residence times and more opportunity for floc formation and attachment. Thus, coagulation, flocculation and separation can be performed within the sand bed, eliminating the need for external flocculators and clarifiers. Equipment savings can be substantial, up to 85% compared to conventional treatment and 50% compared to direct filtration. The DynaSand® Continuous Contact Filtration process is better suited to remove small floc, which can help reduce chemical requirements by 20-30% over conventional treatment.

Applications

The DynaSand® Filter is currently providing exceptional treatment in over 8,000 installations worldwide in a wide variety of applications.

Typical Data	Loading Rate (gpm/ft2)	Influent Solids	Filtrate Solids
Tertiary Filtration	3-5	20-50 ppm SS	5-10 ppm SS
Potable Water – Turbidity	4-5	10-30 NTU	0.1-0.5 NTU
Potable Water – Color	4-5	10–120 PCU	1-5 PCU
Process Water	5	10-30 NTU	0.1-0.5 NTU
Metal Finishing	4-6	20-50 ppm SS	2-5 ppm SS
Steel Mill Scale	8-10	50-300 ppm SS	5-10 ppm SS
Phosphorus Removal	3-5	<1 ppm Total P	<0.1 ppm Total P
Algae Removal	2-4	100 ppm SS	10-20 ppm SS
Denitrification	3-4	10-15 ppm TN	<3 ppm TN
Oil Removal	2-6	<50 ppm O&G	5-10 ppm O&G

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Fort Lauderdale 1.888.PARKSON
Chicago technology@parkson.com
Montreal www.parkson.com
Dubai