Appendix G

Aero-Mod
Treatment Process
Support Documentation

G-7: Nova Filter Proposal

Nova Water Technologies
Ultrascreen® Disk Filter

To:
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For:
Aeromod - Western NC

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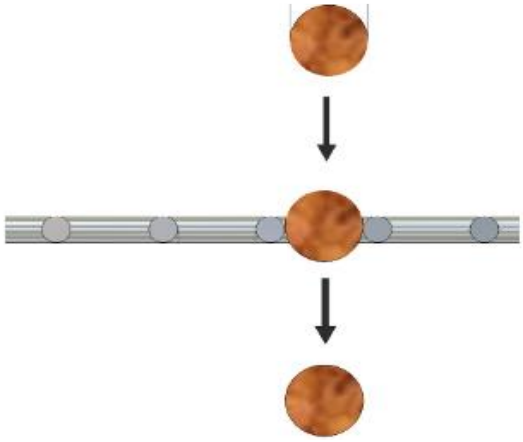
1.0 Introduction

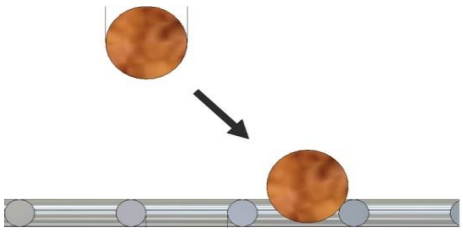
NOVA Water Technologies is pleased to offer equipment and services in accordance with our standard features. The basis of this proposal is compliant with the standard NOVA Water performance specifications and materials in 304 stainless steel. This proposal uses our Model UL1603CS disk filter.

2.0 Principle of Operation

The disks are always in slow rotation during normal operation. The water with TSS is fed at angles less than 90º, which is the basis for "dynamic tangential filtration." The rotation allows use of precision woven wire Stainless Steel micronic mesh, with micron ratings typically between 15 and 25 microns. The disk rotation presents these openings as if they were actually smaller than in a static orientation. This allows for the removal of particles smaller than 10 micron, while requiring minimal water for cleaning. This allows the unit to operate at higher loading rates and achieve equivalent effluent quality compared to static disk filters. This same principle has been proven consistently in the operation of rotatory drum screens, as on example.



Static Filtration – Particle Path



Dynamic Tangential Filtration – Particle Path

3.0 Mechanical Principles

The feed to the disks is introduced into a zone between, or “inside”, each set of disks (see Figure No. 1 below). Each disk is sealed to the walls of the tank by long lasting EPDM rubber seals to maintain filtration integrity and to prevent any short-circuiting. The feed passes through the filter mesh and freely falls into the filtrate zone below (Figure No. 2) and flows out of the effluent outlet. As TSS is captured the liquid level in the feed zone rises until it reaches a pre-set level. A sensor then initiates operation of the wash water pump and the back of the screen mesh is sprayed by low pressure water at 2 to 4 bar for typically one minute. Once the mesh is cleaned the level in the feed zone recedes to another pre-set level where a second level sensor deactivates the wash water pump. All of the solids cleaned from the fine filtration mesh are collected in a simple trough between the disks and leaves the filter under gravity flow. The reject troughs are connected to a common outlet and the concentrated wash water (reject) is sent for further treatment.

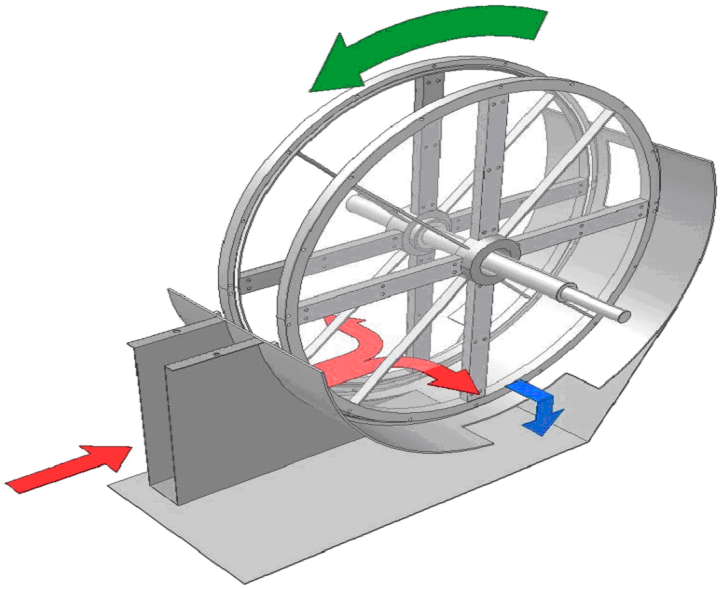


Figure No. 1
The filtration disks are arranged in pairs as show above

The level sensor is also used for turning the filter itself on and off. At low level the filter is de-energized and allowed to remain in a “filter ready” idle mode. This may occur in smaller plants during low flow periods of time. Once flow resumes the idle filter is energized and the normal filtration and wash cycles resume.

A level sensor will send a signal to the control panel when a high level condition or overflow situation occurs.

A situation such as this may occur when there is a significant upset in the plant or during a power outage.

The graphic below represents the typical flow condition during operation.

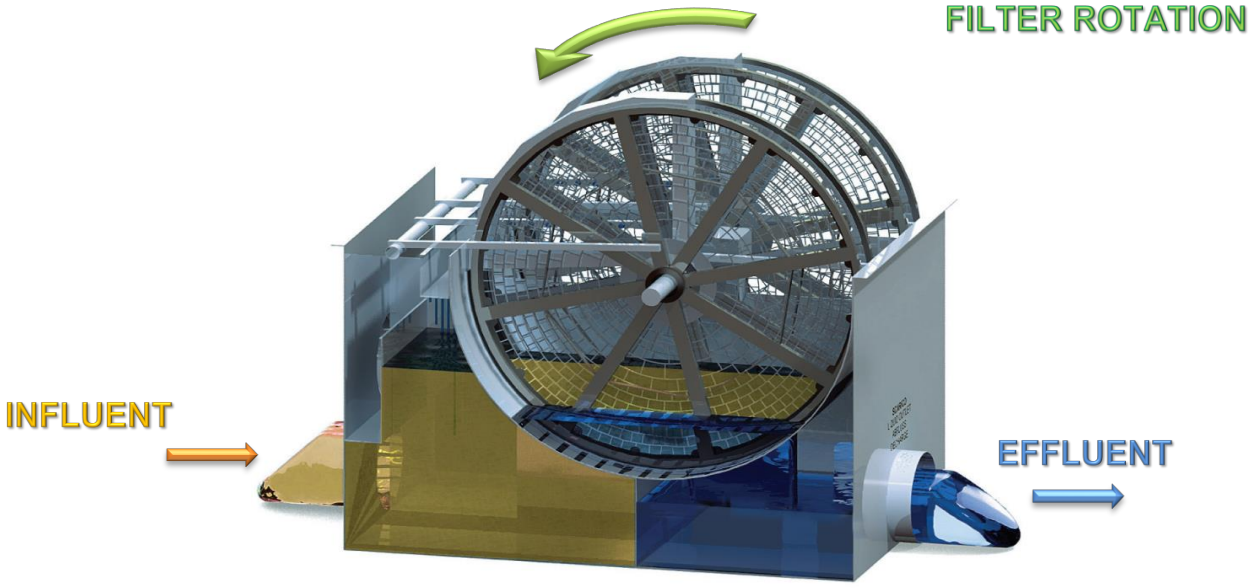


Figure No. 2
Improved filter design hydraulics results in significant increases in capacity

4.0 Plant Design Information

The filter is to be sized for:

	GPM	(MGD)
Average Daily Flow	694	(1.00)
Peak Daily Flow	2083	(3.00)
Redundancy Flow	2083	(3.00)

4.1 Design Information for Filter: UL1603CS

Number of filters	2	
Number of disks per filter	6	
Area per disk	22.0	sq.ft.
Total area per filter	132.0	sq.ft.
Loading rate at avg, 2 filters	2.63	gpm/sq ft
Loading rate at peak, 2 filters	7.89	gpm/sq ft
Loading rate at redundancy, 1 filters	15.78	gpm/sq ft
Filter Drive	(1) 2	hp
Wash Water pump	7.5	hp
Instantaneous Wash Water demand	95.9	gpm/unit
Wash water pressure	4	bar max
Total reject backwash wash water as % of the influent feed rate	0.5 - 1.0	%
Method of feeding filter	By Gravity or Pumped	
Maximum Head requirement	26.4	inches

4.2 Filter Performance Characteristics:

	Influent	Effluent
TSS	Avg. 10 mg/L Max. 15 mg/L	Less than 5 mg/L

5.0 Scope of Supply: UL1603CS

Image of Four (4) Model UL-1606-CS shown

- Qty (2) UL1603CS Ultrascreen® Disk Filter
- 304 stainless steel tank and framing
- 316L stainless steel filter mesh
- Qty (2) backwash pump (7.5 hp)
- Internal spray wash piping and nozzles
- Qty (2) Automatic sludge valve
- 304/304L stainless steel filter disks
- Ball valves and gauges as required
- NEMA compliant Relay Based control panel with 304SS enclosure, 3 Phase, 60 Hz
- Chain & Sprocket drive system
- Filter Level Control Sensor as required
- 304SS covers with two handles per section for easy removal
- Qty (1) year manufacturer's standard warranty

6.0 Budgetary Equipment Cost Estimate

Budgetary Price Estimate for the scope of equipment as shown above is _____ USD

Any taxes or fees are not included. Any changes to NOVA's typical controls may result in additional cost.

Equipment freight to the jobs site, engineering submittals, and start-up services are included in the budget pricing. Budgetary estimates are valid for 180 days.

7.0 Typical Drawings: See attached