



MUNICIPAL FILTRATION COMPANY

Muni-Disk® Testing

The Muni-Disk® cloth media filter was developed in 2005 and built in 2006 at the MFC facilities near Milwaukee, WI.

The first full-scale unit was setup at the 40 MGD Madison Metropolitan Sewerage District (MMSD) in summer 2006 and operated successfully until shutdown in Nov 2007. The test procedure and equipment were developed specifically for process testing of the innovative cloth media tertiary filter in cooperation with local fabricators and with the help and support of MMSD personnel.



The Filter: The MFC filter system consists of a stainless steel tank containing four (4) rectangular, fixed cloth media elements each capable of treating 200,000 gpd of secondary wastewater (0.8 MGD total). Secondary flow from one of nineteen MMSD clarifiers was diverted to the Muni-Disk® system via a self-priming pump, treated, then discharged into the clarifier's effluent channel. The entire system was powered

by a 3 hp pneumatic compressor, which along with the pneumatic open/close valves, are the only mechanical moving components in the system.

Operation: Filtration and backwash efficiencies were tested in 2006 and again in 2007. During the 18 month test period, flow from the secondary clarifier was pumped to the filter during all phases of filtration and backwash. The filtered effluent that collected in the Muni-Disk's main reservoir provided adequate hydraulic head to clean the cloth media during backwash operations. An air scour system was added in spring of 2007 to supplement the previous water only backwash and increase cleaning efficiency. The added agitation from the air scour helped loosen particles from the cloth fabric, which were then carried away with the backwash water flow. Testing in 2007 showed marked improvement in backwash water generation, with cycle time and program changes further improving backwash efficiency. Backwash dropped to as low as 3% of forward flow during the fall of 2007. (Cont Pg 2)



Air Scour Air Reservoir Added Spring 2007

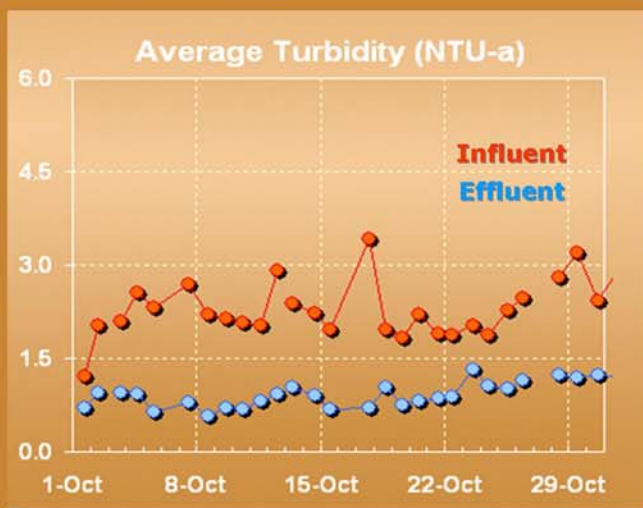
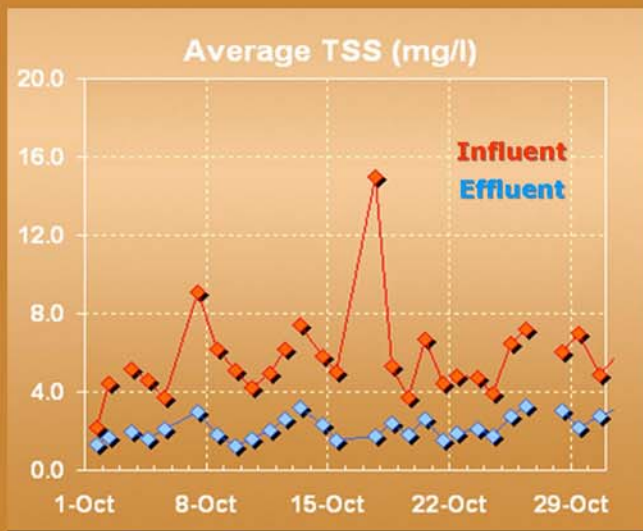
Filter Elements: The cloth media

2

. . . 4 mg/l with several grab samples

panels are sandwiched & supported within the 304 stainless steel framework that makes up each element. Muni-Disk[®] media panels are rectangular (despite the 'disk' name) and remain stationary during filtration and backwash. This design eliminates all suction pumps, spray systems, chain drives, and other mechanical wear items, resulting in the media exhibiting excellent resilience to wear over the test period. Usable surface area for each element is 45 ft², resulting in 180 ft² of cloth area for the filter. Hydraulic loading during the testing was as high as 3.0 gpm/ft² on a continuous basis.

Data: The Muni-Disk[®] filter produced re-use quality effluent throughout the entire test period. Effluent TSS was consistently below . . .



Operating Data from October 2007

below detection limits (<1.1 mg/l). Effluent Turbidity, measured as NTU, was consistently below 1.5 NTU, with numerous daily grab samples well below 1 NTU. (See data for Oct '07).

Summary:

Flow:	405 gpm(.6 MGD) w/3 600 gpm(.8 MGD) w/4
Load:	Up to 3.0 gpm/ft ² (continuous)
TSS:	Influent = 4-16 mg/l Effluent = 1.1-4 mg/l
NTU:	Influent = 1.5-6 NTU Effluent = 1-1.6 NTU
Power Usage	3Hp Compressor running intermittently = \$0.80/day(Filter Only)
Backwash:	5-7% of forward flow, as low as 3%

Field Demonstration:

Based on the successful testing at MMSD, the filter system will be mounted to a trailer, which is expected to be available for field demonstration in the spring/summer of 2008.



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