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ABSTRACT

Multimedia filtration is a common technique for the clarification of industrial and municipally supplied water. This process is high maintenance and moderately effective. Advances in filtration media have since shifted the leading edge and standards of performance. The functional results underscore the vastly improved effectiveness and impressive capital savings found in shifting to a more simplified & proficent filtration media.

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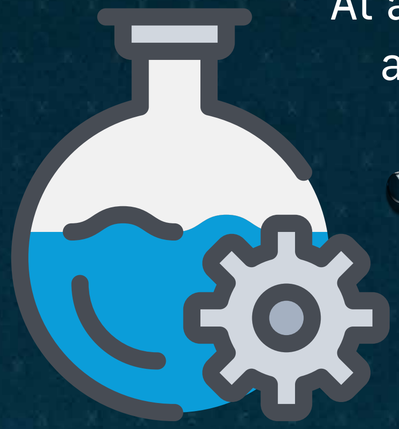
INFORMATION OVERVIEW

- Introduction To Next-Sand
- Comparison : Multimedia Filtration vs Next-Sand
- Next-Sand Properties
- Next-Sand Performance
- Pilot Studies & Installations
- Next-Sand Design & Function
- Next-Sand Advantages & Benefits

NEXT-SAND : INTRODUCTION

NEXT-SAND'S UNIQUE PROPERTIES WILL RADICALLY ALTER THE PERFORMANCE + COST OF YOUR MEDIA FILTRATION & ASSOCIATED CAPITAL EQUIPMENT



At almost half the weight of multimedia, the hardness, stability and microporous character of Next-Sand makes it a perfect filtration media for virtually every application in the water and wastewater treatment industries.

Natural zeolites are a low-cost resource recognized for their unique absorption, catalytic, ion exchange, and molecular sieve properties. Next-Sand is a rare, high-purity Clinoptilolite that offers the very best characteristics for use as water filtration media.

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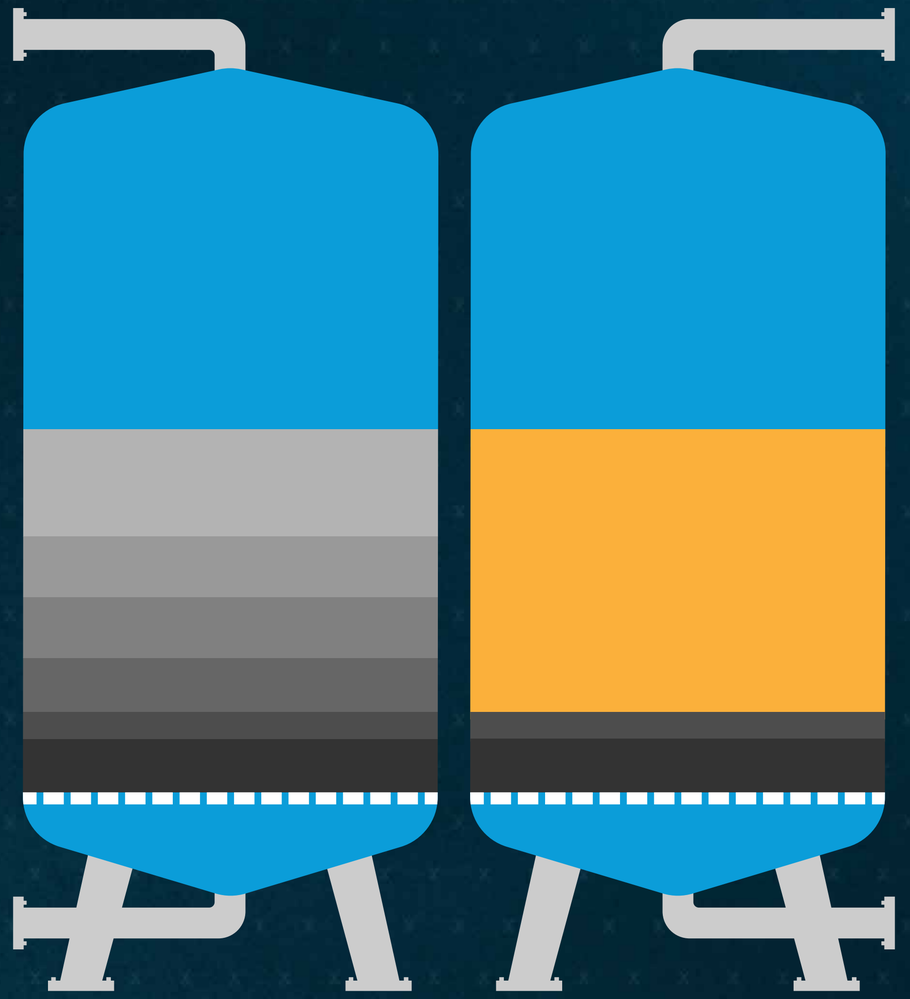
MULTIMEDIA FILTER vs NEXT-SAND

CONSTRUCTION COMPARISON



Freeboard : 50% +

Anthracite : .8-.9mm, 14”-15”

Sand : .45-.55mm, 8”-10”

Garnet : 30x40, 8”-10”

Garnet : 8x12, 6”-8”

Pea Gravel : 3”-4”

Gravel : 6”-8”

Freeboard : 50% +

Next-Sand : 36”-48”

Pea Gravel : 3”-4”

Gravel : 6”-8”

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MULTIMEDIA FILTER vs NEXT-SAND
CHARACTERISTICS COMPARISON

MULTIMEDIA	CHARACTERISTIC	NEXT-SAND
3 - 10 gpm/ft²	Flow Rates	Up to 20 gpm/ft²
12 - 20 micron	Filtration	5 micron (nominal)
15 - 17 gpm/ft²	Backwash Rate	15 - 17 gpm/ft²
0.002 m²/gm	Surface Area	25 m²/gm
95 lbs/ft³	Average Density	55 lbs/ft³
36” - 48”	Typical Bed Depth	36” - 48”

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NEXT-SAND PROPERTIES

- High-Purity, Processed Mined Mineral
- High Hardness / Minimal Attrition
- Lower Shipping Weight vs Multimedia
- High Surface Area
- Hydrophilic Surface
- NSF 61 Listed

- Uniformity Coefficient : 1.7
- Media Size : 14x40 Mesh
- Density : 55 lbs/ft^3
- Surface Area : 25 m^2/gm
- Surface Charge : Net Negative
- Bed Void Volume : 55% to 58%

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NEXT-SAND PERFORMANCE

- Flow Rates Up To 20 gpm/ft²
- 5 Micron Filtration Nominal
- Twice The Loading Capacity Of Multimedia
- Lower Delta P Than Multimedia
- Backwash Flows Of 15 - 17 gpm/ft²
- Bed Depth Equal To Fine Sand + Anthracite

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CASE STUDY #1

REVERSE OSMOSIS PRETREATMENT FOR BOTTLED WATER PLANT

BACKGROUND

A bottled water plant was using multimedia pretreatment for their RO system and sought improved filter performance for higher efficiency and reduced waste.

EQUIPMENT

Multimedia : 48” diameter tank; 36” bed of #16 garnet, #50 garnet, 20x40 mesh sand + anthracite

Next-Sand : 48” diameter tank; 36” bed of 14x40 mesh Next-Sand

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CASE STUDY #1

REVERSE OSMOSIS PRETREATMENT FOR BOTTLED WATER PLANT

TEST DESCRIPTION

The following tests - TSS (Total Suspended Solids), Turbidity, and SDI (Silt Density Index) - were performed over a 5 month period by the plant operators and a consulting chemical engineer.

TEST RESULTS

	FEED	MULTIMEDIA	NEXT-SAND
TSS	31mg/l	23mg/l	<5mg/l
SDI15	.40	.38	.18

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CASE STUDY #1

REVERSE OSMOSIS PRETREATMENT FOR BOTTLED WATER PLANT

CONCLUSION

Next-Sand outperformed multimedia in every aspect. An added benefit was the water savings afforded by Next-Sand's reduced backwash frequency of half that of multimedia.

The high-quality Next-Sand filtrate allowed the reverse osmosis system to operate at higher capacity and higher efficiency.

CASE STUDY #2

REVERSE OSMOSIS PRETREATMENT FOR BOILER FEED WATER

OVERVIEW

An electric power plant was designed and constructed with a multimedia filtration system as pretreatment for a reverse osmosis system. The design specification called for filtrate of the multimedia system (sand & anthracite) to produce 1500 gpm of water with an SDI of <2. The multimedia system was never able to meet this specification, forcing the plant engineer to find an alternative.

CASE STUDY #2

REVERSE OSMOSIS PRETREATMENT FOR BOILER FEED WATER

TEST DESCRIPTION

After a successful pilot testing, the existing vessels were reloaded with Next-Sand in early 2002. The system has consistently operated at designed capacity while exceeding the water quality specifications for years.

PERFORMANCE DATA

SYSTEM FLOW	1500 gpm (750 gpm/vessel)
SURFACE LOADING	~14 gpm/ft²

NEXT-SAND PERFORMANCE	**FEED SDI**	**FILTRATE SDI**
INITIAL	7	<1
24 MONTH AVERAGE	7	<1

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CASE STUDY #2

REVERSE OSMOSIS PRETREATMENT FOR BOILER FEED WATER

CONCLUSION

Next-Sand allowed the utility to operate their high-volume RO on a poor quality water supply that was otherwise unusable based on conventional filtration methods.

Next-Sand continued to perform well under challenging conditions without maintenance or replacement for more than 5 years.

CASE STUDY #3

FILTRATION PERFORMANCE : SDI & TURBIDITY REDUCTION + FILTRATION EFFICIENCY

BACKGROUND

Surface water (river water with silt and clay particles following a rain event in San Antonio, Texas) was tested to compare the relative efficiency and effectiveness of Next-Sand.

EQUIPMENT

Multimedia : 36” bed of #16 garnet, #50 garnet, 20x30 mesh sand and anthracite, operated at 12 gpm/ft²

Next-Sand : 36” bed of 14x40 mesh Next-Sand, operated at 12 gpm/ft²

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CASE STUDY #3

FILTRATION PERFORMANCE : SDI & TURBIDITY REDUCTION + FILTRATION EFFICIENCY

TEST DESCRIPTION

The tests were conducted over a 6 day period. Samples were taken daily.

TEST RESULTS

	FEED	MULTIMEDIA	FEED	NEXT-SAND
TURBIDITY	237	171	252	90
SDI10	8.1	6.1	8.9	4.1

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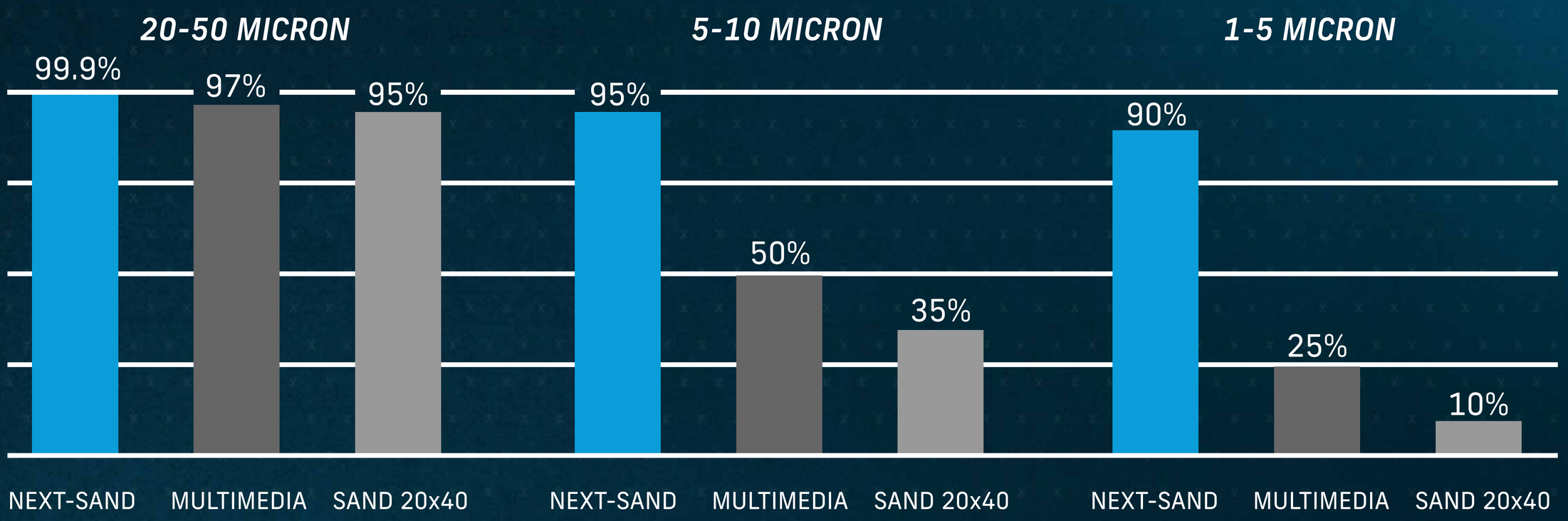
CASE STUDY #3

FILTRATION PERFORMANCE : SDI & TURBIDITY REDUCTION + FILTRATION EFFICIENCY

TEST RESULTS

FILTRATION EFFICIENCY



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CASE STUDY #3

FILTRATION PERFORMANCE : SDI & TURBIDITY REDUCTION + FILTRATION EFFICIENCY

CONCLUSION

The particle analysis shows that Next-Sand performs as well as or better than most 5 micron cartridge filters. Next-Sand operated at half the backwash frequency indicating twice the solids loading capacity of multimedia.

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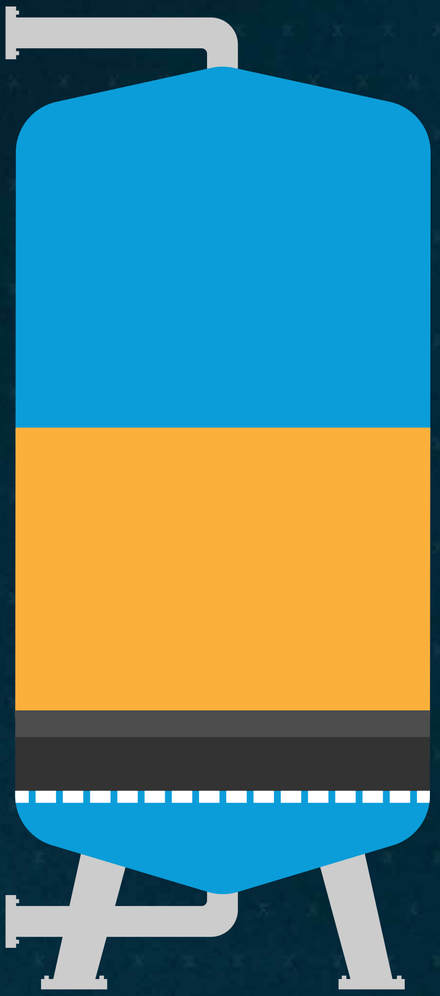
NEXT-SAND SYSTEM DESIGN



FREEBOARD : 50% +

NEXT-SAND : 36” - 48”

UNDERBEDDING : NORMAL

SIZING GUIDELINE : 12-20 gpm/ft²

[Depending On Filtrate Quality
Target & Contaminant Load]

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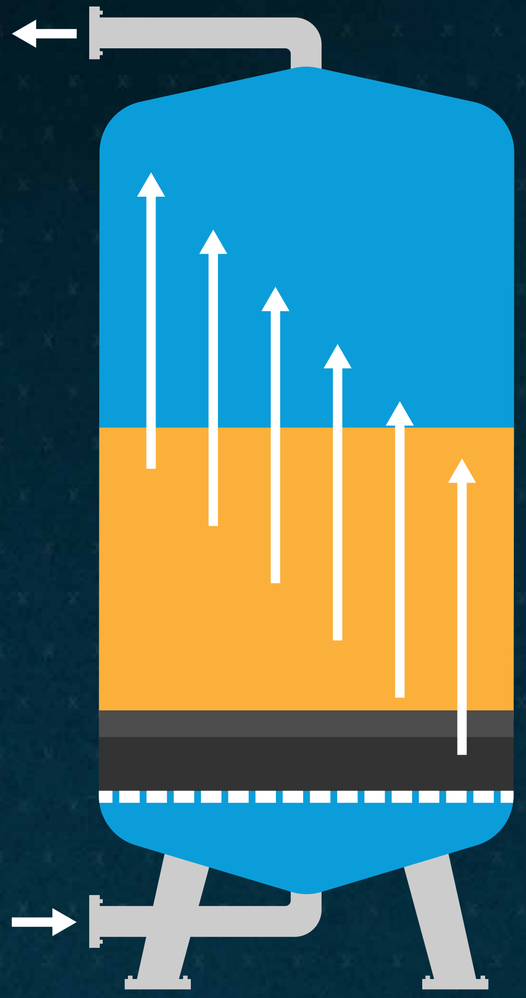
NEXT-SAND LOADING & START UP



1. Load & Level Underbedding
2. Backwash 20-30 Minutes To Clean & Level
3. Load Next-Sand
4. Backwash 20-30 Minutes
5. Settle For 15 Minutes
6. Backwash Again 15-20 Minutes
7. Ready For Service

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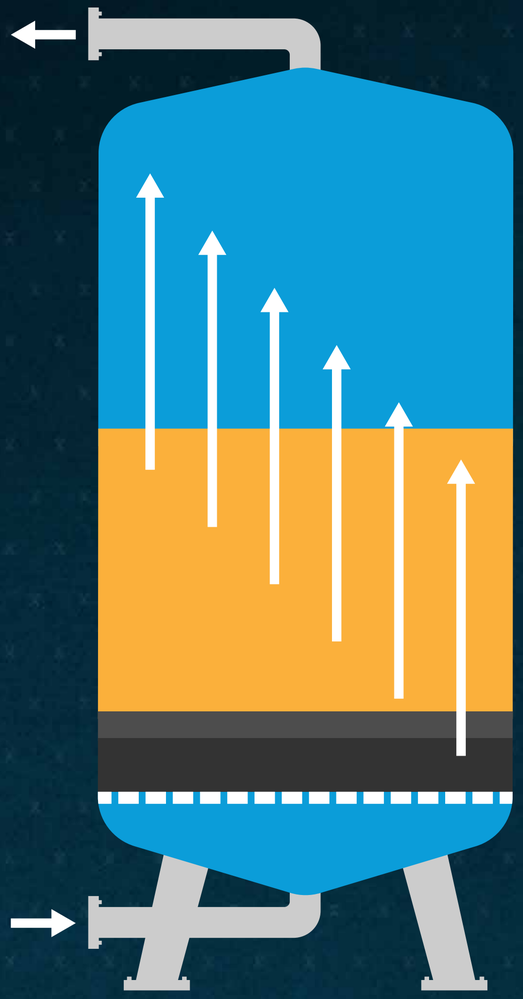
NEXT-SAND BACKWASH



BACKWASH

Backwash at 15-17 gpm/ft² for 10-15 minutes

OPTIONAL : AIR SCOUR

Use 2-3 scfm/ft² air at 90 psi with 3-5 gpm/ft² water backwash (@ 77 °F)

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NEXT-SAND ADVANTAGES & BENEFITS

- Higher Filtration Efficiency
- Lower Pressure Drop
- Higher Performance & High Flows
- Higher Dirt Loading Capacity
- Less Maintenance
- Simplified Inventory

- Less Frequent Backwash

[Saves Time, Water, and Power + Reduces Waste Volume]

- Light Weight Means Lower Freight Costs
- Higher Filtration Efficiency Means Lower Turbidity
- NSF 61 Listed

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NEXT-SAND CAPITAL BENEFITS

COST COMPARISON VS MULTIMEDIA FILTRATION

HALF THE WEIGHT = HALF THE FREIGHT
TWICE THE LOADING = HALF THE WATER USAGE & WASTE
TWICE THE FLOW = HALF THE CAPITAL EQUIPMENT
REDUCED BACKWASH = ENERGY & MAINTENANCE SAVINGS

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NEXT-SAND CAPITAL BENEFITS

COST COMPARISON VS MULTIMEDIA FILTRATION

MULTIMEDIA	500 gpm RO PRETREATMENT	NEXT-SAND
100 ft² (Online)	Surface Area	50 ft² (Online)
3 (96” Diameter)	Filter Vessels Required	3 (66” Diameter)
~527 ft³ (~50,000 lbs)	Media Volume	~249 ft³ (~13,725 lbs)
850 gpm (6” Pipe)	Backwash Required	400 gpm (4” Pipe)
Once Per Day	Backwash Frequency	Once Per Day
51,000 Gallons	Backwash Volume	24,000 Gallons

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NEXT-SAND CAPITAL BENEFITS

COST COMPARISON VS MULTIMEDIA FILTRATION

Footprint Savings : 60%

Capital Savings : $22,500 (Tanks & Piping)

Freight Savings : $1,825 (@ $5/cwt)

Water Savings : $29,565/year (@ $3/1000 gal)

Media Savings : $2,904 (On Reduced Volume)

Capital & Freight Savings : $97.69/$ft^3$

Water Savings : $59.13/gpm Installed Capacity/Year

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HALF THE WEIGHT & TWICE THE EFFICIENCY

WHY PAY MORE AND FILTER LESS?

There is no better time to improve your media filtration performance, find your local distributor today!

For more info, visit NextFiltration.com | Email: sales@nextfiltration.com