

## Nalco UltraSand™ Plus High Efficiency Filters (HEF)

### FEATURES

- 0.5 or 0.25 Micron particle removal
- Flow ranges from 35 to 800 gpm
- Pre-packaged and ready to install
- Skid mounted and movable
- Modular design for flexibility & expandability
- ASME Corrosion resistant stainless steel tanks
- Durable steel manifold with low voltage valves and control
- Single point power connection facilitates installation
- Centrifugal pump with safe and reliable TEFC motor (480 V/3 pH/60 Hz)
- Industrial PLC with HMI
- NEMA 4 control and motor starter with power disconnect
- Automated city water backwash based on pressure differential and time
- Remote monitoring capabilities

### DESCRIPTION

The ability to remove extremely fine particles is the key to successful cooling water filtration. UltraSand Plus high efficiency filters utilize ultra-fine sand to remove particulate matter down to 0.5 or 0.25 micron.

### BENEFITS

Clean water reduces operating costs. Particulate in cooling water systems causes fouling of critical heat exchange equipment. Fouling of heat transfer surfaces has a negative impact on plant efficiency, throughput, and operating costs. High efficiency filtering can be employed to remove particulate matter that causes deposition, thereby helping achieve the following benefits:

- Minimized Downtime, Maintenance, and Cleaning Costs: Avoiding production losses and unexpected costs are critical in today's competitive business environment.
- Increase Equipment Reliability: Maintaining clean water helps reduce cooling system corrosion rates. Eliminating deposits from metal surfaces reduces the possibility of under-deposit corrosion.
- Minimize Capital & Space Requirements: Design and operational factors allow high efficiency filters to be sized much smaller than traditional filtering systems.
- Improved Microbiological Control: Enhance microbiological control by filtering out particulate that acts as seeding sites for bio-formation.



Figure 1 – UltraSand Plus HEF System

## OPERATION

When unfiltered water is directed horizontally into the filter tank, an area of turbulence is created over the bed. Particulate trapped on the surface by the ultra-fine sand is scrubbed off the surface by these turbulent forces. This scrubbing action keeps the filtration surface clean and available for continued particle removal. Backwash frequency is minimized by storing particulate in the turbulent water above the bed and in the naturally formed storage area close to the inlet nozzle. The filter automatically backwashes based on differential pressure or time.

## SIZING

### Particle Analysis

Analyzing the quantity and size of contaminant particles is the first step to cleaning up contaminated cooling water systems. In most cases, visual inspection is inadequate since the majority of suspended matter cannot be seen with the naked eye. A Nalco Water particle size analysis must be conducted to profile the particle composition of your system.

A professionally trained Nalco Water representative will use the test results to compare the effectiveness of various filtration technologies and determine the proper filter size for your system.

Contact your local Nalco Water representative to determine if your system can benefit from high efficiency filtration.

### Cooling Tower Applications

The application of Nalco Water's UltraSand Plus HEF for a cooling tower is sized based on the recirculating flow through the tower. The recirculating flow rate is the sum of the output of all recirculation pumps on any connected basins. If three basins are plumbed together and each basin has one running pump, the total re-circulation flow rate is the sum of the output of those three pumps. The UltraSand Plus HEF for a cooling tower is sized to accommodate a side stream of 2 to 4% of the total recirculation flow rate.

Because these filters have much greater efficiency than a standard multimedia filter, they can be sized smaller than the typical 10% of total recirculation. On systems that see heavy loading of dirt, such as a tower placed in an open dirt field, a filter should be sized to the higher end of the 2 to 4% range. For systems that are more protected, a filter sized toward the lower end of the 2-4% range will be adequate.

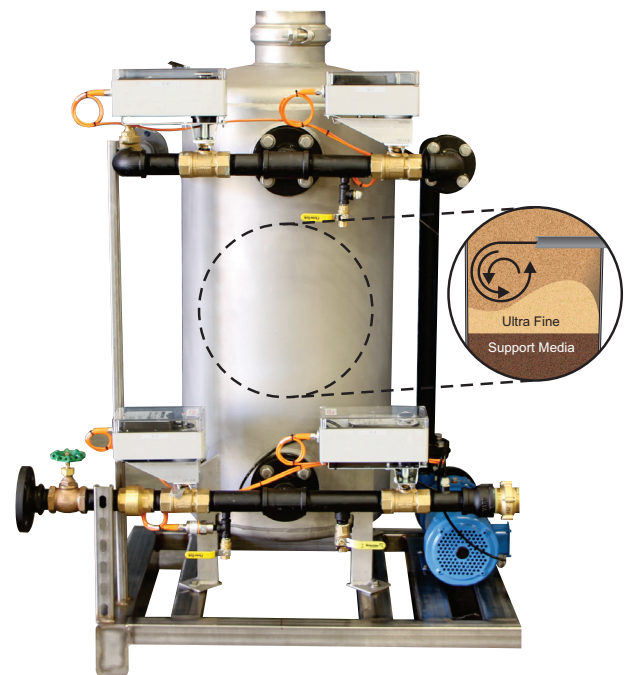


Figure 2

### Closed Loop Applications

The application of Nalco Water's UltraSand Plus HEF for a closed loop is sized based on the total volume (gallons) of the cooling system. The goal is to filter the entire volume of the system in one to three days. Systems that experience heavier loading of suspended particulate should be sized to turn the volume over more frequently (a larger filter), while systems that stay cleaner can be sized to turn the volume over less frequently (a smaller filter). For extremely large closed loops, such as large thermal storage loops, the filter might be sized to turn over the total volume in as much as three to seven days.

## Standard System Requirements

Specification	Requirement
Inlet Water Pressure (from Cooling System)	10-70 psig
Backwash Water Source Pressure	40-60 psig
Inlet / Backwash Water Temperature	40-100°F
Electrical Requirement (standard)	480VAC/3PH/60HZ
Dimensions/Weights	Refer to System Drawing
Location	Indoors out of direct sunlight & rain
Backwash Water Discharge	Atmospheric Floor Drain

## Specifications

Single Tank 0.5 Micron UltraSand Plus filters for Cooling Tower Applications

Description	Micron Rating	Flow Rate GPM	Backwash Flow Rate GPM (total)	Motor HP	Piping Connections				Cooling Tower Flow (gpm)
					Filter Inlet (in)	Filter Outlet (in)	City Inlet (in)	Backwash Outlet (in)	
Single 20" Vessel	0.5	50	25 (125)	1.5	2	2	1.5	1.5	0-2500
Single 30" Vessel	0.5	100	45 (225)	3	3	3	2	2	2500-5000
Single 36" Vessel	0.5	140	75 (375)	5	3	3	2	2.5	3500-7000

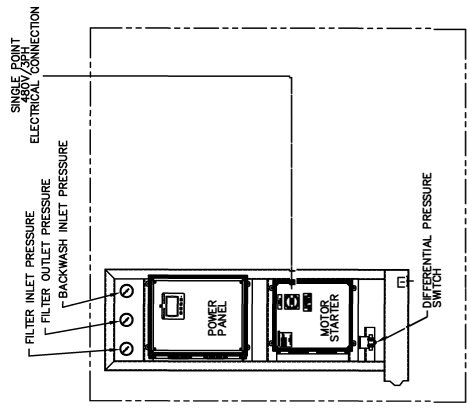
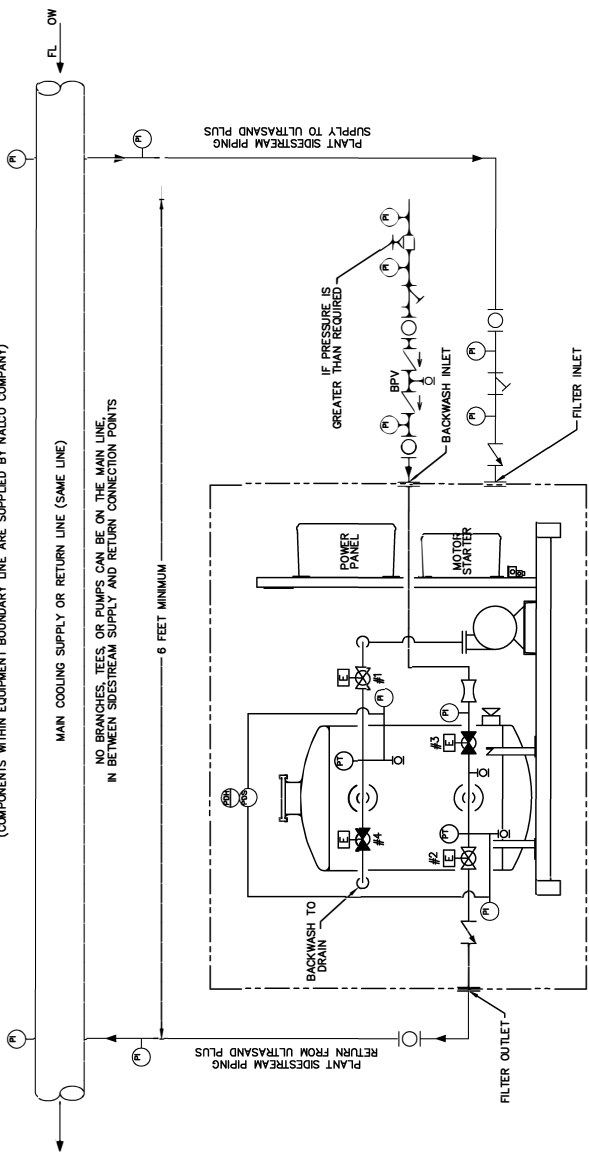
Single Tank 0.25 Micron Ultrasand Plus Filters for Closed Cooling Water Applications

Description	Micron Rating	Flow Rate GPM	Backwash Flow Rate GPM (total)	Motor HP	Piping Connections				Closed Loop Volume (gal)
					Filter Inlet (in)	Filter Outlet (in)	City Inlet (in)	Backwash Outlet (in)	
Single 20" Vessel	0.25	35	15 (105)	1.5	2	2	1.5	1.5	0-150,000
Single 30" Vessel	0.25	70	35 (245)	3	3	3	2	2	100,000-300,000
Single 36" Vessel	0.25	98	50 (350)	5	3	3	2	2.5	140,000-425,000

Multi-Tank 0.5 Micron UltraSand Plus filters

Description	Micron Rating	Flow Rate GPM	Backwash Flow Rate GPM (total) per vessel	Motor HP	Piping Connections				Cooling Tower Flow (gpm)	Closed Loop Volume (gal)
					Filter Inlet (in)	Filter Outlet (in)	City Inlet (in)	Backwash Outlet (in)		
(2) Two 30" Vessels	0.5	200	45 (225)	5	4	4	2	2	5,000-10,000	288,000-864,000
(3) Three 30" Vessels	0.5	300	45 (225)	10	4	4	2	2	7,500-15,000	432,000-1,296,000
(4) Four 30" Vessels	0.5	400	45 (225)	10	6	4	2	2	10,000-20,000	576,000-1,728,000
(6) Six 30" Vessels	0.5	600	45 (225)	15	6	6	2	2	15,000-30,000	864,000-2,592,000
(8) Eight 30" Vessels	0.5	800	45 (225)	20	8	6	2	2	20,000-40,000	1,152,000-3,456,000

**TYPICAL SIDESTREAM FILTER INSTALLATION**  
(COMPONENTS WITHIN EQUIPMENT BOUNDARY LINE ARE SUPPLIED BY NALCO COMPANY)



- NOTES:**
1. INSTALLATION MUST CONFORM TO ALL LOCAL PLUMBING AND ELECTRICAL CODES. CODE COMPLIANCE IS THE RESPONSIBILITY OF THE OWNER.
  2. SIDESTREAM PIPING TO CONNECT TO LOWER HALF OF HORIZONTAL MAIN COOLING LINE.
  3. SEE SPECIFIC FILTER DRAWING FOR APPROXIMATE DIMENSIONS & PLANT PIPE SIZE CONNECTIONS.
  4. CUSTOMER TO MINIMIZE FRICTION HEAD LOSS ALONG SIDESTREAM PIPING SUPPLY TO & RETURN FROM ULTRASAND PLUS.
  5. INSTALL PRESSURE REDUCING VALVE BEFORE BACKWASH WATER (CITY WATER) INLET. EXAMPLE: IF BACKWASH WATER PRESSURE IS GREATER THAN REQUIRED.
  6. STANDARD SYSTEMS:  
FILTER INLET WATER PRESSURE (AT INLET TO FILTER PUMP): STEADY AT 10 PSIG MIN., 70 PSIG MAX.  
BACKWASH WATER PRESSURE: (AT INLET TO FILTER): STEADY AT 40 PSIG MIN., 60 PSIG MAX.
  7. BACKWASH TO DRAIN. ATMOSPHERIC FLOOR DRAIN NEXT TO SYSTEM. CHECK FOR SUFFICIENT SIZE DRAIN FOR SPECIFIC FILTER'S BACKWASH GPM.
  8. CUSTOMER SHOULD CONSIDER INSTALLING LIKE IN OTHER EQUIPMENT INSTALLATIONS, CUSTOMER OWNED CHECK VALVE AND STRAINER UPSTREAM OF EQUIPMENT.

**LEGEND - SYMBOLS**

	CHECK VALVE
	BALL VALVE
	Y-STRAINER
	BACKFLOW PREVENTER
	PRESSURE GAUGE
	PRESSURE REDUCING VALVE
	EQUIPMENT BOUNDARY

REV	DESCRIPTION	BY	DATE
1	FIRST RELEASE	RP	6/24/73
2	TEXT CHANGE	KK	7/8/76

CUSTOMER: NALCO  
 PROJECT NO.: 7/24/73  
 DATE: 7/24/73  
 DRAWN BY: RP  
 CHECKED BY: KK  
 APPROVED BY: N.S.  
 TITLE: ULTRASAND PLUS FILTER TYPICAL SIDESTREAM INSTALLATION

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## System Requirement Guidelines

1. *Inlet water supply pressure to the filter pump must be between 10-70 psi.* Pressure below 10 psi may starve the flooded suction pump for flow resulting in mechanical seal failure. Incoming pressure above 70 psi require non-standard filters with different specifications and materials of construction. Over-pressurization is a safety issue and should be considered a serious matter.
2. *System water temperature must be between 40-100°F.* Temperatures <40°F or >100°F will require non-standard equipment containing special materials of construction.
3. *Backwash water source can either be city water or system water.* City water is highly recommended over system water because the cleaner water will provide longer bed life. Average bed life with city water is 5 years and 3 years with system water. City water or system water needs to be specified before order and fabrication.
4. *Backwash water source pressure must be between 40-60 psi.* Pressures < 40 psi will reduce flow rates and not provide for an effective filter backwash. Particulate and bacteria will build up in the filter bed. A bed replacement will be required in as little as a few weeks. Pressures < 40 psi will require a backwash water source booster pump. Pressures > 60 PSI will increase backwash flow rates and result in the loss of the top layer of ultra-fine sand. Loss of this critical layer of media dramatically reduces filtration efficiency. Additional sand will have to be added to the filter to restore performance. Pressures > 60 psi may also damage the flow control valve. Pressures > 60 psi will require a pressure regulator to reduce pressure below 60 psi.
5. *Atmospheric floor drain line must be in close vicinity of the filter.* The drain must be an open to atmosphere drain capable of accomodating the backwash flow rate (gpm) and volume of water required for backwash.
6. *Electrical supply for the standard equipment is 480 VAC/3 pH/60 HZ.* An uninterrupted alternating current (AC) electrical supply is required.
7. *Location of system should allow adequate space required to install and service the system in the future.* Do not place system outdoors or in direct sunlight.
8. *Side stream supply and return must be installed per "installation diagrams" as outlined on the previous page.*

## To Order

Contact your local Nalco Water Sales Engineer.

## Support

If you have any questions, please contact your Nalco Water representative. In North America, you can contact the Nalco Global Equipment Solutions Help Desk at 1-866-798-7444.

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