
APPENDIX C.4
FINE SCREEN

Lakeside's *RAPTOR*[®] Micro Strainer

Ideal for small treatment plants



- Removes solids that pass through other screens
- Single operational unit screens, compacts and dewateres
- Minimizes maintenance costs

Innovative Screening Solutions

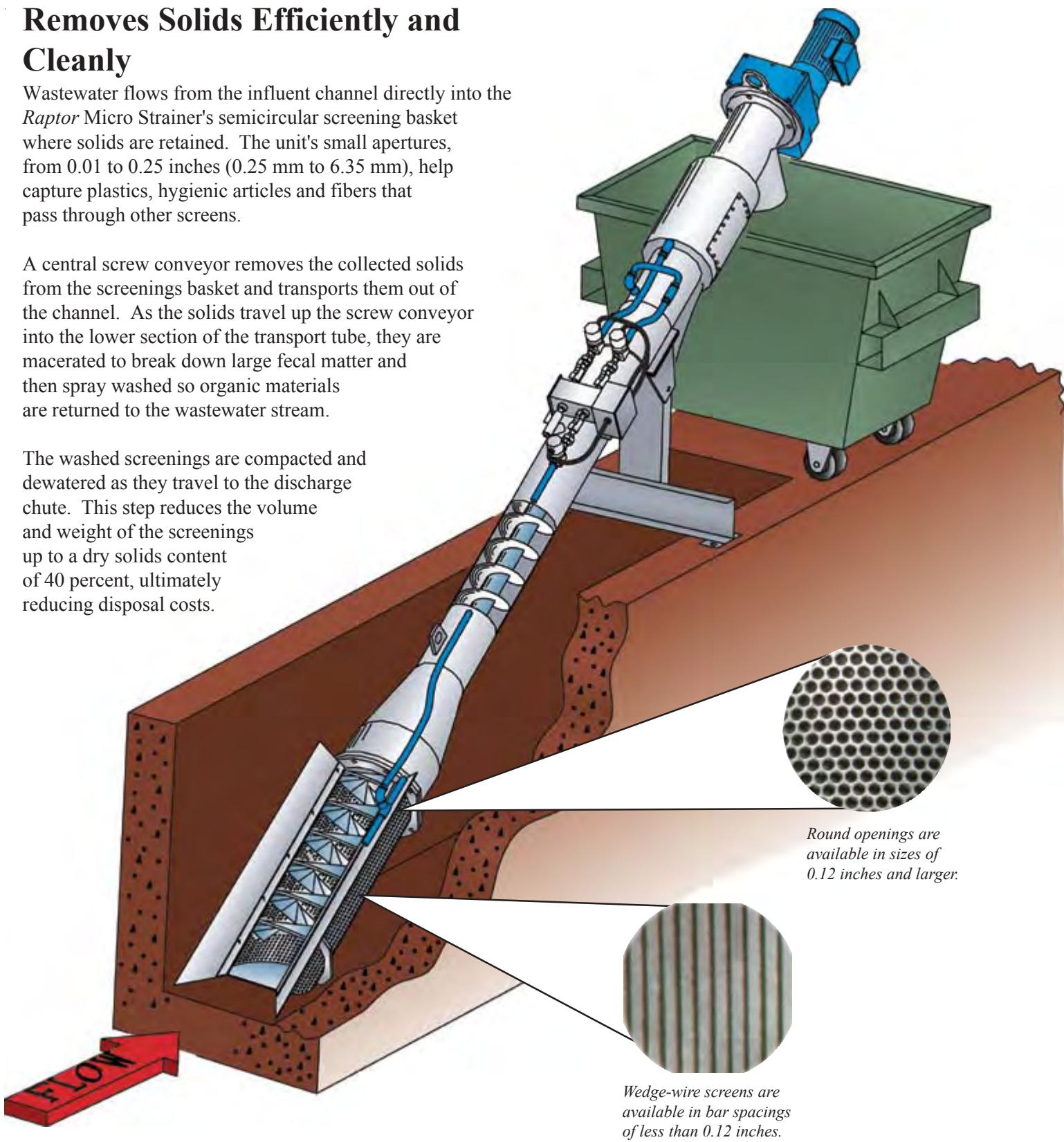
The Lakeside *Raptor* Micro Strainer meets and exceeds the expectations of operators worldwide by providing innovative screening solutions. Not only does the *Raptor* Micro Strainer remove solids from narrow channel installations but it also washes and dewateres the captured screenings. The *Raptor* Micro Strainer features simple design and operation and high removal efficiency with low disposal costs.

Removes Solids Efficiently and Cleanly

Wastewater flows from the influent channel directly into the *Raptor* Micro Strainer's semicircular screening basket where solids are retained. The unit's small apertures, from 0.01 to 0.25 inches (0.25 mm to 6.35 mm), help capture plastics, hygienic articles and fibers that pass through other screens.

A central screw conveyor removes the collected solids from the screenings basket and transports them out of the channel. As the solids travel up the screw conveyor into the lower section of the transport tube, they are macerated to break down large fecal matter and then spray washed so organic materials are returned to the wastewater stream.

The washed screenings are compacted and dewatered as they travel to the discharge chute. This step reduces the volume and weight of the screenings up to a dry solids content of 40 percent, ultimately reducing disposal costs.



Design Features

Superior Design and Construction

- All stainless steel construction for superior corrosion resistance.
- The simple mechanical design requires very little maintenance which is ideal for small plants.
- A hinged structural support permits the unit to pivot out of the channel so all maintenance can be done above floor level.
- An uncomplicated drive assembly makes the unit easier to service and reduces maintenance costs.
- The unit is shipped fully assembled to minimize installation expenses.
- Lower polymer bearing blocks promote longer brush life and can be replaced without disassembling the screen.
- Thicker materials than competing units (0.25 in. thick outer tube and 0.12 in. thick basket) provide longer life.
- All mating parts are machined to ensure proper rotation.



The Raptor Micro Strainer's enclosed drive assembly reduces maintenance expenses.



The stainless steel, shaftless screw conveyor improves screening performance.



Exceptional Efficiency and Handling

- The unique screening basket and 35° to 45° angle of inclination provide high removal efficiency.
- A two-stage screenings wash water system aids in returning organic material to the wastewater stream.
- An integrated screening press reduces the volume and weight of screenings for lower disposal costs and cleaner operation.
- An enclosed transport tube and optional bagging attachment reduce odors and offer a clean working environment to the operator.
- An optional insulation and heating system permits operation in cold climates.

Additional Raptor Micro Strainer Features

Control Panel

Lakeside control panels are PLC equipped for versatile and efficient operation. Explosion-proof designs are available.



Operation is completely automatic.

Factory Pre-Wired

Factory pre-wired solenoid valves save installation costs.



Optional Bagging Attachment



The optional continuous bagging attachment provides a clean work area.

Optional Weather Protection System

Available for all sizes of screens and transport tubes, the Lakeside weather protection system protects to 13° below zero (minus 25° C).



Constructed of fiberglass reinforced polyester laminate.

Lakeside Raptor Screening Products

Fine Screen - Unique 3-plane screen design provides greater screenings removal efficiency without blinding.

Rotating Drum Screen - With bar spacings as narrow as 0.01 inches, screens the finest solids.

Wash Press - Lowers disposal costs by reducing the volume and weight of screenings.

Complete Plant - Screens inorganics and removes grit in one self-contained unit.

Septage Acceptance Plant - Removes inorganic solids from municipal, industrial and septic tank sludge.

Other Lakeside Screening Products

CSO Screens

Stormwater Screens

Water Intake Screens

Hydronic T telescoping rake bar screen cleaner

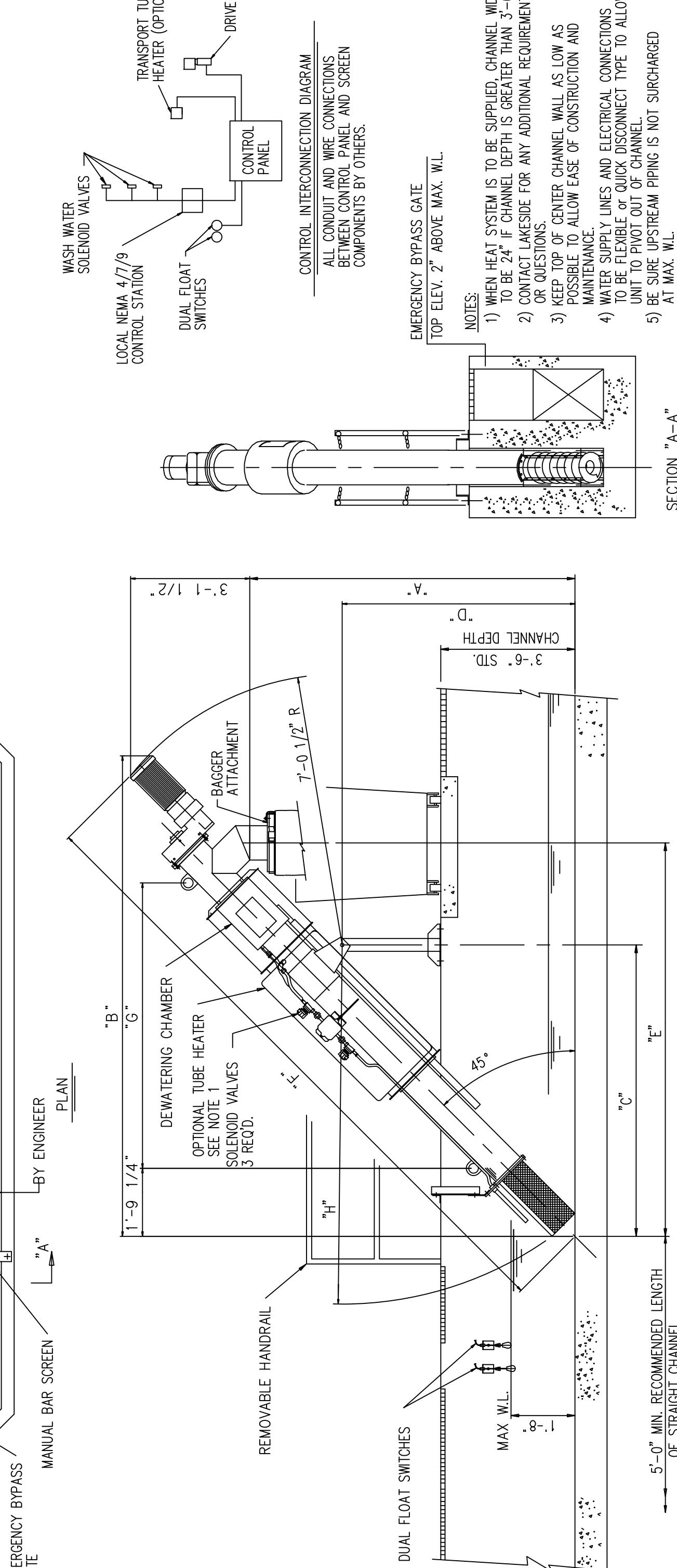
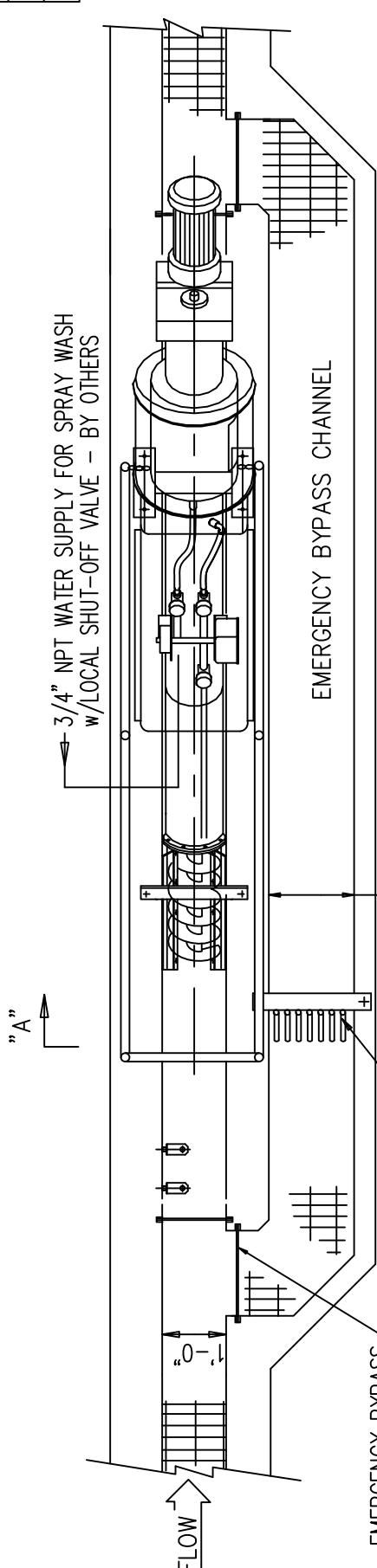


LAKESIDE
Water Purification Since 1928

1022 E. Devon, P.O. Box 8448
Bartlett, IL 60103
630/837-5640, FAX: 630/837-5647
E-mail: sales@lakeside-equipment.com

B: 35a 10/24/107 DXF

12MS	PART No	A	B	C	D	E	F	G	H
STD	-101	8'-5 1/2"	12'-4 1/4"	7'-7 1/4"	5'-11 1/2"	10'-2 3/4"	16'-7 1/2"	7'-2 1/2"	9'-3 5/8"



6) FOR PROPER APPLICATION OF THIS PRODUCT REFER TO RMI-95, LAKESIDE SCREEN GENERAL DESIGN NOTES.

11/4/2015

LAKESIDE EQUIPMENT CORPORATION
PO Box 8448 Bartlett, IL 60103-8448

LEC: 1.4

JOB: Taos Ski Valley, New Mexico

ENG: TEC

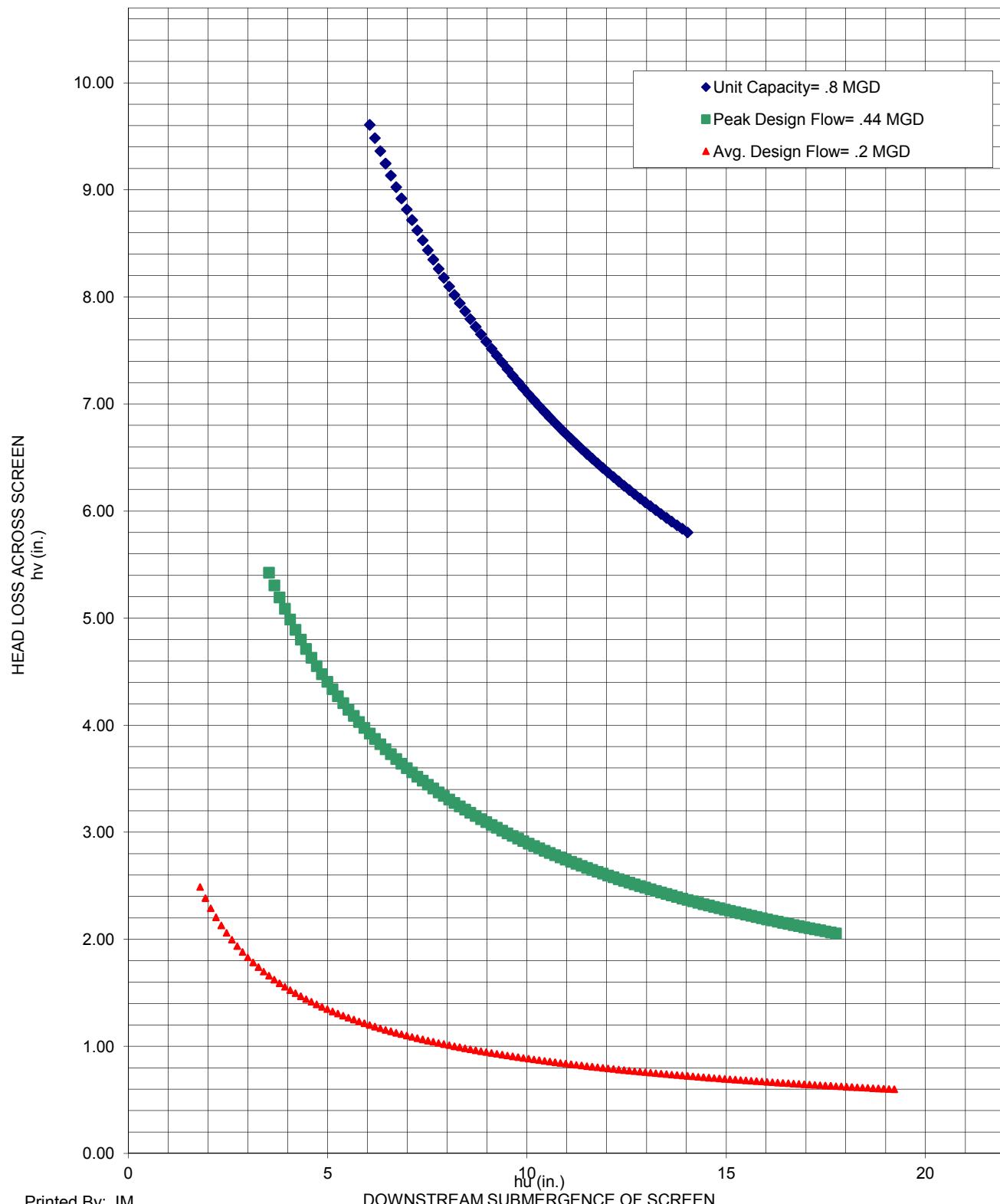
Model: 12MS-0.125

Maximum Water Level= 19.88 in.

(Hu + Hv)

Diameter: 12"

: 1/8"



APPENDIX C.5
UV DISINFECTION



The NeoTech D428™ is specially designed to disinfect water and is an essential component in advanced oxidation processes.

This high-efficiency UV system utilizes NeoTech Aqua's patented ReFlex™ chamber technology, reflecting over 99% of the 254nm UV generated. It is the highest efficiency, smallest footprint, and lowest operating cost UV system in the water treatment industry.

PRODUCT BENEFITS

- Dual lamp efficiency processes up to 300 gallons per minute
- 75% smaller footprint compared to standard UV systems
- May be mounted vertically or horizontally
- Up to four units may be controlled with a single micro-control box
- Built for 120V or 230V single phase power providing maximum flexibility
- No flow, no problem – guaranteed 60 minutes
- Water contact finish – Ra-15
- Controller- Remote
- Alarms, Remote Control, 4-20 mA output
- Realtime dosimetry, 100% dosage assurance – with constant flow
- UV monitor is NIST traceable
- Sanitization in place – hot water or steam
- No-tool lamp change
- NSF Standard 50 certified
- Warranty one year parts and labor

SPECIFICATIONS

Flow Rate - gpm (m³/hr.) - 99% UVT @ 40ml/cm²λ	300 (68)
Flow Rate - gpm (m³/hr.) - 99% UVT @ 30ml/cm²λ	300 (68)
Flow Rate - gpm (m³/hr.) - 95% UVT @ 40ml/cm²λ	226 (51.3)
Flow Rate - gpm (m³/hr.) - 95% UVT @ 30ml/cm²λ	300 (68)
Number of High Output Amalgam Lamps	2
Lamp Life - Hours	9000
Operating Power - watts	235
Operating Pressure - psi (bar)	150 (13)
Operating Temperature - °F (°C)	36 - 104 (2 - 40)
Pressure Drop at rated flow - psi (bar)	2.8 (0.24)
Dry Weight - pounds (kg)	54.8 (24.9)
Dimensions (L x H x D) - inches	30.6 x 7.9 x 11.4
Dimensions (L x H x D) - millimeters	776 x 201 x 290
Sanitary Fittings - Standard	3 in.

- * Lamp life is based on a maximum of one on-off cycle per day and room temperature water.
- * Lamp life is based on a maximum of one on-off cycle per day and room temperature water.
- + All units come standard with sanitary tri-clamp fittings for improved reliability, sanitation, and ease of installation. Alternative connections are available upon request.

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[684.6]

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[496.1]

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[78.2]

7.90

[200.7]

11.40

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7.96

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4X Ø .40 [10.1] THRU

OPTIONS AND SPARES

Description	Part Number
*Light Trap Kit	UVLTK-4
Cleaning Kit	CK-4-1
Amalgam Lamp Kit	LK-28
Lamp Sleeve Kit	QSK-28
UV Monitor Calibration	UVIM-CAL
Ballast Kit, 120V	BK-120
Ballast Kit, 230V	BK-230

* Reflected UV light may be harmful to nonmetallic surfaces, such as PPL, PVC and other plastics. Therefore, it is recommended that a light trap be installed on your unit.

UNPARALLELED EFFICIENCY

The NeoTech D428™ boasts the smallest footprint in its class. With as few as one-tenth as many bulbs compared to standard UV systems, it has the lowest operating cost and maintenance schedule in the field.

NEOTECH
AQUA SOLUTIONS
The World's Most Advanced UV Technology™



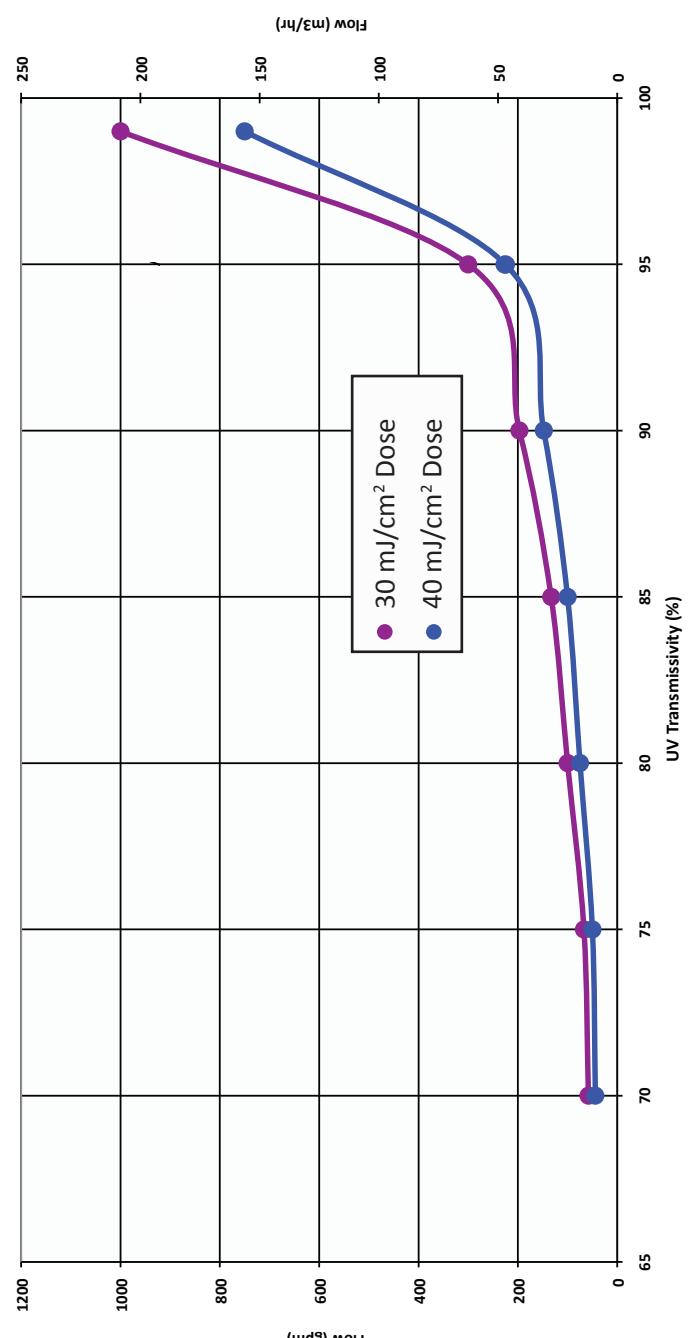
NeoTech D428™

Ultrapure Water Disinfection & Ozone Destruction

• Pharmaceutical • Microelectronics • Medical • Remediation • Beverage
• Commercial/Industrial • Pool/Spa • Waste Water • Drinking Water • AOP

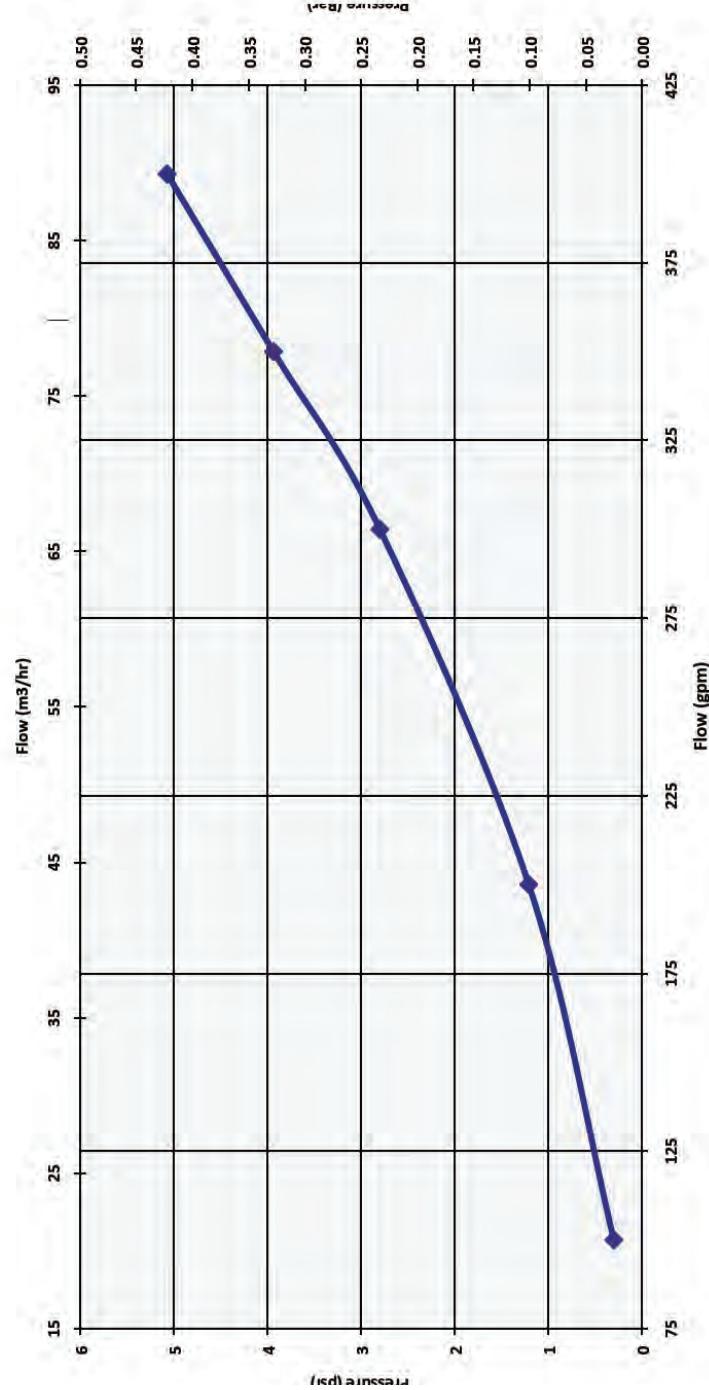
The World's Most Advanced UV Technology™

D428 Flow vs. UVT



The UV transmissivity (UVT) of the treated water, combined with the flow rate through the unit, determine the UV dosage applied to the water. Particles in water typically absorb or reflect UV light which affects the water's UV transmissivity. NeoTech Aqua's units are rated based on a UVT of 99%. The above graph illustrates the appropriate rating for the D428 based on varying UVT levels. The NeoTech Aqua Solutions technical team provides complimentary UVT analysis on customer-supplied water samples to ensure proper UV equipment sizing. Please contact your NeoTech Aqua representative for assistance.

D428 Head Loss



5893 Oberlin Drive, Suite 104, San Diego, California 92121
Toll-Free 888.718.5040, ph: 858.571.6590, fx: 858.571.6596, Web: neotechaqua.com, info@neotechaqua.com

5893 Oberlin Drive, Suite 104, San Diego, California 92121
Toll-Free 888.718.5040, ph: 858.571.6590, fx: 858.571.6596, Web: neotechaqua.com, info@neotechaqua.com

NEOTECH
AQUA SOLUTIONS
The World's Most Advanced uv Technology™



The NeoTech D438™ is specially designed to disinfect water and is an essential component in advanced oxidation processes.

This high-efficiency UV system utilizes NeoTech Aqua's patented ReFlex™ chamber technology, reflecting over 99% of the 254nm UV generated. It is the highest efficiency, smallest footprint, and lowest operating cost UV system in the water treatment industry.

PRODUCT BENEFITS

- Dual lamp efficiency processes up to 500 gallons per minute
- 75% smaller footprint compared to standard UV systems
- May be mounted vertically or horizontally
- Up to four units may be controlled with a single micro-control box
- Built for 120V or 230V single phase power providing maximum flexibility
- No flow, no problem – guaranteed 60 minutes
- Water contact finish – Ra-15
- Controller- Remote
- Alarms, Remote Control, 4-20 mA output
- Realtime dosimetry, 100% dosage assurance – with constant flow
- UV monitor is NIST traceable
- Sanitization in place – hot water or steam
- No-tool lamp change
- NSF Standard 50 certified
- Warranty one year parts and labor

With only two thirty-eight inch lamps, the D438™ provides users the most convenient and lowest cost service schedule of any low pressure or medium pressure UV system today.

MAXIMUM UV PENETRATION

The NeoTech D438™ provides users an unparalleled level of engineering sophistication by maximizing UV distribution in a patented 99% reflective chamber. This unique technical advantage also reduces the number of lamps and power requirements by up to 90% compared to standard UV systems.

MINIMAL MAINTENANCE AND SERVICE

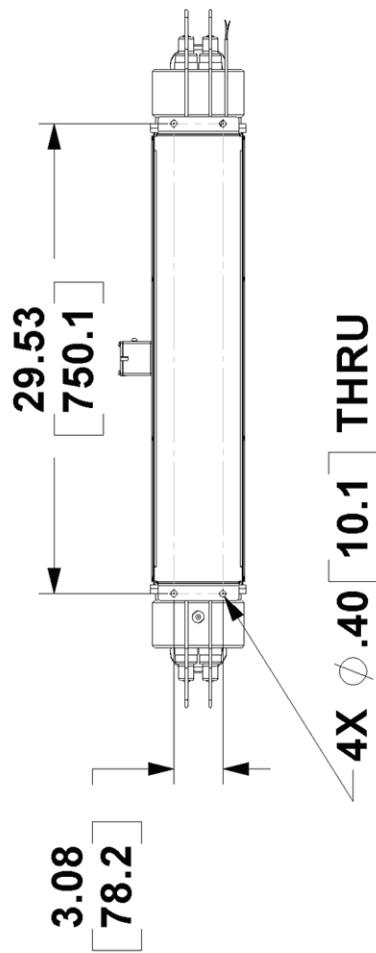
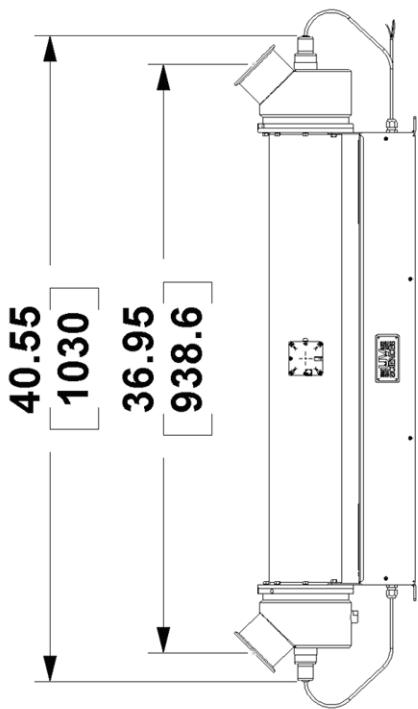
- Lamp Replacement: No Tools Required
- UV Monitor: May be changed with a single screwdriver while the system is operating
- Cleaning: May be cleaned as needed in a CIP loop or manually brushed.

UNPARALLELED EFFICIENCY

The NeoTech D438™ boasts the smallest footprint in its class. With as few as one-tenth as many bulbs compared to standard UV systems, it has the lowest operating cost and maintenance schedule in the field.

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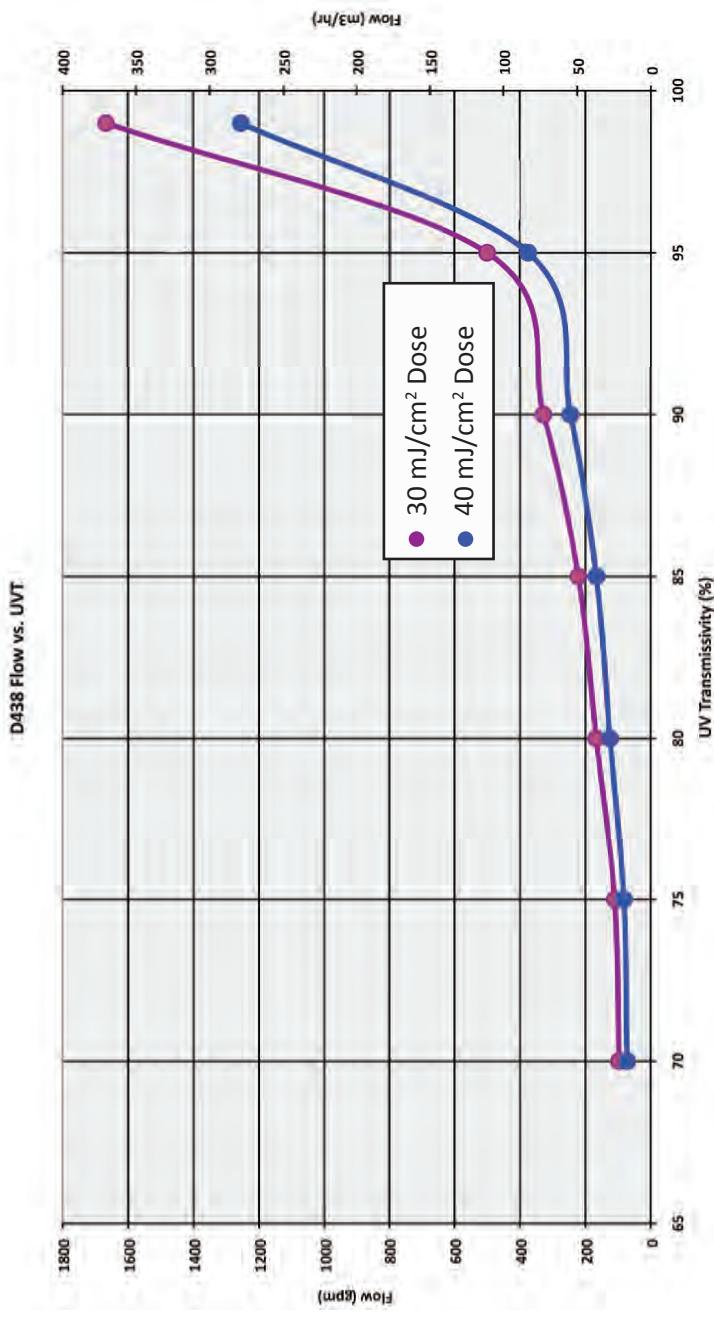
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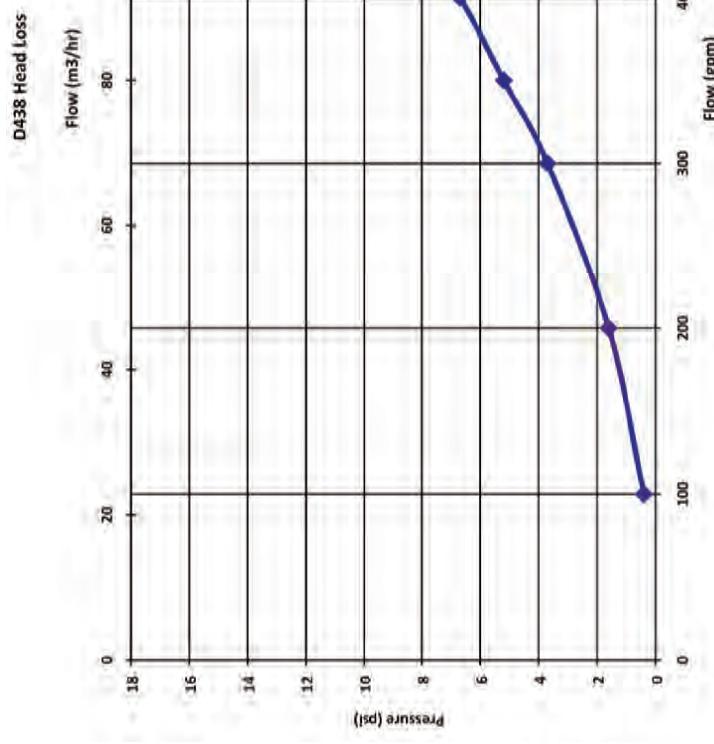
3 in.

4 in.

1 in.



The UV transmissivity (UVT) of the treated water, combined with the flow rate through the unit, determine the UV dosage applied to the water. Particles in water typically absorb or reflect UV light which affects the water's UV transmissivity. Neo Tech Aqua's units are rated based on a UVT of 95%. The above graph illustrates the appropriate rating for the D438 based on varying UVT levels. The NeoTech Aqua Solutions technical team provides complimentary UVT analysis on customer-supplied water samples to ensure proper UV equipment sizing. Please contact your NeoTech Aqua representative for assistance.



APPENDIX C.6

TERTIARY FILTRATION

PHOSPHORUS REMOVAL

Advanced Phosphorus Removal

Blue Water Technologies, Inc. is the industry leader in the development of technologies for phosphorus removal from wastewater. With advanced control techniques and patented nutrient removal systems, Blue Water can provide you with a cost effective solution to meet your phosphorus level needs.

The Blue PRO® system provides a unique approach to chemical dosing, with significantly lower chemical use across the entire wastewater treatment plant than competitors. No other chemical dosing is required in the plant to achieve the lowest phosphorus discharge requirements. Current Blue PRO® installations are meeting permit limits as low as 0.05 mg/L with a chemical dose of only 10 mg/L as Fe. Blue Water's unique chemical control system provides an advantage due to its cost efficiency and ability to seamlessly integrate into and respond to the needs of existing wastewater treatment systems. The chemical dose used with Blue PRO® methods is so much lower than the competition that the comparative savings represent a return on the capital investment in less than three years.

The Blue PRO® process is the leading technology for phosphorus reduction to any level. Whether the targeted phosphorus discharge limit is 10 mg/L P or as low as 0.01 mg/L P, Blue PRO® methods provide reductions in chemical usage, equipment footprint, and associated operations and maintenance costs over alternative technologies. The Blue PRO® platform is the most effective and most inexpensive tertiary treatment solution where additional considerations are needed, such as denitrification or metals removal.



A Blue PRO® installation in Grangeville, Idaho for 0.05 mg/L phosphorus



The Blue PRO® System

How does the Blue PRO® process work? Using Blue Water's Centra-flo® continuous backwash gravity sand filters, a unique control system, and the patented Blue PRO® process for reactive filtration, phosphorus is removed from wastewater streams through an array of mechanisms. Most importantly, Blue PRO® systems optimize adsorption.

Blue Water's reactive filtration process overcomes a critical obstacle to achieving efficient phosphorus removal in bulk aqueous solutions by providing reactive surface sites within the media bed, resulting in forced contact of chemical species with high adsorptive capacity. The adsorptive surface in Blue PRO® filters is a continuously regenerated hydrous ferric oxide (HFO) coating that forms on the surface of the sand media. Coagulation followed by filtration simply cannot compare to the efficiency of adsorptive phosphorus removal.

Waste HFO, phosphorus, and solids are removed from the filter through the backwash or reject stream. Recycling this reject upstream provides the added benefit of removing phosphorus in plant clarification systems, further guaranteeing the achievement of the discharge phosphorus target as well as lowering the chemical dose. The phosphorus is chemically bound, leaving the plant with the sludge, rather than releasing in effluent streams or digestion. Integration of Blue Water's phosphorus removal technology does not require change in the plant's sludge handling system. The Blue PRO® system uses over 30% less chemical than other technologies, therefore producing less sludge. The waste HFO also helps with odor control and can reduce water content in biosolids.

Blue PRO® Applications:

- Advanced total phosphorus removal
- Metals removal, including mercury
- Combined denitrification
- Algae mitigation

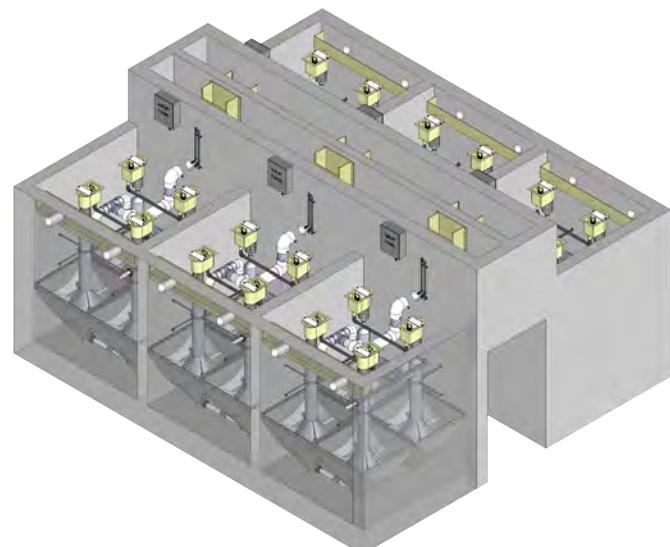


The Blue PRO® system is available in several models and configurations. The modular nature of the filters allows for easy system expansion. The filters are available as freestanding fiberglass or stainless steel units or as in-ground concrete cells. Control systems and smaller filters may be skid mounted for mobility or ease of commissioning.

Additional Features

Since many plants requiring phosphorus mitigation also require nitrogen control, Blue Water provides the option to simultaneously denitrify in the same vessel with the Blue PRO® process. With slight modifications, Blue Water can provide a unique and efficient system for total nutrient reduction.

Besides phosphorus, Blue PRO® methods are effective at removing many other contaminants, such as mercury, arsenic, chromium, and uranium. Minor adjustments in water chemistry may be implemented for the removal of metals and other contaminants, including zinc, lead, copper, iron, and manganese. Blue Water has installations for removal of these contaminants in wastewater plants as well as groundwater systems, including self-contained package treatment systems.



4.3 MGD Blue PRO® system design for 0.07 mg/L TP in a Massachusetts WWTP

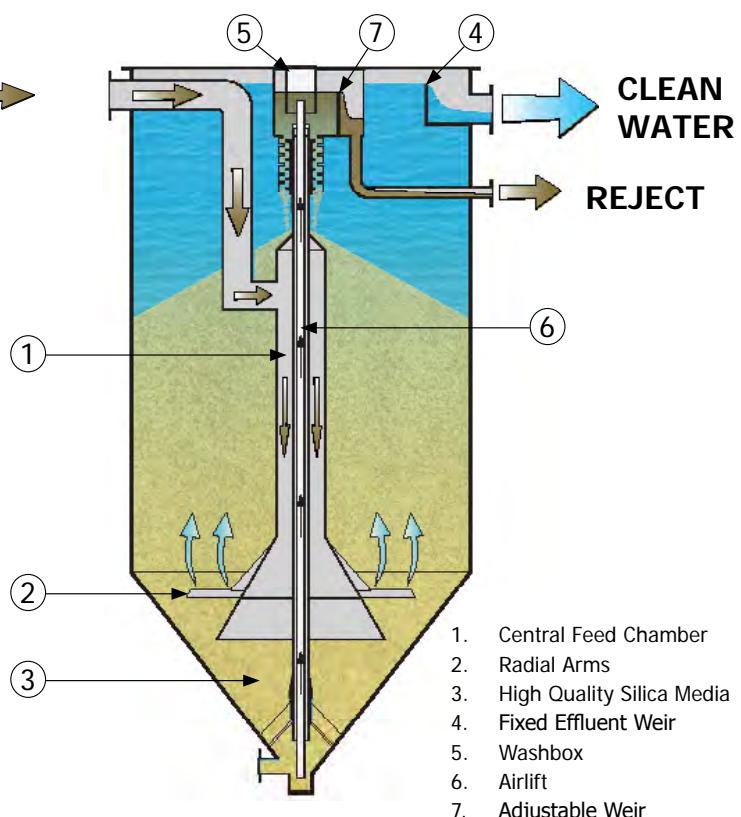
INFLUENT → + **CHEMICAL** →

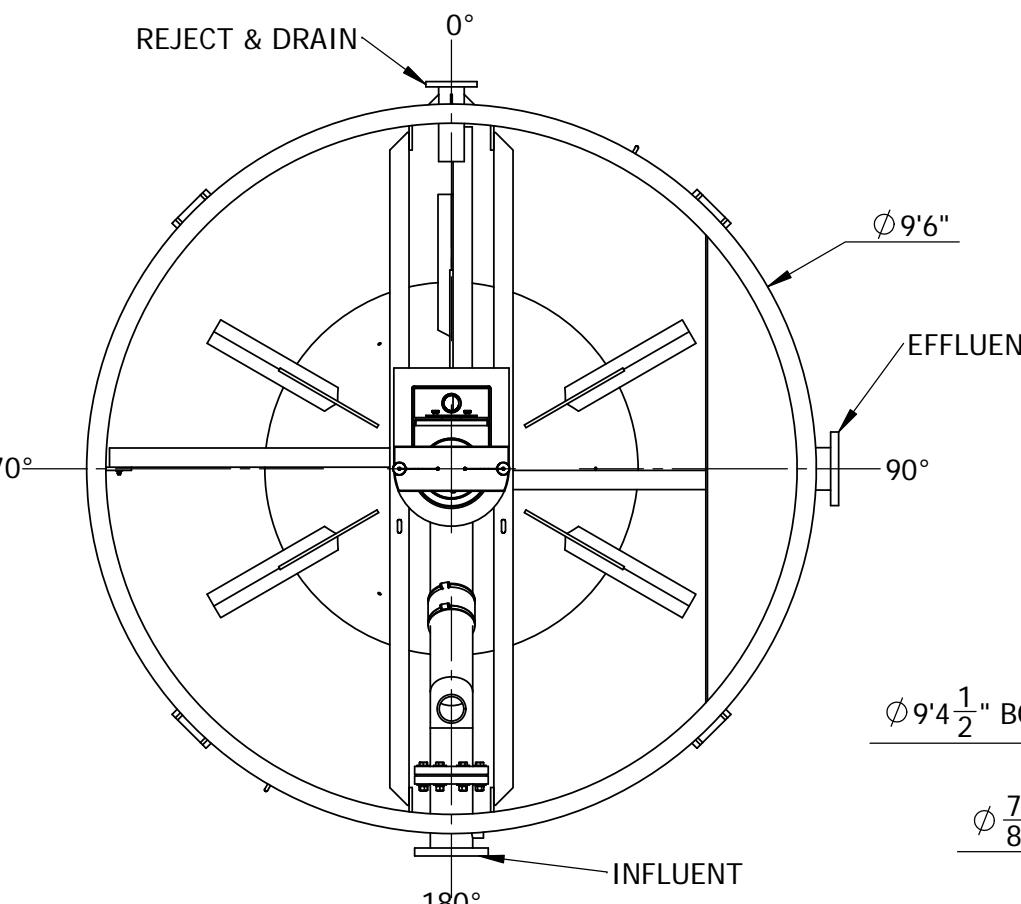
Blue PRO®

Blue Water's Blue PRO® technology is covered by multiple patents and patents pending.

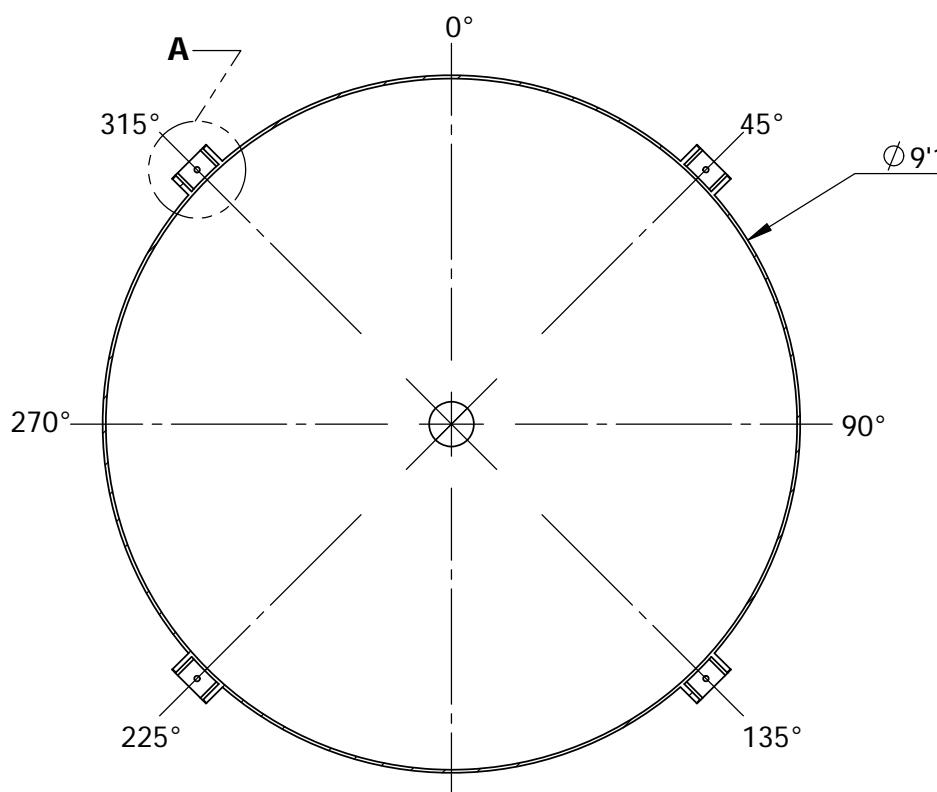
The Blue PRO® Advantages:

- Low capital and O&M costs
- Continuous flow – no interruption for backwash or changing media
- Modular design easily handles capacity increases
- Simple operation & low chemical use



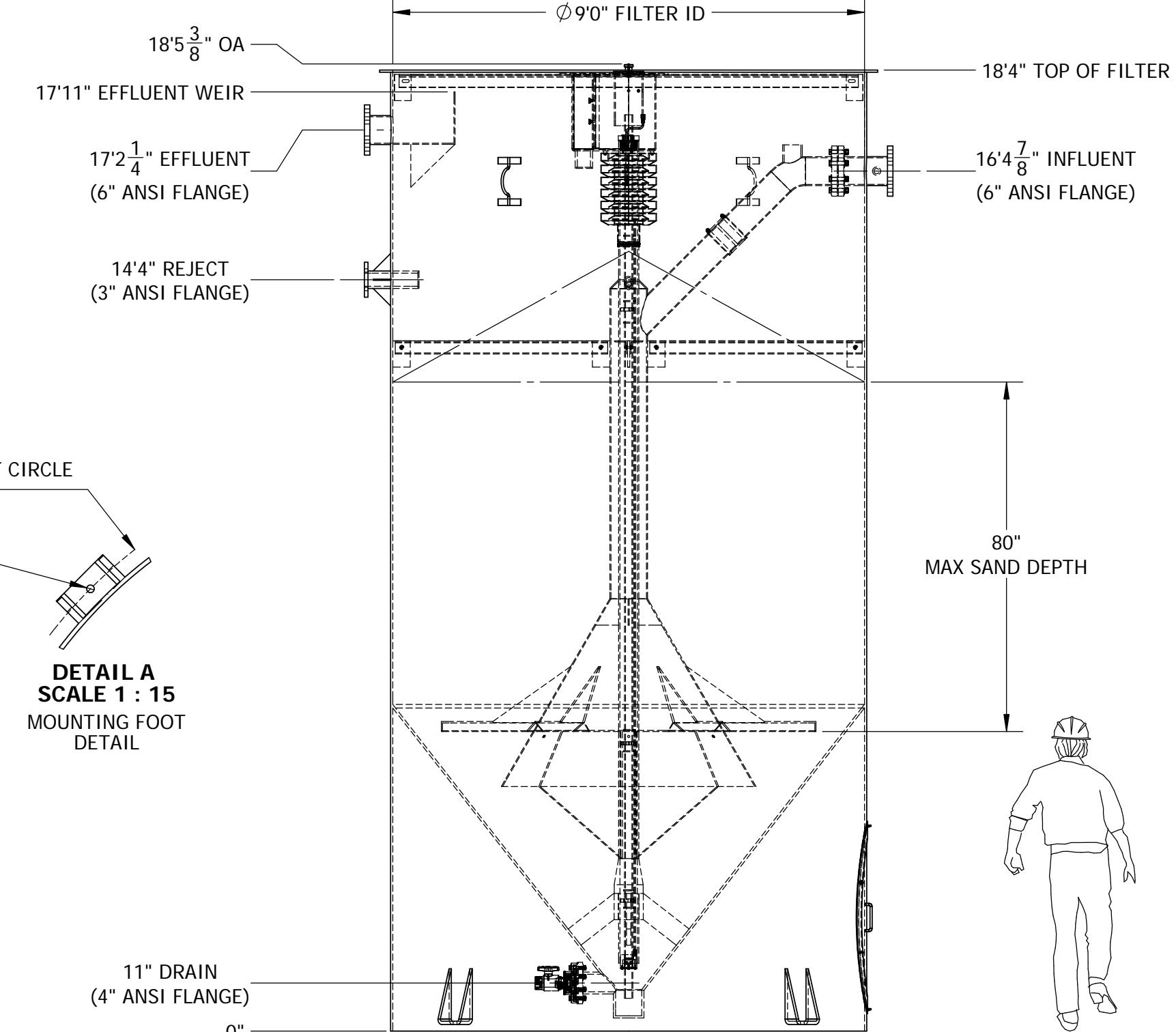


PLAN VIEW NOZZLE ORIENTATION



VESSEL FOOTPRINT

DETAIL A
SCALE 1 : 15



ELEVATION

NOTE

- NOTES:**

 1. PRELIMINARY SALES DRAWING ONLY.
 2. ALL DESIGNS TO BE VERIFIED BY BLUE WATER TECHNOLOGIES ENGINEERING.
 3. NOZZLE SIZE AND LOCATIONS VARIABLE.
 4. A MINIMUM OF 4ft OF HYDRAULIC HEAD IS REQUIRED FOR EACH TREATMENT STAGE.
 5. A MINIMUM OF 5ft OF HEAD SPACE ABOVE THE UNITS ARE REQUIRED FOR MAINTENANCE.
 6. A ROOF HATCH MAY BE NECESSARY, FOR THE INSTALLATION OF FILTER MEDIA AND AIRLIFT MAINTENANCE/REMOVAL, IF THE FILTER UNITS ARE INSTALLED IN A BUILDING.

TECHNOLOGIES	3/25/2013
DRAWN BY:	BMesserschmidt
CHECKED BY:	MLopp
	3/25/2013

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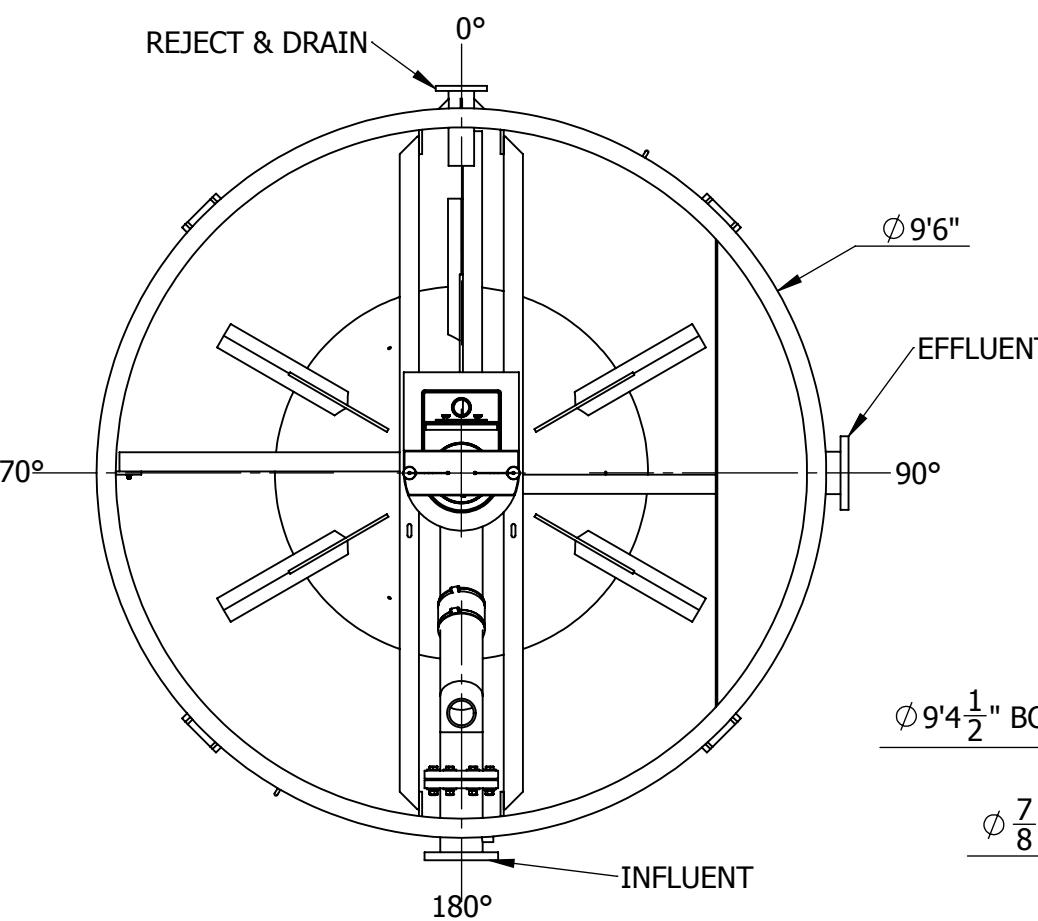
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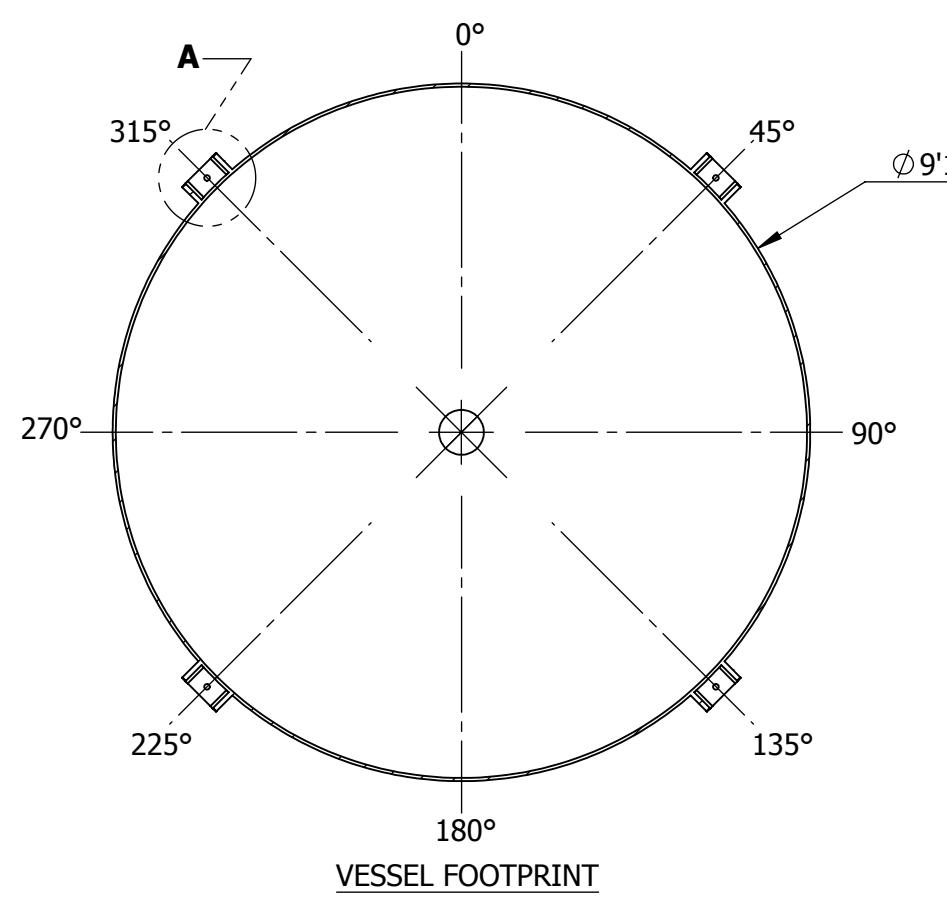
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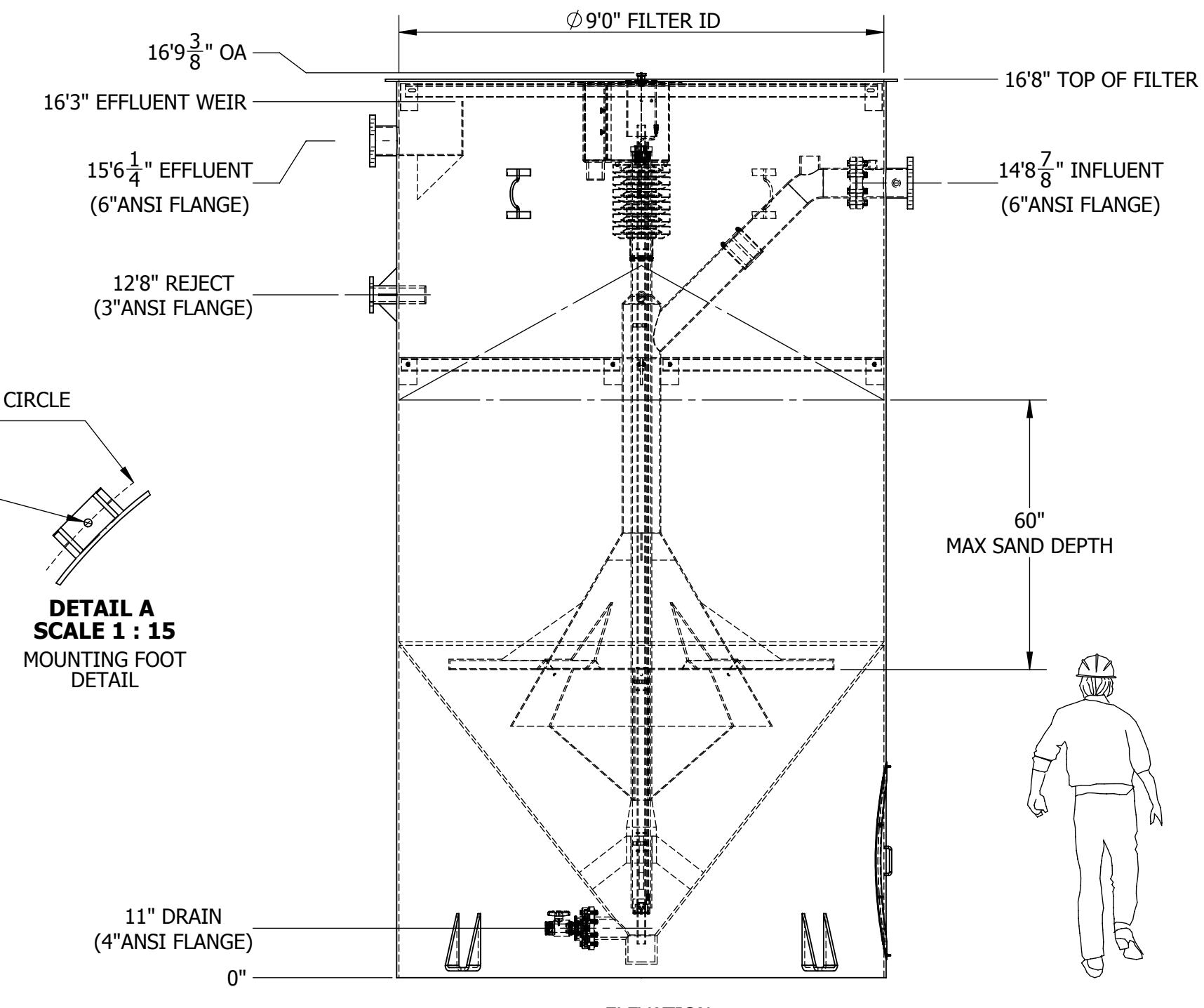


PLAN VIEW
NOZZLE ORIENTATION



**DETAIL A
SCALE 1 : 15**

MOUNTING FOO DETAIL



ELEVATION

NOTES

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TECHNOLOGIES	BMesserschmidt MLopp	3/25/2013 3/25/2013
DRAWN BY:	BMesserschmidt MLopp	
CHECKED BY:		

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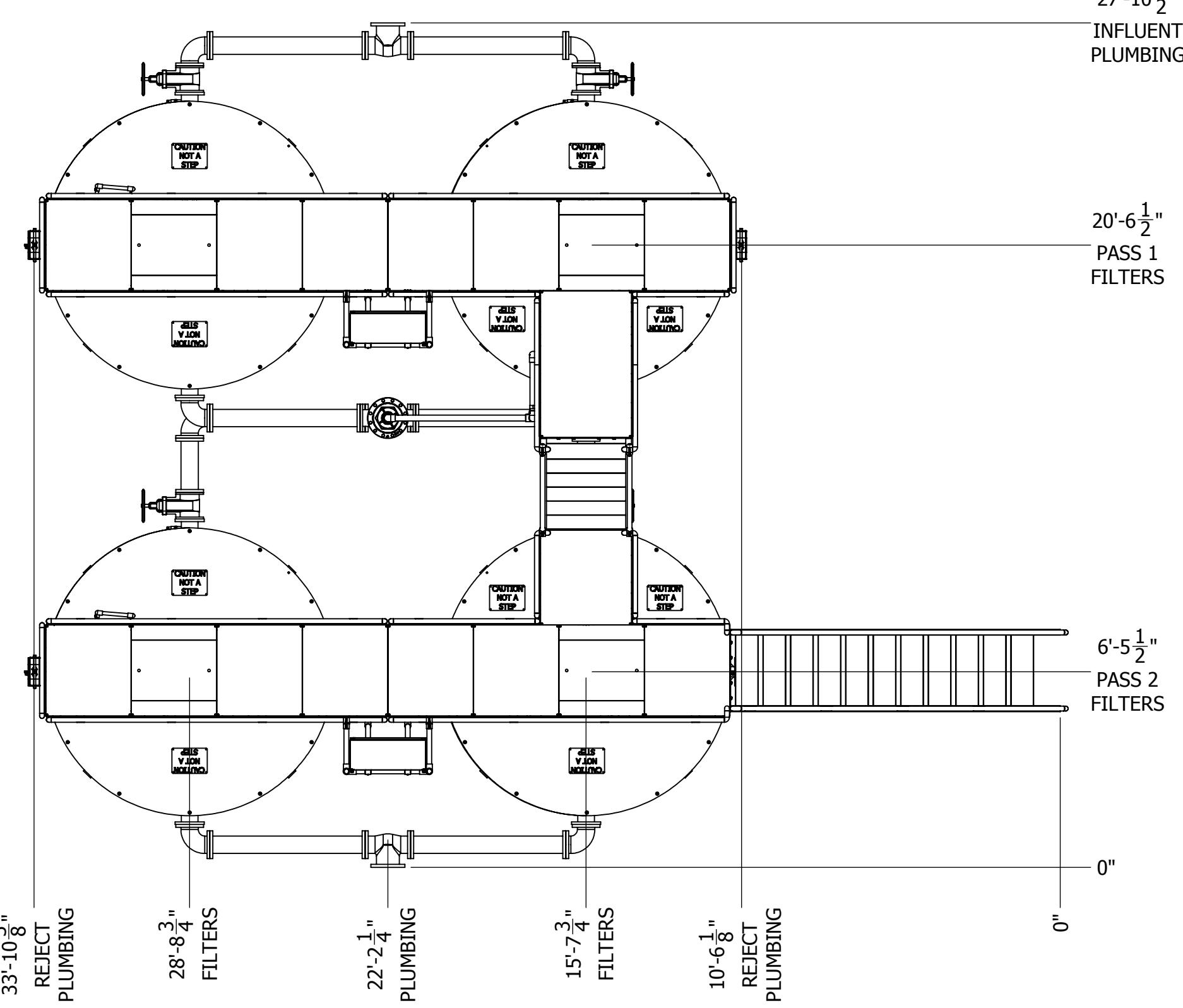
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REVISIONS			
REV.	DESCRIPTION	DATE	ECO
01	Released to Fabrication	4/17/2015	
02	Updated Visuals for Washbox Access.	8/12/2015	

NOTES:

1. THIS DRAWING IS FOR GENERAL ARRANGEMENT ONLY
 2. ALL FLANGES ARE STANDARD ANSI #150
 3. ALL PLUMBING NOT SHOWN, BY OTHERS
 - 4. PIPE HANGARS AND SUPPORTS BY OTHERS.**
 5. A CENTRALLY LOCATED ROOF HATCH MAY BE NECESSARY, FOR THE INSTALLATION OF FILTER MEDIA & AIRLIFT REMOVAL/MAINTENANCE.
 6. INSTALLATION NOTES:
 - PLACE FILTER
 - FILL FILTER
 - ANCHOR FILTER WITH 3/4" ANCHOR BOLT (4 LOCATIONS) MINIMUM 6" EMBEDMENT. DO NOT TORQUE BOLTS GREATER THAN 25 FT-LB.
 - USE NON-SHRINK GROUT BENEATH ALL HOLD DOWN LUGS.



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TECHNOLOGIES	
DRAWN BY:	ASloan
DATE:	01/19/15
HECKED BY:	KJennings
DATE:	01/19/15
PROJECT APPROVAL:	SScott
NAME:	NAME: DATE:

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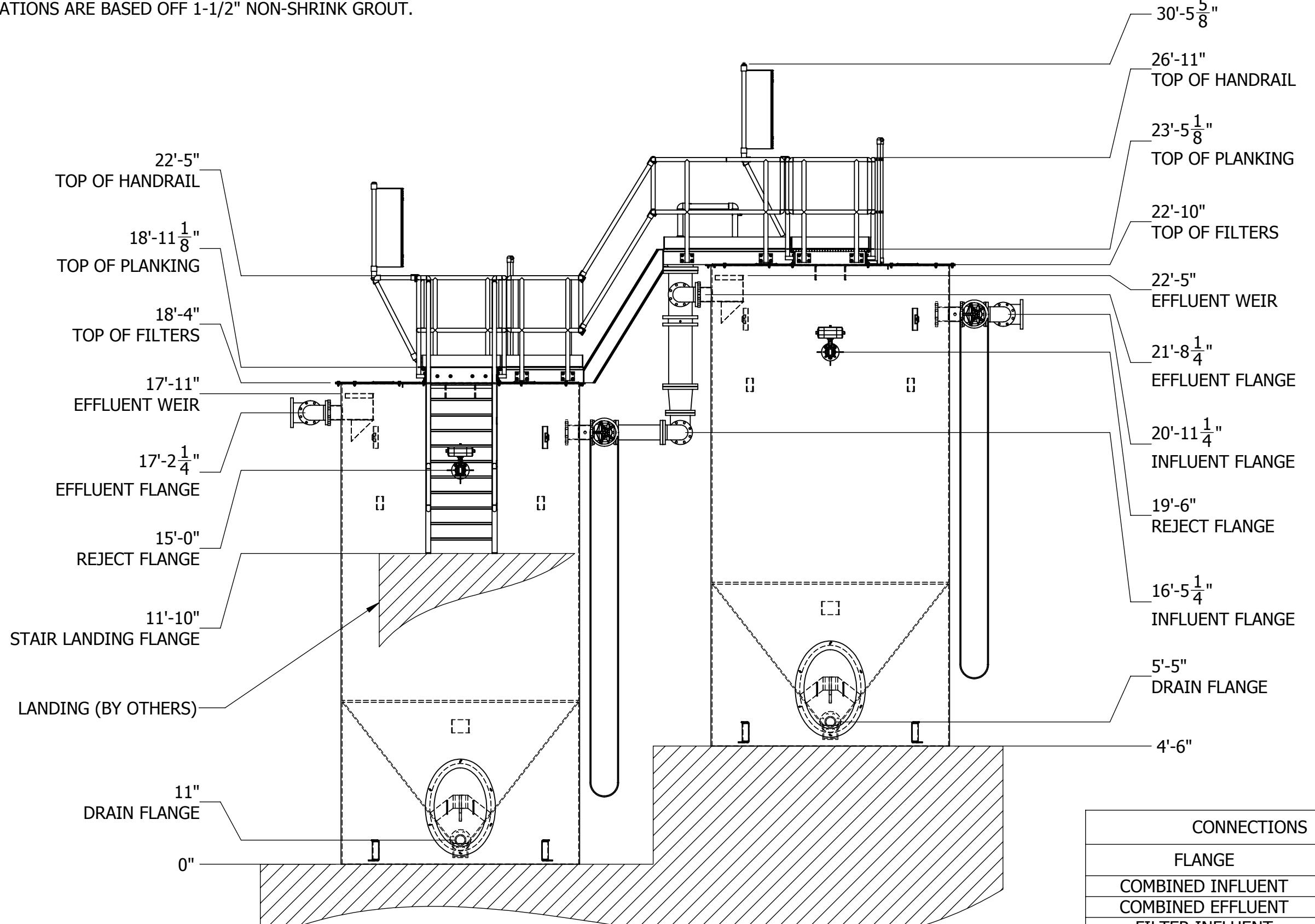
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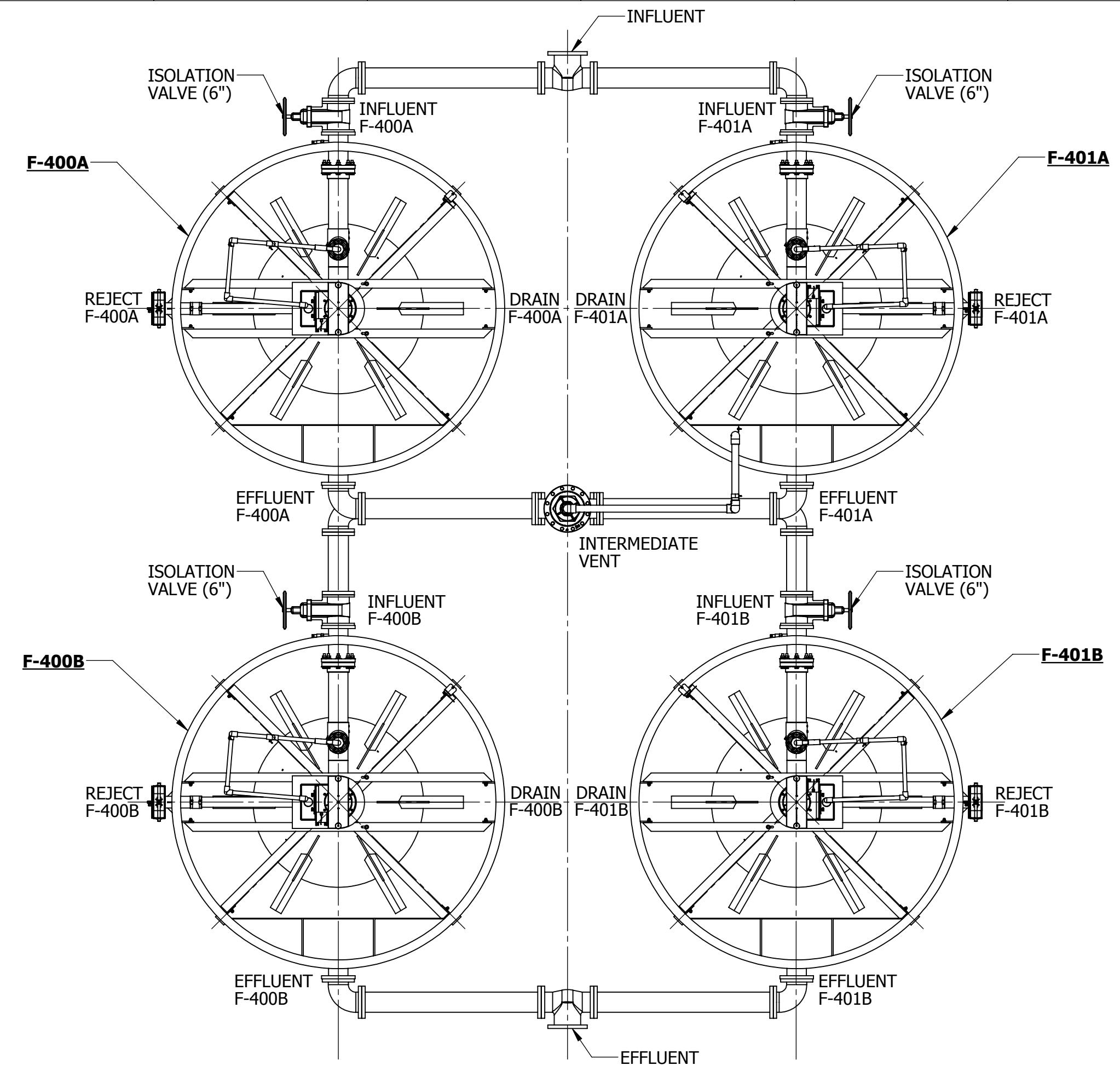
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NOTES:

- ALL ELEVATIONS ARE BASED OFF 1-1/2" NON-SHRINK GROUT.



DRAWN BY:	A.Sloan	DATE:	01/19/15
CHECKED BY:	K.Jennings	DATE:	01/19/15
PROJECT APPROVAL:	S.Scott	NAME:	01/19/15



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910151-Citronele
DESCRIPTION:
**General Arrangement
Pass**
DRAWING NUMBER:
910151-GA

B		SCALE: 1:36	PAGE: 3 OF 3
910151_Citronelle		DESCRIPTION: General Arrangement Drawing, (4X) CF64-80AG, Dual Pass	REV: 02
HES	+1/16" ±.125 ±.030 ±.010	DRAWING NUMBER: 910151-GA	

1
B
SCALE:
1:36
PAGE:
3 OF 3

TECHNOLOGIES			
DRAWN BY:	ASloan	01/19/15	
CHECKED BY:	Klenning	01/19/15	
PROJECT APPROVAL:	SScott	01/19/15	DATE: NAME:



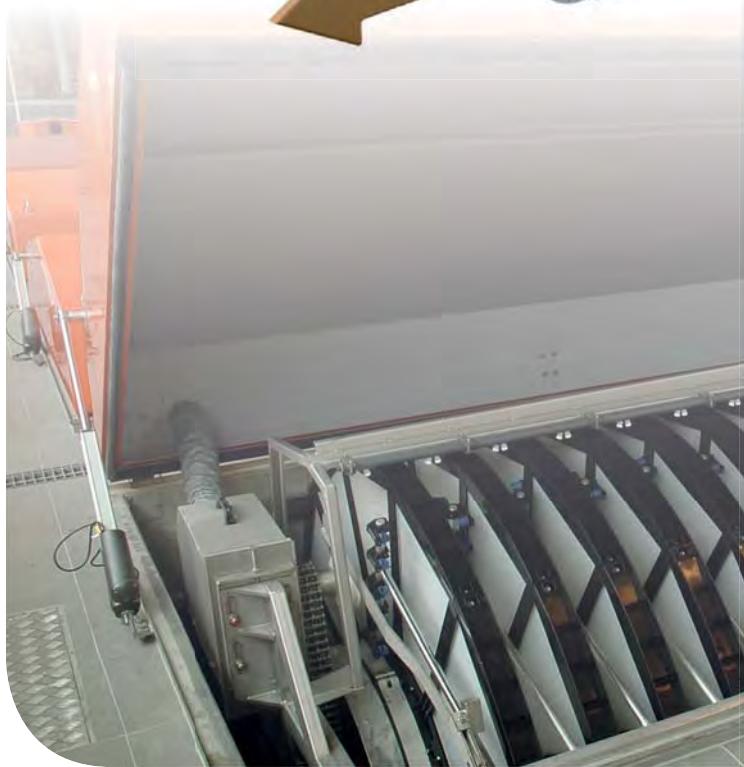
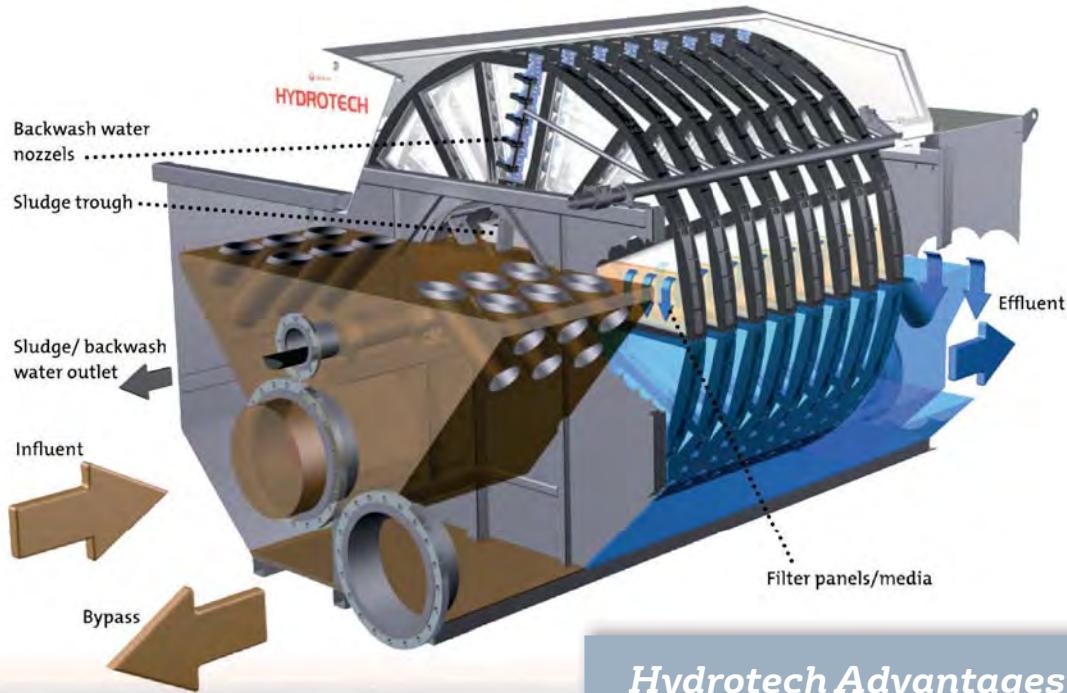
Hydrotech Discfilter Pure Performance

WATER TECHNOLOGIES

The Discfilter Process

The Hydrotech Discfilter provides proven experience for today's demanding wastewater treatment applications through an efficient, yet easy-to-operate design. Influent flows by gravity into the center drum and then passes through the filter media mounted on both sides of the discs. The solids are retained on the media within the discs. Only purified water flows to the collection tank. The inside-out flow path prevents solids accumulation in the tank.

As solids collect on the inside of the media the influent water level rises. Maximum head loss through the media is <12 inches. The inlet water level is measured and the control system automatically initiates backwashing. The filtered effluent is pumped to the backwash spray nozzles, washing solids into the sludge trough as the discs rotate. The backwash water is typically 1% to 2% of the total flow to the filter, while the sludge return is typically <1%. Filtration is continuously maintained, even during backwash.



Hydrotech Advantages

- Unmatched experience and performance
- Innovation: patented designs offer real savings
- Robust construction with 304 or 316 SSTL
- Proven media: durable and chemically resistant
- Meets or exceeds Title 22 requirements at hydraulic loading rates up to and above 6 gpm/ft²
- Consistently produces high quality effluent despite high-solids loadings and upset conditions
- Ideal for “retro-fit” projects in existing basins
- Compact design requires far less space
- Simplified control system and lower installation costs than other filtration technologies
- Improved backwash efficiency reduces operating costs and carbon footprint

Progressive Innovation

The Hydrotech Discfilter utilizes many patented designs including the oscillating backwash spray header, which provides efficient media cleaning while reducing water consumption by 20 percent. Ongoing research ensures the most cost effective filtration methods available.

The Hydrotech Discfilter is available in a variety of models:

1700 series

- Up to 8 discs
- Up to 1 MGD per unit in effluent polishing
- Ideal for small scale projects



2200 series

- Up to 24 discs
- Up to 9 MGD per unit in effluent polishing
- Excellent for a wide range of project sizes

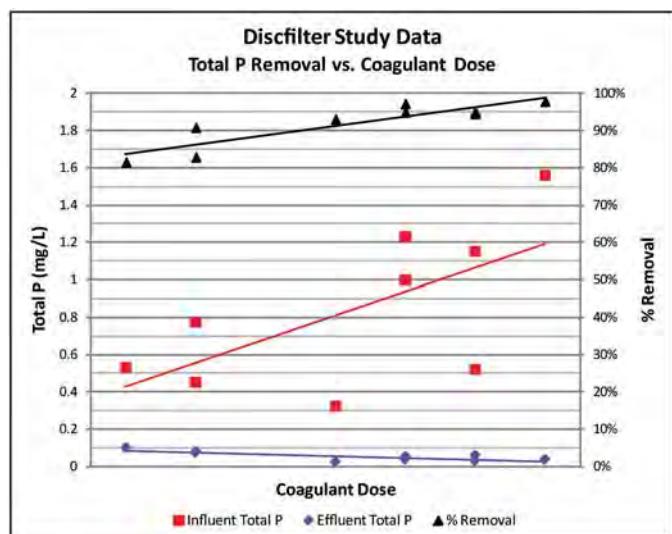


2600 series

- Up to 30 discs for 15 MGD per unit in effluent polishing
- Provides highest filtration area and most compact footprint
- High flow rates maximize treatment in a given footprint
- Energy reduced 15% and footprint by 25%
- User-friendly design for minimal maintenance



Advanced Treatment



The Hydrotech Discfilter enables facilities to meet stringent performance requirements.

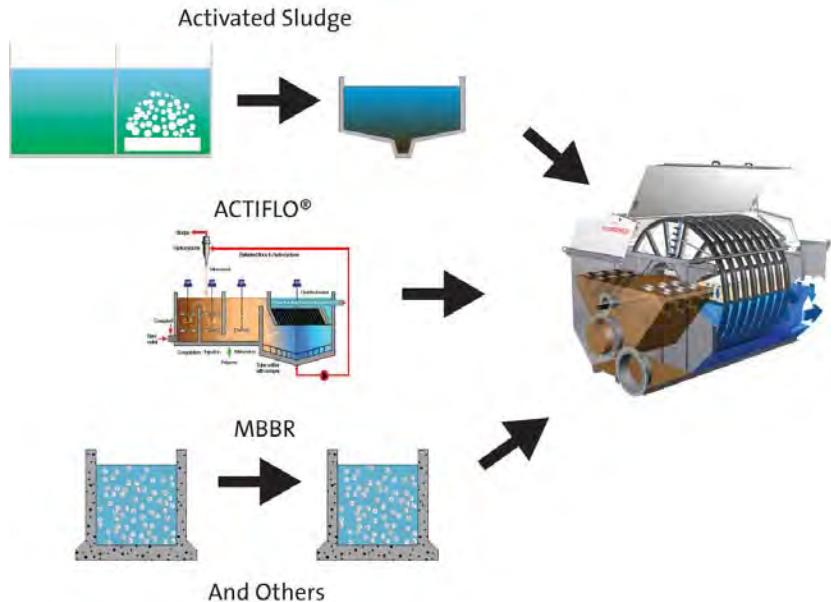
Veolia has pioneered use of the discfilter in combination with coagulation/ flocculation as a cost effective means to reduce effluent phosphorus to < 0.1 mg/L.

Proven Performance

The compact Hydrotech Discfilter is used in a wide range of applications:

- Effluent polishing of wastewater
- Phosphorus removal
- Water reuse (Title 22 approved)
- Retrofit/replacement of existing systems
- CSO, SSO, and primary treatment
- Process water filtration
- Membrane pre-treatment

The Hydrotech Discfilter is ideal for treating effluent from a variety of processes (e.g., activated sludge, fixed film, etc.). Veolia offers full-scale pilots to demonstrate performance.



Designed To Save

Hydrotech systems enable customers to achieve performance with lower cost and straight-forward maintenance. Hydrotech Discfilters provide a large filter area in a small footprint; up to 75% smaller than sand filters and up to 20% smaller than other cloth filters.

The discfilter is delivered as an assembled unit. Other cloth filters require substantial labor for site assembly and a larger footprint for backwash pumps and valves. The discfilter eliminates these concerns and costs. Installation is as simple as off-loading from a trailer, anchoring the unit, and completing mechanical and electrical connections.

O&M is simple and reduces operating costs. Fabrication is in 304 or 316 SSTL for trouble-free operation in the toughest conditions. Durable filter media provides long life without frequent and costly replacement. The efficient backwash process reduces energy costs.



Hydrotech Discfilters are easy to inspect and maintain, saving time and money.

Experience You Can Trust

Today's demanding applications require proven experience. Hydrotech Discfilters lead the market with over 400 installed units in the United States and over 1,900 worldwide.



Oconomowoc, WI

Retrofit of tertiary
sand filters
12 MGD



Fox Lake, IL

Retrofit of tertiary
sand filters
30 MGD



Mesquite, TX

Effluent polishing
48 MGD



Holly Springs, NC

Water reclaim and
phosphorus removal
15 MGD

