



*Innovative Onsite Products and Solutions Since 1970*

June 3, 2022

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LVL Engineering Group  
559 Main Street, Suite 230  
Bethlehem, PA 18018

Dear Michael,

Thank you for the opportunity to review and comment on the Milford Township, Pike County, PA project. This is a 3,100 gpd system using a Ecoflow Electro-mechanical unit discharging to a Eljen GSF Passive Treatment and Dispersal System. The soils for this system are decent and the application is in a sensitive watershed.

As designed, the system will benefit from the Ecoflow feeding the GSF system. The design provides for enhanced treatment, improved distribution, improved lateral rest time, improved aerobic operations and an overall safety factor in the system.

Enhanced Treatment: The result of using the Eljen GSF after a treatment train is akin to Municipal Wastewater plants using trickling sand beds prior to open discharge. It polishes the already treated effluent and provides a final product that goes through a filter. It is going to be better quality.

Onsite Installer recently published an Eljen GSF system serving a Dog Kennel facility in Wisconsin. That system is provided treated effluent from an Aerobic Treatment Unit prior to the Eljen GSF system. While the Aerobic Treatment Unit provides treated effluent, it does not meet the 10 mg/l BOD, 10 mg/l TSS of the Ecoflow system. However, after meeting the Eljen GSF system, the GSF system reduces the effluent by 75% for BOD and TSS prior to final discharge.

This is a common application for Aerobic Treatment Units to a Passive Treatment and Dispersal Technology. Designers and regulators can rely on the system providing higher treatment levels as the GSF system acts as a polisher of the already treated effluent.

Time Dosing: Dosing from the Ecoflow system to the GSF system will also provide for increased supervision and control of the hydraulic load to the absorption area. Hydraulic overloading is one of the leading factors to system failure.

By incorporating time dosing into the design of an on-lot system, unintended inputs of water to the system are quickly identified, because the dosing tank will fill up and the high-level alarm will sound. This will prevent or at least notify of any serious issues occurring upstream of the system.

Pressure Distribution: Pressure distribution provides for the highest levels of treatment for any soil-based system. With pressure distribution we get uniform distribution of effluent in the absorption area. This minimizes, if not eliminates, higher point loading that occurs in non-pressure distribution systems. The equal loading of the systems encourages higher exposure of the effluent to the aerobic bacteria in the field. This provides for increased treatment. Furthermore, pressure distribution systems show higher levels of Fecal Coliform removal when compared to gravity or pump to gravity systems.

There is no "creeping failure" in a pressure distribution system because the effluent is applied equally. This is the most superior dosing method to any soil-based system. Field studies show, better aeration, nitrification, and fecal coliform removal in pressure dosed systems.

Rest Period: Time dosing, in combination with pressure distribution, to the field will provide rest periods in and around the laterals of the dispersal system. This rest period is significant to the system as it allows air to backfill the system. This air provides the aerobic bacteria oxygen. This allows the aerobic bacteria to feed on any biomat in the system or nutrients left behind on the modules. This reduction and maintaining of the biomat inside the Eljen GSF allows for a longer and healthier life of the system.

Safety Factor: Higher than normal ATU effluent numbers will become the influent for the GSF units during those times. Those higher than normal numbers are products of a number of factors. They could include the power being out from a storm, a surge of influent from the home due to higher than normal capacity, lack of needed maintenance on a pump or blower, or many other reasons.

The GSF units are not phased by the short-term higher than normal influent numbers. Long term high influent numbers are bad, but short term do not negatively affect the units and their ability to perform. This is demonstrated in our 2008 third party NSF testing, where BOD and TSS numbers exceeded testing parameters by 100% (BOD 920 mg/l and TSS 420 mg/l, December 4, 2007), yet our effluent numbers were in line with the previous day testing results of 8.6 mg/l BOD and 7.0 mg/l TSS.

Upon review of the system treatment and dispersal train, I am satisfied that the system in place will perform better than either treatment unit on its own. For the reasons listed above, I am comfortable with the system proposed to perform as designed.

For any questions and clarifications, please do not hesitate to reach out to me anytime.

Respectfully,

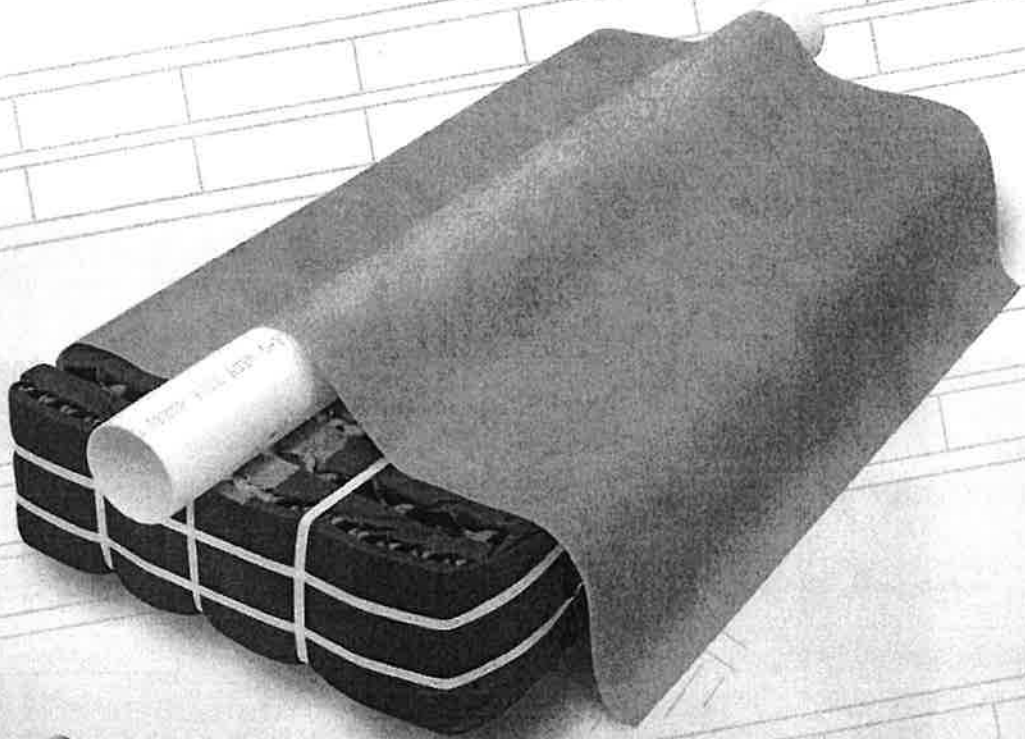


Jim King  
Eljen Corporation  
[jking@eljen.com](mailto:jking@eljen.com)



**Geotextile Sand Filter**

# **Eljen GSF System Overview**



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# Eljen GSF System Description

Each GSF Module is made up of geotextile fabric and a plastic core material that work together to provide vertical surface area and oxygen transfer. The GSF System applies secondary treated effluent to the soil, increasing the soil's long-term acceptance rate. A Specified Sand layer provides additional filtration, and prevents saturated conditions.

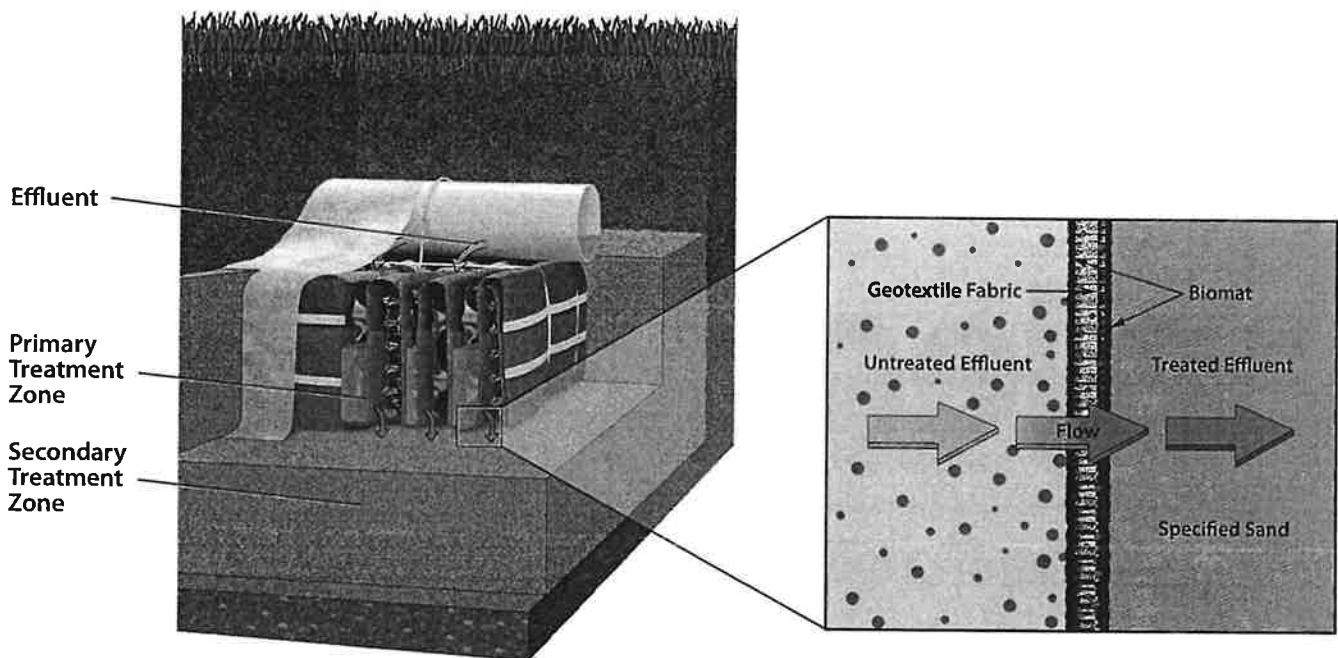
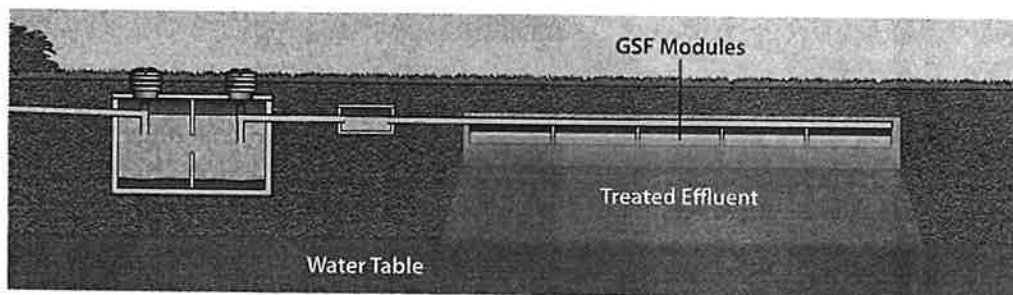
## PRIMARY TREATMENT ZONE

- Perforated pipe is centered above the GSF Module to distribute septic effluent over and into corrugations created by the plastic core of the GSF Module.
- The Module's unique design provides increased surface area for biological treatment of nutrients and contaminants.
- Open air channels within the Module support aerobic bacterial growth on the Module's geotextile fabric interface, and promote oxygen in the system.
- An anti-siltation geotextile fabric covers the top and sides of the GSF Module to protect the system from the migration of fines.
- The GSF Module provides biomat management, and takes the burden of treatment and biomat development off of the native soil.

## SECONDARY TREATMENT ZONE

- Effluent drips into the Specified Sand layer and supports unsaturated flow into the native soil.
- The Specified Sand layer also protects the soil from compaction and helps maintain cracks and crevices in the soil.
- Native soil provides final filtration and allows for groundwater recharge.

## GSF SYSTEM OPERATION



# Testing Overview and Performance

## NSF Standard 40

This standard determines whether treatment systems produce secondary treatment effluent quality, with Class I systems achieving a 30-day average effluent quality of 25 mg/L CBOD5 and 30 mg/L TSS or less, and pH 6.0-9.0. Testing and certification are done at an independent third party testing facility.



**SETUP:** Gravity GSF system with 6" of ASTM C33 sand in a bed configuration. 450 gal/day, (2.0 gal/ ft<sup>2</sup> loading rate).

**RESULTS:** The Eljen GSF is Tested and Certified by NSF to NSF Standard 40 Class 1 since 2014.

More information can be found at [www.NSF.org](http://www.NSF.org).

## NSF Standard 245

This standard includes Total Nitrogen reduction requirements with Class I systems achieving a 30-day average effluent quality of more than 50% Total Nitrogen removal, 25 mg/L CBOD5 and 30 mg/L TSS or less, and PH 6.0-9.0. Testing and certification are done at an independent third party testing facility.



**SETUP:** Gravity GSF system in a bed configuration with 18" of ASTM C33 sand, 12" of sand/woodchip mixture, and 2" of limestone. 450 gal/day (2.0 gal/ft<sup>2</sup> loading rate).

**RESULTS:** Tested and Certified by NSF to NSF Standard 245 Class 1 since 2018.

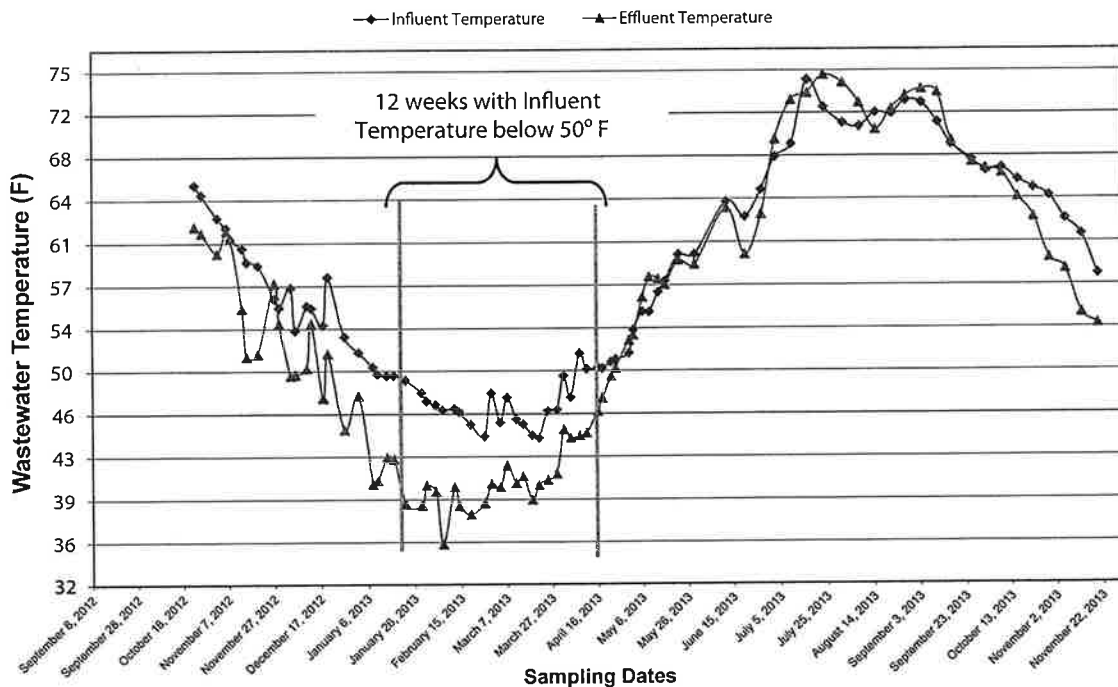
More information can be found at [www.NSF.org](http://www.NSF.org).

The third-party testing results listed below were taken over a 12 month consecutive period. This extended sampling period provided verification to the stability and consistency of the Eljen GSF's performance and capability to handle colder weather conditions. A summary of the test results from the independent third-party evaluation are listed below:

Eljen GSF A42 Modules Treatment Performance during third party 12 months testing (includes 12 consecutive weeks with influent temperature below 50° F)			
	CBOD (mg/L)	TSS (mg/L)	Fecal Coliform (MPN/100ml)
Average	2.0	2.7	66*
Average (cold water period)	1.2	1.7	13*
Median	1.0	2.5	71*
Min Value	1.0	2.5	2*
Max Value	7.2	7.0	10 965*

\*Geometric average

Eljen GSF - A42 Influent and Effluent Temperature (degree F)





### **COMPANY HISTORY**

Established in 1970, Eljen Corporation created the world's first prefabricated drainage system for foundation drainage and erosion control applications. In the mid-1980s, we introduced our Geotextile Sand Filter products for the passive advanced treatment of onsite wastewater in both residential and commercial applications. Today, Eljen is a global leader in providing innovative products and solutions for protecting our environment and public health.

### **COMPANY PHILOSOPHY**

Eljen Corporation is committed to advancing the onsite industry through continuous development of innovative new products, delivering high-quality products and services to our customers at the best price, and building lasting partnerships with our employees, suppliers, and customers.

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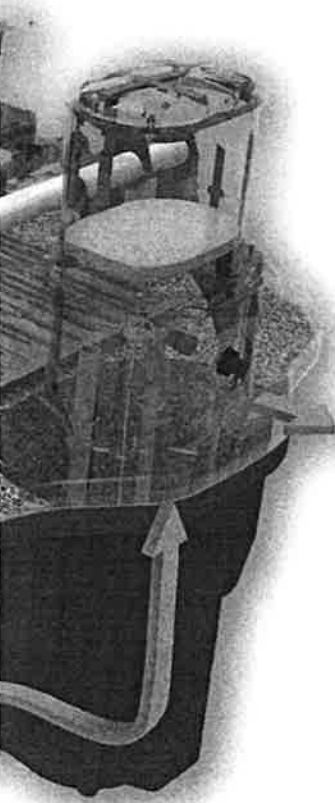
Tel: 800-444-1359 • Fax: 860-610-0427

**[www.eljen.com](http://www.eljen.com)**

# TECHNICAL DATA

Refer to [ptzone.premiertechaqua.com](http://ptzone.premiertechaqua.com) for technical documentation for the following models and others. Contact your regional supervisor for availability.

EC7 MODELS	5.7	7.3
	EC7-1050-P-G/PDV-USA EC7-4000-P-G/PDV-CAN	EC7-1350-P-G/PDV-USA EC7-5000-P-G/PDV-CAN
<b>Daily flow</b>	1,050 US gal/d (4,000 L/d)	1,350 US gal/d (5,000 L/d)
<b>Treatment surface area</b>	61 ft <sup>2</sup> (5.7 m <sup>2</sup> )	79 ft <sup>2</sup> (7.3 m <sup>2</sup> )
<b>Length (A)</b>	133" (3,380 mm)	163" (4,130 mm)
<b>Width (B)</b>	79" (2,000 mm)	81" (2,050 mm)
<b>Height (C)</b>	73" (1,850 mm)	
<b>Inlet height from bottom (D)</b>	49 1/2" (1,260 mm)	
<b>Inlet height from top (E)</b>	23" (580 mm)	
<b>Outlet height (Fg)</b> Gravity discharge models	3" (76 mm)	
<b>Outlet height (Fp)</b> Pumped discharge models	49" (1,240 mm)	
<b>Weight</b> (includes internal components and filtering media)	2,640 lb (1,200 kg)	3,120 lb (1,415 kg)
<b>Total emergency storage capacity</b>	1,155 US gal (4,730 L)	1,595 US gal (4,525 L)
<b>Built-in effective volume available for dosing</b> Pumped discharge models only	230 US gal (870 L)	295 US gal (1,120 L)

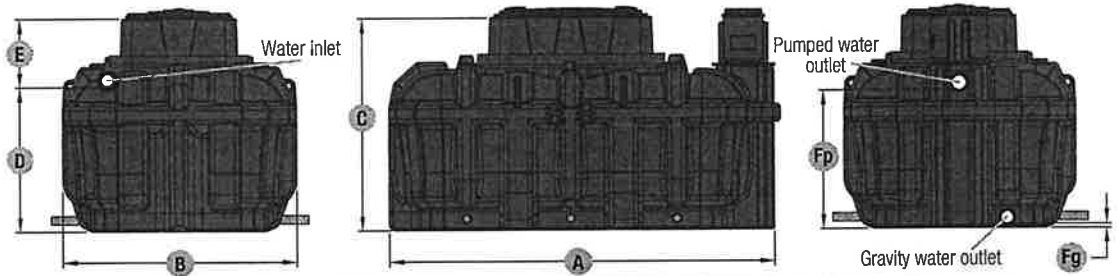


Weights and dimensions are for handling and lifting purposes only. They are approximate and non-binding.

Systems must be installed, commissioned, and used in accordance with our instructions. Installation guides and owner's manuals are available on [ptzone.premiertechaqua.com](http://ptzone.premiertechaqua.com).

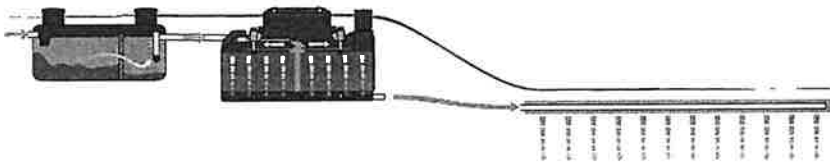
The 7.3 model is produced on request only. Plan for additional delivery time.

- Water inlet**  
Ø 4" (100 mm) nominal
- Gravity water outlet**  
Ø 4" (100 mm) nominal
- Pumped water outlet**  
Ø 1.5" (38 mm) or  
2" (50 mm) nominal

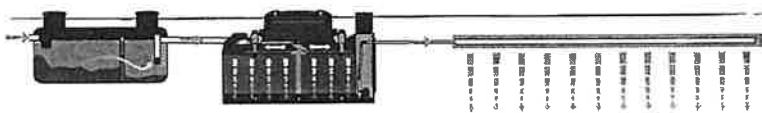


## TYPICAL INSTALLATIONS

Ecoflo Coco Filter polyethylene - watertight bottom - gravity discharge



Ecoflo Coco Filter polyethylene - watertight bottom - pumped discharge



## UV DISINFECTION OPTIONS

Ecoflo Models	DIUV Classic Kit to Be Integrated	DIUV Classic in a TLX Tank
EC7-1050/4000-P-PDV	✗	✓
EC7-1350/5000-P-PDV	✗	✓

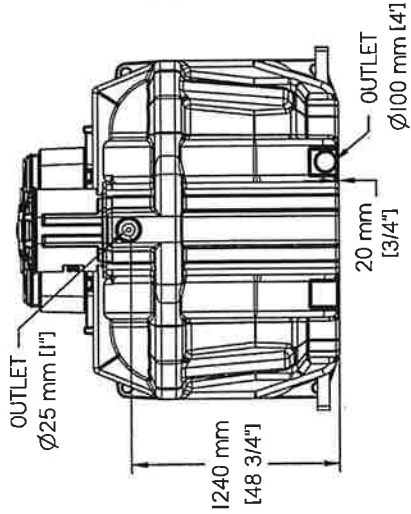
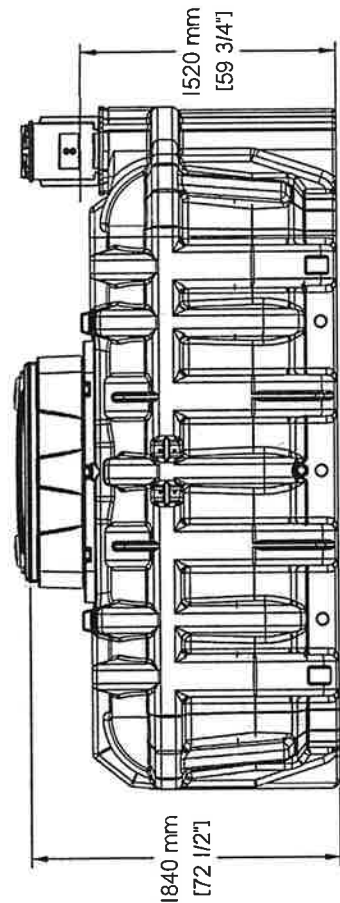
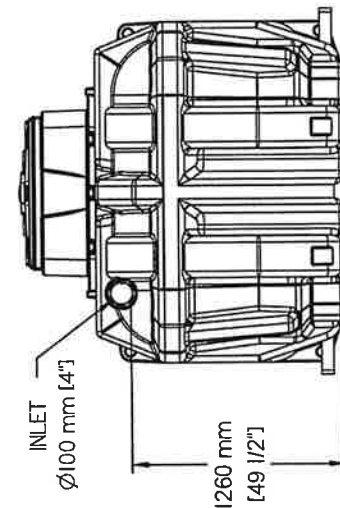
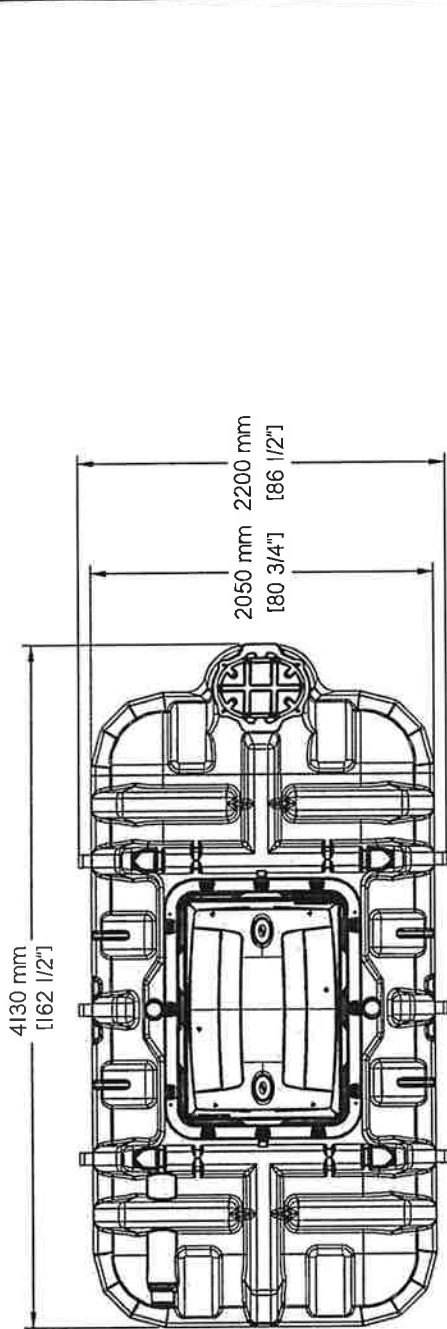
For UV disinfection details, see page 14.

For pumps and other peripherals, see page 15.

**NITROGEN REDUCTION OPTION AVAILABLE (see page 14)**







#	DATE	REVISION	BY		RIVIERE-DU-LOUP (QUEBEC) TEL: (418) 867-8883, FAX: (418) 862-6642	
					<b>PREMIER TECH</b> AQUA	TITLE: ECOFLO EC7-1350-P-P DETAILS
					FABRICATION TOLERANCE mm ±0.15 X ±1/2 XX ±1 XX ±0.040 XXX ±0.5 XXX ±0.020	MATERIAL:
					DRAWN BY: plop VERIFIED BY: APPROVED BY:	DATE: 2014/11/06 DATE: DATE:
					PAPER SIZE: B SCALE: I=30 DRAWING #: EC7-1350-P-P	SEAL:
						UNIT: mm (in)
						I/I

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