

Design Manual

Residential Systems
CE and CEN Models

Indiana

Revised: June 18, 2018



Certified to
NSF/ANSI Standards 40 & 245



Indiana Design Manual Index

TNI Approval Letter

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June 15, 2018

Scott Samuelson
Managing Director
Fuji Clean USA, LLC
41-2 Greenwood Road
Brunswick, ME 04011

Dear Mr. Samuelson:

Re: Approval of Fuji Clean USA, LLC CE- and CEN-Series Model units
For use in residential and commercial onsite sewage systems

The Fuji Clean USA CE- and CEN-Series Model units listed below are hereby approved for use in Indiana as an additional system component in an onsite sewage system by the Indiana State Department of Health (department), under the provisions of *410 IAC 6-8.3-52(h)*, *410 IAC 6-10.1-49(h)*, and the *Indiana Standards for Aerobic Treatment Units* published by the department on September 8, 2015. This approval is for the use in commercial onsite sewage systems and individual residential onsite sewage systems. Approval is effective this 14th day of June, 2018.

The Fuji Clean USA Approved Models are limited to:

ATU Series	Model	Flow Rating (GPD)	Min. Flow (GPD)	BOD Rating (lbs./day)	BOD (mg/L)		TSS (mg/L)	
					Min.	Max.	Min.	Max.
CE	5	450	45	0.52	100	300	100	350
CE	7	630	63	0.73	100	300	100	350
CE	10	900	90	1.04	100	300	100	350
CEN	5	450	45	0.69	100	300	100	350
CEN	7	630	63	0.97	100	300	100	350
CEN	10	900	90	1.38	100	300	100	350

Each Model is approved for options 1.a; 1.b; 1.c; and 2.a; *Indiana Standards for Aerobic Treatment Units*, published by the department on September 8, 2015.

- I. Fuji Clean USA, LLC. is required to:
 - a) Provide tank connectors to ensure watertight pipe connections at the inlet and outlet of the treatment unit;
 - b) Certify distributors, designers, installers, service providers and those involved in permitting of these technologies;
 - c) Submit to the department a list of all certified installers, distributors, and service providers for the State of Indiana on a quarterly basis the first year and annually after that; and notify the department immediately of the removal of any certified installer, distributor, or service providers;

- d) Submit for review and approval of the department any proposed changes to any system component or the Indiana Product Manuals prior to implementation of the changes;
 - e) Notify the department in writing of any scheduled training event at least 10 working days prior to the event;
 - f) Provide on-going consultation to health department staffs, designers, installers, and service providers;
 - g) Report to the department within 30 days the failure of any owner to renew a service contract for the operation and maintenance of any onsite sewage system that includes a Fuji Clean USA CE- or CEN- Series unit.
- II. The Fuji Clean USA CE- and CEN-Series unit is subject to:
- a) The review by the department of each individual project when the unit will be subject to intermittent flows. Further, all start-up and shut down procedures must be carried out by a certified service provider after local health department notification and consultation.
 - b) The review by the department for each individual residential project where:
 - 1. A trash tank is proposed in lieu of a full sized septic tank in accordance with Section IV., *Indiana Standards for Aerobic Treatment Units* published by the department on September 8, 2015, or
 - 2. A soil absorption field of reduced size is proposed in accordance with Section VII. F., *Indiana Standards for Aerobic Treatment Units* published by the department on September 8, 2015.

Unless plan review and permit issuance has been delegated to the local health department in accordance with Section V. C., *Indiana Standards for Aerobic Treatment Units* published by the department on September 8, 2015.
 - c) The applicable provisions of ISDH Rule 410 IAC 6-8.3, and ISDH Rule 410 IAC 6-10.1, including the discharge to a soil absorption field which meets all of the provisions of the applicable rule, except for system sizing as allowed in Section VII. F., *Indiana Standards for Aerobic Treatment Units* published by the department on September 8, 2015;
 - d) Treating only domestic and/or residential strength wastewater;
 - e) The applicable provisions of *Indiana Standards for Aerobic Treatment Units* published by the department on September 8, 2015;
 - f) The Fuji Clean USA Indiana Design, Contractor Installation, Operation and Maintenance, and Owner's Manuals; and
 - g) The provisions and criteria identified in this approval letter.
- III. The Fuji Clean USA CE- and CEN-Series aerobic unit manufacturer, designer, distributor, installer, and service provider is subject to:
- a) Fuji Clean USA, LLC Certification;
 - b) Maintaining a status of good standing with Fuji Clean USA, LLC.

This approval may be revoked or modified by the department for non-compliance, or if it is documented that it would not be in the best interests of public health for approvals to continue.

If you wish to request administrative review of this *Approval* pursuant to Indiana Code 4-21.5-3-5, you must file a petition for review within fifteen (15) days after this *Approval* is received. The petition for review and petition for stay of effectiveness must be postmarked no later than July 10, 2018.

The petition for review must be in writing and must include facts demonstrating that:

- The petitioner is a person to whom the *Approval* is specifically directed;
- The petitioner is aggrieved or adversely affected by the *Approval*; or
- The petitioner is entitled to review under any law.

If the petition for review is not filed timely, this *Approval* becomes FINAL. Any petition for review and petition for stay of effectiveness must be submitted in writing to:

Court Administrator
Office of Legal Affairs, #3H
Indiana State Department of Health
2 North Meridian Street
Indianapolis, IN 46204

If you do not object to this product submittal approval, you do not need to take any further action.

Sincerely,

A handwritten signature in blue ink, appearing to read "m. mettler".

Michael Mettler, REHS, Director
Environmental Public Health Division
317/233-7183
mmettler@isdh.in.gov

cc: Bennette D. Burks, P.E., AOSE, Fuji Clean USA, Technical Advisor for Indiana Approval
Local Health Departments
Onsite Staff



A. Overview and Indiana Rules

Fuji Clean USA (Fuji Clean), residential wastewater treatment systems have been approved in Indiana as Aerobic Treatment Units (ATU) for new and replacement/repair installations. Indiana designs that incorporate Fuji Clean technology shall include the following:

1. All system designers, installers and service providers must be Indiana Fuji Clean USA certified. Training is available on a regular basis in Indiana through Fuji Clean USA's Authorized Representative.
2. Design must be in compliance with the manufacturer's manuals, Indiana State Department of Health (ISDH) Rule [Indiana Standards for Aerobic Treatment Units (ATU)], 410 IAC 6-8.3 and 410 IAC 6-10.1] and any applicable Local Health Department policies, and Local Ordinances.
3. Fuji Clean's TNI Approval Letter, with approved models, is included with this document. (Also on Department's website; "Approved TNI").
4. Fuji Clean's treatment system model selection shall be based on the Design Specification Summary in this Indiana Design Manual.
5. Fuji Clean ATU's will only accept sewage as defined in 410 IAC 6-8.3-41 and in 410 IAC 6-10.1-38.
6. Design will stipulate that water softener backwash shall not enter the Fuji Clean ATU and be managed by an option approved by the ISDH rules.
7. System O&M must be performed by an authorized service provider according to the requirements of the SI O&M program.
8. Soil Absorption system design shall meet or exceed the provisions of Rule 410 IAC 6-8.3, 6-10.1 and Indiana TNI Standards for the specific soil absorption field technology. A Fuji Clean unit utilizing a conventional soil absorption field technology may qualify for a 33 percent reduction in absorption field sizing.
9. Insulation shall be used per the Fuji Clean Installation Manual.
10. CAD and PDF drawings of systems are available at the website: www.fujicleanusa.com

**Please contact Fuji Clean USA or its Indiana Authorized Representative
with questions or for additional technical information.**

B. Design Basics

1. General Design Information: The Fuji Clean CE- and CEN-Series are designed to operate in full compliance with Indiana Rule 410 IAC 6-8.3 for typical residential and commercial applications. The units are not intended to treat industrial or hazardous wastes. The units are suitable for both new and replacement/repair installations and with any type of rejuvenation, subsurface drip system, soil absorption field (SAF), flood dose soil absorption field, subsurface pressure distribution, or elevated sand mound soil absorption field. The choice between the CE- and CEN- Series depends on the need to remove nitrogen. The CE-Series is designed primarily to remove BOD and TSS (Biological Oxygen Demand and Total Suspended Solids). The CEN-Series is configured to provide for TN removal and has been shown through NSF testing to produce effluent having a TN of 10 mg/L. The CEN-Series is intended for use for sites where owners desire or need to reduce nitrogen. Please refer to Section E, Table 1.
2. Upstream Septic Tank: Fuji Clean systems incorporate an integrated primary treatment tank, so no upstream septic tank is required. Septic tanks may be used upstream of the units as Indiana requirements for BOD and TSS removal are unaffected (or enhanced) by upstream septic tanks. Please refer to Section C, Figure 1.
3. System Sizing: Fuji Clean systems intended for one-and two-family dwellings shall be sized in accordance with the Design Daily Flow (DDF), Rule 410 IAC 6-8.3-12, which identifies 150 gpd (gallons per day) per bedroom or bedroom equivalent. Fuji Clean systems intended for larger flows shall be sized based on Rule 410 IAC 6-10.1-60, Sewage Flows. Please refer to Section E, Table 1.
4. Frost Protection: Fuji Clean units must be protected against frost penetration as defined by Rule 410 IAC 6-8.3, Indiana Table VIII, Frost Penetrations in Indiana. Frost protection for the upper half of the tank is provided by insulation board (“blueboard”) with minimum R-8 insulation value. Please refer to Section C, Fig. 2. Please refer to the Fuji Clean Indiana Installation Manual for installation details.

B. Design Basics cont.

5. Disposal Limitations: Please note the prohibitions of Rule 410 IAC 6-8.3-52(j): an onsite sewage system may not be used for the disposal of water from roof drains, foundation drains, swimming pool main drains, hot tub drains, and area drains. Also note that Rule 410 IAC 6-8.3-60 (i) (3-5) allows water softener backwash discharge to locations other than the Fuji Clean unit. Fuji Clean designers shall not include water softener backwash into the Fuji Clean system. Instead, water softener discharge shall be plumbed to circumvent the treatment system and discharged directly to applicable disposable area downstream of the Fuji Clean treatment system.

6. Food Disposers: Fuji Clean recommends that owners not use food disposers because they may result in excessive solids, BOD, TSS, and FOG loadings. Alternatively, owners should be made aware that the use of disposers may result in additional operation and maintenance costs, including more frequent sludge pumpout. This does not pertain to dishwashers with integrated disposals.

7. System Venting: Fuji Clean units require secondary venting in cases where an air lock prevents venting through the plumbing system of the dwelling or building served. Please refer to Section C, Fig. 4.

8. Uplift Restraint: Uplift restraint is required for Fuji Clean tanks in cases where the seasonal high water table is expected to rise above the base of the tank. The designer will estimate the elevation of the tank bottom and estimate the elevation of the seasonal saturation (high water). If the seasonal high water is higher than the tank bottom, then the designer shall include in his or her plan the calculated uplift, the calculated uplift restraint required, and construction drawings, material specifications, and details required to install the uplift restraint system. During installation, the inspector shall confirm that the installation conforms to the drawings, material specifications, and details provided in the plan. If the tank shows signs of uplift during an maintenance event, the maintenance provider shall notify the Authorized Fuji Clean Representative and proper authorities per provisions of the Indiana Fuji Clean USA TNI Approval. (Please refer to Section C, Figure 6 for tie-down kits supplied by Fuji Clean USA through its Indiana distributor.)

C. Installation Overview

Figure 1.
Installation Layout

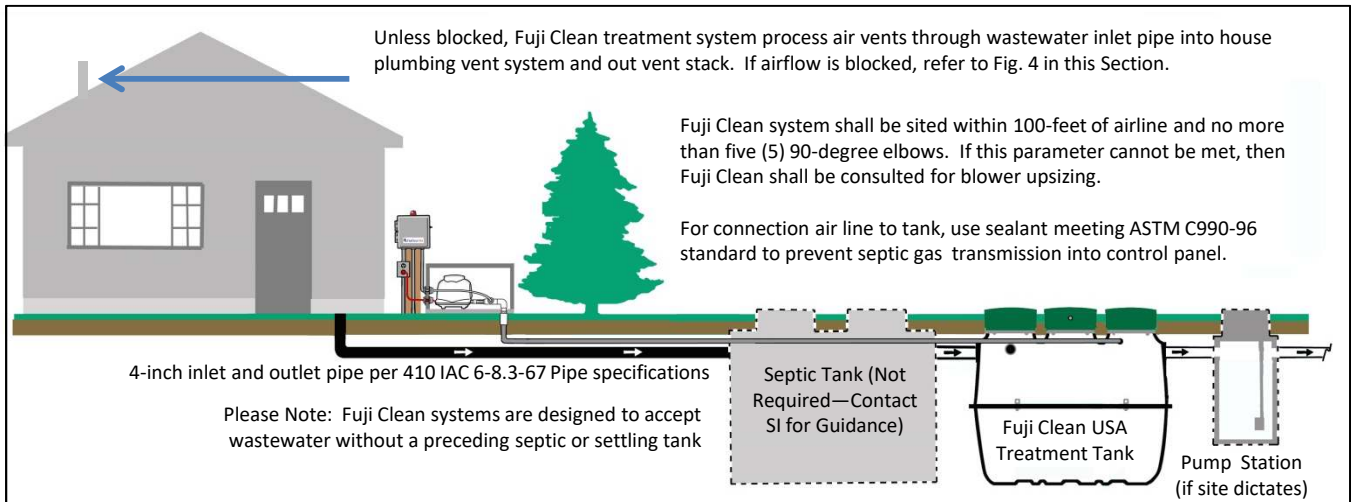


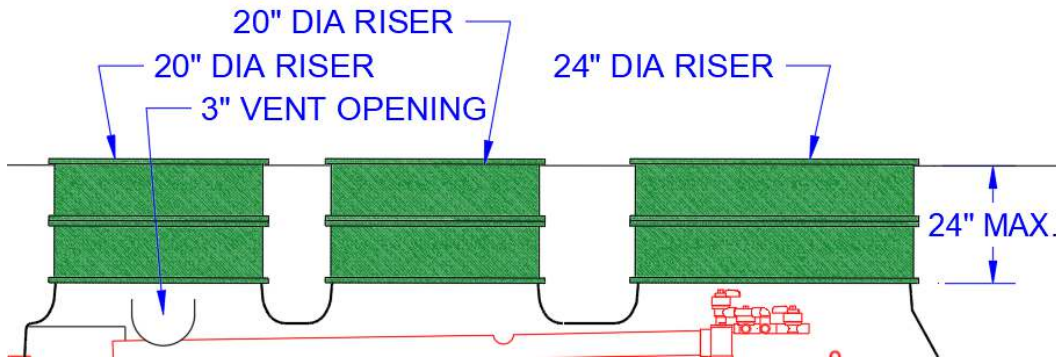
Figure 2. System Insulation



Insulate systems for Indiana sites as specified in the Fuji Clean USA, Indiana Installation Manual. Frost protection for the upper half of the tank is provided by insulation board ("blueboard") with minimum R-8 insulation value. Please refer to the Fuji Clean Indiana Installation Manual for installation details.

Alternative insulation options must be approved in writing by the Indiana authorized Fuji Clean representative.

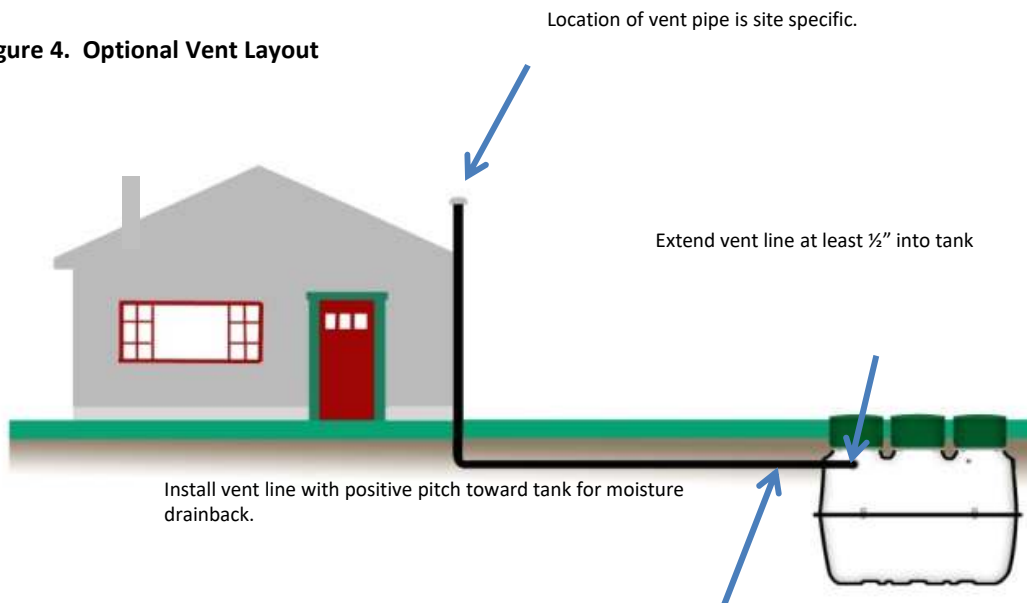
Figure 3. Riser Height Detail



- System is delivered with risers.
- Riser additions may be installed by contractor but total riser height shall be no more than 24" to allow service access.
- Note: Model CE5 requires three 20" diameter risers. All other Fuji Clean systems require two 20" diameter riser and one 24" diameter riser as shown.

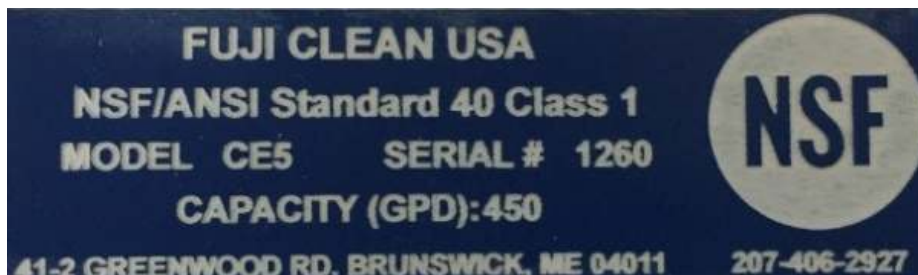
C. Installation Overview, cont.

Figure 4. Optional Vent Layout



- Please refer to Fig. 1 for standard system venting through house plumbing.
- If access to house plumbing vent system is blocked (for example from effluent or grinder pump from house to system), a separate 3" PVC vent line must be installed. A pre-drilled 3" hole for this vent is included with all Fuji Clean systems. (A 3" plug is provided if this vent is not installed.)
- Vent line shall be installed with a watertight grommet or equivalent and extend no less than 1/2" into Fuji Clean tank. Vent shall be installed with continuous positive pitch toward tank so that any accumulated moisture will drain into tank.

Figure 5. NSF Labels



Using grommets or waterproof adhesive, NSF labels (supplied by Fuji Clean), shall be affixed in two locations, inside one riser and on inside of controller.

Figure 6. Uplift Restraint Detail (Hardware provided by Indiana distributor)

Note: Deviations in uplift restraint selection must be approved in writing by Fuji Clean USA, LLC, prior to installation.

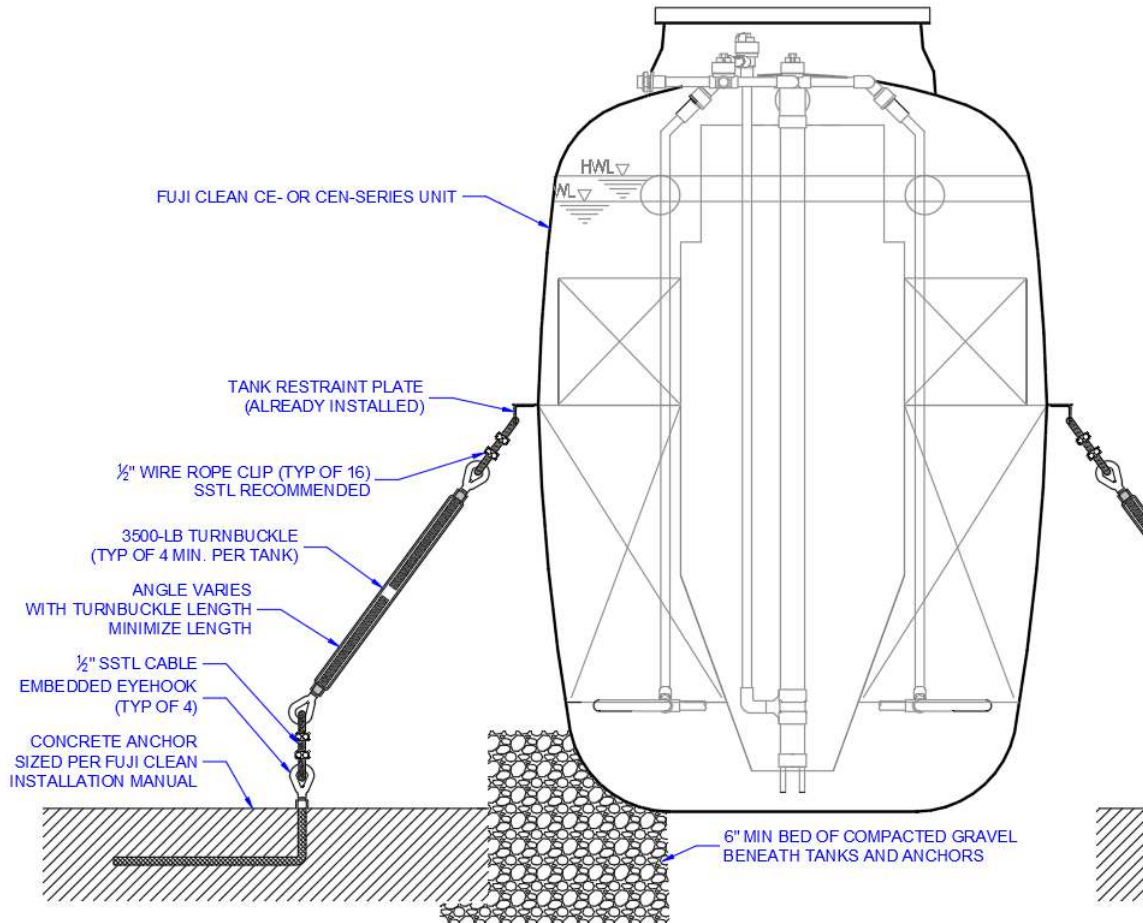
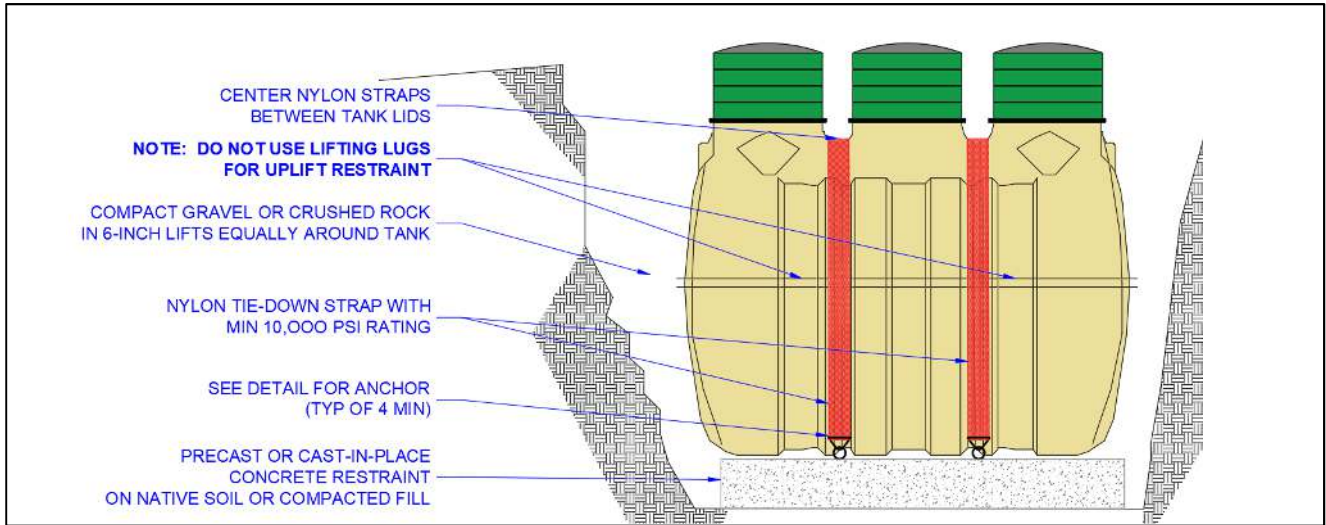


Figure 7. Uplift Restraint with Tie-Down Straps



Suggested uplift restraint configurations include tie-down straps using concrete restraints or concrete collar.

Note: tie down straps and 1/4" SSTL cable are commodity items and not brand specific.

Figure 8. Cable Tie-Down Detail

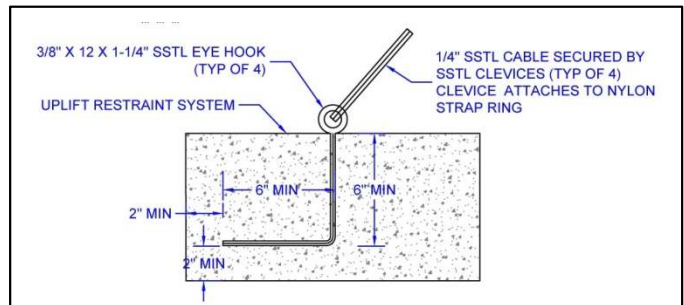
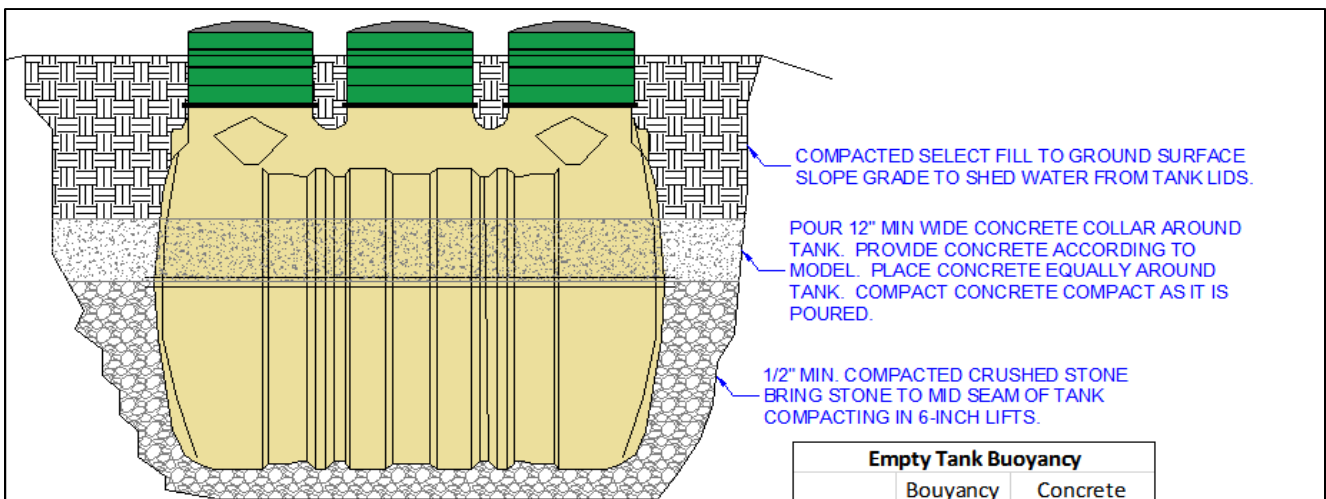


Figure 9. Uplift Restraint with Concrete Collar



Notes:

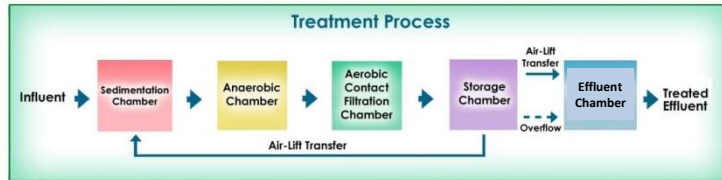
1. "CY" means cubic yards.
2. Concrete shall be compacted by "rodding" or vibrator during pouring.
3. Excavation shall be free of water.

Empty Tank Buoyancy		
Model	Buoyancy (lbs)	Concrete Restraint (CY)
CE5	5,270	1.30
CE7	7,210	1.78
CE10	10,400	2.57
CEN5	7,210	1.78
CEN7	10,400	2.57
CEN10	14,500	3.58

D. Treatment Process Overview

1. Contact Filtration Treatment: Fuji Clean's "contact filtration" treatment is a simple, well engineered process that consists of a controlled, circuitous flow train through anoxic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see Fig. 1A below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help moderate discharge flow of treated effluent.



Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

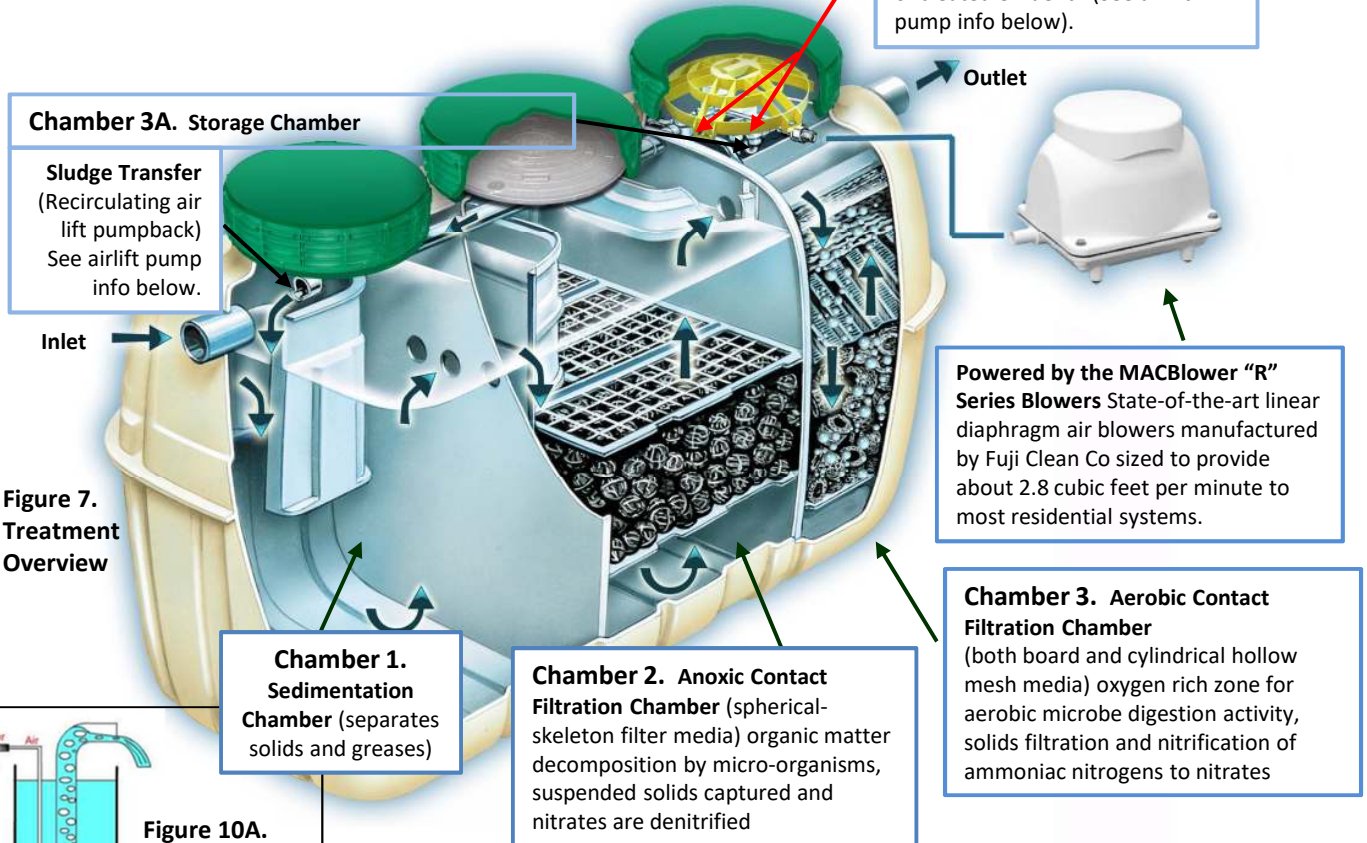


Figure 7. Treatment Overview

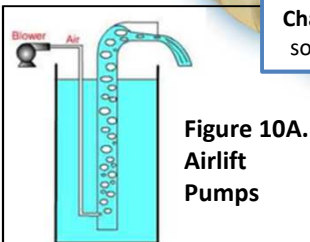
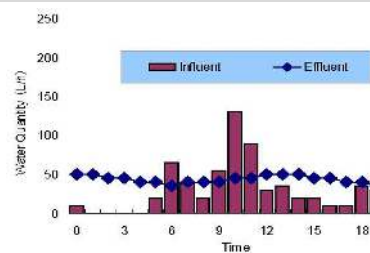
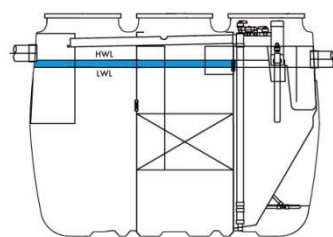


Figure 10A. Airlift Pumps

Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.

Figure 10B. Flow Variability Accommodation

Water level rises and falls between LWL and HWL in the first two chambers smoothing out inflow fluctuations.



E. Design Specifications – Summary, Indiana

TABLE 1—MODEL SPECIFICATIONS

FUJI CLEAN USA Indian Specifications	CE Series BOD, TSS, TN*			CEN Series BOD, TSS, Enhanced TN Removal		
Model	CE5	CE7	CE10	CEN5	CEN7	CEN10
Bedrooms and Bedroom Equivalents	3	4	6	3	4	6
Design Daily Flow (GPD)**	450	630	900	450	630	900
Effluent*** (assumes Typical Domestic Wastewater)						
BOD (mg/L)	10-20	10-20	10-20	10	10	10
BOD (removal in pounds per day)	.52	.73	1.04	.69	.97	1.38
TSS (mg/L)	10-20	10-20	10-20	10	10	10
TN (mg/L)				10	10	10
Blower Model / CFM (Standard)	MAC80R 2.8 CFM	MAC80R 2.8 CFM	MAC100R 3.5 CFM	MAC80R 2.8 CFM	MAC100R 2.8 CFM	MAC100R 3.5 CFM
Power Use (kWh/day)	1.27	1.27	1.92	1.27	1.92	1.92
Tank Detail:						
Material	Fibre-reinforced plastic			Fibre-reinforced plastic		
Height (inches)	61.8	65.7	73.6	65.7	73.6	77.4
Length (inches)	85	95.7	98.8	95.7	98.8	118.9
Width (inches)	43.7	49.2	56.7	49.2	56.7	68.9
Weight (lbs.)	397	463	705	463	705	926
Inlet Invert (inches, rounded to 1/8")	49	53	61	53	61	77.25
Outlet Invert (inches, rounded to 1/8")	47	51	59	51	59	75.25
Access Ports (number)	3	3	3	3	3	3
Access Port Diameter (inches)	3@20"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"	2@20" 1@24"
Volume Total (gallons)	540	749	1069	749	1069	1498
Uplift Restraint (lbs./In)****	77	100	127	100	127	170

**Please consult with the System Integrator (SI) or Fuji Clean USA for commercial models designed to treat hydraulic flows above those listed in this table.

**** Pounds of total uplift restraint required per inch of tank penetration below seasonal high water table. Please refer to Section C for uplift restraint details.

Table 2. NSF Data – Model CE5 (Tested at NSF)

Table 2—Fuji Clean Advanced Treatment System			
Model CE5; NSF Standard 40			
	Influent (Average) mg/L	Effluent (Average) mg/L	% Reduction
BOD/CBOD	152	11	92%
TSS	259	13	95%

Table 3. NSF Data – Model CEN5 (Tested at NSF)

Table 3—Fuji Clean Advanced Treatment System			
Model CEN5; NSF Standard 40/245			
	Influent (Average)	Effluent (Average)	% Reduction
BOD/CBOD			
TSS	305 mg/l	6 mg/l	98%
Total Nitrogen	40 mg/l	10 mg/l	74%
Fecal Coliform (Col./100mL) (Geo. Mean)	6.6 Million	70	

F. Fuji Clean Treatment Technology Advantages

1. Fuji Clean Advantages: The advantage of Fuji Clean treatment technology over conventional onsite sewage systems is that the Fuji Clean treatment system discharges highly treated effluent into the soil absorption system.

Potentially hazardous pollutants as measured by the widely accepted CBOD (Carbonaceous Biochemical Oxygen Demand), TSS (Total Suspended Solids), nutrients, and fecal coliform are reduced to levels that are very significantly less hazardous, and more environmentally accommodating as shown in the tables below. (3rd party NSF International conducted testing). This treated effluent not only allows for a reduction in Soil Absorption Field (SAF) sizing, but also preserves the SAF infiltrative surface from biomat-induced failure because there is not enough CBOD in the effluent to form or feed a biomat or TSS to plug pore spaces.

Product features on the following page include system design and process flow characteristics. Fuji Clean corporate experience and commitment provide consistent, long-term high level treatment.

When incorporating Fuji Clean Advanced Treatment System technology into system design, the Soil Absorption Field (SAF) sizing may include a reduced infiltrative surface area of up to 33% in compliance with the Indiana Standards for Aerobic Treatment Units (ATU) VII(F)(1)(2).

Fuji Clean NSF 40 and 40/245 certified onsite wastewater treatment devices exceed the performance standards for NSF 40, and NSF 40/245 Class I devices.

G. Fuji Clean Product Features

- a) Small footprint, light weight, Fibre-reinforced plastic (FRP) makes the system easy to maneuver in tight locations
- b) Excellent treatment with no preceding septic tank required (per NSF testing configuration)
- c) Highly efficient - Most residential models use 1.27 kWh/day (\$4.68/month @ \$0.12/kWh)
- d) CE-Series Performance: NSF/ANSI 40 Certified with 11 mg/L CBOD5 and 13 mg/L TSS (NSF/ANSI 40 Standard is 25 mg/L CBOD5 and 30 mg/L TSS)
- e) CEN-Series Performance: NSF/ANSI 40/245 Certified: 5 mg/L CBOD5 ; 6 mg/L TSS ; and 10 mg/L Total Nitrogen
- f) Delivered plug and play ready, no onsite assembly required
- g) Capacity to Moderate Surge Flow
- h) Easy Operation & Maintenance – no moving parts or components to remove and wash
- i) World leader in the onsite wastewater treatment system industry with over 2 million installed and operating systems
- j) Proven, reliable SJE Rhombus Alarm/Monitor in all-weather NEMA 4X rated enclosure with telecommunication (including wireless) option available
- k) Residential and commercial model options to meet wide variety of flows
- l) Indiana certified O&M service providers (See details on page 13)
- m) Best-in-class linear diaphragm air blowers
- n) Nutrient reduction models available (both nitrogen and phosphorus)





H. Indiana Authorized Providers

1. Authorized Indiana Service Providers (to date):

- a. Tim Shopp,
TJ Misc., Inc.
2989 County Road 43, Waterloo, IN 46793
Tel: 260-868-1043 (office); 260-417-1786 (mobile)

2. Authorized Indiana Installers (to date)

- a. Tim Shopp,
TJ Misc., Inc.
2989 County Road 43, Waterloo, IN 46793
Tel: 260-868-1043 (office); 260-417-1786 (mobile)

3. Design and Installation Training

Installation training and certification will be provided by TJ Misc.. Inc. to designers, installers and those involved in permitting onsite systems. Training and certification is required prior to installation. TJ Misc. will provide certification and evidence of training and a copy of that certification and evidence will be maintained by TJ Misc. and will be provided to ISDH. TJ Misc. will directly supervise the first system installation for each installer to ensure that designs / installation instructions are being followed.

4. Operation and Maintenance Training:

Operation and Maintenance training and certification will be provided by TJ Misc. Inc. TJ Misc. will provide evidence of training and a copy of that evidence will be maintained by TJ Misc. Inc. and will be provided to ISDH. All authorized service providers shall follow provisions outlined in the Fuji Clean USA Indiana TNI Approval and Local Health Department requirements.

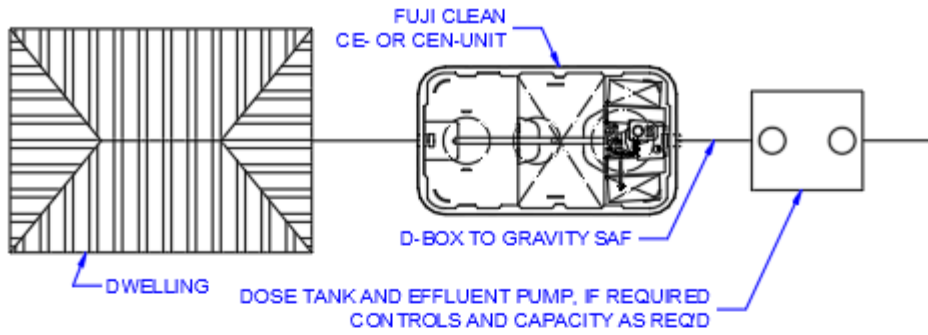
5. Notification:

ISDH shall be notified at least 10 working days in advance of any scheduled training events.

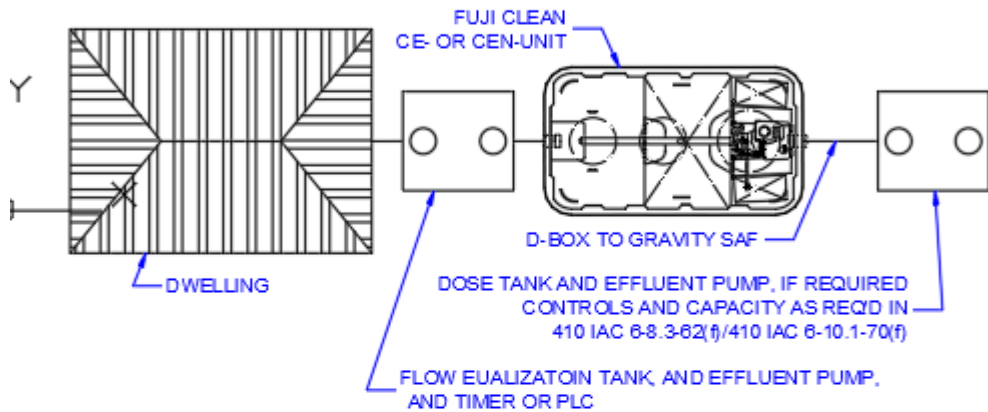
6. Additional Providers:

Fuji Clean USA, LLC, is committed to providing additional service providers as market demands increase.

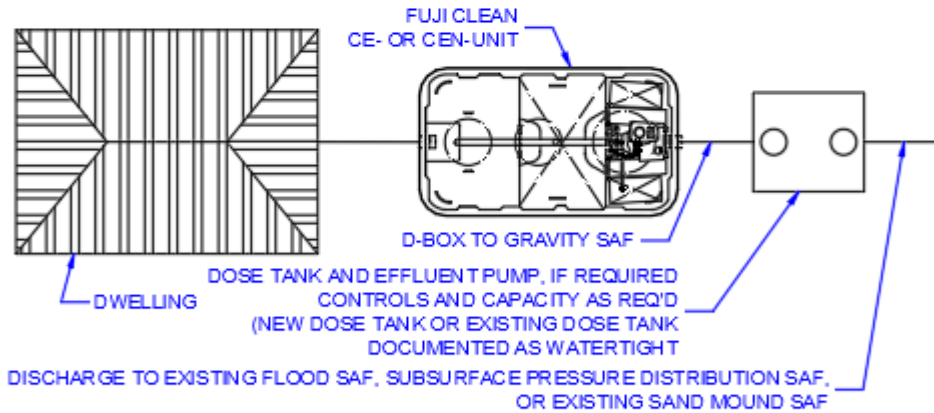
DESIGN CONFIGURATION 1.A: TREATMENT UNIT



DESIGN CONFIGURATION 1.B: FLOW EQUALIZATION OF TREATMENT UNIT



DESIGN CONFIGURATION 1.C: REMEDIATION OR ADDITION TO AN EXISTING RESIDENTIAL SAF



DESIGN CONFIGURATION 2.A: TREATMENT UNIT AND DOSING OF THE SDS SAF

