NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION
ON-SITE WATER PROTECTION BRANCH

INNOVATIVE WASTEWATER SYSTEM APPROVAL

Innovative Wastewater System Approval Number: IWWS 1997-01-R1 Attachment 1

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For: Pressure Dosed Intermittent Sand Filter Kit Models: ISF1030G, ISF1030P, ISF1036G, ISF1036P, ISF1040G, ISF1040P, ISF1048G, ISG1048GA, ISF1048P, ISF1048PZ, ISF1230G, ISF1230P, ISF2018G, ISF2018P, ISF2020G, ISF2020P, ISF2024G, ISF2024GZ, ISF2024P, ISF2024PZ, ISF2030GZ, ISF2030PZ, ISF3030GZ, and ISF3030PZ

Approval Date: July 23, 1999
December 31, 2024 Updated for 18E and renewed for 2025

In accordance with G.S. 130A-343 and 15A NCAC 18E, Section .1700, an application by Orenco Systems, Inc, for a renewal of the approval for their intermittent pressure dosed sand filter system has been reviewed and found to meet the standards of an Innovative system when the following conditions are met.

I. General

A. Scope of this Innovative Approval
   1. Design, installation, use, and operation and maintenance requirements for intermittent pressure dosed sand filter systems, Type A systems, meeting TS-I effluent standards pursuant to 15A NCAC 18E .1201(a), Table XXV.
   2. Operation, maintenance, and monitoring requirements for pressure dosed intermittent sand filter systems and associated dispersal systems to ensure the treatment performance standards are met.

B. This Innovative Approval is applicable to wastewater systems treating domestic strength effluent, as defined in 15A NCAC 18E .0402(a), Table III, utilizing pressure dosed intermittent sand filter systems that have a design daily flow less than or equal to 1,000 gallons per day (gpd).

Use of pressure dosed sand intermittent filter systems for facilities with high strength effluent, as defined in 15A NCAC 18E .0402(a), Table III or industrial process wastewater, shall be proposed by a North Carolina Professional Engineer (PE) to the Department for review and approval on a case-by-case basis, prior to permitting by the local health department (LHD). The system design shall include the proposed untreated wastewater strength in BOD_5, COD, TN, TSS, and fats, oils, and grease, the expected organic loading rate in pounds of BOD or N, the hydraulic loading rate on the pretreatment system, and the calculations, references, and any other needed information to support the proposed design.

C. Any site utilizing these systems shall have wastewater with sufficient alkalinity to facilitate biological treatment processes. The influent shall not have a pH or toxins that significantly inhibit microbial growth.

D. Use of pressure dosed intermittent sand filter systems that have a design daily flow greater than 1,000 gpd may be permitted after approval by the Department on a case-by-case basis in accordance with 15A NCAC 18E .0302(e) or in accordance with G.S. 130A-336.1.

II. System Description

Pre-approved kit models are listed above. The first four numbers of the model depict the filter surface area dimensions in feet. For example, the 1030 represents a filter 10 feet wide by 30 feet long. The G suffix indicates the kit incorporates gravity flow out from the filter. The P suffix indicates the filter is pressure dosed from an internal pump vault installed in the center of the filter. The Z suffix indicates that a hydrosplitter valve is included within the filter distribution network to split septic tank effluent between multiple distribution zones on the filter surface

III. Siting Criteria

The pressure dosed intermittent sand filter systems and associated dispersal fields shall be sited and sized in accordance with 15A NCAC 18E, Section .1200 for TS-I systems. Drip irrigation systems used with pressure dosed intermittent sand filter systems shall be sited and sized in accordance with 15A NCAC 18E .1204 and the manufacturer specific drip approval. The pressure dosed intermittent sand filter systems and associated dispersal fields shall meet all applicable horizontal setback requirements in accordance with 15A NCAC 18E Section .0600 or .1202 and be located to prevent surface and subsurface water inflow and infiltration.

IV. Dispersal Field System Sizing

The dispersal field system sizing criteria shall be based upon the long-term acceptance rate specified in the appropriate portion of the rules or the Provisional, Innovative, or Accepted system approval for the type of dispersal system to be used.

V. Special Site Evaluation

A special site evaluation may be required based on the proposed dispersal system. Refer to 15A NCAC 18E .0510(c) for when a special site evaluation is required.

VI. Design Criteria

A. A septic tank is required before the pressure dosed intermittent sand filter and shall be sized in accordance with 15A NCAC 18E .0801. An access riser that extends above finished grade shall be provided over the septic tank outlet.

B. The containment structure shall consist, at a minimum, of a reinforced plywood support framing, placed in an excavated hole with a pre-cut 30-mil PVC liner provided by Orenco along the bottom and sides.

C. Orenco Systems, Inc, fabricated and installed boots shall be used at the supply line and underdrain penetration points of the liner, in accordance with Orenco System Inc's specifications. No field perforations of the liner should be made.

D. Sand filter underdrain piping and cleanouts shall be provided by Orenco. The gravel and the underdrain system shall be in accordance with Orenco System Inc's specifications.

E. The sand filter media shall be selected from a source approved by the designer authorized by Orenco Systems Inc (authorized designer), and shall meet the following:
   1. requirements of IWWS 1997-01-R1 for a fine or coarse filter sand, and
   2. Orenco System Inc's requirements for either Gradation Range 1 or 2.

F. The sand filter pressure distribution network, supply manifold, orifices, orifice shields, turnups, turnup-protectors, flushing valves, and air coil kit shall be as provided by Orenco System, Inc for each pre-approved filter model. The distribution network, including orifice shields, shall be placed within a six-inch thick layer of washed stone or washed pea gravel in accordance with Orenco System Inc's specifications. A nonwoven synthetic geotextile filter fabric provided by Orenco provided shall be placed on top of the stone/gravel aggregate to prevent fine grained backfield materials from moving down into the filter media. The filter fabric shall not impair movement of air to the sand filter surface. The fabric-covered filter shall be backfilled with six to eight-inches of Group I or II soil material that is mounded to shed surface water away from the filter surface in accordance with Orenco System Inc's specifications. Lateral turn-up end caps, protector sleeves, and manifold cleanouts must extend to or above finished grade.

G. A six-inch minimum diameter observation port or similar device with a removable cap shall be provided to facilitate easy above grade observation of a portion of the sand filter surface.

H. An effluent sampling point must be established for gravity discharge kits. Effluent samples can be taken directly from the sand filter effluent pump basin for pump systems. Options for gravity discharge kits are as follows.
   1. Locate a sampling access port in the discharge pipe between the underdrain exit point from the sand filter and the dispersal field. A four-way cross or similar device can be used where the underdrain discharge pipe and the vertical sampling port intersect to facilitate collection

of effluent samples. The vertical sampling access port and vent pipe must come above the ground surface, be constructed of 4-inch diameter Schedule 40 PVC pipe, and contain a removable cap to allow visual observation and sampling of sand filter effluent flowing to the dispersal field. The cap shall be removable and constructed to prevent the entrance of rainwater, surface water, rodents, and insects. This could simultaneously meet the filter underdrainage system requirement.

2. If ventilation is otherwise provided for in the filter underdrain system as described above, a distribution box or drop box may be used for the sampling access point, located in the final effluent discharge line prior to the dispersal field. The box must be constructed to facilitate at-grade access

I. A State-approved pump tank shall be provided with a liquid capacity equal to or greater than the required septic tank liquid capacity. An Orenco Systems Inc pump vault assembly shall be used in the pump tank.

J. Small, frequent timed doses shall be used to provide maximum treatment of the effluent, in accordance with Orenco Systems Inc's specifications for each kit model.

K. The pump shall be controlled using a Vericomm or Telecomm control panel that includes adjustable timers to control and adjust the number of doses per day and dosing time, an elapsed time meter, a pump impulse counter, and high-water alarm functions. The control panel shall meet the requirements of 15A NCAC 18E .1103.

L. The systems shall be designed for a minimum distal pressure head of five feet.

M. A field adjustment gate valve shall be provided in a valve box at the sand filter for pressure adjustment whenever the supply line exceeds 100 feet in length.

N. The requirements of 15A NCAC 18E Section 1100 shall be met except as provided for in this approval.

O. Pressure dosed intermittent sand filter design parameters, including design flow rates, total dynamic head and available head limitations, shall be in accordance with Table I.

Table I Orenco Intermittent Sand Filter Kit Design Parameters*

Model	Surface Area (ft^2)	# of Orifices, total	# of Zones	Design flow rate (gpm)	Maximum TDH (ft)	Kit Head Loss (ft)	Available Head** (ft)
ISF1030G/P	300	60	1	27	70	10	60
ISF1036G/P	360	72	1	32	58	11	47
ISF1040G/P	400	80	1	35	45	12	33
ISF1048G/P	480	96	1	42	32	15	17
ISF1048GZ/PZ	480	120	2	27	85	15	70
ISF1230G/P	360	75	1	34	55	12	43
ISF2018G/P	360	72	1	32	60	11	49
ISF2020G/P	400	80	1	35	45	12	33

ISF2024G/P	480	96	1	42	32	16	16
ISF2024GZ/PZ	480	120	2	27	84	15	69
ISF2030GZ/PZ	600	150	2	34	51	26	25
ISF3030GZ/PZ	900	225	3	34	54	26	28

Notes:

* See Orenco Systems Inc supplied drawings and specifications for further guidance in completing head loss calculations and for setting floats and timer controls.

** Available Head is the difference between the Maximum TDH and the Kit Head Loss. The Elevation Head (filter distribution network elevation minus pump-off elevation in filter dosing tank) plus transport pipe (supply line) friction losses cannot exceed the Available Head.

VII. Installation and Testing

A. A preconstruction conference shall be required to be attended by the following, as applicable: authorized designer, Authorized On-Site Wastewater Evaluator (AOWE), PE, installer authorized in writing by Orenco Systems Inc (authorized designer), Orenco Systems, Inc licensed distributor, and LHD prior to beginning installation of the pressure dosed intermittent sand filter system.

B. Pressure dosed intermittent sand filter systems shall be installed according to directions provided by Orenco Systems, Inc.

C. All individuals or companies installing pressure dosed intermittent sand filter systems shall be in possession of all necessary permits and licenses before attempting any portion of a new or repair installation. The company or individual must be a Level IV installer and authorized in writing by Orenco Systems, Inc.

D. Watertightness of the septic and pump tanks shall be demonstrated by a leak test in accordance with one of the following:
   1. 24-hour water leak test conducted at the installation site. A water level change of one-half inch or more over twenty-four hours, or visual observation of leakage shall be cause for failure of the watertightness test; or
   2. one of the testing methods in 15A NCAC 18E .0805(b).

E. The authorized installer, PE, AOWE, or authorized designer, and the operator authorized in writing by Orenco Systems, Inc (authorized operator) shall conduct a final inspection and start-up of the pressure dosed intermittent sand filter system and all associated system components. The LHD will attend and observe the final inspection and start-up.

F. Specified site preparation steps and construction specifications for the dispersal system shall be strictly adhered to, including specified depth of trenches in relation to site limiting conditions, cover material specifications if needed, trench installation method, etc.

VIII. Operation, Maintenance, Monitoring, and Reporting

A. Pressure dosed intermittent sand filter systems shall be classified, at a minimum, as a Type Va system in accordance with 15A NCAC 18E .1301(b), Table XXXII. Management and inspection shall be in accordance with 15A NCAC 18E, Section .1300.

B. All pressure dosed intermittent sand filter systems require an operation and maintenance agreement between the system owner and Orenco Systems, Inc, its authorized representative, or with an authorized operator in accordance with 15A NCAC 18E .1302(c). The authorized operator must have proper equipment and training to access and program the control panels on site. The authorized operator shall be:
   1. a North Carolina certified subsurface operator (Operator in Responsible Charge); and
   2. either an employee of Orenco Systems, Inc, or authorized in writing by Orenco Systems, Inc.

C. All pressure dosed intermittent sand filter systems shall be operated and maintained according to the latest version of Orenco Systems, Inc, USA O&M manual.

D. At each pressure dosed intermittent sand filter system inspection, the authorized operator shall follow service procedure steps identified in the Orenco System, Inc, O&M Manual and, at a minimum, observe, monitor, and record the following:
   1. Wastewater level in all the tanks;
   2. Sludge and scum levels in all the tanks;
   3. Clogging of the effluent filter;
   4. Watertightness of tanks, risers, and pipe connections at the tanks;
   5. Operation of pumps, floats, valves, electrical controls, and alarms;
   6. Pumping frequency from pump impulse counters and elapsed run time meters;
   7. Sand filter surface for wastewater ponding;
   8. Dispersal field pump delivery rate (drawdown test), determination of the average pump run time, and dispersal field dosing volume;
   9. Any structural damage, accessibility issues, adequate ventilation, excess odors, ponding of effluent, insect infestations, vegetative growth over the dispersal field, or surfacing of effluent in the dispersal field area;
   10. Sample of effluent collected from the sampling point to check for effluent clarity and odor and a sample of influent, as required; and
   11. Pump cycle and run time meters and any water meter readings.

E. The authorized operator shall conduct any other measurements, monitoring, maintenance activities, and observations as specified in the Operation Permit (OP) and recommended by the manufacturer.

F. Sampling
   1. All sampling shall be done in accordance with 15A NCAC 18E .1302 and .1709. Pressure dosed intermittent sand filter systems shall be sampled annually when the design daily flow is less than or equal to 1,500 gpd. Systems with design daily flows greater than 1,500 gpd and less than or equal to 3,000 gpd shall be sampled twice a year.
   2. Effluent for all systems shall be tested for BOD_5, TSS, and NH_3. Sampling is not required for fecal coliforms when the site is found to be compliant with all other constituents in Table XXV of 15A NCAC 18E .1201(a).
   3. Influent samples, if needed, shall be taken from the outlet end of the septic tank.
   4. Effluent samples shall be collected from the sampling chamber.

G. Notification and Performance of Maintenance and Repairs
   1. The authorized operator shall alert Orenco Systems, Inc, the LHD, and the system owner within 48 hours of needed maintenance or repair activities including, but not limited to landscaping, tank sealing, tank pumping, pipe or control system repairs, media or aerator replacement, and/or adjustments to any other system component.
   2. The authorized operator shall notify the system owner, Orenco Systems, Inc, and the LHD whenever the pump delivery rate efficiency or average pump run times are not within 25 percent of the initial measurements conducted prior to system start-up.
   3. System troubleshooting and needed maintenance shall be provided to maintain the pump delivery rate and average pump run time within 25 percent of initial measurements conducted during system start-up.
   4. Tank compartments will be pumped as needed upon recommendation of the authorized operator and in accordance with the pressure dosed intermittent sand filter system Operation and Maintenance instructions.
   5. The tanks shall be pumped by a permitted septage management firm, and the septage handled in accordance with 15A NCAC 13B .0800.
   6. All maintenance activities shall be logged and recorded in the authorized operator reports provided to the system owner, Orenco Systems, Inc, and the LHD.

H. Reporting
   The authorized operator shall provide a written report to the system owner, Orenco Systems, Inc, and the LHD within 30 days of each inspection. At a minimum, this report shall specify:
   1. The date and time of inspection;
   2. System operating conditions measured and observed according to VIII.D and VIII.E;
   3. Results from laboratory analyses of effluent samples, and influent samples as needed;
   4. Maintenance activities performed since the last inspection report;
   5. An assessment of overall system performance;
   6. A list of any improvements or maintenance needed;
   7. 7- and 30-day readings as required in 15A NCAC 18E .1702(a)(2)(I); and
   8. A determination of whether the system is malfunctioning, and the specific nature of the malfunction.

IX. Responsibilities and Permitting Procedures

A. Prior to the installation of pressure dosed intermittent sand filter system at a site, the owner shall submit an application or Notice of Intent (NOI) to the LHD for the proposed use of this system. Improvement Permits (IP) or Construction Authorizations (CA) issued by the LHD shall have a soil and site evaluation conducted either by the LHD, LSS, or Authorized On-Site Wastewater Evaluator (AOWE). The NOI shall include a soil and site evaluation conducted by an LSS.

B. The IP, CA, and NOI shall contain all the conditions the site approval is based upon, including the proposed used of the Innovative system. The OP will include all conditions specified in the IP and CA. The Authorization to Operate (ATO) should include all the conditions specified in the NOI.

C. When a special site evaluation is required pursuant to 15A NCA 18E .0510, an evaluation and written, sealed report from a Licensed Soil Scientist (LSS) regarding the site shall be provided to the LHD. The report shall contain the information specified in 15A NCAC 18E .0510(d). The LHD may request the assistance of their Regional Soil Scientist in evaluating this report prior to permit issuance.

D. Pressure dosed sand filter systems shall be designed by either a authorized designer, AOWE, or a PE. Systems over 1,000 gpd, or as required in accordance with 15A NCAC 18E .0303(a) shall be designed by a PE.

E. Prior to the LHD issuing a CA for a pressure dosed intermittent sand filter system, a design submittal prepared by an authorized designer, AOWE, or PE shall be submitted. The design submittal shall include the information required in 15A NCAC 18E .0305.

F. It is recommended that local authorized environmental health specialists attend a design training session offered by the manufacturer or the authorized representative prior to permitting the system. Also, at the request of the LHD, a Regional Engineer will review designs.

G. For sites required to be evaluated by an LSS or Licensed Geologist (LG), see Section V and IX.C, the LHD, AOWE, or PE may specify as a condition of the IP and CA that an LSS or LG oversee critical phases of the dispersal field installation and certify in writing that the installation was in accordance with their specified site and installation requirements prior to the OP or ATO issuance.

H. The authorized operator shall be present during the final inspection of the system prior to the issuance of the OP or ATO.

I. The LHD shall issue the OP after the following:
   1. Field verification of installation completion;
   2. Receipt of written documentation from the designer, AOWE, or PE that the system has been designed, installed, and is operating in accordance with the approved plans; and
   3. All necessary legal documents have been completed, including the contract between the system owner and the operator.

   The LHD shall issue the OP for an (a2) and (a5) application after all necessary legal documents have been completed, including the contract between the system owner and the authorized operator.

   The ATO shall be submitted to the LHD in accordance with G.S. 130A-336.1 and G.S. 130A-336.2.

X. Repair of Systems

The provisions of 15A NCAC 18E .1302 shall govern the use of pressure dosed intermittent sand filter systems for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____