

**NORTH CAROLINA DEPARTMENT  
OF ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF ENVIRONMENTAL HEALTH  
ON-SITE WASTEWATER SECTION**

<b>INNOVATIVE WASTEWATER SYSTEM APPROVAL, Attachment</b>
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**INNOVATIVE WASTEWATER SYSTEM NO: IWWS-97-1, ATTACHMENT 1**

**ISSUED TO:** William Cagle, Business Development Manager  
Orenco Systems, Inc.  
814 Airway Avenue  
Sutherlin, Oregon 97479  
1-800-348-9843; Fax: 541-459-2884; <http://www.orenco.com/>

**FOR:** Pressure Dosed Intermittent Sand Filter Kits, Models:  
ISF1030G ISF1030P  
ISF1036G ISF1036P  
ISF1040G ISF1040P  
ISF1048G ISF1048GZ ISF1048P ISF1048PZ  
ISF1230G ISF1230P  
ISF2018G ISF2018P  
ISF2020G ISF2020P  
ISF2024G ISF2024GZ ISF2024P ISF2024PZ  
ISF2030GZ ISF2030PZ  
ISF3030GZ ISF3030PZ

**APPROVAL DATE:** July 23, 1999

In accordance with 15A NCAC 18A.1969, a proposal by William Cagle, Orenco Systems, Inc., for approval of their Pressure Dosed Intermittent Sand Filter Kits as an Attachment to IWWS-97-1 has been reviewed and the system has been found to meet the standards of an innovative system and the requirements for coverage under IWWS-97-1, when all of the following conditions are met:

**A. GENERAL**

This Attachment to Innovative System Approval IWWS-97-1 is applicable to wastewater systems utilizing Type A pressure dosed, intermittent, buried sand filter kits designed and operated to meet Treatment Standard TS-1 (see IWWS-97-1, issued May 1, 1997 for full descriptions of "Type A" and "TS-1"). Systems shall have a design flow not exceeding 1000 gallons per day, and treat domestic sewage only (non-industrial wastewater). Influent waste

strength to the sand filter shall not exceed domestic quality septic tank effluent, and be in accordance with the following parameters:

<b>Table 1: Influent Effluent Characteristics, Orenco Intermittent Sand Filter Kits</b>			
	<b>Average, mg/l</b>	<b>Weekly Peak, mg/l</b>	<b>Rarely Exceeds, mg/l</b>
Biochemical Oxygen Demand (BOD)	130	200	300
Total Suspended Solids (TSS)	40	60	150
Total Kjeldahl Nitrogen (TKN)	65	75	150
Grease plus Oil	20	25	25

Use of Orenco Intermittent Sand Filter Kits in systems that have a design flow exceeding 1000 gallons per day or with a higher influent waste strength may be proposed for consideration by the State on a case-by-case basis.

**B. PRE-APPROVED PRESSURE-DOSED BURIED SAND FILTER KITS**

Pre-Approved Kit Models are listed above. The first four numbers of the Model depict the filter surface area dimensions, in feet (e.g.: “1030” represents a filter 10-feet wide by 30-feet long). The suffix depicts whether the kit incorporates gravity flow out from the filter (“G” suffices), or pressure dosing from an internal pump vault installed in the center of the filter (“P” suffixes). 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.

**C. DRAINFIELD SITING and SIZING CRITERIA**

Ground absorption systems receiving effluent from these pre-approved Pressure-Dosed intermittent Sand Filter kits shall meet the siting and sizing criteria delineated in IWWS-97-1 applicable to sand filter effluent meeting Treatment Standard TS-I (see Sections D and E).

**D. DESIGN CRITERIA**

1. Pretreatment:

A septic tank, including riser(s) and effluent filter(s), shall be provided, as required by statute and rule, from a State-Approved manufacturer approved by the system designer. The septic tank itself is not provided by Orenco but the two riser assemblies (where applicable) and the effluent filter(s) are. Tank liquid capacity shall be in accordance with Rule .1952, or Orenco's tank sizing criteria, whichever is greater. Minimum tank capacity shall be 1000 gallons.

2. Sand Filter Containment Structure:

a. The containment structure shall consist at a minimum of a reinforced plywood support plywood framing not provided by Orenco), placed in an excavated hole with a pre-cut 30-mil PVC liner (provided by Orenco) along the bottom and sides

b. Factory fabricated and installed boots (Orenco-supplied) shall be used at the supply line and underdrain (Gravity discharge model) penetration points of the liner, in strict accordance with Orenco's specifications. No field perforations of the liner should be made.

3. Sand Filter Underdrain:

Sand filter underdrain piping and cleanouts (Orenco-provided) and gravel (not provided by Orenco) shall be in strict accordance with Orenco's specifications.

4. Sand filter media:

The sand filter media shall be selected from a source approved by the system designer (filter sand not supplied by Orenco), and meet the requirement of IWWS-97-1 for fine or coarse filter sand, and Orenco's requirements for either Gradation Range 1 or Gradation Range 2.

5. Pressure distribution network:

The sand filter pressure distribution network, supply manifold, orifices, orifice shields, turnups, turnup-protectors and flushing valves, and "air coil kit" shall be as provided by Orenco 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 (not provided by Orenco), per Orenco's specifications. A nonwoven synthetic geotextile filter fabric (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, per Orenco specifications. Lateral turn-up end caps and protector sleeves and manifold cleanouts must extend to be at or above finished grade.

6. An observation port (minimum 6-inch diameter) or similar device with a removable cap shall be provided to facilitate easy above-grade observation of a portion of the sand filter

surface.

7. An effluent sampling point must be established for gravity discharge kits (effluent samples can be taken directly from the sand filter effluent pump basin). such as follows:

a. Locate a sampling access port in the discharge pipe between the underdrain exit point from the sand filter and the drainfield. A 4-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/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 drainfield. The cap shall be removable and constructed to prevent the entrance of rainwater, surface water, rodents and insects. This could also simultaneously meet the filter underdrainage system requirement.

b. Alternately, if ventilation is otherwise provided for the filter underdrainage system (see 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 drainfield trenches. The box must be constructed to facilitate at-grade access.

#### 8. Dosing system

a. A State-approved pump tank shall be provided (not by Orenco) with a liquid capacity at least equal to the required septic tank liquid capacity, with Orenco-provided pump vault assembly and riser (provided by Orenco, or to be precast into top of tank, or approved alternate).

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

c. The pump shall be controlled using a control panel (Orenco provided) that includes an adjustable timers to control and adjust number of doses per day and dosing time, an elapsed run time meter, a pump impulse counter, and high water alarm functions.

d. The systems shall be designed for a minimum distal pressure head of 5 feet.

e. 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.

f. Requirements for pump dosing systems in Rule .1952(c), except as provided for herein, shall otherwise be met.

9. Filter design parameters, including design flow rates, total dynamic head and available head limitations, shall be in accordance with the following Table:

**Table 2: Orenco Intermittent Sand Filter Kit Design Parameters\***

<b>Models</b>	<b>Surface Area (ft<sup>2</sup>)</b>	<b># of Orifices, total</b>	<b># of Zones</b>	<b>Design Flow Rate (gpm)</b>	<b>Maximum TDH (ft)</b>	<b>Kit Head Loss (ft)</b>	<b>Available Head** (ft)</b>
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-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".

10. Detailed plans for each approved Orenco filter kit shall be in accordance with drawings submitted and retained on file by the On-Site Wastewater Section.

**E. INSTALLATION AND TESTING PROCEDURES**

A preconstruction conference shall be required to be attended by the sand filter system designer (Orenco-authorized), installer, local health department, and licensed soil scientist and registered professional engineer, as applicable, prior to beginning construction of the sand filter and associated ground absorption system.

The septic tank and pump tank shall be tested for water-tightness via a vacuum or leakage test.

Also see applicable sections of IWWS-97-1

**F. OPERATION AND MAINTENANCE**

See applicable section of IWWS-97-1.

All Orenco sand filter kits come with an instructional video and operation and maintenance manual.

**G. RESPONSIBILITIES AND PERMITTING PROCEDURES**

1. See Section I, Items 1, 2, 3, and 7, of IWWS-97-1, which remain applicable to pressure-dosed sand filter systems using Orenco pre-approved kits.
2. Prior to the issuance of an Authorization to Construct for an Orenco Pressure-Dosed Sand Filter System, site-specific plans and specifications prepared by a person with a demonstrated knowledge of such systems shall be submitted for review and approval by the local health department. Approval shall be contingent upon the following:
  - a. specific plans and specifications for the sand filter component have been prepared by a professional engineer or by an individual authorized in writing by Orenco (which may include an authorized agent in a local health department), and
  - b. the specific sand filter design proposed is in accordance with all provisions of this approval as applicable to the proposed facility and site.
3. The system shall be installed by a person with a demonstrated knowledge of installation of Pressure-Dosed Sand Filter system and who is authorized in writing to install the Orenco kit by Orenco..
4. For systems required to be designed by a professional engineer or an Orenco-authorized individual, a professional engineer or Orenco-authorized individual, as applicable, must certify in writing that the system was installed in accordance with the approved plans and specifications prior to Operation Permit issuance. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Section I.2, above), the health department may specify as a condition on the Improvement Permit and Authorization to Construct that a Licensed Soil Scientist or Professional Geologist oversee critical phases of the ground absorption system installation and certify in writing that the installation was in accordance with their specified site/installation requirements prior to the Operation Permit issuance.

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_