

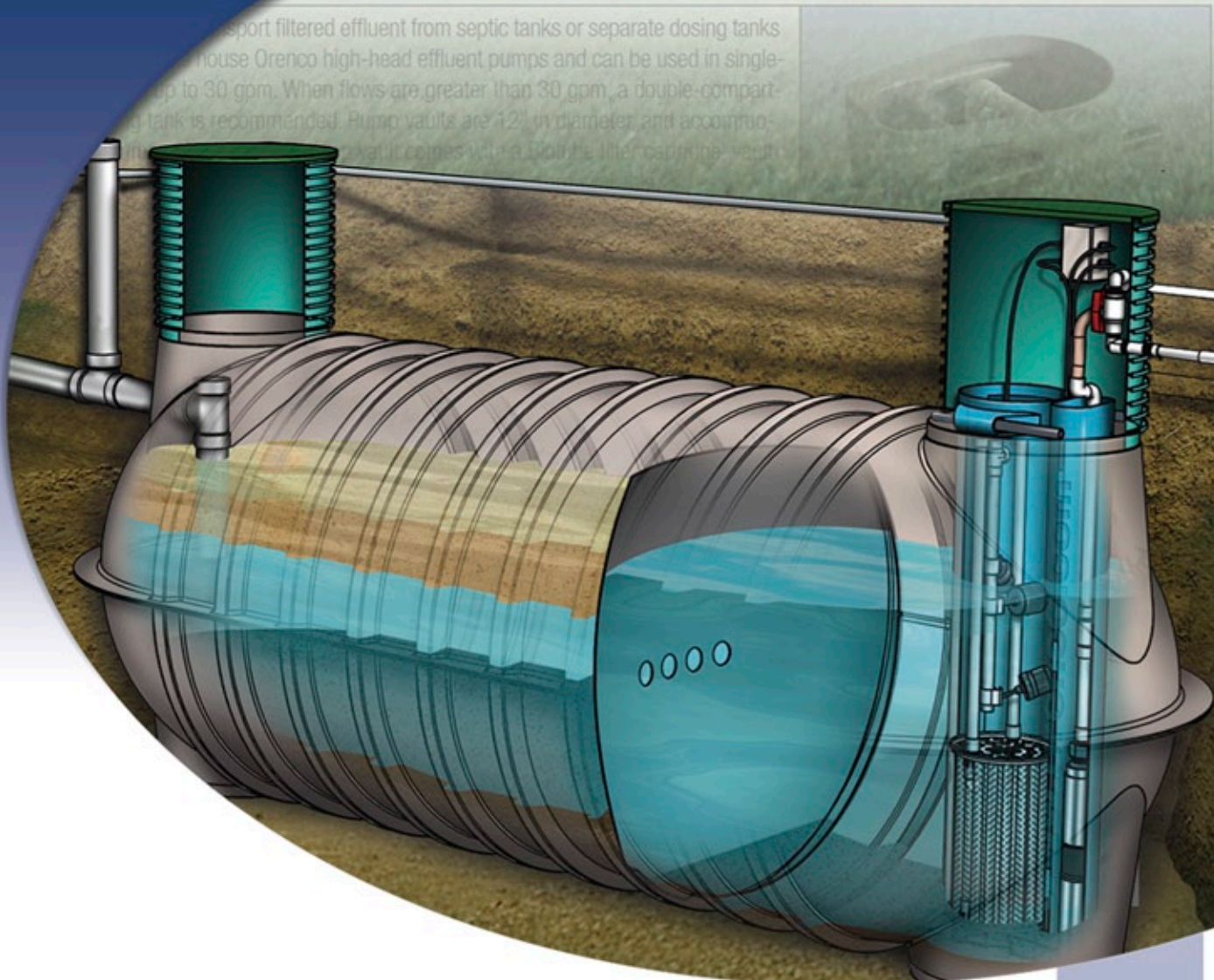
Orenco Systems[®]

Catalog of Onsite Wastewater Systems and Products

Incorporated

umping packages and components

Biotube[®] pump vaults



Product Catalog

VERSION **5.0**



Orenco Systems[®]
Incorporated

*Changing the Way the
World Does Wastewater[®]*

World Does Wastewater[®]

orencos.com
vericomm.net
1-800-348-9843



To Our Customers

Thank you for giving us the opportunity to show you some of the thousands of products that we design and manufacture for onsite and decentralized wastewater treatment systems.

Our company offers treatment solutions for all types of properties: residential and commercial, small flows and large flows, household-strength waste and high-strength waste, poor soils and high groundwater. Whether you need a single item or a complete system package, we're ready to help.

Recently we celebrated our 25th anniversary. In this catalog you'll find many of the products that are milestones in our history, including our Biotube® effluent filter, Biotube pump vault, AdvanTex® textile filter, and Orenco FRP Tank. Today, with the second generation of the Ball and Bounds families involved in the business, Orenco leads the decentralized wastewater industry in innovation and service.

A new entry to our catalog is our flagship product, AdvanTex Treatment Systems, a complete package for secondary treatment of residential-strength waste. AdvanTex is sold by a network of Authorized Dealers. If your Distributor is not an AdvanTex Dealer, call Orenco for the Dealer nearest you, or go to www.orenco.com to find our "Dealer Locator" (go to our "Distributor Locator" to find the "AdvanTex Dealers" section).

We're very proud of our products. They're carefully engineered, reliable, durable, and competitively priced. And we're every bit as proud of our sales and engineering staff. As with all engineered systems, it's important to select the right product for the job. We're here to help you do just that.

In addition to the products in this catalog, we have products designed to meet the requirements of specific states, and we also make custom products. So if you don't see what you want, call one of our 100-plus Distributors (go to www.orenco.com to find the Distributor nearest you with our "Distributor Locator"). Or give us a call directly at 800-348-9843. We look forward to talking with you.

Respectfully,

A handwritten signature in black ink that reads "Darren A. Simmie". The signature is written in a cursive style.

Darren A. Simmie
Sales Manager

How To Use This Catalog

You can find products* in this catalog in three ways:

- Table of Contents (organized by product family)
- Alphabetical Index (page 85)
- Model Code Index (page 89)

There is also an Index of Tables and Figures (page 91).

What's new

This year's Product Catalog includes several new products: our BT-VCOM software and Bluetooth kit (page 51), for servicing VeriComm® control panels; our External Splice Box (page 26), which saves space in risers; our Riser Fabrication Tools and Riser Grates (page 9); and our AdvanTex® Treatment Systems. A complete package for secondary treatment of residential-strength waste, AdvanTex Treatment Systems are sold by a network of Authorized Dealers. If your Distributor is not an AdvanTex Dealer, call Orenco for the Dealer nearest you or go to www.orenco.com to find our "Dealer Locator." This year's catalog also includes new and updated selection guides, figures, features matrixes, sample packages, model code examples, photos, and definitions.

Conventions

The acronyms in parentheses that sometimes appear at the end of a product heading refer to the model code prefix for that product. For a listing of all model codes and their page references, refer to *Model Code Index* on page 91.

Throughout this catalog we refer to documents by title and document control number (DCN). Most of these documents are available on our online document library. To download these documents, go to www.orenco.com and click on *Document Library* at the top of the page. After you register, you can search for documents by title, document control number, category, product, or content.

* Products subject to change without notice.

About Orenco

Orenco was founded in 1981 by President Hal Ball and Executive Vice President Terry Bounds to respond to widespread failures in onsite wastewater systems. Orenco designs and manufactures advanced onsite and decentralized wastewater technologies for individual properties and small communities—properties that are not hooked up to centralized sewers or whose sewers are failing or at capacity.

Our wastewater solutions involve tanks and in-tank filtration systems (effluent filters, pump vaults), secondary treatment systems (textile filters, intermittent sand filters, recirculating sand filters), collection systems (effluent sewers), pumping packages, accessory items, and electrical controls. Our products and systems allow treated effluent to be returned harmlessly to the environment via drainfield, subsurface irrigation, or surface discharge.

We maintain an environmental lab and invest time and money in a continuing research program, often in cooperation with colleges and universities. Our research and technologies appear in numerous publications, including Metcalf and Eddy's *Wastewater Engineering: Treatment, Disposal, Reuse* and Crites and Tchobanoglous's *Small and Decentralized Wastewater Treatment Systems*. Our engineers are regularly asked to give workshops, and our systems have been installed in more than 45 countries around the world.

With nearly 300 employees and more than 100 Distributors, who represent most of the United States, Canada, Greece, Norway, Australia, and New Zealand, Orenco has become the onsite wastewater industry leader. Research, product development, manufacturing, and sales support are handled out of our 23-acre facility in Sutherlin, Oregon.

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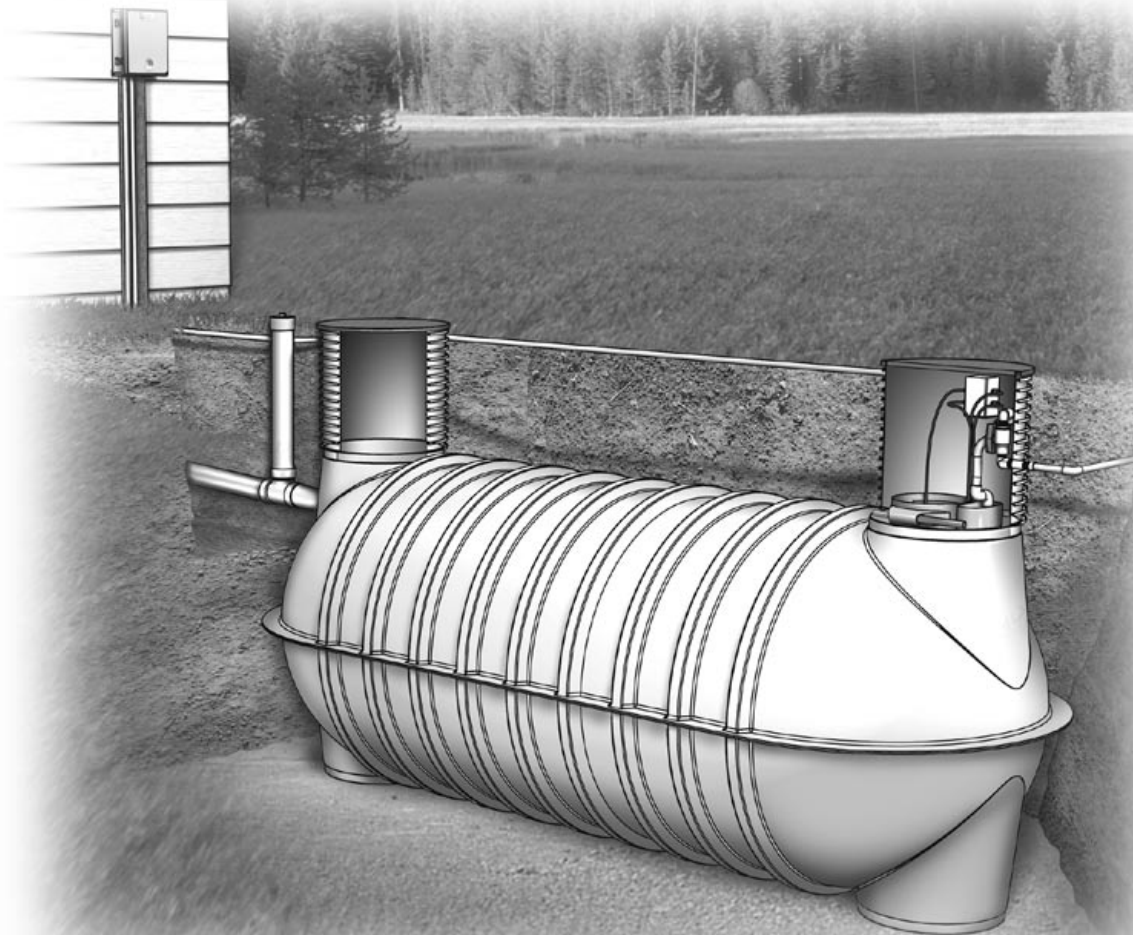
Orenco Fiberglass Tanks

- 100% watertight, water-tested
- Light enough to carry in a small utility trailer
- Built-in lifting brackets allow easy installation with a backhoe
- Made of fiberglass for strength and durability
- Designed for four-foot burial when empty
- Allows placement of baffle wall in any location
- Injection-molded for excellent and consistent part quality
- Optimized for use with Orenco's pump packages
- IAPMO approved

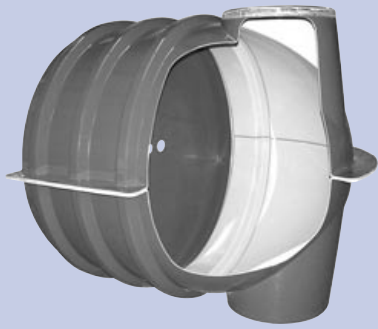
The septic tank is the heart of any onsite system, because a good septic tank can remove two-thirds or more of the contaminants from wastewater. Orenco insists on properly sized, structurally sound, and watertight tanks for all onsite projects that include our equipment. Leaking, deforming, and collapsing tanks often lead to system failure, threatening the reputation of our products and of the onsite industry as a whole.

Orenco's fiberglass tanks are IAPMO approved and are proven to be watertight. They are water tested immediately after assembly, and we require that they be tested again at the construction site prior to backfilling. The Orenco fiberglass tank is lightweight, durable, and highly versatile. And because it is injection-molded, it has excellent part quality and consistency, eliminating costly call-backs for repairs.

In addition to fiberglass tanks, Orenco also provides access risers, fiberglass lids, riser and tank adapters, and all the ancillary products you will need to create a complete tank system.



Orenco Fiberglass Tanks (T)



Cutaway section of tank with baffle

Fully Assembled Tanks

Orenco's injection-molded, watertight tanks have been optimized for use in onsite wastewater collection and treatment systems (residential and commercial) and in communitywide effluent sewer systems. Tanks are made of fiberglass-reinforced polyester for durability, and injection-molded for unmatched part quality and consistency. Two sizes are available: 1000-gallon and 1500-gallon. Baffles can be installed in any of the tank's rib locations, creating a tank with multiple compartments of various volumes, depending on the application. Light enough to haul to the site in a small utility trailer (350 lb and 500 lb, respectively). Strong enough to be buried four feet deep (empty) even in high water areas.

Orenco's fiberglass tanks are distributed through a network of factory-trained and authorized tank assemblers. For more information, including specifications and engineering drawings, call your local Orenco Distributor, or call Orenco at 800-348-9843.

Covered by U.S. Patents #D461,870 and D445,476

NOMENCLATURE



Riser connections (inlet side/outlet side):
 Blank = accepts 24" riser (no adapter needed)
 12 = accepts 12" riser
 18 = accepts 18" riser
 30 = 30" adapter installed

Depth to inverts (inlet/outlet):
 Blank = no inlet or outlet
 11 = 11" (standard)
 13 = 13" (standard)
 C = custom; specify

Diameter of access riser openings (inlet side/outlet side):
 Blank = no riser opening
 12 = accepts 12" riser
 18 = accepts 18" riser
 19 = includes flange for PVU applications
 22 = no flange; AX and PVU with NB option
 C = custom; specify

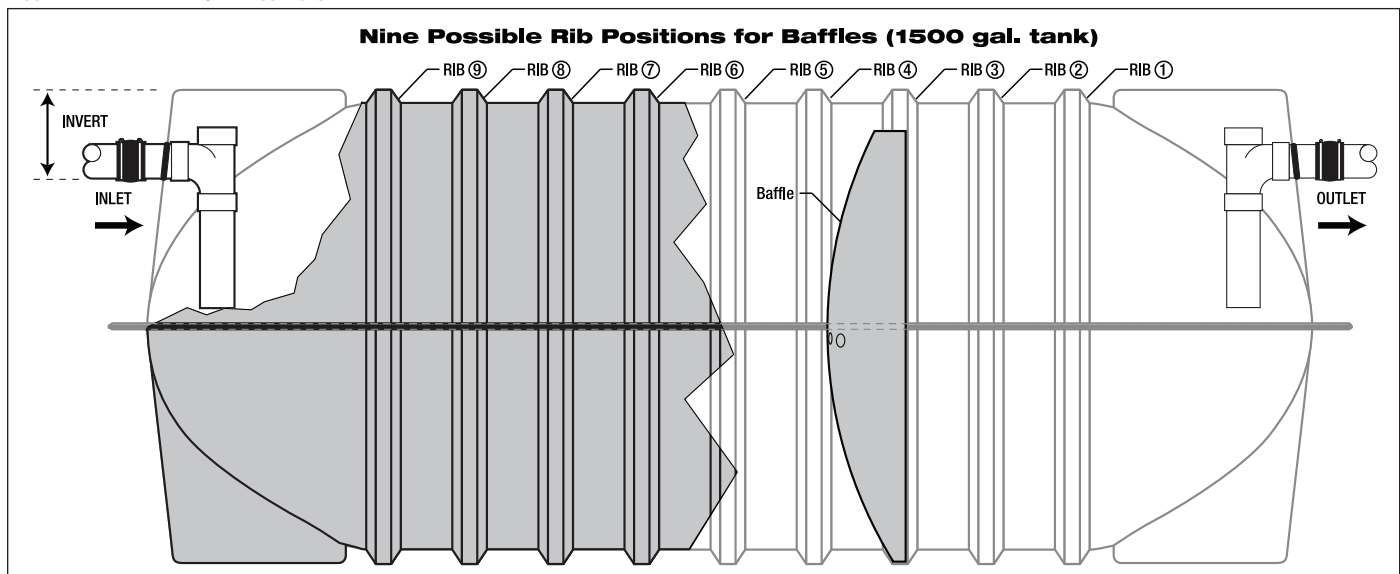
Number of compartments and baffle location (ribs 1 through 9):
 01 = one compartment
 21 = two compartments, rib #1
 22 = two compartments, rib #2, etc.

Tank size (gallons):
 1000
 1500

Tank

Note: Consult with your Orenco Distributor on state and local regulations before ordering.

FIGURE 1. TANK/RIB LOCATIONS



Large Access Risers

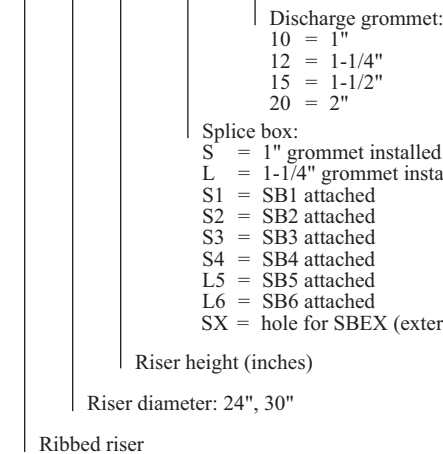
Risers provide access to septic tank openings and can be cast into the tops of concrete tanks, bonded in place, or bolted down using a riser tank adapter. Constructed of ribbed PVC pipe and available in two styles, Ultra-Rib and Perma-Loc. Ultra-Rib is available in 18- and 24-in. diameter. Perma-Loc is available in 30-in. diameter. Standard risers are offered in 6-in. length increments up to 13 ft, while custom risers can be ordered in smaller length increments up to 13 ft. Access riser pipe is also available in bulk. Contact your local Distributor or Orenco for bulk pipe ordering information. See *Lids (FL)* on page 4 for fiberglass lid ordering information.

Small Access Risers

Small access risers are used as valve enclosures, inspection ports, and service connection risers. The 8-in. and 15-in. risers are constructed from lightweight PIP (plastic irrigation pipe); 12-in. risers are constructed from Ultra-Rib PVC pipe.

NOMENCLATURE

Ribbed risers (24 and 30 in.)*



Discharge grommet:
 10 = 1"
 12 = 1-1/4"
 15 = 1-1/2"
 20 = 2"

Splice box:
 S = 1" grommet installed (for Orenco SB1 - SB4 splice boxes)
 L = 1-1/4" grommet installed (for Orenco SB5, SB6 splice boxes)
 S1 = SB1 attached
 S2 = SB2 attached
 S3 = SB3 attached
 S4 = SB4 attached
 L5 = SB5 attached
 L6 = SB6 attached
 SX = hole for SBEX (external splice box)

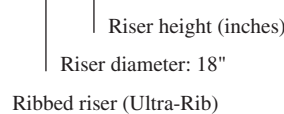
Riser height (inches)

Riser diameter: 24", 30"

Ribbed riser

* 24-in. risers are Ultra-Rib;
 30-in. risers are Perma-Loc.

Ultra-Rib risers (18 in.)

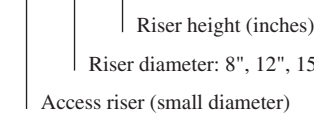


Riser height (inches)

Riser diameter: 18"

Ribbed riser (Ultra-Rib)

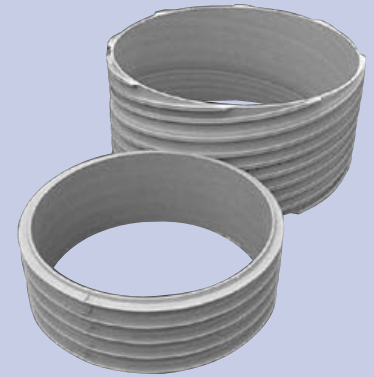
Small access risers (8 in., 12 in., and 15 in.)



Riser height (inches)

Riser diameter: 8", 12", 15"

Access riser (small diameter)



Access risers

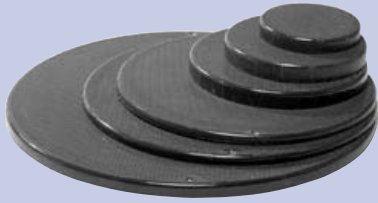
HOW TO SELECT

- Step 1:** Determine the diameter of the riser needed for your application:
Simplex pump systems require a minimum 24-in. diameter access riser.
Duplex pump systems require a 30-in. diameter access riser.
Effluent filters typically require a minimum 18-in. diameter access riser.
Note: We recommend a 30-in. diameter riser when the depth is greater than 3 ft.
- Step 2:** Verify that the riser diameter is compatible with the riser tank adapter and tank hole size. (Refer to *Table 3, Tank Adapter Sizing Chart*, on page 5 for specifics.)
- Step 3:** Determine the height of the riser. The top of the riser should extend a minimum 3 in. above the finished grade level.
Note: This includes 2 in. for settling in new installations. For existing installations, only 1 in. above grade is necessary.
- Step 4:** Determine requirements for splice box and grommet. For grommets used with internal splice boxes, determine the nipple size being used, either 1 in. or 1-1/4 in. SB1 through SB4 requires a 1-in. grommet. SB5 and SB6 require a 1-1/4-in. grommet. Standard location for internal splice boxes is 6 in. down. External splice boxes require a 4-in. grommet 6.25 inches down. Discharge grommet is 18 in. down for tall risers (≥ 24 in.) and 6 in. up from the bottom for short risers (< 24 in.).

TABLE 1. LARGE AND SMALL ACCESS RISER EXAMPLES

Model Code	Description
RR2418+S+12	Ultra-Rib access riser, 24-in. diameter, 18-in. height, with one 1-in. splice box grommet and 1-1/4-in. discharge grommet installed
RR2418+S4+12	Ultra-Rib access riser, 24-in. diameter, 18-in. height, with 4-cord-grip splice box and 1-1/4-in. discharge grommet installed
RR3018+L+(2)20	Perma-Loc access riser, 30-in. diameter, 18-in. height, with 1-1/4-in. splice box grommet, two 2-in. discharge grommets installed

Lids (FL)



Fiberglass lids

Large Lids

Orenco fiberglass lids provide a secure covering for access risers and are capable of supporting a 2500-lb wheel load. On gasketed models, polyurethane, neoprene, or EPDM gaskets ensure a watertight seal. Comes standard with stainless steel Allen head bolts and Allen wrench. May specify special “pinned” (tamper-proof) stainless steel bolts for a higher level of protection. (See *Lid Bolts and Wrench* on page 9.)

Lids are molded with an attractive green or brown finish and a textured, nonskid top surface. Custom colors available on orders greater than 100 units. 24-in. lid available with a “Warning: Do Not Enter” message. Custom imprinting also available on 18-in., 24-in., and 30-in. lids. Contact your local Distributor or an Orenco representative for details.

Note: Beware of imported imitations of our lids that are not as strong. Orenco lids have a “Made in USA” sticker.

Note: Lids are not rated for vehicular traffic.

NOMENCLATURE



- Option:
- Blank = green
- B = brown
- W = warning label (24" and 30" only)
- C = custom logo
- ATX = AdvanTex logo (24" only)

- Attachment method:
- Blank = 2-bolt-hole lid (30" diameter only)
- 4B = 4-bolt-hole lid (24" diameter only)
- 4BU = 4-bolt-hole lid Ultra-Rib (18" and 24" diameter only)

- Options:
- G = gasket
- V = vent
- CF = carbon filter
- I2 = 2" insulation
- I4 = 4" insulation

Lid diameter: 18", 24", 30", 48"

Fiberglass lid

Small Lids

Orenco fiberglass lids are used to cover small access risers. Attractive green finish with a textured, nonskid top surface. Available with or without bolt holes and gasket material. Rated for pedestrian traffic only.

NOMENCLATURE



- Attachment method:
- Blank = slip
- S = side screw
- T = top bolt
- TU = Ultra-Rib (12" diameter only)

- Blank = no gasket
- G = gasket

Lid diameter: 8", 12", 15"

Fiberglass lid

HOW TO SELECT

- Step 1:** Determine diameter required.
- Step 2:** Determine if the lid requires a gasket, a vent, a carbon filter, or insulation.
- Step 3:** For large lids, determine attachment method. For small lids, determine if the access riser requires a lid with a slip-fit (no fasteners), bolted fit, or side set-screw attachment method.

TABLE 2. FIBERGLASS LID EXAMPLES

Model Code	Description
FL24G-4BU	Green fiberglass lid, 24-in. diameter with gasket, four bolt-holes, four 5/16-in. bolts, and hex head wrench
FL15G	Fiberglass lid, 15-in. diameter with gasket

Riser Tank Adapters and Bolt-down Kits (FRTA, PRTA, RRFTA)

Orengo tank adapters provide a structural, watertight method of installing an access riser over a tank opening. Constructed of ABS plastic or fiberglass, adapters can be cast into the top of a concrete tank, bonded to the top of a fiberglass tank, or fastened with a bolt-down kit. See *Adhesives (ADH)* on page 6.

FRTA30-FRP Riser Tank Adapters

30-in. fiberglass adapter made specifically for Orengo fiberglass tanks.

PRTA24 Riser Tank Adapters

ABS adapter for 24-in. diameter access risers. Adapter can be cast into the top of a concrete tank or fastened with a PRTA24BDKIT bolt-down kit.

PRTA30 Riser Tank Adapters

ABS adapter for adapting 30-in. diameter access risers. Adapter can be cast into the top of a concrete tank, or fastened with a PRTA30BDKIT bolt-down kit.

RRFTA Riser Tank Adapters

Fiberglass adapter for adapting 21-in. or 24-in. diameter access risers to a square or round tank outlet. Can be fastened to the top of a tank with RRFTABDKIT bolt-down kit.

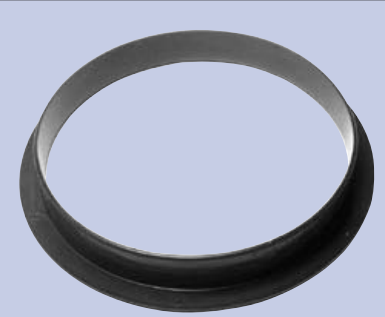
RRFTA30 Riser Tank Adapters

Fiberglass adapter for adapting 30-in. diameter riser to a large square or round tank outlet. Can be fastened to the top of a tank with RRFTA30BDKIT bolt-down kit.

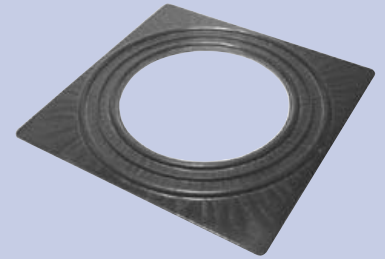
HOW TO SELECT

- Step 1:** Determine the tank access riser diameter.
- Step 2:** Determine the tank access type and shape: either round, square, or grooved.
- Step 3:** Refer to *Table 3, Tank Adapter Sizing Chart*, to match the tank access diameter and shape.

Note: Adapters fit standard commercially available PVC ribbed pipe.



PRTA riser tank adapter



RRFTA riser tank adapter

PRTA24BDKIT Bolt-down Kits

Bolt-down kit includes butyl tape and concrete anchors to attach PRTA24 to top of concrete tank.

PRTA30BDKIT Bolt-down Kits

Bolt-down kit includes butyl tape and concrete anchors to attach PRTA30 to top of concrete tank.

RRFTABDKIT Bolt-down Kits

Bolt-down kit includes butyl tape and concrete anchors to attach RRFTA to top of concrete tank.

RRFTA30BDKIT Bolt-down Kits

Bolt-down kit includes butyl tape and concrete anchors to attach RRFTA30 to top of concrete tank.

RUBDKIT Bolt-down Kits (Ultra-Rib only)

Bolt-down kit includes butyl tape, three concrete anchors, and three stainless steel hold-down straps to attach Ultra-Rib risers to top of concrete tank. One kit required for 12-in. and 18-in. diameter risers; two kits for 24-in. diameter riser.



Bolt-down kit



RUBDKIT bolt-down kit

TABLE 3. TANK ADAPTER SIZING CHART

Adapter Type	Attachment method	Maximum tank opening	Riser diameter
FRTA30-FRP	Glued onto Orengo fiberglass tank or PRTA24, allowing it to accept 30-in. riser.	Made specifically for Orengo FRP tanks	30 in.
PRTA24	Bolted down or cast into concrete tank	Up to 24 in. round; 17 in. square	24 in.
PRTA30	Bolted down or cast into concrete tank	Up to 30 in. round; 21 in. square	30 in.
RRFTA	Bolted down to concrete tank or epoxied to top of non-Orengo fiberglass tank	Up to 24 in. round; 24 in. square	21 in. or 24 in.
RRFTA30	Bolted down to concrete tank	Up to 30 in. round; 30 in. square	30 in.

Adhesives (ADH)



ADH100, ADH10, ADH845, MA320, SS140, and SS115 adhesives



Manual dispensing gun (ADH845-GUN) (left), pneumatic dispensing gun (SS-MK) (right), manual dispensing gun (SS-MK MANUAL) (center)

Adhesives

ADH100 is a single-component adhesive/sealant for sealing pipe grommets and joining PVC or fiberglass risers to ABS or fiberglass PRTA-style tank adapters (where the joint is in shear). Handling strength is achieved within 12 hours; full cure in 2 to 3 days. It comes in a 10.2-oz cartridge tube for application with a caulking gun.

ADH10 (IPS810) adhesive is a white, two-component, self-leveling methacrylate adhesive for bonding PVC, ABS, fiberglass, and concrete. ADH10 comes in pint and quart kits, consisting of A & B components (adhesive and activator), and requires hand mixing. If a self-leveling adhesive is NOT required or if concrete is NOT being bonded, SS115 or SS140 is preferred over ADH10.

ADH845 adhesive is a tan two-component methacrylate adhesive for bonding PVC, ABS, fiberglass, and concrete. This is our only adhesive formulated to work in wet conditions or even under water, making it ideal for field repairs. Repairs on leaking riser connections are possible, but any water pressure must be removed during the repair. ADH845 has the consistency of molasses, comes in 400 mL cartridges, and requires the manual dispensing gun ADH845-GUN.

MA320 is a white two-component methacrylate adhesive that bonds PVC, ABS and fiberglass to themselves or each other, but does not bond to concrete. It comes in a two-part 200-gram (7-oz) see-through plastic pouch that must be kneaded to mix the two components, then cut open and squeezed to apply adhesive.

SS140 adhesive is a gray two-component methacrylate adhesive for bonding PVC and fiberglass to themselves or each other. It does not bond to concrete. It has the consistency of toothpaste and will sag slightly in warmer temperatures. Surface roughening is recommended and provides the best bond strengths, but is not always necessary. Use SS140 above 65° F and SS115 below 50° F. Working life of mixed adhesive is typically 20 to 30 minutes, and it usually hardens in less than 2 hours, depending on temperature and adhesive thickness. It comes in an 870 mL (29.5 oz) two-part cartridge.

SS115 adhesive is a white two-component methacrylate adhesive with properties similar to those of SS140 and comes in the same two-part cartridge, but it has a much shorter open time for use in cooler temperatures and jobs where quicker cure times are desired, or for applications where a white color is desired. Working life of mixed adhesive is typically 10 to 15 minutes, and it usually hardens in less than 45 minutes, depending on temperature and adhesive thickness.

Dispensing Guns

Manual Dispensing Gun (SS-MK MANUAL GUN): Dispenses two-component methacrylate adhesives from 870 mL cartridges. Useful for attaching risers, doing repairs, and performing general field assembly work. Not suitable for large-volume adhesive applications. Strong double gearing ratio, automatic brake release, and quick reloading.

Manual Dispensing Gun (ADH845-GUN): Required for 400-mL ADH845 cartridges.

Pneumatic Dispensing Gun (SS-MK GUN): The Pneumatic Dispensing Gun is suitable for large-volume applications such as FRP tank assembly. Strong double gearing ratio, automatic brake release, and a quick reload function. Can be powered by a compressor or tank.

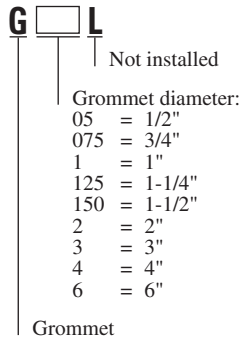
For detailed information about our adhesives, read *NTD-ADH-1, Adhesives Technical Data Sheet*.

TABLE 4. ADAPTER/ADHESIVE AND QUANTITY SELECTION GUIDE

Adapter	ADH10 (Single Application)	ADH100 (Single Application)	MA320 (Single Application)	SS115/SS140 (Applications per cartridge)
Grade ring, 24" (GR24XX)	--	1 tube	1 pouch	5-6 applications per cartridge
Grade ring, 30" (GR30XX)	--	2 tubes	2 pouches	4-5 applications per cartridge
Grade ring, RLA style, 24" (GRI24-RLA)	--	1 tube	1 pouch	5-6 applications per cartridge
Riser-to-lid adapter, 24" (RLA24)	--	1 tube	1 pouch	5-6 applications per cartridge
PRTA tank adapter, 24"	--	1 tube	1 pouch	5-6 applications per cartridge
PRTA30 tank adapter, 30"	--	2 tubes	2 pouches	4-5 applications per cartridge
RRFTA tank adapter, 21" and 24"	1 pint	--	--	--
RRFTA30 tank adapter, 30"	1 quart	--	--	--
FRTA30-FRP tank adapter, 30" (adapter to tank)	--	1 tube	1 pouch	5-6 applications per cartridge
FRTA30-FRP tank adapter, 30" (riser to adapter)	1 quart	--	--	--

Orenco pipe grommets provide a watertight seal at piping penetrations. All grommets conform to standard IPS pipe sizes. Use with ADH100.

NOMENCLATURE



Grommets

HOW TO SELECT

Step 1: For internal splice box grommets, determine the nipple size being used, either 1 in. or 1-1/4 in. SB1 through SB4 requires a 1-in. grommet. SB5 and SB6 require a 1-1/4-in. grommet. External splice boxes (SBEX) require a 4-in. grommet (grommet included with SBEX).

Step 2: For discharge grommets, determine the diameter of the discharge assembly.

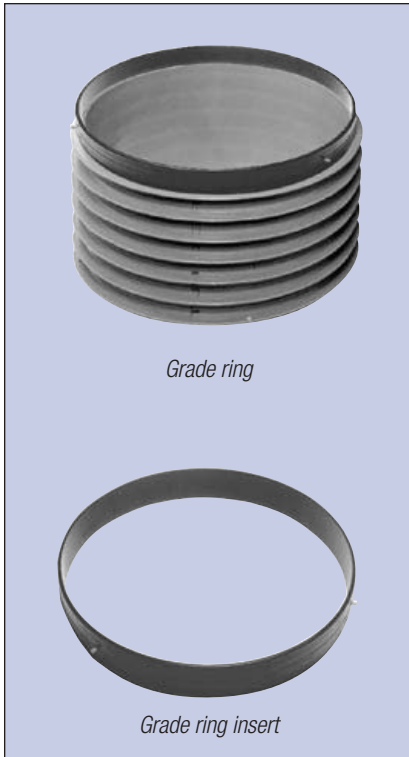
TABLE 5. GROMMET SPECIFICATIONS

Grommet diameter (in.)	Pipe OD (in.)	Splice box	Hole saw size (in.)
1/2	0.84	--	1
3/4	1.05	--	1-1/4
1	1.315	SB1 to SB4, SBX	1-9/16
1-1/4	1.660	SB5 to SB6	1-3/4
1-1/2	1.9	--	2-1/8
2	2.375	--	2-3/4
3	3.5	--	3-7/8
4	4.5	SBEX	5
6	6.625	--	7

TABLE 6. GROMMET EXAMPLE

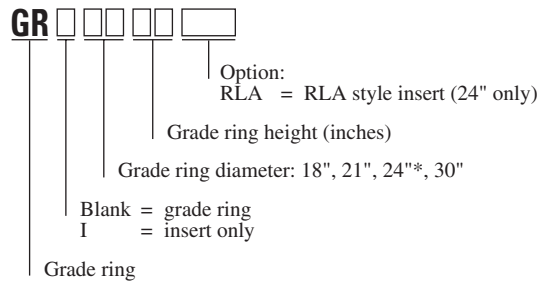
Model code	Description
G125L	1-1/4-in. pipe grommet, not installed

Grade Rings and Grade Ring Inserts (GR, GRI)



A grade ring is used to extend the height of an existing riser, pump basin, or sand filter pump basin. It's constructed of a section of ribbed PVC pipe with a grade ring insert affixed to its edge. Grade ring inserts can be purchased separately. See also *Riser Tank Adapters and Bolt-down Kits (FRTA, PRTA, RRFTA)* on page 5.

NOMENCLATURE



* Use GR24__ for Perma-Loc, Ultra-Rib, and KOR FLO pipe without RLAs

HOW TO SELECT

- Step 1:** Determine the diameter of the riser.
- Step 2:** Determine the height of the riser. The top of the riser should extend a minimum 3 in. above the finished grade level.

Note: This includes 2 in. for settling in new installations. For existing installations, only 1 in. above grade is necessary.

- Step 3:** Determine the lid fastening method: either bolt catches or RLA adapter.

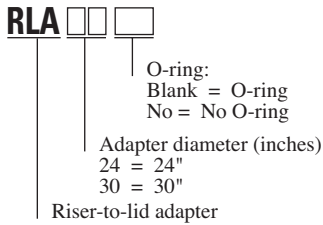
TABLE 7. GRADE RING AND GRADE RING INSERT EXAMPLES

Model code	Description
GR2403	PVC grade ring, 24-in. diameter with attached 3-in. riser
GRI24	Grade ring insert for all standard 24-in. PVC ribbed pipe
GRI24RLA	RLA grade ring insert for 24-in. diameter access risers with existing riser-to-lid adapter (RLA)
GRI30	Grade ring insert for all standard 30-in. PVC ribbed pipe
GRI18	Grade ring insert for 18-in. Ultra-Rib pipe

Riser-to-Lid Adapters (RLA)

Orenco riser-to-lid adapters (RLAs) are attached to the top of a 24-in. diameter riser (either Ultra-Rib or Perma-Loc) to facilitate bolting the lid to the riser. Constructed of ABS plastic.

NOMENCLATURE



Riser-to-lid adapter

Lid Bolts, Screws, and Wrench

Used for securely attaching fiberglass lids to access riser pipe. These stainless steel fasteners can replace all previously used fasteners (excluding RLAs). Heads are flush with the lid surface. Tamper-resistant bolts are available. Fasteners require appropriate wrench or bit for installation and removal.

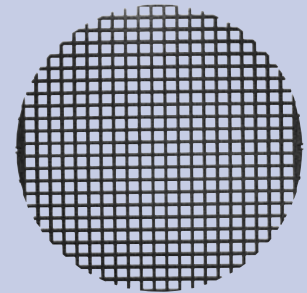
- RRLAB Lid bolt, 5/16 in. x 1.25 in., thread-cutting; used with risers that include an RLA24
- RRLB Lid screw, 5/16 in. x 2 in., hex socket flat head; used with all other risers
- RRLW 3/16-in. hex head wrench to fit 5/16-in. diameter fasteners
- RRTLB Lid bolt, 5/16 in. x 1.25 in., non-thread-cutting, tamper-proof; used with RLA24
- RRTLW Special 3/16-in hex head wrench to fit tamper-proof bolts
- RRLB+W+KIT Kit: Wrench for 12- and 30-in. lids and two screws
- RULB+W+KIT Kit: Wrench for 18- and 24-in. lids and four screws



Lid screw and hex head wrench

Riser Grate

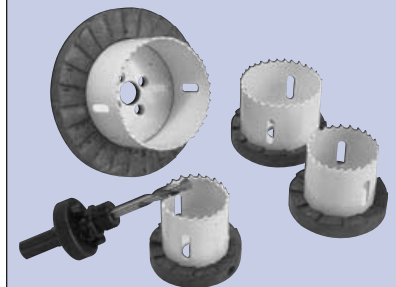
Orenco's Riser Grate is a non-corroding polypropylene grate that can be dropped into the bottom of an access riser. The Riser Grate prevents tools or people from falling into a tank. In addition, service providers can rest filters or other components on the grate inside the riser and hose them off. It is easy to install and remove, and it fits most brands of ribbed PVC profile pipe. Installed in the bottom of a valve box, the grate prevents soil buildup. Riser grates are available in 18-, 21-, 24-, and 30-in. diameters.



Riser grate

Riser Fabrication Tools

Orenco's Riser Fabrication Tools are used to make risers out of ribbed PVC pipe (KorFlo™, Ultra-Corr™, and Ultra-Rib™) and prepare pipe for grommet and lid attachment. The tools include saw guides, saw blades, bolt catch installation tools, drill guides, and custom hole saws for installing Orenco's grommets. The saw guides, specifically for the Model 77 Skilsaw®, help fabricators make perfectly square cuts. The bolt catch installation tools are specifically made for use with KorFlo™ and Ultra-Corr™ pipe.



Riser Fabrication Tools

All Orenco pump packages have these basic components:

- Biotube® pump vault
- Splice box
- Float switch assembly
- Discharge plumbing assembly
- Effluent pump
- Control panel

Tank, risers, lids, and tank accessories must be ordered separately.

Ideal for:

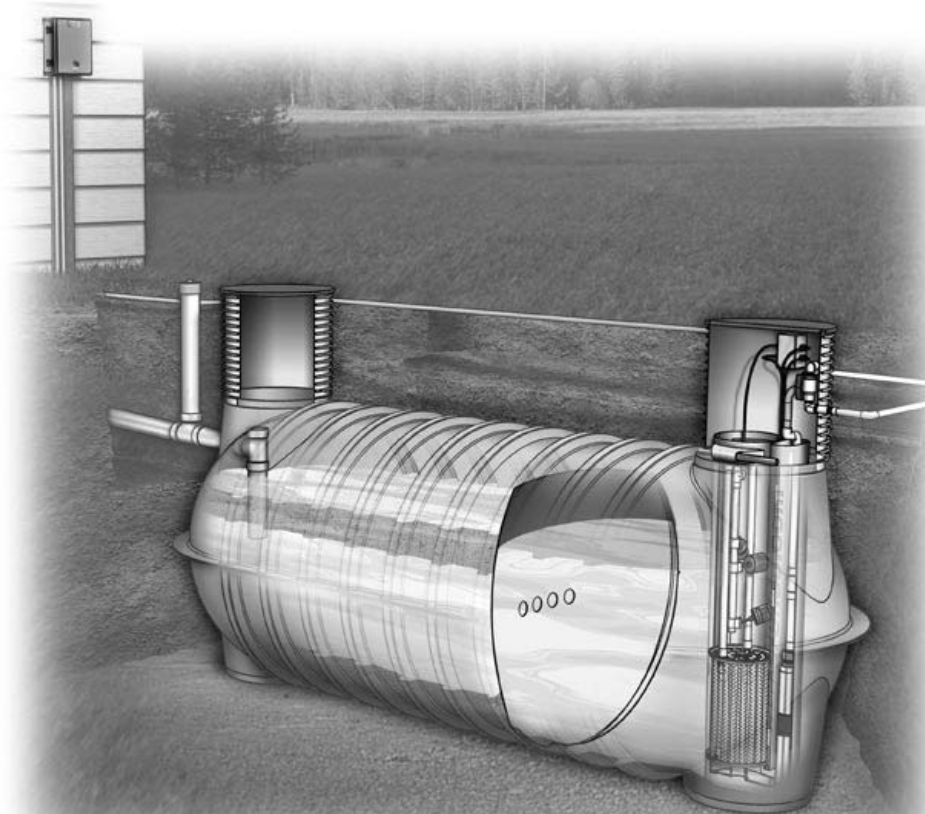
- Effluent sewers
- Drainfields
- Textile filters
- Sand filters
- Peat filters
- Mounds
- Trickling filters
- Aerobic units
- Wetlands
- Lagoons
- Effluent irrigation
- Other applications

Orenco pumping packages are used for pumping effluent from single or double compartment septic tanks and dosing tanks. Patented Biotube® vault technology filters out solids so that only liquid from the “clear zone” between the tank’s scum and sludge layers is pumped. This reduces biological loading and clogging of downstream components, saving money in O&M and extending the life of drainfields and other downstream components. More than 100,000 Orenco pumping packages are in service all over the world, on individual onsite systems and in community-wide effluent sewer systems.

All systems are preassembled with corrosion-resistant, durable components, ensuring reliability. To simplify the selection process for Orenco pumping systems, we have developed pump and pump basin packages that fit most applications.

This section includes all the components that make up a standard pump package, as well as related products. For optimum performance, Orenco recommends the use of complete pump packages instead of “pieces and parts.”

Orenco also manufactures dosing siphons, which provide an alternative to pumps for downhill dosing of gravity and pressurized drainfields, as well as other discharge applications where power is not available and timed dosing is not required.



Single Line-Item Pumping Packages (PSA, PSB)

Simplex Effluent Pumping Package (PSA)

Flow rates up to 10 gpm (15 gpm without 1/4-in. flow control)

This pumping package can be used for pumping from a septic tank to an effluent sewer collection system or drainfield (distribution box, hydrosplitter, etc.).

NOMENCLATURE

PSA □□ - □□ □□ - □□ □□

Height of pump vault:
Blank = 57"
68 = 68"

Discharge assembly:
Blank = standard
DB = drainback
CW = cold weather

Control panel options (see control panel nomenclatures for options)

Control panel:
MVPS1RO = MVP-S1RO-MF3A-Y, G, R
S1RO = S1RO-MFABT-Y, G, W
VCOMS1RO = VCOM-S1RO-MF3A-YB, R, W
() = Specify

PF = PF Series pump
PA = PA Series pump
PJ = PJ Series pump

10 = 10 gpm pump (PF, PA only)
12 = 12 gpm pump (PJ only)

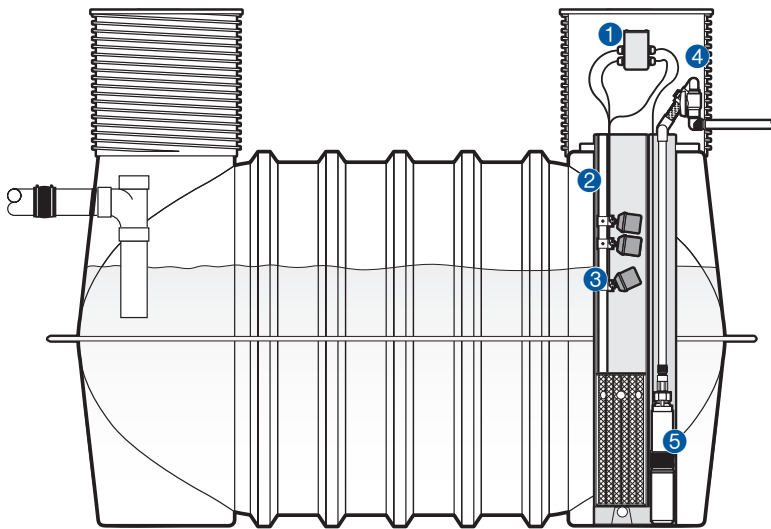
PSA = ProSTEP™ "A" pump package with 1/4" flow control

APPLICATIONS

- STEP collection systems
- Final dispersal area

Note: For cold weather or drainback options, refer to *Pump Discharge Assemblies (HV)* on page 29 for the appropriate discharge assembly.

COMPONENT LOCATION



COMPONENTS

Orenco ProSTEP™ effluent pumping packages include the following components:

- 1 PVC splice box
- 2 Biotube® pump vault
- 3 Float switch assembly
- 4 Discharge plumbing assembly
- 5 Effluent pump
- 6 Control panel

Tanks, risers, lids, and tank accessories are sold separately. See *Orenco Fiberglass Tanks (T)* on page 2 and *Risers and Riser Pipe (RR, RU)* on page 3 for ordering information.

Need help specifying your package? Contact your local Orenco Distributor.

TABLE 8. PSA PUMP PACKAGE EXAMPLES AND COMPONENT LISTS

Component	PSA10-PSR0	PSA10-PMPTR0HTSA-DB68	PSA10-PVROHTSA
1 PVC splice box	SB4	SB4	SB4
2 Biotube® pump vault	PVU57-1819	PVU68-1819	PVU57-1819
3 Float switch assembly	MFABT-Y, G, W-27V	MF3A-YG, R, W-39V	MF3A-YB, R, W-27V
4 Discharge plumbing assembly	HV100BCFCX	HV100BCFCX-DB54	HV100BCFCX
5 Effluent pump	PF100511	PF100511	PF100511
6 Control panel	S1RO	MVP-S1PTR0HTSA	VCOM-S1PTR0HTSA

Simplex Effluent Pumping Package (PSB)

Flow rates up to 40 gpm

This programmable timed pump system can be used for pumping from a septic or dosing tank to a secondary treatment system or final dispersal area.

NOMENCLATURE

PSB - -

Height of pump vault:
Blank = 57"
68 = 68"

Discharge assembly:
Blank = standard
DB = drainback
CW = cold weather

Control panel options (see control panel nomenclatures for options)

Control panel:
MVP = MVP-S1PTRO-MF3A-YG, R, W
SIRO = SIRO-MFABT-Y, G, W
VCOMS1PTRO = VCOM-S1PTRO-MF3A-YG, R, W
VCOMSIRO = VCOM-SIRO-MF3A-YB, R, W
() = Specify

PF = PF Series pump
PA = PA Series pump
PJ = PJ Series pump

30 = 30 gpm pump (PF, PA only)
33 = 33 gpm pump (PJ only)

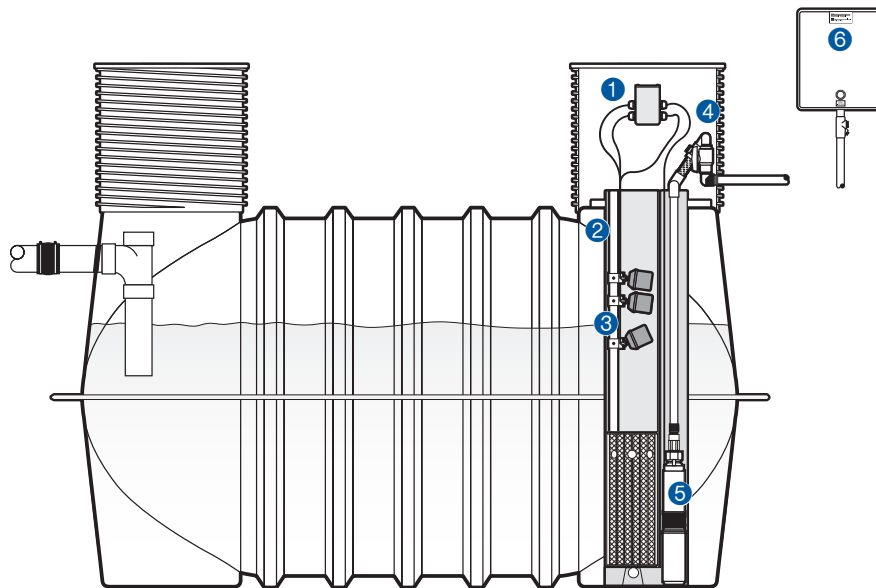
PSB = ProSTEP™ "B" pump package

APPLICATIONS

- Pressurized distribution
- Sand filters
- Programmable dosing

Note: For cold weather or drainback options, refer to Pump Discharge Assemblies (HV) on page 29 for the appropriate discharge assembly.

COMPONENT LOCATION



COMPONENTS

Orengo ProSTEP™ effluent pumping packages include the following components:

- 1 PVC splice box
- 2 Biotube® pump vault
- 3 Float switch assembly
- 4 Discharge plumbing assembly
- 5 Effluent pump
- 6 Control panel

Tanks, risers, lids, and tank accessories are sold separately. See *Orengo Fiberglass Tanks (T)* on page 2 and *Risers and Riser Pipe (RR, RU)* on page 3 for ordering information.

Need help specifying your package? Contact your local Orengo Distributor.

TABLE 9. PSB PUMP PACKAGE EXAMPLES AND COMPONENT LISTS

Component	PSB30-PSRO	PSB30-PMPTROHTSA-DB68	PSB30-PVPTROHTSA
1 PVC splice box	SB4	SB4	SB4
2 Biotube® pump vault	PVU57-1819	PVU68-1819	PVU57-1819
3 Float switch assembly	MFABT-Y, G, W-27V	MF3A-YG, R, W-39V	MF3A-YB, R, W-27V
4 Discharge plumbing assembly	HV125BCFCX	HV125BCFCX-DB54	HV125 BCFCX
5 Effluent pump	PF300511	PF300511	PF300511
6 Control panel	S1ROETMCT	MVP-S1PTROHTSA	VCOM-S1PTROHTSA

Sample Component Pumping Packages

Simplex Effluent Pumping Packages

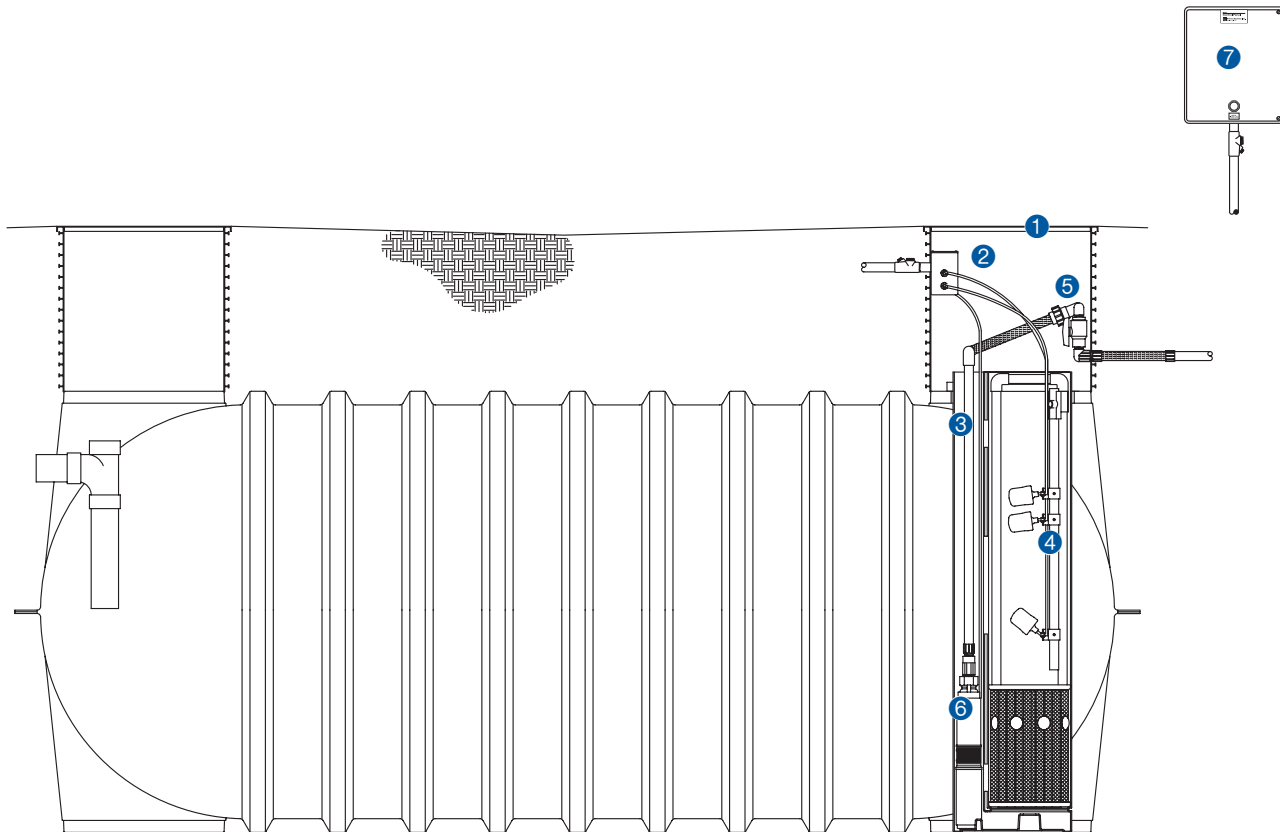
Flow rates up to 70 gpm

These sample component pumping packages are used to pump effluent from a dosing tank to a secondary treatment system or final dispersal area. The first column below shows a standard **programmable timed dose pumping package** and its components. The other two columns give drainback/cold weather and on-demand dose variations. Refer to the individual component sections in the catalog for assistance in selecting the specific models suitable for your application.

Note: Bold items in the Drainback/Cold weather and On-demand dose columns indicate a variation from the Timed dose component.

Component	Timed dose	Drainback	Cold weather	On-demand dose
1 Riser, lid, and accessories	RR2418+S+20	RR2418+S+20		RR2418+L+20
	FL24G-4BU	FL24G-4BU		FL24G-4BU
	ADH100 or MA320	ADH100 or MA320		ADH100 or MA320
2 Splice box	SB4	SB4		SB5
3 Biotube® pump vault	PVU68-1819-L	PVU68-1819-L		PVU68-1819-L
4 Float switch assembly	MF3A-YG,R,W-39V	MF3A-YG,R,W-39V		MF4A-Y,B,R,W-39V
5 Discharge plumbing assembly	HV200BCX	HV200BX-DB	HV200B HVCW200KIT	HV200BCX
6 Effluent pump	PF500511	PF500511		PF500511
7 Control panel	MVP-S1PTRO	MVP-S1PTROHTSA		MVP-S1R0

COMPONENT LOCATION



Duplex Effluent Pumping Packages

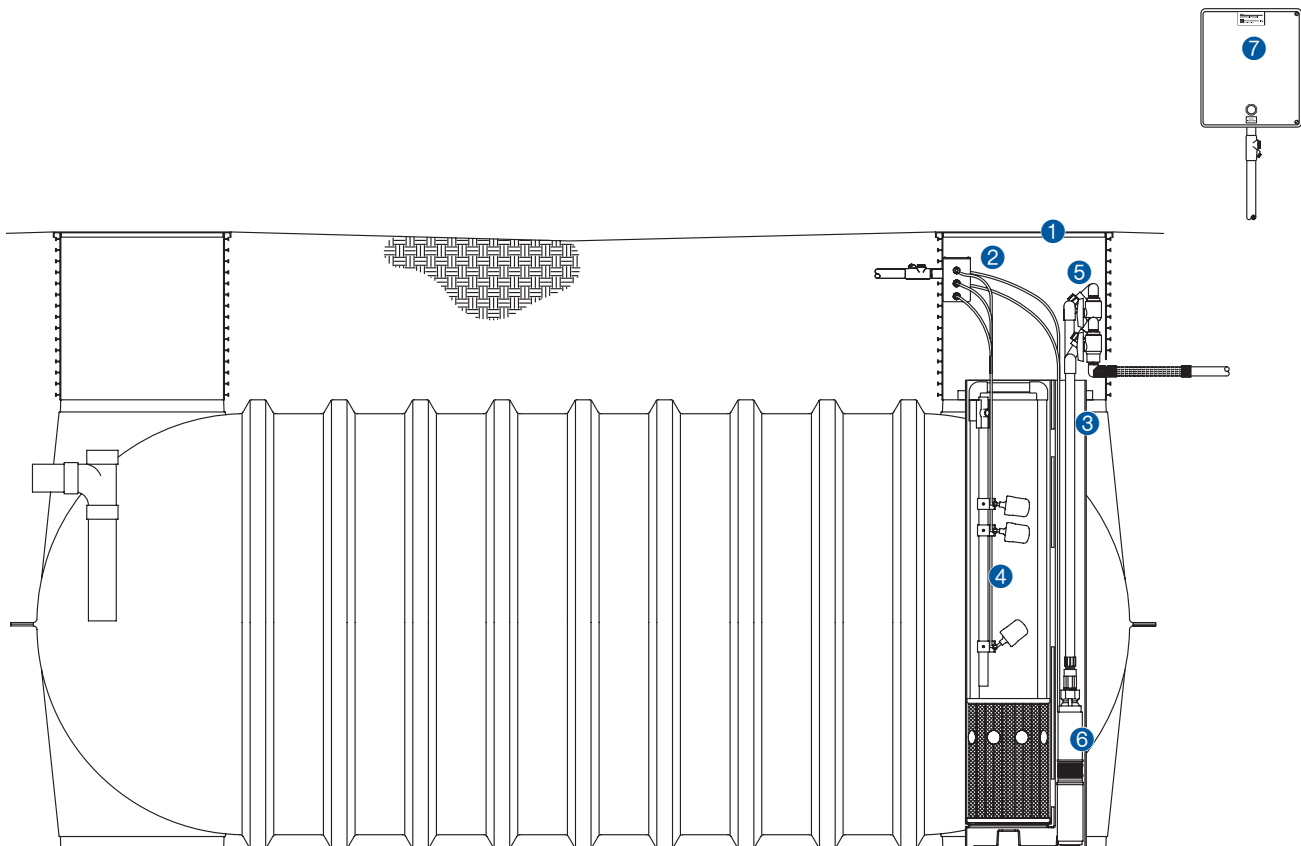
Flow rates up to 70 gpm per pump

These sample component pumping packages are used to pump effluent from a septic or dosing tank to a secondary treatment system or final dispersal area. The first column below shows a standard **programmable timed dose alternating duplex pumping package** and its components. The other two columns give drainback/cold weather and on-demand dose variations. All of these packages use two alternating pumps. Refer to the individual component sections in the catalog for assistance in selecting the specific models suitable for your application.

Note: Bold items in the Drainback/Cold weather and On-demand dose columns indicate a variation from the Timed dose component.

Component	Timed dose	Drainback	Cold weather	On-demand dose
1 Riser, lid, and accessories	RR3018+L+(2)12	RR3018+L+(2)12		RR3018+L+(2)12
	FL30G	FL30G12		FL30G
	FRTA30-FRP	FRTA30-FRP		FRTA30-FRP
	ADHQ10	ADHQ10		ADHQ10
2 Splice box	SB6	SB6		SB6
3 Biotube® pump vault	PVU68-1819-L	PVU68-1819-L		PVU68-1819-L
4 Float switch assembly	MF4A-YP,G,R,W-39V	MF4A-YP,G,R,W-39V		MF4A-YP,B,R,W-39V
5 Discharge plumbing assemblies	HV125BCX (two required)	HV125BCX-DB (two required)	HV125BCX-DB (two) HVCW125KIT (two)	HV125BCX (two required)
6 Effluent pumps	PF300511 (two required)	PF300511 (two required)		PF300511 (two required)
7 Control panel	MVP-DAX1PTROHTSA	MVP-DAX1PTROHTSA		MVP-DAX1ROHTSA

COMPONENT LOCATION



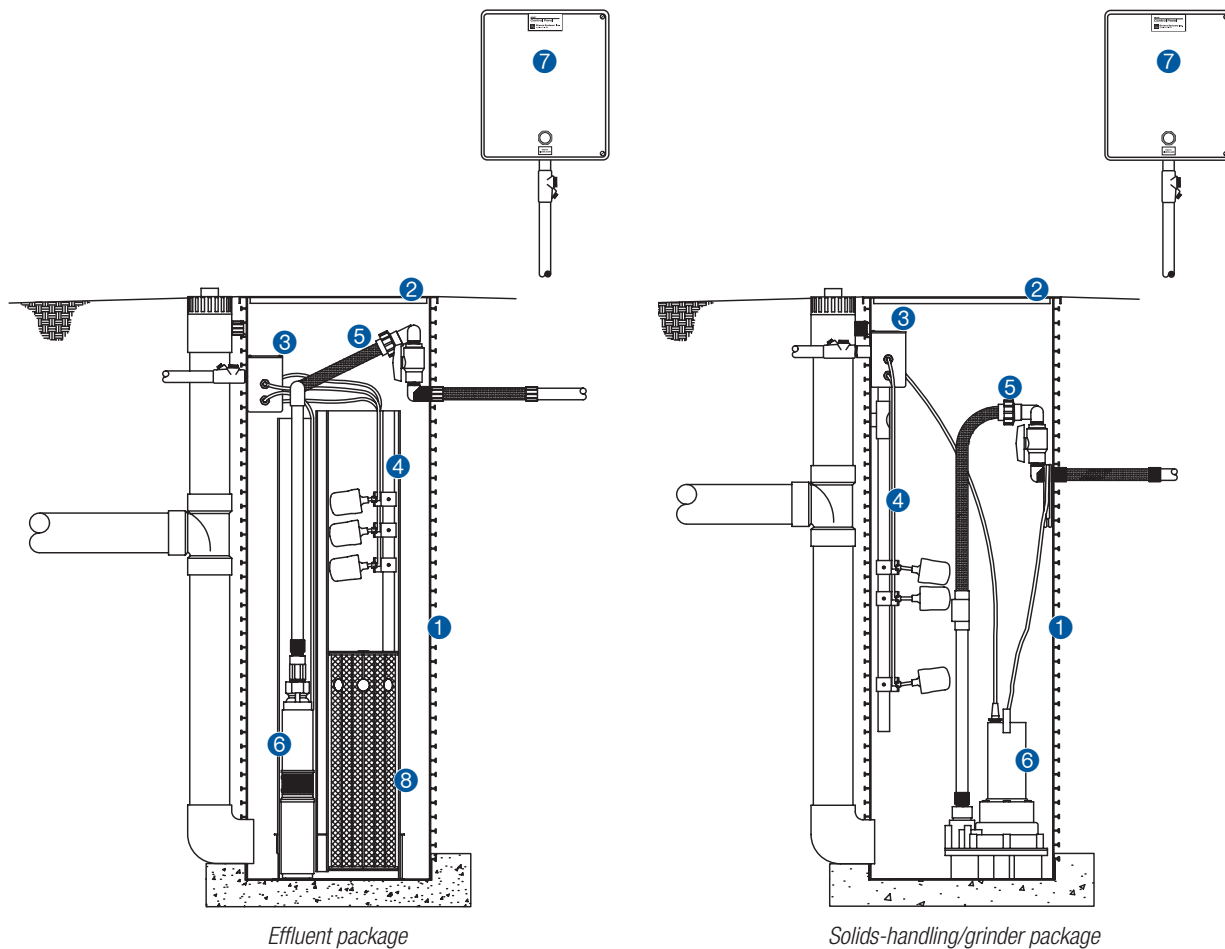
Sample Pump Basin Packages

These sample pump basin packages are used to pump effluent from a septic tank to a sewer collection line or dispersal area via an external pump basin. Specific applications include retrofits and pumping from a secondary treatment system to a dispersal area. The first column below shows an **effluent pump basin package** and its components. The other two columns give solids-handling and grinder variations. Refer to *Pump Basins (PB)* on page 31 for pump basin selection information.

Note: Bold items in the Solids-handling and Grinder columns indicate a variation from the standard (Effluent) component.

Component	Effluent	Solids-handling	Grinder
1 Pump basin	PB2466COV+L+10	PB2454COV+S+20	PB2454COV+S+12
2 Fiberglass lid	FL24-4B	FL24-4B	FL24-4B
3 Splice box	SB5	SB4	SB4
4 Float switch assembly	MF3AT-Y,B,R,W-27FS	MF3A-Y,B,R-39FS	MF3A-Y,B,R-39FS
5 Discharge plumbing assembly	HV100BCFCX	HV200BCX	HV125BCX
6 Pump	PF100511	PSE5011	PMG200
7 Control panel	S1RO	S1	S2
8 Biotube® pump vault	PVU57-1819	--	--

COMPONENT LOCATION



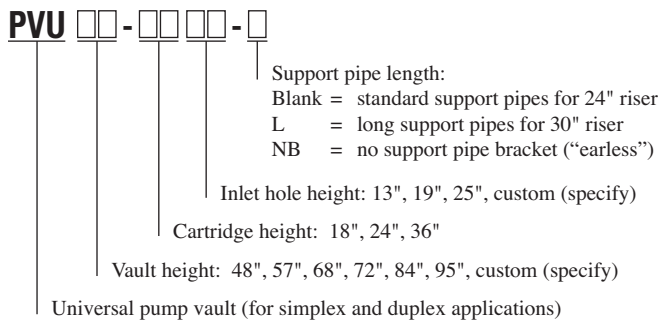
Note: Pump basins are not IAPMO approved.

Orenco Biotube® pump vaults are used to transport filtered effluent from septic tanks or separate dosing tanks in effluent pumping systems. They are a critical component of individual onsite systems and effluent sewer collection systems. Pump vaults house a Biotube effluent filter and one or two Orenco high-head effluent pumps and can be used in single-compartment septic tanks with flows up to 40 gpm. When flows are greater than 40 gpm, a double-compartment septic tank or separate dosing tank is recommended. Pump vaults are 12 in. in diameter, and accommodate one pump (simplex) or two pumps (duplex). Each pump vault comes with a Biotube filter cartridge, vault housing, support pipes, and float bracket to hold the float assembly. Custom lengths can be produced.

“Earless” 68-inch vaults, which rest on the bottom of a tank instead of on support pipes, are also available.

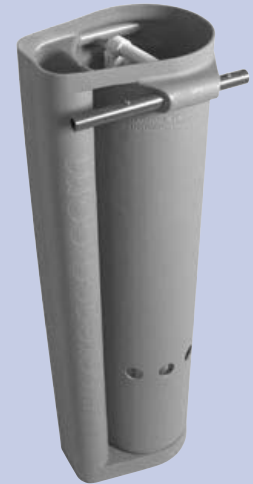
Covered by U.S. Patents #4,439,323 and 5,492,635

NOMENCLATURE



HOW TO SELECT

Step 1: Refer to *Figure 2, Biotube Pump Vault Selection Guide*, on page 18.



Biotube® pump vault



Earless Biotube® pump vault

TABLE 10. BIOTUBE CARTRIDGE EFFECTIVE FILTER AREA

Cartridge height	Filter area	Flow area
18 in.	14.5 ft ²	4.4 ft ²
24 in.	19.7 ft ²	5.9 ft ²
36 in.	30.0 ft ²	9.0 ft ²

TABLE 11. BIOTUBE PUMP VAULT TANK ACCESS AND RISER DIAMETER

Biotube series	Minimum tank access diameter	Minimum riser diameter
PVU simplex	19 in. (20 in. recommended)	24 in.
PVU duplex	19 in. (20 in. recommended)	30 in.

Biotube® Pump Vaults (PVU)

FIGURE 2. BIOTUBE PUMP VAULT SELECTION GUIDE

The tank depth and float settings must be known in order to select the appropriate PVU for the system. Once float settings are determined, select a pump vault that will satisfy the required float settings and also position the pump vault inlet holes at their optimum elevation.

HOW TO SELECT

Step 1: Determine tank depth (TD) (tank depth is measured from the inside bottom of the tank to the outside top of the tank).

Step 2: Determine cartridge height (CH).

Application	Recommended Minimum Cartridge Height
Residential	18 in.
Residential recirculating	24 in.
Commercial	24 in.

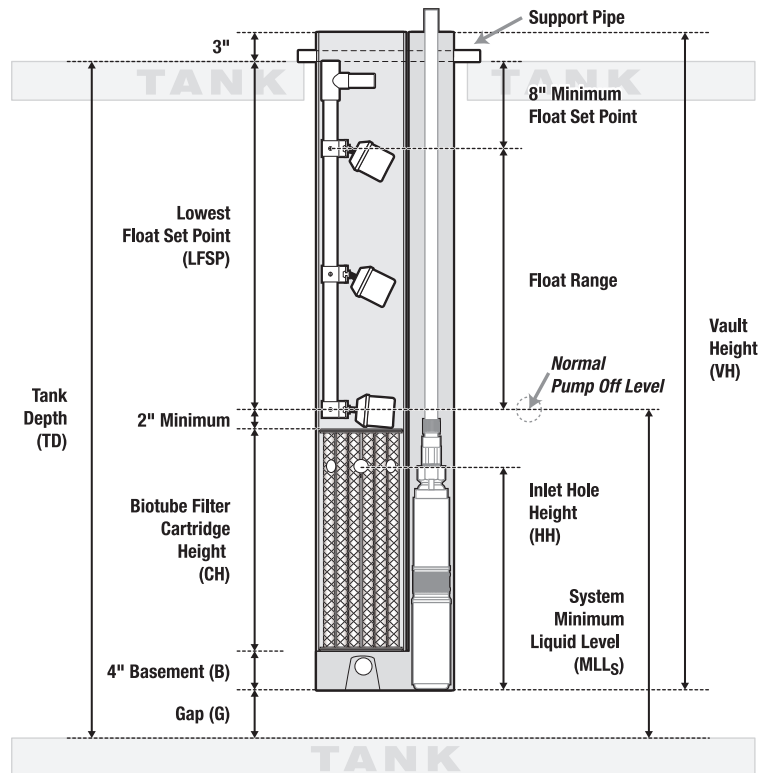
Step 3: Determine float setting elevations for the system. Float settings are measured down from the outside top of the tank (bottom of pump vault support pipes) to the center of the float collar.

Step 4: Select the proper vault height (VH) by selecting the proper tank depth range on the chart below with the matching cartridge height (CH). Verify that the off point (OP) you calculated in Step 3 falls within the range listed in the "Off point range" Column.

Step 5: Verify that the off point (OP) is above the minimum liquid level of the pump (MLL_p) using the following equation: $TD - OP > MLL_p + G$.

Model code	Tank depth range	Off point range	Inlet hole height	Cartridge height	Vault height
PVU48-1818	48-53 in.	16-20 in.	18	18	48
PVU57-1819	54-61 in.	23-29 in.	19	18	57
PVU57-1813	62-64 in.	27-29 in.	13	18	57
PVU68-1819	65-70 in.	34-39 in.	19	18	68
PVU68-1813	71-72 in.	39-41 in.	13	18	68
PVU57-2425	54-61 in.	19-21 in.	25	24	57
PVU57-2419	62-64 in.	19-24 in.	19	24	57
PVU68-2425	65-70 in.	24-32 in.	25	24	68
PVU68-2419	71-72 in.	30-34 in.	19	24	68

Pump model	MLL _p
PF100511	20 in.
PF200511	20 in.
PF300511	22 in.
PF500511	22 in.
PA100511	18 in.
PA200511	18 in.
PA300511	18 in.
PA500511	18 in.
PJ120511	20 in.
PJ180511	20 in.
PJ330511	22 in.
PJ550511	24 in.



Orenco high-head effluent pumps are manufactured specifically for wastewater applications, to transport filtered effluent from septic tanks. High-head capabilities make them the ideal choice for STEP effluent sewer systems. Steep pump curves provide high-pressure capacity to clear plugged orifices in pressurized distribution systems. Orenco high-head effluent pumps possess a high cycling capability (up to 300 cycles/day on most models), which is needed for optimum treatment in many of today's high performance onsite systems. 60-Hz 1/2 hp to 1-1/2 hp pumps are UL and CSA listed for use in effluent; 50-Hz pumps are CSA-listed only. 5-year extended warranty included with all PF series pumps and is available for purchase with other pumps. Three-phase pumps and 2-hp, 3-hp, and 5-hp pumps are available in limited models. CE listing available on certain models. PF and PA pumps include an SOOW type cable, suitable for Class I, Division 1 and 2 applications. PJ pumps include SJOOW type cable, which is not suitable for Class I, Division 1 and 2 applications.

NOMENCLATURES

PF □ □ □ □ □ - □ □

Cord length:
Blank = 10'
20 = 20'
30 = 30'
50 = 50'

Voltage (nameplate):
1 = 115 (1/2 hp only)
200 = 200
2 = 230 (220 if 50 Hz)
4 = 460

Frequency:
1 = single-phase 60 Hz
3 = three-phase 60 Hz
5 = single-phase 50 Hz

Horsepower:
05 = 1/2 hp
07 = 3/4 hp
10 = 1 hp
15 = 1-1/2 hp

Nominal flow (gpm):
10
20
30
50

Pump (PF Series)

PA □ □ 05 1 1

Voltage (nameplate):
1 = 115 (60 Hz)

Phase:
1 = single-phase

Horsepower:
05 = 1/2 hp

Nominal flow (gpm):
10
20
30
50

Pump (PA Series)

PJ □ □ 05 1 1

Voltage (nameplate):
1 = 115

Phase:
1 = single-phase

Horsepower:
05 = 1/2 hp

Nominal flow (gpm):
12
18
33
55
75

Pump (PJ Series)

PJ 75 15 1 2

Voltage (nameplate):
2 = 230 (60 Hz)

Phase:
1 = single-phase

Horsepower:
15 = 1-1/2 hp

Nominal flow:
75 = 75 gpm

Pump (PJ Series)



PF Series high-head effluent pump

HOW TO SELECT

To take the guesswork out of pump sizing, Orenco's *Design Aid CD-ROM* (see *Design Aid Catalog and CD-ROM (PMCDROM)* on page 82) includes a computerized *PumpSelect™* program that provides fast, error-free hydraulic calculations and generates system curves. See *PumpSelect™* on page 24 for an example.

PUMPING PACKAGES AND COMPONENTS

High-head Effluent Pumps (PF, PA, PJ)

TABLE 13. SELECTED PF/PA/PJ SERIES HIGH-HEAD EFFLUENT PUMP SPECIFICATIONS^a

Model	hp	Nameplate amps (full load/max)	Actual amps (design flow/max) ^{b, c}	Nom. flow	Disch. size	Length	MLL ^d	Cycles/day	Weight ^e
PF Series, 60 Hz, operated at 120 and 240V									
PF100511	0.50	10.0/12.0	12.7/12.7	10 gpm	1.25 in.	22.1 in.	20 in.	300	27.0 lb
PF100512	0.50	5.0/6.0	6.3/6.3	10 gpm	1.25 in.	22.1 in.	20 in.	300	27.0 lb
PF100712	0.75	6.8/8.0	8.3/8.3	10 gpm	1.25 in.	25.0 in.	22 in.	300	30.0 lb
PF1010 ^f	1.00	-	-	10 gpm	1.25 in.	-	24 in.	100 ^g	-
PF200511	0.50	10.0/12.0	12.4/12.4	20 gpm	1.25 in.	24.0 in.	20 in.	300	27.0 lb
PF200512	0.50	5.0/6.0	6.3/6.3	20 gpm	1.25 in.	24.0 in.	20 in.	300	27.0 lb
PF2010 ^f	1.00	-	-	20 gpm	1.25 in.	-	25 in.	100 ^g	-
PF2015 ^f	1.50	-	-	20 gpm	1.25 in.	-	28 in.	100 ^g	-
PF300511	0.50	10.0/12.0	12.2/12.2	30 gpm	1.25 in.	21.5 in.	22 in.	300	26.0 lb
PF300512	0.50	5.0/6.0	6.2/6.2	30 gpm	1.25 in.	21.5 in.	22 in.	300	26.0 lb
PF300712	0.75	6.8/8.0	8.5/8.5	30 gpm	1.25 in.	25.0 in.	24 in.	300	30.0 lb
PF3010 ^f	1.00	-	-	30 gpm	1.25 in.	-	27 in.	100 ^g	-
PF3015 ^f	1.50	-	-	30 gpm	1.25 in.	-	29 in.	100 ^g	-
PF500511	0.50	10.0/12.0	12.1/12.1	50 gpm	2.00 in.	19.4 in.	22 in.	300	28.0 lb
PF500512	0.50	5.0/6.0	6.2/6.2	50 gpm	2.00 in.	19.4 in.	22 in.	300	28.0 lb
PF500712	0.75	6.8/8.0	8.5/8.5	50 gpm	2.00 in.	22.7 in.	24 in.	300	31.0 lb
PF5010 ^f	1.00	-	-	50 gpm	2.00 in.	-	27 in.	100 ^g	-
PF5015 ^f	1.50	-	-	50 gpm	2.00 in.	-	29 in.	100 ^g	-
PF Series, 50 Hz, operated at 230V									
PF100552	0.50	4.1	3.9/4.1	10 gpm	1.25 in.	22.0 in.	20 in.	300	27.0 lb
PF100752	0.75	6.5	6.2/6.2	10 gpm	1.25 in.	27.0 in.	24 in.	300	30.0 lb
PF300552	0.50	4.1	3.9/4.0	30 gpm	1.25 in.	21.5 in.	22 in.	300	26.0 lb
PF500552	0.50	4.1	4.0/4.0	50 gpm	2.00 in.	19.4 in.	22 in.	300	28.0 lb
PF500752	0.75	6.5	6.3/6.4	50 gpm	2.00 in.	22.7 in.	24 in.	300	31.0 lb
PF501052	1.00	7.6	7.3/7.4	50 gpm	2.00 in.	26.0 in.	27 in.	100	34.0 lb
PA Series, 60 Hz, operated at 120V									
PA100511	0.50	10.0/12.0	12.5/12.5	10 gpm	1.25 in.	22.5 in.	18 in.	300	24.0 lb
PA200511	0.50	10.0/12.0	12.8/12.8	20 gpm	1.25 in.	22.3 in.	18 in.	300	24.0 lb
PA300511	0.50	10.0/12.0	12.1/12.1	30 gpm	1.25 in.	21.5 in.	18 in.	300	23.0 lb
PA500511	0.50	10.0/12.0	12.0/12.1	50 gpm	2.00 in.	19.8 in.	18 in.	300	24.0 lb
PJ Series, 60 Hz, operated at 120 and 230V									
PJ120511	0.50	10.0/12.0	12.9/12.9	12 gpm	1.25 in.	20.8 in.	20 in.	300	23.0 lb
PJ180511	0.50	10.0/12.0	12.7/12.7	18 gpm	1.25 in.	20.3 in.	20 in.	300	22.5 lb
PJ330511	0.50	10.0/12.0	12.2/12.2	33 gpm	1.25 in.	20.3 in.	22 in.	300	22.5 lb
PJ550511	0.50	10.0/12.0	12.2/12.2	55 gpm	2.00 in.	20.9 in.	27 in.	300	22.5 lb
PJ751512 ^h	1.50	10.6/13.1	12.6/12.7	75 gpm	2.00 in.	32.8 in.	27 in.	100	46.5 lb
Options									
PAWARRANTY (not necessary for PF pumps)				5-year warranty for PA and PJ pumps. (Must be purchased at time pump is purchased.)					

a. Specifications subject to change.

b. As tested by Orenco.

c. Actual running amperage may exceed the motor's nameplate amperage by 10% (UL778).

d. Pump's minimum liquid level.

e. Shipping weight with single-phase motor and 10-ft cord.

f. Available mid-2007.

g. 300 cycles/day attainable with three-phase motor.

h. Two PJ75 pumps cannot operate simultaneously in a single PVU. Options are available, call Orenco.

Note: Other voltages and horsepower are available.

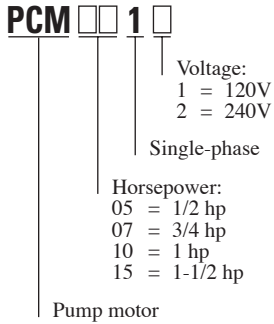
For a full list, contact Orenco at 1-800-348-9843.

Replacement Pump Parts and Rebuild Kits (PCM, PCL, PR)

Replacement Pump Motors (PCM)

For PF Series pumps only.

NOMENCLATURE



Note: For larger horsepower and three-phase motors, please call Orenco.

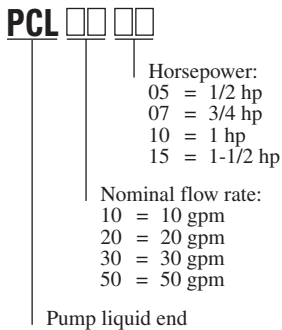


Replacement pump motor

Replacement Pump Liquid Ends (PCL)

For PF Series pumps only.

NOMENCLATURE

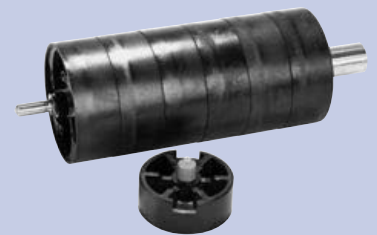
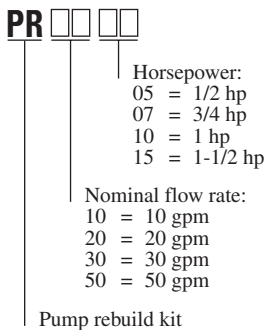


Replacement pump liquid end

Pump Rebuild Kits (PR)

Pump rebuild kits (for PF Series pumps only) consist of a liquid end replacement stack, which includes the shaft, coupling, impellers, and diffusers.

NOMENCLATURE



Pump rebuild kit

TABLE 14. PUMP REPLACEMENT AND REBUILD EXAMPLES

Model code	Description
PCM1012	Replacement pump motor, 1 hp, single-phase, 240V
PCL3005	Replacement liquid end, 30 gpm, 0.5 hp
PR2005	Pump rebuild kit, 20 gpm, 0.5 hp

Lightweight, quality construction, 2-in. solids-handling pumps with stainless steel and thermoplastic materials. Manufactured by Grundfos. UL listed.

NOMENCLATURE

Solids-handling pump

PSE □ □ **1** □

Voltage:
1 = 120 (PSE40, PSE50 only)
2 = 240

Single-phase

Horsepower:
40 = 4/10 hp
50 = 1/2 hp
75 = 3/4 hp
100 = 1 hp
150 = 1-1/2 hp

Sewage pump (solids handling)

HOW TO SELECT

To take the guesswork out of pump sizing, Orenco's *Design Aid CD-ROM* (see *Design Aid Catalog and CD-ROM (PMCDROM)* on page 82) includes a computerized *PumpSelect™* program that provides fast, error-free hydraulic calculations and generates system curves. See *PumpSelect™* on page 24 for an example.



TABLE 16. SOLIDS-HANDLING AND GRINDER PUMP SPECIFICATIONS

Model code	hp	Voltage	Discharge size	Weight
PSE4011	4/10	120	2 in.	25 lb
PSE4012	4/10	240	2 in.	25 lb
PSE5011	1/2	120	2 in.	29 lb
PSE5012	1/2	240	2 in.	29 lb
PSE7512	3/4	240	2 in.	29 lb
PSE10012	1	240	2 in.	29 lb
PSE15012	1-1/2	240	2 in.	31 lb
Grinder pump (manufactured by F. E. Myers)				
PMG200 ^a	2	240	1-1/4 in.	91 lb

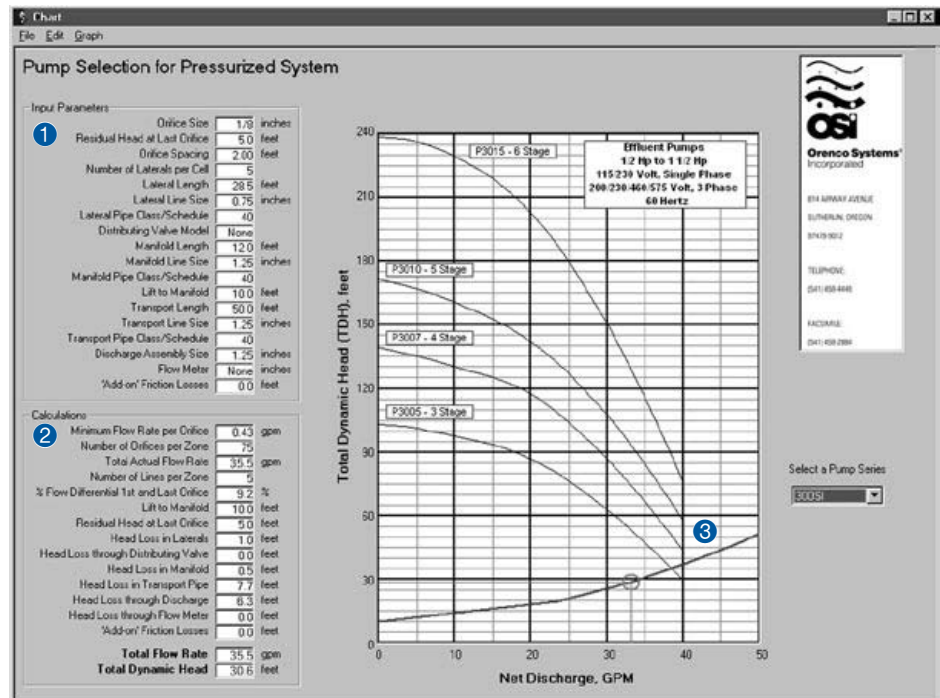
a. Cast iron construction

- 1 Input fields allow you to input your system's parameters. Convenient pull-down menus give quick and easy selection.
- 2 Descriptions of each input field make them easier to understand. We also give you typical value ranges to speed up the process.
- 3 "Calculate" button makes running complex system calculations as easy as one click.
- 4 Calculation fields show the actual data for your system after running the calculation generator.
- 5 "Generate Chart" button lets you see the performance curve for your system's pump calculations.

To take the guesswork out of pump sizing, Orenco's **Design Aid CD-ROM** (see *Design Aid Catalog and CD-ROM (PMCDROM)* on page 82) includes a computerized **PumpSelect™** program that provides fast, error-free hydraulic calculations and generates system curves.

INPUT SCREEN

OUTPUT SCREEN



- 1 "Input Parameters" gives you a complete list of the Input fields from the previous screen.
- 2 "Calculations" gives you a complete list of the Calculation fields from the previous screen.
- 3 Chart provides a graphical representation of your system's pump calculations, allowing you to match your calculation with the appropriate pump.

Orengo dosing siphons can be used as an alternative to pumps when dosing downhill and timed dosing is not necessary. Flow rates can range from just a few gallons per minute to several hundred gallons per minute, depending on siphon size. Dosing siphons use no moving parts. To monitor siphon operation, include a float option on your dosing siphon and order a digital dose counter. See *Digital Counters* on page 44. For help selecting dosing siphons, contact your local Distributor or Orengo Systems.

NOMENCLATURE

2-inch dosing siphon

OSI 2 □ □ □

Blank = Siphon with vault assembly
 D = Direct discharge (siphon only)
 F = Float

Drawdown (inches):
 04 = 4"
 08 = 8"
 10 = 10"
 12 = 12"
 14 = 14"

Discharge diameter: 2"

Siphon

Note: External Vent Assembly included

3- and 4-inch dosing siphon

OSI □ □ □ □

Options:
 B = Mounting bracket
 ES = Effluent screen
 F = Float

Drawdown (inches):
 10 = (3" siphon only)
 12 = 12"
 14 = 14"
 16 = 16"
 18 = 18"
 20 = 20"
 24 = 24"
 30 = 30"
 36 = 36"
 42 = 42"
 48 = 48"

Discharge diameter:
 3 = 3"
 4 = 4"

Siphon

Note: External Vent Assembly sold separately

6- and 8-inch dosing siphon

OSI □ □ □

Drawdown (inches)
 18 = 18" (6" siphon only)
 24 = 24"
 30 = 30"
 36 = 36"
 42 = 42"

Discharge diameter (inches)
 6 = 6"
 8 = 8"

Siphon

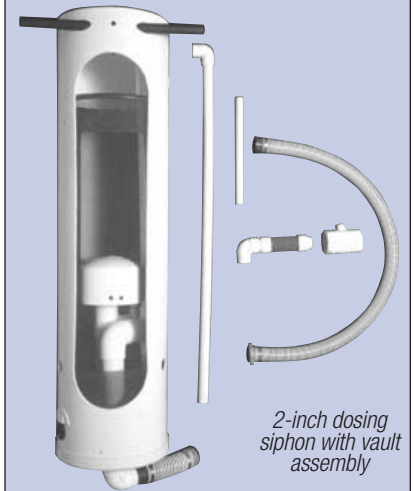
3- and 4-inch External Vent Assembly

OSI □ VENT

Vent Assembly

Diameter (inches)
 300 = 3"
 400 = 4"

Siphon



2-inch dosing siphon with vault assembly



3-inch dosing siphon

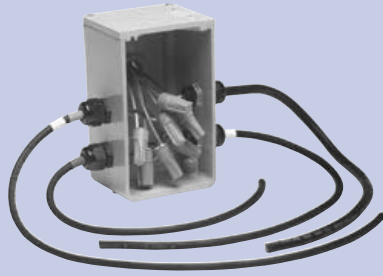


External vent assembly

TABLE 17. DOSING SIPHON EXAMPLES

Model code	Description
OSI204F	Dosing siphon, 2-in. diameter, 4-in. drawdown, with float
OSI310B	Dosing siphon, 3-in. diameter, 10-in. drawdown, with mounting bracket
OSI618	Dosing siphon, 6-in. diameter, 18-in. drawdown

Splice Boxes (SB, SBEX, SBX)



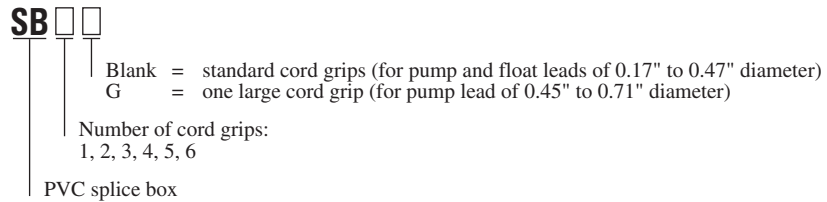
Splice box

Internal Splice Boxes (SB)

Orenco internal splice boxes are used to safely house spliced wire connections between an electrical control panel and such equipment as effluent pumps and float switches. These PVC splice boxes are available with 1 to 6 watertight cord grips, and come with watertight splicing kit. SB1 through SB4 models connect to 3/4-in. diameter conduit; SB5 and SB6 models connect to 1-in. diameter conduit. All Orenco splice boxes are NEMA4X rated for use in wet locations.

Note: See Risers and Riser Pipe (RR, RU) on page 3 to order splice boxes attached to risers.

NOMENCLATURE



HOW TO SELECT

- Step 1:** Determine the number of float cords.
- Step 2:** Determine the number of pump cords.
- Step 3:** Add the number of float cords and pump cords together. This number indicates how many cord grips are required.

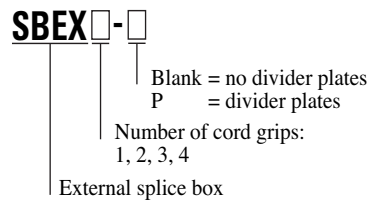


External Splice Box

External Splice Boxes (SBEX)

Orenco's External Splice Box attaches outside the access riser of an underground tank and is completely waterproof. Engineered specifically for pressurized water and wastewater treatment systems, it is UL-listed and especially suited for use in locations prone to high groundwater and other wet conditions. Using the external splice box allows more equipment or increased working room in the riser, or allows use of a smaller diameter riser. External splice boxes include a 4-in. grommet.

NOMENCLATURE



HOW TO SELECT

- Step 1:** Determine the number of float cords.
- Step 2:** Determine the number of pump cords.
- Step 3:** Add the number of float cords and pump cords together. This number indicates how many cord grips are required.
- Step 4:** Determine whether a divider plate to separate Class 1 and Class 2 or 3 wiring is needed.

Explosion-Proof Splice Boxes (SBX)

For Class I, Division 1 hazardous locations

When required by local codes, Orenco's explosion-proof splice boxes are used in the access riser of a pump system to provide a housing for spliced wires between the control panel and effluent pump. Constructed of copper-free aluminum, the enclosure contains a ground screw. Up to four 3/4-in. conduit ports (one in from the control panel and the remainder out to pumps) are available, and the control panel is sealed to prevent gas movement. Use 1-in. splice box grommets for installation. See *Grommets (G)* on page 7.

Note: Explosion-proof splice boxes are suitable only for pumps with two-wire leads.

NOMENCLATURE

SBX-

Number of pumps:
 S = simplex (1 pump)
 D = duplex (2 pumps)
 T = triplex (3 pumps)

Explosion-proof splice box



TABLE 18. SPLICE BOX EXAMPLES, WITH SPLICE BOX ACCESSORIES

Model code	Description
SB4	Internal splice box with 4 cord grips
SBX-S	Simplex explosion-proof splice box
Accessories	
SBABRKING	Aqua Blue/Red King connector for watertight multiple connections
SBCG	Electrical cord grip, 1/2-in. NPT (UL) watertight, 0.17 in. to 0.47 in.
SBCGL	Electrical cord grip, 3/4-in. NPT (UL) watertight, 0.45 in. to 0.71 in.

Note: Grommets are ordered separately. Refer to *Grommets (G)* on page 7 for details.

Conduit Seals (SBCS)

Orenco's conduit seal kits create a watertight, gastight seal between a conduit and a splice box that prevents the passage of liquids, vapors, or flames. Available for 3/4-in. and 1-in. conduit. Conduit seal kits include sealant and fiber filler.

NOMENCLATURE

SBCS

Conduit size:
 075 = 3/4"
 100 = 1"

Conduit seal kit



Float Switch Assemblies and Float Collars (MF, MFCOLLAR)



Float switch assembly



V Model float

Float Switch Assemblies (MF)

Orenco float switch assemblies can be mounted in pump vaults, effluent screens, pump basins, and risers. Float switch assemblies are preassembled with one or more floats mounted on a 1-in. PVC float stem. Floats are color-coded to indicate their function. (See *Table 37, Control Panel and Float Switch Function Matrix*, on page 56 for color-code and functionality.) ABS float collars provide secure mounting that is easily adjustable.

Note: We now supply non-mercury floats. See V model and X model floats in *Table 38* on page 56.

NOMENCLATURE

MF □ □ □ □ - □ □ □ □ □ □

Cord length:
Blank = 10' cord (standard)
20 = 20' cord*
30 = 30' cord*

Application:
FS = field set
FTL = elbow-style for Biotube base-inlet filters only
PB = pump basin
V = pump vault (factory standard float settings)
VC = pump vault (specify float settings)

Stem length:
Blank = no stem, floats on collars only
19, 21, 27, 33, 37, 39, 45, 51, 57, 66 = stem length in inches
5, 11 = stem length in inches for elbow-style float brackets for effluent filters

Color code:
Blank = no color indicated
Y = yellow
G = green
B = blue
R = red
O = orange
E = gray
W = white
P = purple
YG = yellow-green
YP = yellow-purple

Float switch models:
A, B, C, D, G, T, V, X

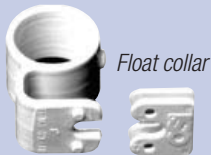
Number of float switches (when using multiples of same float switch model)
Blank = no float collar

Mechanical or mercury float switch assembly

* Not standard for V, X floats. Special order required.

HOW TO SELECT

- Step 1:** Refer to *Table 37, Control Panel and Float Switch Function Matrix*, on page 56 to determine the functions you want your floats to perform; cross-reference your selections to determine the types of floats required.
- Step 2:** Determine the number of float switches required.
- Step 3:** Refer to *Table 24, Float Stem Length* on page 32 to determine stem length.
- Step 4:** Determine application: field set, pump basin, or pump vault.
- Step 5:** Determine cord length: 10 ft, 20 ft, or 30 ft.



Float collar

Float Collars (MFCOLLAR1)

Orenco float collars for 1-in. Schedule 40 pipe are the simplest, most reliable way to attach liquid level control floats. Constructed of ABS for long life. Quick release clip requires no special tools to mount or adjust. Accommodates two float cord diameters.

TABLE 19. FLOAT SWITCH ASSEMBLY EXAMPLES

Model code	Description
MFABT-Y, G, W-27V	Float switch assembly, with three floats (one A, one B, and one T), 27-in. stem length, Biotube pump vault
MF3A-YG, R, W-33V	Float switch assembly, with three A model floats, 33-in. stem length, Biotube pump vault
MF1A-Y5FTL	Elbow-style float bracket for base-inlet Biotube filters (see p. 36)

Orenco pump discharge assemblies (hose and valve assemblies) are used to convey effluent from a pump to the exterior of a riser or pump basin. Pump discharge assemblies come preassembled and are composed of PVC valves and flexible hose that simplify installation and maintenance. Pump discharge assemblies are available in four configurations: standard, high-head, low-head, and drainback. Available with unions or cam-style quick disconnects. Retrofitting a standard pump discharge assembly with a cold weather kit allows deeper burial of the discharge line.

NOMENCLATURE

Standard application

HV -

Configuration:
 Blank = field cut (high-head style)
 H = high-head style pump (standard)
 L = low-head style pump
 DB = drainback (always field cut)

Options:
 B = ball valve
 C = check valve
 FC = flow controller (1" diameter only)
 AS = antisiphon
 X = external flex hose
 Q = quick disconnect
 S = true-union ball check valve (available for 1-1/2" discharge only)

Discharge diameter:
 100 = 1"
 125 = 1-1/4"
 150 = 1-1/2"
 200 = 2"

Pump discharge assembly

Cold weather application

HVCW KIT

Kit

Discharge diameter:
 100 = 1"
 125 = 1-1/4"
 150 = 1-1/2"
 200 = 2"

Cold weather application

Pump discharge assembly

External flex assemblies

HVX -

Discharge connection (inches):
 Blank = same as discharge diameter
 100 = 1"
 125 = 1-1/4"
 150 = 1-1/2"
 200 = 2"

Discharge diameter (inches):
 100 = 1"
 125 = 1-1/4"
 150 = 1-1/2"
 200 = 2"

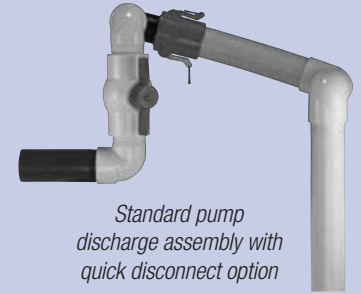
Flex extension

Pump discharge assembly

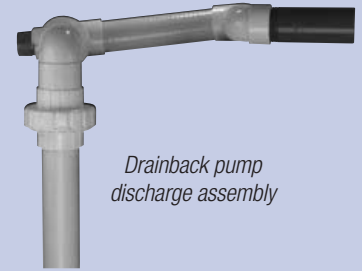
HOW TO SELECT

- Step 1:** Determine the pump discharge diameter.
- Step 2:** Select desired options: ball valve, check valve, flow controller, or antisiphon (for dosing downhill).
- Step 3:** Determine configuration: field cut, high-head, low-head, or drainback. Use drainback when the outlet depth is 18 in. or shallower and the transport pipe allows for a consistent slope. Use cold weather kit with the standard pump discharge assembly in cold weather applications, when the outlet depth is greater than 18 in. Optional drain hole allows for drainback or for burying the transport below the frost line.

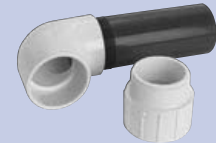
Note: Refer to Orenco engineering drawings NDW-TD-EPS-HV-1 and NDW-TD-EPS-HV-2 for details of drainback and cold weather applications respectively.



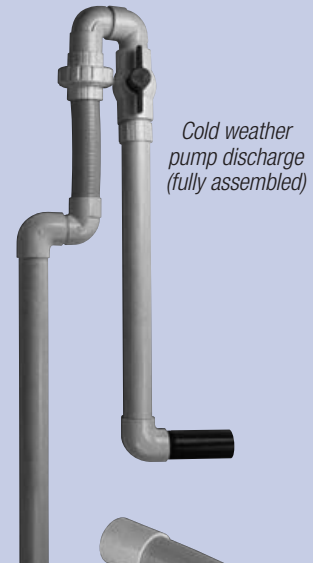
Standard pump discharge assembly with quick disconnect option



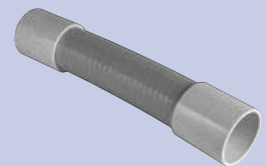
Drainback pump discharge assembly



Cold weather kit



Cold weather pump discharge (fully assembled)

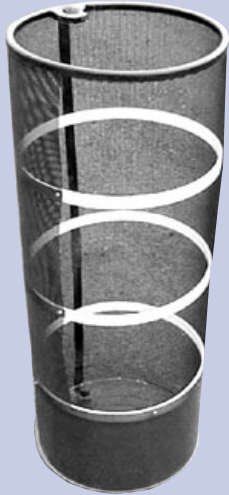


External flex assembly

TABLE 20. PUMP DISCHARGE ASSEMBLY EXAMPLE

Model code	Description
HV100BCFCX	Pump discharge assembly, 1 in. with ball valve, flow control, check valve, and external flex
HV125BCX	Pump discharge assembly, 1-1/4 in. with ball valve, check valve, and external flex
HV125BX-DB	Pump discharge assembly, 1-1/4 in. with ball valve and external flex (drainback style)

Effluent Screens and Screened Pump Vaults (ES, SV)



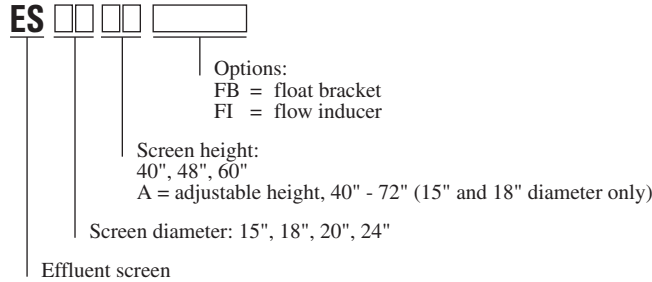
Effluent Screen

Effluent Screens (ES)

Orenco effluent screens are used in effluent dosing tanks to minimize the solids leaving the tank. Constructed of reinforced cylinders of 1/8-in. mesh polyethylene with a fiberglass base. Effluent screens are available with float brackets and flow inducers.

Note: We recommend using a pump vault instead of an effluent screen whenever possible. See Biotube® Pump Vaults (PVU) on page 17 for pump vault information.

NOMENCLATURE



Screened pump vault

Screened Pump Vaults (SV)

Orenco screened pump vaults are designed for use with conventional low-head style effluent and sewage pumps.

Covered by U.S. Patents #4,439,323 and 5,492,635

Note: If you are using high-head effluent pumps, we recommend using a Biotube pump vault instead of a screened pump vault. See Biotube® pump vaults (PVU) on page 17.

NOMENCLATURE

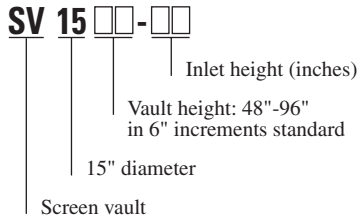


TABLE 21. EFFLUENT SCREEN AND SCREENED PUMP VAULT EXAMPLES

Model code	Description
ES1540FB	Effluent screen, 15-in. diameter, 40-in. height, with float bracket
ES15A	Effluent screen, 15-in. diameter, adjustable height up to 72 in.
SV1560-18	Screened pump vault, 15-in. diameter, 60-in. height, 18-in. inlet hole height

Orenco pump basins are used as secondary pump chambers and lift stations in septic systems. Specific applications include retrofits and pumping from a secondary treatment system to a dispersal area. Constructed of PVC pipe with fiberglass base. A 4-in. inlet elbow and float bracket come standard, and holes to accommodate splice boxes and discharge piping are optional. Available in 24-in. and 30-in. diameters in standard 6-in. length increments. Custom lengths available. Lids and floats ordered separately.

Note: Pump basins are not IAPMO approved.

NOMENCLATURE

PB □□ □□ □□ + □□ + □□ + □□

Discharge grommet:
 10 = 1"
 12 = 1-1/4"
 15 = 1-1/2"
 20 = 2"

Splice box:
 S = 1" grommet installed
 (for Orenco SB1 - SB4 splice boxes)
 L = 1-1/4" grommet installed
 (for Orenco SB5, SB6 splice boxes)
 S3 = SB3 attached
 S4 = SB4 attached
 L5 = SB5 attached
 L6 = SB6 attached

Cleanout vent:
 Blank = no cleanout
 COV = cleanout vent

Flow inducer:
 Blank = no flow inducer
 FI = flow inducer

Basin height: 54", 60", 66", 72"
 Basin diameter: 18", 24", 30"
 Pump basin



Pump basin with cleanout vent option

HOW TO SELECT

- Step 1:** Determine pump basin diameter.
- Step 2:** Determine pump basin height. See *Figure 3, Pump Basin Selection Guide*, on page 32 for specific measuring locations. Basin height (H) must accommodate the pump height (P), the float settings (FS), and the elevation between the invert (I) of the inlet pipe and a point at least 1 in. above the finished grade level. The alarm level (A) should be positioned at or below the invert of the inlet pipe.
- Step 3:** Select flow inducer option if required.
- Step 4:** Select cleanout vent option if required.
- Step 5:** Determine if splice box and discharge grommet options are required. For more information, see *Risers and Riser Pipe (RR, RU)* on page 3.

TABLE 22. PUMP BASIN SPECIFICATIONS

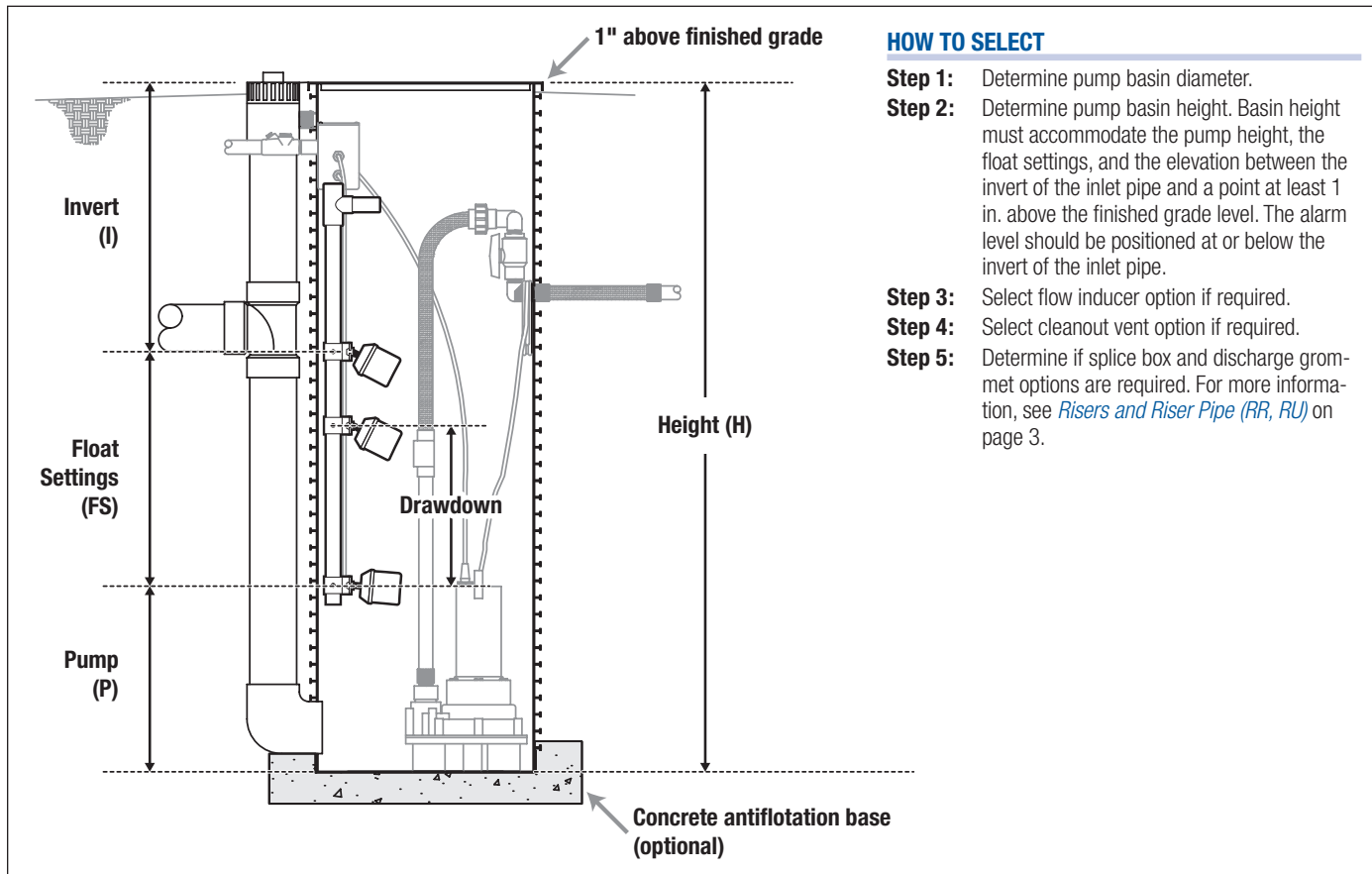
Pump basin diameter (in.)	Capacity (gallons per inch)
18	1.06
24	1.88
30	2.96

TABLE 23. PUMP BASIN EXAMPLE

Model code	Description
PB2454COV+S+12	Pump basin, 24-in. diameter, 54-in. height, with cleanout vent, 1-in. splice box grommet, 1-1/4-in. discharge grommet.

Pump Basins (PB)

FIGURE 3. PUMP BASIN SELECTION GUIDE



HOW TO SELECT

- Step 1:** Determine pump basin diameter.
- Step 2:** Determine pump basin height. Basin height must accommodate the pump height, the float settings, and the elevation between the invert of the inlet pipe and a point at least 1 in. above the finished grade level. The alarm level should be positioned at or below the invert of the inlet pipe.
- Step 3:** Select flow inducer option if required.
- Step 4:** Select cleanout vent option if required.
- Step 5:** Determine if splice box and discharge grommet options are required. For more information, see *Risers and Riser Pipe (RR, RU)* on page 3.

TABLE 24. FLOAT STEM LENGTH

Application	Model	Stem length/assembly	Application	Model	Stem length/assembly
PVU	PVU48-18	19	SV	SV1548(FI)	39
	PVU57-18	27		SV1554(FI)	39
	PVU57-24	21		SV1560(FI)	51
	PVU68-18	39		SV1566(FI)	51
	PVU68-24	33		SV1572(FI)	63
	PVU68-36	21		SV1578(FI)	63
	PVU72-18	39 / 43 ^a		PB	PB __ 48
	PVU72-24	37	PB __ 54		39
	PVU72-36	21 / 25 ^a	PB __ 60		45
	PVU84-18	51 / 55 ^a	PB __ 66		51
	PVU84-24	45 / 49 ^a	PB __ 72		57
	PVU84-36	37	PB __ 78		63
	PVU95-18	66	FT		FT04 series
	PVU95-24	57 / 60 ^a		FT0848	MF1A-Y-12UT
PVU95-36	45 / 48	FT0854		MF1A-Y-12FT	
PBSF	PBSF __ 70(FI)	39	FT12 series	MF1A-Y-12FT	
			FT15 series	MF1A-Y-12FT	

a. Standard float stem length/maximum float stem length. Use the standard unless your float settings require a longer stem. The maximum float set point is 2 in. longer than the stem length.

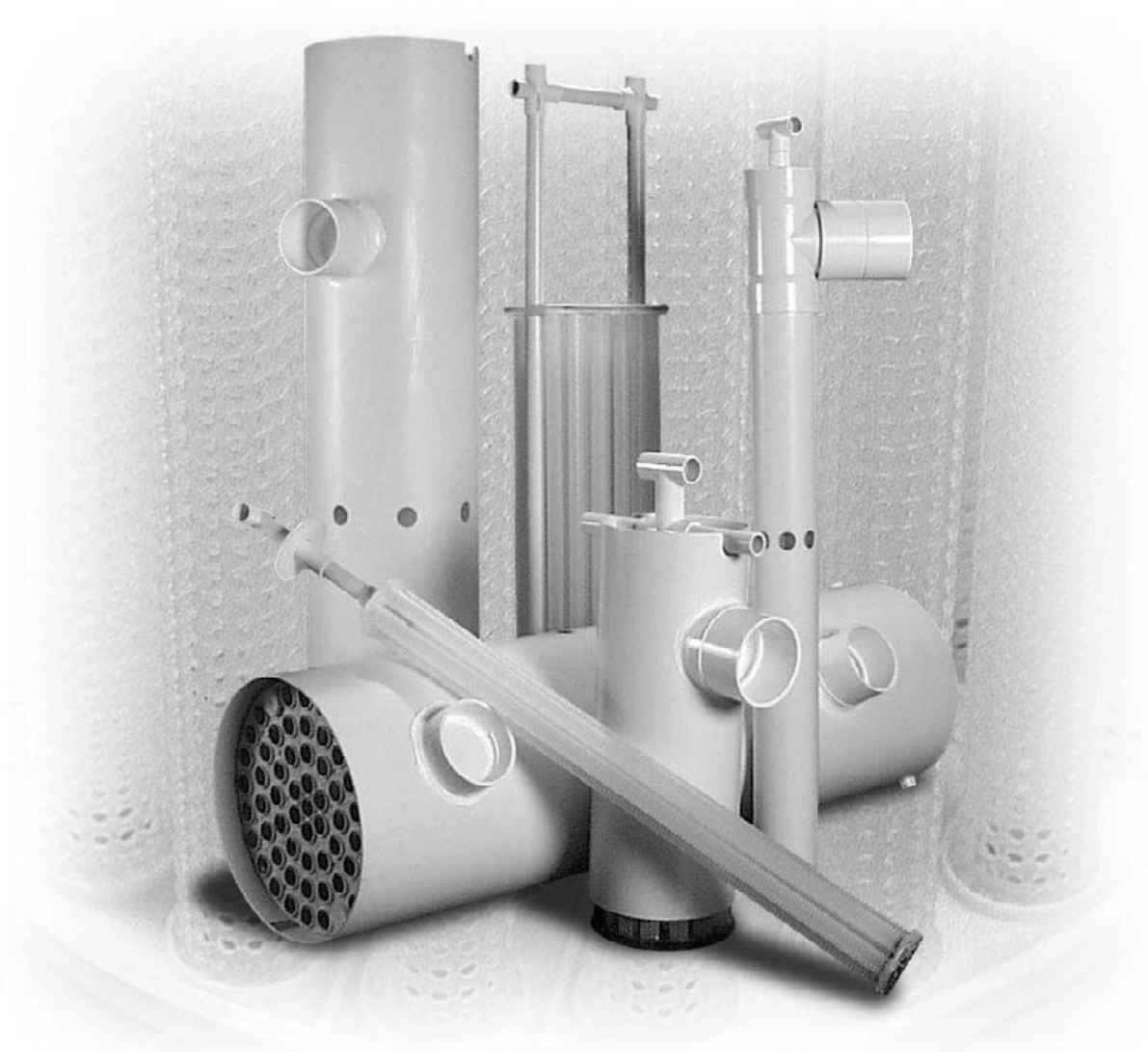
Effluent Filters

- Install in minutes inside new or existing tanks
- Remove about 2/3 of suspended solids, extending drainfield life
- Corrosion-proof construction ensures long life
- Easy to clean by simply hosing off whenever the tank needs pumping
- Alarm available to signal the need for cleaning
- Flow-modulating discharge orifices available to limit flow rate leaving tank
- Commercial sizes available

Oreco's Biotube® effluent filters prevent the discharge of large solids from the tank, dramatically improving the quality of effluent and extending drainfield life.

Effluent from the relatively clear zone of the septic tank, between the scum and sludge layers, enters the Biotube effluent filter through its vertical inlet holes. Larger particles are retained in the interior space, where further decomposition of organic materials occurs. Optional flow modulating orifices at the outlet of the filter slow the flow through the tank, allowing maximum settling of solids.

Effluent filters are not all alike. Ours have 5-10 times more flow area than others, so they don't need to be cleaned as often, and that reduces maintenance time and cost.



Sample Effluent Filter Packages

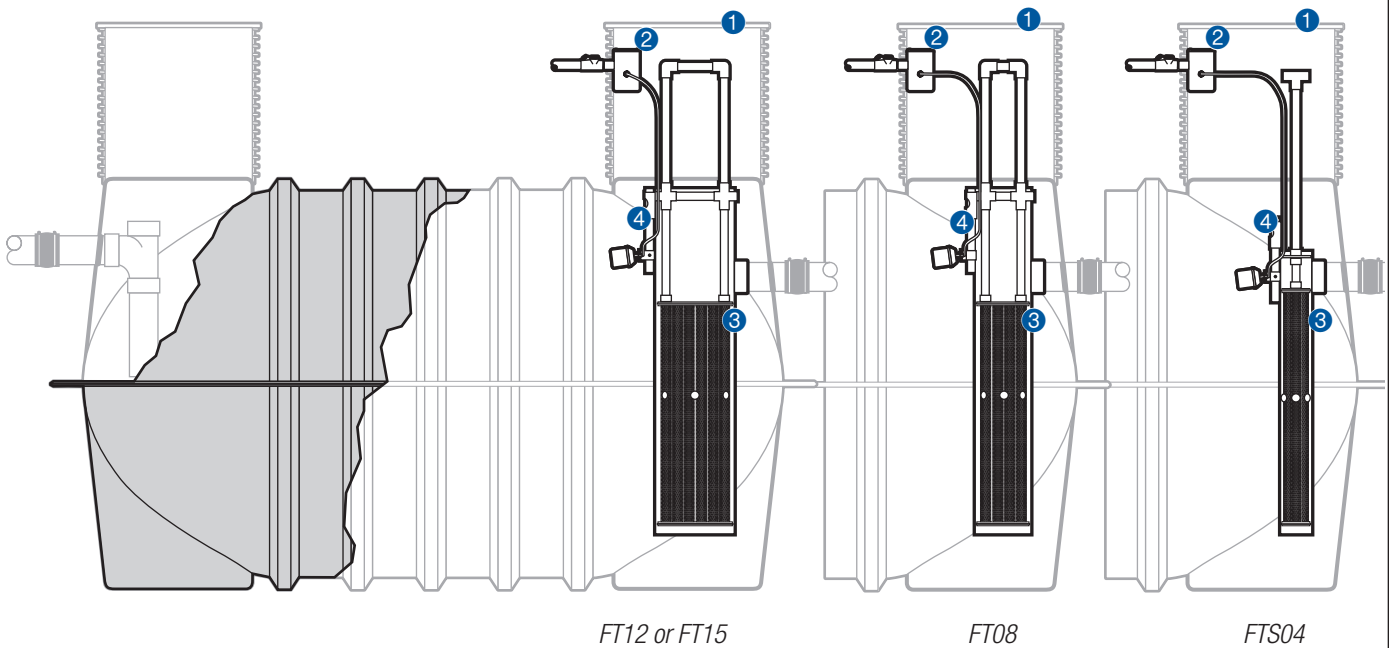
Effluent Filter Packages

Following are sample effluent filter packages. The first column below shows a standard residential effluent filter package and its components. The other two columns give small and large commercial variations. For larger flow rates, use multiple filters.

Note: Bold items in the Commercial columns indicate a variation from the Residential component.

Component	Residential	Commercial (small)	Commercial (large)
1 Riser, lid, and accessories	RR2418+S	RR2418+S	RR2418+S
2 Splice box	FL24-4B	FL24-4B	FL24-4B
3 Effluent Filter	PRTA24	PRTA24	PRTA24
4 Float switch assembly	PRTA24BDKIT	PRTA24BDKIT	PRTA24BDKIT
5 Alarm panel	ADH100	ADH100	ADH100
	SB1	SB1	SB1
	FTS0444-36MA	FT0854-36A	FT1554-36A
	MF1A-Y-09UT	MF1A-Y-12FT	MF1A-Y-12FT
	AMAHW	AMAHW	AMAHW
	For other alarm panels, see Alarm Panels on page 45.		

COMPONENT LOCATION



FT Series Residential Biotube® Effluent Filters

Covered by U.S. Patents #4,439,323 and 5,492,635

FT-Series Biotube effluent filters are used in new or existing tanks, for both residential and commercial applications. Each filter comes with a Biotube filter cartridge (in 4-, 8-, 12- and 15-in. diameters), PVC housing, and extendable PVC handle. A shortened version of our standard 8- and 12-in. diameter filters, called a “base inlet filter,” is available for low-profile tanks. Optional alarm to signal a tank high-level condition, which may indicate a need to clean the filter. Optional **slide rail** system, available on larger filters, simplifies installation and provides tank access for servicing. Slide rails are required when there is only one access to the tank.

NOMENCLATURE

4-in. FT Series



- Options:
- Blank = no options
- M = flow modulation plate installed
- A = float bracket attached
- Cartridge height: 28" and 36" are standard
- Housing height: 36" and 44" are standard
- Filter diameter (inches)
- W = fits Type 3034 outlet pipe
- S = fits Schedule 40 outlet pipe
- Blank = 1/8" filtration
- P = 1/16" filtration
- Biotube effluent filter series

HOW TO SELECT

- Step 1:** Select the correct effluent filter size by matching your system’s design flow, in gallons per day, with the appropriate column in *Figure 4, Sizing Biotube Effluent Filters*, on page 39.
- Step 2:** Determine the outlet pipe type and diameter. Schedule 40 (OD = 4.5 in.) and Type 3034 (OD = 4.215 in.) are available.
- Step 3:** Determine filtration required by local regulations (1/8-in. or 1/16-in.) and whether flow modulation plate and float bracket (for optional alarm) are needed.

Note: Required tank access opening for slide rails is 22 in.



FT-Series Biotube effluent filter

Biotube filter Slide rail

TABLE 25. FT SERIES SPECIFICATIONS

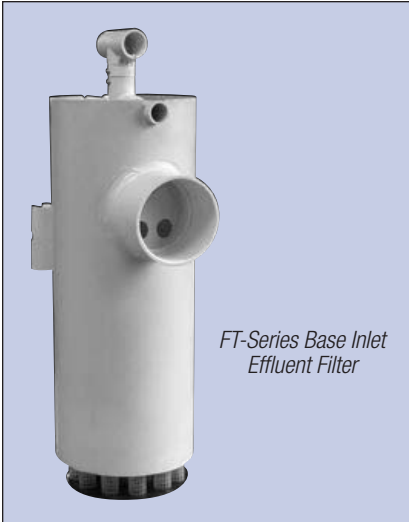
Effluent filter description	Filter area ^a	Flow area ^b
4-in. FT Series Biotube effluent filter, 28-in. cartridge height	3.9 ft ²	1.2 ft ²
4-in. FT Series Biotube effluent filter, 36-in. cartridge height	5.1 ft ²	1.5 ft ²
8-in. FT Series Biotube effluent filter, 36-in. cartridge height	14.6 ft ²	4.4 ft ²
12-in. FT Series Biotube effluent filter, 36-in. cartridge height	30.0 ft ²	9.0 ft ²
15-in. FT Series Biotube effluent filter, 36-in. cartridge height	50.5 ft ²	15.2 ft ²

a. Filter area is defined as the total surface area of all the individual Biotubes within the filter cartridge.
 b. Flow area is defined as the total open area (area of the “holes”) of all the individual Biotubes within the filter cartridge.

TABLE 26. FT SERIES AND OPTIONAL COMPONENT EXAMPLES

Model code	Description
FTS0444-36MA	Biotube effluent filter, Schedule 40 outlet, 4-in. diameter, 44-in. housing height, 36-in. tall cartridge with flow modulating plate
FT1254-36A	Biotube effluent filter, 12-in. diameter, 54-in. housing height, 36-in. cartridge height, with float bracket
FT1566-36AR	Biotube effluent filter, 15-in. diameter, 66-in. housing height, 36-in. cartridge height, with float bracket and slide rail

Residential Biotube® Effluent Filters (FT)



FT-Series Base Inlet Effluent Filter

FT Series Base Inlet Model

NOMENCLATURE

FT **22-14 B**

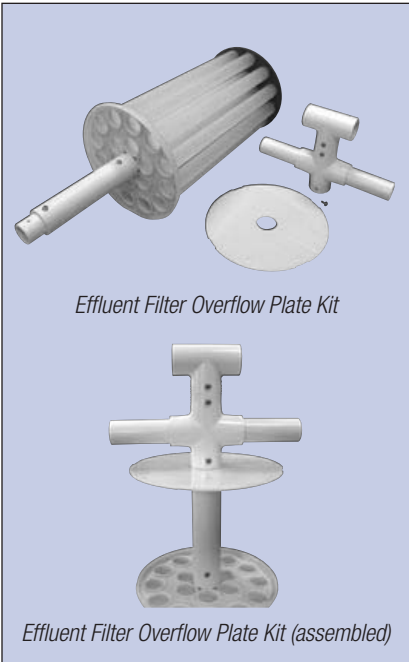
- Options:
 - A = float bracket
 - FSO = overflow plate
- Base inlet model
- Cartridge height: 14" standard
- Housing height: 22" standard
- Filter diameter (inches)
 - 08 = 8"
- Blank = 1/8" filtration
- P = 1/16" filtration
- Biotube effluent filter series



Float Elbow (shown with float)

Float Elbow

Allows a float to be attached to the base inlet filter to activate a high-level alarm. Can be used instead of the float bracket on new filters, or can be retrofitted in the field to existing filters. To specify, see *Table 19, Float Switch Assembly Examples*, on page 28.



Effluent Filter Overflow Plate Kit

Effluent Filter Overflow Plate Kit (assembled)

Effluent Filter Overflow Plate Kit

For 8-in. base inlet filters. Prevents effluent from bypassing filter if filter becomes clogged. Kit consists of an overflow plate and a coupling with a 1-in. diameter sleeve glued into it.

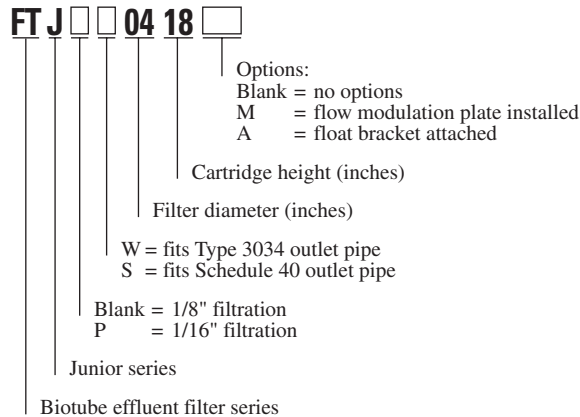
Residential Biotube® Junior Effluent Filters (FTJ)

Biotube® Junior Effluent Filters (FTJ)

Orengo Biotube Jr. effluent filters are ideal for smaller flows or where septic tank height limitations prevent the use of our full-size filter. Each filter comes complete with Biotube filter cartridge, PVC housing, and extendable PVC handle.

Covered by U.S. Patents #4,439,323 and 5,492,635

NOMENCLATURE



HOW TO SELECT

Step 1: Determine the tank's outlet type, either Schedule 40 or Type 3034.

Effluent Filter Inserts (FTi)

Biotube® Effluent Filter Inserts (FTi)

Biotube filter inserts are used in an existing septic tank outlet tee. Recommended for retrofit applications. For new applications, use FT Series filters.

Covered by U.S. Patents #4,439,323 and 5,492,635

NOMENCLATURE

FTi Series (residential)

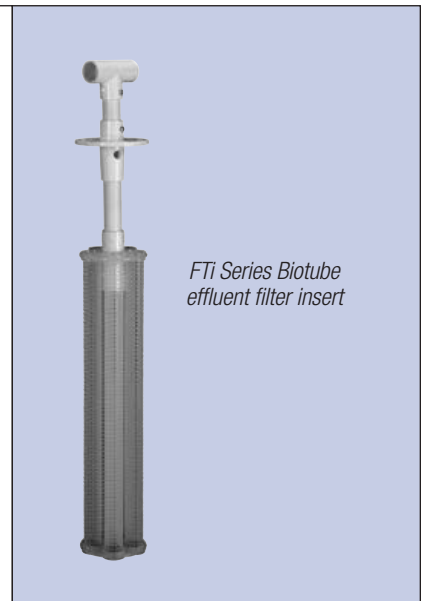
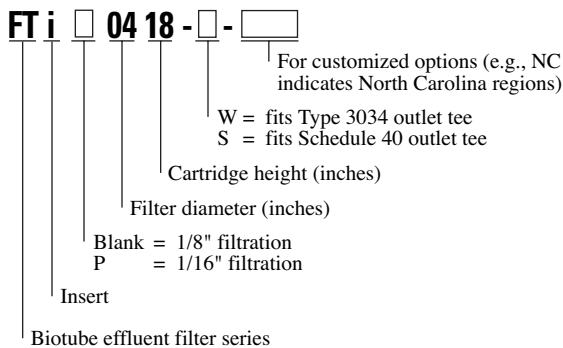


TABLE 27. FTJ SERIES AND FTi SERIES EXAMPLES

Model code	Description
FTJS0418M	Biotube Jr. effluent filter, Schedule 40 outlet, 4-in. diameter, 18-in. tall cartridge with flow modulating plate
FTI0418-S	Biotube effluent filter insert, 4-in. diameter, 18-in. height, fits Schedule 40 housing

TABLE 28. FTJ SERIES AND FTi SERIES SPECIFICATIONS

Effluent filter description	Filter area	Flow area ^a
4-in. diameter FTJ Series Biotube effluent filter, 18-in. cartridge height	2.44 ft ²	0.73 ft ²
4-in. diameter FTi Series Biotube effluent filter insert	2.15 ft ²	0.64 ft ²

a. Smaller filters have up to 50% less flow area than the standard 4-in. residential filters and may require more frequent cleaning. See Figure 4, *Sizing Biotube Effluent Filters*, on page 39 for more information.

Commercial Biotube Effluent Filters (FT)



15-inch and 8-inch FT-Series Biotube effluent filter



Biotube filter Slide rail

FT Series Commercial Biotube® Effluent Filters

Commercial FT-Series Biotube effluent filters are used in new or existing tanks. Each filter comes with a Biotube filter cartridge (in 8-, 12- and 15-in. diameters), PVC housing, and extendable PVC handle. A shortened version of our standard 8- and 12-in. diameter filters, called a "base inlet filter," is available for low-profile tanks; see page 36. Optional alarm to signal a tank high-level condition, which may indicate a need to clean the filter. Optional slide rail system, available on larger filters, simplifies installation and provides tank access for servicing. Slide rails are required when there is only one access to the tank. See page 35 for 4-in. Biotube filters for residential systems.

Covered by U.S. Patents #4,439,323 and 5,492,635

NOMENCLATURE

FT - 36

Options:

- Blank = standard series
- A = float bracket*
- B = base inlet series
- R = slide rail series (12" and 15" only)**

Cartridge height, 36" standard

Housing height (inches):

- 22 = base inlet model
- 48 = when minimum liquid level is 37" - 46" (8" dia. only)***
- 54 = when minimum liquid level is 46" - 63"***
- 60 = when minimum liquid level is 64" - 84"***
- 66 = when minimum liquid level is 85" - 112"***

Filter diameter:

- 08 = 8"
- 12 = 12"
- 15 = 15"

- Blank = 1/8" filtration
- P = 1/16" filtration

Biotube effluent filter series

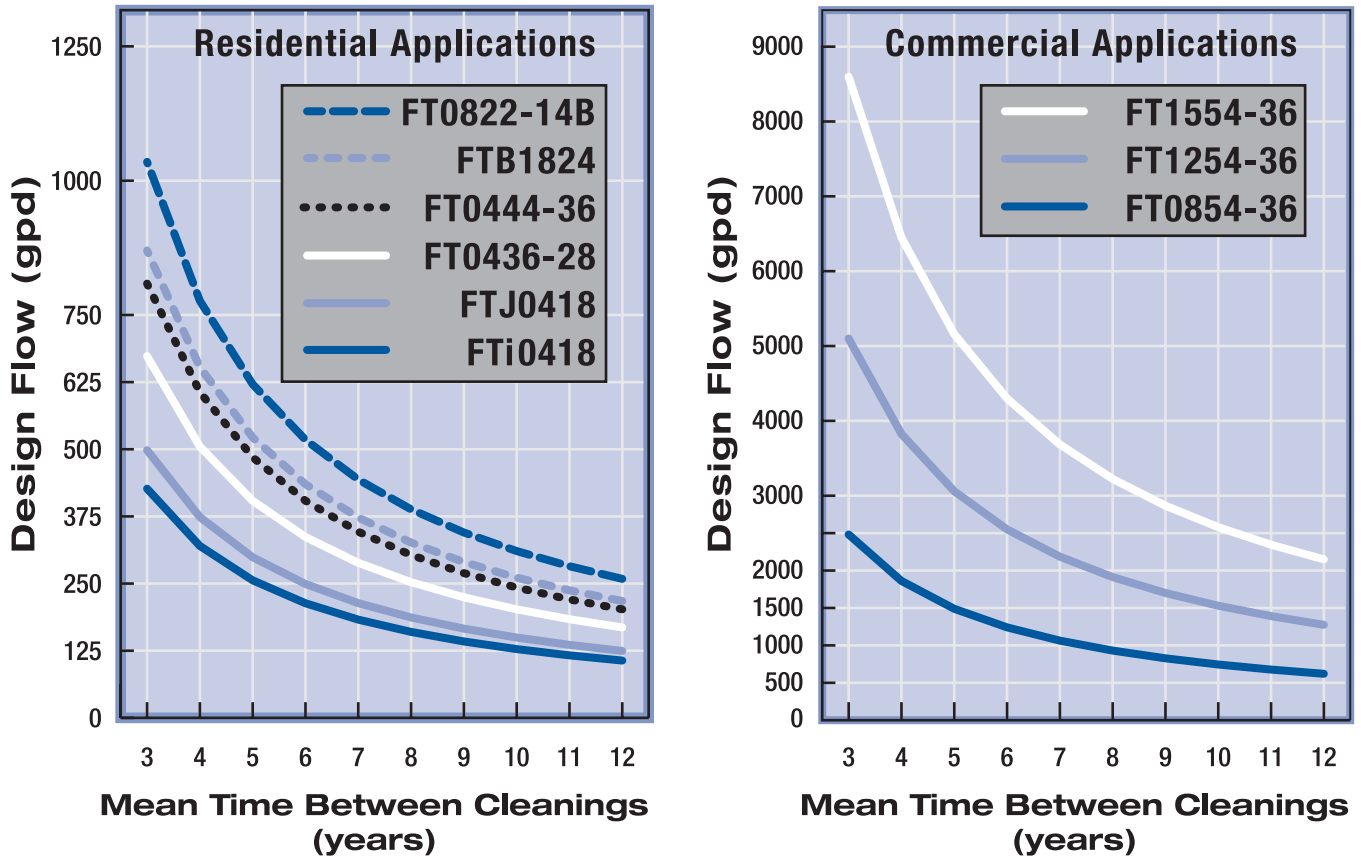
* Indicates bracket epoxied to housing. Add-on alarm also available (see page 36)

** Use the slide rail when only one access is available for the filter chamber

*** Minimum liquid level is measured from the invert of the outlet to the tank floor

FIGURE 4. SIZING BIOTUBE EFFLUENT FILTERS

These charts show the relationship between Biotube filter size (diameter), design flow, and mean time between cleanings. The larger the filter and the smaller the flow, the longer you can go between cleanings. For example, a typical three-year cleaning frequency would require an 8-in. filter for up to 2,500 gpd, a 12-in. filter for up to 5,000 gpd, and a 15-in. filter for up to 8,500 gpd. Assumes a properly sized watertight tank and residential strength waste. See Orenco document *NDA-FT-FT-1* for more information.



External Effluent Filter Basins (FTB)



External effluent filter basin

Orenco's 18-in. external effluent filter basin, featuring patented Biotube® filter technology, is an ideal way to improve performance of existing residential septic systems by reducing solids discharged to the drainfield. External filter basins eliminate the need to make costly and sometimes hazardous modifications to existing septic tanks with restrictive access openings or to unusable outlet baffles or tees. Composed of an 18-in. diameter section of ribbed PVC pipe with a fiberglass base and 8-in. diameter Biotube® effluent filter. A grade ring insert (supplied) and a fiberglass lid are required to bring the unit up to finished grade.

NOMENCLATURE

FTB 18 24 -08 12

- Filter cartridge height: 12" standard
- Filter diameter: 8" standard
- Basin height: 24" standard
- Basin diameter: 18" standard
- Biotube effluent filter basin

TABLE 29. EXTERNAL EFFLUENT FILTER BASIN SPECIFICATIONS

External effluent filter basin description	Filter area	Flow area
18-in. diameter FTB, with 8-in. diameter and 12-in. tall Biotube filter cartridge	4.9 ft ²	1.5 ft ²

Orenco offers multiple lines of controls covering a wide range of applications:

- Alarm panels
- Standard (electromechanical) panels
- MVP (digital programmable) panels
- VCOM remote telemetry panels with VeriComm® Web-based monitoring
- TCOM remote telemetry panels with real-time connectivity
- Custom panels

All Orenco panels include:

- Touch-safe controls
- Three-year warranty
- UL-type 4X rating for wet locations (NEMA4X)
- UL, UL-C listing

Orenco Systems® specializes in designing and manufacturing control and monitoring systems for the water handling and wastewater industries. Our experts know what issues are important to designers, engineers, and system operators. From simple alarms, to tried and true standard (electromechanical) panels, to MVP (digital programmable) panels, to Web-based remote telemetry control systems, to custom-built real-time networked remote telemetry control systems, Orenco offers the best value for your dollar.

We use the finest, precision-engineered components available, and we back our panels up with ongoing research, years of applied experience, and a three-year warranty. Available with UL 508 and 698A listing for industrial control panels in the US and Canada. 50 Hz panels available. CE marking available for European markets.

These panels have been designed for use in the onsite industry, but they can also be used in many other applications. Our standard control panels, customized panels, remote telemetry panels, and Web-based monitoring system are unsurpassed in the control system industry.



Control Panel Selection Guide



Orenco control panel

Use *Table 30, Control Panel Feature and Option Matrix* to help determine the best panel for your application. If you don't see what you need, fill out a *Custom Panel Quote Request*, available in this catalog on page 54 or online at www.orenco.com.

HOW TO SELECT

- Step 1:** Determine how many pumps are required for your application.
- Step 2:** Determine which additional features are required for your application.
- Step 3:** Determine which panel or panels best match your desired features.
- Step 4:** If several panels are a match, choose between the desired panel series:

Standard alarm panels (A): Electromechanical controls; low-cost item; limited applicability and functionality; shorter float life.

Standard control panels (S, DAX, SSF): Electromechanical controls; wide applicability; moderate level of functionality.

MVP control panels (MVP-S, MVP-SSF, MVP-DAX): Digital programmable controller; wide applicability; high level of functionality.

VCOM control panels (VCOM-S, VCOM-DAX): Telemetry-enabled for remote control, as well as alarm management; must be paired with VCOM Web-based monitoring system; highest level of functionality.

TABLE 30. CONTROL PANEL FEATURE AND OPTION MATRIX

Control panel function	A	S	MVP-S	VCOM-SRO	VCOM-SPTRO	SSF	MVP-SSF	DAX	MVP-DAX	VCOM-DAXRO	VCOM-DAXPTRO
Features											
Number of pumps control panel can support	1	1	1	1	1	2	2	2 alt.	2 alt.	2 alt.	2 alt.
Number of floats supported by standard panel	≤ 2	≤ 3	≤ 4	3	3	≤ 6	≤ 7	≤ 4	≤ 5	4	4
Number of floats supported with all options	≤ 3	≤ 4	≤ 4	3	3	≤ 8	≤ 8	≤ 5	≤ 5	4	4
Digital indicator of float status	--	--	✓	✓	✓	--	✓	--	✓	✓	✓
Septic tank cutoff during high level condition	--	--	--	--	--	✓	✓	--	--	--	--
Signal-rated pump float	--	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Single float type, for all functions	--	--	✓	✓	✓	--	✓	--	✓	✓	✓
Ability to use separate on/off floats	--	✓	✓	✓	--	✓	✓	✓	✓	✓	--
Additional features											
Intrinsically safe relay IR	--	+	+	+	+	+	+	+	+	+	+
Programmable timed dosing PT	--	+	✓	--	✓	+	✓	+	✓	--	✓
Redundant off (septic tank) RO	+	+	✓	✓	✓	+	✓	+	✓	✓	✓
Redundant off (sand filter) RO	--	--	--	--	--	+	+	--	--	--	--
Current sensor CS	--	+	+	--	--	+	+	+	+	--	✓
Disconnect switch DS	+	+	+	+	+	+	+	+	+	+	+
Remote alarm (dry contact) RA	+	+	+	+	+	+	+	+	+	+	+
Test switch TS	+	+	+	+	+	+	+	+	+	+	+
Heater HT	+	+	+	+	+	+	+	+	+	+	+
Elapsed time meter ETM	+	+	✓	✓	✓	+	✓	+	✓	✓	✓
Counter CT	+	+	✓	✓	✓	+	✓	+	✓	✓	✓
Pump run light PRL	+	+	+	+	+	+	+	+	+	+	+
Power light PL	+	+	+	+	+	+	+	+	+	+	+
Surge arrester SA	+	+	+	+	+	+	+	+	+	+	+
Phone line surge arrester PSA	--	--	--	✓	✓	--	--	--	--	✓	✓

- ✓ Standard.
- ✓ Built into logic unit.
- ✓ Built into telemetry unit; viewable via Internet and direct connection.

- + Optional.
- Not available.

TABLE 31. CONTROL PANEL FEATURE/BENEFIT DESCRIPTIONS

Option	Benefit
IR (intrinsically safe relay)	The intrinsically safe relay option is required for systems with tanks in applications classified as hazardous locations (Class I, Division 1) (UL 698A). Intrinsically safe control panels are designed so that the energy delivered to the floats is insufficient to cause an ignition of a flammable gas in the tanks. One intrinsically safe relay is required for every two floats. The panel nomenclature indicates how many relays are included with the panel. For example, DAX1IR2PTRO would indicate two relays for use with up to four floats.
PT (programmable timer)	The programmable timer allows the system to be timed-dosed. Timed dosing provides superior wastewater treatment by delivering the effluent in discrete doses at regular intervals and can reduce the chances of saturated soil conditions due to hydraulic overloading. A properly set timer is matched to the design flow of the system and allows for early detection of system abuses, before major damage occurs. Recommended for all treatment systems.
RO (redundant off float)	The redundant off option uses a signal float to prevent pumps from operating when there is not enough liquid in the tank. This helps to prevent damage to pumps by activating an alarm during abnormally low level conditions. The redundant off option also detects leaky tanks or systems that are siphoning. In addition, the redundant off float acts as a backup in case another float gets stuck. Recommended for all pumping systems.
CS (current sensor)	Current sensors monitor pump operation and are used to detect a pump failure in systems where a pump failure will not necessarily lead to a high-water alarm condition. With a current sensor, an alarm will be activated if the pump is called to run, but pump current is not detected. Current sensors are highly recommended in systems in which it may be difficult to detect a pump failure, such as a duplex alternating system. Recommended for commercial systems.
DS (disconnect switch)	The disconnect switch option allows for a single shut-off point for all power entering a panel. This switch is an easy means to disconnect power when maintenance needs to be done or when there is an emergency.
RA (remote alarm)	The remote alarm option provides a dry contact closure in the panel for connection of external devices that might use voltages up to 240 VAC. (All Orenco control panels include a 120 VAC output to activate remote alarms.) The remote alarm option is especially useful for phone dialers and is recommended when voltage needs are unknown.
TS (test switch)	The test switch option provides a single switch that can be used to confirm the operation of the alarm light and audible alarm.
HT (heater)	The heater option keeps the panel warm in cold weather and reduces panel condensation. The heater automatically adjusts its output wattage with varying temperature. Recommended for all MVP, PLC, and telemetry control panels.
ETM (elapsed time meter)	The elapsed time meter option provides an electromechanical totalizing meter that records the total time that a pump has been called on to run by the controls. The run time can be used to calculate flow through a system. (An elapsed time meter function is built into MVP and telemetry panels as a standard.) Recommended for all pumping systems.
CT (counter)	The counter option provides an electromechanical totalizing meter that records the total number of cycles that a pump has been called on to run by the controls. When combined with the ETM option, variances in the counter activity can reveal problems with pumps or floats. (A counter function is built into MVP and telemetry panels as a standard.)
PRL (pump run light)	The pump run light option provides a green light on the front of the panel enclosure that will illuminate when the pump is called to run by the controls.
PL (power light)	The power light option provides a green light on the front of the panel enclosure that will illuminate when the control panel has power.
SA (surge arrestor)	The surge arrestor option reduces system performance problems caused by power irregularities, such as surges and spikes. Recommended for MVP, PLC and telemetry control panels.

Digital Counters



*AMDDC
digital dose counter*



*AMSSI
Siphon Sitter I*



*AMSSII
Siphon Sitter II*

Digital counters are typically used with a float switch for monitoring and recording discharges from septic tanks with gravity discharge and siphons. Helps keep an accurate record of the number of discharges in systems without a pump.

AMDDC Digital Dose Counter

The AMDDC digital dose counter is an event monitor that records the number of times the siphon discharges. Suitable for use with any dry contact signal. Raintight enclosure with viewing window. Battery-powered. (Long-life lithium battery included.) Order float switch separately.

AMSSI Siphon Sitter I

Siphon Sitter I is an AMDDC plus a float. It records the number of times the siphon discharges. Uses a digital dose counter with signal float switch attached to siphon. Battery-powered. (Long-life lithium battery included.)

AMSSII Siphon Sitter II

Siphon Sitter II is an in-drainfield monitor that records the number of times the drainfield is dosed. Uses a digital dose counter with signal float in baffled canister. Battery-powered. (Long-life lithium battery included.) One required for each siphon in dual, alternating siphon systems.

Alarm panels are typically used with a single float in the tank as a high level alarm. This application is commonly found in systems without a pump. Alarm panels can also be used as remote alarms for control panels. All alarm panels feature an audible and visual alarm. Available options include indoor or outdoor rating, automatic or manual reset mode, and low voltage or 115-V operation.

HOW TO SELECT

Step 1: Refer to *Table 36, Alarm Panel Feature Matrix*, to determine which features are required, and match them up to the alarm panel type that will support them.

AMAHW Liquid Level Alarms

AMAHW alarm panels are used with mechanical or mercury float switches and feature a red light and audible alarm. Automatic reset of alarms. Suitable for use as a stand-alone unit or as a remote alarm; raintight enclosure allows both outdoor and indoor installation. UL listed. Order signal float switch separately.

AMLAHW Liquid Level Alarms

AMLAHW alarm panels are used with mechanical or mercury float switches and feature a red light and audible alarm. Requires manual reset of alarms. Suitable for use as a stand-alone unit or as a remote alarm; raintight enclosure allows both outdoor and indoor installation. UL listed. Order signal float switch separately.

AMSGBA Single-Gang Box Alarms

AMSGBA alarms are used in single-gang boxes, as a remote alarm. Requires manual reset of alarms. For indoor use only.

AMSENTI, AMSENTII, and AMSENTII-W Liquid Level Alarms

AMSENTI Sentinel I alarm panels are low voltage (9V) with AC transformer that plugs into 115-V wall socket. AMSENTII Sentinel II alarm panels are low voltage (9V) battery powered (battery included). Red light and audible alarm (with test/silence/auto operation). AMSENTII-W alarm panels are watertight for outdoor use. All three models require manual reset of alarms. Thermoplastic enclosure for indoor installation only (on AMSENTI and AMSENTII models). Suitable for use with any dry contact signal. UL listed power supply. Order float switch separately.



AMAHW liquid level alarm



AMLAHW liquid level alarm



Single-gang box alarm



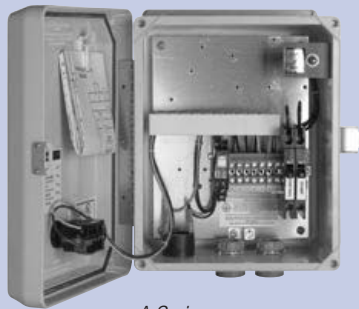
AMSENTI liquid level alarm

TABLE 32. ALARM PANEL FEATURE MATRIX

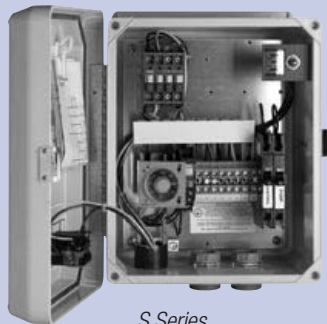
	AMAHW	AMLAHW	AMSGBA	AMSENTI	AMSENTII	AMSENTII-W
High voltage (110 V)	✓	✓	✓	--	--	--
Low voltage (9V) battery	--	--	--	--	✓	✓
Low voltage (9V) AC adapter	--	--	--	✓	--	--
Automatic reset of alarm	✓	--	--	--	--	--
Suitable for outdoor use	✓	✓	--	--	--	✓
Suitable as remote alarm	✓	✓	✓	--	--	--
Suitable as stand-alone alarm	✓	✓	--	✓	✓	✓

✓ Standard.
 -- Not available.

Standard Control Panels (A, S, DAX)



*A Series
Simplex Alarm Panel*



*S Series
Simplex Control Panel*



*DAX Series
Duplex Control Panel*

Orenco's A, S, and DAX series of standard electromechanical control panels are specifically designed for use with effluent pumping and onsite treatment systems, when pumping from point "A" to point "B."

NOMENCLATURE



Options (should appear in the following order):

- IR = intrinsically safe relay (S, DAX only)
- PT = programmable timer (S, DAX only)
- RO = redundant off
- CS = current sensor (S, DAX only)
- DS = disconnect switch
- RA = remote alarm (dry contact)
- TS = test switch
- HT = heater
- ETM = elapsed time meter
- CT = counter
- PRL = pump run light
- PL = power light
- SA = surge arrestor

Pump voltage:*

- 1 = 120 VAC
- 2 = 240 VAC

Panel series:

- A = simplex alarm panel
- S = simplex control panel
- DAX = duplex alternating control panel

* All panels require 120 VAC for the controls

A Series Simplex Alarm Panels (A)

Simplex alarm panels are a low-cost option for effluent sewer (STEP) systems and pump control into conventional gravity or pressurized drainfields where cost is the critical factor. The "A" panel is designed to control a low horsepower simplex pump and alarm system. Pump power switching is handled directly by the pump's ON/OFF float switch, which must be motor-rated. Options are limited (see nomenclature).

S Series Simplex Control Panels (S)

Simplex control panels can be used for pressure sewer (STEP) systems, onsite treatment systems, and pump control into conventional gravity or pressurized drainfields. "S" series pump control panels are a popular choice for a simplex pump and alarm system. These panels include a motor contactor, which increases system life by reducing the load requirements on the float switches. "S" Series panels also allow options such as a programmable timer or use of larger horsepower pumps.

DAX Series Duplex Control Panels (DAX)

Duplex control panels can be used in pressure sewer and onsite treatment systems that require the use of two alternating pumps. The pair of pumps can be wired for both "lead" and "lag" operation; a built-in alternating relay switches the "lead" and "lag" positions each pump cycle.

TABLE 33. STANDARD CONTROL PANEL EXAMPLES

Model code	Description
S1R0	Simplex control panel, 120 VAC pump, redundant off
S1PTROETMCT	Simplex control panel, 120 VAC pump, programmable timer, redundant off, elapsed time meter, and counter
DAX2PTROCS	Duplex alternating control panel, 240 VAC pumps, programmable timer, redundant off, and current sensor

Orengo's SSF series of standard electromechanical control panels include controls for two pumps: one in the septic tank (upstream), the second in the sand filter (downstream). Interlocked controls prevent the upstream pump from running if a high-level alarm condition occurs downstream. SSF controls are specifically designed for use with effluent pumping in sand filter treatment systems, when pumping from point "A" to point "B" (first pump) and then from point "B" to point "C" (second pump).

NOMENCLATURE

SSF /

Downstream options (should appear in the following order):

- IR = intrinsically safe relay
- PT = programmable timer
- RO = redundant off
- CS = current sensor
- ETM = elapsed time meter
- CT = counter
- PRL = pump run light

Upstream options (should appear in the following order):

- IR = intrinsically safe relay
- PT = programmable timer
- RO = redundant off
- CS = current sensor
- ETM = elapsed time meter
- CT = counter
- PRL = pump run light

General panel options (should appear in the following order):

- DS = disconnect switch
- RA = remote alarm (dry contact)
- TS = test switch
- HT = heater
- PL = power light
- SA = surge arrestor

Pump voltage:*

- 1 = 120 VAC
- 2 = 240 VAC

Sand filter control panel

* All panels require 120 VAC for the controls

SSF Series Sand Filter Control Panels (SSF)

Sand filter control panels can be used to control two pumps in a sand filter treatment system. These panels include motor contactors, which increase system life by reducing the load requirements on the float switches. SSF series panels also allow options such as a programmable timer and use of larger horsepower pumps, not to mention more flexibility in drawdowns.



SSF Series Sand Filter Control Panel

TABLE 34. STANDARD SAND FILTER CONTROL PANEL EXAMPLES

Model code	Description
SSF1PTRO/	Sand filter control panel, 120 VAC pumps; upstream programmable timer and redundant off
SSF1PTRO/RO	Sand filter control panel, 120 VAC pumps; upstream programmable timer and redundant off; downstream redundant off
SSF2HTPRTO/	Sand filter control panel, 240 VAC pumps, heater; upstream programmable timer and redundant off

MVP Control Panels (MVP-S, MVP-DAX)



MVP-S Series
Simplex Control Panel



MVP-DAX Series
Duplex Control Panel

Orenco's digital programmable MVP control panels are specifically designed for use with effluent pumping and onsite treatment systems, when pumping from point "A" to point "B." All MVP panels include an easy-to-use, programmable logic unit that incorporates many timing and logic functions, such as multiple timing intervals to adjust for changing flow conditions. MVP panels offer several functions as standard, including elapsed time meters, counters, digital indication of float switch status, different alarm/light signals for varying alarm conditions, and the ability to use one float switch type for all functions. The panels include motor contactors and accept all standard options.

NOMENCLATURE

MVP -

Options (should appear in the following order):

- IR = intrinsically safe relay
- PT = programmable timer
- RO = redundant off
- CS = current sensor
- DS = disconnect switch
- RA = remote alarm (dry contact)
- TS = test switch
- HT = heater
- PRL = pump run light
- PL = power light
- SA = surge arrestor

Pump voltage:*

- 1 = 120 VAC
- 2 = 240 VAC

S = Simplex series
DAX = Duplex series

MVP control panel

* All panels require 120 VAC for the controls

MVP-S Series Simplex Control Panels

MVP simplex control panels are especially suited for timed dosing in single pump systems.

MVP-DAX Series Duplex Control Panels

MVP duplex alternating control panels are ideal for controlling two-pump systems. These panels include an MVP programmable logic unit that provides equal run-time on each pump. The MVP unit also accepts signals for turning on both pumps for high demand situations.

TABLE 35. MVP CONTROL PANEL EXAMPLES

Model code	Description
MVP-S1RO	MVP simplex control panel, 120 VAC pump, redundant off
MVP-S1PTRO	MVP simplex control panel, 120 VAC pump, programmable timer, and redundant off
MVP-DAX2PTROHTSA	MVP duplex alternating control panel, 240 VAC pumps, programmable timer, redundant off, heater, and surge arrestor

MVP-SSF Series Sand Filter Control Panels

Orenco's MVP sand filter control panels can be used to control two pumps in a sand filter treatment system, when pumping from point "A" to point "B" (first pump) and then from point "B" to point "C" (second pump). Interlocked controls prevent the first (upstream) pump from running if a high level alarm condition occurs in the downstream pump.

MVP-SSF panels also include an easy-to-use, programmable logic unit that incorporates many timing and logic functions, such as multiple timing intervals to adjust for changing flow conditions. MVP-SSF panels offer several functions as standard, including elapsed time meters, counters, digital indication of float switch status, and the ability to use one float switch type for all functions.

NOMENCLATURE

MVP-SSF [] [] [] / []

- Downstream options (should appear in the following order):
 - IR = intrinsically safe relay
 - PT = programmable timer
 - RO = redundant off
 - CS = current sensor
 - PRL = pump run light
- Upstream options (should appear in the following order):
 - IR = intrinsically safe relay
 - PT = programmable timer
 - RO = redundant off
 - CS = current sensor
 - PRL = pump run light
- General panel options (should appear in the following order):
 - DS = disconnect switch
 - RA = remote alarm (dry contact)
 - TS = test switch
 - HT = heater
 - PL = power light
 - SA = surge arrestor
- Pump voltage:*
 - 1 = 120 VAC
 - 2 = 240 VAC
- SSF Series
- MVP control panel

* All panels require 120 VAC for the controls



MVP-SSF Series Sand Filter Control Panel

TABLE 36. MVP-SSF CONTROL PANEL EXAMPLES

Model code	Description
MVP-SSF1PTRO/	MVP sand filter control panel, 120 VAC pumps; upstream programmable timer and redundant off
MVP-SSF1PTRO/RO	MVP sand filter control panel, 120 VAC pumps; upstream programmable timer and redundant off; downstream redundant off
MVP-SSF2HTPTRO/	MVP sand filter control panel, 240 VAC pumps, heater; upstream programmable timer and redundant off

VeriComm® Telemetry Control Panels (VCOM)



VeriComm® Series
Simplex Remote Telemetry Control Panel



VeriComm® Series
Duplex Remote Telemetry Control Panel

VeriComm® control panels and the VeriComm Monitoring System are integral components of a complete remote monitoring system and cannot be ordered separately from each other.

Orenco's VeriComm® line of affordable telemetry control panels, coupled with the VeriComm web-based monitoring system, has been designed specifically for decentralized wastewater collection and treatment for residential systems. VeriComm gives wastewater system operators and service providers the ability to **remotely monitor and control** each individual site's performance, saving money on operation and maintenance while remaining virtually invisible to the homeowner.

In addition to including all the features of a standard panel for the same application, VeriComm panels include a number of very "smart" features:

- Communication and alarm management;
- Three operating modes ("start-up" and "test" modes, as well as a "normal" mode);
- Data collection and logs;
- Troubleshooting and diagnostic logic; and
- Advanced control logic to keep system operating normally in the event of float failures.

All VCOM panels have elapsed time meters and counters, which are built into the telemetry unit and are viewable via Internet and direct connection with a laptop or Pocket PC® device (Bluetooth® Kit required, see page 51). VCOM panels share existing phone lines, and include a DSL filter/surge arrestor for the phone line as a standard feature. They also have the ability to use one float switch type for all functions.

For more detailed information on these features, ask your local Distributor or Orenco representative for a VeriComm technical data sheet.

NOMENCLATURE

VCOM - RO

Options (should appear in the following order):

- IR = intrinsically safe relay
- DS = disconnect switch
- RA = remote alarm (dry contact)
- TS = test switch
- HT = heater
- PRL = pump run light
- PL = power light
- SA = surge arrestor

Redundant off

Blank = no timer

PT = programmable timer

Pump voltage:*

1 = 120 VAC

2 = 240 VAC

S = simplex

DAX = duplex

VeriComm® control panel

* All standard panels require 120 VAC for the controls

VCOM-S1RO, VCOM-S2RO

Telemetry panel for remote monitoring and control of on-demand simplex pumping operations in effluent sewer systems.

VCOM-S1PTRO, VCOM-S2PTRO

Telemetry panel for remote monitoring and control of timed dosing in simplex pumping operations. Applications include timed dosing of non-recirculating systems such as sand filters and drainfields.

VCOM-DAX1RO, VCOM-DAX2RO

Telemetry panel for remote monitoring and control of on-demand duplex alternating pumping operations. Applications include effluent sewer systems and lift stations.

VCOM-DAX1PTRO, VCOM-DAX2PTRO

Telemetry panel for remote monitoring and control of timed dosing in duplex alternating pumping operations. Applications include timed dosing of non-recirculating systems such as sand filters and drainfields. A current sensor is standard on all time-dosed duplex panels.



VCOM-S1RO
VeriComm® Remote Telemetry Control Panel

Bluetooth VCOM Kit (VCOM-BLUETOOTHKIT)

Bluetooth is a standard developed by electronics manufacturers that allows any sort of electronic equipment to make its own connection without wires, cables or any direct connection. The Bluetooth kits are used to give Pocket PC devices access to VeriComm panels. With a Bluetooth-equipped Pocket PC device, you can adjust settings, see data logs, and turn outputs on and off as far as 30 ft (9 m) away from the panel. Also works with Macintosh® or Windows® laptops, using standard terminal software.



Bluetooth VCOM Kit

VeriComm® Monitoring System

- Automatically notifies operators of alarms;
- Self-adjusts based on trend data;
- Allows operators to change settings remotely;
- Generates data logs and reports;
- Detects high/low liquid levels, stuck float switches, pump failures, excessive cycles/run times, clogged filters, and many other conditions.

VeriComm® control panels and the VeriComm Monitoring System are integral components of a complete remote monitoring system and cannot be ordered separately from each other.

VeriComm® is the world's first affordable, Web-based monitoring system for small-scale wastewater collection and treatment. It provides 24/7 monitoring of all your systems, automatic communication of alarms, an escalating alarm response process, and a secure, password-protected Web site. User-friendly pages show just what is happening at all your systems...what condition is triggering an alarm or alert, what you should do about it, and whom you can call. The robust database behind the Web pages gives you all the operating parameters of your system at the moment of the alarm, alert, or regularly scheduled update. And it provides you with the system's complete "alarm history," for troubleshooting and record-keeping purposes.

For more detailed information, go to www.vericomm.net and click on the [Online Demo](#) icon on the login page. (No password is necessary to view the demo.)

FIGURE 5. THE CALL ANALYSIS PAGE

The screenshot shows a web browser window titled "Call Analysis" with the URL <http://www.vericomm.net/secure/callAnalysis.cfm>. The page header includes the VeriComm logo and navigation links: Alarm Management, System Management, Help, and Log Off. The main content area is titled "Call Analysis" and is for "Faulkner County RTUD10028".

Site Information:
 Site Address: 301 Ball Rd., Umpire, AR 71971
 Site Number: RTUD10028
 Panel Type: AXB1

Fault Condition:
High Recirculating Override Cycles
 The recirculating system is reporting excessive override cycles.

Recommended Action(s):
 1. Check for excessive inflow.
 2. Verify float position (e.g., Override Timer Float may be positioned incorrectly).
 3. Check the operation of the splitter valve.

Date Information:
 Reported: April 14, 2006 1:00 AM (CT)

Alarm Status:
 New Alarm
 Notification Stopped
 Clear this call. (A note is required.)

Note:
 No alarm notes have been assigned to this call.
 Note:

Operator, Date, Options

Orenco Systems®, Inc.
 Copyright © 2002 by Orenco Systems, Inc. All rights reserved worldwide.

The Call Analysis page is the heart of the VeriComm® web site. This page describes the fault condition for the reported alarm in plain English and makes recommendations for action.

Orenco's manufacturing facilities can produce UL-listed telemetry and custom control panels ranging from variations of our standard models to highly customized designs to meet your specifications. 50 Hz panels and CE marking are available for European markets.

All our standard options listed in *Table 31, Control Panel Feature/Benefit Descriptions*, are available in custom panels. In addition, custom variations of standard panels include the addition of larger horsepower pumps, three-phase power, seal failure and over-temperature sensors, over- and under-current sensors, remote alarm indicators, extra alarm lights or alarm circuits, phone dialers, and heaters. We also install customer-supplied parts.

Orenco's most notable lines of custom control panels include the following:

Digital Programmable Logic Controllers

Custom MVP Panels

In addition to including many of the same features as the standard MVP (such as digital timing and indication of float status), custom MVP panels can also include additional components/features. And they can be specifically programmed for your unique application. Custom MVP panels become especially cost effective — relative to the cost of electromechanical panels — as the complexity of the panel increases.

PLC Panels

For large systems, when the requirements of a system are greater than an MVP panel can handle, a custom PLC panel is a good option. PLCs have virtually unlimited memory and a larger number of inputs and outputs available to panel designers. In addition to including many of the same features as standard MVPs (such as digital timing and indication of input and output status), PLC panels also have multiple options for operator interfaces, from two-line text displays to color touch-screen graphical displays. PLCs support many communication protocols and can be interfaced with a variety of systems.

Telemetry Panels

Orenco TeleComm™ (TCOM) panels are cost-effective, integrated telemetry panels that include digital control, data logging, and remote access and control in real time. They are ideal for stand-alone monitoring and control systems. Alarm notifications are sent to numeric pagers. Panels can be accessed directly at the site with our Bluetooth Kit, a null-modem cable, and a laptop, or remotely using a computer with a modem. TCOM panels require a dedicated phone line. TCOM panels share some of the control features of our standard VCOM panels, but the monitoring interface is not Web-based. HyperTerminal™ or a similar VT100 terminal emulator (commonly bundled with most computer operating systems) is all you will need to communicate with TCOM panels; no special computer software is required.

HOW TO REQUEST A QUOTE

The *Custom Panel Quote Request* form is available on our Web site at www.orenco.com. To access the form, click on "Monitoring & Control Devices" on the left side of the page and click the "Custom Control Panels" link to this link's immediate right. On the "Custom Control Panels" page, click the "Custom Quoter" link.

If Internet access is not available, photocopy the *Custom Panel Quote Request* on page 54 and complete the information on the form. When you are finished, fax this form and any other information or specifications to Orenco at 541-459-6781, **Attn: Electrical Engineering Department**. If you are uncertain about what to enter on the form, please provide specifications or a description of the panel operation, and we will assist you in determining the proper controls needed. Please note that all our standard options listed in *Table 31, Control Panel Feature/Benefit Descriptions*, are available in custom panels as well.



Custom control panel



Telemetry control panel

Custom Panel Quote Request

Note: See also Online Quote Request instructions on page 53.

Customer	Engineer
Company: Your name: Phone: Fax: Address: Email:	Engineer's company: Engineer's name: Engineer's phone: Engineer's fax: Engineer's address: Engineer's email:

Project	
Project name: City: State: Specs available? Date needed:	Primary contact: Preferred contact method: <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> E-mail

Electrical Service			
Voltage:	Phase:	Frequency:	Is 120 VAC, single-phase, 60 Hz available for control panel? <input type="checkbox"/> Yes <input type="checkbox"/> No

Pump				
Voltage:	Phase:	Frequency:	Hp:	FLA:
Make and model: <input type="checkbox"/> Over-temperature sensor	<input type="checkbox"/> Seal fail Type:	<input type="checkbox"/> Capacitor pack Dimensions:		

Panel Operation																		
Panel base model:	Number of pumps:	Float functions:	Number of floats:															
Alternating Operation <input type="checkbox"/> Alternating (duplex) (two pumps) <input type="checkbox"/> Other: <input type="checkbox"/> Alternating (triplex) (three pumps) <input type="checkbox"/> Alternating (quadruplex) (four pumps) <input type="checkbox"/> Nonalternating (all pumps run together) <input type="checkbox"/> Nonalternating (pumps run independently)		Timer settings (if applicable): <table border="0"> <tr> <td></td> <td style="text-align: center;"><i>Tank #1</i></td> <td style="text-align: center;"><i>Tank #2</i></td> </tr> <tr> <td>Cycle off:</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Cycle on:</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Override off:</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>Override on:</td> <td>_____</td> <td>_____</td> </tr> </table>			<i>Tank #1</i>	<i>Tank #2</i>	Cycle off:	_____	_____	Cycle on:	_____	_____	Override off:	_____	_____	Override on:	_____	_____
	<i>Tank #1</i>	<i>Tank #2</i>																
Cycle off:	_____	_____																
Cycle on:	_____	_____																
Override off:	_____	_____																
Override on:	_____	_____																

Panel Options	
Microprocessor-based control <input type="checkbox"/> MVP (programmable logic module) <input type="checkbox"/> PLC (programmable logic controller) <input type="checkbox"/> TCOM (custom telemetry)	Main disconnect <input type="checkbox"/> Internal <input type="checkbox"/> Handle on enclosure front
Elapsed time meter <input type="checkbox"/> Include in logic unit if capacity available <input type="checkbox"/> External component required	Cycle counter <input type="checkbox"/> Include in logic unit if capacity available <input type="checkbox"/> External component required
Flashing alarm light <input type="checkbox"/> Small (2 in. diameter) <input type="checkbox"/> Large (4 in. diameter) <input type="checkbox"/> Caged (5 1/2 in. diameter)	Phone dialer <input type="checkbox"/> 2-channel real voice <input type="checkbox"/> 4-channel <input type="checkbox"/> 8-channel real voice
<input type="checkbox"/> Intrinsically safe relay (Class I, Division 1) (UL 698A) <input type="checkbox"/> Redundant off <input type="checkbox"/> Current sensor <input type="checkbox"/> Dry contact for alarm <input type="checkbox"/> Alarm test switch <input type="checkbox"/> Heater <input type="checkbox"/> Pump run light	<input type="checkbox"/> Power light <input type="checkbox"/> Surge arrestor <input type="checkbox"/> GFI receptacle <input type="checkbox"/> Control transformer <input type="checkbox"/> Phase monitor <input type="checkbox"/> Over-temperature light <input type="checkbox"/> Number of fans (write in): _____
<input type="checkbox"/> Other options (write in): _____	

Panel Construction	General Comments
Enclosure type <input type="checkbox"/> Stainless steel NEMA4X <input type="checkbox"/> Deadfront <input type="checkbox"/> Steel NEMA4 <input type="checkbox"/> Least expensive NEMA4 <input type="checkbox"/> Other: _____	

How a float switch works

A float switch is a liquid level sensor. Float switches come in many shapes and sizes, but they all operate in a similar manner. They often have two wires attached to a contact inside the float switch. This contact behaves like a light switch. In one position, the switch is closed and allows current to flow through; in the other position, the current is cut off. As a float switch is lifted by the liquid, a mechanism changes the state of the contact to either open or closed.

The operation of the control panel is closely tied to the float switches that are attached to it. Different panels support different numbers and types of floats.

HOW TO SELECT

- Step 1:** Determine how many pumps will be in the system.
- Step 2:** Refer to *Table 30, Control Panel Feature and Option Matrix*, to determine which features are required, and match them up to the control panel type that will support them.
- Step 3:** Refer to *Table 37, Control Panel and Float Switch Function Matrix*, and determine which float switch will match up with each system function.
- Step 4:** Refer to *Table 38, Signal- and Motor-Rated Float Switch Matrix*, to determine the drawdown characteristics of each float.
- Step 5:** Refer to the nomenclature for *Float Switch Assemblies (MF)* on page 28 to order the correct float switch assemblies.

Float switch terminology

The terminology descriptions below will help you understand the differences between the various Orenco float switch models and should help simplify your float switch selection.

Normally open or normally closed

The default state of a float — normally open or normally closed — refers to the contact positions in the float when the float is resting (down). Float switches have an internal contact. The terms “normally open” (N/O) and “normally closed” (N/C) refer to the state of the float switch contact in the down position. A normally open float switch has an open contact (off) in the down position and a normally closed float switch has a closed contact (on) in the down position. Different panel functions require different types of float switches. Most applications require float switches that are normally open. One notable exception is the redundant off and low-level alarm function that requires a normally closed float switch, except with MVP and VCOM panels.

Signal-rated or motor-rated

Every float has a maximum amount of current it can handle. Exceeding these limits may cause premature failure. Signal-rated or “control” floats are used to activate pump control panels and alarms. Only low amperage signals pass through these float switches, hence the float switch is “signal-rated.” All Orenco panels that use motor contactors can use signal-rated float switches. In some systems, a float switch is used to directly start and stop a pump. In this application, the current that is running the pump passes through the float switch as well, and the float switch must be “motor-rated.” In most instances, a motor-rated float switch can be used as a signal float switch.

Drawdown

Drawdown (in inches) refers to the difference in liquid level between a float switch’s activation and deactivation points (*Figure 6, Float Switch Drawdown*). Drawdown can be altered by adjusting the tether length of the float switch cord. When selecting float switches, keep in mind that any float switch that can directly start and stop a pump should have a drawdown capability, to avoid rapid cycling of the pump.

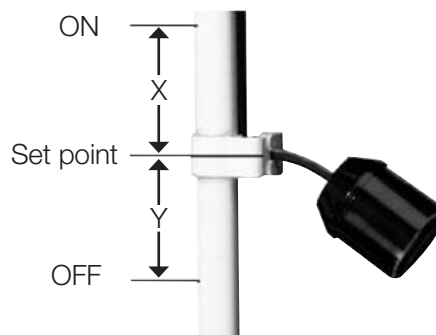
Type

Floats have mechanical or mercury contactor types. The important distinction between these is that mercury floats are not rated for potable water.

IR (intrinsically safe relay)

Approved for use with intrinsically safe, Class I, Division 1 applications, where reliable float switch operation with very low current is required.

FIGURE 6. FLOAT SWITCH DRAWDOWN



Float Switch Selection Matrixes

TABLE 37. CONTROL PANEL AND FLOAT SWITCH FUNCTION MATRIX

Float switch function	Tag color code	A, ASF	S, SSF	MVP-S	MVP-SSF	DAX	MVP-DAX	VCOM-S	VCOM-DAX
On-demand dose		FACTORY STANDARD FLOAT ASSEMBLY*							
		MFABT	MF3AT	MF4A	MF2A (S.Filter)	MF3AT	MF4A	MF3A	MF4A
High level alarm	Y (yellow)	A	A	A	A	A	A		
High level alarm, pump on	YB (yellow-blue)							A	
High level alarm, lag pump on	YP (yellow-purple)					A	A		A
Lag pump on	P (purple)					A	A		
Pump on	B (blue)		A	A		A	A		A
Pumps off	R (red)		A	A		A	A	A	A
Pumps on/off	G (green)	B	B	A	A	B	A		
Redundant off, low level alarm	W (white)	T	T	A		T	A	A	A
Timed dose		--	MF2BT	MF3A	MF3A (septic)	MFA2BT	MF4A	MF3A	MF4A
High level alarm	Y (yellow)		A	A	A	A	A		
High level alarm, lag pump enable	YP (yellow-purple)					A	A		A
High level alarm, override timer on/off	YG (yellow-green)		B	A	A			A	
Lag pump on/off	PG (purple-green)					B			
Lag pump enable	P (purple)						A		
Override timer on/off	G (green)		B	A	A	B	A		A
Timer on/off	R (red)		B	A	A	B	A	A	A
Redundant off, low level alarm	W (white)		T	A	A	T	A	A	A

* Floats in bold type indicate the float model used when factory-standard functions are desired. Floats in plain text indicate the float model used when alternate functions are desired. Substitute V floats for A floats and X floats for T floats where state regulations prohibit mercury floats.

TABLE 38. SIGNAL- AND MOTOR-RATED FLOAT SWITCH MATRIX

Float	State	Type	IR	Volts	Amps	hp	Tether	X	Y	Drawdown
Signal-rated floats (for control switch applications)										
A Model	Normally open	Mercury	Yes	n/a	n/a	n/a	2.00 in.	n/a	n/a	n/a
T Model	Normally closed	Mercury	Yes	n/a	n/a	n/a	2.00 in.	n/a	n/a	n/a
V Model*	Normally open	Mechanical, small drawdown	Yes	n/a	n/a	n/a	2.00 in.	< 1 in.	< 1 in.	< 1 in.
X Model*	Normally closed	Mechanical, small drawdown	Yes	n/a	n/a	n/a	2.00 in.	< 1 in.	< 1 in.	< 1 in.
Motor-rated floats (for pump switch applications)										
B Model	Normally open	Mechanical	No	120V	13A	1/2 hp	2.00 in.	2.50 in.	1.50 in.	4.00 in.
				240V	13A	1 hp	3.00 in.	3.00 in.	1.50 in.	4.75 in.
							4.00 in.	3.25 in.	1.50 in.	4.75 in.
C Model	Normally open	Mechanical	No	120V	13A	1/2 hp	2.00 in.	3.00 in.	2.50 in.	5.50 in.
				240V	15A	2 hp	3.00 in.	3.50 in.	3.00 in.	6.50 in.
							4.00 in.	4.00 in.	3.50 in.	7.50 in.
							5.00 in.	4.50 in.	4.00 in.	8.50 in.
							6.00 in.	5.25 in.	4.25 in.	9.50 in.
D Model	Normally open	Mechanical	No	120V	15A	3/4 hp	2.00 in.	3.00 in.	2.50 in.	5.50 in.
				240V	15A	2 hp	3.00 in.	3.50 in.	3.00 in.	6.50 in.
							4.00 in.	4.00 in.	3.50 in.	7.50 in.
							5.00 in.	4.50 in.	4.00 in.	8.50 in.
							6.00 in.	5.25 in.	4.25 in.	9.50 in.
G Model	Normally open	Mercury	Yes	120V	15A	3/4 hp	2.00 in.	1.50 in.	3.00 in.	4.50 in.
				240V	15A	2 hp	3.00 in.	1.75 in.	3.00 in.	4.50 in.
							4.00 in.	2.00 in.	3.50 in.	5.50 in.

* Suitable for replacement of A model and T model floats where mercury floats are not allowed.

In addition to complete treatment system packages, Orenco provides a comprehensive selection of treatment system components, including:

- Tanks
- Pumping packages
- Pump basin packages
- Control panels
- Risers, lids, and accessories
- Manifold kits and underdrains
- Liners and filter fabric
- Air coil kits
- Splitter valves and recirculating valves

Applications:

- Homes, subdivisions, resorts
- Small and mid-sized communities
- Commercial properties with domestic strength waste
- Schools, restaurants, gas stations
- RV parks, mobile home parks
- Campgrounds, rest areas

Orenco offers several secondary treatment solutions for environmentally sensitive building sites — sites that require better wastewater treatment, including nitrogen reduction, than a standard tank and drainfield can provide:

- AdvanTex® Textile Treatment Systems (complete package available, including textile media)
- Intermittent Sand Filters (kit available, with media specifications)
- Recirculating Sand/Gravel Filters (kit available, with media specifications)

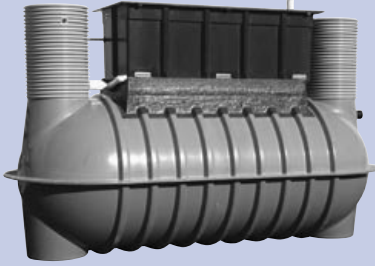
Orenco's treatment systems produce clear, odorless effluent that is 97-99% cleaner than the wastewater coming into the system. As a result, the treated effluent is reusable for landscape irrigation and is approved for use in the most restrictive regulatory jurisdictions.

All Orenco's treatment technologies are packed bed filters, which use both biochemical processes and a filtering media — such as textile, sand, or gravel — to provide treatment. Packed bed filters have been proven to be the most reliable onsite technologies available. They require very little power. And they are easy to service.

All Orenco's treatment systems use pumps, liquid level sensors, and programmable controls with timers so that wastewater is "dosed" to the filtering media and then to the drainfield in small, even amounts throughout the day. This produces optimal treatment, even under peak flow conditions. Applications include residential, commercial, and community-wide systems.



AdvanTex® AX20 Treatment Systems



Some AdvanTex Dealers sell the AdvanTex Treatment System pre-installed onto an Orenco fiberglass tank, as shown in this photo.

The standard AdvanTex Treatment System package includes the rectangular, watertight filter pod with its textile treatment media and in-tank pumping system, as shown in the illustration below.

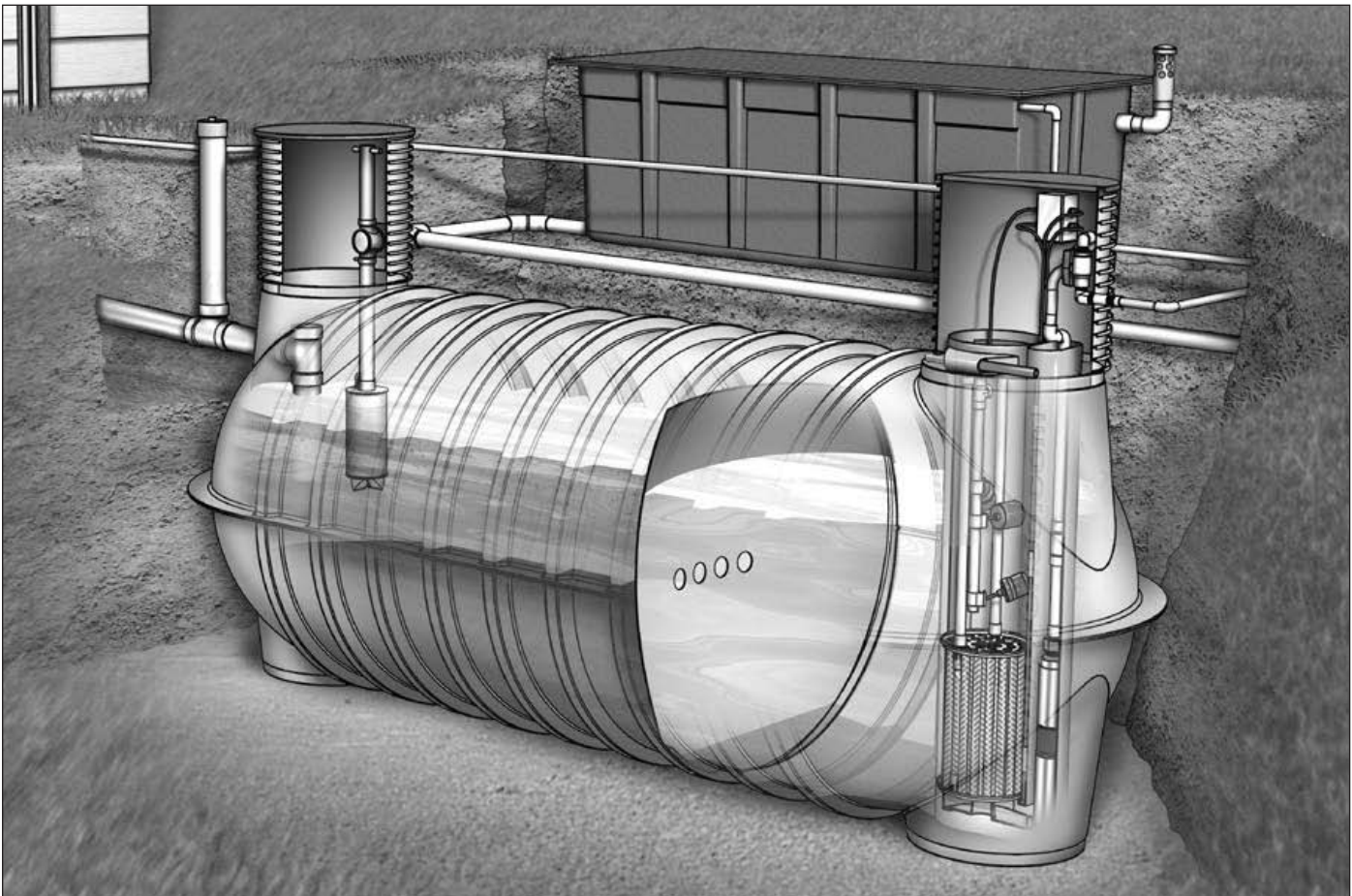
AdvanTex® Treatment Systems are the ideal solution for secondary treatment of residential wastewater flows. Orenco's patented* AdvanTex systems consistently produce such good effluent — e.g., BOD and TSS in the 10/10 mg/L range, even under peak flow conditions — that homeowners often have them installed with subsurface drip systems for landscape irrigation.

AdvanTex has been approved in most of North America, and more than 10,000 AdvanTex filters are now in use. AdvanTex has also passed ANSI and NSF Standard 40 testing protocols. A proven nitrogen-reducing configuration is available.

AdvanTex Treatment Systems come as a complete package including pumping system, treatment media, and all accessories. The treatment media — a highly absorbent engineered textile — treats a tremendous amount of wastewater in a small space. Consequently, AdvanTex systems are compact and require a very small system footprint. Systems are flush to the ground and, in most cases, the watertight basin that holds the treatment media can be installed right on top of the tank.

AdvanTex Treatment Systems are part of a comprehensive program that includes trained and authorized installers and service providers, regular operation and maintenance, remote telemetry monitoring (see VeriComm® section of catalog), and lifetime data tracking by distributors. Consequently, residential AdvanTex systems are sold through a separate channel of authorized AdvanTex Dealers. Call Orenco at 800-348-9843 for more information or go to www.orenco.com and, from the Home Page, click on "Advanced Treatment Systems," then on "AdvanTex Treatment Systems."

* Covered by the following U.S. patent numbers: 6,540,920; 6,372,137; 5,980,748; 5,531,894; 5,480,561; 5,360,556; 5,492,635; 4,439,323. Additional patents pending.



AdvanTex® AX100 Treatment Systems are the ideal solution for large residential flows, commercial flows, and community-wide wastewater treatment. The patented* AX100 can make raw wastewater up to 98% cleaner and meet the most stringent regulatory requirements. It can also reduce nitrogen significantly, depending on influent and configuration. Because the AX100 produces such consistently clean effluent, it is frequently installed with subsurface drip systems for water reuse.

Like the AX20, the AX100 comes as a complete package and uses an engineered textile for the treatment media. It is compact, easy to install, easily serviceable, and allows peak loading rates as high as 50 gpd/ft². Orenco's AX100 product line was introduced in 2002, and more than 1,000 AX100 filters are now in use.

Orenco's commercial-sized AdvanTex Treatment Systems are part of a comprehensive program that ensures they are appropriately designed, correctly installed, and properly started up and maintained. The program includes trained and authorized installers and service providers, as well as educational workshops for designers, engineers, and regulators. Every project follows a checklist, and an online project management tool with automated reporting functions ensures all parties are kept apprised of project progress.

In addition, every system benefits from ongoing manufacturer support, ongoing O&M, real-time monitoring and control via telemetry-enabled control panels (see the TCOM™ section of the catalog on page 53), and lifetime data tracking by distributors. Consequently, commercial AdvanTex systems are sold through authorized Commercial AdvanTex Dealers. Call Orenco at 800-348-9843 for more information or go to www.orenco.com and, from the Home Page, click on "Advanced Treatment Systems," then on "AdvanTex Treatment Systems."

* Covered by the following U.S. patent numbers: 6,540,920; 6,372,137; 5,980,748; 5,531,894; 5,480,561; 5,360,556; 5,492,635; 4,439,323. Additional patents pending.



AdvanTex AX100 Treatment System



Intermittent Sand Filter Packages (ISF)

Intermittent sand filters (ISFs) are capable of producing clear, clean effluent that meets the criteria for “advanced” wastewater treatment. As a result, ISFs can be a good solution for environmentally sensitive building sites, as long as there is sufficient land available (since the typical ISF footprint is 360 ft²). To have a properly functioning ISF, the right type and size of sand media must be used, and the system must be properly installed. Orenco provides system designers with guidelines for media selection. And Orenco sells complete, carefully engineered ISF packages that come with a helpful installation video.

Orenco’s Intermittent Sand Filter Packages include the following:

- Pumping package
- Liner and accessories
- Filter fabric
- Manifold assembly
- Pump basin package (if required)
- Distributing valve (if required)

Orenco ISF packages, for loading rates of 1.25 gpd/ft², are available for the following design flows and sizes:

Design Flow	Size	Design Flow	Size
375 gpd	10 ft x 30 ft	500 gpd	29 ft x 20 ft
450 gpd	10 ft x 36 ft	600 gpd	10 ft x 48 ft
450 gpd	12 ft x 30 ft	600 gpd	20 ft x 24 ft
450 gpd	20 ft x 18 ft	750 gpd	20 ft x 30 ft
500 gpd	10 ft x 40 ft	1125 gpd	30 ft x 30 ft

The individual components of an intermittent sand filter package are described in other parts of this catalog.

NOMENCLATURE

ISF □□ □□ □ - □□ - □□ □□ □□ □□

Distributing valve:
 Blank = no distributing valve
 Z = zoned distribution

Discharge assembly:
 Blank = standard
 DB = drainback
 CW = cold weather

Drainfield pump (if required):
 Blank = no pump (gravity discharge)
 10 = 10 gpm
 20 = 20 gpm
 30 = 30 gpm
 50 = 50 gpm

Septic tank pump:
 30 = 30 gpm
 50 = 50 gpm

Sand filter discharge style:
 G = gravity
 P = pump

Filter length (feet)

Filter width (feet)

Intermittent sand filter kit

Note: For design details, refer to Orenco’s Design Aid CD-ROM and the Orenco document Sand Filter Kit Selection Chart (SCH-SG-ISF-1), which is available on our online document library. You may also contact Orenco or your local Distributor for design assistance.

TABLE 39. ISF PACKAGE EXAMPLES

Model code	Description
ISF1230G-30-CW	12 ft x 30 ft ISF kit with gravity discharge, 30-gpm septic tank pump, and cold weather discharge kit
ISF1036-P-30-50	10 ft x 36 ft ISF kit with pump discharge, 30-gpm septic tank pump and 50-gpm drainfield pump
ISF2030P-30DBZ	20 ft x 30 ft ISF kit with pump discharge, 30-gpm septic tank pump, 30-gpm drainfield pump, and drainback discharge assembly, with zoned distribution

Sample Intermittent Sand Filter Component Packages

Gravity Discharge ISF Packages

These ISF packages are used to pump effluent from a septic tank to a sand filter. From the sand filter, the effluent then flows by gravity to a drainfield. The first column below shows a standard ISF package and its components. The other two columns give drainback and cold weather variations.

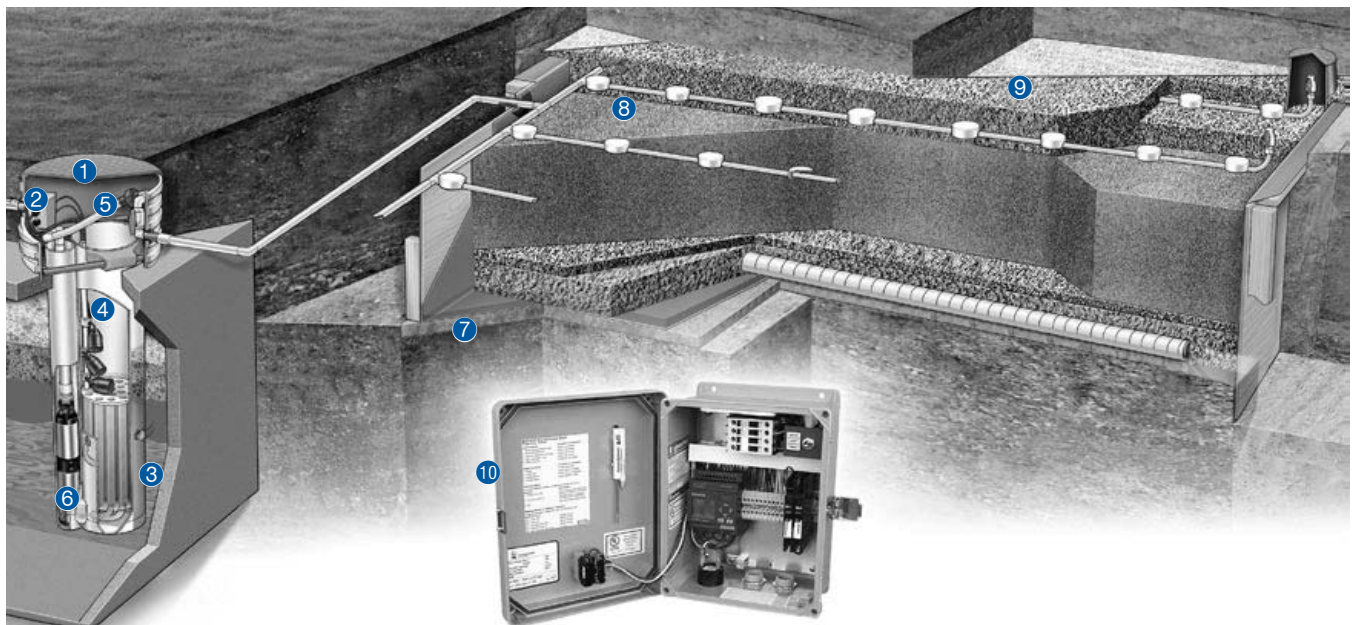
The Drainback package is used for cold weather applications. It has a lid with 2-in. insulation, a control panel with a heater, and a hose and valve assembly set up to drain back into the tank to prevent line freezing.

The Cold Weather package is used for cold weather applications that require deeper tank burial. It also has a lid with 2-in. insulation and a control panel with a heater, in addition to a hose and valve assembly that can be set up for tank wall discharge.

Note: Bold items in the Drainback and Cold Weather columns indicate a variation from the standard component.

Component	Standard	Drainback	Cold Weather
1 Riser, lid and accessories	RR2418+S+12	RR2418+S+12	RR2436+S
2 Splice box	FL24G-4BU	FL24GI2-4BU	FL24GI2-4BU
3 Biotube® pump vault	PRTA24	PRTA24	PRTA24
4 Float switch assembly	PRTA24BDKIT	PRTA24BDKIT	PRTA24BDKIT
5 Discharge plumbing assembly	ADH100	ADH100	ADH100
6 Effluent pump	P300511	P300511	P300511
7 Liner	PAWARRANTY	PAWARRANTY	PAWARRANTY
8 Manifold kit	LI_____	LI_____	LI_____
9 Filter fabric	LIB125	LIB125	LIB125
Air coil kit (not shown)	LIB400	LIB400	LIB400
10 Control panel	SFM____G-1	SFM____G-1	SFM____G-1
	LIFF_____	LIFF_____	LIFF_____
	SFAC150	SFAC150	SFAC150
	MVP-S1PTRO	MVP-S1PTROHT	MVP-S1PTROHT

COMPONENT LOCATION



Sample Intermittent Sand Filter Component Packages

Pump Discharge ISF Packages

These ISF packages are used to pump effluent from a septic tank to a sand filter. From the sand filter, the treated effluent is then pumped again to a drainfield. The first column below shows a standard ISF package and its components. The other two columns give drainback and cold weather variations.

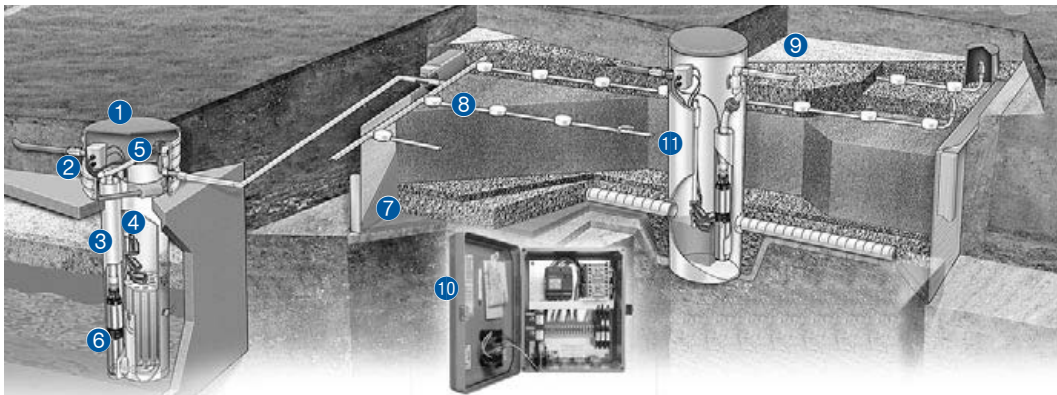
The Drainback package is used for cold weather applications. It has a lid with 2-in. insulation, a control panel with a heater, and a hose and valve assembly set up to drain back into the tank to prevent line freezing.

The Cold Weather package is used for cold weather applications that require deeper tank burial. It also has a lid with 2-in. insulation and a control panel with a heater, in addition to floats and pump with 20-ft cord lengths and a hose and valve assembly that can be set up for tank wall discharge.

Note: Bold items in the Drainback and Cold Weather columns indicate a variation from the standard component.

Component	Standard	Drainback	Cold weather
1 Riser, lid and accessories	RR2418+S+12	RR2418+S+12	RR2436+S
	FL24G-4BU	FL24GI2-4BU	FL24GI2-4BU
	PRTA24	PRTA24	PRTA24
	PRTA24BDKIT	PRTA24BDKIT	PRTA24BDKIT
	ADH100	ADH100	ADH100
2 Splice box	SB4	SB4	SB4
3 Biotube® pump vault	PVU57-1819	PVU57-1819	PVU57-1819
4 Float switch assembly	MF3A-YG,R,W-27V	MF3A-YG,R,W-27V	MF3A-YG,R,W-27V
5 Discharge plumbing assembly	HV125BCX	HV125BX-DB	HV125BX HVCW125KIT
6 Effluent pump	P300511	P300511	P300511
	PAWARRANTY	PAWARRANTY	PAWARRANTY
7 Liner	LI_ _ _ _	LI_ _ _ _	LI_ _ _ _
	LIB125 (two)	LIB125 (two)	LIB125 (two)
8 Manifold kit	SFM_ _ _ _P-1	SFM_ _ _ _P-1	SFM_ _ _ _P-1
9 Filter fabric	LIFF_ _ _ _	LIFF_ _ _ _	LIFF_ _ _ _
Air coil kit (not shown)	SFAC150	SFAC150	SFAC150
10 Control panel	MVP-SSF1PTRO/ PBSF1870FI-20+S+12	MVP-SSF1PTROHT/ PBSF1870FI-20+S+12	MVP-SSF1PTROHT/ PBSF1870FI-20+S+12
11 Pump basin	FL18G-4BU	FL18GI2-4BU	FL18GI2-4BU
	SB3	SB3	SB3
	MF2A-Y,G-39PB	MF2A-Y,G-39PB	MF2A-Y,G-39PB
	HV125BCX	HV125BX-DB	HV125BX HVCW125KIT
	P300511	P300511	P300511
	PAWARRANTY	PAWARRANTY	PAWARRANTY

COMPONENT LOCATION



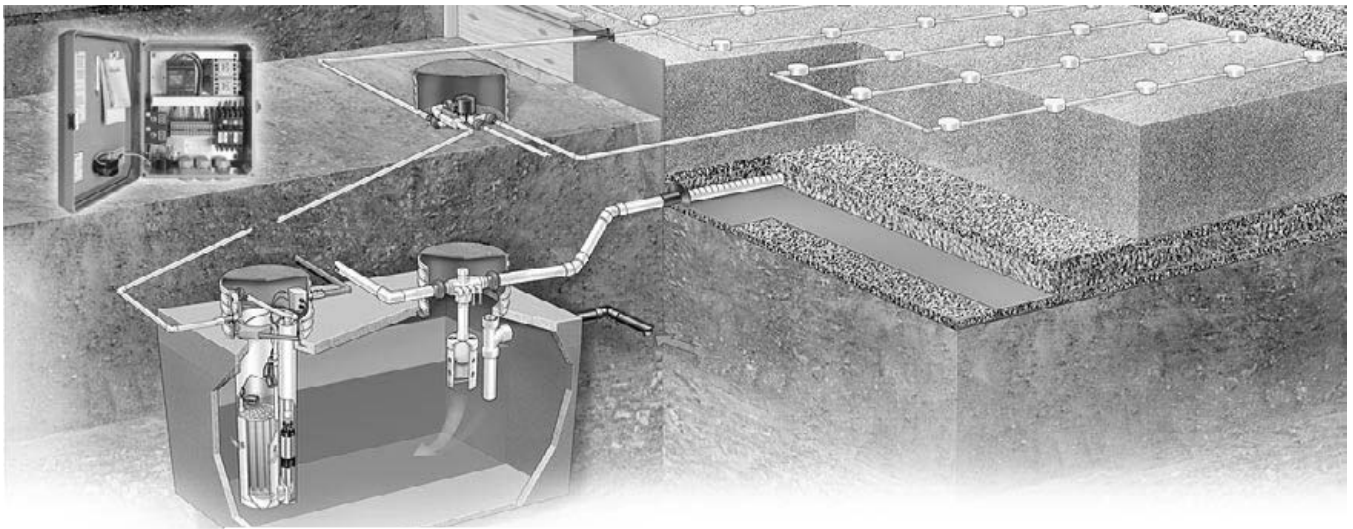
Recirculating sand filters (RSFs) are similar to ISFs except that a portion of the treated effluent is returned to a recirculation tank. There it is used to dilute the effluent from the septic tank before it is applied to the filter. Recirculation, in combination with properly selected media, allows higher application rates — as high as 5 gpd/ft² for RSFs vs. 1.25 gpd/ft² for ISFs — and stronger organic loadings. Consequently, RSFs can provide good wastewater treatment for small commercial and multi-family applications, such as subdivisions, campgrounds, rest areas, resorts, and schools.

RSFs consistently produce effluent that has BOD and TSS levels under 10 mg/L and total nitrogen reductions of 40-50%, even with variations in volume and strength of incoming wastewater. Like Commercial AdvanTex Treatment Systems, RSFs are modular and can therefore accommodate large design flows. However, because sand does not have the high surface area, void space, and holding capacity of textile, RSFs require much more land space. (For example, a 5,000-gpd RSF system treating residential waste requires 1,000 ft² of treatment area, whereas a 5,000-gpd AX100 system requires only about 250 ft² of treatment area, reducing the footprint of the system by three-quarters.)

Orenco's engineers assist system designers with recommended media specifications, tank sizing criteria, application rates, dosing frequency, drainfield sizing, and maintenance requirements. Standard designs and packaged kits are available.

Orenco's Recirculating Sand Filter packages include the following:

- Complete pumping system
- Distributing valve assembly and recirculating splitter valve
- Manifold and underdrain
- Remote telemetry control panel
- Liners
- Access risers and lids



Sand Filter Collection Drains (SFCD)

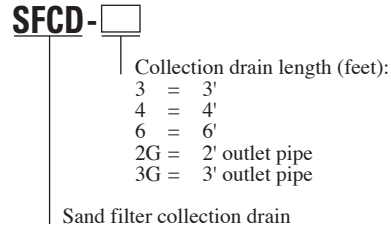


Sand filter collection drain

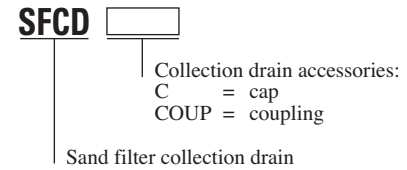
Orenco sand filter collection drains are 4-in. Class 125 PVC pipe with 1/4-in. slots, 4 in. on center. They collect treated effluent at the bottom of a sand filter, for final discharge. Offered in 3-, 4-, or 6-foot lengths, coupling included. For systems with gravity discharge, a section of unslotted PVC pipe provides an exit through the sand filter wall. Collection drain caps are required.

NOMENCLATURE

Sand filter collection drain pipes



Sand filter collection drain accessories



HOW TO SELECT

Step 1: For pump systems: Collection drain length will be the overall length of the sand filter, minus the diameter of the sand filter pump basin, minus 2 ft (1-ft setback on each end). Two SFCDs required. A coupling is required between each section of pipe.

For gravity systems: Collection drain length will be the overall length of the sand filter, minus 2 ft (1-ft setback on each end). A separate 2-ft or 3-ft section (2G or 3G) of underdrain providing an outlet through the sand filter wall is also required. One SFCD required. A coupling is required between each section of pipe.

TABLE 41. SAND FILTER COLLECTION DRAIN EXAMPLES

Model code	Description
SFCD6	Sand filter collection drain, 4-in. diameter, 6-ft length
SFCD C	Sand filter collection drain cap

Intermittent and Recirculating Sand Filter Manifolds (SFM, RSFM)

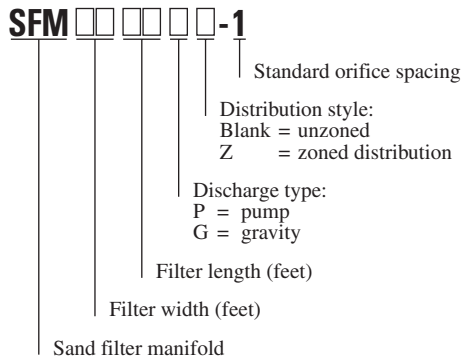
Orenco **intermittent sand filter manifolds** come in package form, for easy selection and installation. Included are the manifold header, lateral piping, orifice shields, collection underdrain, and flushing assemblies with access ports, ready to install in the sand filter bed. Eliminates difficult field fabrication, ensures accurately sized and spaced orifices, and provides easier maintenance.

Orenco **recirculating sand filter manifolds** are provided as a prepackaged kit for accuracy and ease of installation. Included are the manifold header, lateral piping, orifice shields, and flushing assemblies, ready to install in the sand filter bed. One kit is needed for each dosing zone of the recirculating sand filter (RSF). Eliminates difficult and time-consuming field fabrication and ensures accurately sized and spaced orifices.

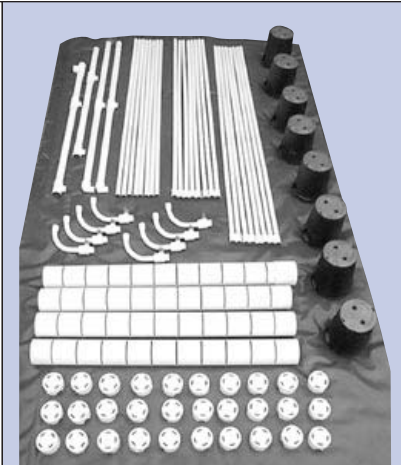
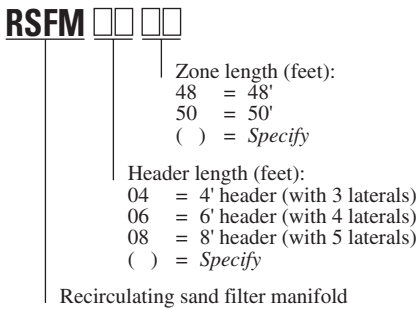
The header is made of 1-1/4-in. diameter Schedule 40 PVC; laterals are 1-in. diameter Class 200 PVC with 1/8-in. diameter drilled orifices. Each kit includes a screw-on cap for testing residual head. Laterals and orifices are located on 24-in. spacing. Custom manifolds available.

NOMENCLATURE

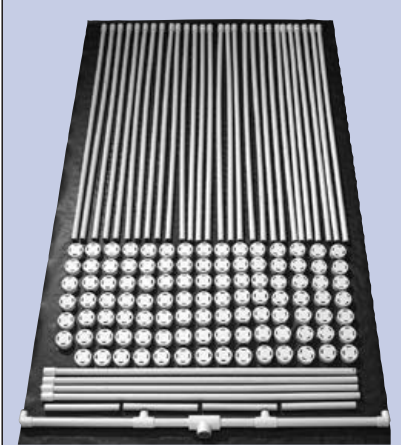
ISF Manifolds



RSF Manifolds



Intermittent sand filter manifold package



Recirculating sand filter manifold package

HOW TO SELECT – ISF

Step 1: Determine the length and width of the sand filter bed. The overall dimensions of the sand filter represent the ordering dimensions of the sand filter manifold.

Example: 12 ft x 30 ft sand filter requires a 12 ft x 30 ft sand filter manifold.

HOW TO SELECT – RSF

Step 1: Determine the total number of dosing zones in the recirculating sand filter.

Step 2: Determine the length and width of a single dosing zone in the RSF.

The length of the manifold header will be 2 ft shorter than the width of the dosing zone. The length of the lateral will be 2 ft shorter than the zone length.

Example: An 8 ft x 50 ft RSF dosing zone will require a single RSFM 0650 manifold, with three 48-ft laterals with 25 orifices each.

Note: Collection drains for RSF manifold kits ordered separately.

TABLE 42. ISF AND RSF MANIFOLD EXAMPLES

Model code	Description
SFM1230P-1	Sand filter manifold, 12 ft wide, 30 ft long, pump discharge
RSFM0650	Recirculating sand filter manifold, 6 ft header (4 laterals), 48 ft lateral length (25 orifices per lateral)

Orifice Shields and Air Coil Kits (OS, SFAC)



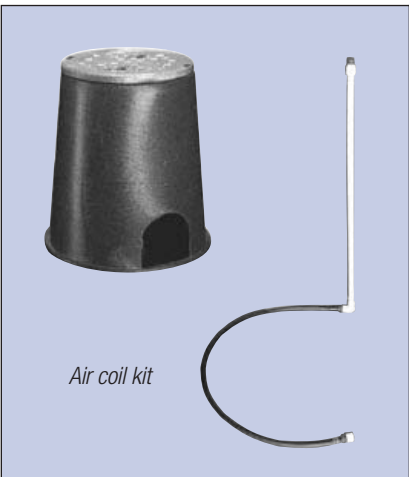
Orifice Shields (OS)

Orenco's patented orifice shields are used in a pressurized distribution system to prevent surrounding media from blocking orifices. Constructed of PVC, orifice shields snap-fit onto laterals. Orifice shields (and orifices) can be installed facing up or down (cold weather applications).

Covered by U.S. Patent #5,360,556

NOMENCLATURE

OS □□□
 Lateral pipe size (inches):
 075 = 3/4"
 100 = 1"
 125 = 1-1/4"
 150 = 1-1/2"
 200 = 2"
 Orifice shield



Air Coil Kits (SFAC)

Orenco air coil kits allow an operator to force supplemental air into a sand filter to help rejuvenate it if the sand filter has been overloaded or poorly maintained. Constructed of polyethylene tubing with PVC stand pipe, air coils have evenly placed emitter outlets.

Note: Air coil kits come with a VB7 valve box for standpipe access.

NOMENCLATURE

SFAC □□□
 Air coil length (feet):
 75 = 75' (for sand filters up to 150 sq. ft.)
 150 = 150' (for sand filters up to 600 sq. ft.)
 Sand filter air coil

TABLE 43. ORIFICE SHIELD AND AIR COIL KIT EXAMPLES

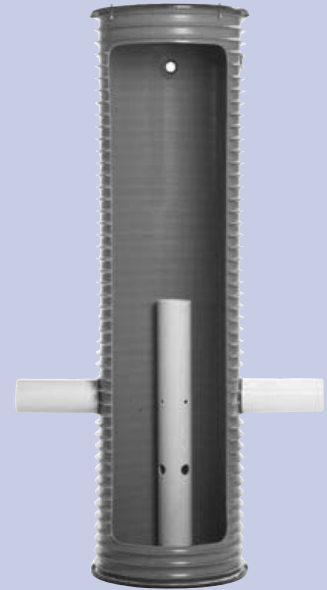
Model code	Description
OS075	Orifice shield, 3/4-in. diameter lateral pipe
SFAC150	Air coil kit, 150-ft length, for use on intermittent sand filters up to 600 ft ²

Orenco sand filter pump basins are used to collect effluent and discharge effluent from intermittent sand filters. Constructed of PVC, these sand filter pump basins include float bracket and fiberglass base. Lids ordered separately.

NOMENCLATURE

PBSF □□□□ - □□ + □ + □

- Discharge grommet:
 10 = 1"
 12 = 1-1/4"
 15 = 1-1/2"
 20 = 2"
- Splice box:
 S = 1" grommet installed (for Orenco SB1 - SB4 splice boxes)
 L = 1-1/4" grommet installed (for Orenco SB5, SB6 splice boxes)
- Inlet hole height (inches)
- Flow inducer:
 Blank = no flow inducer (inlet holes up 7")
 FI = flow inducer (inlet holes up 20")
- Basin height (inches)
- Basin diameter: 18", 24"
- Sand filter pump basin



Sand filter pump basin

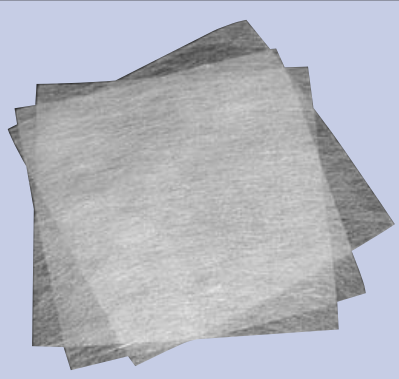
HOW TO SELECT

Step 1: Determine the height of the sand filter pump basin. The top of the basin should extend a minimum 1 in. above the finished grade. For specific measuring locations, refer to *Figure 7, Sand Filter Pump Basin Height Selection Guide*.

TABLE 44. SAND FILTER PUMP BASIN EXAMPLE

Model code	Description
PBSF1870FI-20+S+12	Sand filter pump basin, 18-in. diameter, 70-in. height, with flow inducer

Filter Fabric (LIFF)



Filter fabric

Orenco filter fabric is used to protect the top layer of intermittent sand filters and drainfields from fine soils, yet provide a permeable membrane to allow air and water to pass through. Filter fabric is a lightweight (0.85 oz. per square yard) continuous filament material available in 27-in., 36-in., 54-in., and 120-in. widths.

NOMENCLATURE

LIFF □ □

- Fabric size:
- 2 = 27" x 100' roll
- 27 = 27" wide (specify length)
- 3 = 36" x 100' roll
- 36 = 36" wide (specify length)
- 3-1.5m = 36" x 1500' roll
- 4.5 = 54" x 100' roll
- 54 = 54" wide (specify length)
- 10 = 10' x 100' roll
- 120 = 10' wide (specify length)
- 10-1.5m = 10' x 1500'

Filter fabric

HOW TO SELECT

- Step 1:** Determine the width of the sand filter or dispersal bed.
- Step 2:** Select a filter fabric roll width that will evenly divide into the overall sand filter or dispersal bed width. Filter fabric can be overlapped on intermittent sand filters.

Recirculating Splitter/Ball Valves (RSV, MM)



Recirculating splitter valve

Recirculating Splitter Valves (RSV)

Recirculating splitter valves (RSVs) are used to provide a guaranteed flow split for accuracy in recirculating treatment systems. Constructed of a PVC enclosure and rubber float ball, they redirect 100% of the incoming flow to the recirculation tank during periods in which the float ball is not seated, 80% or less when the float ball is seated. The remaining flow is diverted downstream. Recirculating splitter valves can be field-adjusted for splits ranging from "no split" (as with recirculating ball valves) to a 4:1 split. The desired recirculation ratio will be achieved even during peak flows.

NOMENCLATURE

RSV □ **U**

- Union
- Splitter valve diameter: 3", 4"
- Recirculating splitter valve



Recirculating ball valve

Recirculating Ball Valves (MM)

Recirculating ball valves are used to direct return flow to the recirculation tank during periods in which the float ball is not seated or bypass the recirculation tank when the float ball is seated. Recirculating ball valves include float ball, cage, and piping, with observation port. The 3-in. and 4-in. discharge line models can be ordered with unions. Contact Orenco to order unions or other couplings for other discharge line sizes.

NOMENCLATURE

MM □ □

- Union options:
- Blank = no unions
- U = two unions supplied (3" or 4" only)
- Discharge line size:
- 3", 4", 6"
- Recirculating ball valve

Flushing Assemblies (SE)

Orenco flushing assemblies provide easy access for lateral maintenance. Flushing assembly kits include a PVC sweep ell with ball valve and a polyethylene valve box enclosure.

Note: Kits include VB7 valve box enclosure.

NOMENCLATURE

SE **075**

Flushing type:
C = cap
V = ball valve

3/4" diameter

Assembly/kit:

A = assembly (no valve box)

K = kit (includes VB7 valve box)

Flushing assembly



Flushing assembly

Valve Boxes (VB)

Orenco valve boxes are used to provide access to flushing assemblies. Constructed of polyethylene.

NOMENCLATURE

VB

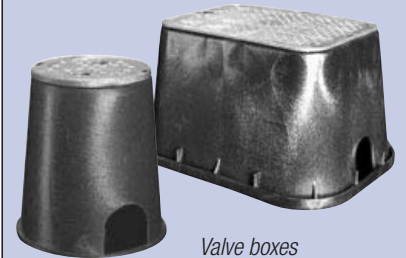
Size:

7 = 7" diameter round

1217 = 12" x 17" rectangular

X1217 = 6" extension for 12" x 17" valve box

Valve box

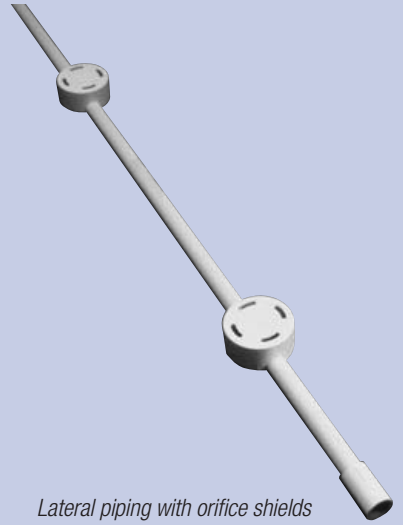


Valve boxes

TABLE 45. VALVE BOX EXAMPLES AND ACCESSORIES

Model code	Description
VB7	Valve box, 7-in. diameter round enclosure, 10 in. deep
VB1217	Valve box, 12 in. x 17 in. rectangular enclosure, 10 in. deep
VBX1217	Valve box extension, 6 in. tall, fits VB1217

Lateral Piping and Shallow Gravelless Drainfield Supplies (LP, HP, IP)

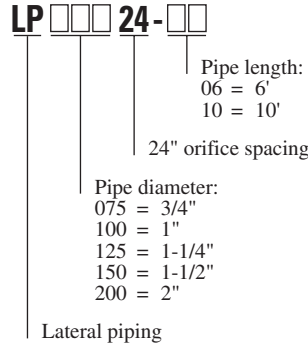


Lateral piping with orifice shields

Lateral Piping

Orenco standard lateral piping is predrilled Class 200 pipe with 1/8-in. orifices on 24-in. centers, with a coupling on one end. Each orifice is precisely drilled to ensure uniform distribution of effluent. Custom configurations and Schedule 40 PVC pipe available. Orifice shields sold separately.

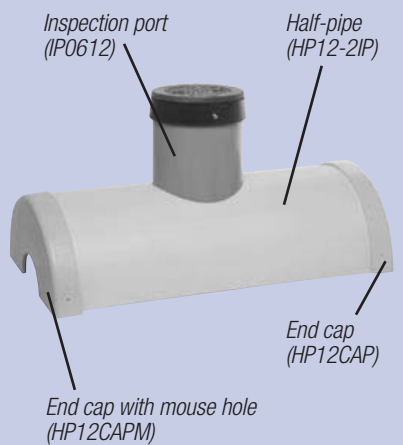
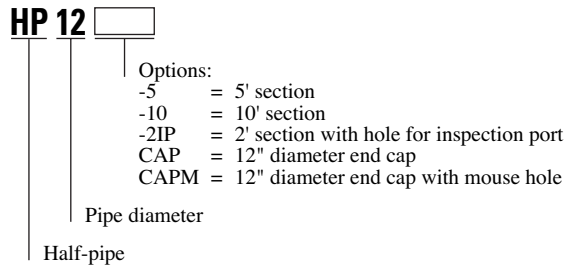
NOMENCLATURE



Shallow Gravelless Drainfield Supplies

Orenco shallow gravelless drainfields are used for subsurface dispersal of sand filter quality effluent. Using a 12 in. wide by 10 in. deep trench, shallow gravelless drainfields distribute treated effluent in the top soil stratum, where roots and soil biota are concentrated. One inspection port per lateral is recommended.

NOMENCLATURE



HOW TO SELECT

- Step 1:** Determine total length of drainfield.
- Step 2:** Select individual drainfield cover lengths (half-pipe) that equal up to the total length of drainfield required.
- Example:** A 40-ft drainfield would require four 10-ft lengths of half-pipe, one HP12CAP, one HP-12CAPM, one HP12-2IP, and one IPO612.

Note: 2 ft drainfield cover with inspection port should be positioned where determined by local regulations. Drainfield covers may be overlapped.

TABLE 46. DRAINFIELD HALF-PIPE AND OPTIONAL COMPONENT EXAMPLES

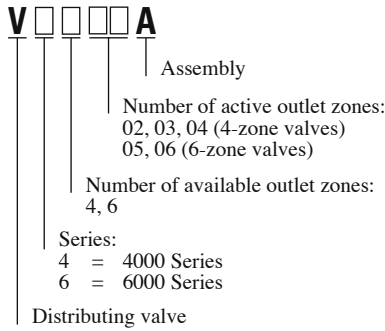
Model code	Description
HP12-10	Drainfield cover, 12-in. diameter, 10-ft length
HP12-2IP	Drainfield cover, 12-in. diameter, 2 ft long, with inspection port hole (inspection port sold separately)
IPO612	Inspection port, 6-in. diameter, 12-in. height

Orenco automatic distributing valve assemblies are mechanically operated and sequentially redirect the pump's flow to multiple zones in a distribution field or treatment system. Valve actuation is accomplished by a combination of pressure and flow. Automatic distributing valve assemblies allow the use of smaller horsepower pumps on large sand filters and drainfields. For example, a large community drainfield requiring 300 gpm can use a six-line valve assembly to reduce the pump flow rate requirement to only 50 gpm.

We require the use of high-head effluent pumps (page 19) with Biotube pump vaults (page 17) to provide pressure and meet flow requirements, and to prevent debris from fouling valve operation. An inlet ball valve, a section of clear pipe (for monitoring), and a union for each outlet are provided for a complete assembly. Ideal valve location is at high point in system. Contact Orenco or your local Distributor for detailed design guidelines, including our document *Orenco Automatic Distributing Valve Assemblies (NTP-VA-1)*.

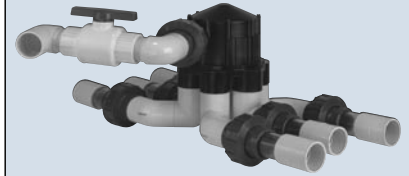
Note: Distributing valve assemblies are warranted only for use with Orenco high-head filtered pumping systems.

NOMENCLATURE



HOW TO SELECT

- Step 1:** Determine the number of discharge outlets required for the system.
- Step 2:** Refer to *Table 47, Automatic Distributing Valve Guide*, to determine the flow rate of the system.

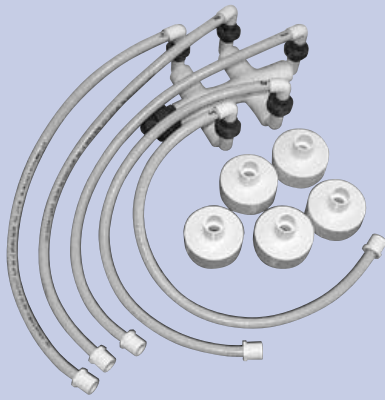


Automatic distributing valve

TABLE 47. AUTOMATIC DISTRIBUTING VALVE GUIDE

Model code	Inlet size	Outlet size	Flow range	Recommended enclosure
V4400	1.25 in.	1.25 in.	10-40 gpm	RR24 _ _
V4600	1.25 in.	1.25 in.	10-25 gpm	RR24 _ _
V6400	1.5 in.	1.5 in.	15-100 gpm	RR24 _ _
V6600	1.5 in.	1.5 in.	15-100 gpm	RR30 _ _

Hydrosplitters and Enclosures (HSA, HSRR)



Hydrosplitter

Hydrosplitters (HSA)

Hydrosplitters are used when dosing filtered effluent by pump or siphon to achieve proper distribution of flow to gravity drainfield laterals of varying lengths and/or elevations. Unaffected by settling ground, flow is pressurized to the hydrosplitter and then flows by gravity to individual drainfield laterals. Fabricated with PVC components, each hydrosplitter is designed to meet the specific needs of a particular drainfield. Recommended minimum pressure at the hydrosplitter inlet is 2 ft.

Note: Order hydrosplitter access enclosures and fiberglass lids with optional insulation separately. Custom hydrosplitters available. Call for information.

NOMENCLATURE

Hydrosplitter

HSA □□□ - □□ - □□

Discharge line diameter:
05 = 1/2"
10 = 1"

Number of outlet lines:
02 = 2
03 = 3
04 = 4
05 = 5
06 = 6
07 = 7
08 = 8
09 = 9
10 = 10

Manifold diameter:
100 = 1"
125 = 1-1/4"
150 = 1-1/2"
200 = 2"

Hydrosplitter assembly

Hydrosplitter enclosure

HSRR □□ □□

Riser height: 12", 18", 24"

Riser diameter: 24", 30"

Hydrosplitter access riser

HOW TO SELECT

- Step 1:** Determine the number of outlet lines and corresponding manifold diameters.
- Step 2:** Call Orenco Systems or your local Distributor for flow control disc orifice sizing. See *Flow Control Assemblies/Discs and Flowsplitter Basins (FCA, FCD)* on page 75 for ordering information.
- Step 3:** Use orifice sizes to determine discharge line size. 1/2-in. lines can use flow control orifices up to 0.6-in. diameter, and 1-in. lines can use flow control orifices up to 1.05-in. diameter.

Hydrosplitter Enclosures (HSRR)

Hydrosplitter enclosures are "mouse-holed" PVC access risers, which allow for easy installation of the transport and discharge lines. Insulated lids (ordered separately) are recommended. See *Lids (FL)* on page 4.

HOW TO SELECT

- Step 1:** Refer to *Table 48, Hydrosplitter Enclosure Guide*, to determine the enclosure diameter.
- Step 2:** Determine the height of the enclosure. The top of the enclosure should extend a minimum 1 in. above the grade level.

TABLE 48. HYDROSPPLITTER ENCLOSURE GUIDE

Model code	Manifold diameter	Number of outlets	Enclosure
HSA100	1 in.	2, 3, 4	HSRR24 __
HSA125	1-1/4 in.	5, 6	HSRR24 __
HSA150	1-1/2 in.	7, 8	HSRR30 __
HSA200	2 in.	9, 10	HSRR30 __

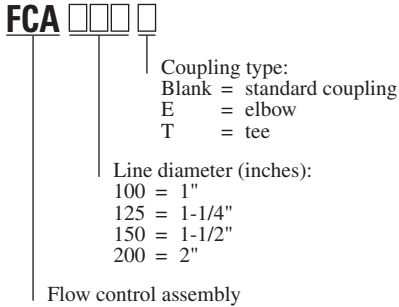
Flow Control Assemblies/Discs and Flowsplitter Basins (FCA, FCD)

Flow Control Assemblies (FCA)

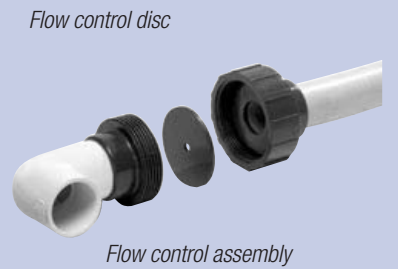
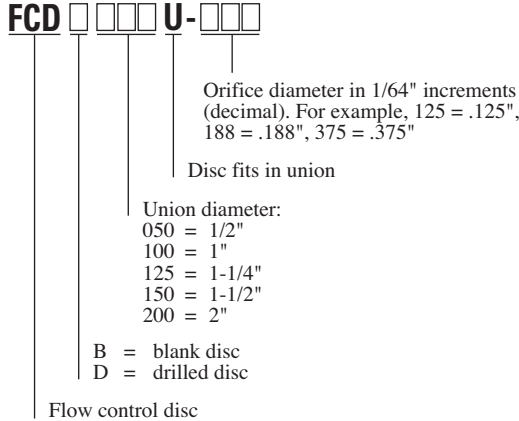
Orenco flow control assemblies use a flow control disc inside a union to equalize flow in pressurized distribution laterals at varying elevations and/or lengths. The orifice size of the flow control disc is dependent upon many factors. Orenco can assist you in calculating the orifice size.

NOMENCLATURE

Flow control assembly (FCA)



Flow control disc (FCD)



HOW TO SELECT

- Step 1:** Determine the following system parameters:
- Style of manifold: center, end, or tee style
 - Orifice residual head
 - Orifice diameter
 - Number of discharge laterals
 - Number of orifices per lateral
 - Elevation distance between laterals

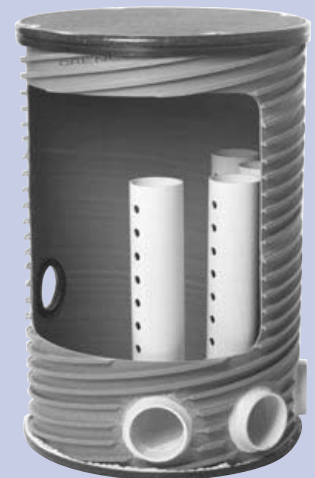
Step 2: Call Orenco or your nearest Distributor for orifice sizing.

TABLE 49. FLOW CONTROL ASSEMBLY EXAMPLES

Model code	Description
FCA100	Flow control assembly, 1 in. diameter line, standard coupling
FCDB100U	Orifice disc, 1 in. union diameter, blank
FCDD100U-375	Orifice disc, 1 in. union diameter, drilled 0.375 in.

Flowsplitter Basins

Flowsplitter basins are used to split large variable flows, such as flows from a dosing siphon or effluent from a sand filter. Effective on systems with low available heads. Also used for level control in wetland systems. Custom configurations only. Call for more information.



The products in this section include:

- Unions, check valves, gate valves, and ball valves
- Air release assemblies
- Service connections
- Carbon filters and accessories
- Flow meters
- Stormwater catch basins
- Apparel and miscellaneous items
- Design aids/videos
- Infiltration test kits
- Scum measuring devices

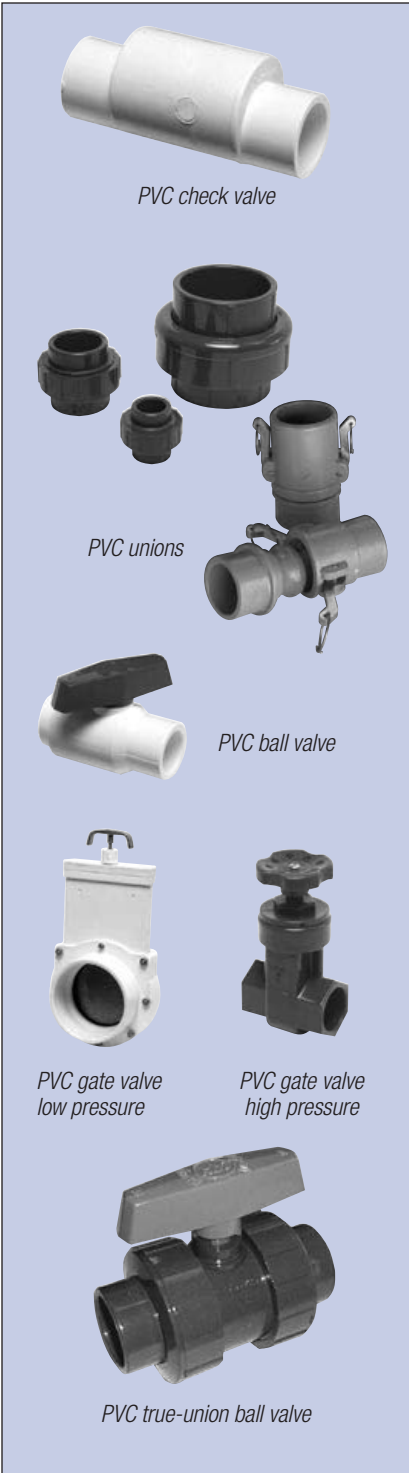
Orenco provides thousands of products to the onsite industry. This catalog simply shows the most frequently ordered in our standard lines. But we have many more, and we customize products for particular applications.

This section showcases some of the specialized valves and unions we provide for onsite collection and treatment systems. This section also includes our carbon filters, which reduce the odor of sewer gases.

Finally, be sure to note the specialized products for testing and maintenance of onsite systems, such as our infiltration test kit and our scum measuring device.



Unions and Valves (KSC, U, V, VG, VLT, VTU)



Orenco's unions and valves are used in water and wastewater systems for controlling flow and aiding maintenance.

NOMENCLATURE



Fitting type:
T = threaded
S = slip

Nominal pipe diameter (inches):
0500 = 1/2" (U, VLT only)
0750 = 3/4" (U, VLT only)
1000 = 1" (KSC, U, VG, VLT, VTU)
1250 = 1-1/4" (KSC, U, VG, VLT, VTU)
1500 = 1-1/2" (KSC, U, VG, VLT, VTU)
2000 = 2" (KSC, U, VG, VLT, VTU)
3000 = 3" (KSC, U, VTU)
4000 = 4" (KSC, U, VTU)
6201 = 2" (V only)
6401 = 4" (V only)
6601 = 6" (V only)
6801 = 8" (V only)

Valve type:
KSC = swing check valve
U = union
V = low pressure gate valve
VG = high pressure gate valve
VLT = ball valve
VTU = true union ball valve

PVC Check Valves, 150 psi (KSC)

PVC check valves prevent backflow in a system. Provides unobtrusive access in direction of flow, but requires only 1/2 pound of back pressure for complete closure. Available with either slip or threaded connections.

PVC Unions, Schedule 80 (U)

PVC unions are used as a disconnection point in piping assemblies. Constructed of Hi-Impact Type II PVC, with EPDM O-ring seals. Available with either slip or threaded connections.

PVC Gate Valves – Low Pressure, 18 psi (V)

PVC sliding gate valves are used as an inexpensive valve for quick shut-off. Constructed with PVC and 416 stainless steel. Available with slip connections.

PVC Gate Valves – High Pressure, 150 psi (VG)

PVC high pressure gate valves have a screw-in faucet type handle and are approved for use in controlling flows. Can be used where throttling capabilities are desired. Available with slip or threaded connection.

PVC Ball Valves, 150 psi (VLT)

PVC ball valves are used for shutting off flow to a distribution line. Molded of Hi-Impact Type II PVC, with a preloaded stem seal using EPDM O-ring seals. Available with either slip or threaded connections.

PVC True-Union Ball Valves, 150 psi (VTU)

True-union ball valves combine the features of a PVC union and ball valve into one component. Available with either slip or threaded inlet and outlet connections. One end blocked, allowing disassembly of downstream side while valve is under pressure.

TABLE 50. UNION AND VALVE EXAMPLES

Model code	Description
KSC1250S	PVC check valve, 1.25 in. diameter, S x S (slip on both ends)
U1250S	PVC union, 1.25 in. diameter, S x S (slip on both ends)
V6401	Gate valve, 4 in. diameter, S x S (slip on both ends)
VG1250S	High pressure gate valve, 1.25 in. diameter, S x S (slip on both ends)
VLT1250S	PVC ball valve, 1.25 in. diameter, S x S (slip on both ends)
VTU1250S	Ball valve/true union, 1.25 in. diameter, S x S (slip on both ends)

Air Release Assemblies (ARA, ARB)

Orenco air release assemblies are used at high points in pressure collection lines to liberate excess air or prevent vacuum from forming in effluent sewer collection systems. Air release valves and air release piping are separate components of an air release assembly. Access risers and lids sold separately. See *Risers and Riser Pipe (RR, RU)* on page 3 and *Lids (FL)* on page 4 for ordering information.

NOMENCLATURE

Air release valve

ARB □ □

- Valve type:
 - 05 = Air release
 - 15 = Combination air/vacuum release
- Air release valve

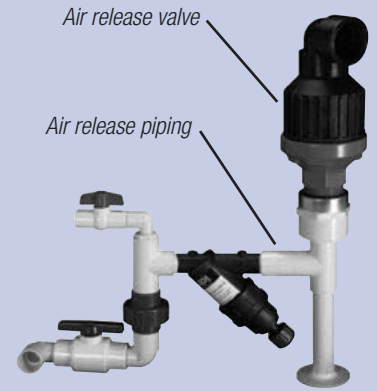
Air release assembly

ARA □

- Valve diameter:
 - 1 = 1" female adapter (use with ARB05)
 - 2 = 2" female adapter (use with ARB15)
 - M = manual
- Air release assembly

HOW TO SELECT

- Step 1:** Determine what style valve is required.
- Step 2:** Determine the diameter of the connection piping.



Air release assembly

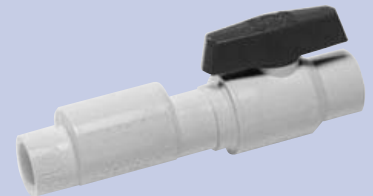
Service Connections (SC)

Service connections are used to isolate pressure mainlines from individual service laterals, by combining a ball valve and check valve into one component. Service connections also help to simplify inspection and maintenance procedures. Access risers and lids sold separately. See *Risers and Riser Pipe (RR, RU)* on page 3 and *Lids (FL)* on page 4 for ordering information.

NOMENCLATURE

SC □ □ □

- Line diameter
 - 100 = 1"
 - 125 = 1-1/4"
 - 150 = 1-1/2"
 - 200 = 2"
- Service connection



Service connection

TABLE 51. AIR RELEASE ASSEMBLY AND SERVICE CONNECTION EXAMPLES

Model code	Description
ARA2	Air release piping assembly, 2 in.
ARB15	Combination air/vacuum release valve, 2 in.
SC100	Service connection, 1 in.

Carbon Filters and Accessories (CF, CFR, CFB)



Carbon Filters (CF)

Orenco carbon filters are used to reduce the odor of sewer gases. Containing granulated activated impregnated carbon, the UV-resistant PVC housing slips onto standard Schedule 40-size pipe. Carbon recharge packages and adapter bushings are available. Custom sizes available.

For carbon filter lids refer to *Lids (FL)* on page 4.

NOMENCLATURE

CF □
 Filter diameter:
 3 = 3"
 4 = 4"
 Carbon filter

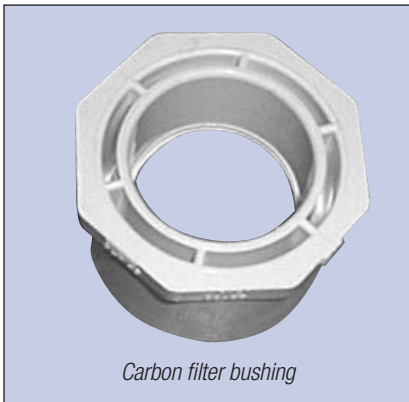


Carbon Filter Recharge Packages (CFR)

Orenco carbon filter recharge packs are used as a simple, clean method of refilling carbon filters. Offered in a ready-to-drop-in pouch for all standard carbon filter sizes.

NOMENCLATURE

CFR □
 Carbon filter diameter (inches):
 3 = 3"
 4 = 4"
 12 = 12" (for lids)
 Carbon filter recharge package



Carbon Filter Bushings (CFB)

Orenco carbon filter bushings are used to adapt the mounting flange of the carbon filter to an existing vent outlet of different diameter. Molded of PVC.

NOMENCLATURE

CFB □ □
 Bushing size (inches):
 32 = 3" to 2" reducer
 42 = 4" to 2" reducer
 43 = 4" to 3" reducer
 Carbon filter bushing

TABLE 52. CARBON FILTER, RECHARGE PACKAGE, AND BUSHING EXAMPLES

Model code	Description
CF3	Carbon filter with weather cap, 3-in. diameter
CFR3	Activated carbon refill package, for 3-in. diameter filter
CFB32	Bushing for carbon filter, mounts CF3 to 2-in. diameter outlet

Flow Meters (FM)

Flow meters are used to measure cumulative flow through a transport line, using an analog display with an odometer-type totalizer. An oscillating piston and magnetic drive register precisely measures variable flows of filtered effluent. Recommended for use with treated effluent.

NOMENCLATURE

FM □□□□

Indicates connection style:
 Blank = male threaded connection (FM062, FM075, FM100);
 female threaded connection (FM150, FM200)
 U = with unions, slip connection
 (FM062, FM075, FM100 only)

Meter size (inches):
 062 = 5/8"
 075 = 3/4"
 100 = 1"
 150 = 1 1/2"
 200 = 2"

Flow meter

HOW TO SELECT

- Step 1:** Determine the approximate flow rate of your system.
- Step 2:** Refer to *Table 53, Flow Meter Specifications* to select the correct size flow meter.

Note: Magnetic flow meters for use with telemetry systems transmit flow information via shielded cable to a display or control panel. They are available by special order.

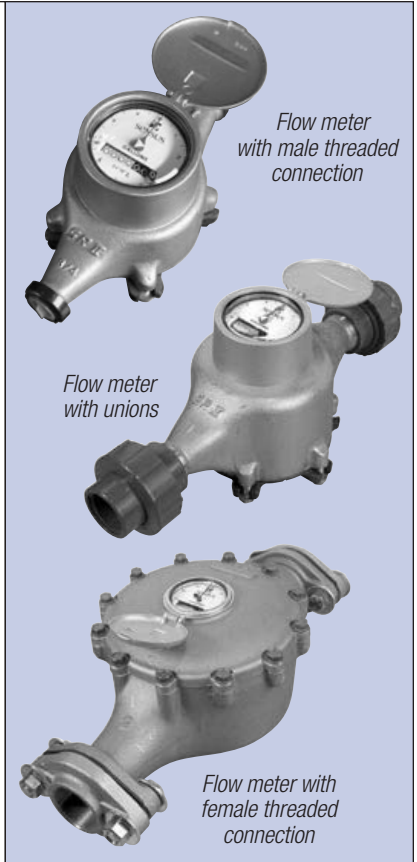


TABLE 53. FLOW METER SPECIFICATIONS

Model code	Flow range (gpm)	Nominal line size (in.)
FM062	1-10	1
FM075	2-15	1
FM100	3-25	1.25
FM150	5-50	1.5
FM200	8-80	2

Stormwater Catch Basins (SCB)

Orenco's stormwater catch basins are used to filter stormwater. Constructed of a PVC housing with effluent screen. These stormwater basins will handle up to 160 gallons per minute when the screen is clean. Custom sizes are available for larger flows.

NOMENCLATURE

SCB □□□□

Basin height:
 24 = 24"
 36 = 36"

Basin diameter:
 08 = 8"
 12 = 12"

Stormwater catch basin



Apparel and Miscellaneous Items



Hats

Orenco offers several styles of hats — a combination of structured, unstructured, six-panel, garment-washed, and “unifit” baseball caps — in navy blue and khaki. Navy caps have a white Orenco logo (OS) on the front and the Orenco Systems, Inc. wordmark on the back. Khaki caps have the logo and wordmark in blue. Black hats with the AdvanTex® logo (and a yellow field under the brim with AdvanTex logos) are also available.

Work Shirts and Jackets

Orenco denim and hickory-style shirts feature a full button front and front pocket, with three-color Orenco Systems logo above the pocket. Insulated Carhartt® jackets with a zip-front and two-color AdvanTex logo are available in black.

Polo Shirts

Orenco polo shirts come in white and navy, with a two-color Orenco Systems logo on the left front. Plain collar or herringbone collar. AdvanTex polo shirts are available in white with a herringbone collar and a one-color AdvanTex logo. Polo shirts with Orenco's 25th Anniversary logo are also available. Orenco's 25th Anniversary polo shirts come in gray with a teal and white logo, and feature a moisture-wicking fabric.

Sweatshirts

Orenco sweatshirts are 12-oz. super cotton from Fruit of the Loom. Navy with a three-color Orenco Systems logo. AdvanTex sweatshirts are black Ultimate Hanes® with a two-color AdvanTex logo.

T-Shirts

Orenco t-shirts are preshrunk 100% cotton Beefy-Ts®. Short-sleeved T-shirts are available in white and light gray, with a two-color Orenco Systems logo on the front. Long-sleeved T-shirts are also available in white and light gray, with a two-color Orenco Systems logo on the front. Orenco Tank T-shirts are white, short-sleeved, shirts with green 'Tank/tee' and Orenco wordmarks on the front and a drawing of an FRP tank with Orenco's slogan and web address on the back.

Fleece Vests

Orenco fleece vests are offered in navy with Orenco Systems logo on the front.

Fleece Blankets

Orenco fleece blankets are offered in navy with an Orenco Systems logo. Limited quantity available.

Testing Tools

Infiltration Test Kits (INFIL-KIT)

Infiltration test kit results are commonly used by engineers and designers to determine reasonable soil loading rates for sand filter quality effluent. Uses a battery powered timer and pump.

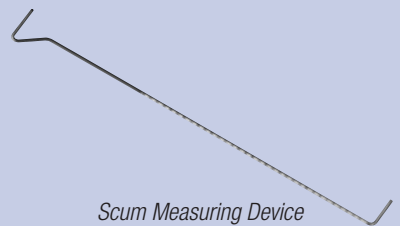
Kit includes a programmable timer panel, float valve, pump, pump chamber, lateral pipe, and half-pipe cover.

Scum Measuring Devices (SMUG)

Scum measuring devices are used by STEP system operators, septic tank pumpers, and onsite maintenance personnel to measure scum accumulations for forecasting pump-out intervals.



Infiltration Test Kit



Scum Measuring Device

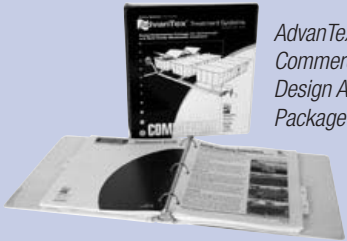
Tools for Design, Sales, and Installation



Design Aid Package



AdvanTex Residential Design Aid Package



AdvanTex Commercial Design Aid Package



AdvanTex DVD and Video



ISF DVD and Video



AdvanTex Residential Installation DVD and Video



Tank Installation DVD and Video

Design Aid Package and CD-ROM

Orenco's Design Aid Package and CD-ROM is an invaluable tool for designers of onsite wastewater treatment systems. It includes Orenco's stand-alone PumpSelect™ program that takes the guesswork out of sizing pumps and configuring carrier lines. PumpSelect™ (Microsoft® Windows® compatible) provides fast, error-free hydraulic calculations and generates system curves. The latest Design Aid Package includes 32 completely updated STEP Equipment and Tank Drawings, as well as copies of Orenco's AutoCAD® drawings for intermittent and recirculating sand filters, pumping systems, and related products. To complete the package, we've included a DWG viewer (eDrawings™, from SolidWorks Corporation) and a PDF viewer (Adobe® Reader® from Adobe Systems, Inc.) on the CD-ROM. Product code: PMCDROM.

AdvanTex Residential Design Aid Package

The AdvanTex Residential Design Aid Package and CD-ROM is a design and engineering package for residential wastewater treatment, featuring the AdvanTex AX20 Textile Treatment System. It includes brochures, drawings, technical data sheets, performance summaries, design criteria, case studies, and published research. It also includes sample operation, installation and maintenance manuals as well as a sample warranty. The AdvanTex Residential Design Aid Package also includes a CD-ROM and two DVDs. The CD-ROM includes all the AX20 drawings included in the binder in both AutoCAD and PDF format, along with several standard AdvanTex documents in PDF format. The two DVDs are a system overview for customers ("Dependable, High-Performing AdvanTex Treatment Systems"), and a video installation guide for installers ("AdvanTex Installation"). All DVDs are available in VHS video format. Product code: PMAXRESBINDER.

AdvanTex Commercial Design Aid Package

The AdvanTex Commercial Design Aid Package is a design and engineering package for commercial and multi-family wastewater treatment, featuring the AdvanTex AX100 Textile Treatment System. It includes drawings, design criteria, and material specifications. In addition, the AdvanTex Commercial Design Aid Package includes a brochure, case studies, an installation guide, a sample warranty, and published research about AdvanTex Treatment Systems. Product code: PMAXCOMBINDER.

AdvanTex Treatment Systems DVD and Video

The AdvanTex Treatment Systems DVD explains the differences between standard systems and advanced systems and what questions homeowners should be asking when researching their options. Questions cover topics such as performance, noise, smell, cost, and maintenance. Product codes: PMAXSALESDVD, PMAXSALESVHS.

Intermittent Sand Filter DVD and Video

Orenco's Intermittent Sand Filter DVD and video explain how intermittent sand filters provide a superior level of wastewater treatment. It also explains how to install them and how to maintain them. For designers, engineers, regulators, educators, homeowners, contractors, and installers. Product codes: PMISFDVD, PMISFVHS.

AdvanTex Residential Installation DVD and Video

The AdvanTex Installation DVD and video parallels our AdvanTex Installation Manual. The DVD is divided into four modules: AdvanTex Filter Installation, External Splice Box Installation, Control Panel Installation, and RSV Bracket Installation. The first module (AdvanTex Installation) is divided into twelve DVD chapters to provide step-by-step instruction. With this DVD, installation trainings are easier and more effective. This DVD is useful for new and current Installers and Service Providers, Designers, and Regulators. Product codes: PMAXINSDVD, PMAXINSVHS.

Tank Installation DVD and Video

The Tank Installation DVD and video parallels our Fiberglass Tank Installation Instructions. The DVD includes instructions for excavation, bedding, tank placement, backfilling, watertightness testing, buoyancy countermeasures, and grading. It also includes important safety information. Product codes: PMTNKINSDVD, PMTNKINSVHS.

Contact Orenco for information about international terms and conditions.**1. Terms of Payment**

Purchaser agrees to pay for the merchandise in accordance with the terms set forth in the invoice. Past due invoices shall bear a service charge of 1.5% per month. If Seller employs a collection agency to collect any amount not paid by Purchaser, Purchaser shall pay all of Seller's costs to employ the collection agency. If any suit, action or proceeding is instituted by Seller to collect any amount not paid by Purchaser, Purchaser shall pay all of Seller's reasonable attorney fees and collection costs whether incurred before, during or after a trial, or before, during or after an appeal.

2. Delivery

All sales shall be FOB Seller's premises. Unless the Purchaser supplies explicit shipping instructions to Seller and Seller agrees to such instructions not less than seven (7) days before the date of shipment, the method and route of shipment shall be determined at Seller's discretion. All shipments shall be insured at Purchaser's expense and made at Purchaser's risk.

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Prices on the merchandise are exclusive of all city, state and federal excise taxes, including, without limitation, taxes on manufacture, sales, receipts, gross income, occupation, use and similar taxes. Whenever applicable, any tax or taxes will be added to the invoice as a separate charge to be paid by the Purchaser. If any such taxes are due and such taxes are not added to the invoice, Purchaser shall pay such taxes and indemnify and hold Seller harmless from such taxes. If Purchaser is exempt from any such taxes, Purchaser shall provide Seller with a tax exemption certificate acceptable to the taxing authorities.

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Subject to the exclusions, limitations, and conditions contained herein, Seller warrants that all merchandise will be free from defects in workmanship. Claims for a breach of this limited warranty shall be made as follows:

- (a) If the merchandise is an AdvanTex® Treatment System for Residential Applications or for Commercial and Multi-Family Applications, any claim for breach of this limited warranty must be made in writing within three (3) years from the date of installation in the appropriate application, as long as the System is continuously covered by a service contract provided by an Orenco authorized service provider.
- (b) If the merchandise is a Biotube® Effluent Filter for Residential Applications, any claim for breach of this limited warranty must be made in writing but it can be made at any time after delivery of the Biotube® Effluent Filter to the Purchaser.
- (c) If the merchandise is a control panel, any claim for breach of this limited warranty must be made in writing within three (3) years after delivery of the control panel to the Purchaser.
- (d) If the merchandise is an FRP Septic Tank Half-Shell, any claim for breach of this limited warranty must be made in writing by the Orenco Distributor or Dealer within five (5) years from the date of shipment of the FRP Septic Tank Half-Shell to the Distributor or Dealer.
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- (g) If the merchandise is a P, PA, or PJ Series Pump purchased with an extended warranty, any claim for breach of this limited warranty must be made in writing within five (5) years after delivery of said pump to the Purchaser.
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This is not a firm offer and may be changed or revoked at any time by Seller. Acceptance of this offer by Purchaser is expressly limited to the exact terms contained herein, and any attempt by Purchaser to alter or omit any of such terms shall be deemed a rejection and a counteroffer.

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If any merchandise shall be manufactured and/or sold by the Seller to meet the Purchaser's particular specifications or requirements and is not part of the Seller's standard line offered by it to the trade generally in the usual course of the Seller's business, the Purchaser agrees to defend, indemnify, and hold harmless the Seller against all suits at law or in equity and from all damages, claims and demands for actual or alleged infringement of any United States or foreign patent, and to defend any suit or action which may be brought against the Seller for any alleged infringement because of the manufacture and/or sale of the merchandise covered thereby. In addition, Purchaser assumes all responsibility for the compatibility of the merchandise, the adequacy of performance of the merchandise, and for the adequacy of the engineering, design or specifications furnished by the Purchaser to Seller.

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Merchandise may not be returned by the Purchaser without the prior approval and acceptance by the Seller. Only merchandise inspected and approved by Seller shall be considered for return. Merchandise accepted for return is subject to a restocking fee and all transportation charges. Merchandise must be securely packed to reach Seller without damage. The amount of the credit or refund, if any, to be given to Purchaser for a return shall be determined by Seller.

8. Governing Law

The laws of the state of Oregon shall govern this Agreement and the rights and obligations of the parties hereto. Purchaser consents to the jurisdiction and venue of the Circuit Court of the State of Oregon for Douglas County for any disputes arising under this Agreement.

9. Technical Assistance

If Seller furnishes any technical assistance or information to Purchaser with respect to merchandise sold hereunder, Seller makes no representation or warranty concerning the accuracy of such assistance or information. Purchaser waives and releases any claim against Seller arising out of any technical assistance or information provided by Seller.

10. Labeling

Purchaser acknowledges that it has received and reviewed Seller's labeling and literature concerning the merchandise sold hereunder. Purchaser agrees that it will provide to its employees who handle, process, or sell such merchandise all of the information contained in Seller's labeling and literature.

11. Modifications

This document contains all of the terms and conditions with respect to the sale and purchase of the Products (or materials) sold hereunder. These terms and conditions supersede any of previous date and no modification thereof shall be binding on Seller unless separately contracted in writing and agreed to by a duly authorized representative of Seller. No modification shall be effected by the acknowledgment of acceptance or purchase order forms stipulating different conditions. Unless Purchaser shall notify Seller in writing to the contrary as soon as practicable after receipt of this document by Purchaser, acceptance of the terms and conditions hereof by Purchaser shall be indicated and, in the absence of such notification, the Purchaser's acceptance of the Products shall be equivalent to Purchaser's assent to the terms and conditions hereof. Waiver of either party of any default by the other hereunder shall not be deemed a waiver by such party of any default by the other which may thereafter occur.

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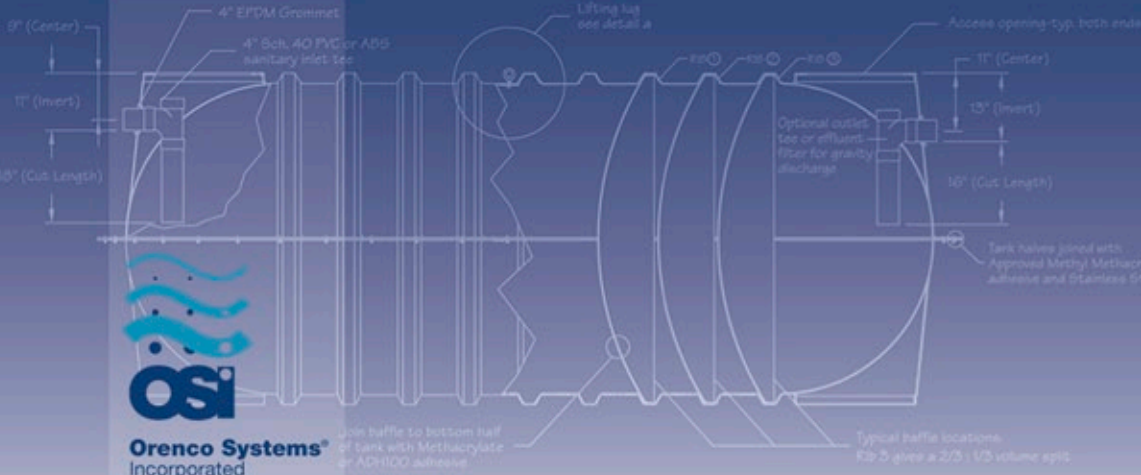
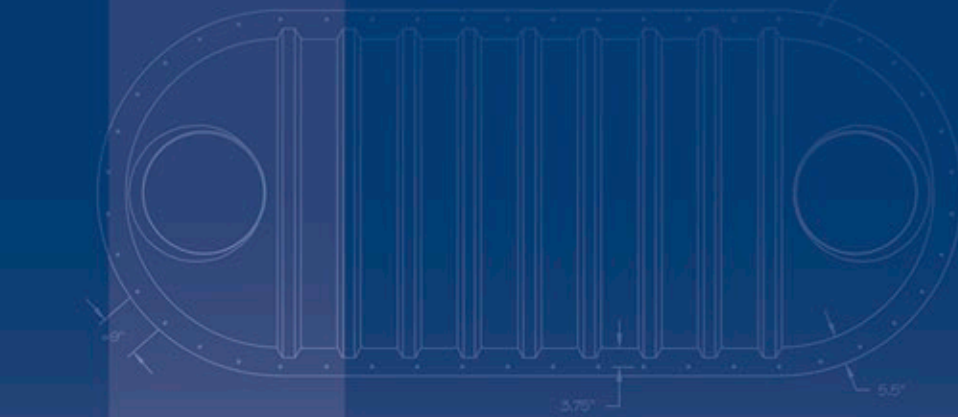
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1500 GALLON TWO COMPARTMENT FIBERGLASS TANK
TYPICAL ASSEMBLED TANK

14-20 x 1 1/4" Type 304 stainless
Steel Bolts (40' total to connect
each end, 10' along each side)



Oreco Systems[®]
Incorporated

*Changing the Way the
World Does Wastewater[®]*

814 Airway Avenue
Sutherlin, OR
97479

Toll Free:
1-800-348-9843

Telephone:
1-541-459-4449

Facsimile:
1-541-459-2884

oreco.com
vericomm.net

ACT-PRD-1
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