

**Patterson Woods
Lot 2, Phase 1 WWTS**

Project Location:
262 Youngsville Blvd.
Youngsville, NC 27596
Franklin County
PIN: 1852-05-4094
PID: 039335
Patterson Woods Lot 2 Phase

Project Owner:
Three Six Builders Corporation
c/o Leslie Privette
PO Box 1250
Zebulon, NC 27545
(919) 440-9145

PROFESSIONAL ENGINEER SEAL

This document
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by Kevin D.
Davidson, NC PE
#024582 on
April 29, 2020.
This medium shall
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REV.	ISSUED DATE	DESCRIPTION
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SHEET TITLE

Detail Sheet 3

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R. Huffman	04/27/2020
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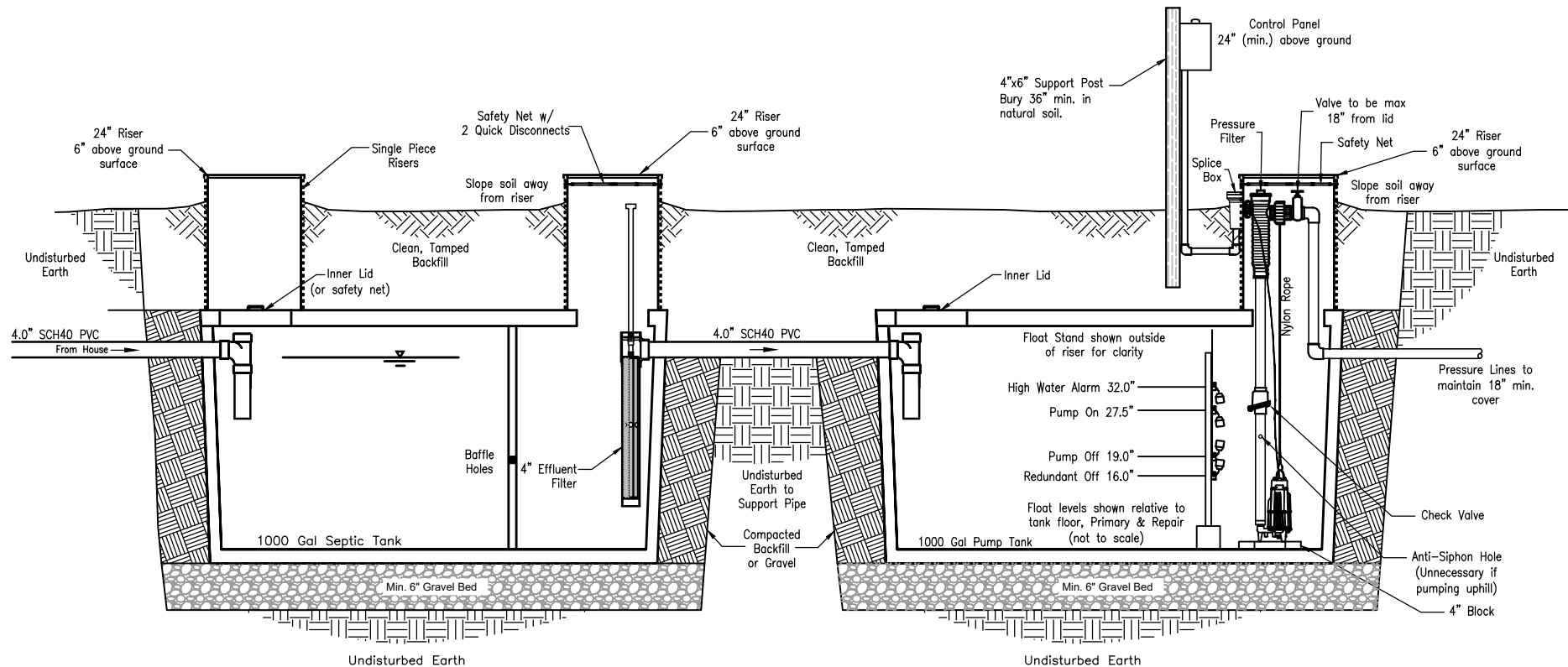
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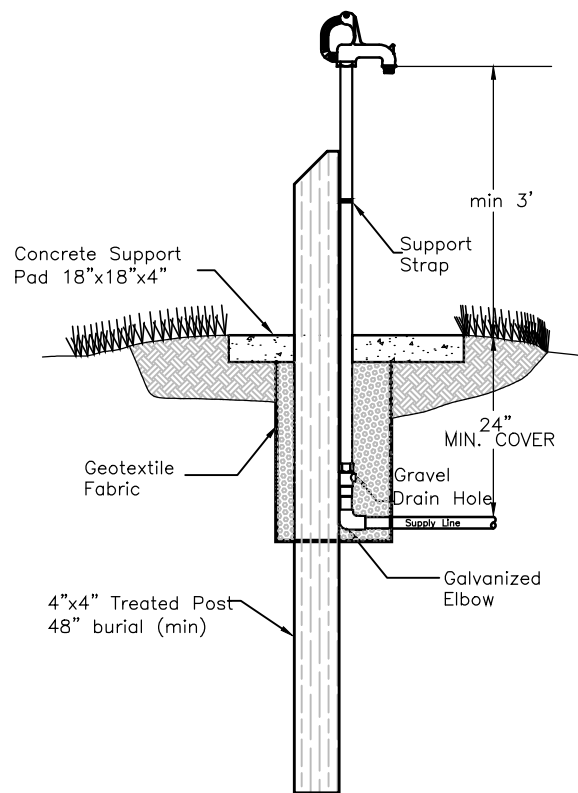
DRAWING NUMBER

WW-8



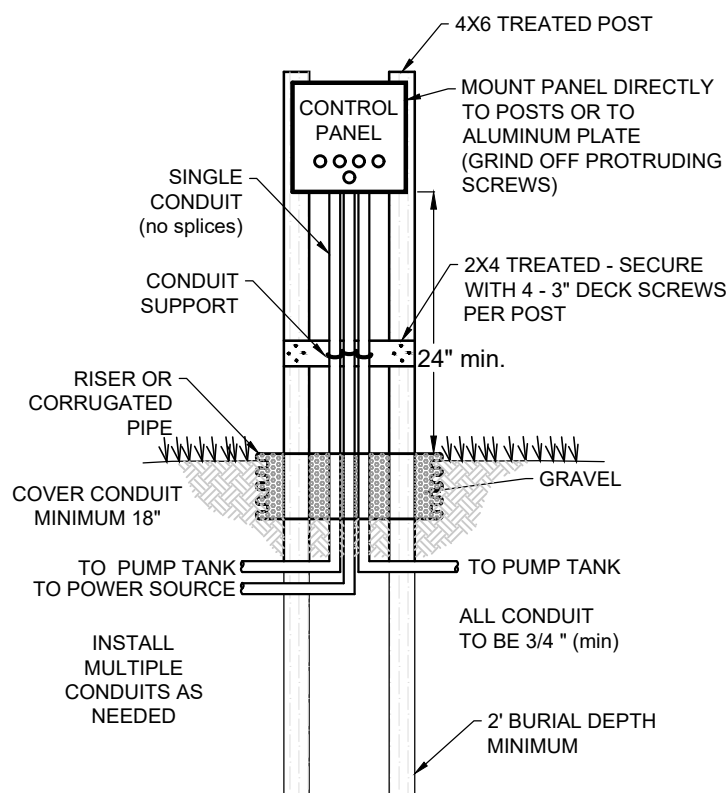
SYSTEM PROFILE VIEW

1
WW-8
N.T.S.



YARD HYDRANT (if no spigot w/i 50' of system)

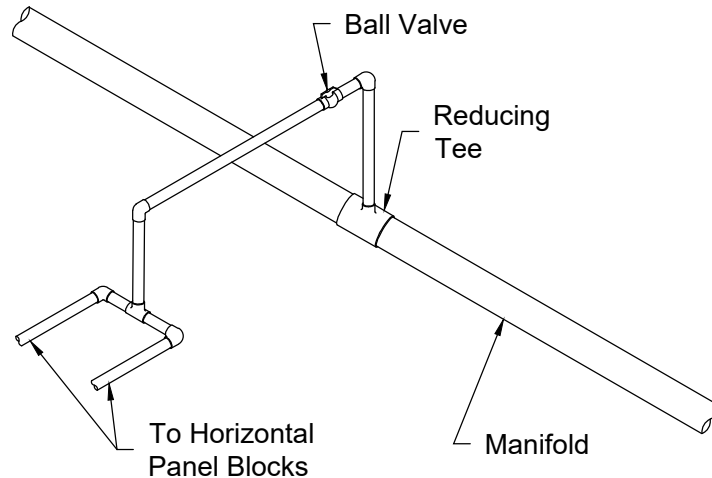
2
WW-8
N.T.S. SOURCE: AWT



CONTROL PANEL SUPPORT

3
WW-8
N.T.S. SOURCE: AWT

Connector Pipe & Ball Valve to be same diameter
as lateral pipes unless specified otherwise.



LP LATERAL - MANIFOLD, HOR. PANELS

4
WW-8
N.T.S.

Trenching and Excavation Safety

The employer must comply with the trenching and excavation requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA-approved state plan requirements.

Inspection of Excavations
OSHA standards require that a competent person inspect trenches daily and as conditions change before worker entry to ensure elimination of excavation hazards. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions.

Access and Egress
OSHA standards require safe access and egress to all excavations, including ladders, steps, ramps, or other safe means of exit for employees working in trench excavations 4 feet (1.22 meters) or deeper. These devices must be located within 25 feet (7.6 meters) of all workers.

Recommendations
Heavy equipment and trucks should stay as far as possible from the edge of any trench. Always use pads under stabilizers to minimize ground pressures that could lead to failures.

(b) Definitions

"Cemented soil" means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.
"Cohesive soil" means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.
"Dry soil" means soil that does not exhibit visible signs of moisture content.
"Fissured" means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.
"Granular soil" means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.
"Layered system" means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.
"Moist soil" means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.
"Plastic" means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.
"Saturated soil" means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

"Soil classification system" means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.
"Stable rock" means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.
"Submerged soil" means soil which is underwater or is free seeping.
"Type A" means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:
(i) The soil is fissured; or
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
(iii) The soil has been previously disturbed; or
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.

"Type B" means:
(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

"Type C" means:
(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil from which water is freely seeping; or
(iv) Submerged rock that is not stable, or
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

"Unconfined compressive strength" means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.
"Wet soil" means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

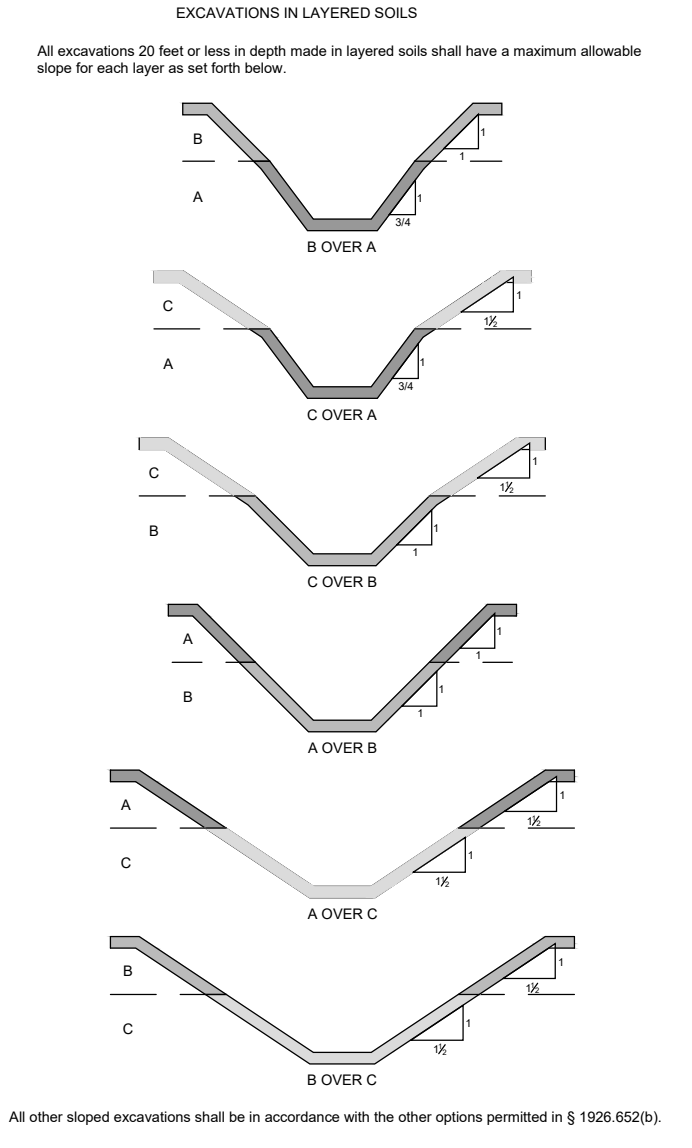
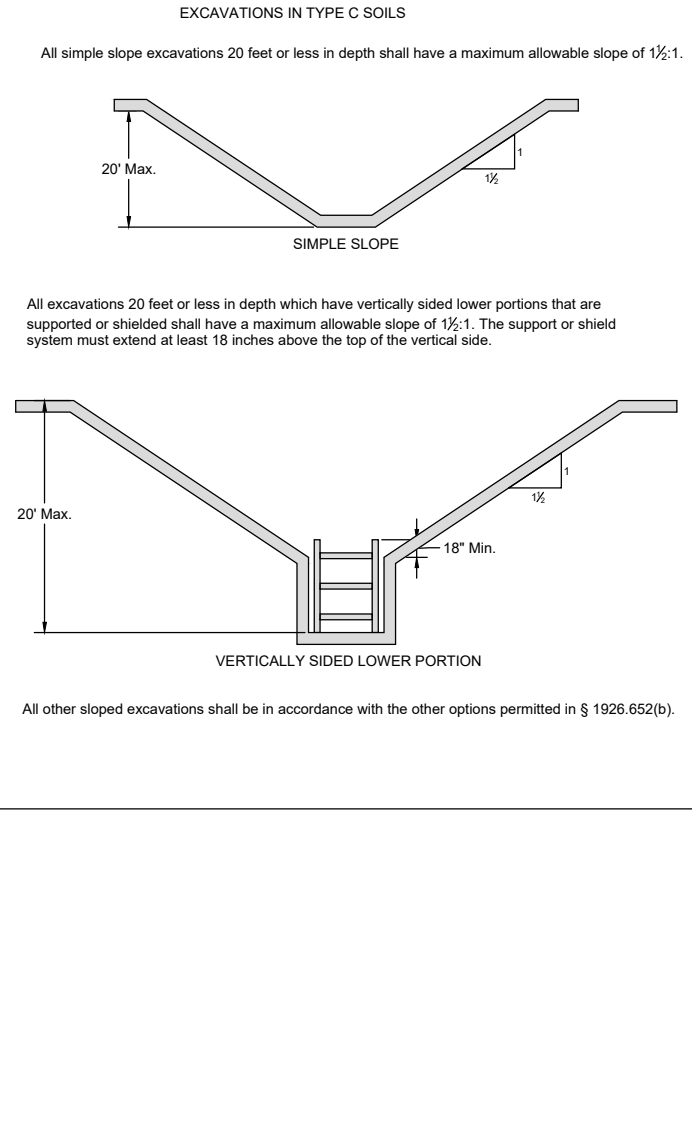
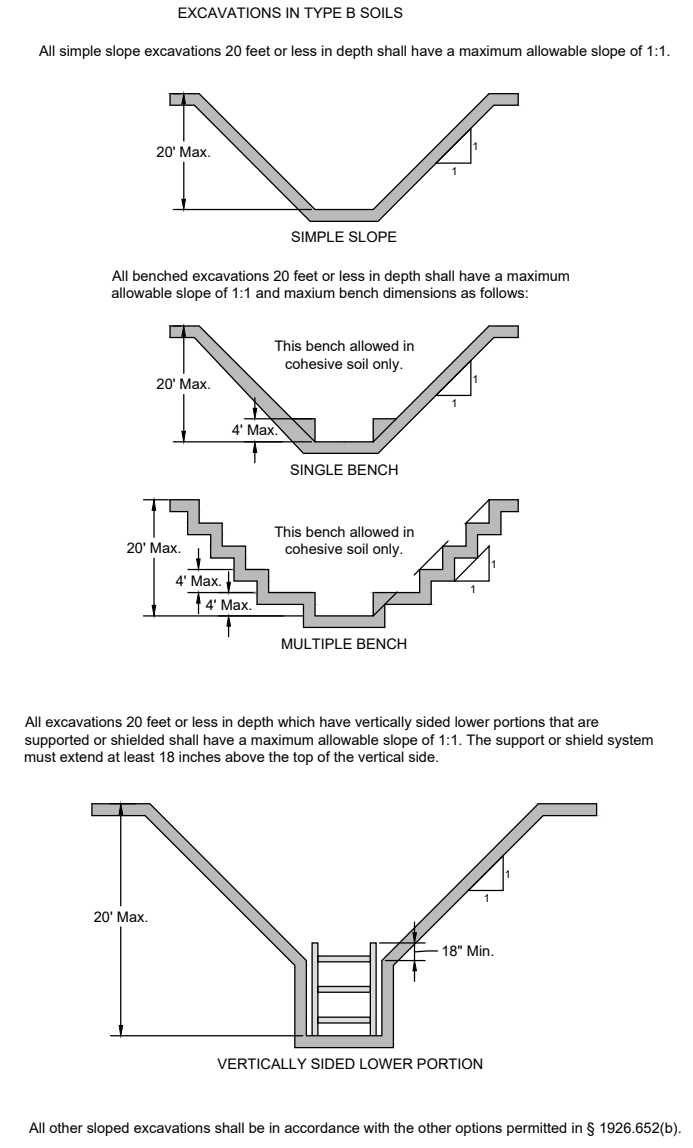
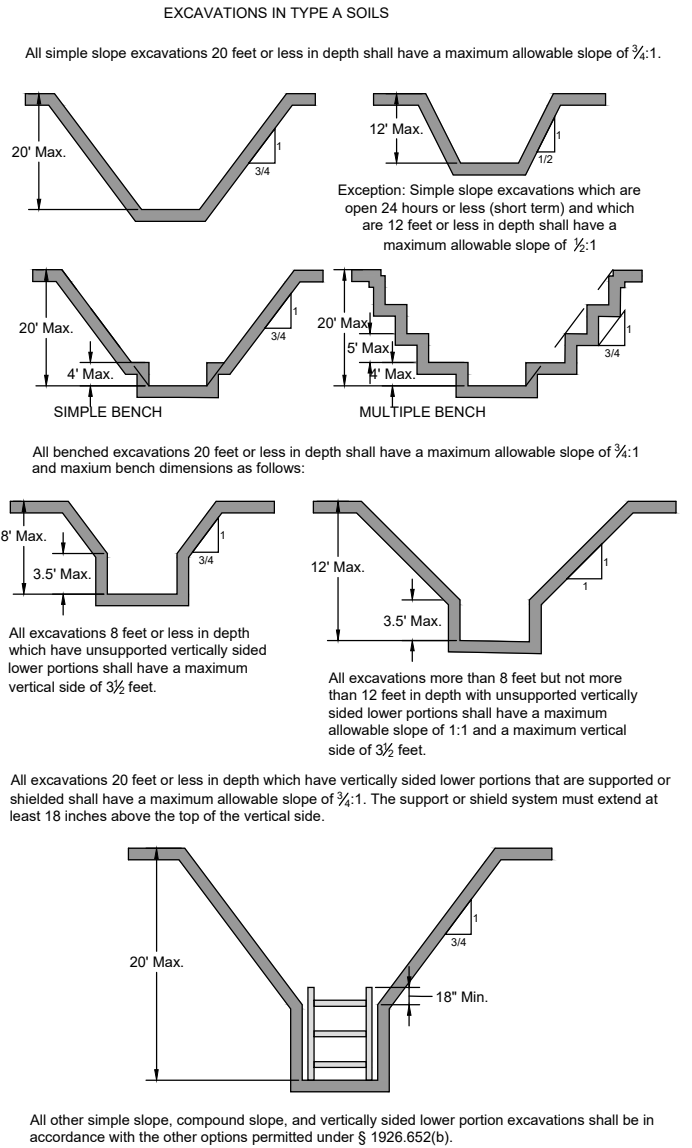
(c) Requirements

- (1) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of this appendix.
- (2) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.
- (3) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in paragraph (d) of this appendix, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.
- (4) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.
- (5) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(d) Acceptable visual and manual tests

- (1) Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.
 - (i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.
 - (ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
 - (iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spill off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.
 - (iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
 - (v) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.
 - (vi) Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.
 - (vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

- (2) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.
 - (i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.
 - (ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.
 - (iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488 - "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb, however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of soil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences.If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.
 - (iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.
 - (v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:
 - (A) If the sample develops cracks as it dries, significant fissures are indicated.
 - (B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined.
 - (C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures.If they pulverize easily into very small fragments, the material is granular.



AWT
Engineers and Soil Scientists
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501 N. Salem Street, Suite 203
Apex, North Carolina 27502
919-859-0669
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FINAL DESIGN NOT RELEASED FOR CONSTRUCTION	
REV.	ISSUED DATE DESCRIPTION
SHEET TITLE	
Excavation Safety	
DRAWN BY: R. Huffman	CREATED ON: 04/27/2020
REVISED BY: ----	REVISED ON: ----
RELEASED BY: ----	RELEASED ON: ----
DRAWING NUMBER	
WW-9	

**MODEL: TS 1000 STB
NON TRAFFIC
1000 Gallon Septic Tank**

SHDAF PRECAST SEPTIC INC.
4130 WEST US HWY 64
LEXINGTON, NC 27295
PHONE (336) 787-5826
FAX (336) 787-2826

WWW.SHDAFPRECAST.COM

SHDAF-1,000 SEPTIC TANK

STB-347 NON TRAFFIC

LIQUID CAPACITY-1,000 GALLONS/AIRSPACE-10'

TANK HEIGHT-67 $\frac{1}{2}$ "

BOTTOM OF TANK TO CENTER OF INLET-59"

BOTTOM OF TANK TO CENTER OF OUTLET-57"

LENGTH TO WIDTH RATIO-2 TO 1

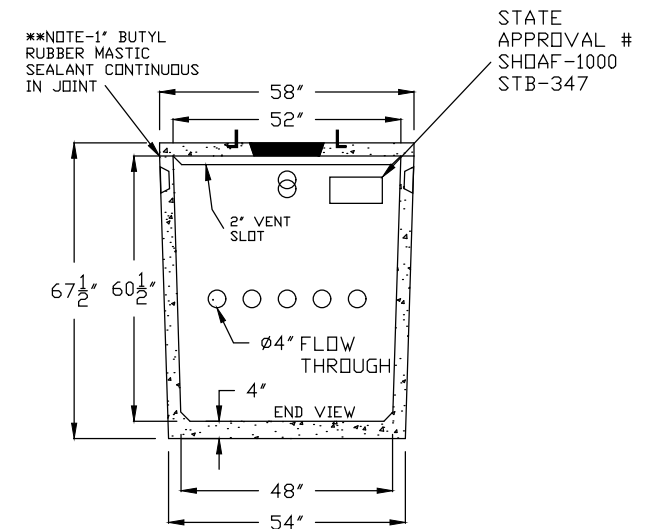
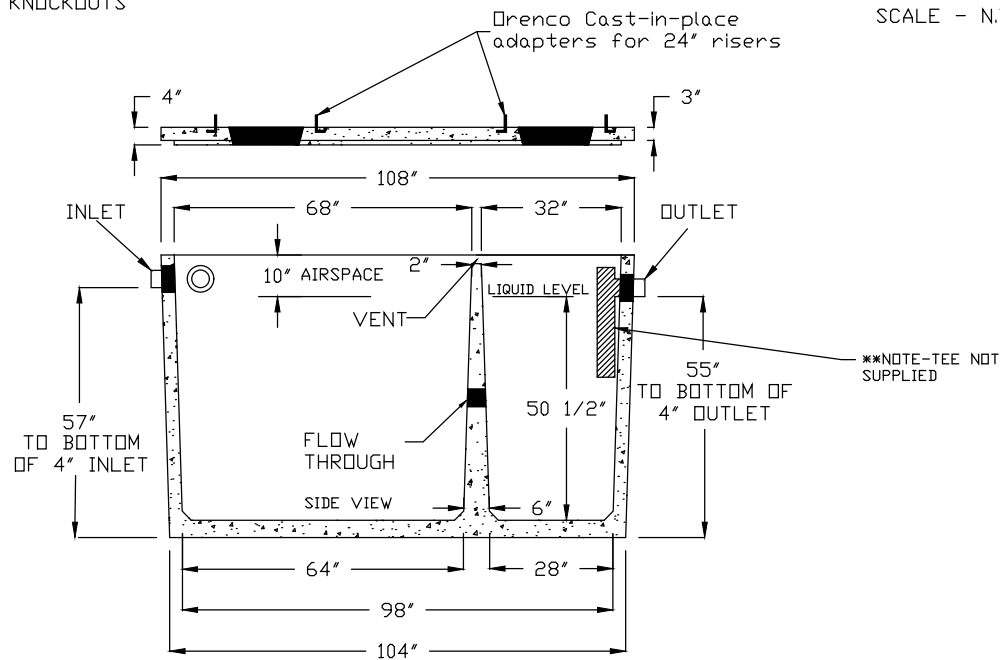
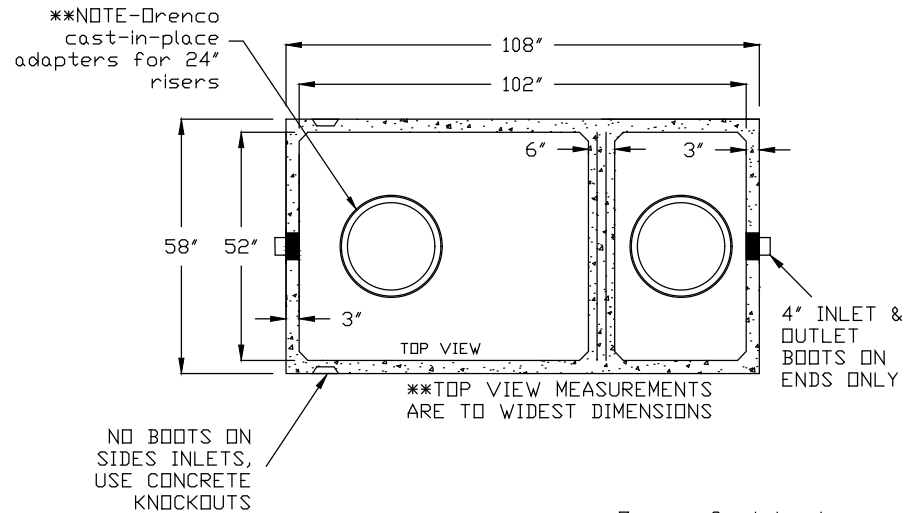
SIZE OF INLET & OUTLET-3" OR 4" PIPE

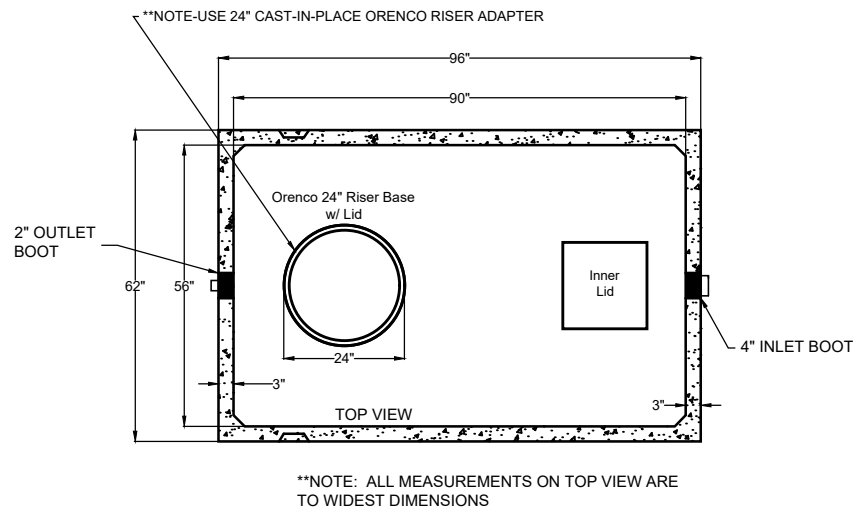
TYPE OF INLET & OUTLET-POLYLOCK OR EQUAL (MEETS ASTM C-923)

CONCRETE PSI-4000; TANK WEIGHT- 10,500 LBS.

REINFORCEMENT PER STATE CODE

SCALE - N.T.S.





SHOAF PRECAST SEPTIC INC.

4130 WEST US HWY 64

LEXINGTON, NC 27295

PHONE (336) 787-5826

FAX (336) 787-2826

WWW.SHOAFPRECAST.COM

SHOAF-1000 NON TRAFFIC RATED

PT-363 NON TRAFFIC

LIQUID CAPACITY-1008 US GALLONS INCLUDING 9" AIRSPACE

GALLONS PER INCH-20.16 (AVGERAGE)

TANK HEIGHT-57"

BOTTOM OF TANK TO CENTER OF INLET-48"

BOTTOM OF TANK TO CENTER OF OUTLET-48"

LENGTH TO WIDTH RATIO-2 TO 1

SIZE OF INLET & OUTLET-3" OR 4" PIPE

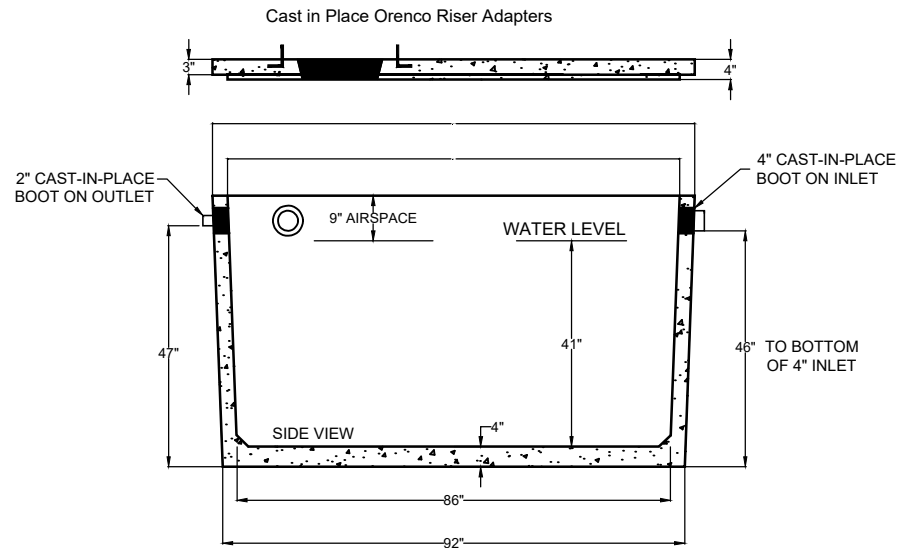
TYPE OF INLET & OUTLET-POLYLOCK OR EQUAL (MEETS ASTM C-923)

CONCRETE PSI-4000; TANK WEIGHT-9,000 LBS.

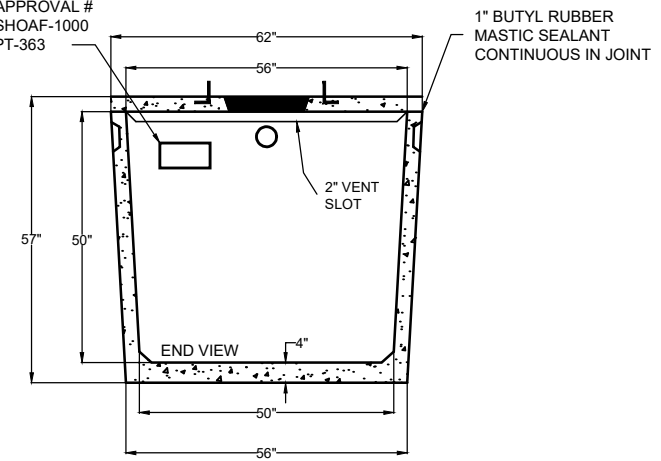
REINFORCING PER STATE CODE

SCALE - N.T.S.

MODEL: TS 1000 PT NON TRAFFIC 1000 Gallon Pump Tank



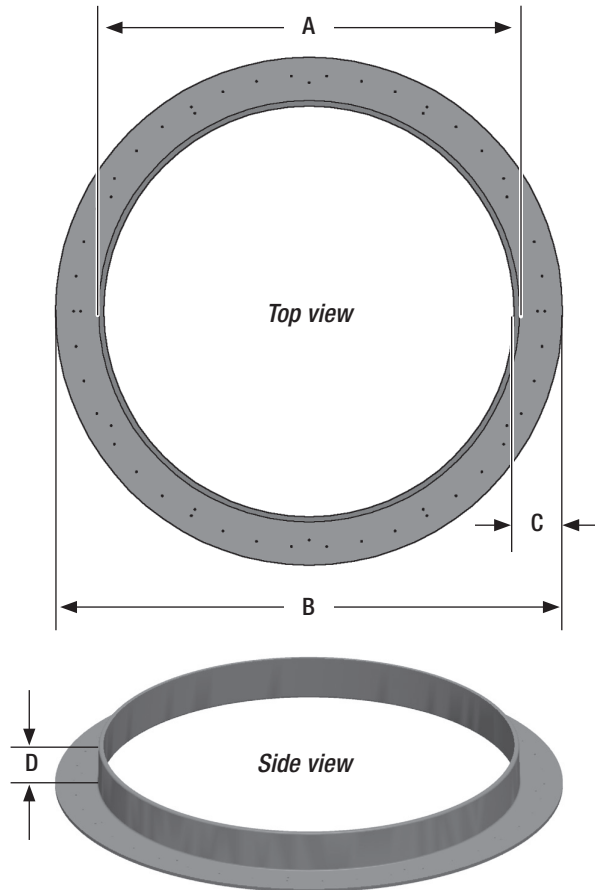
STATE
APPROVAL #
SHOAF-1000
PT-363



PRTA ABS Tank Adapters

Applications

PRTA tank adapters are used to provide a structural, watertight method of installing a 24- or 30-inch (600- or 750-mm) access riser over a tank opening.



General

Orenco's PRTA tank adapters are molded plastic products and therefore have excellent part-quality and consistency. PRTA tank adapters can be cast into a tank or fastened to the top of the tank with a bolt-down kit. The bolt-down kit consists of either six or twelve (depending on model) stainless steel concrete anchors and a roll of butyl tape.

The O.D. of the vertical flange matches the I.D. of Orenco's ribbed risers, which provides a suitable joint to seal with MA320, ADH100, SS115, or SS140 adhesive.

Cast in Place Tank Adapters.

PRTA24

Septic Tank (2)

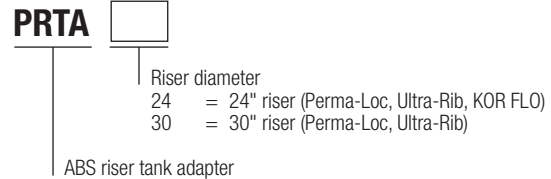
Pump Tank (1)

Standard Models

PRTA24, PRTA30

PRTA24BDKIT (6 anchors), PRTA30BDKIT (12 anchors)

Product Code Diagram



Materials of Construction

Tank adapter	ABS
Concrete anchors	Stainless steel anchor bolts
Sealant	Butyl tape

Specifications

Dimensions*	PRTA24	PRTA30
A - Outside dia., in. (mm)	23.38 (594)	29.25 (743)
B - Flange dia., in. (mm)	26.75 (679)	34.25 (870)
C - Horizontal flange width, in. (mm)	2.00 (51)	2.50 (64)
D - Vertical flange height, in. (mm)	3.50 (89)	3.25 (83)

*The tank adapter has a nominal 0.25 inch (6 mm) thickness.

Access Risers – Ultra-Rib™

Applications

Orenco's Access 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 adaptor. They can also be used as valve enclosures.



General

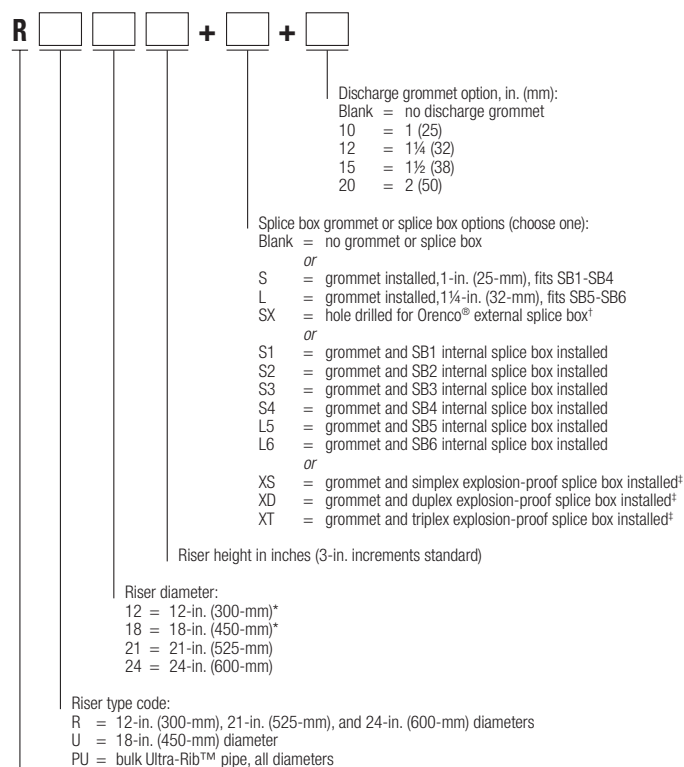
Orenco Ultra-Rib™ Access Risers are constructed of ribbed PVC pipe and are available in 12-, 18-, 21-, and 24-in. diameters. They can be ordered in 3-in. (76.2-mm) increments in lengths up to 13 ft (3.96 m) for 12- and 18-in. diameter risers, and up to 14 ft (4.27 m) for 21- and 24-in. diameter risers. Orenco Ultra-Rib riser pipe is also available in truckload quantities. A complete line of Orenco pipe-cutting tools makes it easy to fabricate risers in your shop or in the field

Risers: RR24 XX
Adjust riser height to allow for minimum 6" above ground.

Standard Models

RR12XX, RU18XX, RR21XX, RR24XX

Product Code Diagram



Materials of Construction

Ultra-Rib™ PVC Pipe: PVC

Specifications

Model	RR12XX	RU18XX	RR21XX	RR24XX
I.D., in. (mm)	11.74 (298)	17.65 (448)	20.50 (521)	23.50 (597)
Wall Thickness - excluding ribs, in. (mm)	0.10 (3)	0.19 (5)	0.25 (6)	0.25 (6)
O.D. - including ribs, in. (mm)	13.13 (334)	19.44 (494)	22.63 (575)	25.63 (651)
Weight, lbs per ft (kg per m)	5 (7.4)	11 (16.4)	15 (22.3)	19 (28.3)

PVC Riser Installation

Installing PVC Access Risers onto Cast-In Orenco® Riser-Tank Adapters

Access risers provide access to septic tank openings, simplifying inspection and maintenance procedures. Access riser-to-tank connections must be watertight for the proper functioning of an onsite septic system or effluent sewer system. Orenco strongly recommends watertightness testing of all access riser-to-tank connections after installation.

Following are instruction sets for prepping and installing access risers, installing grommets, and selecting adhesives for riser installations. Refer to the chart below to determine which instruction set to use.

Instruction Set	Page
1. Riser Preparation	1
2. Grommet Installation	2
3. Riser Installation — PRTA24-2 Adapters	3
4. Riser Installation — RRFTA24, RRFTA30, PRTA24, PRTA30, FRTA24-RVF, and FRTA30-FRP Adapters	4
5. Riser Installation — Orenco FRP Tanks with 24-inch-Diameter (600-mm) Risers	5
6. Riser Watertightness Testing	6
7. Adhesive Selection and Quantities	7

Instruction Set 1: Riser Preparation

Step 1: Determine Riser Height

Determine how high the riser needs to be.

- The top of the riser should be about 3 inches (75 mm) above finished grade after installation and backfilling — This allows 2 inches (50 mm) for tank settling and 1 inch (25 mm) for ensuring drainage away from the riser.

Step 2: Cut Riser to Size (if Necessary)

If the riser needs to be cut to size, cut it with a circular saw or table saw.

- Always cut excess length from the bottom of the riser.
- For square, even cuts, a good fit, and a watertight joint between the riser and the adapter, use an Orenco riser-cutting saw guide.
- To install risers less than 30 inches (760 mm) wide onto 500-gallon (2000-L) Orenco FRP tanks, cut the riser so it fits into the tank and the lowest rib rests on the tank's top, as shown.

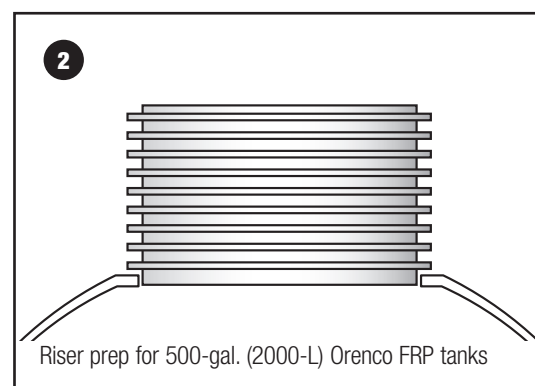
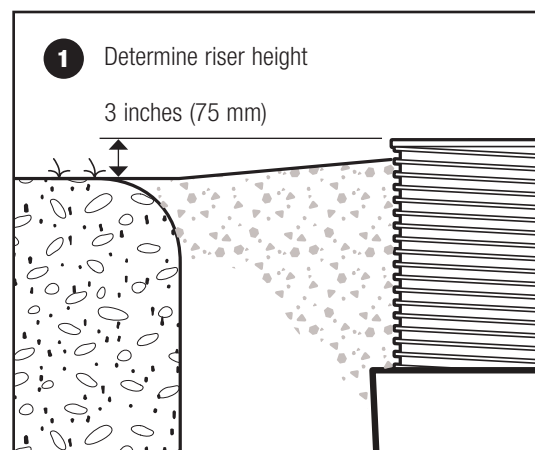
Step 3: Dry Fit Riser to Adapter

Step 3a: Dry fit the riser to the adapter.

- Make sure riser penetrations are the right sizes and in the correct locations.

Step 3b: If the riser is higher than 3 inches (75 mm) above the estimated final grade, cut it to size per the instructions in Step 2.

Step 3c: If the riser is too short, use an Orenco grade ring to extend it.



Instruction Set 2: Grommet Installation

Step 1: Mark Access Riser

Step 1a: Use the site plans or drawings to find out if riser penetrations are needed.

Step 1b: Use the plans or drawing to mark the locations of the penetrations.

- If plans or drawings aren't available, use Drawing 1b as a general guide for locating riser penetrations.

Step 2: Drill Holes and Clean Access Riser

Step 2a: Drill holes for riser penetrations.

- If you have questions about where to locate various riser penetrations, contact your Distributor for more information.

Using Orenco® RKHS Hole Saws ...

Cut the hole and grind the ribs down to make a flat, smooth surface for installing the grommet.

- Make sure your hole saw is the correct size and your drill is at least 18 volts.
- Don't grind too deeply — about 1/16 inch (1.6 mm) is deep enough.

Using Standard Hole Saws ...

- 1: Use the correctly sized hole saw to cut a hole, centered on the mark.
 - 2: Trim the riser ribs back 1 inch (25 mm) from around the hole.
- Use a grinder or cutting tool to notch the ribs through to the riser wall.
 - Use a hammer and chisel to break off the notched rib sections.
 - Use a grinder to make a flat, smooth surface around the hole.

Step 2b: Clean and deburr the hole and flat surface with a wire brush and deburring knife or tool.

- Be careful not to enlarge the penetration.

Step 3: Install Grommet

Step 3a: Apply a bead of adhesive to the groove in the grommet's outer diameter.

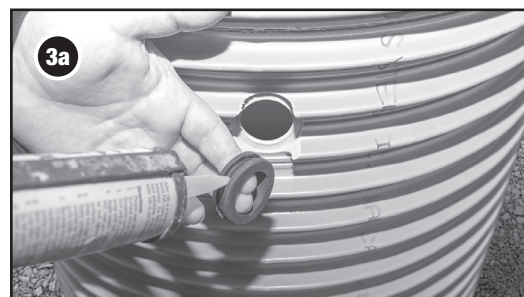
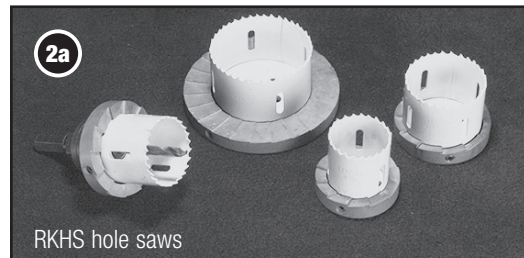
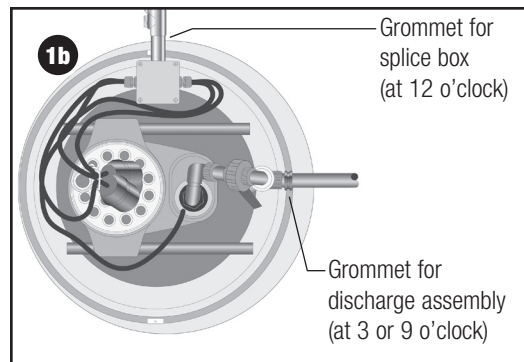
- For adhesive recommendations, see Instruction Set 7.

Step 3b: Firmly press the grommet into the penetration.

Grommet Hole Sizing Guide

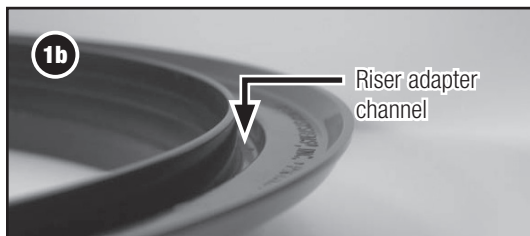
Grommet size, inches (nominal IPS pipe size)	Hole saw size
1/2	1
3/4	1-1/4
1	1-9/16
1-1/4	1-3/4
1-1/2	2-1/8
2	2-3/4
3	3-7/8
4	5

For more information on grommet dimensions and actual pipe O.D., see the Orenco Technical Data Sheet for grommets, NTD-RLA-PG-1





Cutaway view of Orenco® PRTA24-2, cast into concrete tank with 24-inch (600-mm) access riser attached



Riser adapter channel



Instruction Set 3: Riser Installation — PRTA24-2 Adapters

Step 1: Prep Adapter Channel and Riser

Step 1a: Roughen the adapter channel and the bottom surfaces of the riser with sandpaper.

Step 1b: Use a clean cloth and acetone or alcohol to clean the channel and the bottom surfaces of the riser.

- The channel must be clean and dry for a good fit and watertight joint.
- Let the acetone or alcohol dry completely.

Step 2: Apply Adhesive

Fill the channel with methacrylate adhesive.

- For adhesive recommendations, see Instruction Set 7.

Note: If you're using a methacrylate adhesive that's non-self-leveling, use enough to fully fill the channel, with no voids in the adhesive.

Step 3: Install Riser

Step 3a: If the riser has penetrations, align the riser correctly.

Step 3b: Firmly press the bottom of the riser into the channel.

- Twist the riser back and forth slightly to fully seat it and to create a good bond.
- If the inside seam is not completely filled, add adhesive to form a complete fillet.

Step 3c: Use a tongue depressor, putty knife, or clean cloth to make a good fillet over the inside seam.

Note: If cold weather conditions or frost heave are a concern at the site, contact a qualified engineer or Orenco for additional recommendations on installing ribbed PVC risers.

IMPORTANT: Orenco strongly recommends that all tank risers 12-in. (300-mm) and larger in diameter be equipped with riser safety grates to help prevent accidental or unauthorized entry.

Step 4: Test Riser Watertightness

Follow Instruction Set 6 of this document for testing the riser's watertightness.

Note: Watertight connections are critical for the wastewater system to function effectively and efficiently.

Instruction Set 4: Riser Installation — RRFTA24, RRFTA30, PRTA24, PRTA30, FRTA24-RVF, and FRTA30-FRP Adapters

Step 1: Prep Adapter and Riser

Step 1a: Roughen the bonding surfaces of the adapter and riser with sandpaper.

Step 1b: Use a clean cloth and acetone or alcohol to clean the bonding surfaces of the adapter and the riser.

- The bonding surfaces must be clean and dry for a good fit and watertight joint.
- Let the acetone or alcohol dry completely.

Step 2: Apply Methacrylate Adhesive

Apply a bead of methacrylate adhesive to the outside of the adapter.

- For adhesive recommendations, see Instruction Set 7.

Step 3: Install Riser

Step 3a: If the riser has penetrations, align the riser correctly.

Step 3b: Firmly press the riser onto the adapter until the bottom of the riser is resting on the concrete (cast-in adapters) or the adapter flange (bolted-down adapters).

- Twist the riser back and forth slightly to fully seat it and to create a good bond.

Step 3c: Apply a bead of methacrylate adhesive to the inside of the access riser-adapter joint.

Step 3d: Use a putty knife, tongue depressor, or clean shop rag to make a continuous fillet on the inside of the access riser-adapter joint.

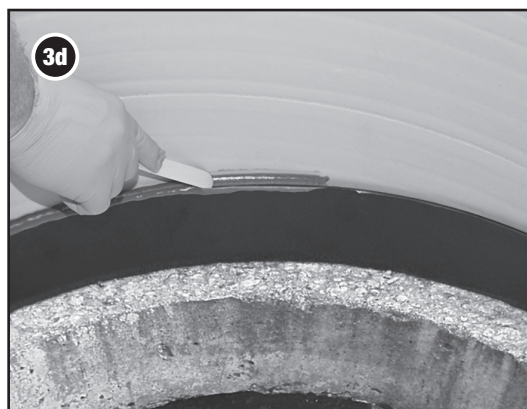
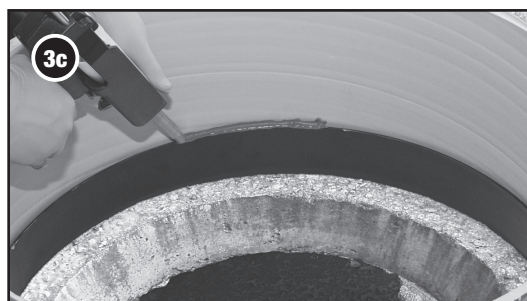
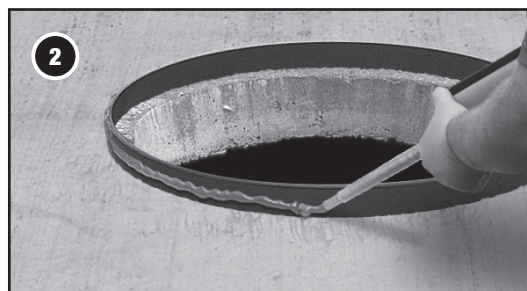
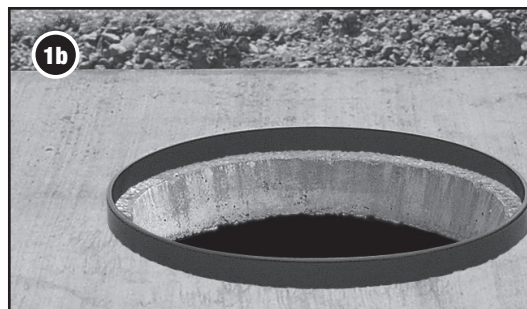
Note: If cold weather conditions or frost heave are a concern at the site, contact a qualified engineer or Orenco for additional recommendations on installing ribbed PVC risers.

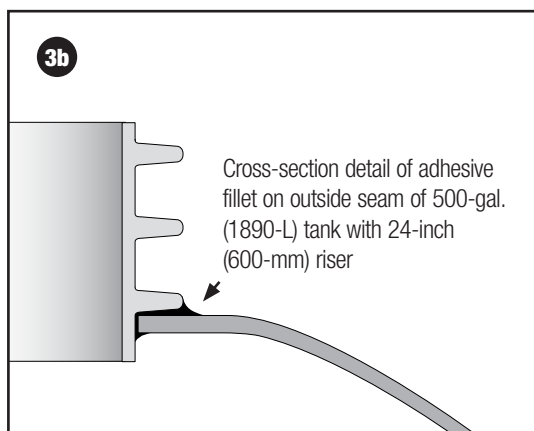
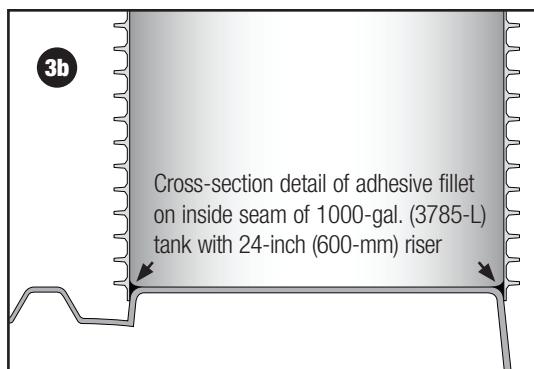
IMPORTANT: Orenco strongly recommends that all tank risers 12-in. (300-mm) and larger in diameter be equipped with riser safety grates to help prevent accidental or unauthorized entry.

Step 4: Test Riser Watertightness

Follow Instruction Set 6 of this document for testing the riser's watertightness.

Note: Watertight connections are critical for the wastewater system to function effectively and efficiently.





Instruction Set 5: Riser Installation — Orenco FRP Tanks with 24-inch- Diameter (600-mm) Risers

Step 1: Prep Tank and Riser

Step 1a: Roughen the bonding surfaces of the tank and the riser with sandpaper.

Step 1b: Use a clean cloth and acetone or alcohol to clean the roughened tank surface and the bottom surfaces of the riser.

- The surfaces must be clean and dry for a good fit and watertight joint.
- Let the acetone or alcohol dry completely.

Step 2: Apply Methacrylate Adhesive

Apply methacrylate adhesive to the bonding surfaces of the tank and the riser.

- For adhesive recommendations, see Instruction Set 7.

Step 3: Install Riser

Step 3a: If the riser has penetrations, align the riser correctly.

Step 3b: Press the riser into position

- For 1000-gal. through 2000-gal. tanks (3785-L through 7570-L), firmly press the riser onto the tank opening
- For 500-gal. (1890-L) tanks, firmly press the riser into the tank opening.
- Twist the riser back and forth slightly to fully seat it and create a good bond.
- If the seams aren't completely filled, add adhesive to form a complete fillet.

Step 3c: Use a tongue depressor, putty knife, or clean cloth to make a good fillet over the seams.

Note: If cold weather conditions or frost heave are a concern at the site, contact a qualified engineer or Orenco for additional recommendations on installing ribbed PVC risers.

IMPORTANT: Orenco strongly recommends that all tank risers 12-in. (300-mm) and larger in diameter be equipped with riser safety grates to help prevent accidental or unauthorized entry.

Step 4: Test Riser Watertightness

Follow Instruction Set 6 of this document for testing the riser's watertightness.

Note: Watertight connections are critical for the wastewater system to function effectively and efficiently.

Instruction Set 6: Riser Watertightness Testing

IMPORTANT: A watertight tank and watertight riser-to-tank connections are critical for the wastewater system to function effectively and efficiently.

Step 1: Prep for Test

Step 1a: Make sure the adhesive seams have set and the tank has been backfilled according to the manufacturer's instructions – typically to the tank's midpoint.

Step 1b: Plug the inlet (and outlet, if present) of the tank with watertight plugs.

Step 1c: Fill the tank with water to a level 2 inches (51 mm) into the riser.

Step 2: Test Watertightness

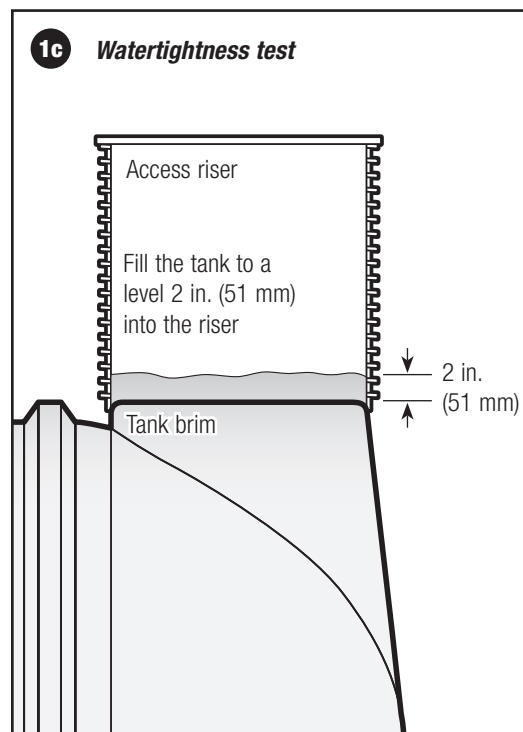
Step 2a: Wait for the required time before inspecting the riser-to-tank connections for leakage.

- Follow the tank manufacturer's recommendations (or applicable local regulations) for wait times before inspecting the tank for leaks.
- Orenco recommends at least 30 minutes for its fiberglass tanks.

Step 2b: Check for any drop in the liquid level inside of the riser and any visible leakage from the riser-to-tank connections.

- At the end of the test, there should be no drop in liquid level and no visible leakage from seams, pinholes, or other imperfections.
- If leaks are found during the test, seal the leaks and repeat the test.

Step 2c: Once the riser-to-tank connections are proven watertight, remove the plug(s) and drop the water level in the tank to just below the invert of the inlet or outlet, whichever is lower.



Instruction Set 7: Adhesive Selection and Quantities

Use the table below to select the correct adhesive and quantity for your grommet or riser installation(s). Be sure to check the expiration date on the adhesive package. If the adhesive is expired, do not use it to install Orenco components.

Note: Before installing a riser on an Orenco riser-tank adapter with an adhesive not recommended in the table below, contact your Distributor or Orenco.

Component		Adhesive Type and Approximate Usage				
		MA8120 300/300-mL cartridge (600-mL total)	SA510 300/300-mL cartridge (600-mL total)	MA320 7-oz (200-mL) packet	IPS 810 1-pint (473-mL) 1-quart (946-mL)	ADH100 10.2-oz (300-mL) tube
Grommets		n/a	n/a	n/a	n/a	various quantities
Riser Tank Adapters	FRTA36	1 cartridge*	1 cartridge*	n/a	n/a	n/a
	PRTA24	½ cartridge*	½ cartridge*	1 packet	n/a	1 tube
	PRTA24-2	≥ ½ cartridge*	≥ ½ cartridge*	n/a	< 1 pint	n/a
	PRTA30	< 1 cartridge*	< 1 cartridge*	2 packets	n/a	2 tubes
	RRFTA24	½ cartridge*	½ cartridge*	1 packet	n/a	1 tube
	RRFTA30	1 cartridge*	1 cartridge*	2 packets	n/a	n/a

* Indicates preferred adhesive for this application

DuraFiber™ Access Lids

Applications

Orenco® DuraFiber™ Access Lids provide a secure, damage-resistant covering for ribbed PVC and HDPE risers, pump basins, and access ports. They are not recommended for vehicular traffic. 24-inch (600-mm) DuraFiber lids require an RLA24 adapter to mate to 24-inch (600-mm) Perma-Loc™ pipe. 30-inch (750-mm) DuraFiber lids are not compatible with 30-inch (750-mm) RLA Riser-Lid-Adapters or 30-inch (750-mm) Perma-Loc pipe. For these products, use Orenco's FLF-Series lids.

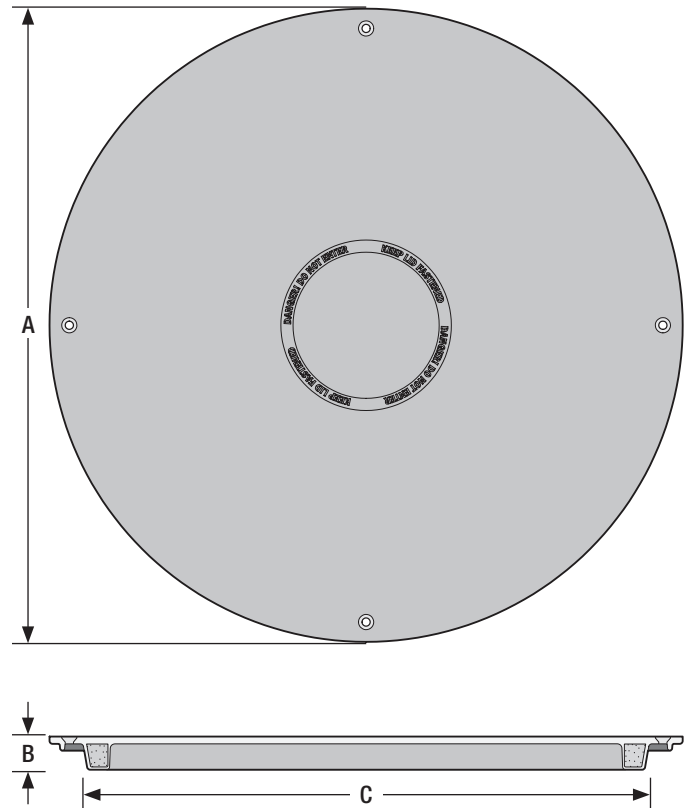
General

DuraFiber Access Lids are constructed of resin-infused fiberglass fabrics for extreme durability and damage resistance, with breaking strengths in excess of 20,000 pounds (9,000 kg).

They feature flat-style flanges for easier access, allowing clean, flush-to-grade installations. They have cored centering rings for aligning lids with risers. They also have urethane gaskets to help provide watertight seals.

DuraFiber Lids feature a non-skid surface for better grip and aesthetics, a molded-in caution statement, and room for a customer logo. They come with four 5/16-inch stainless steel flathead socket cap screws and a hex key wrench.

DuraFiber Lids are available with optional insulation, installed at the factory or in kits that can be installed in the field.



Standard Models

FLD24G, FLD24GATX, FLD24GW, FLD30G, FLD30GATX, FLD30GW

Product Code Diagram

FLD

Riser Lids: FLD 24G
Septic Tank (2)
Pump Tank (1)

Color and logo options:
Blank = green color lid
B = brown color lid
C = custom logo
ATX = AdvanTex® logo
W = warning label

Insulation:*
Blank = no insulation
I2 = 2-inch (50-mm) insulation installed
I4 = 4-inch (100-mm) insulation installed

Vent and filter options:
Blank = no vent or filter options
V = vent
CF = carbon filter

Gasket options:
G = gasket (standard)
Blank = no gasket

Lid diameter, in. (mm):
24 = 24 (600)
30 = 30 (750)

DuraFiber™ fiberglass lid

* Insulation has an R-value of 10 per 2-inch (50-mm) increment.

Materials of Construction:

Lid	Fiberglass reinforced polyester
Gasket	Urethane
Centering ring core	Structural foam
Mounting hardware	Stainless steel
Insulation (optional)	Closed-cell foam
Insulation mounting hardware	Stainless steel

Specifications

Model	FLD24XX	FLD30XX
A in. (mm)	26 (660)	33 (838)
B, in. (mm)	1½ (38)	1½ (38)
C, in. (mm)	23¼ (590)	29¼ (743)
Gasket width, in. (mm)	¾ (19)	¾ (19)
Bolt hole diameter, in. (mm)	5/16 (8)	5/16 (8)
Weight, lbs (kg)	11 (5)	20 (9)
Bolt holes, per lid	4	4

External Splice Box

Applications

The Orenco® External Splice Box attaches outside the access riser of an underground tank. It is engineered specifically for water and wastewater treatment systems and is especially suited for use in locations prone to high groundwater and other wet conditions. Its separate conduit hubs, large volume, and optional dividers make it useful for maintaining isolation of high and low voltage wires where needed. It has four cord grips which accommodate power cords for floats and pumps of 0.170 - 0.470 inches (4.3 - 11.9 mm) in diameter. Unused cord grips can be plugged watertight with the supplied cord grip plugs. Each External Splice Box is provided with a hole-cutting template to simplify installation on the riser and a 4-inch (100-mm) diameter grommet for the riser penetration.

SBEX1-4, Use As Needed

Run Cords through splice box to panel

DO NOT CUT WIRES IN SPLICE BOX IF POSSIBLE

General

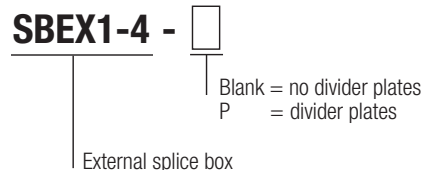
To specify the Orenco External Splice Box for your installation, require the following:

- Watertight for prolonged submergence per UL listing (Type 6P)
- Attachment external to access riser to allow inspection with no need to open the riser lid
- Volume of 100 in.³ (1639 cm³) for easy wiring access and to accommodate multiple wiring configurations
- Bottom entry, so conduit or direct-bury cable always remains below minimum burial depth
- Molded of UL (f1) rated plastic, resistant to cold and UV exposure, suitable for external applications
- Optional divider plates available for isolating high and low voltage wires from separate conduits or direct-bury cable

Standard Models

SBEX1-4, SBEX1-4-P

Product Code Diagram



The External Splice Box is molded of a UL (f1) rated PVC alloy. It has a UL Type 6P listing for prolonged submergence.

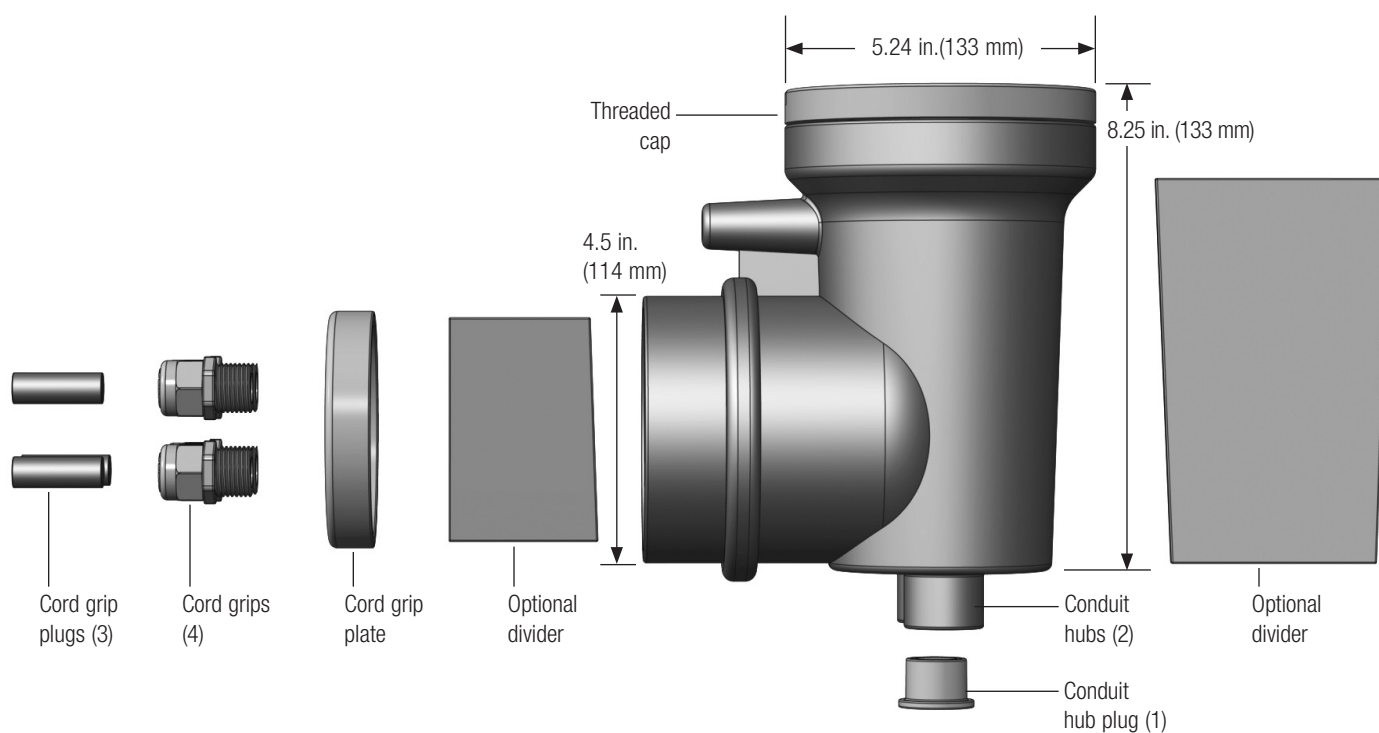
Physical Specifications

Volume	100 in.3 (1639 cm ³)
Cord grips	4 per SBEX
Cord grip plugs	3 per SBEX
Cord diameters accommodated	0.170- 0.470 in. (4.3 - 11.9 mm)
Conduit hubs	2
Conduit hub plug	1
Conduit sizes accommodated	¾ in., 1 in. (with coupling), ½ in. (with fitting or bell end)
Dia. of hole into riser	5 in. (127 mm), hole-cutting template included

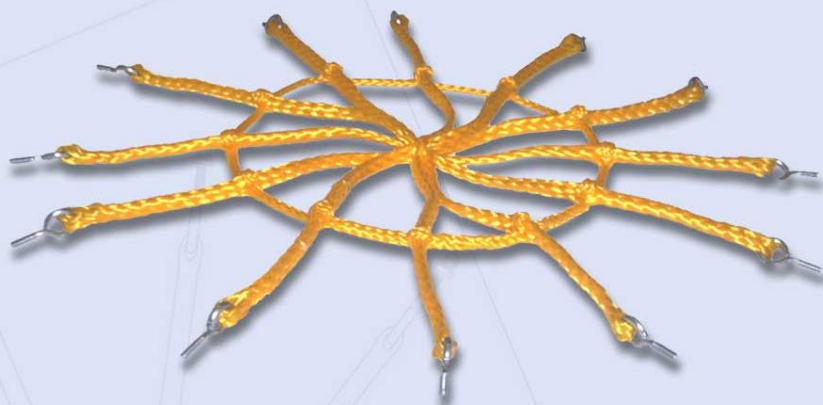
Materials of Construction

Splice box	PVC alloy
Cord grips	Nylon
Cord grip plugs	EPDM rubber
O-rings	Buna rubber
Conduit hub plug	PVC per ASTM D-1784
4-in. (100-mm) grommet*	EPDM rubber

* Grommet not shown in illustration below



Locate in every riser that does not have an inner lid.

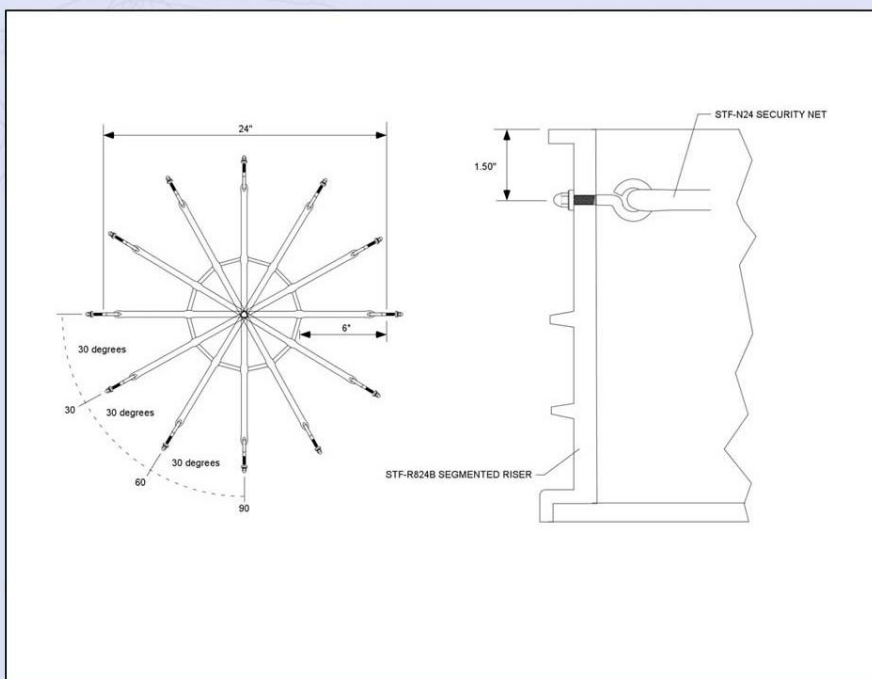


FEATURES

- ❖ Use as a security measure to keep persons, especially children, from accidental entry while systems are being serviced or any other instance where a cover is removed
- ❖ Available to fit 18", 24", and 30" diameter risers
- ❖ Open areas in web are large enough to allow tanks to be pumped without having to remove the security net
- ❖ Installs easily in our segmented riser and others

Order part No. STF-N18
STF-N24
STF-N30

CAD detail drawing available in DXF format

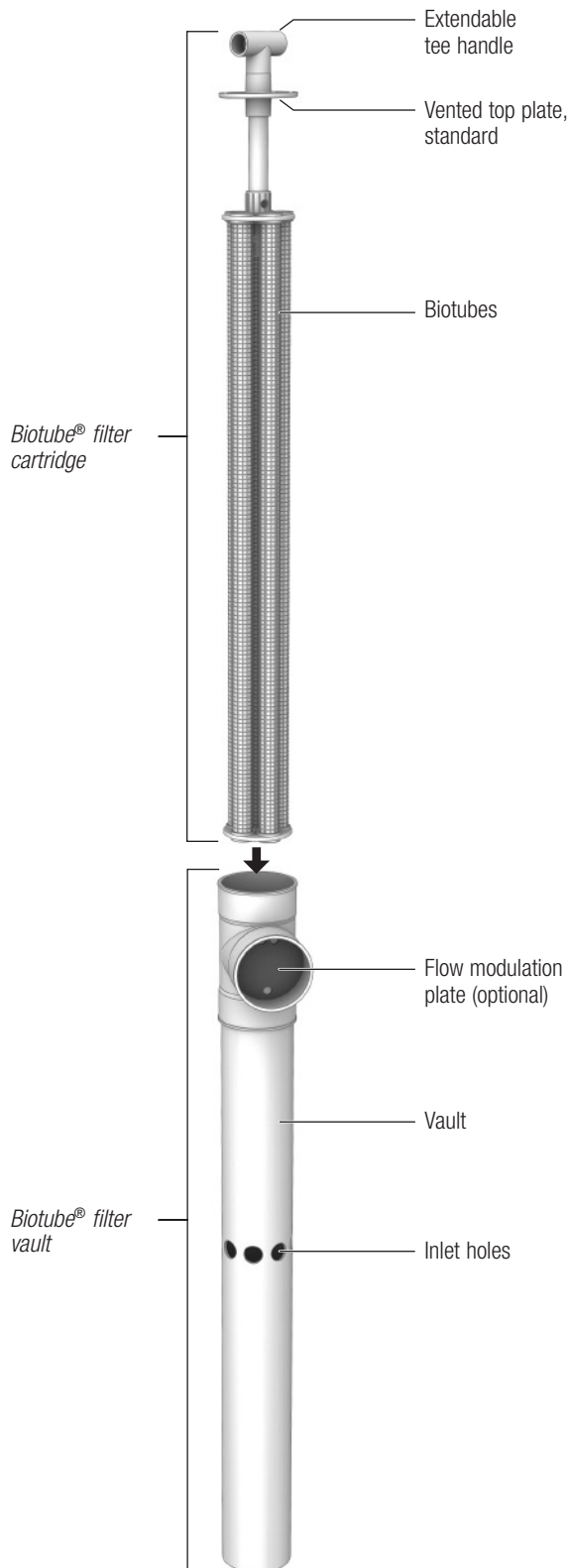


RELATED PRODUCTS

STF-CI24 page 5
STF-APC24G page 6
STF-APC24B page 6
STF-R824B page 9
STF-AR24 page 9
STF-APC24GI-075 page 14
STF-APC24BI-075 page 14
STF-APC24GI-100 page 14
STF-APC24BI-100 page 14
STF-APL24G page 14
STF-APL24B page 14

U.S. Patent Pending

4-in. (100-mm) Biotube® Effluent Filters



Applications

Orenco® 4-inch Biotube® Effluent Filters are designed to remove solids from effluent leaving residential septic tanks. They can be used in new and existing tanks at flows of up to 1200 gpd.

General

Orenco 4-inch Biotube Effluent Filters (U.S. Patents No. 4,439,323 and 5,492,635) are used to improve the quality of effluent exiting a septic tank in a residential septic system. Increased effluent quality improves system performance and extends drainfield life.

The Biotube cartridge fits tightly in the vault and is removable for maintenance. The tee handle can be extended for easy removal of the cartridge.

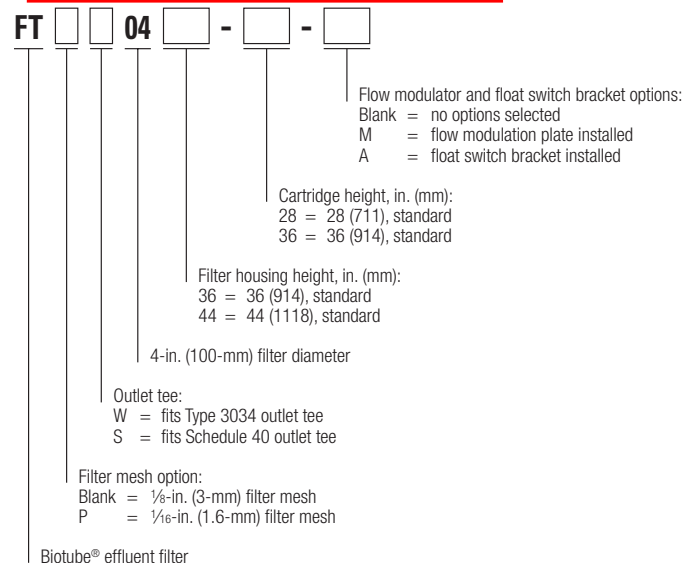
Standard Models

FTS0444-36, FTS0444-36M, FTW0436-28, FTW0436-28M

FTW0444-36, FTW0444-36M

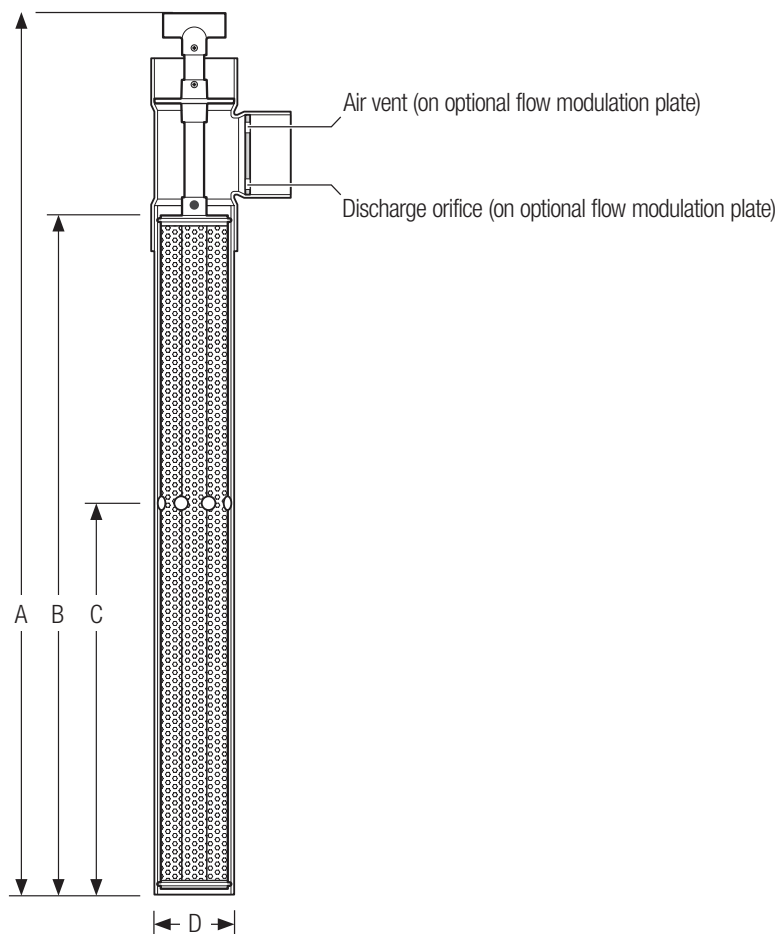
Product Code Diagram

FTP-0444-36-NC
 Install in Septic Tank



Materials of Construction

Vault	PVC
Biotube® cartridge	Polypropylene and polyethylene
Handle components	PVC, polyethylene, stainless steel



Specifications

Model	FTS0444-36/FTS0444-36MFTW0436-28/FTW0436-28M FTW0444-36/FTW0444-36M	
A - Vault height, in. (mm)	44.00 (1118)	36.00 (914)
B - Cartridge height, in. (mm)	36.00 (915)	28.00 (710)
C - Inlet hole height,* in. (mm)	21.25 (540)	19.25 (489)
D - Nominal diameter, in. (mm)	4.00 (100)	4.00 (100)
Number of inlet holes	8	8
Inlet hole diameter, in. (mm)	1.13 (29)	1.13 (29)
Number of discharge orifices	1 or 2 [†]	1 or 2 [†]
Discharge orifice diameter, in. (mm)	4.00 or 0.25 (100 or 6) [†]	4.00 or 0.25 (100 or 6) [†]
Discharge coupling diameter, in. (mm)	4.00 (100)	4.00 (100)
Number of air vents	1	1
Air vent diameter, flow modulation plate, in. (mm)	0.50 (13)	0.50 (13)
Filter surface area, [‡] ft ² (m ²)	5.1 (0.50)	3.9 (0.40)
Flow area,** ft ² (m ²)	1.5 (0.15)	1.2 (0.12)

* Inlet hole height can vary depending on the configuration of the tank. Optimum hole height is 70% of the minimum liquid level.

[†] Available on optional flow modulation plate.

[‡] Filter area is defined as the total surface area of all individual Biotubes[®] within the filter cartridge.

** Flow area is defined as the total open area (or area of the mesh openings) of all the individual Biotubes within the filter cartridge.

4-in. Biotube[®] Effluent Filter

Installation and Maintenance Instructions

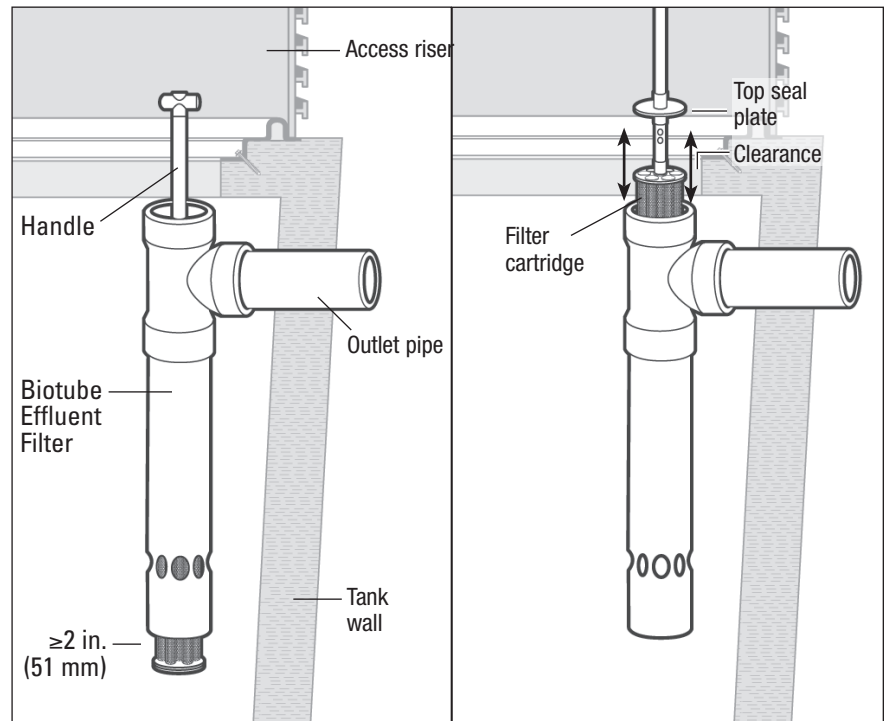
Biotube Effluent Filters* extend drainfield life by preventing solids from leaving the septic tank. Our 4-in. (nominal size) filter comes in its own housing, in both 44-in. (1118-mm) and 36-in. (914-mm) lengths. Our Jr. insert filter is 18 in. (457 mm) long, fits in a nominal 4-in. outlet tee, and comes with or without its own housing. Biotube Effluent Filters install in minutes, inside new or existing tanks.

Installation Instructions

Step 1: Test-Fit the Effluent Filter

Test-fit the effluent filter on the septic tank's outlet pipe without gluing. Make sure it fits plumb. Install the assembly as snug as possible to the tank wall, but ensure sufficient clearance for removing the filter cartridge.

If using the 4-in. Biotube Insert Filter, adjust the length of the outlet tee so that the bottom of the Insert Filter extends at least 2 in. (51 mm) below the bottom of the outlet tee.



*Protected by U.S. Patent Numbers 5,492,635 and 4,439,323

Installation Instructions (continued)

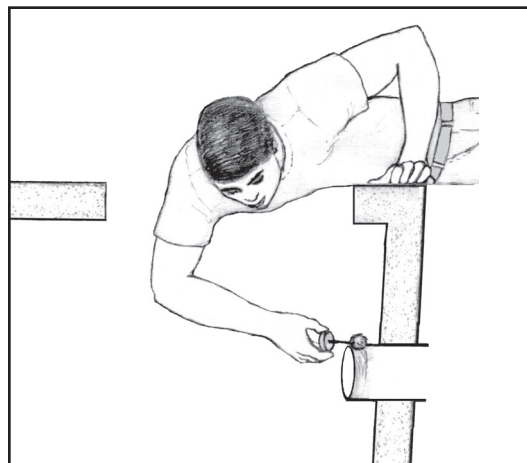
Step 2: Attach Filter to Tank

Two attachment methods can be used:

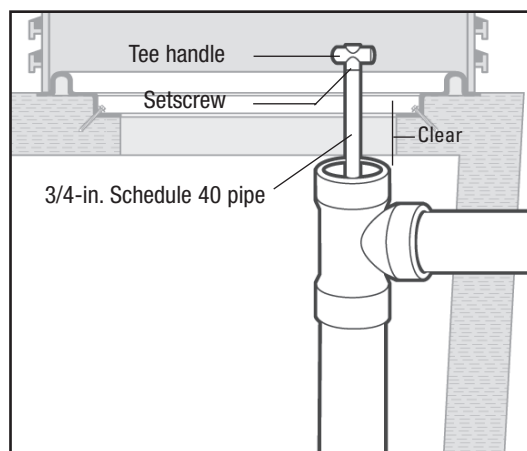
- 1) Glue the filter onto the tank outlet pipe using appropriate primer and glue.
- 2) A stainless steel setscrew can be used to secure the filter instead of glue.

Step 3: Extend Cartridge Handle

For easier access when servicing, the cartridge handle may be extended using a longer length of 3/4-in. Schedule 40 PVC pipe.



This illustration shows the gluing technique for installing a filter into a new septic tank. Installing a filter into an existing tank is a custom, site-specific job.



Cartridge handles can be extended for easier access.

Maintenance Instructions

To ensure the effluent filter is functioning properly, inspect it every year. Under normal conditions, your effluent filter will function for several years before cleaning is necessary. Clean the filter when it becomes clogged enough to restrict normal flows out of the septic tank. At a minimum, clean the filter whenever the tank is pumped. High-level alarms, which activate when the filter is clogged, are recommended to prevent backups.

Be sure to dress properly when inspecting and cleaning the filter. Wear full-length pants and shirt, shoes, gloves, and goggles or glasses.

Step 1

Remove the access lid to your septic tank by unscrewing the stainless steel lid bolts with the hex head wrench provided. If your lid is above ground, it will be easy to find. If it is buried below ground, find the marker that indicates its location.

Step 2

Remove the filter cartridge by grasping the tee handle and lifting it out of its housing.

Step 3

Spray the cartridge tubes with a hose to remove any material sticking to them. Ensure that the three orifices in the optional flow modulation plate inside the filter are clear of any debris. Make sure the rinse water runs back into the tank, but do not allow solids material to fall into the open filter housing.

Step 4

Firmly place the cartridge back into the housing.

Step 5

Some effluent filters come with an alarm that activates when the filter needs cleaning. If you have an alarm, check to make sure it is working by lifting the float with a stick. An audible horn should sound. The alarm panel is normally mounted on the side of the house or in the garage.

Note: If your effluent filter doesn't have an alarm system and you would like one, call your local septic system installer.

Step 6

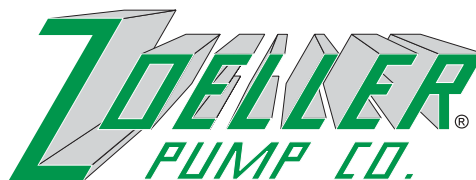
Record the date that you inspected and/or cleaned your filter on the form that follows this page. If you checked the alarm or made any other observations about the tank or system, include that information under "Notes."

Step 7

Attach the access lid by placing it on the riser, matching the holes in the lid with the holes in the riser. Insert each lid bolt through the lid and the hole in the riser and tighten with hex head wrench provided. Before leaving, pull up firmly on the lid to make sure it is secure.

"QUALITY PUMPS SINCE 1939"

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.



SECTION: 2.20.010

FM0493

0311

Supersedes

0810

PRIMARY

N57, 115V, 1 Ph, 60 Hz, 0.30 HP
1-1/2" NPT Discharge

COMPARE THESE FEATURES

- Non-Clogging vortex impeller
- Float operated, submersible (NEMA 6) 2-pole mechanical switch & variable level long cycle systems available
- UL Listed 3-wire cord plug; 9 ft. standard for automatic, 15 ft. standard for nonautomatic
- Corrosion resistant powder coated epoxy finish
- No sheet metal parts to rust or corrode
- Stainless steel screws, switch arm, guard and handle
- No screens to clog
- Watertight neoprene "□" ring between motor and pump housing
- Solid buoyant polypropylene float
- Motor - 60 Hz, 1550 RPM, oil-filled, hermetically sealed, automatic reset thermal overload protected
- Upper and lower sleeve bearings running in bath of oil
- Entire unit pressure tested after assembly
- Carbon and ceramic shaft seal
- Maximum temperature for effluent or dewatering—130°F (54°C)
- Passes 1/2" inch spherical solids
- 1 1/2" NPT Discharge.
- On point—7 1/4" • Off point—3"
- Major width—10 3/32" • Height—10 1/16"

SPECIAL MODEL FEATURES:

MODEL 53

- Cast iron switch case, motor & pump housing
- Engineered thermoplastic base
- Engineered, glass-filled, plastic impeller with metal insert
- Stainless steel guard & handle
- Bearing - lower & upper oil fed cast iron

MODEL 57

- All cast iron construction
- Stainless steel guard & handle
- Bearing - lower & upper oil fed cast iron
- Cast iron impeller

MODEL 55

- Bronze switch case, motor & pump housing
- Engineered thermoplastic base
- Engineered, glass-filled, plastic impeller with metal insert
- Stainless steel guard & handle
- Bearing - lower & upper oil fed bronze

MODEL 59

- All bronze construction
- Stainless steel guard & handle
- Bearing - lower & upper oil fed bronze
- Bronze impeller

ALL MODELS ARE COMPLETELY SUBMERSIBLE HERMETICALLY SEALED

Watertight - dust tight. Permanently oiled bearings.

VARIABLE LEVEL CONTROL SYSTEMS AVAILABLE

Note: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-PUMP • FAX (502) 774-3624

visit our web site:
www.zoeller.com

53 - 57 Cast Iron Series

55 - 59 Bronze Series

(For Pump Prefix Identification see News & Views 0052)

"MIGHTY-MATE"

SUBMERSIBLE PUMP

FOR

DEWATERING (SUMP)

OR

EFFLUENT (SEPTIC TANK SYSTEMS)



Tested to UL
Standard UL778.



C US
(Tested to UL778 and
CSA22.2 108 Standards)



PASSES 1/2" SOLIDS

1 1/2" NPT DISCHARGE

AUTOMATIC MODEL



VORTEX TYPE
IMPELLER

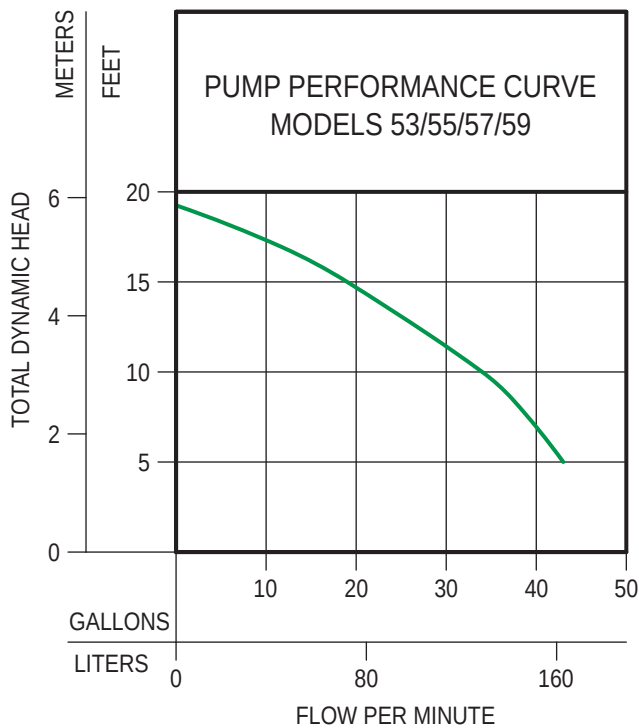


BN MODEL



MODELS AVAILABLE

- Automatic or Nonautomatic
- "53 - 57" - .3 HP, 115V or 230V
- "55 - 59" - .3 HP, 115V or 230V
- BE53/BE57 & BN53/BN57 available packaged with Piggyback Variable Level Float Switch



009897

TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT AND DEWATERING

MODEL		53/55/57/59	
Feet	Meters	Gal.	Liters
5	1.5	43	163
10	3.0	34	129
15	4.6	19	72
Shut-off Head:		19.25 ft.(5.9m)	

CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Variable level float switches available
- Variable level long cycle systems available
- Available with special cord lengths of 15', 25', 35', (50' 230V only)
- Alarm systems available
- Duplex systems available

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. Single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. Mechanical alternator "M-Pak" 10-0072 or 10-0075.
4. See FM0712 for correct model of Electrical Alternator.
5. Variable level control switch 10-0225 used as a control activator, with Electrical Alternator (3) or (4) float system.

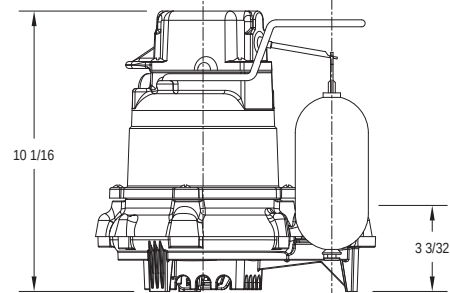
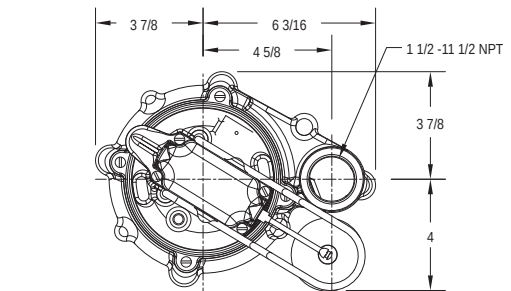
Single Seal		Control Selection					Listings	
Model	Volts	Phase	Mode	Amps	Simplex	Duplex	CSA	UL
M53/55 & M57/59	115	1	Auto	9.7	1	-----	Y	Y
N53/55 & N57/59	115	1	Non	9.7	2	3 or 4 & 5	Y	Y
* BN53	115	1	Auto	9.7	*	-----	Y	Y
* BN57	115	1	Auto	9.7	*	-----	N	Y
* BE53/57	230	1	Auto	4.8	*	-----	Y	Y
D53/55 & D57/59	230	1	Auto	4.8	1	-----	Y	Y
E53/55 & E57/59	230	1	Non	4.8	2	3 or 4 & 5	Y	Y

* Single piggyback switch included.

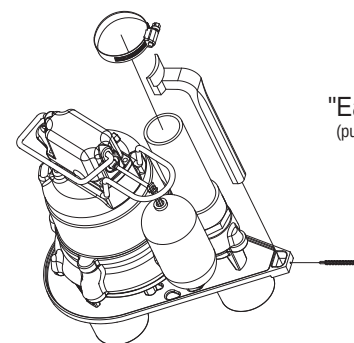
CAUTION

All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Sump/ Sewage Basins, FM0487; and Single Phase Simplex Pump Control/Alarm Systems, FM0732.



SK858



"Easy assembly"
(pump & discharge pipe
not included.)

OPTIONAL PUMP STAND P/N 10-2421

- Reduces potential clogging by debris
 - Replaces rocks or bricks under the pump
 - Made of durable, noncorrosive ABS
 - Raises pump 2" off bottom of basin
 - Provides the ability to raise intake by adding sections of 1½" or 2" PVC piping
 - Attaches securely to pump
 - Accommodates sump, dewatering and effluent applications
- NOTE: Make sure float is free from obstruction.

RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.

PRIMARY

N57, 115V, 1 Ph, 60 Hz, 0.30 HP
1-1/2" NPT Discharge

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-7867 • FAX (502) 774-3624

visit our web site:
www.zoeller.com

SPECIFICATIONS

EFFLUENT/SUMP SIMPLEX SYSTEM

ZOELLER SUBMERSIBLE DEWATERING OR EFFLUENT PUMPS

SEAL	SOLIDS	DISCHARGE	MATERIAL	MODELS							
Single	1/2"	1½" NPT	Cast Iron	53	57	98	140	151			
Single	1/2"	1½" NPT	Cast Bronze	55	59						
Single	5/8"	1½" NPT	Cast Iron	137	191						
Single	5/8"	1½" NPT	Cast Bronze	139							
Single	3/4"	1½" NPT	Cast Iron	145	152	153					
Single	3/4"	1½", 2", or 3 NPT	Cast Iron	161	163	165	185	186	188	189	
Double	1/2"	1½"	Cast Iron	4140							
Double	3/4"	1½", 2", or 3 NPT	Cast Iron	4145	4161	4163	4165	4185	4186	4188	4189

SIMPLEX SYSTEM

Furnish a Zoeller Submersible Pump Model N57 Single Seal or Model _____ Double Seal, with a capacity of 28.6 GPM against a Total Dynamic Head of 8.6 feet. Motor Specification: 115 Voltage, 60 Cycles, 1 Phase, 0.3 HP. Discharge to be X 1½ inch NPT. Optional _____ 2 inch NPT or _____ 3 inch NPT (161/4161 - 189/4189). Cord length to be 20 feet. Pumps will pass X ½ inch solids (53,55,57,59, 98, 140/4140 & 151 Series) or _____ 5/8 inch solids (137 & 139 Series) or _____ 3/4 inch solids (145/4145, 152, 153, 161/4161, 163/4163, 165/4165, 185/4185, 186/4186, 188/4188 & 189/4189 Series.) Pumps shall be _____ UL Listed, X CSA Certified, X SSPMA certified, _____ State of Wisc. approved, _____ other (Specify _____).

SINGLE PHASE PUMPS

GENERAL

Pump motor shall be hermetically sealed, submersible type operating in a high quality dielectric oil for cooling the windings and for lubrication of the motor bearings and ceramic-carbon shaft seal. Single phase motor shall have internal automatic resetting, thermal overload protection. Construction shall be of _____ cast iron with 100% baked-on powder coated epoxy finish for corrosion resistance and longer casting durability (or _____ cast bronze). All fasteners and external metal parts shall be of stainless steel. Impeller shall be of vortex non-clog design. (Addition noted below.) Check applicable series:

_____ 53 (cast iron) _____ 55 (cast bronze) series pump shall have a shaded pole motor. Impeller, with metal insert, and base shall be of glass reinforced molded material. Switch case shall be of cast or molded material. Guard and handle shall be of stainless steel.

X 57 (cast iron) _____ 59 (cast bronze) series pump shall have a shaded pole motor. Guard and handle shall be of stainless steel.

_____ 98 (cast iron) series pump shall have ½ HP PSC motor.

_____ 137 (cast iron) _____ 139 (cast bronze) series pump shall have ½ HP split phase motor with current sensing, starting relay enclosed in switch housing.

_____ 151 (.33 HP) _____ 152 (.4 HP) _____ 153 (½ HP) series pump shall have a permanent split capacitor motor. The impeller shall be "glass reinforced thermoplastic." Motor housing shall be cast iron.

_____ 145 (¾ HP) _____ 140 (1 HP) series pump shall have a permanent split capacitor motor with capacitor in the switch housing attached to the pump. The impeller shall be "glass reinforced thermoplastic." Motor housing shall be cast iron. Discharge shall be a permanently affixed 1½ inch female NPT hub.

_____ 4140 (1 HP cast iron) _____ (4145 (¾ HP cast iron) series pump with double carbon/ceramic shaft seals shall have a 1 HP permanent split capacitor motor with capacitor in the switch housing attached to the pump. The impeller shall be "glass reinforced thermoplastic." Motor housing shall be cast iron. Discharge shall be a permanently affixed 1½ inch female NPT hub. The lower seal cavity shall be oil-filled.

_____ 161 (½ HP) _____ 163 (½ HP) _____ 165 (1 HP) cast iron series pump shall have a permanent split capacitor motor with run capacitor and magnetic contactor enclosed

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies



REPAIR

N57, 115V, 1 Ph, 60 Hz, 0.30 HP
1-1/2" NPT Discharge

COMPARE THESE FEATURES

- Non-Clogging vortex impeller
- Float operated, submersible (NEMA 6) 2-pole mechanical switch & variable level long cycle systems available
- UL Listed 3-wire cord plug; 9 ft. standard for automatic, 15 ft. standard for nonautomatic
- Corrosion resistant powder coated epoxy finish
- No sheet metal parts to rust or corrode
- Stainless steel screws, switch arm, guard and handle
- No screens to clog
- Watertight neoprene "□" ring between motor and pump housing
- Solid buoyant polypropylene float
- Motor - 60 Hz, 1550 RPM, oil-filled, hermetically sealed, automatic reset thermal overload protected
- Upper and lower sleeve bearings running in bath of oil
- Entire unit pressure tested after assembly
- Carbon and ceramic shaft seal
- Maximum temperature for effluent or dewatering—130°F (54°C)
- Passes 1/2" inch spherical solids
- 1 1/2" NPT Discharge.
- On point—7 1/4" • Off point—3"
- Major width—10 3/32" • Height—10 1/16"

SPECIAL MODEL FEATURES:

MODEL 53

- Cast iron switch case, motor & pump housing
- Engineered thermoplastic base
- Engineered, glass-filled, plastic impeller with metal insert
- Stainless steel guard & handle
- Bearing - lower & upper oil fed cast iron

MODEL 57

- All cast iron construction
- Stainless steel guard & handle
- Bearing - lower & upper oil fed cast iron
- Cast iron impeller

MODEL 55

- Bronze switch case, motor & pump housing
- Engineered thermoplastic base
- Engineered, glass-filled, plastic impeller with metal insert
- Stainless steel guard & handle
- Bearing - lower & upper oil fed bronze

MODEL 59

- All bronze construction
- Stainless steel guard & handle
- Bearing - lower & upper oil fed bronze
- Bronze impeller

ALL MODELS ARE COMPLETELY SUBMERSIBLE HERMETICALLY SEALED

Watertight - dust tight. Permanently oiled bearings.

VARIABLE LEVEL CONTROL SYSTEMS AVAILABLE

Note: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
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visit our web site:
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53 - 57 Cast Iron Series

55 - 59 Bronze Series

(For Pump Prefix Identification see News & Views 0052)

"MIGHTY-MATE"

SUBMERSIBLE PUMP

FOR

DEWATERING (SUMP)

OR

EFFLUENT (SEPTIC TANK SYSTEMS)



Tested to UL
Standard UL778.



C US
(Tested to UL778 and
CSA22.2 108 Standards)



PASSES 1/2" SOLIDS
1 1/2" NPT DISCHARGE

AUTOMATIC MODEL



VORTEX TYPE IMPELLER

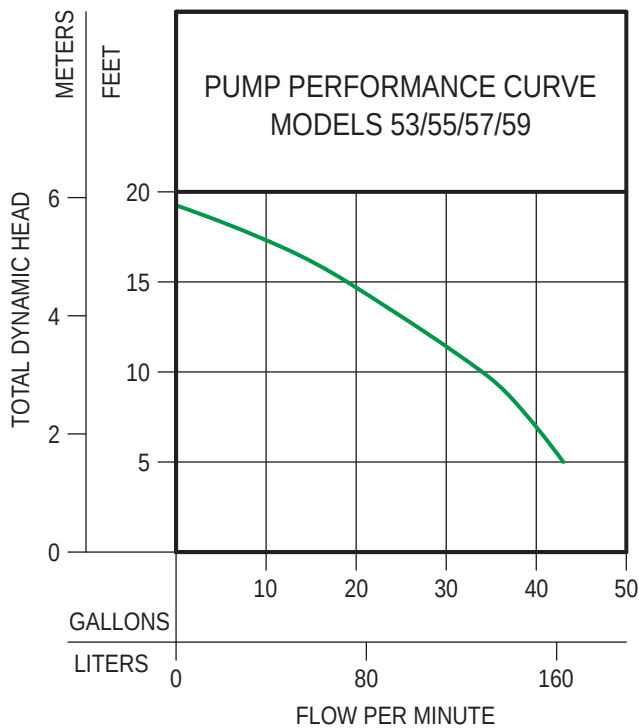


BN MODEL

MODELS AVAILABLE

- Automatic or Nonautomatic
- "53 - 57" - .3 HP, 115V or 230V
- "55 - 59" - .3 HP, 115V or 230V
- BE53/BE57 & BN53/BN57 available packaged with Piggyback Variable Level Float Switch





009897

CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Variable level float switches available
- Variable level long cycle systems available
- Available with special cord lengths of 15', 25', 35', (50' 230V only)
- Alarm systems available
- Duplex systems available

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. Single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. Mechanical alternator "M-Pak" 10-0072 or 10-0075.
4. See FM0712 for correct model of Electrical Alternator.
5. Variable level control switch 10-0225 used as a control activator, with Electrical Alternator (3) or (4) float system.

Single Seal Model	Control Selection						Listings	
	Volts	Phase	Mode	Amps	Simplex	Duplex	CSA	UL
M53/55 & M57/59	115	1	Auto	9.7	1	-----	Y	Y
N53/55 & N57/59	115	1	Non	9.7	2	3 or 4 & 5	Y	Y
* BN53	115	1	Auto	9.7	*	-----	Y	Y
* BN57	115	1	Auto	9.7	*	-----	N	Y
* BE53/57	230	1	Auto	4.8	*	-----	Y	Y
D53/55 & D57/59	230	1	Auto	4.8	1	-----	Y	Y
E53/55 & E57/59	230	1	Non	4.8	2	3 or 4 & 5	Y	Y

* Single piggyback switch included.

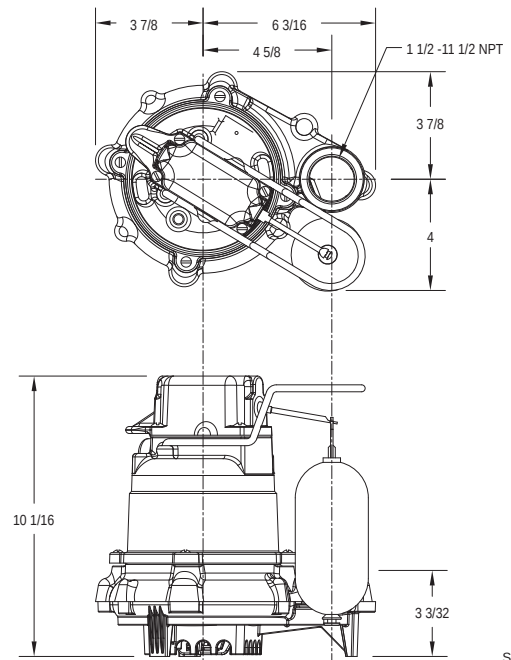
CAUTION

All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

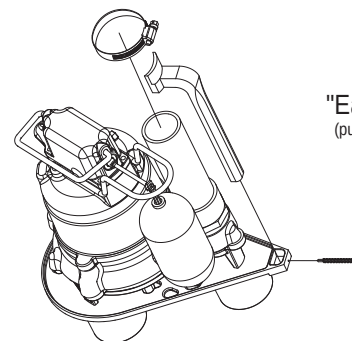
For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Sump/ Sewage Basins, FM0487; and Single Phase Simplex Pump Control/Alarm Systems, FM0732.

TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT AND DEWATERING

MODEL		53/55/57/59	
Feet	Meters	Gal.	Liters
5	1.5	43	163
10	3.0	34	129
15	4.6	19	72
Shut-off Head:		19.25 ft.(5.9m)	



SK858



"Easy assembly"
(pump & discharge pipe
not included.)

OPTIONAL PUMP STAND P/N 10-2421

- Reduces potential clogging by debris
 - Replaces rocks or bricks under the pump
 - Made of durable, noncorrosive ABS
 - Raises pump 2" off bottom of basin
 - Provides the ability to raise intake by adding sections of 1½" or 2" PVC piping
 - Attaches securely to pump
 - Accommodates sump, dewatering and effluent applications
- NOTE: Make sure float is free from obstruction.

RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.

REPAIR

N57, 115V, 1 Ph, 60 Hz, 0.30 HP
1-1/2" NPT Discharge

SPECIFICATIONS

**EFFLUENT/SUMP SIMPLEX SYSTEM
ZOELLER SUBMERSIBLE DEWATERING OR EFFLUENT PUMPS**

SEAL	SOLIDS	DISCHARGE	MATERIAL	MODELS							
Single	1/2"	1½" NPT	Cast Iron	53	57	98	140	151			
Single	1/2"	1½" NPT	Cast Bronze	55	59						
Single	5/8"	1½" NPT	Cast Iron	137	191						
Single	5/8"	1½" NPT	Cast Bronze	139							
Single	3/4"	1½" NPT	Cast Iron	145	152	153					
Single	3/4"	1½", 2", or 3 NPT	Cast Iron	161	163	165	185	186	188	189	
Double	1/2"	1½"	Cast Iron	4140							
Double	3/4"	1½", 2", or 3 NPT	Cast Iron	4145	4161	4163	4165	4185	4186	4188	4189

SIMPLEX SYSTEM

Furnish a Zoeller Submersible Pump Model N57 Single Seal or Model _____ Double Seal, with a capacity of 30.6 GPM against a Total Dynamic Head of 5.9 feet. Motor Specification: 115 Voltage, 60 Cycles, 1 Phase, 0.3 HP. Discharge to be X 1½ inch NPT. Optional _____ 2 inch NPT or _____ 3 inch NPT (161/4161 - 189/4189). Cord length to be 20 feet. Pumps will pass X ½ inch solids (53,55,57,59, 98, 140/4140 & 151 Series) or _____ 5/8 inch solids (137 & 139 Series) or _____ 3/4 inch solids (145/4145, 152, 153, 161/4161, 163/4163, 165/4165, 185/4185, 186/4186, 188/4188 & 189/4189 Series.) Pumps shall be _____ UL Listed, X CSA Certified, X SSPMA certified, _____ State of Wisc. approved, _____ other (Specify _____).

SINGLE PHASE PUMPS

GENERAL

Pump motor shall be hermetically sealed, submersible type operating in a high quality dielectric oil for cooling the windings and for lubrication of the motor bearings and ceramic-carbon shaft seal. Single phase motor shall have internal automatic resetting, thermal overload protection. Construction shall be of _____ cast iron with 100% baked-on powder coated epoxy finish for corrosion resistance and longer casting durability (or _____ cast bronze). All fasteners and external metal parts shall be of stainless steel. Impeller shall be of vortex non-clog design. (Addition noted below.)

Check applicable series:

_____ 53 (cast iron) _____ 55 (cast bronze) series pump shall have a shaded pole motor. Impeller, with metal insert, and base shall be of glass reinforced molded material. Switch case shall be of cast or molded material. Guard and handle shall be of stainless steel.

X 57 (cast iron) _____ 59 (cast bronze) series pump shall have a shaded pole motor. Guard and handle shall be of stainless steel.

_____ 98 (cast iron) series pump shall have ½ HP PSC motor.

_____ 137 (cast iron) _____ 139 (cast bronze) series pump shall have ½ HP split phase motor with current sensing, starting relay enclosed in switch housing.

_____ 151 (.33 HP) _____ 152 (.4 HP) _____ 153 (½ HP) series pump shall have a permanent split capacitor motor. The impeller shall be "glass reinforced thermoplastic." Motor housing shall be cast iron.

_____ 145 (¾ HP) _____ 140 (1 HP) series pump shall have a permanent split capacitor motor with capacitor in the switch housing attached to the pump. The impeller shall be "glass reinforced thermoplastic." Motor housing shall be cast iron. Discharge shall be a permanently affixed 1½ inch female NPT hub.

_____ 4140 (1 HP cast iron) _____ (4145 (¾ HP cast iron) series pump with double carbon/ceramic shaft seals shall have a 1 HP permanent split capacitor motor with capacitor in the switch housing attached to the pump. The impeller shall be "glass reinforced thermoplastic." Motor housing shall be cast iron. Discharge shall be a permanently affixed 1½ inch female NPT hub. The lower seal cavity shall be oil-filled.

_____ 161 (½ HP) _____ 163 (½ HP) _____ 165 (1 HP) cast iron series pump shall have a permanent split capacitor motor with run capacitor and magnetic contactor enclosed

Installer Friendly Series® Control Panels

The innovative **Installer Friendly Series®** control panels from SJE-Rhombus® feature an **easy-to-use touch pad** on the inner door for programming and monitoring on-site installations.

- IFS Single Phase Simplex Demand/Timed Dose Panel
- IFS Single Phase Duplex Demand/Timed Dose Panel

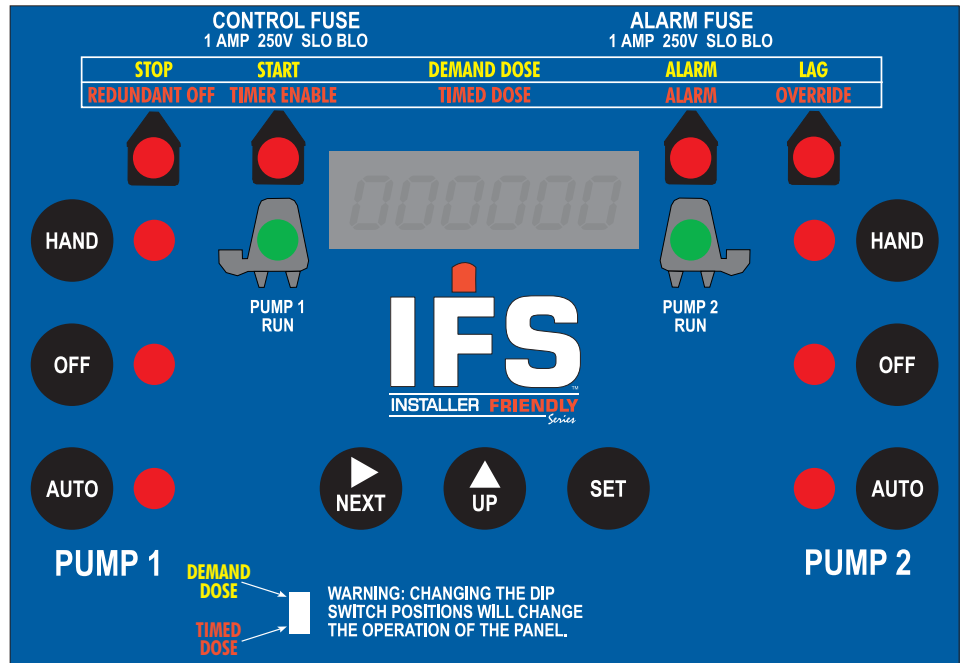
IFS PANEL FEATURES:

- **NEMA 4X** weatherproof enclosure for indoor/outdoor use
- Inner door for added safety
- New innovative circuit board design offers a clean installation
- Separate control and alarm fuses
- Digital display board is standard
- Alarm beacon and horn (85 decibel rating) provides audio/visual warning of alarm condition
- Test / normal / silence switch
- Panel can be easily converted to either demand dose to timed dose in the field
- Easy to read float/pump wiring diagram
- Instruction label on inside cover for viewing and programming digital display
- Includes float switches
- Includes step-by-step installation instructions



1-888-DIAL-SJE (1-888-342-5753)
www.sjerrhombus.com

Installer Friendly Series name and logo Reg. Cdn. Pat. & Tm. Off., Marque Déposée.
©SJE-Rhombus 03/11



TOUCH PAD/DISPLAY FEATURES:

- Easy-to-use touch pad for programming pump control
- Pump run indicator(s)
- Float status indicators, including float out-of-sequence alarm
- HAND/OFF/AUTO pump control switch(es)
- Hand mode safety feature
- Six digit LED display (now a standard feature) includes:
 - Elapsed time meter(s)
 - Cycle counter(s)
 - Alarm counter
 - Lead/Lag Selector toggles pump operation (duplex models)
 - Float error counter
 - Override counter (timed dose)

INSTALLER FRIENDLY SERIES® - IFS Single Phase Simplex (Demand/TD)

Single phase, simplex demand dose or timed dose, float or C-Level™ controlled system for pump control and system monitoring.

The IFS simplex control panel is designed to control one 120, 208, 240 VAC single phase pump in water and sewage installations. The panel features an easy-to-use touch pad with display on the inner door for programming and system monitoring. The panel configuration can be easily converted in the field to either a timed dose or demand dose.

The optional C-Level™ sensor is a pressure transducer that senses the liquid level in the tank and sends a signal to the IFS panel. Pump activation levels can be adjusted by using the panel touch pad. C-Level™ CL40 sensor operating range is 3-39.9 inches (7.6-101.3 cm). C-Level™ CL100 operating range is 3-99.5 inches (7.6-252.7 cm).

TOUCH PAD FEATURES

- A. **Level Status Indicators** illuminate when floats or set points are activated. Alarm will activate if a float operates out of sequence.
- B. **HOA (Hand-Off-Automatic) Buttons** control pump mode with indication. Hand mode defaults to Automatic when stop level or redundant off level is reached.
- C. **Pump Run Indicator** illuminates when pump is called to run.
- D. **LED Display** shows system information including: level in inches or centimeters (C-Level™ only), mode, pump elapsed time (hh:mm), events (cycles), alarm counter, float error count, timed dose override counter (timed dose only), and ON/OFF times (timed dose only).
- E. **NEXT Push Button** toggles display.
- F. **UP and SET Push Buttons** set pump ON/OFF times (timed dose only) or activation levels (C-Level™ only).

PANEL COMPONENTS

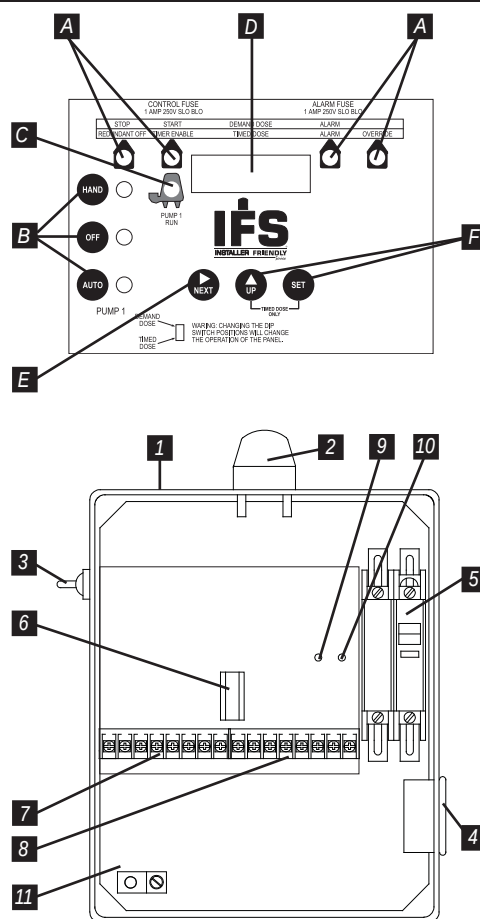
1. **Enclosure base** measures 10 X 8 X 4 inches (25.4 X 20.32 X 10.16 cm). NEMA 4X (ultraviolet stabilized thermoplastic with removable mounting feet for outdoor or indoor use). **Note:** Options, voltage, and amp range selected may change enclosure size and component layout.
2. **Red Alarm Beacon** provides 360° visual check of alarm condition.
3. **Exterior Alarm Test/Normal/Silence Switch** allows horn and light to be tested and horn to be silenced in an alarm condition. Alarm automatically resets once alarm condition is cleared.
4. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating).
5. **Circuit Breaker** (optional) provides pump disconnect and branch circuit protection.
6. **Power Relay** controls pump by switching electrical lines. Definite purpose contactor used when pump full load amps are above 15.
7. **Float Connection Terminal Block**
8. **Incoming Control/Alarm Power & Pump Terminal Block**
9. **Control Power Indicator/Fuse** indicator light illuminates if control power is present in panel. Alarm will activate if control fuse is blown.
10. **Alarm Power Indicator/Fuse** indicator light illuminates if alarm power is present in panel.
11. **Ground Lug**

NOTE: Schematic/Wiring Diagram and Pump Specification Label are located inside the panel on enclosure cover

OPTIONAL FEATURE

- **34" (86.36cm) Panel Mounting Post** (Factory Installed). Includes Duplex Installation Kit (Enclosure upsized to 10" x 8" x 6" (25.4 x 20.32 x 15.24 cm). Max. Enclosure size 14" x 12" x 6" (35.56 x 30.48 x 15.24 cm)

SEE BACKSIDE FOR COMPLETE LISTING OF AVAILABLE OPTIONS.



Model Shown IFS11W114X8AC

Reg. Cdn Pat. & TM Off
C-Level™ Sensor US Patent 8,336,385. Other patents pending.

FEATURES

- Entire control system is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes:
Demand Dose - three 20' SJE MilliAmpMaster™ control switches
Timed Dose - two 20' SJE MilliAmpMaster™ control switches
- Complete with step-by-step installation instructions
- Three-year limited warranty



SJE Rhombus

PO Box 1708, Detroit Lakes, MN 56502
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1-218-847-4617 Fax

email: sje@sjerhombus.com

www.sjerhombus.com