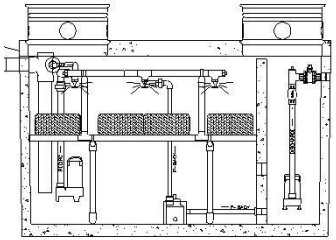
Installation Manual
SeptiTech® Residential System CONCRETE TANK
Equipment and Components
9-8-14

System Components Supplied by SeptiTech

1. SeptiTech Processor (STAAR 0.5, STAAR 0.75, STAAR 1.0) in concrete tank with pre-installed equipment.

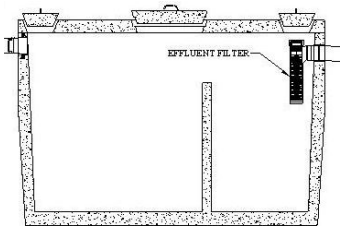


2. NEMA 4X rated Controller with built-in alarm functions and wiring diagram for licensed electrician to install and connect.

3. Pump-back "Tee" (4" x 4" x 2") with 1-1/2" bushing for Schedule 40 pipe.

4. Air Intake

5. Two-compartment (2/3-1/3) Septic Tank (when called for in contract. Otherwise supplied by contractor).



System Components Supplied by Contractor

Piping

a. 4-inch, Schedule 40 PVC for inlet piping and connection between Septic Tank and Processor.

b. 2-inch, Schedule 40 PVC for airlines, piping and fittings,

c. 1-1/2" Schedule 40 PVC for pump-back line. (Also acceptable is 160/200 psi PE with appropriate fittings

d. 2" Schedule 40 PVC for pump-back line. (Also acceptable is 160/200 psi PE with appropriate fittings

Electrical

a. Wire: #14 AWG minimum, THHN, THWN or TFFN (per Code)

b. 1-inch PVC electrical conduit

c. Two (2) 110-volt circuits, one (1) 15-amp and one (1) 20-amp for most applications. (A 220-volt circuit may be required for systems that require a large discharge pump).

Insulation

a. 2-inch rigid foamboard insulation to cover upper half of Processor, air and water lines in cold climates. (Refer to Cold Climate Installation Recommendations on Pages 13-14)

Stone, Fill, Loam, Seed etc.

Important Notes

A. SeptiTech is not responsible for design or installation of disposal field.

B. Where saturated soil or high seasonal high water tables are indicated between the bottom of the tank and the ground surface, immediately fill tanks to levels specified on Page 9.

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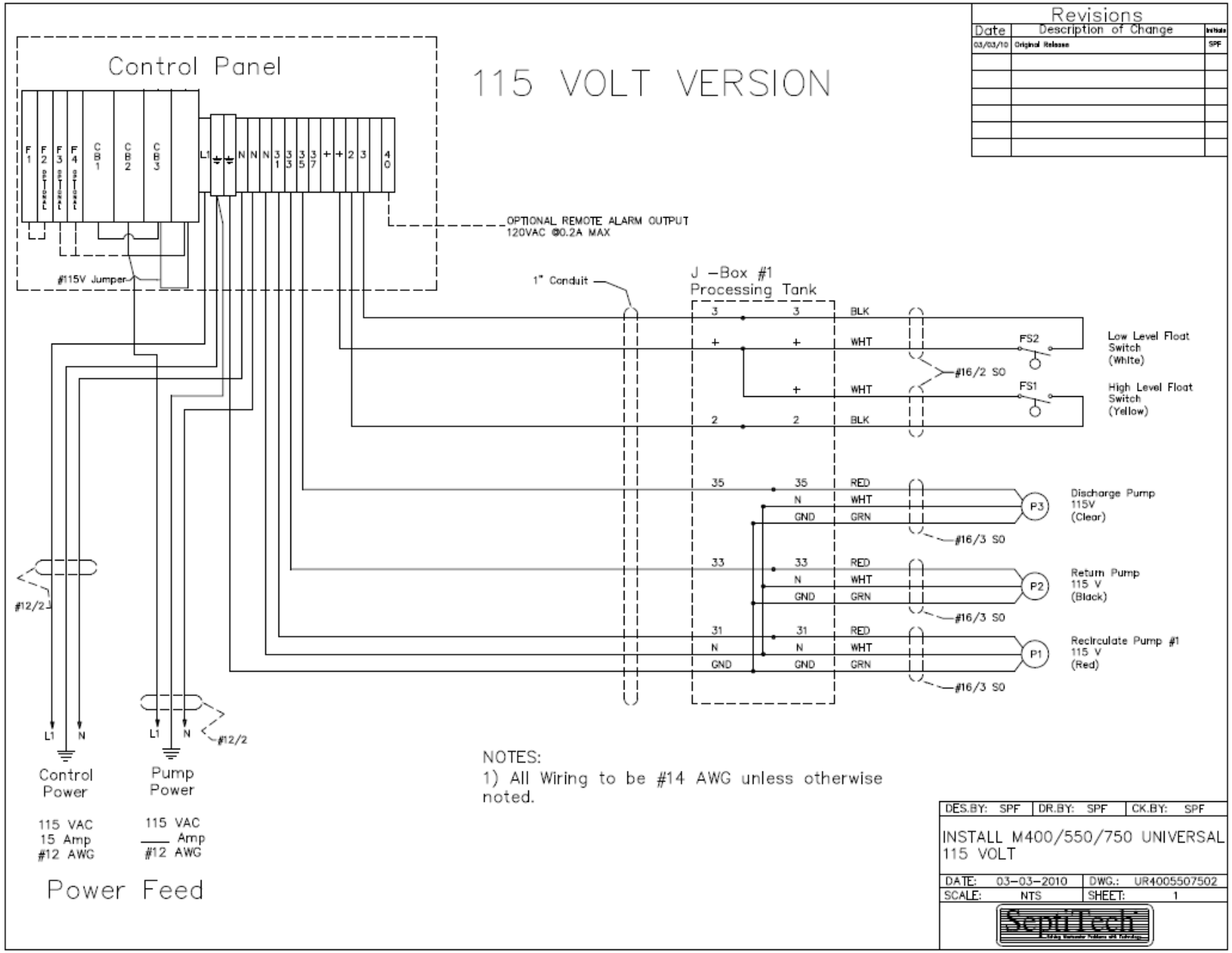

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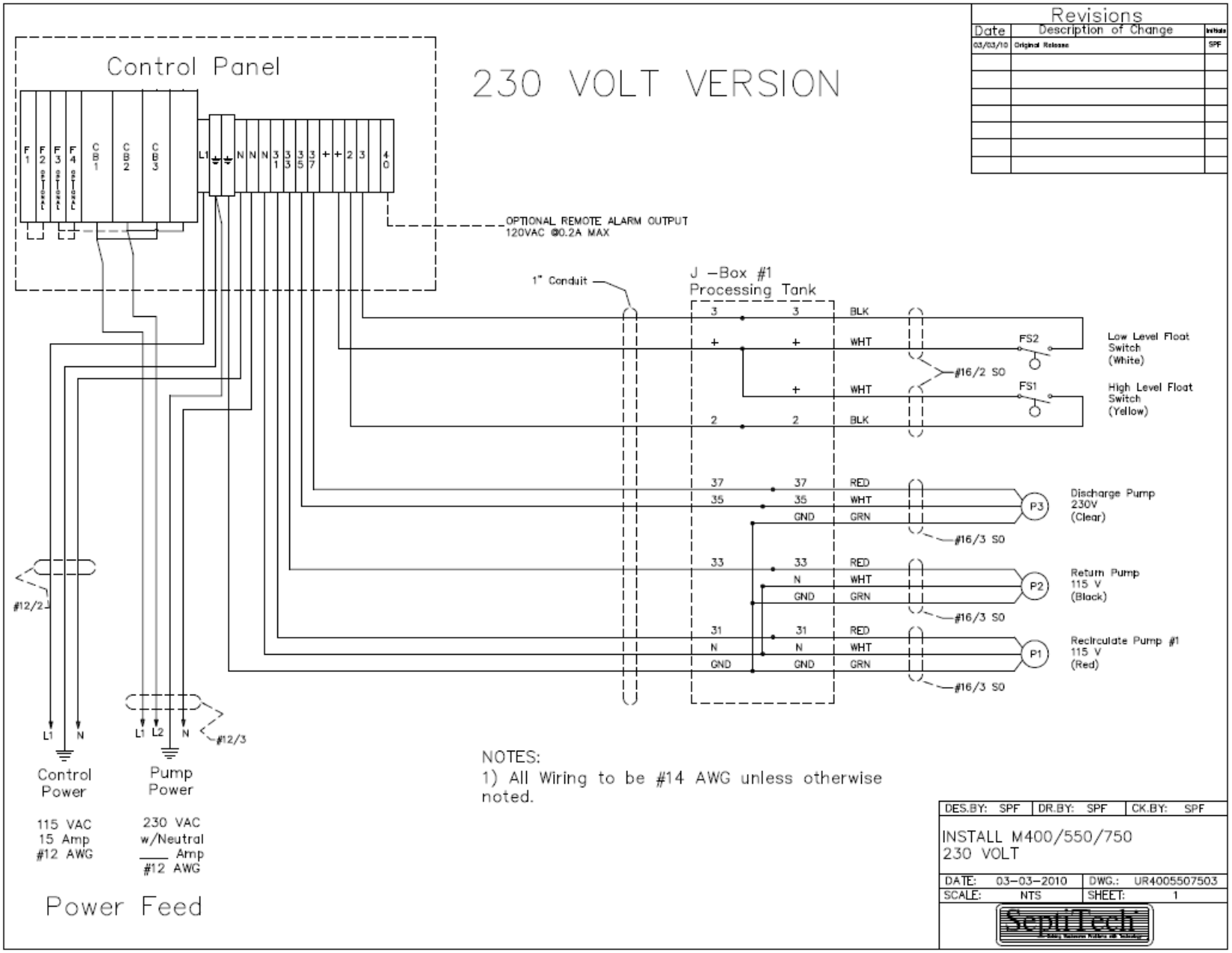
SeptiTech Residential System CONCRETE TANK
Wiring Schematics – 230 Volt Install



Installation Manual
SeptiTech Residential System CONCRETE TANK
Off-loading and Unpacking

Offloading and Pre-Installation Procedures

1. Inspect tank(s) for any damage during transportation.

2. Remove SeptiTech Processor access lids to be sure there is no obvious internal damage. (eg. broken PVC piping). Re-secure lids.

3. Set SeptiTech Processor as level as possible. (Maintain adequate pitch between septic tank outlet and SeptiTech Processor inlet invert – a minimum of ¼" pitch per foot).

4. Secure the Controller, Air Intake Pipe and Pump-back "Tee" in a safe, protected area until build-out and installation.

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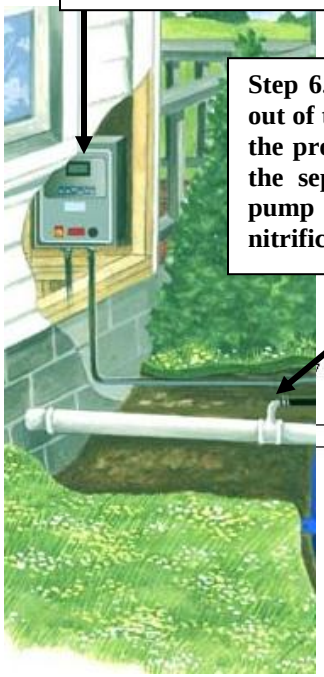
SeptiTech Residential System CONCRETE TANK
Process Overview

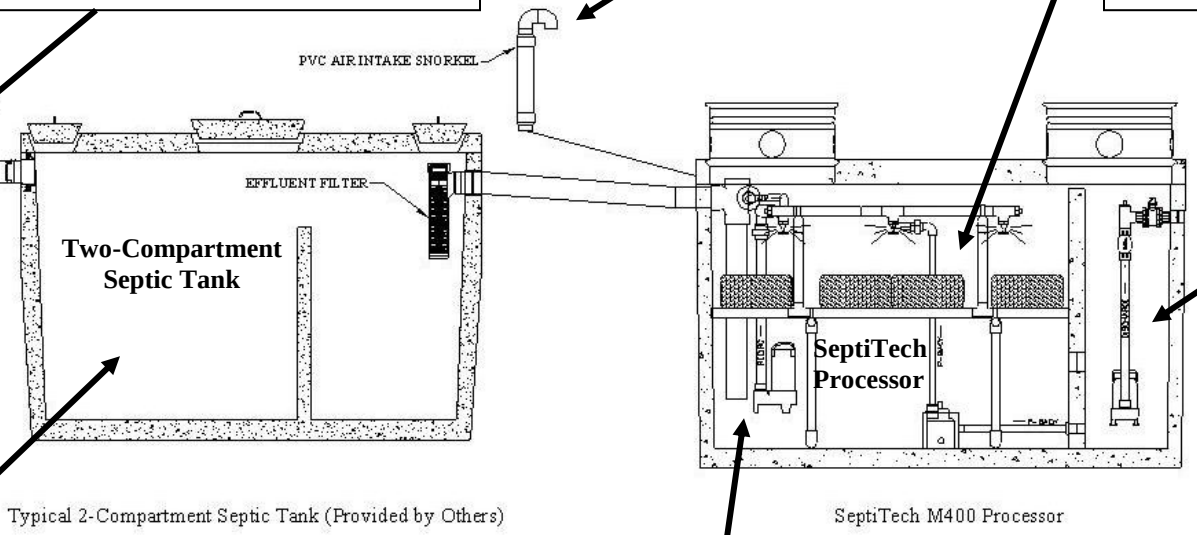
Step 3. When enough water enters the Processor, a float activates the treatment process, all phases of which are governed by the Programmable Logic Controller.



Step 6. Dead microbes and flock are washed out of the media pillows and into the bottom of the processor where they are pumped back to the septic tank via a Pumpback Tee. This pump back process also assists with the de-nitrification process

Step 5. Microbes also require oxygen to live, and fresh air from the outside is drawn in during the recirculation process through the Air Intake Snorkel.

Step 4. During trickling filter processing, wastewater is repeatedly sprayed over and trickles through the "filter media," which offers an ideal living environment for millions of colonies of nutrient consuming microbes to grow, reproduce and consume waste. In cooler climates (see page 13), the Processor is insulated to help maintain processor heat, which is conducive to efficient microbe growth.



Typical 2-Compartment Septic Tank (Provided by Others)

SeptiTech M400 Processor

Step 7. After treatment by microorganisms in the media, the clean effluent flows to a decant chamber where it is pumped to the leach field in frequent and measured doses to maximize the absorptive surface area in the leach field

Step 1. Wastewater flows from the house to the 2-compartment Septic Tank. Solids settle. Grease floats. Anaerobic (without oxygen) decomposition begins.

Step 2. Liquid effluent from the septic tank then flows to the SeptiTech Processor where it mixes with a treated water reservoir in the base of the tank.

Installation Manual
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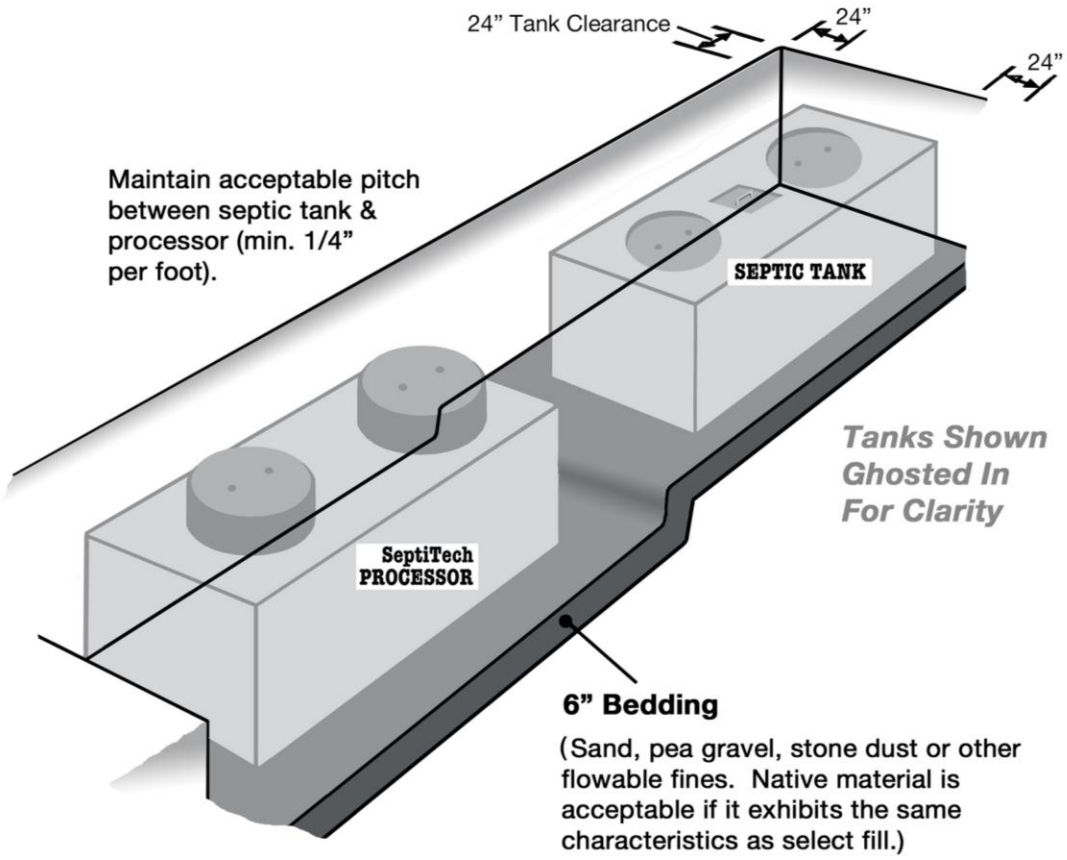
Installation Requirements

Access Ports on SeptiTech Processor	Must be no more than 24" from lid to top of tank. (This is necessary for service access).
Piping and Fittings	Schedule 40 or Schedule 80 PVC, or 160/200 psi PE hose are all acceptable
Electric Power	For most residential applications, two (2) 110-volt circuits, (one 15-amp for the controller/alarm and one 20-amp for the pumps are required. Larger discharge pumps may require one 220-volt, 20-amp circuit)
Electrical (Other)	Wire size: #14 AWG minimum. Wire type: THHN, THWN or TFFN. Wire Conduit: 1" PVC (All electrical work to comply with local and National code)
Ventilation	If Septic Tank is fed via pump station, or for some reason tanks cannot vent freely up house vent pipe, a separate air vent in septic tank must be installed.
Insulation (cooler climates)	2" rigid foamboard insulation (R-21 insulating value) over upper half of tank and over external piping.
Air Intake Protection	The air intake assembly must be at least 36" above grade.
Bedding	Tanks must be bedded in 6-inch bedding consisting of sand, pea gravel, stone dust or other flowable fines. Native material is acceptable if it exhibits the same characteristics as select fill.
Slope	Tanks must be installed in a level position with final grade sloped away from access ports to divert water.
Start-Up	SeptiTech system start-up must be completed or overseen by SeptiTech certified personnel.

Installation Manual
SeptiTech Residential System CONCRETE TANK
Installation Procedure – Step 1. Site Preparation

- Identify and mark tank excavation location. The excavation should be sized with at least 24 inches around tanks and 6 inches below tank to allow for proper backfilling.
- Step Processor tank down to achieve required pitch.
- Installer shall comply with all federal, state and local regulations.
- Standard tanks are not rated for vehicular traffic, unless an H-20 rated tank is specifically ordered.
- Verify no underground utilities or pipes are located in the elevation vicinity.



Installation Manual
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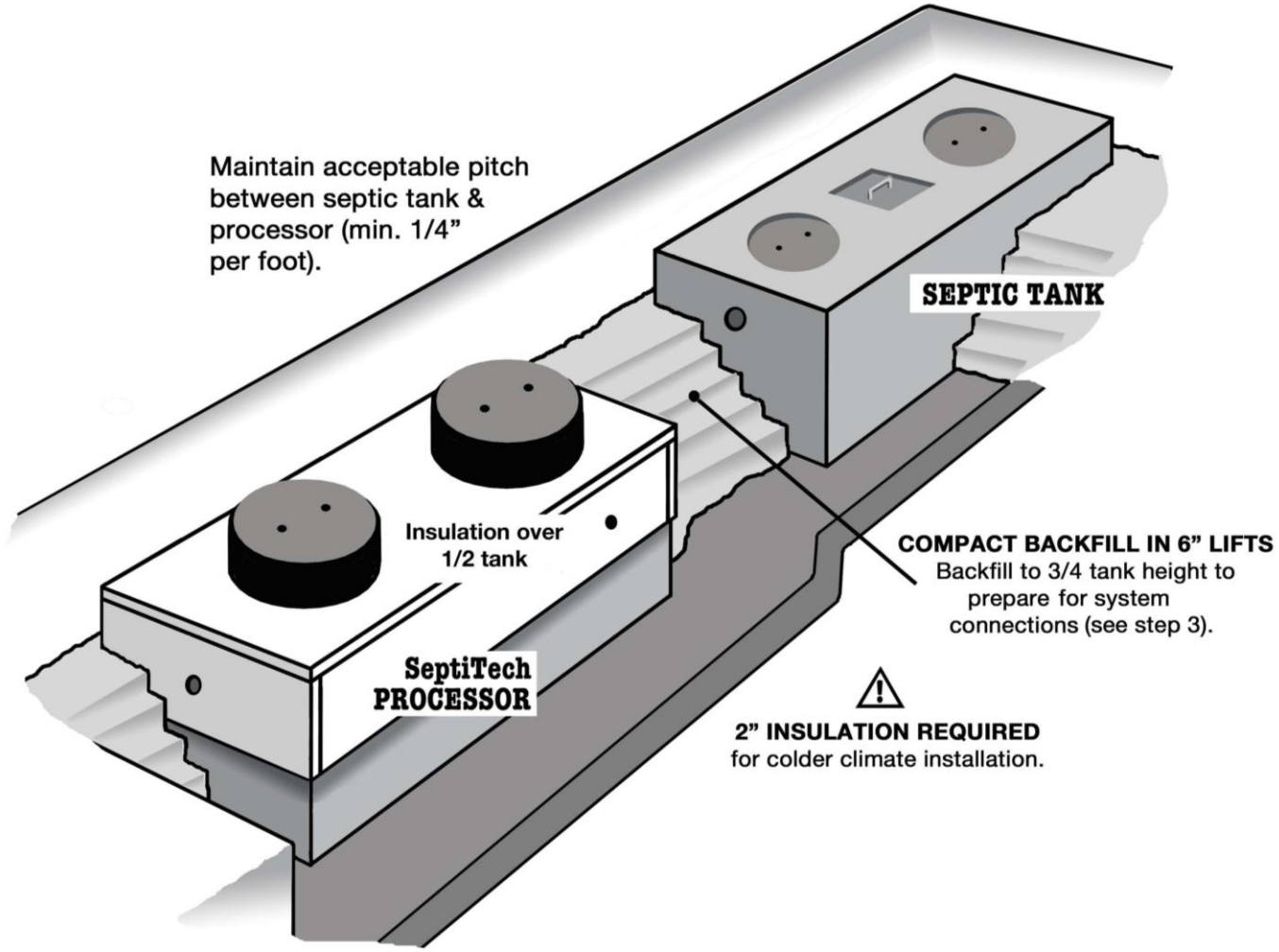
Installation Procedure – Step 2. Set and Partially Backfill Tanks

- Ensure both Septic Tank and Processor Tank are level.
- Use 2-inch rigid foamboard insulation (R-21 insulating value) to cover upper half of Processor, air and water lines in cold climates. (Refer to Cold Climate Installation Recommendations on pages 13-14)
- Following backfill, fill SeptiTech Processor tank with clean water to level just below the PVC platform (about 1/3 full). Fill Septic Tank to outlet invert.
- In high groundwater areas, fill both tanks immediately to levels specified above.



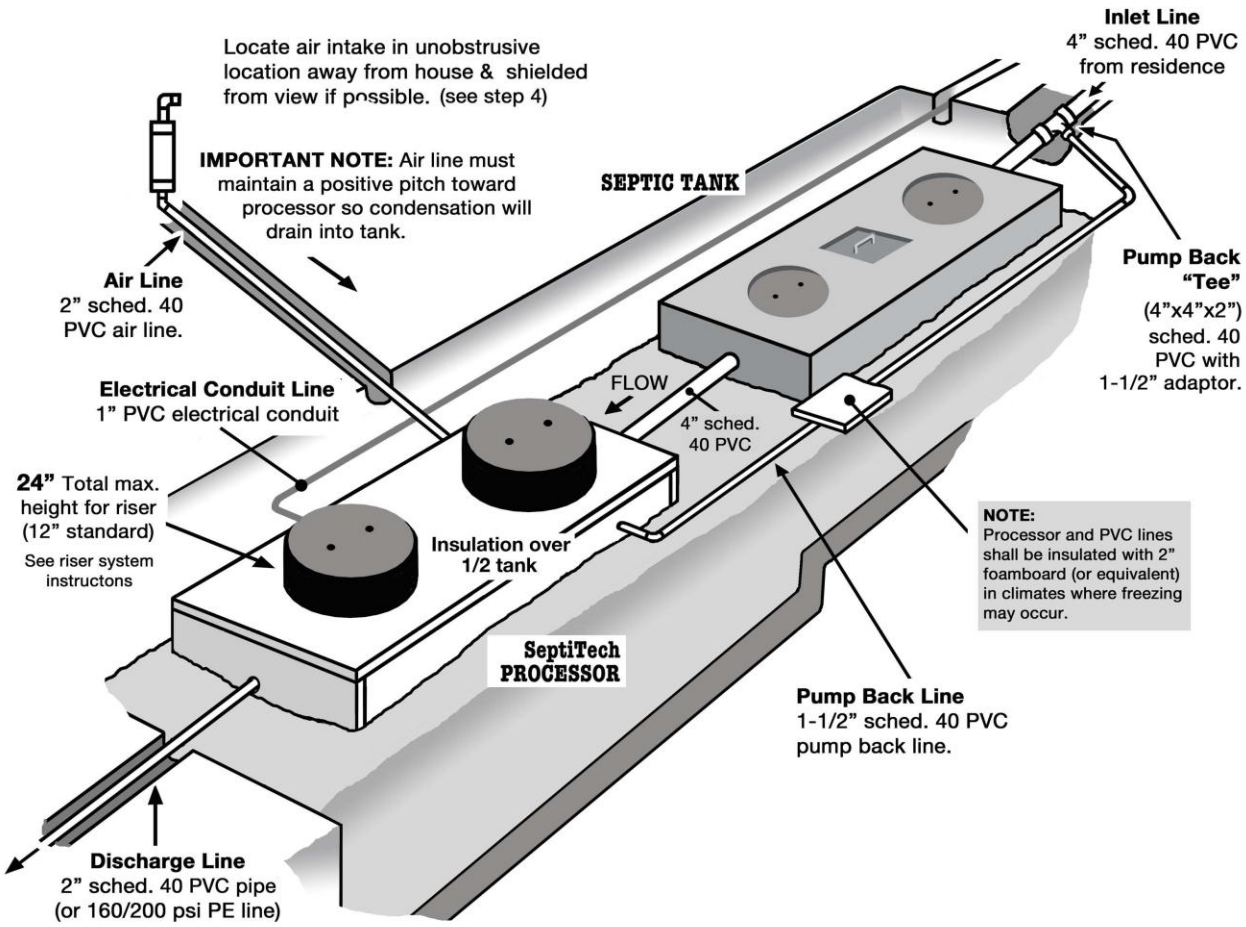
Installation Manual
SeptiTech Residential System CONCRETE TANK
Installation Procedure—Step 3, Make System Connections

- **Important Note**: If Septic Tank is fed via pump station, or for some reason tanks cannot vent freely up house ventpipe, install a separate vent in septic tank or septic tank inlet line.

- Compact soil beneath all exterior piping for support.

- Use 2-inch rigid insulation. Overlap butt joints over external piping.

- Mount Controller in protected heated area (maintain operational temp minimum of 50˚) or contact SeptiTech for installation of panel heater. (Panel is NEMA 4X rated for outdoor mounting if necessary).



Installation Manual
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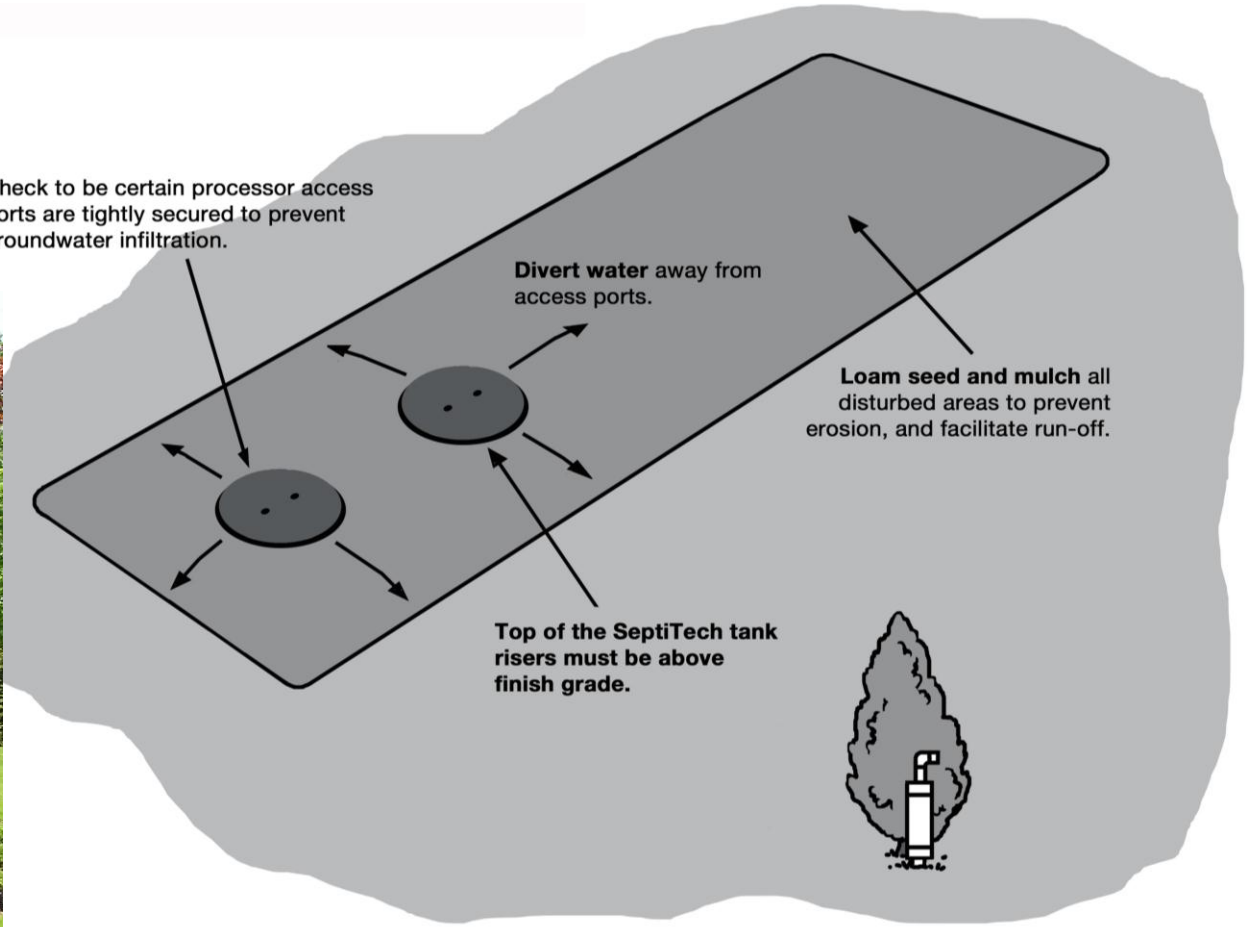
Installation Procedure—Step 4, Final Site Preparation

- Please contact your SeptiTech representative for final testing and start-up.

- Be certain clean water is in tanks and Controller is mounted and wired.



1. The SeptiTech processor depends on the activity of bacteria in order to effectively treat the wastewater. Temperature has an affect on this activity in that colder temperatures will slow the bacterial growth and thus the efficiency of the treatment process. Therefore, it is recommended that in cold weather regions that the SeptiTech processor tank be insulated using 2-inch thick rigid foam board insulation (R-21 insulating factor) across the top of the tank, within the access hatches (is applicable), and halfway down the sides of the tank. This will help to capture as much heat as possible from the processor in order to maximize bacteria activity.

2. The SeptiTech processor uses multiple pumps in order to accomplish various tasks. Therefore, there are several external pipes to the system that have the potential for freezing in cold weather climates. These pipes include the following:

   - Solids pump-back pipe from the processor back to the head of the primary septic tank
   - Discharge pipe from the processor out to the disposal field
   - Denite recycle pipe (if applicable) from the processor to the head of the primary septic tank.

   In order to aid in the prevention of freezing of these pipes, SeptiTech recommends the following:

   - Install the piping below frost level (typically 4-feet minimum) in order to get the pipe out of the freezing zone of the earth.
   - Install rigid 2-inch foam board insulation (R-21 insulating factor) 6-inches above the top of the pipe in order stop the penetration of the frost level into the ground. Do not install the insulation directly over the top of the pipe. Make sure that there is a 6-inch buffer between the top of the pipe and the bottom of the insulation.
   - If the 4-foot depth can not be met due to constraints such as ledge, then the use of 2-layers of rigid insulation should be used in order to account for this.
   - Backfill the pipe with proper fill material (crushed stone or select compact fill).

   Figure 1 (page 14) shows a typical pipe trench installation detail for forcemains that should be followed for cold weather climate installations:

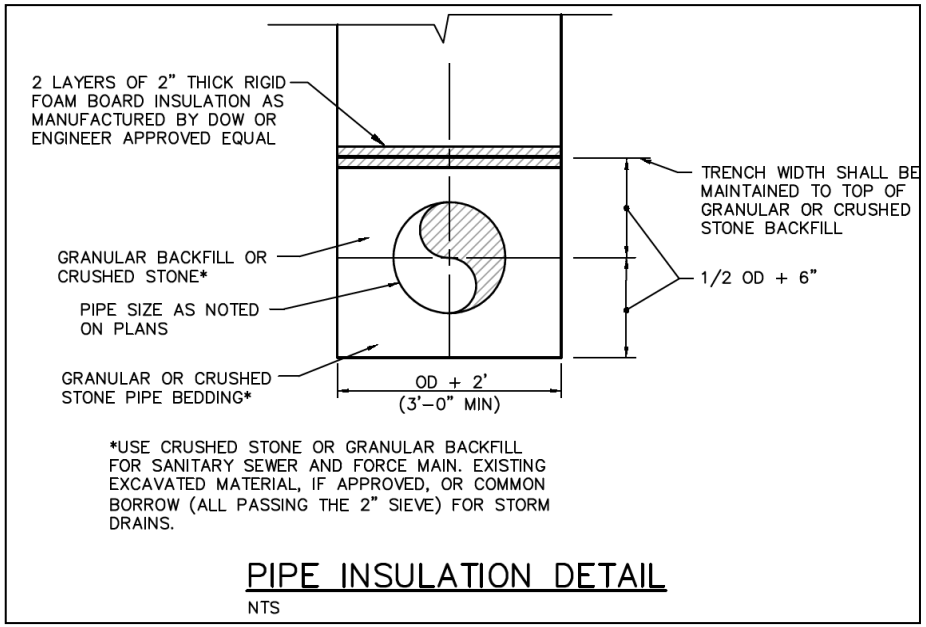
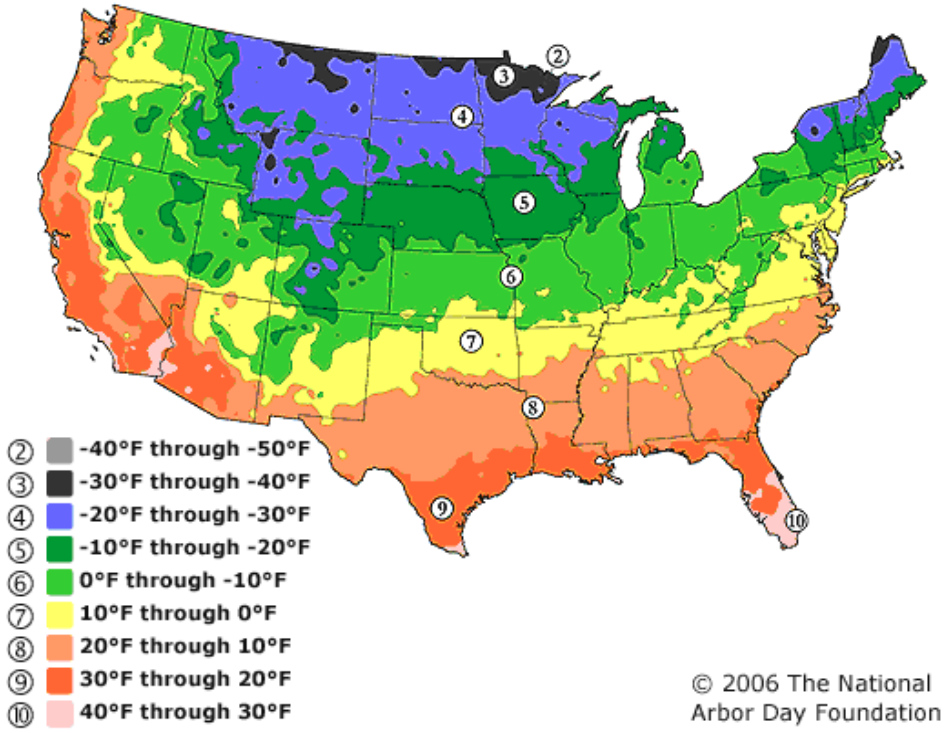


Figure 1: Typical Force Main Installation Detail



3. **Cold Weather Climate:** SeptiTech recommends following the USDA Plant Hardiness Zone Map as an indication of "cold weather climates". Installation of the SeptiTech processors within USDA Zones 3-6 should be considered "cold climates". A sample map of the USDA Zones from the National Arbor Day Foundation is provided below. Further information can be obtained at www.usna.usda.gov/Hardzone/ushzmap.html